

INFLUENCE OF COMPUTERIZED PHYSICIAN ORDER ENTRY INTERVENTIONS ON PROTON PUMP INHIBITOR

Haya Abu-Seir*, PharmD; Renee Paxton, PharmD, BCPS; Michelle Dehoorne-Smith, PharmD; Pramodini Kale-Pradhan, PharmD
St. John Hospital and Medical Center, 22101 Moross Road, Detroit, MI, 482362148
h.abuseir@gmail.com

Purpose: Proton pump inhibitors (PPIs) are often included in an institution's electronic order sets (EOS); many lacking an indication for use. At our institution, inappropriate PPI use is estimated at 53%, of which 21% were initiated through EOS. Untoward effects of PPI use, including the increased incidence of *Clostridium difficile* infections (CDI) have propelled optimization of PPI use. Additionally, there is paucity of data assessing untoward effects of electronic order sets on PPI utilization. This analysis is designed to assess the influence of EOS on PPI utilization. A secondary outcome of CDI incidence in patients receiving PPI will also be assessed.

Methods: This is a single-centered quality improvement project with a quasi-experimental design evaluating 400 adult patients receiving PPIs prior to and following institutional interventions implemented to minimize inappropriate PPI utilization. PPI limiting interventions include (1) removal from EOS lacking an indication for use; (2) creation of an electronic form visible at the time of prescribing for IV pantoprazole requiring documentation of indication; and (3) education in the form of a reference card and a letter outlining the aforementioned changes to prescribers. Patients receiving PPIs prior to admission, concomitant H2RAs antagonists during admission, or having a diagnosis of CDI on admission or in the preceding three months will be excluded. Data collection includes: PPI agent, therapy duration and dosing, origin of PP order (EOS vs a la cart), and indication. CDI testing results, antibiotic use and immunosuppressive conditions or medications will also be collected.

Results and Conclusions: Will follow data collection and analysis.

Learning Objectives:

Describe appropriate indications for proton pump inhibitors

Identify potential consequences of PPI overuse secondary to standing order forms

Self Assessment Questions:

Which of the following is an inappropriate indication for pantoprazole?

- A: *H. pylori* infection (peptic ulcer disease)
- B: Zollinger-Ellison syndrome
- C: Lower GI bleed
- D: Gastroesophageal reflux disease

PPIs, particularly chronic use, could cause which of the follow

- A: Chronic cough
- B: Cirrhosis
- C: Dysphagia
- D: *C. difficile* infections

Q1 Answer: C Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5

PROCALCITONIN-GUIDED ANTIMICROBIAL THERAPY IN THE TREATMENT OF LOWER RESPIRATORY TRACT INFECTIONS

*Thomas S. Achey, Pharm.D.; Angela Huang, Pharm.D, BCPS; Sarah Schulz, Pharm.D, BCPS; Matthew Stanton, Pharm.D., BCPS; Njeri Wainaina, M.D.; Adrian Umplierrez de Reguero, M.D.; Kelsey Hawkins; Sara Revolinski, Pharm.D., BCPS

Froedtert Hospital, 9200 W. Wisconsin Ave., Department of Pharmacy, Milwaukee, WI, 53226
thomas.achey@froedtert.com

Purpose: Overutilization of antimicrobials is a common occurrence in healthcare today. It has been shown to cause unnecessary toxicity to patients as well as selection for resistant organisms. Multiple strategies have been employed to assist providers with optimizing antimicrobial therapy for the treatment of infectious diseases. The use of biomarkers to aid in clinical decision-making is one such strategy. One of the biomarkers that has been studied for this purpose is procalcitonin (PCT) an endogenous hormone precursor released into the bloodstream during bacterial infection. The utility of PCT has been well-documented in the setting of lower respiratory tract infections (LRTIs), where levels have been used to determine whether initiation of antibiotic therapy is necessary and when de-escalation or discontinuation of antimicrobial therapy may be possible. The purpose of this retrospective, non-randomized, pre-post quasi-experimental study is to examine the effect of PCT on the duration of antimicrobial therapy for LRTIs.

Methods: Froedtert & the Medical College of Wisconsin has developed a treatment guideline outlining how PCT may be employed in the treatment of LRTIs. The pre-intervention group will include all patients admitted with a LRTI from November 1, 2013 to January 31, 2014, prior to the implementation of our institution-specific PCT treatment guideline. The post-intervention group will be studied during the same time frame of the subsequent year. The primary outcome will be the number of days of antibiotic exposure for the treatment of LRTIs. Secondary outcomes, such as length of stay, 30-day hospital readmission, 30-day all-cause mortality, and medication costs, will also be assessed.

Results & Conclusion: Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the procalcitonin (PCT) assay and highlight its clinical role in guiding antibiotic therapy in patients with lower respiratory tract infection. Discuss the utility of procalcitonin assays to presently available biomarkers

Self Assessment Questions:

Procalcitonin may be used to guide antimicrobial therapy in the following conditions:

- A: Community acquired pneumonia
- B: Urosepsis
- C: Osteomyelitis
- D: A & B

Procalcitonin should be interpreted cautiously in the following population

- A: Osteoarthritis
- B: End stage renal disease
- C: Sepsis
- D: Influenza

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-300-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A COMPARISON BETWEEN PHARMACISTS PERCEPTIONS OF PATIENTS EDUCATIONAL NEEDS WITH PATIENT PERCEPTIONS IN THREE INDEPENDENT COMMUNITY PHARMACIES.

*Jeffrey A Ackerman PharmD, Lisa M Meny PharmD
PGPA Pharmacy, 3544 Meridian Crossing Drive, Suite
120, Okemos, MI, 48864
jeffrey.ackerman.pharmd@gmail.com

Purpose: To determine the pharmacy based educational needs of a patient population as perceived by patients and pharmacists.
Methods: A brief survey will be administered by pharmacy staff at three independent community pharmacies to patients (or caregivers) and staff pharmacists assessing patient needs for pharmacy based education. Staff pharmacist surveys will be completed prior to the initiation of patient data collection at each location. All patients (or caregivers) over 18 years of age consenting to complete a survey during prescription pickup will be included. Patients (or caregivers) who do not consent or do not come into the pharmacy to pick up a prescription during the data collection period will be excluded. Surveys will be administered over a 3 month period for patients and caregivers. All pharmacists that participate in the dispensing process at the initiation of the study period will be included. Paper based surveys will be provided by pharmacy staff at the time of prescription pick up and completed by patients or caregivers.
Results: No results have been collected to date. Results will be presented at the conference.
Conclusions: Conclusions will be presented at the conference.

Learning Objectives:

Recognize why pharmacists are an appropriate healthcare professional to educate patients on medications and disease states.
Explain why pharmacy based educational services could be helpful to patients.

Self Assessment Questions:

Which of the following is a reason pharmacists are an appropriate healthcare professional to educate patients?

- A Pharmacists are routinely reimbursed for educational services.
- B: Pharmacists can explain disease states better than doctors.
- C: Pharmacists are the most accessible healthcare professional.
- D: Pharmacists know the most about disease states.

Which of the following is a reason to educate patients about their disease states?

- A A patient could learn about lifestyle modifications to improve his or
- B A patient could teach the doctor how to manage his or her disease
- C A patient could monitor and adjust his or her own medications.
- D A patient could manage the care of others with the same disease :

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-712-L04-P
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IMPLEMENTATION OF A QUALITY ASSURANCE PROGRAM FOR CLINICAL PHARMACY SERVICES

Maria Renee Advincula, PharmD* and Amber Meigs, PharmD, BCPS
NorthShore University HealthSystem, 2650 Ridge
Avenue, Evanston, IL, 60201
madvincula@northshore.org

Purpose:
Quality indicators are used as an approach to help improve services provided within an organization. This enables employees to uphold standards and organizational priorities, measure progress, and allows for improvement opportunities. Within our health system, there is no standardized method to determine how well a pharmacist performs clinical pharmacy services. Managers have variable processes for evaluating their employees clinical skills. The purpose of this project is to create a system that helps managers to assess the quality of clinical services provided by their staff in a standardized way.

Methods:
A survey was conducted to determine how managers performed quality assurance audits and assessed their satisfaction with resources used to perform audits. A project taskforce was formed in order to achieve project goals. The taskforce consisted of a clinical pharmacy manager, PGY2 health system pharmacy administration resident, and Assistant Vice President of Pharmacy Services. The taskforce met with the Clinical Pharmacy Services Committee to determine which clinical pharmacy services provided would be appropriate to include in the project. The taskforce reviewed pharmacists responsibilities for measurable data, auditable and feasible tasks that could be performed by a manager. A data collection tool was created and approved by clinical pharmacy managers. Managers will use the tool to assess pharmacy services performed by each of the pharmacists between January through March 2015. Initial feedback on the audit tool will be obtained in February 2015 and enhancements will be made accordingly. Post-implementation evaluation of the tool will be performed by pharmacy managers for further improvements to meet future assessment needs.

Results/Conclusion:
Collection of information is currently in progress. Final results and conclusions will be presented at the Great Lakes Residency

Learning Objectives:

Outline the process for developing and implementing a tool to perform quality assurance on pharmacy clinical services
Identify potential barriers/limitations of implementing a pharmacist audit tool

Self Assessment Questions:

What can be considered as a limitation for implementation of the quality assurance audit tool?

- A Pharmacy managers will utilize tool to perform timely audits
- B: Not all clinical services performed by pharmacist are assessed by
- C: The tool is electronic and organized
- D: Pharmacy managers have a process for assessing clinical service

Quality indicators used within a pharmacy department enables employees to:

- A Help improve pharmacy services provided within an organization
- B Prevent managers from measuring staff progress
- C Prohibit benchmarking opportunities
- D Impede employees from upholding standards and organizational p

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-713-L04-P
Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY AND SAFETY OF CURRENT HEPATITIS C TREATMENT UTILIZING SOFOSBUVIR AND/OR SIMEPREVIR CONTAINING REGIMEN IN A VETERAN POPULATION - A RETROSPECTIVE CHART REVIEW

Mayowa Agbaje-Williams, PharmD MPH*; Hong Lam, PharmD; Lisa Rene-Young PharmD BCPS AQ-ID; Molly Heneghan PharmD BCACP
Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Avenue, Chicago, IL, 60612
mayowa.agbaje-williams@va.gov

Purpose

Hepatitis C virus (HCV) infection affects approximately 1.3% of the United States population. About 75-85% of patients become chronically infected with this virus, which can lead to complications including end stage liver disease and hepatocellular carcinoma. Historically, interferon (IFN) based regimens were the backbone of HCV treatment. However, significant side effects have precluded treatment in patients with psychiatric issues, autoimmune diseases, hepatic decompensation, cardiac disease, anemia and thrombocytopenia.

In December 2013, sofosbuvir (SOF) and simeprevir (SMV) were approved by the Food and Drug Administration (FDA) for treatment of HCV infection. This approval prompted the American Association for the Study of Liver Diseases (AASLD) to release new guidelines for the treatment of HCV that included, for the first time, SOF and SMV with or without ribavirin as non-IFN regimens. These agents have fewer side effects compared to IFN-based regimens and clinical trials data report cure rates up to 90% in genotype 1 patients.

In early 2014, our institution began treating many patients who required an IFN-free regimen with SOF and SMV combination.

Objective

The purpose of this study is to evaluate treatment response and safety of the current anti-HCV regimens based on the 2014 AASLD HCV treatment guidelines.

Methods

This is a retrospective chart review of patients who received HCV treatment from January 1, 2014, to September 30, 2014. Patients will be identified via electronic search of our institutions computerized patient record system. The primary endpoint is sustained virological response (SVR) 12 weeks after the end of treatment. Secondary endpoints will evaluate response rates across pre-specified subgroups including treatment naïve, treatment experienced (including null responder and prior relapsers), compensated and decompensated cirrhosis.

Results and Conclusion

Results and conclusion will be presented at the 2015 Great Lakes Pharmacy Residency Conference taking place from April 29 - May 1, 2015.

Learning Objectives:

List 3 limitations of interferon based regimens

Describe the rationale for use of new anti-HCV regimens

Self Assessment Questions:

The following are co-morbidities that preclude the use of interferon-based regimen EXCEPT

- A: Decompensated hepatic disease
- B: Hypertension
- C: Major depressive illness
- D: Autoimmune disorders

Which of the following is NOT an advantage to using the newer anti-HCV regimen

- A: Increase in sustained viral response rates
- B: Improved safety profile
- C: Minimal drug interactions
- D: Minimal treatment cost

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-301-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

REDESIGN OF ENTERPRISE-WIDE PHARMACY SERVICES TO ADVANCE PATIENT CARE ACROSS THE CONTINUUM (PART I: INPATIENT)

Maria Luz A. Ajami, PharmD, MS Candidate*; Jordan Rush, PharmD, MS Candidate; Dave Hager, PharmD, BCPS; Joe Cesarz, PharmD, MS; Michelle Thoma, PharmD, BCACP; Kate Hartkopf, PharmD, BCACP; Philip Trapskin, PharmD, BCPS; Steve Rough, MS, RPh, FASHP
University of Wisconsin Hospital and Clinics, 600 Highland Ave, Mailcode 1530, Madison, WI, 53792
majami@uwhealth.org

Purpose

Pharmacy services at the University of Wisconsin Hospital and Clinics (UWHC) have grown over the past 40 years, predominantly in the inpatient care setting. Post-discharge coordinated care for UWHC patients has not been aligned between acute and ambulatory care settings. The growing need for coordinated care across the continuum has provided the stimulus for evaluating the inpatient pharmacy practice model in order to maximize value, improve quality, and enhance the patient experience.

The primary objective for this project was to optimize value-based practice activities across care settings through designing, piloting, and evaluating an idealized pharmacy practice model.

Methods

The Redesign of Enterprise-wide Pharmacy Services Continuum of Care Committee (REPS-CCC) was developed in July 2014 to oversee the project. This committee was co-chaired by the project investigators and comprised of pharmacists and patient advocates. The REPS-CCC met during three, eight-hour workshops in fall 2014. Project investigators created a repository of idealized design pharmacy practice statements from best practices identified in the literature and provided by pharmacy experts. In August 2014 the REPS-CCC reviewed and approved the statements. Thereafter, a gap analysis was performed to assign a value to each statement and compare each to current practices. The REPS-CCC further condensed and prioritized these statements based on the calculated value, perceived value, and identified gaps. Prioritized statements were used by the REPS-CCC to create an idealized practice model across all care settings. In winter 2015, this model will be piloted in various areas. Metrics for success will be developed prior to piloting, and results will be analyzed to determine the feasibility of a system-wide rollout. Outcomes to be evaluated include patient experience, patient outcomes, staff satisfaction, and productivity metrics.

Results

Expected results include idealized pharmacy practice statements, a value-based gap analysis of current practices, recommendations for a redesigned value-based practice model, and a strategic plan for enterprise-wide implementation.

Learning Objectives:

Explain the purpose of using idealized design principles in the creation of an ideal pharmacy practice model

Identify the components of a gap analysis and describe their purpose

Self Assessment Questions:

Initial idealized design statements were created WITHOUT which of the following in mind?

- A: Supporting literature
- B: Expert opinion
- C: Feasibility limitations
- D: All of the above

The purpose of this gap analysis was to compare the idealized design pharmacy statements with which of the following

- A: Supporting literature
- B: Other institution best practices
- C: Pharmacy expert opinion
- D: Current practices

Q1 Answer: C Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF ORAL ANTIPSYCHOTIC SUPPLEMENTATION OF LONG-ACTING ANTIPSYCHOTIC INJECTIONS IN AN ACUTE-CARE PSYCHIATRIC SETTING

Jennifer N. Alastanos*, PharmD; Chris Paxos, PharmD, BCPP, BCPS, CGP; Jessica L. Boss, PharmD, BCPS, CGP

Akron General Medical Center, 1 Akron General Avenue, Akron, OH, 4430
jennifer.alastanos@akrongeneral.org

Purpose:

Long-acting antipsychotic injections are often prescribed in an effort to increase adherence in patients with schizophrenia known to have poor adherence to oral therapy. The United States Food and Drug Administration approved dosing for aripiprazole, risperidone, and paliperidone has specific recommendations for oral antipsychotic supplementation when initiating long-acting injections. Antipsychotic polypharmacy may result from failure to discontinue oral antipsychotics. Furthermore, sub-therapeutic levels of the antipsychotic may occur if oral supplementation is not continued during the recommended time frame, possibly leading to a decline in symptom control. Previous studies concluded rates of co-prescribing of oral and long-acting injections require further investigation. Therefore, the objective of this study is to describe the frequency of oral antipsychotic supplementation according to recommendations and to identify predictors of oral supplementation inconsistent with recommendations.

Methods:

This is an Institutional Review Board approved retrospective chart review of oral supplementation of long-acting antipsychotic injections. Pharmacy records were utilized to identify patients admitted to an inpatient psychiatric unit who received at least one dose of aripiprazole, risperidone, or paliperidone long-acting injection between December 2009 and November 2014. Exclusion criteria included age less than 18 years or pregnancy. Data collection included demographics, third party insurance, prescriber, psychiatric diagnoses, length of stay, long-acting injection, oral antipsychotic prior to initiation of long-acting injection, and total number of antipsychotics at discharge. The primary outcome is the percentage of patients receiving oral antipsychotic supplementation according to recommendations (new initiation or maintenance treatment and the percentage of patients receiving oral antipsychotic supplementation inconsistent with recommendations (oral supplementation less than recommendations, greater than recommendations, or during maintenance treatment). Secondary outcomes include identifying patient characteristics that increase likelihood of receiving oral supplementation inconsistent with recommendations.

Results/Conclusions:

Data analysis in progress with results to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss recommendations regarding oral supplementation of second-generation long-acting injectable antipsychotics.

Describe the potential impact of antipsychotic polypharmacy.

Self Assessment Questions:

What is the recommended time frame for oral antipsychotic supplementation after beginning treatment with aripiprazole long-acting antipsychotic injection?

- A 0 days
- B 10 days
- C 14 days
- D 21 days

Which of the following is a potentially negative impact of antipsychotic polypharmacy?

- A Decreased use of anti-parkinsonian agents
- B Improved quality of life
- C Increased adherence
- D Increased adverse effects

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-302-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING PRACTICES OF ANALGESIA AND SEDATION FOR MECHANICALLY VENTILATED PATIENTS AND ADHERENCE TO CURRENT GUIDELINES IN A COMMUNITY HOSPITAL SETTING

*Anthony Albani, Pharm.D., Jeffrey Yochum, Pharm.D., BCPS, Nadir Hinnawi, Pharm.D., Rahim Mohammadali, Pharm.D., BCPS

Wheaton Franciscan – St. Joseph Campus, 5000 W. Chambers St., Milwaukee, WI, 53210

anthony.albani@wfhc.org

Purpose:

Current guidelines for the management of sedation and analgesia recommend the use of protocols to aid in patient care in the intensive care unit. Currently, Wheaton Franciscan - St. Joseph Campus does not employ a comprehensive standardized protocol for the initiation and maintenance of analgesia and sedation for patients who are mechanically ventilated. Medical management of mechanically ventilated patients is facilitated by hospitalists, intensivists and pulmonologists. It is possible that the variety of providers and lack of institutional guidance contributes to variability in prescribing practices. Evaluating the clinical outcomes associated with current practices may aid in identifying specific areas where a clinical pathway may provide the most benefit.

Methods:

Wheaton Franciscan - St. Joseph Campus is a community teaching hospital with a 24-bed critical care unit. A retrospective chart review will take place for patients with an ICD-9 code for mechanical ventilation for the period from July 2013-June of 2014. Patients will be excluded for the following criteria: mechanical ventilation < 48 hours, death prior to discharge, requirement of a paralytic infusion, diagnosed with alcohol withdrawal, traumatic brain injury, cerebrovascular injury, or medication overdose. Patients included in the study will undergo a chart review to collect information about the management of sedation and analgesia while mechanically ventilated. Collected data will include patient age, gender, actual body weight, primary diagnosis, sedative and analgesic medications, total daily medication use (mg/day), Riker Sedation-Agitation Scale scores, Adult Nonverbal Pain Scale scores, percentage of time adequate analgesia achieved, percentage of time adequate sedation achieved, time mechanically ventilated, length of hospital stay, and incidence of delirium.

Results/Conclusions:

Data collection is currently in progress and a summary of available results will be presented at the Great Lakes Conference.

Learning Objectives:

Identify appropriate selection of medication used for sedating mechanically ventilated patients

Describe the types of assessment tools that may be used to monitor pain and analgesia in mechanically ventilated patients

Self Assessment Questions:

Which intervention is associated with improved clinical outcomes in mechanically ventilated patients?

- A Sedation strategies that employ benzodiazepines
- B The use of a pharmacologic delirium protocol
- C The use of objective measures of brain function
- D Maintaining light levels of sedation

Which is a valid pain assessment scale that can be utilized in mechanically ventilated patients?

- A Behavioral pain scale (BPS)
- B Pain assessment and intervention notation
- C Motor activity assessment scale
- D Any scale utilizing vital signs

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-303-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING A PHARMACISTS IMPACT TO PREVENT MEDICATION ERRORS DURING THE DISCHARGE PROCESS

Margaret Aldstadt, PharmD*, Margo Ashby, PharmD BCPS
Baptist Health Madisonville, 900 Hospital Drive, Madisonville, KY, 42431
margaret.alldstadt@bhsi.com

Statement of the purpose: Medication errors may occur at any transition of care. There is research that suggests pharmacist involvement during the discharge process can decrease the rate of 30-day hospital readmissions and emergency department visits. Institutions in these studies implemented several types of services, including medication reconciliation or screening, patient education, and post-discharge follow-up calls. The purpose of this study is to identify the number of medication errors a pharmacist can prevent for patients being discharged from the hospital to home, and to address medication-related problems that persist once the patient returns home.

Statement of methods used: Patients assigned to the Family Practice Residency Service at Baptist Health Madisonville will be selected between February and March 2015 for a prospective medication profile review. Prior to discharge, the patient profiles will be screened to determine the presence of any medication errors, including drug interactions, errors of omission, or therapeutic duplications. Assistance with discharge medication counseling will be performed. Two days after discharge, a pharmacist will conduct a telephone call in order to determine the presence of any medication-related problems. Finally, patient records will be reviewed to verify that a hospital follow-up visit with the primary care provider was completed. Data collection will include patients baseline demographics, diagnosis, number of medication errors identified, pharmacist interventions, and number of patients completing a follow-up visit. The results will be analyzed to determine the significance of the pharmacists interventions and the feasibility of justifying a pharmacist involvement in the discharge process.

Summary of (preliminary) results to support conclusion: Results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Identify potential gaps in transitions of care that could adversely affect patients during the transition from hospital to home.

Discuss the findings of previously published literature evaluating the effects of pharmacists interventions during the discharge process.

Self Assessment Questions:

Potential gaps in transitions of care that could adversely affect patients include which of the following?

- A: Failing to transfer a record of hospital stay to the patient's primary
- B: Faxing an updated medication list to the patient's pharmacy after c
- C: Providing patients with educational materials about new medicatio
- D: Reconciling medications with patients before discharge

Which of the following answers summarizes findings of the RED trial evaluating the effects of pharmacists interventions during the discharge process?

- A: Pharmacists did not identify a significant number of medication pr
- B: Intervention participants had a significantly lower rate of hospital u
- C: There was no difference in total cost between the two groups stud
- D: There was no statistical difference in the rate of PCP follow-up bet

Q1 Answer: A Q2 Answer: B

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Activity Type: Knowledge-based Contact Hours: 0.5

DAPTOMYCIN COMPARED TO VANCOMYCIN FOR THE TREATMENT OF OSTEOMYELITIS IN AN OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY SETTING: A RETROSPECTIVE STUDY

*Jason Val G. Alegro, Pharm.D., Jamie S Winner Baldus, Pharm.D., BCPS, AQ-ID

Veteran Affairs - Clement J. Zablocki Medical Center, 5000 W. National Avenue, Milwaukee, WI, 53295

jasonval.alagro@va.gov

Purpose: Historically, vancomycin has been the drug of choice for the treatment of osteomyelitis (OM), particularly because of the concern for methicillin-resistant staphylococcus aureus (MRSA) isolates. With questionable sustained efficacy and high recurrence rates within 12 months (30-50%), adverse effect profile, and the need for frequent monitoring, studies for alternative OM therapies are warranted. There have been limited studies evaluating daptomycin, a lipopeptide bactericidal antibiotic with MRSA coverage, for the treatment of OM. The primary objective of this study is to assess recurrence rates of OM in patients treated with vancomycin or daptomycin, specifically those part of the Zablocki Veterans Affairs Medical Center (ZVAMC) Outpatient Parenteral Antimicrobial Therapy (OPAT) program. Methodology: This study has been submitted to the Institutional Review Board for approval. Patients who received antimicrobial therapy with vancomycin or daptomycin with an ICD-9 code consistent with the diagnosis of osteomyelitis and enrolled in the ZVAMC OPAT program will be considered for inclusion into this analysis. Patients in both groups will be subsequently matched according to pre-specified criteria in a 1:1 vancomycin to daptomycin ratio. Patients with concurrent septic arthritis, orthopedic foreign body infection, less than 14 days of antibiotic therapy or absolute neutrophil count less than 500 cells/mm³ will be excluded. The primary outcome is recurrence rate of osteomyelitis, defined as re-diagnosis and re-treatment of osteomyelitis within 6 months after completion of initial antimicrobial therapy. Secondary outcomes include mean dose and duration of therapy, change in creatine phosphokinase (CPK), mean change in serum creatinine, and costs associated with both therapies. Results/conclusions: Will be presented at the Great Lakes Pharmacy Residency Conference pending data collection and analysis.

Learning Objectives:

Describe the advantages and disadvantages of using daptomycin over vancomycin for the treatment of osteomyelitis in outpatients.

Recognize adverse effects and drug-drug interactions associated with daptomycin therapy.

Self Assessment Questions:

Which of the following is an important consideration when starting someone in an outpatient setting on daptomycin versus vancomycin therapy?

- A: Daptomycin has significantly lower direct drug costs than vancomy
- B: Daptomycin is a once daily infusion whereas vancomycin is typica
- C: Daptomycin has increased recurrence rates of osteomyelitis comp
- D: Daptomycin requires drug level monitoring similar to vancomycin

Which of the following is true regarding adverse effects and drug-drug interactions associated with daptomycin?

- A: Daptomycin should be discontinued in patients with a CPK ≥ 10 tir
- B: Daptomycin should be discontinued in patients with a CPK ≥ 5 tim
- C: Daptomycin should not be used in patients on statin therapy as thi
- D: Daptomycin may still be used if a patient experiences drug rash wi

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-304-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING PERI-PROCEDURAL MANAGEMENT OF ANTI-THROMBOTIC AGENTS IN OUTPATIENT SURGERY CLINICS

Shally Alendry, PharmD*; Erika Smith, PharmD, BCPS; Jennifer Hardman, PharmD; Elizabeth Thimm, PharmD; Froedtert and the Medical College of Wisconsin, Milwaukee, WI

Froedtert Hospital, 740 W Wisconsin Ave, Apt # 101, Milwaukee, WI, 53233; shally.alendry@froedtert.com

There has been a rise in the number of outpatient procedures over the past few decades. As outpatient surgical procedures do not require pre-procedure hospitalization, it becomes necessary to develop an anti-thrombotic medication management plan and communicate it to the patients. Patients on anti-thrombotic medications are managed in various ways depending on the patients thromboembolic and bleeding risk factors as well as the procedures bleeding risk and provider preference. Determining the plan may require the involvement of multiple providers. Due to the variation in pre-procedural planning, the workflow process can be complex. If the management plan is not clearly communicated to the patient, this can lead to either cancellation or delay of procedure or bleeding adverse events if the procedure is performed. The goal of this project is to understand and define the current peri-procedural anti-thrombotic medication management workflow processes at Froedtert & the Medical College of Wisconsin (F&MCW) outpatient surgery clinics; in an effort to enhance patient service, satisfaction and safety along with reducing cost for adverse event management or procedure cancellation.

This is an observational, retrospective, single-centered, non-randomized, quality improvement intervention. Patients were selected if they took anti-thrombotic medications and had an outpatient surgery scheduled through the gastroenterology (GI), pulmonary and interventional radiology (IR) clinics. The study involved learning the different workflows of the three clinics. Patient data collection took place from October 1, 2014 to December 31, 2014. The primary objectives of this project are to determine the rate of bleeding and the rate of procedure cancellation. The secondary objectives of this project are to determine the rate of adherence of the outpatient surgery clinics to the F&MCW Center for Medication Utilization approved anti-thrombotic medication management guidelines. The data will be evaluated to recommend a best practice model.

Data collection and analysis is ongoing. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe the gaps in communication with the current workflow process of peri-procedural planning in outpatient surgery clinics.

List recommendations for how the workflow process can be improved to achieve a standardized process.

Self Assessment Questions:

What percentage of cancellation was seen in the month of November for the IR outpatient surgery clinic due to miscommunication related to anti-thrombotic medications?

- A: 28.6
- B: 19.2
- C: 34.5
- D: 5.6

What problem was discovered after reviewing the chart of a non-Froedtert patient who received thrombotic medications during the procedure that calls for improvement and standardization of workflow process?

- A: Two strengths of aspirin (81 mg and 325 mg) were listed in patient
- B: Medication reconciliation was not completed during pre-procedure
- C: Pre-procedure call was made 7 days prior to the procedure
- D: The patient's medications should not be managed as they are from

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-895-L05-P

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COMPARISON OF VANCOMYCIN DOSING IN HYPERMETABOLIC VERSUS NON-HYPERMETABOLIC PATIENTS WITH THERMAL INJURY

Brittainy Allen, Pharm.D.*, Sarah Zavala, Pharm.D., BCPS, Whitney Chaney, Pharm.D., BCPS

Loyola University Medical Center, 2160 S. First Ave, Maywood, IL, 60153
brittainy.allen@lumc.edu

Purpose: Thermal injuries are one of the most common and debilitating forms of trauma. Infection remains a major cause of morbidity and mortality in this patient population. Immunosuppression and disruption of the skin's protective barrier places burn patients at an increased risk of acquiring nosocomial infections caused by multi-drug-resistant organisms, including methicillin-resistant *Staphylococcus aureus* (MRSA). Vancomycin is the mainstay of treatment in patients with gram positive infections. Due to conflicting evidence, there is controversy surrounding the use of vancomycin concentrations as a marker of efficacy for treating infections. As a result of hypermetabolism following thermal injury, larger doses of vancomycin may be required in order to reach target serum concentrations. No data exists to explore dosing strategies in burn patients based on total body surface area (TBSA) of the injury. This study will assess vancomycin dosing in hypermetabolic (TBSA $\geq 20\%$) versus non-hypermetabolic burn patients (TBSA $< 20\%$), and assess whether reaching target troughs correlates with improved patient outcomes.

Methods: This retrospective cohort study received approval from the Institutional Review Board at Loyola University Medical Center. The electronic medical record database was used to identify patients ≥ 18 years of age who were admitted to the burn service and received vancomycin from January 2008 to January 2015. Patients were excluded if they had chemical or electrical burns; history of chronic kidney disease, were on dialysis, or had a baseline serum creatinine > 2 g/dL; or if no appropriate trough was drawn at steady state. The primary endpoints were resolution of infection and percentage of patients within target trough concentrations. Secondary endpoints included the following: in-hospital mortality, vancomycin dosing, reinfection rates, length of hospital stay, length of ICU stay, treatment failure, ventilator-free days, and rate of acute kidney injury.

Results/Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the metabolic manifestations following burn injury and differentiate between the ebb phase and the hypermetabolic phase.

Discuss the current literature regarding pharmacokinetics of vancomycin in burn patients.

Self Assessment Questions:

The term describing the time period >48 hrs post-burn injury that can last up to 24 months is which of the following?

- A: Ebb phase
- B: Transition phase
- C: Hypermetabolic phase
- D: Shock phase

Ackerman, et al. concluded which of the following about vancomycin trough concentrations in burn patients:

- A: Higher troughs were associated with more rapid resolution of infection
- B: Higher troughs were associated with a decreased duration of therapy
- C: Stratification by TBSA ($<$ or $\geq 50\%$) had an effect on trough concentrations
- D: None of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-305-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF BLEEDING IN CRITICALLY-ILL END STAGE LIVER DISEASE PATIENTS RECEIVING PHARMACOLOGICAL PROPHYLAXIS

Abeer T. Ammar, PharmD, BCPS, PGY2 Critical Care Resident*;
Georgeanna Rechner, PharmD, BCPS, Critical Care Pharmacy
Specialist

Rush University Medical Center, 1653 W Congress
Parkway, Chicago, IL, 60612

abeer_ammarr@rush.edu

End-stage liver disease may increase the risk of venous thromboembolism (VTE). Current guidelines do not specifically comment on prophylactic anticoagulation in this population and literature is limited to small, unbalanced retrospective reviews with inconsistent methods and results. The purpose of this study is to determine if the use of pharmacological agents for VTE prophylaxis in patients with end stage liver disease increases the risk of bleeding events. Additionally, to determine whether patients without pharmacological prophylaxis have an increased risk of VTE events compared to those who did receive pharmacological prophylaxis.

This retrospective cohort study included patients with end-stage liver disease admitted to the medical or surgical intensive care units (ICUs) at Rush University Medical Center. Parameters collected include: age, sex, weight, basic metabolic panel, ICU admission date, cirrhosis etiology (i.e. alcoholic, viral, drug-induced, autoimmune), acuity of liver failure (i.e. chronic, acute, acute on chronic), baseline/nadir platelet (PLT) count, baseline/peak international normalized ratio (INR), baseline/peak bilirubin, baseline serum creatinine, pharmacological prophylaxis regimen, presence of anti-platelet agents, presence of end-stage renal disease, non-hepatic malignancy, presence of central venous access, history of VTE, and presence of heparin-induced thrombocytopenia antibodies. Inclusion for this study required the following criteria: adults 18 years of age or older, a medical or surgical ICU stay, presence of end-stage liver disease, and diagnostic criteria for coagulopathy defined as a PLT count < 50,000 cells/mm³ or an INR > 1.5. Exclusion criteria included: pregnancy, patients receiving therapeutic anticoagulation, admission for thrombosis, or for admission of a bleeding event.

Collection and analysis of the data is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Recall risk factors in patients with end stage liver disease that predispose them to thrombotic events

State the current recommendation for VTE prophylaxis according to the American College of Chest Physicians (ACCP)

Self Assessment Questions:

Which of the following factors increase the risk of thrombotic events with end stage liver disease:

- A: Increased levels of factor VIII
- B: Increased levels of protein C
- C: Increased levels of protein S
- D: Increased levels of plasmin

Which of the following represents recommendations by the American College of Chest Physicians (ACCP) with respect to VTE prophylaxis in patients with end stage liver disease?

- A: VTE prophylaxis with unfractionated heparin or low molecular weight
- B: VTE prophylaxis with unfractionated heparin only
- C: VTE prophylaxis with low molecular weight heparin only
- D: No specific recommendations made

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-306-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SEASONAL INFLUENZA A H3 OUTBREAK IN STEM CELL TRANSPLANT RECIPIENTS

Karen Sweiss PharmD, BCOP, Pritesh Patel MD, Annie Oh MD, Scott Wirth PharmD, BCOP, Jennifer Anderson* PharmD, Vjay Yeldandi MD, Damiano Rondelli MD

University of Illinois at Chicago, 833 S Wood St., Chicago, IL, 60612

jlinaand@uic.edu

Seasonal Influenza A H3 Outbreak in Stem Cell Transplant Recipients

Statement of Purpose

Influenza virus infection can lead to serious morbidity and mortality in patients who have undergone hematopoietic stem cell transplant (HSCT). Recipients of HSCT are at a high risk of developing severe complications of influenza infection, having a prolonged course of illness, and developing resistance to antiviral therapy. The Center for Disease Control and Prevention has reported that influenza A, H3N2 subtype is the most common virus being isolated in the United States during the 2014-2015 influenza season. Influenza immunization is reported to be only 23% effective due to differences between the antigens included in the vaccine and those present in the most common virus this year. The purpose of this study undertaken at the University of Illinois is to describe the clinical characteristics and impact of infection with the influenza A virus (H3 subtype) in the HSCT population during the 2014-2015 season.

Statement of Methods Used

This study is a descriptive, retrospective case series. The charts of patients who received either an allogeneic or autologous stem cell transplant and were subsequently diagnosed with influenza A (H3 subtype) were reviewed to identify risk factors, treatment, and outcomes. Patients were diagnosed with influenza A by reverse transcriptase PCR assay, and viral RNA was analyzed to determine if the patient was carrying influenza A H3 subtype. Data collected includes type of HSCT, immunization with the influenza vaccine, median time from transplant to influenza A infection, symptoms, duration of symptoms, presence of graft-versus-host disease (GVHD), immunosuppressive therapy, clinical and radiologic evidence of lower respiratory tract disease, and length of treatment with oseltamivir.

Statement of preliminary results to support conclusion

Preliminary results of this study are pending.

Conclusions reached

The conclusions of this study are pending.

Learning Objectives:

Identify complications that may occur with influenza A (H3 subtype) infection in the hematopoietic stem cell transplantation (HSCT) population.

List characteristics of HSCT patients that may increase their risk for developing severe infection associated with influenza.

Self Assessment Questions:

1. Which of the following complications may occur with influenza A (H3 subtype) infection in the HSCT population?

- A: Pneumonia
- B: Antiviral drug therapy resistance
- C: Prolonged infection
- D: All of the above

2. What factors present in HSCT patients may make them more at risk for developing severe infection associated with influenza A?

- A: Chronic GVHD
- B: Prolonged immune-suppression
- C: Prophylactic anti-infective medications
- D: A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-716-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

**ASSESSMENT OF VETERAN AND PHARMACIST PERSPECTIVES
ON THE IMPACT OF DISCHARGE MEDICATION COUNSELING:
PART 2 OF 2**

Audrey M. Andres, PharmD*, Emily D. Peedin, PharmD, William X. Malloy, M.S., PharmD, BCPS, Christopher M. Degenkolb, PharmD, BCPS

Veteran Affairs - Indianapolis VA Medical Center, 1481 W 10th Street, Indianapolis, IN, 46202

audrey.andres@va.gov

Purpose: At the Indianapolis VAMC, all patients receive medication counseling by a pharmacist prior to discharge. However, pharmacists differ in the method, content, and documentation of this counseling. The primary objective of this project is to evaluate pharmacists' perspectives on the effectiveness and barriers of discharge medication counseling across weekday and weekend discharges.

Methods: This quality improvement initiative was exempt from IRB approval. The pharmacist voice of the customer questionnaire identified components of discharge medication counseling currently prioritized and delivered by each pharmacist, and perceived effectiveness and barriers to patient education and documentation. Results were compared across weekday and weekend discharges as well as between pharmacy residents, clinical pharmacists, and clinical pharmacy specialists.

Results: Only 10% of pharmacists perceived the discharge medication counseling they perform to be "very effective". The majority of pharmacists covering weekday discharges perceived their counseling to be "effective", while those covering weekend discharges chose "somewhat effective". Across weekday and weekend discharges, pharmacists prioritized the purpose of medication and directions for use in their counseling. The top three barriers to effective patient education were patients' eagerness to leave the hospital, lack of time, and patients' health literacy. Pharmacists reported difficulty in assessing patient understanding as well as uncertainty in what steps to take if patients had poor understanding of counseling as barriers to documentation of patient education.

Conclusions: Pharmacist perspectives of discharge patient education are similar between weekend and weekday discharges as well as across positions. Although pharmacists are not documenting specific elements of counseling, key elements are prioritized and effectively retained by the veterans. Documentation of patient education could be improved through the creation of a tool to define and assess patient understanding. There is also a need for a standard process to determine follow up for patients with poor understanding.

Learning Objectives:

Discuss pharmacists' perception of the effectiveness and barriers regarding discharge medication counseling

Describe the current state of assessment of patient understanding and the development of a tool to improve the process

Self Assessment Questions:

The majority of pharmacists perceived their discharge medication counseling to be:

- A Very effective
- B Effective
- C Somewhat effective
- D Not effective

What was the most significant barrier to effective discharge medication counseling from the pharmacists' perspective?

- A Patient's health literacy
- B Lack of confidence in counseling ability
- C Patient's eagerness to leave the hospital
- D Location (Inpatient vs. Outpatient)

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-717-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

**CLINICAL IMPACT OF A PHARMACY-DRIVEN INPATIENT
WARFARIN DOSING PROTOCOL**

Miroslav A. Anguelov*, Pharm.D., Hayley Carey, Pharm.D., Brian Peters, Pharm.D., M.S.

Riverview Health, 395 Westfield Rd., Noblesville, IN, 46060

manguelov@riverview.org

Purpose: The benefits of pharmacy-driven warfarin dosing protocols are well documented in the literature. There is a need to evaluate the therapeutic outcomes of a newly established pharmacy-driven warfarin dosing protocol in this institution. The primary objective of this study is to demonstrate the differences in achieving and maintaining therapeutic INR with an automatic pharmacy dosing protocol compared to physician dosing. The secondary objective is to compare differences in appropriate management of supra-therapeutic INR between the pharmacy-driven protocol and current physician prescribing practices.

Methods: The study is a single-center retrospective cohort study. The first cohort includes inpatients with warfarin therapy managed by a prescriber before the implementation of the pharmacy-driven warfarin dosing protocol. The second cohort includes inpatients with warfarin therapy managed by the pharmacy-driven warfarin dosing protocol. An electronic medical record system will be used to identify patients admitted between February 1, 2014 and January 31, 2015 who were either continuing home warfarin therapy or starting warfarin therapy. Data collected will include indication for warfarin therapy, therapeutic International Normalized Ratio range, number of days needed to reach therapeutic INR for new warfarin therapy, number of days in and out of therapeutic INR range, and number of critical INR. History of thrombosis and comorbidities affecting metabolism of warfarin will be collected when available. Time to reach a therapeutic INR will be examined with Kaplan-Meier survival curves and Cox proportional hazards regression modeling. Fisher's exact or chi-squared test will be used for categorical data and a Student's t-test will be used for continuous data. P-values of less than 0.05 will be considered statistically significant.

Results/Conclusion: Data collection and analysis are pending. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize patient comorbidities that may alter the response to warfarin.

Explain the limitations associated with initial loading doses of warfarin.

Self Assessment Questions:

Which of the following may alter the pharmacokinetics and/or metabolism of warfarin?

- A Asthma
- B Atrial Fibrillation
- C Hyperlipidemia
- D Dietary insufficiency

Severe depletion of which of the following may cause a hypercoagulable state in patients who receive loading doses of warfarin?

- A Factor VII
- B Protein C
- C Factor II
- D Protein S

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-718-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

STAKEHOLDERS PERCEPTIONS OF DIGITAL BADGES

Safaa W. Aref*, PharmD, BCPS, Kimberly S. Plake, PhD, RPh
Purdue University, 138 Nimitz Dr Apt 13, West Lafayette, IN, 47906
swaref@purdue.edu

Background: Digital badges are validated visual credentials representing skills, abilities, achievements, or experiences earned through the completion of specified tasks in a wide array of learning environments. The concept of digital badges is aimed at capturing learning that occurs in both traditional and nontraditional settings and acknowledging skills or competencies not measurable with routinely used assessment methods. Multiple entities, including universities, have utilized digital badges in the past several years. However, little research has explored the potential reward digital badges would bring to their holders, particularly upon seeking employment. No published research addresses: 1) employer perceptions of the use of digital badges in pharmacy curricula to quantify achievements, 2) the value of digital badges in evaluating candidates for employment, or 3) the role of digital badges in continuous professional development.

Purpose: To explore pharmacy employers, residency program directors, and fellowship program directors' perceptions of digital badges in pharmacy curricula to quantify activities and achievements in evaluating candidates.

Methods: A survey was developed and will be sent to pharmacy employers, residency program directors, and fellowship program directors nationwide. The survey will be administered through Qualtrics and sent to participants via email in February 2015. Survey question formats include multiple choice, dichotomous response, ranking, and Likert scale. The questions focus on exploring various facets of stakeholders' perceptions of digital badges, including awareness, perceived value, perceived challenges, willingness to incorporate, and demographics. Data analysis will include descriptive statistics and nonparametric statistical testing.

Results and Conclusions: Project outcomes will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define digital badges.

List two ways digital badges can be incorporated into pharmacy practice and education.

Self Assessment Questions:

Which of the following is correct about digital badges?

- A They are intended to replace traditional assessment methods.
- B They can only be viewed through specific technologic platforms.
- C They are intended represent learning that occurs in various learning environments.
- D They can only be issued by individuals affiliated with universities

Digital badges can be incorporated into pharmacy practice for the purpose of:

- A Acknowledging employee achievements.
- B Documenting patient care activities.
- C Creating a departmental logo or brand.
- D Organizing hiring documents.

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-719-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY OF ONCE DAILY TOBRAMYCIN IN CYSTIC FIBROSIS PATIENTS LESS THAN 6 YEARS OLD

Alexandria Arends, PharmD*, Rebecca Pettit, PharmD, MBA, BCPS
Indiana University Health, 700 N Alabama apt 515, Indianapolis, IN, 46204
aarends@iuhealth.org

Purpose: Patients with cystic fibrosis receive multiple courses of aminoglycosides starting at a young age. Concerns regarding aminoglycoside adverse effects, specifically ototoxicity and nephrotoxicity, have triggered researchers to evaluate the dosing regimen of these medications. Studies have assessed the safety and efficacy of extended interval dosing (EID) versus three-times daily tobramycin in CF patients 6 years of age and older. Equivalent efficacy, decreased serum creatinine concentrations within the pediatric EID group, and increased serum creatinine concentrations within the adult EID group was demonstrated. Ototoxicity was not observed in either of the patient groups. While these studies addressed patients 6 years of age and older, there is still a gap in knowledge in understanding toxicity risk associated with the use of once daily extended interval dosing compared to three-times daily tobramycin in pediatric cystic fibrosis patients 5 years of age and younger. This research will provide insight as to the nephrotoxicity and ototoxicity risks within this patient population. This study will also analyze weight based dosing and serum drug concentrations required to meet pharmacokinetic parameters.

Methods: This is a retrospective chart review of cystic fibrosis patients 5 years of age and younger, admitted to Riley Hospital for Children for an acute pulmonary exacerbation from January 1, 2003 to January 1, 2014, and treated with IV tobramycin. Patients were excluded if they had preexisting renal or hearing impairment, received nebulized antibiotics during hospitalization, or received previous IV aminoglycoside therapy within the past 30 days. **Results:** Data collected include patient demographics, tobramycin dose, serum concentrations, calculated pharmacokinetic parameters, serum creatinine, urine output, and audiograms. Students t-test and chi-squared will be used to analyze data. **Conclusion:** Data collection and analysis are pending. Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the advantages of extended interval aminoglycosides in contrast to thrice-daily dosing in patients with cystic fibrosis.

Explain the adverse effect and toxicity risk of extended interval aminoglycosides in patients with cystic fibrosis who are less than 6 years old.

Self Assessment Questions:

Which of the following is the primary argument in favor of dosing aminoglycosides once daily?

- A More effective when treating CF exacerbations
- B Ability to maximize pharmacokinetic parameters while minimizing toxicity
- C Patients will have decreased risk of line infection
- D Ability to receive treatment in the outpatient setting

Which of the following adverse effects are associated with extended interval dosing?

- A Neurotoxicity due to higher concentrations within the CSF
- B Cardiac toxicity from direct damage to cardiomyocytes
- C Hepatotoxicity as a result of interference with bilirubin transport
- D Ototoxicity from damage to cochlear hair cells

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-307-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY AND EFFICACY OF TWO DIFFERENT DOSES OF TRANEXAMIC ACID IN ORTHOPEDIC PATIENTS

William L Armstrong*, PharmD.; Tara K Jellison, PharmD., MBA, FASHP; Abby L Todt, PharmD., BCPS; Luke C Keller, PharmD., BCPS
Parkview Health System, 11109 Parkview Plaza Dr, Fort Wayne, IN, 46844
william.armstrong@parkview.com

Purpose:

Half of patients undergoing total hip or total knee replacement require a postoperative blood transfusion. These patients are at increased risk of infection as well as increased healthcare costs due to blood transfusions. Tranexamic acid (TXA) is an anti-fibrinolytic drug that has been shown to be a cost effective option reducing blood loss and decreasing the frequency of blood transfusion by inhibiting plasminogen. However, due to the mechanism of action, there is concern about an increased risk of developing thromboembolic complications such as deep vein thrombosis or pulmonary embolism. Based on current literature, an optimal dosing regimen of tranexamic acid has not been identified. The objective of this study is to determine which tranexamic acid dosing regimen, a 10mg/kg IV pre-op followed by a 10mg/kg IV intra-op dose or a single 20mg/kg IV intra-op dose, results in a lower frequency blood transfusion without an increased risk of adverse events due to tranexamic acid.

Methods:

This is a retrospective chart review study that evaluated the efficacy and safety of two tranexamic acid dosing regimens in patients undergoing elective total hip or knee replacement at a community-based health system from March 2013 to current. The primary outcome was the percentage of subjects requiring blood transfusion. Secondary outcomes were a change in hemoglobin, estimated total blood loss, total volume of blood transfused and hospital length of stay. Safety outcomes included rates of thrombosis, acute kidney injury, and myocardial infarction. A cost analysis was performed comparing the cost of a blood transfusion and tranexamic acid. Patients were excluded if the tranexamic acid dosing regimen differed from either of the doses listed, needed emergent hip or knee replacements, or required total hip or knee revisions.

Results and Conclusions:

To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the mechanism of action for tranexamic acid
List two adverse effects that are of concern with tranexamic acid

Self Assessment Questions:

What is the mechanism of action for tranexamic acid?

- A Competitive tPA inhibition
- B Competitive plasminogen inhibition
- C Competitive urokinase inhibition
- D Competitive fibrin inhibition

Which of the following is an adverse effect that may be directly caused by tranexamic acid?

- A Subarachnoid hemorrhage
- B Hepatic insufficiency
- C Deep vein thrombosis
- D Dry mouth

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-308-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PROACTIVE RISK ASSESSMENT OF HAZARDOUS DRUGS HANDLING USING HEALTHCARE FAILURE MODE AND EFFECT ANALYSIS (HFMEA) FRAMEWORK

Atrik G Aryan*, PharmD; Lindsey Ladell, PharmD, BCPS
Veteran Affairs - Clement J. Zablocki Medical Center, 5000 W National Ave, Milwaukee, WI, 53295
atrik.aryan@va.gov

Statement of the purpose

Handling of hazardous medications is a high risk process involving multiple steps and multiple disciplines. Failure modes in the process can put healthcare workers at significant risk for long term adverse effects. A proactive risk assessment permits the identification of vulnerabilities before they actually occur, thus mitigating risk. Additionally The Joint Commission requires accredited programs to conduct at least one proactive risk assessment of a high-risk process each eighteen months.

Statement of methods used

The VA National Center for Patient safety (NCPS)'s healthcare failure mode and effect analysis (HFMEA) framework was used to conduct proactive risk assessment. An interdisciplinary team involving representatives from pharmacy, nursing, process improvement, industrial hygiene and environmental services was assembled. System vulnerabilities were identified using process and sub-process flow diagramming, and through the identification of failure modes. Risk was assessed using a hazard-scoring matrix. The course of action was determined using a decision tree algorithm.

Summary of (preliminary) results to support conclusion

There are no results available at this time.

Conclusions reached

HFMEA can serve as an effective tool for the identification and correction of medication use system failures before they actually occur.

Learning Objectives:

Explain the purpose and utility of using the Healthcare Failure Mode and Effect Analysis (HFMEA) framework in reviewing hazardous medication practices in a health system

Discuss various steps involved in Healthcare Failure Mode and Effect Analysis (HFMEA)

Self Assessment Questions:

The HFMEA framework has utility in reviewing hazardous medication practices for which of the following reasons?

- A Identifies system vulnerabilities before they occur
- B Conducts an analysis after an event has occurred
- C Prioritizes action plans based on potential for hazard
- D A & c

Which of the below describes correct order of HFMEA framework?

- A Assemble the team, Graphically Describe the process, Conduct a hazard analysis, Develop actions and outcome measures
- B Graphically Describe the process, Develop actions and outcome measures, Assemble the team, Conduct a hazard analysis
- C Assemble the team, Conduct a hazard analysis, Develop actions and outcome measures, Graphically Describe the process
- D Develop actions and outcome measures, Graphically Describe the process, Assemble the team, Conduct a hazard analysis

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-896-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PHARMACIST-LED OUTPATIENT TARGET SPECIFIC ORAL ANTICOAGULANT SERVICE

Emily J. Ashjian, PharmD, BCPS*; Elizabeth Renner, PharmD, BCPS, BCACP, CACP; Brian Kurtz, PharmD, BCACP, CACP; Robert Yeshe, PharmD Candidate; Geoffrey Barnes, MD

University of Michigan Health System, 1111 East Catherine Street, Room 316, Ann Arbor, MI, 48109

eashjian@med.umich.edu

Purpose: Target specific oral anticoagulants (TSOACs) including dabigatran, rivaroxaban, and apixaban represent alternatives to warfarin. These medications provide an attractive choice due to their predictable pharmacokinetics, fixed-dose regimens, lack of routine monitoring, and fewer drug interactions compared to warfarin. However, they require dose adjustments for patient specific factors and lack a monitoring parameter to follow patient adherence with therapy. This study aims to determine the impact of a pharmacist-led TSOAC program in an outpatient anticoagulation service on the percentage of patients initiated and maintained on appropriate TSOAC therapy with the goal of improving therapeutic outcomes while reducing adverse events.

Methods: This is a single center, retrospective, observational matched cohort analysis. It has been approved by the University of Michigan Institutional Review Board. All patients age 18 and older who participated in an initial pharmacist visit as part of the University of Michigan Health System (UMHS) Outpatient Anticoagulation Service TSOAC Program between September 20, 2013 and December 31, 2014 will be included in the intervention group. This group will be matched with patients who had TSOAC therapy initiated by their UMHS physician during the same time period but did not participate in a pharmacist visit. The primary outcome is the percentage of patients taking a TSOAC referred to the UMHS Outpatient Anticoagulation Service for whom initial therapy was appropriate as compared to those managed under usual care. This study will also determine the percentage of patients referred to the TSOAC program who received a warranted medication adjustment after therapy initiation compared to those managed under usual care. Secondary outcomes will determine the mean rate of adherence to TSOAC therapy as measured by medication possession ratios. Adverse events including bleeding episodes and thromboembolic events will also be compared. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review key characteristics of the target specific oral anticoagulants.

Identify the role of the pharmacist in management of target specific oral anticoagulants.

Self Assessment Questions:

AM is a 42 year old male recently diagnosed with a left lower extremity DVT. He works 80 hours per week and dislikes taking medication. His past medical history is significant for T2DM, HTN, and GERD.

- A: Warfarin 5 mg by mouth once daily, adjusted to INR goal of 2-3
- B: Dabigatran 150 mg by mouth twice daily.
- C: Rivaroxaban 20 mg by mouth once daily.
- D: Apixaban 2.5 mg by mouth twice daily.

Which of the following are ways in which pharmacists may assist in the management of target specific oral anticoagulants?

- A: Determining the appropriate dose and duration of therapy
- B: Providing patient education
- C: Ensuring affordability of a target specific oral anticoagulant
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-309-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

VALIDATION OF THE HAS-BLED SCORING SCHEMA FOR THE DETERMINATION OF BLEEDING RISK IN ANTICOAGULATED PATIENTS

*Kimberly L Askren, PharmD; Eric T Johnson, PharmD, BCPS; Alicia E Mattson, PharmD, BCPS; Andrew Borgert, PhD

Gundersen Lutheran Medical Center, 509 Bannora Lee Ct, La Crosse, WI, 54601

klaskren@gundersenhealth.org

Purpose: The HAS-BLED scoring schema has been well-validated in patients with atrial fibrillation to stratify patients risk of bleeding complications. The goal of this study is to determine whether it can be additionally applied to patients on anticoagulation for reasons such as pulmonary embolism or deep vein thrombosis. By validating HAS-BLED in a more diverse population, it may provide a more concrete method for clinicians to evaluate bleeding risk in patients prior to initiation of anticoagulants rather than determining risk based on less validated means. Optimizing anticoagulation based on objective assessment of risk will help prevent negative outcomes, including thrombotic and bleeding events.

Methods: Gundersen Lutheran Medical Centers electronic health record will be used to retrospectively evaluate patients who were initiated on oral anticoagulants. These patients will be assessed using the HAS-BLED schema (Hypertension, Abnormal renal/liver function, Stroke, Bleeding tendency/predisposition, Labile INRs, Elderly age >65, Drugs concomitant aspirin/NSAIDs or alcohol abuse) to determine risk of bleeding and then followed for one year for evaluation of bleeding events. Eligible patients include any adult (>18 years of age) who is taking warfarin, rivaroxaban, apixaban, or dabigatran and followed within Gundersen Health System. Patients treated with oral anticoagulants for short term indications (e.g. postoperative VTE prophylaxis) will be excluded. The primary outcome will be incidence of major bleeding (defined as bleeding requiring hospitalization and decrease in hemoglobin > 2g/L or requiring blood transfusion, or intracranial hemorrhage). Secondary outcomes will include major vs. minor bleeding, 30 day hospital admission rate, recurrence of thrombotic events, and mortality during the one year follow up period. Information to be collected includes patient demographics, comorbidities, concomitant medications and pertinent lab values.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of utilizing a bleed risk score in anticoagulated patients.

Recall the various components of the HAS-BLED score, and classify specific patients based on risk.

Self Assessment Questions:

Which of the following characteristics is taken into account when calculating a patient's HAS-BLED score?

- A: Gender
- B: Genetic Factors
- C: Renal Function
- D: Malignancy

Which of the following patients would be considered high risk of bleeding?

- A: An 80 year old male with hypertension, but no other comorbidities
- B: A 72 year old female with stage 4 CKD and diabetes, who also takes
- C: A 76 year old male with a history of stroke.
- D: A 50 year old female who is a current alcoholic and has beginning

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-310-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OUTPATIENT CEFTAROLINE FOSAMIL INFUSION FOR THE TREATMENT OF OSTEOARTICULAR INFECTION

Vasilios Athans, PharmD, BCPS; Rachel M. Kenney, PharmD, BCPS (AQ-ID); Sanjeev Kumar, BDS, MHSA; Jacob Wong, PharmD; Marcus Zervos, MD; Susan L. Davis, PharmD

Henry Ford Health System, 2799 West Grand Boulevard, Detroit, MI, 4820
vathans1@hfhs.org

Purpose: Ceftaroline fosamil (CPT) may be a suitable alternative to vancomycin (VAN) as backbone therapy for osteoarticular infection (OAI). However, limited efficacy data exist for this indication, and few studies have evaluated the long-term safety profile of CPT. The objective of this study is to describe the safety and efficacy of CPT outpatient antimicrobial therapy for OAI.

Methods: This study will be completed using a matched retrospective cohort design. Retrospective review will be conducted using Henry Ford Health System electronic medical records. All patients treated for documented OAI (osteomyelitis, septic arthritis, prosthetic joint infection) from October 2010-February 2014 will be screened for inclusion. Patients must also have received outpatient parenteral antimicrobial therapy (OPAT) for ≥ 14 days with a CPT-based or VAN-based regimen. Exclusion criteria: <1 follow-up ambulatory or home health visit within 180 days of hospital discharge, concurrent VAN and CPT for ≥ 24 hours infective endocarditis, OAI involving chest or skull, pathogen resistant to CPT and/or VAN. Patients will be matched according to OAI subtype, anatomical site of infection, microbiology, and insurance status. Primary endpoint to be assessed by a blinded adjudicator is infection-related readmission, defined as readmission within 180 days of initial hospital discharge due to clinical worsening on therapy, infection recurrence post therapy, or treatment intolerance. Secondary endpoints include adverse event (AE) incidence attributable to each study arm, drug and healthcare expenditure, and rationale for CPT use (if available). A co-investigator will perform data validation on 10% of cases collected by the primary investigator prior to analysis. Categorical variables will be compared via Chi-square or Fishers exact test, as appropriate. Continuous variables will be compared with the unpaired Students t-test. Multivariate logistic regression will be performed to identify independent predictors of infection-related readmission.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify the characteristics of osteoarticular infection that render its management challenging to the modern clinician

Review the properties of ceftaroline fosamil that support its role in the treatment of osteoarticular infection

Self Assessment Questions:

Osteoarticular infections are associated with a significant patient burden and overall morbidity. Which of the following characteristics contribute to this phenomenon?

- A Osteoarticular infections are associated with high relapse rates
- B: The most common causative pathogens are Enterococcus spp.
- C: Osteoarticular infections require a lengthy duration of therapy
- D: a & c

Which of the following properties serve as a rationale for ceftaroline fosamil's role in the management of osteoarticular infection?

- A Spectrum of activity including Staphylococcus aureus and Pseudomonas
- B Once-daily dosing for ease of administration
- C Animal models demonstrating potent bactericidal activity in bone
- D Evidence supporting shorter duration of therapy compared to vancomycin

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-311-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

WHY NOT ANTICOAGULATE? EXPLORING LACK OF TREATMENT IN HIGH RISK PATIENTS: A SINGLE CENTER RETROSPECTIVE REVIEW

Erin August, PharmD*, Julie Bartell, PharmD, CACP, BCACP
Monroe Clinic, 515 22nd Ave, Monroe, WI, 53566
erin.august@monroeclinic.org

Purpose: This study is designed to determine the percentage of Monroe Clinic patients with atrial fibrillation failing to receive anticoagulation in accordance with the 2014 AHA/ACC/HRS guidelines. Additionally, this study aims to identify reasons for withholding anticoagulation and explores the evidence supporting or refuting these reasons.

Methods: Retrospective chart review was performed on patients with atrial fibrillation. Patients with current prescriptions for anticoagulants were separated from those without to determine percentage of patients without anticoagulation. Data was collected on those without current prescriptions, and patients were stratified by CHADS2-VASc and HAS-BLED scores. Provider documentation was reviewed to determine factors considered when deciding to withhold anticoagulation. Reasons for withholding were collated, and evidence supporting or refuting these reasons was analyzed.

Results: 1047 patients at Monroe Clinic had atrial fibrillation as an active problem in the problem list. Of these, 457 (43.6%) were not anticoagulated. CHADS2-VASc scores ranged from 0-9 and HAS-BLED scores ranged from 0-6. Some of the more common documented reasons for withholding anticoagulation included low stroke risk, high falls risk, history of bleed, allergy, advanced age, patient preference, palliative care only, atrial fibrillation limited to provoked episodes only, history of poor compliance, and time since last episode of atrial fibrillation.

Conclusion: Anticoagulation is withheld from patients for a wide variety of reasons. Current evidence supports withholding anticoagulation in certain cases, however there are also many reasons why anticoagulation is unjustifiably withheld. While the choice to withhold anticoagulation must be made on an individual basis, there is a vast amount of literature available to help guide the decision-making process

Learning Objectives:

Identify reasons for withholding anticoagulation in high risk patients.

Discuss the evidence supporting or refuting reasons for withholding anticoagulation in patients with atrial fibrillation.

Self Assessment Questions:

The 2014 AHA/ACC/HRS guidelines recommend anticoagulation for all patients with atrial fibrillation with a CHADS2-VASc score equal to or greater than ____.

- A 0
- B: 1
- C: 2
- D: 3

Approximately how many times per year would an elderly patient on warfarin have to fall for the risk of bleeding complications to outweigh the risk of embolic stroke?

- A 25
- B 90
- C 300
- D 500

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-312-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF UNIT-DOSE PACKAGING ON ADHERENCE IN AN HIV POPULATION

Mina Baghzouz*, PharmD; Stephen Lott, PharmD, CSP; Claire Lee PharmD, CSP; Linda Lampi PharmD, CSP; Jennifer Hagerman, PharmD; Diplomat Specialty Pharmacy, 4100 S Saginaw St, Flint, MI, 48507
mbaghzouz@diplomat.is

Purpose: To determine the impact of unit-dose packaging on adherence and viral loads for patients diagnosed with human immunodeficiency virus (HIV) who receive anti-viral medications from a specialty pharmacy. The results of this study will be used to consider future services that may be offered by a specialty pharmacy.

Methods: This study has both prospective and retrospective portions. For the retrospective portion of the study, average medication possession ratio (MPR) values from the past year were collected from the pharmacy database for patients with HIV receiving unit-dose packaging and those receiving standard packaging. Average MPR values for the two types of packaging were compared using a t-test. For the prospective portion of this study, unit-dose packaging has been offered to a select group of patients with HIV who take three or more oral medications and have an average MPR less than 0.9 for all medications filled at a specialty pharmacy. Baseline data, which includes MPR, viral load, and an adherence survey, were collected prior to the use of unit-dose packaging. Study patients will be followed for four months. At the conclusion of the study period, viral load, MPR, and adherence survey results will be recollected and compared to baseline data.

Results: For the retrospective portion of the study, a total of 327 patients were included in the analysis. A difference was found in the mean capped MPR values between patients receiving standard packaging versus adherence packaging. For the prospective portion of the study, twenty three patients (4 female, 19 male) were enrolled. The mean age is 51 years and the mean baseline MPR was 0.76. Data from the prospective portion is currently being collected. Final results for the both the retrospective and prospective portions will be presented at the Great Lakes Residency Conference.

Conclusion: Final conclusions to be presented at the GLRC.

Learning Objectives:

Identify differences in adherence in populations that use unit-dose packaging versus those who use standard pharmacy packaging.
Discuss the efficacy of unit-dose packaging in improving adherence and clinical endpoints for patients with HIV.

Self Assessment Questions:

Which of the following statements about the retrospective analysis is true?

- A Unit-dose packaging was found to significantly improve adherence
- B: Standard packaging was found to significantly improve adherence
- C: No significant difference was found in adherence between standard
- D: Data from the retrospective analysis was inconclusive.

Which outcome was assessed for the prospective portion of the study?

- A CD4 cell count
- B Adherence measured with proportion of days covered
- C Rate of opportunistic infections
- D HIV viral load

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-720-L02-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING ADHERENCE TO INSTITUTION SPECIFIC EXTRAVASATION MANAGEMENT GUIDELINES

Della Bahmandar*, Pharm.D., MBA; Amy T. Martin, Pharm.D., BCPS; Mandy C. Leonard, Pharm.D., BCPS; Joseph Hooley, BPS, CPPS; Stephanie Bass, Pharm.D., BCPS; Cleveland Clinic Health System, Cleveland, OH

Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH, 441955245

bahmand@ccf.org

BACKGROUND

Extravasation of IV medication is considered a medical emergency that can lead to serious outcomes if not treated appropriately. As many as 25% of extravasations can lead to serious injury; causing a burden of disease more severe than the principal admitting diagnosis. Various nursing organizations have compiled guidelines based on the limited evidence and expert opinion; however, discrepancies in recommendations and limited information within the guidelines lead to the need for development of institutional protocols. Evaluating adherence to an institutions protocol can lead to better understanding regarding discrepancies between protocol and practice, while determining areas for improvement, education, and awareness. The goal of the study is to describe the adherence to the Cleveland Clinic Health System (CCHS) Extravasation Management Guidelines (EMG) at the Cleveland Clinic Main Campus.

METHODS

In this non-interventional, single center, retrospective chart review, extravasation events were identified through the generation of a report from the institutions adverse event reporting system containing all extravasation events reported from August 2013 through August 2014. Adult patients, defined as older than 18 years, who experienced an extravasation event were screened for inclusion if admitted to inpatient, outpatient or the emergency department locations at the Cleveland Clinic Main Campus. The primary outcome was to determine the percent of documented extravasations receiving appropriate management. The secondary outcomes were to evaluate compliance with the nursing procedure for extravasation management, determine the percent of extravasation antidotes administered within the correct timeframe specified by the CCHS EMG, and calculate the percentage of pharmacologic antidote orders entered into the EPIC system using the specifically designed antidote drug files.

RESULTS/ CONCLUSION

Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss challenges arising from a lack of high quality evidence based literature in the management of extravasation injuries
Describe the importance of evaluating adherence to institution specific extravasation guidelines

Self Assessment Questions:

1. Various organizations have compiled extravasation management guidelines. Choose the correctly matched selection below:

- A Society of Critical Care Medicine (SCCM) – Chemotherapy and B
- B: Society of Critical Care Medicine (SCCM) – Contrast medium extr
- C: Oncology Nursing Society (ONS) – Contrast medium extravasation
- D: American College of Radiology (ACR) – Contrast medium extrava

Evaluating adherence to an institutions protocol can help determining areas for:

- A Reprimand
- B Improvement, education, and awareness
- C Discipline
- D Reimbursement

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-897-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPROVING PATIENT SPECIFIC CLINICAL DECISION SUPPORT FOR PHARMACISTS AT THE POINT OF ORDER VERIFICATION

Oyshik Banerjee, PharmD*, Muriel Forbes, PharmD
NorthShore University HealthSystem, 777 Park Ave West, Highland Park, IL, 60035
obanerjee@northshore.org

Purpose:

The quality of care in healthcare systems has been demonstrated to be improved with the use of electronic medical records, computerized physician order entry (CPOE), and with the use of electronic clinical decision support (CDS). These electronic options assist with the retrieval of relevant clinical information allowing for more informed clinical decisions, improved patient safety outcomes, and additional cost saving interventions and initiatives. An effective CDS system should streamline the process of presenting relevant clinical information at the point of order verification. The primary goal of this project is to improve CDS for pharmacist at the point of order verification at a four hospital health system through the development of an electronic health system CDS report. Secondary goals of the project include measurement of pharmacist satisfaction and the reports impact on workflow changes.

Methods:

This project is a quality improvement project and does not require institutional IRB review and approval. Reports and historical data associated with verified and unverified orders were reviewed. A taskforce was formed comprising of at least one pharmacist from the inpatient pharmacy staff of each of the four hospitals. There were small group discussions outlining options and suggestions. These were then presented to the institutions Pharmacy Clinical Services Committee for review and recommendations. A clinical decision support tool was built into the test environment of the electronic health record. Testing will follow to validate functionality and identify any associated issues. After verification and validation, the tool will be transitioned into the electronic health record.

Results/Conclusion:

Testing of the clinical decision support tool is in progress and results will be presented at the Great Lakes Residency Conference in April 2015.

Learning Objectives:

Explain the benefits of clinical decision support for pharmacists at point of order verification.

Discuss effective strategies associated with formulation and implementation of relevant changes within an institutions electronic medical record.

Self Assessment Questions:

What is an advantage of CDS?

- A Improved patient safety outcomes
- B: Better informed clinical decisions
- C: Additional cost saving interventions
- D: All of the above

Which of the following is a quality of an effective CDS system?

- A Presents relevant patient information at the point of order process
- B Guides pharmacists in how to search for information
- C Provides contact number for outside resources
- D Provides information about P&T meeting minutes

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-721-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFICATION OF PATIENT FACTORS ASSOCIATED WITH TREATMENT FAILURE IN PATIENTS TREATED WITH DIRECT-ACTING ANTIVIRAL AGENTS FOR HEPATITIS C THERAPY

Farah Barada*, PharmD, Hannah Brooks, Pharm D BCPS, Milena McLaughlin, PharmD MSc BCPS AAHVP, Michael Postelnick, RPh BCPS AQ ID

Northwestern Memorial Hospital, 251 East Huron Street, Chicago, IL, 60611
fbarada@nm.org

Background: Hepatitis C (HCV) standard of care has evolved since the introduction of all oral interferon-free direct-acting antiviral agents. The improved efficacy and safety of these oral agents was demonstrated in multiple clinical trials. These agents have resulted in increased sustained virological response rates, shorter duration of therapy, and decreased incidence of adverse effects. Very limited data surrounding the incidence of treatment failure with the use of direct acting antivirals for HCV therapy as well as risk factors for failing therapy has been described.

Purpose: The objective of this study is to identify patient factors that are associated with an increase risk of treatment failure with all oral direct acting antivirals regimens during hepatitis C therapy, in a case-control study of patients treated at Northwestern Memorial Hospital.

Methods: This retrospective case-control study will aim to assess the incidence of treatment failure in patients, at a large academic medical center, who received all oral interferon-free direct acting antiviral agents for HCV therapy. After identification of these patients, patients will be matched 1 (case, patient who failed treatment) to 4 (control, patient who cleared HCV virus). Patient specific factors will be collected and compared between the two groups. Factors collected and analyzed will include patient demographics, patient genotype, length of HCV treatment, types of HCV agents used, co-morbidities as well as adherence, to list a few.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize and discuss management options for treatment naïve patient with HCV based on genotype.

Indicate patient factors associated with treatment failure in Hepatitis C therapy.

Self Assessment Questions:

Based on the AASLD/IDSA/IAS-USA hepatitis C guidelines, what would be the best treatment option for a treatment naïve patient diagnosed with HCV genotype 1b and cirrhosis?

- A Sofosbuvir plus simeprevir for 12 weeks
- B: Ledipasvi-sofosbuvir for 12 weeks
- C: Ledipasvi-sofosbuvir plus ribavirin for 12 weeks
- D: Peg-interferon plus ribavirin for 48 weeks plus sofosbuvir for 12 weeks

Which of the following is/are example(s) of previous factors associated with HCV treatment failure?

- A Age
- B Treatment Duration
- C HCV Genotype
- D A and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-722-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TIME TO RECOGNITION OF SEPSIS IN A REGIONAL HOSPITAL

Jennifer E. Baric*, Pharm.D. PGY1 Pharmacy Resident, Kristan E. Vollman, Pharm.D. Emergency Medicine Clinical Pharmacy Specialist, Shannon J. Allcron, Pharm.D. BCPS Critical Care Pharmacy Specialist
Owensboro Heath Regional Hospital, 1201 Pleasant Valley Rd, Owensboro, KY, 42303
jen.baric@owensborohealth.org

Purpose: Sepsis-related mortality has declined over recent years; however, there are over 750,000 cases per year in the United States. Failure to recognize sepsis can result in treatment delay and negatively impact clinical outcomes. Many studies have evaluated the process of treatment initiation and the effect on mortality, but few compare the ability to recognize and quickly treat patients that present septic versus those who become septic after admission. To increase recognition at the initial onset, some institutions have implemented processes, such as sepsis alerts, codes, teams, or hotlines; none of these mechanisms exist at the study institution. The primary objective was to compare time to treatment, defined as time from SIRS criteria being met to antibiotic administration, in patients who presented septic compared to those who became septic after admission.

Methods: Adult patients admitted between January 1 and June 30, 2014 with a diagnosis of sepsis were included in this retrospective analysis. Patients were captured using ICD9 codes and sorted into two groups: septic at admission and sepsis that developed ≥ 24 hours after admission. A random number generator was used to select patients in the septic at admission group so it included the same number of patients as the second group. Pregnant patients, prisoners, and patients who did not meet the definition of sepsis were excluded. Sepsis severity was determined based on systemic inflammatory response syndrome (SIRS) criteria, blood pressure, and presence of organ dysfunction. Positive cultures were documented and used to confirm an infection source. The specific antimicrobial agent administered, fluid quantity, and time to administration of antimicrobial(s) and fluids were collected. Results will be analyzed by the appropriate statistical test based on data type.

Results/Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify sepsis and classify the severity

Explain the current recommendations for the management of sepsis that are known to decrease mortality

Self Assessment Questions:

A 95 year old female presents to the emergency department after she was found on the hallway floor by her daughter. The patient had been down for an unknown period of time. At presentation the patient

- A Not septic
- B Sepsis
- C Severe sepsis
- D Septic shock

According to the 2012 Surviving Sepsis Campaign Guidelines, which of the following decreases mortality in patients with septic shock?

- A Phenylephrine
- B Antithrombin
- C Early goal-directed therapy
- D Erythropoietin

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-313-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE ROLE OF A PHARMACIST IN A CANCER CLINIC

Jacob Barker*, Shawna Kraft, Lindsey Kelley
University of Michigan Health System, Victor Vaughan House, Room 316, 1111 E. Catherine St, Ann Arbor, MI, 48108
jabarker@med.umich.edu

Background: The field of oncology has been rapidly evolving with the advent of new targeted therapies, especially oral chemotherapy. The shift from conventional chemotherapy to the innovative targeted therapies, as well as advancements in supportive care, has altered chemotherapy delivery from an inpatient oriented setting to an ambulatory setting. The impact of a pharmacist in the ambulatory oncology clinic has not been well documented. Pharmacists bring specific drug knowledge that has shown to help decrease drug related problems and overall drug costs. The proposed project will provide data showing the introduction of a pharmacist in direct care of a patient in an ambulatory clinic can diminish drug related problems, increase patient turn around, and provide revenue. This proposed revenue increase will come from Blue Cross Blue Shield of Michigan (BCBSM) reimbursement from provider delivered care management (PDCM) billing codes.

Objectives: The objectives for this research is to provide evidence that the inclusion of a clinical pharmacist in direct patient care in an outpatient cancer clinic will decrease drug related problems, increase the overall efficiency of the clinic, increase the revenue of the clinic and ensure compliance with ASCO/QOPIs accreditation standards.

Study Design: Our study is a retrospective, single center cohort study of patients who visited the cancer clinics at the University of Michigan Comprehensive Cancer Center during the months of October 2014 to February 2015. Study arms are comprised of subjects that visited the melanoma clinic, on days which a pharmacist saw them, compared to days a pharmacist is not present. Each subject completes a medication reconciliation form during their visit and will be analyzed retrospectively. Reports on revenue, patient turn around and compliance to accreditation will be run after each visit from a subject and analyzed to compare between days a pharmacist is present at clinics and not present.

Learning Objectives:

Identify potential measurable outcomes pharmacists can impact in cancer clinics

Recognize the benefits pharmacists provide in patient turn around

Self Assessment Questions:

Which of the following were measurable outcomes that can be potentially impacted by pharmacist interventions in outpatient cancer clinics?

- A Patient turn around
- B ASCO/QOPI compliance
- C Revenue
- D All of the above

Which steps in the chemotherapy ordering and production process can be affected by pharmacists working in outpatient cancer clinics?

- A Performing first verification of chemotherapy orders
- B Checking the final product
- C Releasing orders
- D Both A & C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-723-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

FEASIBILITY OF A TRANSITION OF CARE SERVICE BETWEEN AN INDEPENDENT COMMUNITY PHARMACY AND A COMMUNITY HOSPITAL FOR CARDIAC UNIT DISCHARGES.

Brian J Barkow, PharmD, RPh*, Korey A Kennelty, PharmD, MS, PhD, RPh, Amanda R Margolis, PharmD, MS, BCACP, Samantha L Selvick, PharmD, RPh, Jeff A Kirchner, RPh, Becki M Detaege, BS, MT(ASCP), Lois Van Abel, MBA, BSN, RN, NEA-BC, Tracy A Vandelloo, RTL-CM
UW-Madison School of Pharmacy Community Pharmacy Residency Program, 635 Main St., Green Bay, WI, 54301
bjbarkow@gmail.com

Purpose: To assess the feasibility of a joint program between a community hospital and an independent pharmacy aimed at reducing hospital readmissions by empowering patients in their self-medication management.

Methods: An established relationship between a Midwest community hospital and an independent pharmacy is being explored to develop an outpatient transition of care service. A needs assessment of key stakeholders at the hospital helped target patient population and shape intervention protocol development. All patients on the hospital's cardiology unit will be screened using a modified Wisconsin Pharmacy Quality Collaborative level 2 identification tool. They will also be scored by length of stay, acuity of admission, comorbidities, and emergency department visits criteria to determine their risk for readmission. Qualifying patients will be approached prior to discharge to explain the service and to obtain permission for the community pharmacist to contact them. Acceptance or refusal with reason will be documented and faxed to the pharmacist, who will contact and arrange a meeting with the patient. The patient will choose where to meet prior to provider follow-up at home, at the pharmacy, or at clinic. A profile review will be done prior to appointment. Meeting with the patient the pharmacist will: perform a baseline education check (medication name, directions, purpose and memory-hook), review medication knowledge deficiencies and discharge instructions using medication self-management strategies, assess patients current status, reassess patients understanding of medications and conditions, determine future follow-ups, and communicate a summary of the visit to their provider. Program feasibility will be assessed through proportion of patients who utilize the service, reasons for declining, patient choice of meeting location, professional time involvement, and patient satisfaction of service. Patient satisfaction will be measured through a piloted questionnaire.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the value of input from each healthcare provider working with patients
Identify adjustments made to the patient-care service so as to operate closer to its intentions

Self Assessment Questions:

As the development process continued, feedback from the cardiac unit nurses helped add what component to the patient-pharmacist encounter

- A Medication reconciliation
- B: Patient re-education of discharge instructions
- C: Motivational interviewing
- D: Nutritional label reading check

After implementation of the service the initial inclusion criteria did not identify the number of patients desired by the service. The inclusion criteria were adjusted to include a modified WPQC level

- A The patient received prescriptions from multiple (>1) health care p
- B Patient was on 4+ medications to treat/prevent 2+ chronic conditio
- C The patient was discharged from the hospital or LTCF setting in th
- D The patient experienced health literacy issues

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-314-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF BLEEDING RISK IN PATIENTS ON WARFARIN IN AN AMBULATORY CARE SETTING

David B Baszynski, PharmD*; Sara Griesbach, PharmD; Brandon Parkhurst, MD; Kori Krueger, MD
Marshfield Clinic, 1000 N Oak Ave, Marshfield, WI, 54449
baszynski.david@marshfieldclinic.org

Purpose: Warfarin is associated with significant bleeding risks. Many clinical factors have been associated with increased risk of bleed, and a number of clinical tools have been developed to assess this risk. These tools differ in several ways including how derived, clinical factors included, and weighting scale. These differences make identifying which tool should be utilized for a given institution difficult. The purpose of this study is to identify which clinical tool best predicts major bleeding events in the Marshfield Clinic patient population on warfarin.

Methods: This retrospective study will include patients age 18 and older that were taking warfarin and followed by the Marshfield Clinic Anticoagulation Service between March 2011 and November 2014.

Patients with a primary care provider outside of the Clinic system will be excluded. Data to be collected will include: number of patients followed by the Marshfield Clinic Anticoagulation Service that are taking warfarin, number of patients who experienced a major bleeding event associated with warfarin, HAS-BLED score, ATRIA score, and OBRI score. Major bleeds will be defined as; any bleed resulting in hospitalization, death, or blood transfusion. The frequency of the following clinical factors will be described; hypertension, abnormal renal function, abnormal liver function, previous stroke, previous bleed, anemia, labile INR, elderly age, concomitant use of NSAIDs or antiplatelets, recent myocardial infarction, and diabetes mellitus. The predictive quality of each tool (HAS-BLED, ATRIA, and OBRI) will be compared with the C statistic. Results: Data collection is currently being conducted. Study results and conclusions are pending.

Learning Objectives:

Identify Identify the parameters that constitute the HAS-BLED bleeding risk assessment tool.

Identify Identify the patient population used to develop the ATRIA bleeding risk assessment tool.

Self Assessment Questions:

Which of the following parameters is NOT included in the HAS-BLED bleeding risk assessment tool?

- A Labile INR
- B: History of stroke
- C: Diabetes
- D: Hypertension

Which of the following patient populations was used to develop the ATRIA bleeding risk assessment tool?

- A Patients recently hospitalized for a myocardial infarction
- B Patients with atrial fibrillation on warfarin
- C Patients recently hospitalized for pulmonary embolism
- D Patients with atrial fibrillation on any antiplatelet or anticoagulant t

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-315-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

MEDICATION RELATED FALL REVIEWS: EVALUATING THE IMPLEMENTATION OF A PHARMACIST FALL REVIEW E-CONSULT SERVICE AND A COMPUTERIZED METHOD TO IDENTIFY HIGH FALL RISK MEDICATIONS

Carson L. Bechtold*, Pharm.D., Bhairvi A. Patel, Pharm.D., BCPS, CGP, Dayna C. Mitchell, Pharm.D., BCPS, Valerie L. Wodzinski, RN, MS, AOCN

Veteran Affairs - Edward Hines, Jr. Hospital, 5000 S 5th Avenue, Hines, IL, 60141
carson.bechtold@va.gov

Background: Falls are the leading cause of unintentional injury death in adults over 65. Falls can lead to significant changes in quality of life and reduce the level of independence of those who suffer them. Pharmacists have the expertise required to review medication profiles to determine if a fall is medication related and offer safer alternatives to mitigate future fall risk. The E-consult service was initiated in August 2014 in an attempt to standardize and simplify the process of requesting pharmacist fall reviews. It allows providers to directly consult pharmacists by providing a check box at the end of a patient fall note. It also uses a computerized method to identify high fall risk medications the veteran is receiving to help the provider quickly determine if a more in depth medication review is needed.

Purpose: To evaluate the change in rate of pharmacist consultation after implementation of the E-consult. Secondary objectives include percentage of consults placed that were appropriate for pharmacist review based in pre-specified criteria within the consult, the total number of falls appropriate for pharmacy consultation, the accuracy of the computerized method in identifying high fall risk medications, the number of falls that were determined to be medication related and the outcomes of pharmacist recommendations for medication related falls.

Methods: This is a retrospective, observational chart review of patients who experienced a fall three months before to three months after E-consult implementation. A manual chart review will be performed of patients who had a reported fall throughout the study period. Data collection after E-consult implementation will include demographic information, history of falls in the last 3 months, high risk medications, cause of the fall, and outcome of pharmacist recommendations in medication related falls.

Results and Conclusions: To be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize classes of medication associated with increased risk of falling
Identify potential benefits of using an E-consult for fall reviews

Self Assessment Questions:

Which of the following medications may be inappropriate to prescribe to a patient with a history of falls?

- A Rosuvastatin
- B: Aspirin
- C: Eszopiclone
- D: Fluconazole

Which of the following is a potential benefit of using E-consults to address patient falls?

- A Increased continuity of fall evaluation
- B Increased workload for pharmacist and providers
- C Increase unnecessary fall review
- D Increased confusion regarding medication reconciliation responsibility

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-898-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PSEUDOMONAS OUTCOMES STRATIFIED BY CARBAPENEM MINIMUM INHIBITORY CONCENTRATION

Lydia Benitez PharmD, Twisha Patel, PharmD, BCPS, Krishna Rao, MD, Jared Borlagdan, Jerod Nagel PharmD BCPS (AQ-ID)

University of Michigan Health System, 220 Lyndenglen Dr, Apt. 206, Ann Arbor, MI, 48103

lbenitez@umich.edu

Purpose

The purpose of this study is to compare clinical outcomes of patients treated with carbapenems for *Pseudomonas aeruginosa* infections with different minimum inhibitory concentrations (MIC). The specific aims of this study include: assessing the impact of carbapenem MIC on all cause 30-day mortality, length of stay post identification of a positive culture, rate of readmission with the same organism, and infection attributed mortality of patients with *P. aeruginosa* infections.

Methods

This is a retrospective, single-center, observational study utilizing multivariate regression. Subjects admitted to University of Michigan Health System (UMHS) that developed a *P. aeruginosa* infection at any point during the course of their admission and who were treated with an anti-pseudomonal carbapenem from January 1, 2009 through September 1, 2014 were included. For patients with multiple admissions for *P. aeruginosa* infections, only the first admission within a 30 day period was included in the analysis. Our study included UMHS inpatient age ≥ 18 yrs with a positive culture in the blood or respiratory culture for *P. aeruginosa* during the admission (if multiple positive cultures during the same admission only the first culture was counted) who received imipenem/cilastatin or meropenem > 48 hours. Patients were excluded if they had a previous positive culture obtained from outside hospital with incomplete records, carbapenem organism sensitivities were unavailable, had a diagnosis of cystic fibrosis, or had a positive respiratory cultures but did not meet definition of infection with *P. aeruginosa*. Data collected for each patient included demographic, clinical and microbiological information. The primary outcome of interest is 30-day all-cause mortality. Secondary outcomes of interest include 30 day infection attributed mortality, length of stay, for bacteremia cases time to clearing cultures, and readmission with pseudomonas within 30 days of index admission.

Results

In progress

Conclusions

In progress

Learning Objectives:

Recognize the impact of CLSI breakpoint minimum inhibitory concentration revisions

State the need for harmonizing carbapenem minimum inhibitory concentration breakpoints

Self Assessment Questions:

With regards to the treatment of *Pseudomonas*, the most recent revisions to the CLSI breakpoints for carbapenems is supported by what type of evidence?

- A PK/PD data from Monte Carlo simulations
- B: A large number of clinical outcomes studies
- C: Limited clinical outcomes data
- D: A and C

What is the importance of identifying the MIC that correlates with worse clinical outcomes?

- A To optimize carbapenem use in multi-drug resistant pseudomonas
- B To limit the use of toxic antimicrobial therapies
- C A and B
- D To decrease carbapenem use

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-316-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CREATION OF AN ELECTRONIC ASTHMA DISEASE STATE MANAGEMENT MODULE TO INCREASE COMPLIANCE WITH TREATMENT GUIDELINES AND IMPROVE ASTHMA-RELATED QUALITY OUTCOMES

Kristina M. Bennwitz, PharmD*; Joe L. Cesarz, PharmD, MS; Sean D. Gehrke, PharmD; Kerry A. Goldrosen, PharmD, RPh
University of Wisconsin Hospital and Clinics, 2355 University Ave
#215, Madison, WI, 53726
kbennwitz@uwhealth.org

Purpose: With an increased emphasis on improving patient outcomes, health systems are identifying methods to enhance care. Adherence to treatment guidelines and efficient documentation can facilitate improved outcomes. In treating patients with asthma, evidence-based guidelines are proven to improve disease control. Provider and pharmacist knowledge and application of these guidelines can ensure recommended stepwise treatment, appropriate doses of controller inhalers, and improved asthma-related outcomes. Documenting symptom control and medication adherence in an electronic medical record (EMR) provide a foundation for evidence-based asthma treatment. The primary objective was to evaluate and improve health care provider compliance to the UW Health Asthma Clinical Practice Guidelines for asthmatic patients receiving prescriptions from a UW Health pharmacy. Secondary objectives were to increase pharmacist knowledge of asthma symptom monitoring and controller medications and improve asthma-related patient outcomes for patients receiving asthma controller prescriptions from a UW Health pharmacy.

Methods: A computer-based training module focused on evidence-based asthma treatment guidelines was developed. A pre-post-assessment survey was created and utilized to determine pharmacist baseline knowledge and improvement. Development of an asthma disease state management module for the EMR was designed with the pharmacy informatics team and will be piloted. Inclusion criteria for enrollment into the asthma disease state management module include: 12 to 55 years old, diagnosis of asthma, and two consecutive fills of an asthma controller medications at UW Health pharmacies. Patients who see specialists or non-UW Health primary care providers were excluded. Process outcomes include time to complete module encounter, number of completed encounters, and number of medication recommendations. Patient outcomes data, including documentation of asthma symptoms in the electronic medical record, adherence barriers and adherence for controller medications was reported.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe asthma monitoring that supports stepwise medication therapy for patients

Discuss how pharmacists can improve adherence to asthma clinical practice guidelines

Self Assessment Questions:

Which of the following should be documented to support a change to a patient's asthma medication therapy?

- A: Current asthma symptoms and medication adherence to controller
- B: Medication adherence to rescue inhaler and Asthma Action Plan
- C: Asthma symptoms from last year and medication adherence to rescue inhaler
- D: Asthma Action Plan and asthma symptoms from last year

What electronic tool can pharmacists utilize to communicate with providers when identifying patients with poor asthma control and adherence?

- A: Telephone
- B: Electronic medical record
- C: Mailed letter
- D: Electronic prescribing

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-317-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE CHANGE IN HEMOGLOBIN A1C AFTER THE ADDITION OF EXENATIDE ER TO U-500 INSULIN IN PATIENTS WITH TYPE 2 DIABETES.

Megan Bensi, Pharm.D., PGY1 Pharmacy Resident*; Angela Zielinski, Pharm.D., BCPS, CDE; Marne Rapp, Pharm.D., BCPS
Veteran Affairs - Chalmers P. Wylie VA Ambulatory Care Center, 402 N. James Rd (Pharmacy 119), Columbus, OH, 43212
m-bensi@onu.edu

The primary objective of this study is to evaluate the change in hemoglobin A1C after the addition of exenatide extended-release (ER) to regular U-500 insulin in patients with type 2 diabetes. Secondary objectives include evaluation of change from baseline in weight and body mass index (BMI), change in total daily insulin dose, and incidence of adverse events such as hypoglycemia, gastrointestinal side effects, pancreatitis, and thyroid carcinoma. Additional objectives include evaluation of estimated glomerular filtration rate, serum creatinine, serum potassium, lipid panel, concomitant diabetes medications, drug costs pre and post combination therapy, and continuous glucose monitoring data where available.

This retrospective analysis will be conducted at the Chalmers P. Wylie VA Ambulatory Care Center in Columbus, Ohio. Eligible patients include those with type 2 diabetes and prescriptions for exenatide ER and regular U-500 insulin from January 2012-February 2015. To meet inclusion criteria, patients must be 18 years of age or older with diagnosis of type 2 diabetes and a prescription for regular U-500 insulin and exenatide ER. Exclusion criteria include patients prescribed exenatide ER for less than 2 months at the time of data collection and patients with a hemoglobin less than 10 g/dL. For the primary endpoint, the percent change in hemoglobin A1C will be reported as the mean change from baseline values. Baseline is defined as the two most recent hemoglobin A1C values available prior to the initiation of combination therapy. Baseline A1C will be compared to A1C values during the course of treatment until the start of data collection in February 2015. A mean change in A1C of at least 1% from baseline will be considered clinically significant. A paired t-test will be used to detect a 1% difference in hemoglobin A1C (80% power, $p < 0.05$) and it will be necessary to have a sample size of at least 10 patients.

Results/Conclusions: Pending

Learning Objectives:

Describe the potential advantages of adding exenatide ER to regular U-500 insulin.

Discuss the difference in primary effect on blood glucose lowering between exenatide ER and regular U-500 insulin.

Self Assessment Questions:

The addition of exenatide ER to regular U-500 insulin may result in which of the following?

- A: Higher insulin dose requirements
- B: Weight loss
- C: Hyperglycemia
- D: Polyuria

Exenatide ER may provide additional blood glucose lowering to regular U-500 insulin due to which of the following characteristics?

- A: Exenatide ER primarily targets fasting plasma glucose (FPG) levels
- B: Exenatide ER primarily acts as an insulin sensitizer
- C: Exenatide ER primarily targets post-prandial plasma glucose (PPG)
- D: Exenatide ER primarily works to lower LDL cholesterol production

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-318-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING AND OPTIMIZING INPATIENT PHARMACY EMPLOYEE ENGAGEMENT IN A COMMUNITY HEALTH-SYSTEM

Ted Berei, Pharm.D., MBA**; Stan Kent, RPh, MS
NorthShore University HealthSystem, 9600 Gross Point
Road, Skokie, IL, 60076
Tberei@northshore.org

Purpose:

Employee engagement has recently evolved into a core priority in the healthcare industry. The Advisory Board Company recently released its Hospital Workforce Engagement Benchmark report for 2014. With survey results from 665,000 respondents at nearly 600 member hospitals and health-systems, only 40.5% of employees were found to be engaged. When broken down by individual departments, pharmacy ranked third from the bottom of clinical groups, with only 35.8% employee engagement. An engaged workforce directly impacts organizational performance outcomes including employee safety, retention, productivity, customer loyalty, and profitability. As a result, organizations have focused efforts on evaluating their current engagement status to identify high-impact areas where immediate resource allocation will result in significant gains. The purpose of this project is to assess inpatient pharmacist and technician engagement across a four-hospital community health-system and develop a sustainable initiative focused on enhancing employee engagement.

Methods:

This assessment is exempt from review by the Institutional Review Board because the primary goal is to assess for quality assurance. Inpatient pharmacist and technician engagement scores from the health systems 2014 survey will be used as baseline data for comparison. An online survey will be distributed to all inpatient pharmacy staff to measure the importance and effectiveness of targeted engagement initiatives. Small group discussions will also be held with inpatient staff to further verify survey data, as well as enhance employee awareness of ongoing engagement efforts. Focused, data-driven engagement initiatives will then be implemented across the department. Inpatient pharmacist and technician engagement scores from the health-systems 2015 survey will be compared to 2014 data to assess for improvement. Descriptive statistics will be used.

Results:

Data collection is ongoing and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the importance of an engaged workforce and the potential impact on organizational performance outcomes.

Identify sustainable initiatives that can enhance employee engagement scores.

Self Assessment Questions:

Nearly ____ in 10 employees are considered unengaged according to the Advisory Board Company's 2014 Hospital Workforce Engagement Benchmark survey.

- A: 2
- B: 4
- C: 6
- D: 8

Which of the following statements regarding employee engagement are true?

- A: Employee engagement has been recognized by human resources
- B: Terms such as passion, willingness, and commitment all adequate
- C: The more engaged employees are, the more likely their employer
- D: B & C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-724-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING THE NEED FOR A LONG ACTING INTRAMUSCULAR ANTIPSYCHOTIC INITIATION PROTOCOL IN AN ACUTE CARE PSYCHIATRIC FACILITY

Krista Best, PharmD*; Crystal Mounce, PharmD, BCPS; Emma Palmer PharmD, BCPS, BCPP; Bryan Strobl, BPharm, MBA
Central State Hospital, 10510 La Grange Road, Louisville, KY, 40223
krista.best@ky.gov

PURPOSE: Within two years of hospital discharge about 75% of patients with schizophrenia will discontinue their antipsychotics and this is found to increase relapse risk five-fold. Long acting injectable (LAI) antipsychotics (AP) may improve compliance and decrease adverse events when used properly. The initiation of LAI AP is complicated by variation in the six available LAIs titration schedules, requirement for concurrent oral AP overlap, and dosing intervals. The primary objective of this study is to assess the appropriateness of prescribing the three most commonly used LAI APs in an acute psychiatric facility. The results will be used to determine the need for a protocol to assist in the initiation of these agents. Secondary outcomes include potential cost savings, survey of physicians comfort level with prescribing LAI AP, number of reported adverse drug reactions, average length of stay, AP prescriptions/separate chemical entities upon admission and discharge, and comparison of baseline demographics.

METHODS: This study has received full IRB approval. Retrospective chart review was conducted of patients who have received one dose of LAI risperidone, paliperidone, or haloperidol while admitted between January 2012 and July 2014. Patients will be excluded if they are less than 18 years old or if the patient was on the LAI medication prior to admission. Prescribing will be deemed appropriate if the following five criteria are met: (1) indication, (2) test dose of short acting AP (oral or short acting injectable), (3) correct dosing interval, (4) evidence based dose escalation schedule, and (5) appropriate oral AP supplementation during initiation. The primary outcome will be analyzed using the Chi-Square or Fishers exact test, and secondary outcomes will be compared with descriptive statistics and measures of variability.

RESULTS/ CONCLUSION: Data is currently under review, results to be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Name FDA approved indications for long acting injectable risperidone, paliperidone, haloperidol.

List appropriate initiation strategies for long acting injectable risperidone paliperidone, haloperidol.

Self Assessment Questions:

Which of the following is an FDA approved indication for the long acting injectable paliperidone palmitate?

- A: Depression
- B: Amphetamine-Induced Psychotic Disorder
- C: Schizophrenia
- D: Narcissistic Personality Disorder

Which long acting injectable antipsychotic is administered every two weeks?

- A: Haloperidol decanoate
- B: Paliperidone palmitate
- C: Risperidone microspheres
- D: Aripiprazole monohydrate

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-725-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EXPANDING STANDARDIZED PHARMACIST-PROVIDED INPATIENT EDUCATION

*Abby M Biesterveld, PharmD, Julie Dagam, PharmD, BCPS, Angie Weitendorf, PharmD, BCPS, Dan Persells, PharmD
Aurora St. Luke's Medical Center, 2900 W. Oklahoma Avenue, Milwaukee, WI, 53215
abby.biesterveld@aurora.org

Purpose:

High-alert medications pose an increased risk of causing significant patient harm when used inappropriately. Certain safeguards may be used to help reduce the risk of errors. One strategy is to improve access to information which may occur through providing education to patients taking these medications. A process to standardize pharmacist-provided education to inpatients on warfarin therapy was recently implemented at all 15 hospitals within the Aurora Health Care system. The objective of this project is to design, implement, and assess a process for expanding standardized pharmacist-provided education for other select high risk medications to inpatients.

Methods:

The current processes for pharmacist-provided education at each of the Aurora Health Care hospitals were determined through conducting a survey. Based on a literature search and input from pharmacists, the newer oral anticoagulants rivaroxaban, apixaban, and dabigatran were selected for expanding standardized pharmacist-provided education. With the assistance of the pharmacy IT team, the electronic medical record was utilized for identification of patients taking oral anticoagulants that warrant education as well as documentation of the workflow process. A resource was created to be used as a guide for pharmacists when providing education. Pharmacy caregivers were trained on the new workflow, and a pilot of the new process was conducted in an inpatient cardiology patient care area. Data collected included utilization, time, and general feedback on the process, and were used to implement necessary adjustments to optimize the process.

Results/Conclusion: Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify two methods that may be utilized to identify a specific medication or class of medications that may warrant pharmacist-provided education to inpatients.

Describe three elements of standardized pharmacist-provided education that must be considered when expanding the service.

Self Assessment Questions:

All of the following are ways in which a specific medication or class of medications may be identified that warrant pharmacist-provided education to inpatients, except:

- A Survey directors of pharmacy and clinical pharmacists to receive it
- B Perform a literature search
- C Write a progress note
- D Look for ISMP recommendations

Which of the following must be considered when expanding standardized pharmacist-provided education?

- A Identification of patients and documentation within the electronic h
- B Barriers to providing education
- C Current processes for pharmacist-provided education
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-319-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PROCALCITONIN TEST RESULT ON PROVIDER ORDERING AND MODIFICATION OF ANTIBIOTIC THERAPY

Emma L. Bingen, PharmD*, Steven C. Ebert, PharmD, FCCP, FIDSA
Meriter Hospital, 202 S Park St, Madison, WI, 537153609
ebingen@meriter.com

Purpose: Serum procalcitonin levels have been shown to rise in correlation with bacterial infections and have been studied in the management of patients with lower respiratory tract infections and/or systemic inflammatory response syndrome (SIRS)/sepsis. Evidence from the current literature suggests procalcitonin-guided therapy can lead to a decrease in antibiotic use (by withholding initial therapy or discontinuing therapy when appropriate) without increasing mortality. Procalcitonin level thresholds of less than 0.25 ng/mL for suspected lower respiratory tract infection and less than 0.5 ng/mL for suspected SIRS/sepsis are used to rule out bacterial infection. The procalcitonin test has been available at Meriter-UnityPoint Health (M-UPH) Hospital in Madison, Wisconsin since Fall 2013. The purpose of this study is to evaluate the current impact of the procalcitonin result on the clinician decision-making processes of initiation and/or continuation of antibiotic therapies in patients at M-UPH.

Methods: Institutional Review Board approval was obtained prior to initiating data collection. A retrospective chart review of all hospitalized patients age 18 or older with serum procalcitonin levels drawn over a 5 week period will be performed. Patients who were pregnant or who had received a stem cell or solid organ transplant, or a diagnosis of HIV/AIDS, absolute neutropenia, or chronic infection were excluded from the study. Data to be collected includes procalcitonin level(s), type of suspected/documented infection, temperature(s) and white blood cell count(s) on procalcitonin test day(s), microbiologic data, clinician interpretation of procalcitonin level, types and duration of antibiotics, and length of stay.

Conclusions/Results: Data collection and analysis are currently in progress. Final conclusions and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the disease state(s) in which procalcitonin levels have been used clinically to guide antibiotic treatment decisions.

Explain the use of procalcitonin to determine duration of antibiotic therapy.

Self Assessment Questions:

Procalcitonin levels can be used to manage antibiotic therapy in which of the following disease states?

- A Cellulitis
- B Endocarditis
- C Sepsis
- D Diverticulitis

Which of the following is the minimum initial procalcitonin level that would suggest continuing antibiotics in a patient with suspected pneumonia?

- A 0.5 ng/mL
- B 0.25 ng/mL
- C 0.15 ng/mL
- D 0.05 ng/mL

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-320-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECTIVENESS OF PHARMACIST-MANAGED CLINICS IN ACHIEVING HYPERTENSION CONTROL: A QUALITY IMPROVEMENT ANALYSIS IN A VETERAN POPULATION

Shennae B Blackwood* PharmD, Jessie L Bergman PharmD, BCACP, Barbara J Kasper PharmD, BCACP, Ashley A Thais PharmD
Veteran Affairs - Illiana Health Care System, 1900 E. Main Street, Danville, IL, 61832
Shennae.Blackwood@va.gov

Purpose: The primary objective of this quality improvement analysis is to evaluate the effectiveness of Clinical Pharmacy Specialists (CPS) hypertension disease state management within VA Illiana Health Care System (VAIHCS).

Methods: A retrospective chart review was conducted on patients enrolled in Patient Aligned Care Team (PACT) CPS-managed Disease State Management (DSM) Clinics at VAIHCS for hypertension management through face-to-face or telephone encounters between November 1, 2011 and March 1, 2014. The following information was collected: demographics, medical conditions, hypertension regimen at initial and final encounter, goal blood pressure, and blood pressure at initial and final encounter. The primary study endpoint is the change in systolic and diastolic blood pressure from initial to final DSM encounter. Secondary endpoints include the proportion of patients reaching blood pressure treatment goals at the final pharmacist encounter and the type and quantity of therapeutic interventions utilized by CPS in the DSM clinic.

Results: Systolic blood pressure decreased from a mean SD of 149.612.7 mm Hg at the initial pharmacist encounter to 129.48.3 mm Hg at the final pharmacist encounter, and diastolic blood pressure decreased from 87.311.9 mm Hg at the initial pharmacist encounter to 76.48.6 mm Hg at the final pharmacist encounter. There was a significant reduction in both systolic blood pressure of -20.3mm Hg $P=0.0001$ (95% CI 16.59 - 23.97) and diastolic blood pressure of -10.9mm Hg $P=0.0001$ (95% CI 8.37 - 13.47) during patient enrollment in DSM clinic. Ninety-eight percent of patients reached blood pressure treatment goals at the final DSM encounter. Overall, CPS initiated a total of 328 therapeutic interventions during patient enrollment in DSM. Approximately 30% of therapeutic interventions resulted in intensification of patient therapeutic regimen.

Conclusions: PACT Clinical Pharmacy Specialists within the VA Illiana Health Care System achieve a significant reduction in systolic and diastolic blood pressure in Veterans enrolled in DSM clinic.

Learning Objectives:

Recognize the role of patient aligned care team (PACT) clinical pharmacy specialists (CPS) in hypertension disease state management
Discuss the effect of PACT CPS on management of hypertension within VA Illiana Health Care System.

Self Assessment Questions:

Which of the following therapeutic interventions can pharmacists initiate in order to reduce blood pressure?

- A Patient education and counseling about lifestyle changes, such as
- B Medication management, such as drug monitoring with adjustment
- C Counseling on appropriate blood pressure monitoring technique, such as
- D Patient education and counseling about lifestyle changes, such as

Which of the following statements is correct regarding the effect of PACT CPS on hypertension management within VA Illiana?

- A Few patients achieve their target blood pressure goal through CPS
- B Approximately 98% of patients achieve their target blood pressure
- C All patients achieve a target blood pressure goal of <140/90 mm Hg
- D All patients achieve a target blood pressure goal of <140/80 mm Hg

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-321-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZATION OF VITAMIN D DEFICIENCY AND EFFECTS OF SUPPLEMENTATION IN ADULT BURN PATIENTS

Mary E Blair*, PharmD, BCPS; Todd A Walroth, PharmD, BCPS; Katie M Bussard, NP; Alethea Clore, RD; Serena A Harris, PharmD, BCPS; Karalea D Jasiak, PharmD, BCPS; David R Foster, PharmD, FCCP; Rajiv Sood, MD, FACS
Eskenazi Health, 720 Eskenazi Ave., Indianapolis, IN, 46202
mary.blair@eskenazihealth.edu

Purpose: Vitamin D deficiency is linked to increased morbidity and mortality in critical illness. Vitamin D deficiency is a widespread problem in the general population. Burn patients have additional risk factors for continued deficiency: hypermetabolism, decreased sun exposure, and impaired synthesis. Standard supplementation recommendations do not exist for this population. Our objective was to characterize vitamin D status and effects of supplementation in adult burn patients.

Methods: This pre/post study was comprised of a retrospective stage including burn patients admitted prior to implementation of a vitamin D replacement protocol (4/1/11 to 3/31/13), with a documented serum 25(OH)D level. The second stage was a prospective, observational analysis of a vitamin D replacement protocol. Patients < 18 yrs, pregnant, incarcerated, or already receiving vitamin D were excluded. The primary endpoints were baseline or initial vitamin D status and percent achievement of normal serum 25(OH)D level following supplementation. Secondary endpoints were LOS, sepsis, mortality and adverse effects.

Results/Conclusions: Of 660 patients admitted during the retrospective stage, 33 met inclusion criteria. Median age was 40 yrs [IQR 31-66] and 82% were male. Median total body surface area of burn was 23% [IQR 13.5-37.5]. Baseline/initial serum 25(OH)D levels were normal in 15% of subjects (n=5); insufficient in 21% (n=7); and deficient in 64% (n=21). Median serum 25(OH)D level was 18 ng/dL [IQR 13-24]. Vitamin D was supplemented in 23 patients with 91% receiving ergocalciferol 50,000 IU/week. Nine patients, all on 50,000 IU/week, had a follow-up level and all were still below normal. Mean level increased from 15.2 + 7.2 to 19.2 + 6.1 ng/dL ($p=0.209$). Median LOS was 27 days [IQR 15-37]. The rate of sepsis was 30% (n=10) and overall mortality was 12% (n=4). No adverse effects were reported. Results of the prospective stage and conclusions will be presented at the conference.

Learning Objectives:

Define the pathophysiologic characteristics of burn patients that may predispose them to vitamin D deficiency in the hospital and following discharge.

Describe the available evidence regarding vitamin D deficiency and outcomes in critically ill patients as it applies to adult burn patients.

Self Assessment Questions:

Which of the following is/are reasons why burn patients are at an increased risk of vitamin D deficiency?

- A Hypermetabolism
- B Decreased sun exposure
- C Impaired synthesis by the skin
- D All of the above

In critically ill patients, vitamin D deficiency has been linked to which of the following?

- A Increased nutritional requirements
- B Increased mortality
- C Decreased length of stay
- D Decreased 90-day readmission rates

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-322-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PHARMACY TECHNICIAN EDUCATION IN RELATION TO COMMUNITY PHARMACY VACCINATION RATES

Gregory M. Blette* PharmD, Leslie M. Lake PharmD, Jennifer L. Focht PharmD, Margie E. Snyder PharmD MPH
Purdue University/Kroger Pharmacy, 5960 Castleway West Drive, Indianapolis, IN, 46250
gregory.blette@kroger.com

Purpose: The primary objective of this study is to examine the impact of an immunization and communication skills-based education program for pharmacy technicians on non-influenza vaccination rates in supermarket community pharmacies. The secondary outcome is to determine if there is an effect on pharmacy technician job satisfaction as a result of their contributions to patient care after receiving the formal training.

Methods: This prospective, randomized control trial will collect data from non-influenza vaccine transactions over three months in twenty-eight supermarket pharmacies in Indiana. The pharmacies included in the study were selected, matched, and randomized based on similar prescription volume and geographic location. Technicians in the intervention pharmacies will receive formal training consisting of: (1) two online modules approximately 10-15 minutes in length, and (2) a session of two live, off-site lectures with interactive discussion. Modules will be presented before the live lectures and are designed to allow technicians to attain general baseline knowledge. The active learning lectures will reinforce and build upon the online module information, provide technicians with practice role-playing, and allow for real-time feedback from the instructor. After training is complete, non-influenza immunization rates will be calculated from weekly vaccine transaction reports for intervention and control pharmacies. The difference in vaccination rates between the study groups will be analyzed through use of a two-sided t-test. Quality of the pharmacy technician education program will be evaluated by examining the change in immunization rates as well as through pharmacy technician job satisfaction determined by an administered survey.

Summary of Preliminary Results: Collection of information is currently in progress. Preliminary results and conclusions will be presented at the Great Lakes Residency Conference.

Conclusions Reached: Research is currently in the data collection phase and results and conclusions are pending.

Learning Objectives:

Identify the reasons behind needing to increase vaccine rates in the community

Explain the importance of patient communication in immunization delivery

Self Assessment Questions:

Which of the following best describes a reason to vaccinate the public?

- A: Increases revenue for pharmaceutical companies to fund continue
- B: Prevent illness and death
- C: Treat already sick individuals and reduce healthcare costs
- D: Adults no longer require vaccines once they received them as children

Which of the following best describes how pharmacy technicians can have an impact with non-influenza vaccines in community pharmacies?

- A: They can screen patients and relay appropriate vaccine information
- B: They can administer vaccines under the supervision of a certified pharmacist
- C: They can recommend vaccines and counsel patients on potential side effects
- D: They can take vaccine prescriptions from a Doctor's office over the phone

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-323-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PROPHYLACTIC ANTIBIOTIC SELECTION, DOSING, AND TIMING IN CONJUNCTION WITH RISK FACTORS IN PATIENTS PRESENTING WITH SURGICAL SITE INFECTIONS

Matthew T. Blum*, Pharm.D., MBA; Ashley L. Ross, Pharm.D., BCPS; Jennifer A. Wiedmar, Pharm.D., BCPS; Mark R. Cox, Pharm.D., BCPS; Lynn C. Wardlow, Pharm.D., BCPS, MBA
University of Louisville Hospital, 530 South Jackson Street, Louisville, KY, 40202
matthebl@ulh.org

Purpose: The purpose was to determine if preoperative antibiotic selection in conjunction with identified risk factors was associated with surgical site infections (SSIs) at University of Louisville Hospital and Jewish Hospital.

Methods: This study was a retrospective chart review evaluating adult patients diagnosed with surgical site infections based on inpatient International Classification of Diseases, Ninth Revision coding. The patient population was obtained from two affiliated hospitals between the time periods of 10/2010-06/2014. Primary outcomes included the association of surgical site infections with the type of preoperative antibiotics received and the percent of surgical cases in compliance to current SCIP guidelines. Secondary outcomes identified common organisms isolated, assessed if laboratory markers correlated with infection, determined the average time until presentation of infection, and evaluated if antibiotics were given within the recommended time frame, both preoperatively and postoperatively. Patients were included only if they had a surgery performed at either hospital. Exclusion criteria included previous infection within 30 days, antibiotics within 7 days, surgery within 30 days or secondary to trauma, age < 18 years old, immunosuppression, burns greater than 10% total body surface area, and surgical procedures where the standard of care was not vancomycin or cefazolin.

Preliminary Results: Preliminary results show that antibiotics were administered in accordance to SCIP measures 73.1% (n=19) of the time in the preoperative and intraoperative settings, and 80.8% (n=21) of the time in the postoperative setting. Cultures obtained in patients with surgical site infections identified 5 gram-positive and 5 gram-negative organisms. Mean time to diagnosis was 8 days after the surgical procedure + 4 days.

Conclusions: Preliminary conclusions suggest there are multiple opportunities for the healthcare team to improve education on the timing and selection of antibiotics, incorporation of antibiotic administration into the pre-surgery timeout, and optimization of postoperative antibiotic dosing to meet SCIP measures.

Learning Objectives:

Define Surgical Care Improvement Project (SCIP) guidelines and potential means to improve compliance in local operating rooms.

Discuss preoperative antibiotic selection based off trends in common pathogens associated with surgical site infections at University of Louisville Hospital and Jewish Hospital.

Self Assessment Questions:

A patient receiving preoperative cefazolin for a knee replacement should have the infusion administered:

- A: Just after initial incision is made
- B: 30 minutes after the initial incision
- C: 60 minutes to just prior to the initial incision
- D: 60 to 90 minutes prior to the initial incision

A patient undergoing a lumbar fusion at a hospital with a low occurrence of MRSA and no history of MRSA colonization should receive which antibiotic regimen preoperatively? (NKDA)

- A: cefazolin
- B: vancomycin
- C: cefazolin + vancomycin
- D: No preoperative antibiotics are warranted

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-324-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING ANTIMICROBIAL THERAPY FOR ACUTE RESPIRATORY TRACT INFECTIONS WITHIN THE EMERGENCY DEPARTMENT

*Kristin L Blunt, Pharm.D.; Valerie L Ravenna, Pharm.D., BCPS; Christopher M Knock, Pharm.D.

Aurora St. Luke's Medical Center, 5642 S Swift Ave, Cudahy, WI, 53110
kristin.blunt@aurora.org

Purpose: Reducing over-prescribing of antimicrobials is the cornerstone of many stewardship efforts. Antimicrobial stewardship initiatives are intended to improve clinical outcomes, limit emerging bacterial resistance, and reduce excessive costs. According to a recent study, there were 2.2 million adult uncomplicated respiratory infection visits in emergency departments across the US. Approximately 52% of these visits resulted in prescriptions for antimicrobials. Studies have shown that integration of evidence-based treatment guidelines into a clinical decision support tool may help providers optimize therapeutic selections. The goal of this project was to assist prescribers in making evidence-based treatment decisions when choosing therapy for selected acute respiratory tract infections. To realize this goal, clinical decision support tools were created and a process was implemented to allow for standardization of antimicrobial prescribing. This effort was targeted at patients presenting with acute bronchitis or COPD exacerbation discharging from the emergency department.

Methods: This was a prospective, single-center study at a tertiary care hospital that sees an estimated 65,000 emergency department visits annually. Adult patients being discharged from the emergency department with a diagnosis of acute bronchitis or COPD exacerbation between January and March 2015 were included in the analysis. This data will be compared to a retrospective cohort from a similar time period in 2014. Exclusion criteria included patients <18 years of age and those admitted to the hospital for further treatment. Electronic health record alerts were created to notify prescribers when a patient had a disposition of discharge and a diagnosis of acute bronchitis or COPD exacerbation was entered. This alert provided an electronic link to a treatment algorithm from which prescribers could select the most appropriate antimicrobial therapy. The primary outcome was appropriate selection of treatment for discharge.

Preliminary Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Discuss the role of antimicrobials in treating acute respiratory tract infections

Describe clinical decision support tools available to aid emergency department providers

Self Assessment Questions:

Which of the following is true regarding treatment of acute respiratory tract infections?

- A All patients who present to the emergency department with acute I
- B: No patients presenting to the emergency department with acute ex
- C: All patients with acute respiratory tract infections should have a sp
- D: Supportive therapy for acute bronchitis should be offered for patier

Which of the following are clinical decision support tools that can aid providers with prescribing diagnosis-specific antimicrobials?

- A Condition-specific order sets
- B Documentation templates
- C Best practice alerts
- D A & c

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-325-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACY RESIDENTS PERCEPTION OF PRECEPTORS AS ROLE MODELS

Samantha H Bochenek, PharmD*; Ann M Fugit, PharmD, BCPS; Aaron M Cook, PharmD, BCPS; Kelly M Smith, PharmD, BCPS, FASHP, FCCP

University of Kentucky HealthCare, 800 Rose Street,
H110, Lexington, KY, 405360293
sbo247@uky.edu

Purpose: Although medical and pharmacy student literature exists, there is limited information regarding the perception of preceptors as role models by pharmacy residents. The primary objective of this research project is to evaluate pharmacy residents perception of preceptors as role models. A secondary objective is to conduct a gap analysis comparing characteristics deemed desirable by pharmacy residents in a preceptor versus characteristics exhibited by current preceptors. Identifying characteristics that are important to pharmacy residents but not exemplified by preceptors may result in enhanced preceptor recruitment, development and training.

Methods: A 55-item questionnaire was developed and distributed to all pharmacy residents in the state of Kentucky for rating on a 5-point Likert scale the importance of selected preceptor characteristics. The survey also asked pharmacy residents to rate which selected characteristics were exemplified in current preceptors. The percentage of residents who view their preceptors as role models by scoring them ≥ 4 is the primary outcome. The primary outcome will also be stratified based on residents age, gender, and year of residency. Furthermore, the primary outcome will be stratified based on preceptor characteristics such as years of experience, board certification and residency training. A secondary outcome will be a gap analysis of characteristics important to residents versus characteristics that are exemplified by current preceptors defined as a score ≥ 4 . Finally, characteristics will be pooled into three groups: clinical, teaching, and personal qualities. A gap analysis will be conducted for each group comparing characteristics important to residents versus characteristics that are exemplified by current preceptors defined as a score ≥ 4 .

Preliminary Results: Sixty-nine out of eighty-nine (77%) pharmacy residents responded to the survey.

Final Results/Conclusion: Final results and conclusion are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the domains a preceptor should be competent in to become a positive role model.

Recall the percentage of pharmacy residents who view their preceptor as a role model.

Self Assessment Questions:

Which of the following domains should a preceptor be competent in to become a positive role model?

- A Cognitive, affective, and psychomotor qualities
- B: Personal, clinical, and teaching qualities
- C: Visual, auditory, and tactile qualities
- D: Emotional intelligence, communication skills, and adaptability

What percentage of pharmacy residents view their preceptor as a role model?

- A 50%
- B 75%
- C 85%
- D 90%

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-726-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACISTS' IMPACT ON DOOR-TO-NEEDLE TIME IN ACUTE ISCHEMIC STROKE

Joe D Bodkin*, Pharm.D.; Stephanie Bennett, Pharm.D., BCPS;
Elisabeth Donahey, Pharm.D., BCPS; Megan Rech, Pharm.D., BCPS
Loyola University Medical Center, 2160 S. First Ave., Maywood, IL, 60153
Joe.Bodkin@lumc.edu

Purpose:

Treatment with intravenous (IV) tissue plasminogen activator (tPA) for acute ischemic stroke has been shown to reduce long-term disability when administered to eligible patients. Due to its time-sensitive nature, consensus guidelines recommend a door-to-needle (DTN) time of for IV tPA within 60 minutes of onset of stroke symptoms. Multiple methods have been implemented to help reduce the DTN time, including code stroke teams, protocols to guide treatment, and defining primary or comprehensive stroke centers. Despite multiple initiatives to reduce DTN time, hospitals still have difficulty meeting the 60 minute deadline. The purpose of this study is to assess whether the addition of a pharmacist to a stroke response team decreases DTN time in patients receiving tPA for acute ischemic stroke.

Methods:

The Institutional Review Board at Loyola University Medical Center approved this retrospective, cohort analysis. Patients ≥ 18 years old with diagnosis of suspected acute ischemic stroke admitted through the emergency department and received tPA between October 1, 2012 and December 31, 2014 were identified using tPA order set. Patients were excluded if they were already inpatient when stroke occurred or were transferred from another facility. Stroke onset, patient arrival to emergency department, completion of CT scan, tPA order entered into medical record, and tPA administration time were collected using electronic medical records. The primary endpoint of this study was DTN time. The secondary endpoints include the following: imaging-to-needle time, onset-to-needle time, tPA order to administration time, length of stay, all-cause in-hospital and 90-day mortality, Modified Rankin Score (mRS), National Institutes of Health Stroke Scale (NIHSS) scores upon discharge, discharge disposition, symptomatic intracranial hemorrhage, and signs or symptoms of bleeding.

Results/Conclusion:

To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define time parameter goals in the management of acute ischemic stroke (AIS) and their implications on reduction of morbidity.
Explain delays in therapy and strategies used to reduce door to needle (DTN) time.

Self Assessment Questions:

What is the door-to-imaging time goal?

- A 15 minutes
- B: 20 minutes
- C: 25 minutes
- D: 30 minutes

Which of the following can cause delays in DTN time?

- A Pre-notification of hospital by emergency medical services
- B Use of specific protocols and tools
- C Premixing tPA for high-likelihood candidates
- D Notifying each stroke-team member individually

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-326-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE RELATIONSHIP OF GLUCOSURIA AND GRADE III-V ACUTE KIDNEY INJURY IN PATIENTS TREATED WITH AN IFOSFAMIDE, CARBOPLATIN, AND ETOPOSIDE (ICE) REGIMEN

Blake R. Bonkowski, Pharm.D.*, Polly E. Kintzel, Pharm.D., BCPS, BCOP

Spectrum Health System, 100 Michigan Street NE, Grand Rapids, MI, 49503

blake.bonkowski@spectrumhealth.org

Purpose: The purpose of this study was to assess the relationship between glucosuria and regimen-related grade III-V acute kidney injury (AKI) in adult oncology patients receiving ifosfamide, carboplatin, and etoposide (ICE) chemotherapy for Hodgkin lymphoma (HL) or non-Hodgkin lymphoma (NHL).

Methods: A retrospective cohort was conducted with patients treated with ICE, or rituximab + ICE (RICE) chemotherapy, for HL or NHL between 1/1/2011 and 12/31/14 at Spectrum Health Grand Rapids. Patients were classified into two groups based on ever having glucosuria or never having glucosuria. Data was collected for each inpatient admission where the patient received a cycle of ICE/RICE chemotherapy. AKI was defined according to the National Cancer Institutes Common Terminology Criteria for Adverse Events. The primary endpoint was rate of grade III-V AKI throughout all cycles of ICE/RICE chemotherapy. Secondary endpoints included rate of AKI of any grade, rate and severity of creatinine elevations, rate of diagnosis of Fanconi syndrome, and correlation of grade III-V acute kidney injury and length of stay.

Results: A total of 30 patients (93 encounters) were included in this study, including 25 patients with NHL and five with HL. Of the 30 patients, 22 patients received RICE and eight received ICE. The patient had a mean age of 55 years, with 57% being male. Nineteen patients experienced glucosuria at least once, while 11 did not have glucosuria during any cycle of ICE/RICE. There were no incidents of grade III-V AKI in either study group. Three (15%) patients in the glucosuria group and zero patients in the non-glucosuria group had AKI of any grade at least once during their cycles of ICE/RICE ($p=0.279$).

Conclusion: The finding of glucosuria during treatment with ICE/RICE chemotherapy for HL or NHL was not associated with grade III-V AKI in this study population.

Learning Objectives:

Describe the nephrotoxic and uroepithelial toxic potential of ICE chemotherapy.

Outline the renal and uroepithelial monitoring parameters for ICE chemotherapy.

Self Assessment Questions:

Which of the following statements about ifosfamide is correct?

- A Coadministration of mesna prevents ifosfamide's nephrotoxic effect
- B: Fanconi syndrome is a result of ifosfamide's uroepithelial toxicity
- C: Ifosfamide is toxic to both the proximal tubule and glomerulus
- D: Urinalysis is the only monitoring needed with ifosfamide administration

Which of the following correctly describes why a urinalysis is needed to monitor ICE chemotherapy?

- A Monitoring for glomerular toxicity with carboplatin
- B Monitoring for hemorrhagic cystitis with ifosfamide
- C Monitoring for allergic reactions with etoposide
- D Monitoring for efficacy of carboplatin

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-327-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF WORKFLOW AND PERFORMANCE METRICS IN THE STERILE COMPOUNDING ROOM

Christopher Boreen, Pharm.D*.; Jeffrey Chalmers, Pharm.D., B.S.; Jonathan Williams, Pharm.D., M.S.; Garrett Eggers, Pharm.D., M.S.; Simon Lam, Pharm.D., BCPS; Angela Yaniv, Pharm.D.

Cleveland Clinic, 9500 Euclid Avenue, Mail Code JJN1-432, Cleveland, OH, 44114

boreenc@ccf.org

Statement of the purpose

Intravenous (IV) compounding errors are the most likely to cause direct harm to patients, yet sterile compounding rooms continue to be an area with minimal reliance on technology. It is critical for technicians to be accurate in this setting due to challenges in identifying errors as well as the critical nature of many medications compounded in this setting. Despite the reliance on technician accuracy, it remains challenging to objectively measure performance. Currently, the Cleveland Clinic Pharmacy Department relies on media fill tests, direct observations, anecdotal reporting, and written competencies to evaluate technician performance. These evaluation techniques provide a limited snapshot of overall performance and can be subjective.

The primary purpose of this project is to develop pharmacy technician performance metrics using an IV workflow system to assess individual productivity and accuracy in the sterile compounding room. The secondary purpose is to describe the impact of IV workflow systems on turnaround time.

Statement of methods used

Technician productivity will be assessed based on volume and compounding time. Compounding accuracy will be assessed based on the percentage of doses compounded that were rejected by the pharmacist and the percentage of products that were incorrectly selected for barcode scanning.

The secondary objective of this project will assess the impact of the IV workflow system on turnaround time. Turnaround time will be evaluated based on a comparison of pre- and post-implementation data. Pre-implementation data will use scan points from a dose tracking system. Post-implementation data will use the same scan points within the IV workflow system.

Results and Conclusions: To be presented at the Great Lakes Pharmac Resident Conference.

Learning Objectives:

Describe the safety risks associated with the syringe pull-back method
Identify metrics that can be utilized by IV workflow information systems to enhance the efficiency and safety of the sterile compounding room

Self Assessment Questions:

Which of the following is an objective metric that can be captured using IV workflow information systems?

- A: Media fill tests
- B: Direct observations
- C: Anecdotal reporting
- D: Dose rejection rate

Which of the following is a technique utilized by IV workflow systems to replace the syringe pull-back method?

- A: Barcode scanning
- B: Image capturing during compounding
- C: Automated calculations
- D: Dose tracking

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-727-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING THE USE OF A STANDARDIZED ORDER SET FOR POSTOPERATIVE PAIN MANAGEMENT IN TOTAL ARTHROPLASTY PATIENTS

Brittany N. Bowen, PharmD*; Jaculin Cole, PharmD; Martha Slot, PharmD

Spectrum Health, 100 Michigan St. NE, Grand Rapids, MI, 49503

brittany.bowen@spectrumhealth.org

PURPOSE: Over the past decade, there has been increasing emphasis across health systems on pain control. Studies have shown that, in spite of the increased focus on pain control, the safe and effective management of opioid-tolerant individuals remains a challenge.

Identifying opioid tolerance and anticipating increased needs for this population reduces suboptimal pain control. The purpose of this study is to evaluate whether identification of opioid-tolerant patients before surgery and the use of an order set with medications tailored to opioid use results in improved pain management in opioid-tolerant individuals.

METHODS: Adult patients admitted for total arthroplasty between October 2014 and December 2014 who had an order set for postoperative pain management initiated were identified retrospectively. The primary objective of this study was to evaluate whether patients were assigned to the appropriate opioid use category based on their documented morphine equivalents prior to admission. Secondary objectives include the effectiveness of the selection of the opiate use category by assessment of average pain scores postoperatively, total number of breakthrough doses received, time to first breakthrough dose total morphine equivalents utilized for breakthrough pain postoperatively adverse drug events, HCAHP pain scores, readmission rates, and hospital length of stay.

RESULTS: 57 patients out of 102 were analyzed on interim analysis. Patients had a mean age of 66 and 46% were male. Seventeen patients (29.8%) were assigned to the appropriate opiate use category based on documented morphine equivalents prior to admission.

CONCLUSIONS: In patients undergoing total arthroplasty, approximately one third of patients were assigned to the correct order set based on documentation of medication history. Further results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Describe the importance of identifying opiate-tolerance prior to surgery to design optimal pain regimens.

Discuss a treatment plan for the management of postoperative pain in a patient with opiate tolerance.

Self Assessment Questions:

Which of the following is a useful strategy to identify opiate tolerant individuals prior to surgery?

- A: A complete and accurate medication history documenting morphine
- B: Check blood levels of narcotics prior to surgery
- C: Warn the patient about possible adverse effects of narcotics
- D: Generate a Michigan Automated Prescription System (MAPS) report

Components of a well-designed post-operative pain regimen for individuals with opiate tolerance include all of the following EXCEPT:

- A: Consideration of a short acting opioid for breakthrough pain
- B: Consideration of a fentanyl patch
- C: Consideration of Tylenol or a selective COX-2 inhibitor 1-2 hours prior to surgery
- D: Consideration of an adjunct pain medication, such as gabapentin,

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-728-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF ADHERENCE TO RECOMMENDATIONS FOR BONE MINERAL DENSITY SCREENING IN HIV-INFECTED PATIENTS

Kathy M. Imhoff-Witt, PharmD, BCPS; Crystal M. Boykin*, PharmD, PGY-1 Pharmacy Practice Resident; Tamara M. Hammons, PharmD, CDE, BCPS

Veteran Affairs - Cincinnati Medical Center, 3200 Vine St, Cincinnati, OH, 45220

Crystal.Boykin@va.gov

Purpose

The life span of the HIV-infected population is increasing and metabolic complications such as osteoporosis and osteopenia are becoming more common. Current literature attributes this to antiretroviral medications. The 2013 Infectious Disease Society of America primary care

(IDSA) guidelines highlight appropriate bone mineral density (BMD) screening among persons infected with HIV. Assessment is important since low BMD can enhance fracture risk which can then increase morbidity and mortality. The primary objective of this study is to evaluate if practitioners at the Cincinnati VA Medical Center (CVAMC) are following recommendations for BMD screening per the IDSA guidelines among the HIV-infected population.

Methods

The computerized patient record system will be utilized to conduct a retrospective chart review of all patients diagnosed and enrolled in the HIV Clinic at the CVAMC starting from November 13, 2013, at which the most recent IDSA primary care guidelines for management of persons infected with HIV were published, until February 28, 2015. Electronic medical charts of each patient will be reviewed to assess if HIV-infected individuals, who meet criteria for a BMD scan per IDSA guidelines, have received a baseline bone densitometry by dual-energy X-ray absorptiometry (DXA). A T-score will be used to interpret if the patient has osteoporosis or osteopenia from the DXA scan. A T-score of -1.0 or above is normal, a T-score between -1.0 and -2.5 is diagnostic for osteopenia, and a T-score of -2.5 or below is diagnostic for osteoporosis. Each patients chart will also be reviewed for osteoporosis risk factors including current use of antiretrovirals, tenofovir and efavirenz. The study will help determine whether education and/or proposed process improvements such as clinical reminders are necessary to ensure BMD screening in HIV patients who meet criteria.

Results

Results will be presented at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the recommendations proposed by the Infectious Disease Society of America for bone mineral density screening in the HIV-infected patient population

Describe the effects of antiretroviral medications on low bone mineral density in the HIV-infected patient population

Self Assessment Questions:

According to the Infectious Disease Society of America Primary Care Guidelines published in November 2013, bone mineral density screening is recommended in HIV-infected patients who are:

- A: Men and women aged ≥ 65 yrs
- B: Men aged ≥ 65 yrs and postmenopausal women aged ≥ 50 yrs
- C: Men aged ≥ 50 yrs and postmenopausal women aged ≥ 65 yrs
- D: Men and postmenopausal women aged ≥ 50 yrs

Tenofovir is an antiretroviral medication that has been associated with reducing bone mineral density in the HIV-infected population through:

- A: Inhibiting calcium absorption from diet
- B: Renal calcium and phosphate wasting
- C: Directly interfering with vitamin D metabolism
- D: Directly interfering with calcitonin production

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-328-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INTRATHECAL MORPHINE VERSUS TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK WITH SINGLE DOSE "CAINE" VERSUS EPIDURAL IN SURGERY PATIENTS

Jaleesa Bragg, PharmD*, Tara Jellison, PharmD, MBA, FASHP, Sarah Pfahler, PharmD, MBA, BCPS, Jacob Balyeat, PharmD, CGP

Parkview Health System, 11109 Parkview Plaza Drive, Fort Wayne, IN, 46845

jaleesa.bragg@parkview.com

Purpose:

Surgery can be a source of significant postoperative pain. Traditionally, epidural analgesia has been considered the standard of care when providing postoperative pain management in this patient population. While epidural analgesia has established efficacy, there is evidence that suggests effective alternatives exist. The objective of this study is to assess the efficacy of intrathecal morphine, TAP block, and opioid epidural in providing postoperative analgesia in surgery patients in order to better define the role of each of these analgesic methods.

Methods: This study is a retrospective chart review. Patients admitted to Parkview Regional Medical Center for surgery, age ≥ 18 years, and receiving intrathecal morphine, TAP block, or opioid epidural will be eligible for inclusion in this study. Subjects will be analyzed in one of three treatment arms; intrathecal morphine, TAP block, or opioid epidural. Data will be collected from electronic medical records from March 2013 to present. The primary outcome measured in this study is post-op opioid consumption. Secondary outcomes include length of stay, time to return of bowel function, readmission rate within 30 days, time to ambulation, medications needed for adverse event reversal, total hospital cost, total post-op analgesic cost, and patient perception of pain. Adverse events will be analyzed by assessing medications needed for adverse event reversal. Naloxone, diphenhydramine, anti-emetic, and laxative administration will be evaluated. A cost analysis will include total cost of care and total post-op analgesic cost for each arm.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe potential benefits of alternative techniques in postoperative pain management in surgery patients.

Discuss the impact of increased post-operative opioid consumption.

Self Assessment Questions:

Which of the following is a consequence of inadequate post-operative pain control?

- A: Reduced length of stay
- B: Decreased time to mobility
- C: Decreased opioid utilization
- D: Increased cost

Which of the following is a potential benefit of single-dose intrathecal morphine?

- A: Decreased urinary retention
- B: Smaller dose requirement
- C: More invasive
- D: Shorter duration of action

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-329-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IN-VITRO ACTIVITY OF CEFTRIAXONE AGAINST METHICILLIN SUSCEPTIBLE STAPHYLOCOCCUS AUREUS USING E-TEST, BROTH DILUTION, AND TIME-KILL METHODS

Derek N. Bremmer, PharmD*; Joan-Miquel Balada-Llasat, PharmD, PhD, ABMM; Debra A. Goff, PharmD, FCCP; Karri A. Bauer, PharmD, BCPS (AQ-ID)

The Ohio State University Wexner Medical Center, 410 W. 10th Avenue, 396 Doan Hall, Columbus, OH, 43210-1234

derek.bremmer@osumc.edu

Purpose: In the treatment of methicillin-susceptible *Staphylococcus aureus* (MSSA) bacteremia, an anti-staphylococcal penicillin is recommended. Ceftriaxone, a third generation cephalosporin, demonstrates favorable pharmacokinetics allowing once daily dosing. Currently, Clinical Laboratory Standards Institute (CLSI) does not recommend obtaining ceftriaxone minimum inhibitory concentrations (MICs) against MSSA isolates. We investigated the in-vitro activity of ceftriaxone against MSSA in response to the recent reports of MSSA resistance.

Methods: Ninety-six MSSA blood isolates obtained from adult inpatients between January 1, 2012 and December 31, 2013 were included. MICs for ceftriaxone were determined via E-test method. Although there are no current CLSI interpretive criteria for ceftriaxone against staphylococci, the 2012 CLSI M100 susceptible breakpoint of ≤ 8 g/mL was used. For ceftriaxone non-susceptible isolates, further MIC analysis was performed using standard broth macro-dilution (BMD). Time-kill assay was also performed on all E-test non-susceptible isolates using a standard inoculum of 1×10^6 cfu/mL. Each isolate was exposed to a concentration of ceftriaxone equal to the BMD MIC, E-test MIC, and clinical breakpoint. Surviving bacteria were enumerated at 0, 10, and 24 hours. Bactericidal activity was defined as a ≥ 3 log decrease in CFU/mL at 24 hours.

Results: By E-test method, 11.5% (11/96) of MSSA strains were non-susceptible to ceftriaxone, MIC > 8 g/mL. However, all strains tested susceptible by BMD (range: 4g/mL - 8g/mL). By time kill assay, log kills of isolates exposed to ceftriaxone at a concentration equal to the BMD or E-test MIC did not differ by Mann-Whitney (median: -1.69 vs -2.63; $P=0.052$). Bactericidal activity was achieved in 18% and 36% of isolates exposed to 8g/mL and 16g/mL at 24 hours, respectively.

Conclusion: Ceftriaxone E-test overcalls resistance among MSSA isolates. By time-kill analysis, ceftriaxone lacked universal bactericidal activity at serum achievable concentrations. Clinicians should exercise caution when considering the use of ceftriaxone for critically ill patients with MSSA infections.

Learning Objectives:

Identify various testing methods to determine antibiotic in-vitro activity. Describe ceftriaxones in-vitro activity against methicillin sensitive *Staphylococcus aureus*.

Self Assessment Questions:

Which of the following is the recommended method of determining antibiotic susceptibility?

- A: E-test method
- B: Broth dilution method
- C: Time-kill assay
- D: Checkerboard method

Which option best describes ceftriaxones activity against methicillin sensitive *Staphylococcus aureus* in-vitro?

- A: Ceftriaxone was susceptible by both E-test and broth dilution meth
- B: Ceftriaxone was non-susceptible by E-test in some isolates, but w
- C: Ceftriaxone was susceptible by both E-test and broth dilution meth
- D: Ceftriaxone was non-susceptible by E-test in some isolates, but w

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-330-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF ADENOSINE AND REGADENOSON IN CARDIAC STRESS TESTING

Heidi L. Brink, Pharm.D*; Jennifer Dickerson, MD; Julie Stephens; Kerry Pickworth, Pharm.D

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 W 10th Ave, Columbus, OH, 43210

heidi.brink@osumc.edu

Purpose: In patients unable to exercise to sufficient cardiac workload, a pharmacologic stress test using adenosine (A) or regadenoson (R) is preferred to the traditional exercise method. These agents, due to their pharmacologic activity, differ in administration and side effect profile. The primary objective of this study is to compare the side effect profile of adenosine and regadenoson in nuclear stress testing.

Methods: Patients undergoing a pharmacologic stress test at two outpatient clinics at a single centered tertiary care academic medical center between January 2014 and December 2014 were eligible for inclusion. Pharmacologic stress testing is similar between clinics except for the difference in pharmacologic agent used at each site. Baseline demographics, co-morbidities, dose administered, cost of agents and recovery time was recorded. For the primary endpoint, side effects experienced during the pharmacologic stress test were collected; including flushing, chest pain, headache, dyspnea, nausea/vomiting and the use of aminophylline rescue.

Results: Preliminary data includes information on 292 of 580 patients; 152 adenosine and 140 regadenoson. Baseline demographics and co-morbidities were similar between groups. Overall, the regadenoson patients experienced more side effects during the pharmacologic stress test (71% R vs 19% A), the most common of which were dyspnea (59% R vs 12% A) and headache (26% R vs 0.65% A). The regadenoson group also had a higher incidence of aminophylline rescue (2.86% R vs 0.65% A).

Conclusions: Preliminary data suggests patients undergoing a pharmacologic stress test may experience fewer side effects with adenosine than with regadenoson.

Learning Objectives:

Describe the differences in administration and side effect profile of adenosine and regadenoson
Identify patient populations which may be considered high risk for adenosine/regadenoson stress test

Self Assessment Questions:

One advantage to using regadenoson over adenosine is:

- A: Ease of use (administered as 0.4mg IV push rather than weight-ba
- B: Shorter half-life, leading to faster recovery time
- C: Has been shown superior to adenosine in cardiac imaging
- D: Cost – regadenoson remains less expensive (per average dose) th

Which of these patient populations would you consider high risk for adenosine or regadenoson stress test:

- A: COPD – chronic obstructive pulmonary disease
- B: CKD – chronic kidney disease
- C: CAD – coronary artery disease
- D: Epilepsy

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-729-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF THE QTc INTERVAL CHANGE IN PEDIATRIC ONCOLOGY PATIENTS RECEIVING ONDANSETRON VERSUS GRANISETRON

Julia D Brown, PharmD*; Jennifer Townsell, PharmD, BCOP; Ashley Teusink, PharmD, MBA, BCPS; Christine L Phillips, MD
Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, Cincinnati, OH, 45229-3026
Julia.Brown@cchmc.org

Selective serotonin 5-hydroxytryptamine-3 antagonists are commonly used for the prevention and treatment of chemotherapy-induced nausea and vomiting in adult and pediatric oncology patients. While these agents are generally well tolerated, they contain a safety labeling precaution for their potential to prolong the QTc interval. This study was conducted to determine the change in the QTc interval following administration of scheduled granisetron and ondansetron in pediatric oncology patients. Methods: A retrospective chart review was conducted to evaluate all oncology patients less than 21 years of age that received at least three days of scheduled granisetron or ondansetron between January 10, 2010 and August 31, 2014. Patients were included if they received a baseline EKG within 90 days prior to the first dose of scheduled granisetron or ondansetron and if they had a repeat EKG while receiving scheduled granisetron or ondansetron. The primary outcome was the change in the QTc interval following extended administration of scheduled granisetron or ondansetron. Results: All oncology patients at Cincinnati Children's Hospital Medical Center (CCHMC) who received at least three days of scheduled ondansetron or granisetron were reviewed. Fifty-two patients, median age 8.51 years, met inclusion criteria; 69.2% received scheduled ondansetron, and 30.8% received scheduled granisetron. The median duration of scheduled ondansetron was 9 days (range 3 - 90 days) and granisetron was 16 days (range 3 - 104 days). The frequency of ondansetron is commonly prescribed as every eight hours (64.7%) and every six hours (27.5%). Granisetron was dosed either 10 mcg/kg/dose (67.7%) or 20 mcg/kg (32.3%) every twelve hours (80.6%) or every twenty-four hours (19.4%). Conclusions: Oncology patients are at high risk for a prolonged QTc interval as they may be receiving multiple medications that are associated with potential for QTc prolongation and may have underlying electrolyte abnormalities due to their treatment course.

Learning Objectives:

Review the mechanism of action of selective serotonin 5-hydroxytryptamine-3 antagonists.

Discuss the potential of 5-HT3 antagonists to prolong the QTc interval, and summarize the supporting evidence in the pediatric population.

Self Assessment Questions:

Which of the following is an important monitoring parameter when patients are on QTc prolonging medications?

- A: Calcium level
- B: Magnesium level
- C: Phosphorus level
- D: Sodium level

Which of the following medications is associated with the highest risk of QTc prolongation?

- A: Ampicillin
- B: Enoxaparin
- C: Lisinopril
- D: Ondansetron

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-333-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A GROWING CONCERN: EXAMINING THE NEED FOR AN OUTPATIENT BOWEL REGIMEN ORDER SET FOR CHRONIC OPIOID THERAPY AT THE HUNTINGTON, WV VETERANS AFFAIRS MEDICAL CENTER

J. Michael Brown, Pharm.D., Ph.D.* and Brittini D. Drake, Pharm.D., BCPS

Veteran Affairs - Huntington Medical Center, 1540 Spring Valley Drive, Huntington, WV, 25755

james.brown@va.gov

Purpose of the Research:

Chronic pain treatment costs the United States an estimated \$635 billion annually.¹ While there has been a great deal of deserved focus on those who abuse medications used to treat chronic pain, less attention has been given to those legitimately seeking medical care. Part of ensuring adequate treatment for chronic pain is educating and treating known side effect of opioid medication. Among those is the treatment of opioid induced constipation which can be a cause of embarrassment and inappropriate adherence to opioid therapy. The purpose of the current study is to assess proper treatment for opioid induced constipation and assess the need for an outpatient order set to assure proper therapeutic management of veterans with chronic pain.

Methods:

A retrospective chart review was conducted on patients prescribed long-term opioid therapy (> 3 months) for chronic non-cancer pain. Patient medication records were examined to determine appropriate long-acting and short-acting opioid prescribing. Additionally, appropriateness of bowel regimen prescribing and compliance was assessed. The information collected was used to develop an order set for Outpatient Prescribers to aide in prescribing of appropriate bowel regimen medications.

Results:

Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the mechanism behind opioid induced constipation and treatments.

Select appropriate bowel regimens for patients on chronic opioid therapy

Self Assessment Questions:

Which opioid receptor is responsible for opioid induced constipation?

- A: Delta
- B: Kappa
- C: Mu
- D: Nociceptin

The incidence of opioid induced constipation compared with matched controls is:

- A: 15
- B: 25
- C: 35
- D: 65

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-331-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF AN ANTIMICROBIAL STEWARDSHIP CARE BUNDLE FOR PATIENTS HOSPITALIZED WITH CLOSTRIDIUM DIFFICILE INFECTION

Paul E. Brumley, PharmD*, Anu N. Malani, MD, Curtis D. Collins, PharmD, MS

St. Joseph Mercy Health System, 5301 McAuley Drive, Ypsilanti, MI, 48197
paul.brumley@stjoeshealth.org

Background: The study objective was to determine whether there was an improvement in compliance with recommended Clostridium difficile infection (CDI) treatment after introduction of an institutional CDI bundle with daily antimicrobial stewardship team (AST) assessment.

Methods: This was a single-center, quasi-experimental study evaluating compliance with an AST-implemented care bundle in patients with CDI compared to historical controls, using a one group pretest-posttest design. The primary outcome, compliance with overall bundle elements, was achieved when the following measures were accomplished: (1) Appropriate CDI antibiotic therapy based on the institutional treatment algorithm; (2) Discontinuation of acid suppressant therapy in the absence of a pre-specified indication; and (3) Discontinuation of unnecessary antibiotics. Secondary objectives were to evaluate the extent to which AST involvement impacted treatment compliance, and to assess trends in CDI clinical outcomes, such as mortality and readmission.

Results: 169 patients were evaluated; 83 after implementation of the care bundle (AST group) from January - March, 2014; and 89 prior to bundle implementation (historical control group) from January - March, 2013. Compliance with overall bundle endpoints was significantly higher in the AST group versus the control group (79.3% vs. 46.1%, $p < 0.001$). Individual bundle components which were significantly improved in the AST group were discontinuation of non-essential acid suppressants (95.2% vs. 78.7%, $p < 0.001$), and administration of appropriate CDI therapy (81.9% vs. 64.0%, $p < 0.009$). There was a significant increase in the number of AST-driven interventions per patient not initially meeting CDI treatment compliance measures (56.6% vs. 12.4%, $p < 0.001$). No significant differences were observed in overall or CDI-related mortality or readmissions, durations of therapy, or in reduction of non-essential concomitant antimicrobials.

Conclusion: The introduction of a comprehensive CDI bundle with AST involvement significantly improved adherence to institutional treatment recommendations and overall management of patients with CDI.

Learning Objectives:

Identify appropriate treatment for an initial episode of Clostridium difficile infection per the IDSA guidelines.

List appropriate indications for the continuation of acid suppressant therapy in the setting of a Clostridium difficile infection.

Self Assessment Questions:

Which of the following would be an appropriate treatment option for an initial episode of Clostridium difficile infection in an 84 year-old man with a WBC count of 20?

- A: Metronidazole 500 mg IV q8h
- B: Metronidazole 500 mg PO q8h
- C: Vancomycin 125 mg PO q6h
- D: Vancomycin 500 mg IV q8h

Which of the following scenarios would be an appropriate indication for continuing a patient's omeprazole in the setting of a Clostridium difficile infection?

- A: Concomitant prednisone 40 mg PO q24h for a COPD exacerbation
- B: Mechanical ventilation for 72 hours
- C: Incidence of GI bleed three years ago
- D: ICU stay for four days

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-334-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PROCESS TO PROMOTE APPROPRIATE DE-ESCALATION AND OPTIMAL DURATION OF ANTIMICROBIAL THERAPY IN THE ICU

Carrie Bruno*, PharmD, Tyler Guetschow, PharmD, Ryan Van Engel, PharmD, Dan Persells, PharmD, Margaret Cook, PharmD, BCPS

Aurora St. Luke's Medical Center, 2900 West Oklahoma Ave, Milwaukee, WI, 53215

carrie.bruno@aurora.org

Purpose:

Inappropriate antimicrobial use is proven to increase resistance and is directly correlated to increased length of stay and cost. Critically ill patients within the intensive care unit are of greatest concern due to increased antimicrobial use and longer duration of therapy. Antimicrobial stewardship efforts center around effective resource utilization. The purpose of this project is to increase appropriate use of antimicrobials and reduce antimicrobial consumption.

Methods:

This was a prospective evaluation of a pharmacist driven process in two intensive care units within a 680 bed tertiary care adult medical center. Patients treated with cefepime, piperacillin/tazobactam, vancomycin or ceftriaxone were evaluated on day three and day seven of therapy. Excluded populations included patients who were immunocompromised, younger than 18 years of age, or pregnant. Additionally, patients with osteomyelitis or central nervous system infections were also excluded due to highly individualized and extended durations of therapy. An electronic health record (EHR) algorithm was developed to trigger pharmacist assessment of antimicrobial selection and duration at 48 hours and six days following therapy initiation. Antimicrobial selection and duration were assessed in terms of appropriateness according to drafted internal guidelines that mirror nationally accepted therapeutic standards. Any necessary recommendations were made to the treatment team. Documentation of the results of these recommendations including the amount of time required was recorded. Data will be collected and analyzed for a total of three months.

Results/Conclusions: Data collection and analysis is currently being done and will be presented at the Great Lakes Conference.

Learning Objectives:

Describe the impact of electronic health record (EHR) driven alerts to promote timely antimicrobial de-escalation in a critically ill adult population.

Identify barriers to successful implementation of a pharmacist driven process to assess antimicrobial selection and duration.

Self Assessment Questions:

Which of the following was identified as a barrier to providing successful recommendations for antimicrobial de-escalation?

- A: Pharmacist time required to make recommendations
- B: Provider preference in selection of antimicrobials
- C: Availability of cultures and sensitivities
- D: All of the above

Which of the following is a benefit of implementing antimicrobial stewardship efforts?

- A: Increased antimicrobial consumption
- B: Decreased pharmacist involvement in patient care
- C: Decreased development of antimicrobial resistance
- D: Increased hospital length of stay

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-335-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF FLUOROQUINOLONE PRESCRIBING CRITERIA AT A TERTIARY MEDICAL CENTER

Emily E. Bryant, PharmD*; Valerie L. Ravenna, PharmD, BCPS; Daniel W. Persells, PharmD

Aurora St. Luke's Medical Center, 1751 N. Cambridge Ave., Apartment #4, Milwaukee, WI, 532021817

emily.bryant@aurora.org

Purpose: Fluoroquinolones are among the most commonly prescribed antimicrobials in the United States. They play an important role in the treatment of many bacterial infections, including infections caused by enteric pathogens, prostatitis, nosocomial pneumonia, and community-acquired pneumonia. However, overuse of fluoroquinolones has led to an increase in fluoroquinolone-resistant strains of bacteria, including virulent pathogens such as *Pseudomonas aeruginosa* and methicillin-resistant *Staphylococcus aureus* (MRSA). In addition, their broad spectrum of activity appears to contribute to the fact that they carry a higher relative risk of *Clostridium difficile* infection in comparison to other classes of antimicrobial agents. The objectives of this project are to develop a system-wide policy that restricts fluoroquinolones to accepted use criteria and examine the impact of fluoroquinolone prescribing criteria on post-implementation use data at a tertiary medical center.

Methods: Evidence-based recommendations for prescribing criteria, outlining uses that were deemed to not meet criteria or as accepted were drafted into a preliminary policy. This was coordinated in conjunction with key infectious diseases stakeholders and following an in-depth literature review. Providers, both inpatient and outpatient in a variety of practice specialties (e.g. family medicine, emergency medicine, surgery, infectious diseases) were consulted for feedback in developing the finalized prescribing criteria document. Fluoroquinolone orders following implementation will require review against accepted criteria by a clinical pharmacist or require infectious diseases consultation. Pre-implementation use data have been collected, and will be compared to future data collected after the prescribing criteria has gone into effect.

Results & Conclusions: Post-implementation use data, including days of therapy (DOT) and defined daily dose (DDD) for fluoroquinolones are currently being collected. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the potential benefits of decreasing fluoroquinolone use.

Identify clinical scenarios where alternative antimicrobial agents may be utilized to reduce fluoroquinolone use.

Self Assessment Questions:

Reductions in fluoroquinolone use have been demonstrated in the literature to:

- A Decrease rates of *Clostridium difficile* infection
- B: Decrease Methicillin-Resistant *Staphylococcus aureus* (MRSA) co
- C: Decrease rates of fluoroquinolone resistance in gram-negative bac
- D: All of the Above

Select the clinical scenario where a fluoroquinolone should be prescribed :

- A Patient recently treated with ciprofloxacin for an uncomplicated uri
- B Patient with a recent history of infections caused by multi-drug res
- C Empiric treatment of community acquired pneumonia in a patient v
- D Patient presenting to urgent care with acute bronchitis

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-336-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A TELEPHONE-BASED CLINIC FOR TREATMENT OF PATIENTS WITH CO-MORBID DIABETES AND DEPRESSION

Rachel A Buchanan, PharmD*; Amanda E Ludwig, PharmD; Art A Schuna, RPh, MS, BCACP, FASHP; Erica E Frazier, PharmD; Rachel C Molander, MD

Verteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Attn: 119, Madison, WI, 53705

Rachel.Buchanan2@va.gov

Purpose: Though separate disease states, diabetes and depression are closely linked. Diabetic patients are twice as likely to have depression. Furthermore, as diabetes is a complex disease state, it has been shown to impact mood and quality of life. A new clinic, utilizing motivational interviewing, has been developed at the Madison VA to enroll patients with uncontrolled diabetes and a positive depression screen into a telephone based medication management clinic. The purpose of this research is to evaluate the clinics efficacy, marked by improvement in diabetes and/or depression as well as interventions made.

Methods: Patients enrolled in this new clinic were those with a positive PHQ9 (depression screen) and A1C >9% at the Madison VA. Furthermore, these patients were not receiving additional diabetes management outside of their primary care provider. Review of these patients was conducted via a retrospective chart review, which included analysis of baseline characteristics and review of PHQ9 scores and A1C values. Involvement of mental health services was captured along with any antidepressants or antipsychotics being used by these patients. Primary outcomes are change in PHQ9 and A1C throughout enrollment in this new clinic. Secondary outcomes include interventions at each telephone appointment, including number of medication adjustments or coordination of mental health services.

Results and Conclusions: To be presented at the Great Lakes Pharmac Resident Conference

Learning Objectives:

Explain the relationship between diabetes and depression

Identify the likelihood of non-adherence to medications for patients with depression

Self Assessment Questions:

Studies have shown that diabetic patients are how many times more likely to have depression:

- A three times
- B: two times
- C: four times
- D: depression rate is the same as the general population

Patients who have clinical depression are how many times more likely to be non-adherent to medications when compared to the general population:

- A three times
- B two times
- C four times
- D non-adherence rate is the same as the general population

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-337-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ROLE OF PHARMACIST IN CV SURGERY OUTPATIENT CLINIC

Allison Buida, PharmD*, Frank Spexarth, RPH, BCPS
Aurora St. Luke's Medical Center, 2900 W. Oklahoma
Ave., Milwaukee, WI, 53215
allison.buida@aurora.org

Purpose: Ambulatory pharmacy is a growing field with more pharmacists seeing patients outside of the hospital and retail settings. Several studies have shown the benefit of pharmacists evaluating patients home medications prior to surgical interventions. This study will examine the role of pharmacists evaluating cardiovascular surgery patients undergoing CABG and valve replacement surgeries.

Currently, at our practice site, patients undergoing cardiovascular surgery are not seen by the pharmacist until admitted to the hospital. Many of these patients have the potential for optimization of drug therapy prior to surgery. This maximization of therapy could lead to decreased length of stay, decreased costs, and improved outcomes for our patients.

Methods: The patients of one surgeon were seen in the preoperative clinic, same day interventional surgery, and hospital. Patients were evaluated for possible interventions prior to CABG or valve replacement surgery. Pharmacists utilized a checklist which focused on potential areas for recommendations such as vasoplegia risk, atrial fibrillation prophylaxis, perioperative antibiotics, iron deficiency anemia, post-operative nausea and vomiting, and anticoagulation. Interventions were tracked and categorized. Pharmacist time for performing this service was collected in order to estimate the time requirements for expanding this service to the other six surgeons in the clinic. Trends with interventions were reported to stakeholders periodically.

Results/Conclusions: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify barriers to implementing a new pharmacy service in an outpatient cardiovascular surgical clinic

Recognize potential preoperative medication interventions in cardiovascular surgery patients

Self Assessment Questions:

Patients undergoing CABG and/or valve replacement surgeries can be seen preoperatively in which of the following settings?

- A Outpatient clinics
- B Hospital
- C Same day interventional services
- D All of the above

Potential preoperative medication interventions include which of the following?

- A Clarifying allergic reactions to a penicillin allergic patient
- B Recommending to start supplemental iron in an iron deficient patient
- C Recommending to hold anticoagulation prior to surgery
- D All of the above are potential interventions

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-730-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTI-XA MONITORING IN CANCER PATIENTS TAKING TREATMENT DOSES OF LOW MOLECULAR WEIGHT HEPARIN

Kelly R. Burke, PharmD*; Christina Mactal Haaf, BCPS, BCOP; Nancy Shapiro, FCCP, BCPS
University of Illinois at Chicago, 833 S. Wood St, Chicago, IL, 60612
krburke3@uic.edu

Purpose: Treatment for venous thromboembolism (VTE) with low molecular weight heparin (LMWH) is recommended by the National Comprehensive Cancer Network. Therapeutic monitoring with anti-Xa levels assesses the anticoagulant effect of LMWH. Anti-Xa monitoring is controversial with little evidence to determine its effect on clinical outcomes. No published studies have determined the correlation of anti-Xa levels and outcomes in cancer patients. This study will determine if monitoring anti-Xa levels is beneficial in this population, in order to establish a relationship between outcomes and anti-Xa levels.

Methods: This is a descriptive, retrospective cohort study approved by the University of Illinois Institutional Review Board. Cancer patients who received either dalteparin or enoxaparin for treatment of venous thromboembolism will be included in a chart review assessing treatment monitoring, and safety with LMWH. The primary outcome of this study is recurrence of VTE in University of Illinois Hospital (UIH) cancer patients taking treatment doses of dalteparin or enoxaparin. Secondary objectives include number of bleeding events and number and frequency of anti-Xa levels in UIH cancer patients taking treatment doses of dalteparin or enoxaparin. Appropriate statistical tests will be used to evaluate the study objectives.

Results/Conclusion: Data collection is currently ongoing.

Learning Objectives:

Review current recommendations for treatment of venous thromboembolism in cancer patients.

Recognize the patient populations in which routine anti-Xa monitoring has been studied.

Self Assessment Questions:

Which anticoagulant drug class is currently recommended as first-line therapy for treatment of venous thromboembolism in cancer patients?

- A Direct Thrombin Inhibitors
- B Low-Molecular-Weight Heparins
- C Vitamin K Antagonists
- D Factor Xa Inhibitors

Routine anti-Xa monitoring has been previously studied in which patient population?

- A Pediatrics
- B Immunosuppressed
- C Obesity
- D Cirrhosis

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-338-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A MENTAL HEALTH CLINICAL PHARMACIST ON A PRIMARY CARE MENTAL HEALTH INTEGRATION TEAM

Dr. Michelle K. Bury*, PharmD, PGY2 Psychiatric Pharmacy Resident;
Dr. Matthew T. Haas, PharmD, BCPS, BCP, P Mental Health Clinical
Pharmacy Specialist; Dr. Janel M. Larew, PharmD, BCPS, Mental
Health/HBPC Clinical Pharmacy Specialist; Dr. Beth M. DeJongh,
Veteran Affairs - Clement J. Zablocki Medical Center, 5000 West
National Avenue, Milwaukee, WI, 53295
Michelle.Bury@va.gov

Statement of the purpose:

The Primary Care Mental Health Integration (PCMHI) mission is to integrate care for veterans physical and mental health (MH) conditions, improve access and quality of MH care, and provide a stepped care and population based approach to MH treatment. The primary objective of this project is to evaluate the impact a PCMHI clinical pharmacist makes on rating scale outcomes and treatment interventions. Secondary objectives include assessing medication adherence rates, and provider and patient satisfaction.

Statement of methods used:

This retrospective study is exempt from institutional review board approval due to medical center policy exemption for projects conducted for quality improvement purposes. A computerized patient record system will be used to identify patients who were referred to the PCMHI team and managed by the PCMHI pharmacist during a 12-month period. Patients will be included if they are at least 18 years old; referred to the PCMHI team for medication management of depression, anxiety, posttraumatic stress disorder, or alcohol use disorder; and were followed for at least 4 weeks. The following data will be collected through a chart review: patient age, date of birth, race, gender, last four digits of their social security number, chief complaint, diagnosis, pertinent comorbidities, PCMHI referral date, psychotherapy, date and week of treatment for each PCMHI pharmacy visit, type of interventions made, adherence rates, and allergies and adverse drug reactions. Also, PHQ-9, GAD-7, and PCL scores will be recorded as appropriate. The change from baseline MH rating scale scores as compared to week 4, 8, and 12 scores will be assessed for statistical significance by using Students paired t-test. A questionnaire will be distributed to participating providers and patients to assess satisfaction.

Summary of (preliminary) results to support conclusion:
No results available at this time.

Conclusions reached:

This study is currently in progress.

Learning Objectives:

Identify the barriers for patients to access high-quality mental health care.

Indicate the severity of depression, anxiety, or posttraumatic stress disorder based on a mental health rating scale score.

Self Assessment Questions:

Which of the following are barriers for patients to access high-quality mental health care?

- A Cost of mental health care
- B: Physician shortages
- C: Stigma of mental illness
- D: All of the above

A patient presents to clinic for antidepressant follow up. She scores a 10 on the Patient Health Questionnaire-9 (PHQ-9). What depression severity does this score MOST likely indicate?

- A Mild
- B Moderate
- C Moderately severe
- D Severe

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-339-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF MEDICATION ALERTS SEEN DURING ORDER ENTRY

Jenny Bute*, Pharm.D.; Jeffrey Chalmers, B.S., Pharm.D.; David Stowe R.Ph.; Joseph Gagliardi, Clinical Analyst
Cleveland Clinic, 9500 Euclid Avenue, JN1-200, Cleveland, OH, 44118
butej@ccf.org

Background: The benefits of clinical decision support (CDS) within computerized provider order entry (CPOE) systems in reducing the rate medication errors have been shown in numerous studies. Certain elements of CDS, such as medication related alerts, are amongst the most common alerts generated during the ordering process in the CPOE system. Too many alerts may increase the risk of desensitizing the use to clinically significant alerts that may prevent medication errors and patient harm. Currently, Cleveland Clinic does not have a formalized procedure to identify and optimize these alerts. This study evaluated the clinical appropriateness of current medication alerts and defined a systematic framework for alert optimization in the future. The primary objective was to determine if a decrease in clinically insignificant alert volume will lead to a decrease in override rate among prescribers. Secondary objectives were to characterize the frequency and distribution of the different types of medication alerts currently seen and to evaluate the impact of a monthly alert review and optimization on the number of significant alerts identified.

Methodology: This was an IRB-exempt study that evaluated five different types of medication alerts, which are duplicate therapy, drug-drug interaction, drug-allergy interaction, dosing range, and drug-pregnancy interaction alerts. For the five month duration of this study, a monthly Alert Summary Report (ASR) was generated to characterize all medication alerts triggered during CPOE over the previous two weeks. The primary investigator reviewed and summarized the ASR spreadsheet and determined candidates for intervention, utilizing four different methods to determine the clinical significance of each different type of alert. Approved interventions were then implemented in the CPOE system. This cycle was repeated monthly and results were trended to address the study objectives.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe methods for efficiently identifying opportunities to optimize medication related alerts within computerized provider order entry systems

Discuss the impact of certain interventions on alert volume

Self Assessment Questions:

Which of the following method can be used to identify an opportunity for alert intervention?

- A Cancellation rate
- B: Override rate
- C: Alert Prioritization Score (APS)
- D: Alerts per order rate

What intervention has the highest impact of decreasing alert volume without compromising patient safety?

- A Increasing the specificity of an alert
- B Decreasing the specificity of an alert
- C Turning off drug-pregnancy alerts
- D Turning off drug-allergy alerts

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-731-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ARIPIRAZOLE AND ITS EFFECT ON TRIGLYCERIDE LEVELS COMPARED TO OTHER ATYPICAL ANTIPSYCHOTICS

*Justin R Butler, PharmD; Courtney V Eatmon, PharmD, BCPP;
Matthew T Lane, PharmD, BCPS

Veteran Affairs - Lexington Medical Center, 1101 Veterans
Drive, Lexington, KY, 40502

justin.butler@va.gov

Purpose:

Atypical antipsychotics are widely prescribed for various mental health conditions. The adverse effects associated with this class of medications can lead to an increase in patient morbidity and mortality. While weight gain and elevated cholesterol increase the lifetime risk of coronary artery disease and should be treated, a rapid increase in triglyceride levels may be enough to warrant discontinuation of antipsychotic therapy due to the risk of acute pancreatitis. The objective of this study is to compare the metabolic effects of aripiprazole with other atypical antipsychotics, with an emphasis on the effect on triglyceride levels.

Methods:

Electronic chart review will identify patients who received their first prescription for aripiprazole, olanzapine, risperidone, or quetiapine between January 1, 2008 and January 1, 2013 and who maintained therapy for at least six months. The data to be collected is as follows: age, gender, weight, height, antipsychotic being prescribed, refill history, fasting lipid panels, and indication for use. In our analysis we will include those that have at least an 80% medication possession ratio and at least two fasting lipid panels (baseline plus follow-up) during the study period. If a patient had previously been prescribed a different antipsychotic, they will still be included in this study as long as there was at least a six month washout period in between medications to negate the potential metabolic effect of prior therapy. Patients with uncontrolled diabetes will be excluded. The primary outcome will be the change in triglyceride levels of those taking aripiprazole compared to other antipsychotics. We hypothesize that aripiprazole will have a more pronounced effect on triglyceride levels compared to other atypical antipsychotics. Outcomes will be evaluated using two-way Analysis of Variance. This study has been approved by the institutional review board.

Results/Conclusions: To be presented at Great Lakes Residency Conference

Learning Objectives:

Describe the common side effects associated with atypical antipsychotics

Identify appropriate patients who may benefit from the initiation of an atypical antipsychotics

Self Assessment Questions:

Which is a side effect that is seen in both first and second generation antipsychotics but is less common in the second generations?

- A Diarrhea
- B: Hypertension
- C: Constipation
- D: Extrapyramidal symptoms

Which patient would be a candidate to be initiated on an atypical antipsychotic

- A 55 YO male who presents to his physician complaining of unresolved
- B 40 YO female who suffers from 3-4 panic attacks per week who is
- C 50 YO male with MDD who has failed 3 different antidepressants
- D 30 YO female who presents to her physician with new onset feelings

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-340-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

USP CHAPTER 797: AN ASSESSMENT OF COMPLIANCE

Sean W. Byers* Pharm.D., Michael A. Metz RPh BSPHarm

Aurora St. Luke's Medical Center, 2900 West Oklahoma
Avenue, Apartment # 313, Milwaukee, WI, 53215

sean.byers@aurora.org

Purpose: USP Chapter 797 describes conditions and practices to prevent harm, including death, to patients that could result from, microbial contamination, variability in the intended strength or quality of correct ingredients and unintended chemical and physical contaminants in compounded sterile preparations. Aurora Health Care is an integrated health care system where all sites are held to the same standard of preparing all compounded sterile products in a sterile, USP Chapter 797 compliant, manner and environment. The purpose of this project is to first identify gaps in compliance with USP 797 within the inpatient hospital pharmacies across the health care system. The second aspect is to update Aurora Health Care policies and procedures related to USP Chapter 797 while developing and prioritizing an action plan to address identified gaps.

Methods: A gap analysis was developed to assess compliance of certain area of USP Chapter 797 in all the inpatient hospitals within Aurora Health Care system. This analysis was developed from available gap analyses drawn up by experts on USP Chapter 797, and narrowed down to focus on processes and documentation. Data was collected by visiting each inpatient hospital pharmacy to directly observe current practices and compliance with USP Chapter 797. Based on the areas of inconsistent compliance identified by the gap analysis, resources were gathered and compiled into an action plan consisting of multiple tool kits. The action plan will provide guidance, organization and direction for which gaps to be addressed in the short term, as well as other aspects planned to be addressed in the future, to assist all sites in becoming compliant with USP 797.

Results/Conclusions: Data collection and analysis is currently being done and will be presented at the Great Lakes Conference.

Learning Objectives:

Recognize certain processes and documentation required to be completed by employees involved in the compounding of sterile products to be in compliance with U.S. Pharmacopeial Convention (USP) Chapter 797

Describe an approach to assess gaps in compliance with USP Chapter 797 and methods to bridge those gaps

Self Assessment Questions:

For employees preparing compounded sterile products aseptically in low to medium risk conditions, how often must procedural tests such as the media fill challenge and gloved finger-tip sampling must be

- A Twice a year
- B: Yearly
- C: Every other year
- D: Three times a year

Which employees involved in the preparation of compounded sterile products are expected to document the completion and passing of both the media-fill challenge and gloved finger-tip sampling?

- A Pharmacists
- B Technicians
- C Pharmacists and Technicians
- D Nurses

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-732-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING THE PREPAREDNESS OF PHARMACY RESIDENCY GRADUATES

Elizabeth A. Cady, Pharm.D.*, Aaron M. Cook, Pharm.D., BCPS, Melissa L. Thompson Bastin, Pharm.D., BCPS, Craig A. Martin, Pharm.D., BCPS, Kelly M. Smith, PharmD, BCPS, FASHP, FCCP
University of Kentucky HealthCare, 4057 Mooncoin Way, #6207, Lexington, KY, 40515
beth.cady@uky.edu

Purpose: Residency programs must set and meet achievable objectives to create successful residents who feel prepared and are capable of working effectively as high-level, independent practitioners. Meeting ASHP accreditation standards does provide a foundation for residency programs, but to ensure those pharmacists are in fact working effectively, and feel prepared to face the challenges of the workplace, evaluation of those graduates once they are out in practice is warranted. The preparedness of entry-level practitioners from other professionals, most notably nurses and physicians, has been assessed, but to date, no specific studies have assessed the preparedness of pharmacy residency graduates. The purpose of this study was to survey residency graduates from a single pharmacy residency program from the past 10 years and have them evaluate their level of preparedness after being in practice for at least 6 months. Results from the study will be used for programmatic improvement.

Methods: This was an IRB-approved, electronic, survey-based study. The survey was pre-tested by a group of approximately 15 individuals (including research advisors and current pharmacy residents from multiple residency sites across the country). Survey participants were University of Kentucky HealthCare pharmacy residency graduates from 2004-2014. A list of these 117 graduates was obtained from an alumni relations administrator. Graduates were electronically sent an approximately 200 point electronic survey (point totals varied for each participant, depending on their career path). Assessment questions were in the form of multiple choice, fill in the blank, likert scale, and others. Survey results were evaluated in aggregate and were compared to a similar study, published in 2005. This study, which surveyed a cohort of UK pharmacy residency graduates from 1994-2003, sought to assess program effectiveness and residents experiences with the UK pharmacy residency program.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify tools that can be used by other residency programs to assess residency graduates level of preparedness for practice after graduating from an American Society of Health-System Pharmacists (ASHP) accredited pharmacy residency program.

Discuss methods and strategies that programs currently use to evaluate the effectiveness of their residency programs (in addition to the evaluations required during the residency) and how they use this information to implement programmatic improvements.

Self Assessment Questions:

Who is the governing body that provides accreditation to pharmacy practice residency programs?

- A: American Pharmacists Association
- B: American Society of Health-System Pharmacists
- C: American College of Clinical Pharmacy
- D: American Association of Colleges of Pharmacy

According to ASHP standards, each program requires an evaluation (after the completion of each learning experience) of which of the following

- A: Resident's performance, resident self-assessment, and resident e
- B: Resident's performance, resident evaluation of the preceptor/progi
- C: Resident's evaluation of the preceptor and learning experience
- D: Evaluations are only required on a quarterly basis, not after the co

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-733-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ACCREDITATION AND REDESIGN OF SPECIALTY PHARMACY SERVICES AT AN ACADEMIC MEDICAL CENTER

Scott Canfield, PharmD*; Andy Pulvermacher, PharmD; Joe Cesarz, MS, PharmD
University of Wisconsin Hospital and Clinics, 600 Highland Ave, F6/133
Mail Code 1530, Madison, WI, 53792
scanfield@uwhealth.org

Purpose: To ensure the sustainability of specialty pharmacy services at UW Health through achievement of specialty pharmacy accreditation, workflow redesign, and expansion of patient case management services. **Methods:** A gap analysis was conducted to compare specialty pharmacy practice at UW Health against Utilization Review Accreditation Commission accreditation standards. Areas of non-compliance were identified, stratified, and prioritized based on necessity and the estimated time required to achieve compliance. A workflow redesign work group was organized and implemented to identify opportunities to improve operations and adjust the practice model to accommodate increasing specialty pharmacy prescription volume and accreditation requirements. Operations and workflows within the specialty mail service pharmacy were evaluated and diagrammed. Time standards for specialty pharmacy activities within the medication use process were developed through manual documentation. Areas examined included the overall staffing model, pharmacist versus pharmacy technician responsibilities, patient enrollment services, benefits investigation, prior authorization services, case management, order processing, packaging, and shipping. Additionally, a specialty pharmacy case management program was expanded within the electronic medical record to include multiple sclerosis and hepatitis C. Workflows for the expansion of case management were developed and implemented. Results of the accreditation gap analysis were reported to the specialty pharmacy services oversight committee, and recommendations from the workflow redesign work group were presented to the ambulatory pharmacy leadership committee. **Results and Conclusions:** Preliminary results include the consolidation of product fulfillment and shipping services for mail service specialty prescriptions to a single location. Additional results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe current specialty pharmacy accreditation standards

Identify methods and workflows that a pharmacy enterprise may adopt to prepare for specialty pharmacy accreditation

Self Assessment Questions:

The URAC accreditation process includes which of the following:

- A: A desktop review of materials
- B: An on-site visit
- C: Random inspections throughout the review process
- D: Both A and B

Which of the following is a barrier many health systems may face when starting a specialty pharmacy program?

- A: Incorporating new services into existing operations
- B: A lack of leadership support since specialty pharmacy is never prc
- C: Extremely high start-up costs
- D: A small patient population receiving specialty care within the healt

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-734-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

A COMPARISON OF CEFAZOLIN AND CEFTRIAXONE FOR THE TREATMENT OF METHICILLIN-SUSCEPTIBLE STAPHYLOCOCCUS AUREUS (MSSA) BACTEREMIA

Dustin R Carr, PharmD*; Usha Stiefel, MD; Robert A Bonomo, MD; Sharanie V Sims, PharmD, BCPS (AQ-ID)

Veteran Affairs - Louis Stokes Cleveland Medical Center, 10701 East Blvd, Cleveland, OH, 441061702

dustin.carr@va.gov

Purpose: Anti-staphylococcal penicillins (ASP) are the traditional first-line therapy for methicillin-susceptible *Staphylococcus aureus* (MSSA) bacteremia; yet, the use of cefazolin and ceftriaxone has become more frequent due to more convenient dosing, especially when used as outpatient parenteral antimicrobial therapy (OPAT). Cefazolin has favorable results when compared against ASPs, however, recent literature suggests the risk of increased treatment failures possibly due to hydrolysis by β -lactamases, also known as the cefazolin inoculum effect. The clinical efficacy of this phenomenon has not been determined. Ceftriaxone, an alternative agent, offers a favorable pharmacokinetic profile and more cost containment in comparison; however, it has a broader spectrum of activity. To date, there has only been one comparator trial of cefazolin versus ceftriaxone for mixed MSSA infections which found similar favorable clinical outcomes, however, there are no studies comparing the use of ceftriaxone and cefazolin in the Veteran population with MSSA bacteremia.

Objectives: To compare rates of treatment failure at the end of therapy in Veteran patients treated with cefazolin or ceftriaxone for MSSA bacteremia. Secondary objectives include occurrence of relapse, duration of therapy, source of infection, treatment setting, adverse drug reactions, presence of subsequent *Clostridium difficile* or recurrent bacteremia, all-cause mortality, and cost.

Methodology: A retrospective chart review was conducted and included patients diagnosed with MSSA bacteremia from January 2009 to August 2014 who received ≥ 14 days of parenteral cefazolin or ceftriaxone. Patients were excluded if they received OPAT with another concomitant anti-staphylococcal antibiotic, documented polymicrobial infection, received empiric antibiotics for >72 hours after cultures were finalized, transferred from outside facility, or if OPAT was not meant to be curative.

Results: To be determined

Conclusions: To be determined

Learning Objectives:

Describe the rationale for the use of cefazolin and ceftriaxone for MSSA bacteremia

Recall the literature surrounding the use of cefazolin and ceftriaxone for MSSA bacteremia

Self Assessment Questions:

Which of the following, is typically administered once daily when used as outpatient parenteral antimicrobial therapy (OPAT) for MSSA bacteremia?

- A Nafcillin
- B: Ceftriaxone
- C: Cefazolin
- D: Oxacillin

Which of the following statements is correct?

- A The inoculum effect has been associated with the use of ceftriaxone
- B Cefazolin is inferior to anti-staphylococcal penicillins
- C Cefazolin has a broader spectrum of activity than ceftriaxone
- D Cefazolin has similar efficacy to anti-staphylococcal penicillins

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-341-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INTERVENTIONS TO REDUCE 30-DAY COPD READMISSIONS IN A SMALL COMMUNITY HOSPITAL

Thomas J Carroll, PharmD*; Margo Ashby, PharmD, BCPS

Baptist Health Madisonville, 900 Hospital Drive, Madisonville, KY, 42431
thomas.carroll@bhsi.com

Purpose

The purpose of this project is to determine whether the implementation of a standardized protocol and interdisciplinary patient education will reduce 30-day readmission rates for patients with COPD.

Methods

COPD patients admitted from April 1, 2014 through December 31, 2014 were provided with a face-to-face visit in the hospital where they were asked to explain two signs of a COPD exacerbation. They were also contacted with a phone call after discharge to determine if they had filled their prescriptions and had an appointment with their primary care provider. Readmissions rates within 30 days were also reviewed. A group of interdisciplinary practitioners was formed at our institution to develop a COPD inpatient treatment protocol. During the month of February, a pharmacist will be providing medication counseling for COPD inpatients.

Preliminary results

In the initial analysis 259 patients were included. 53 (20.5%) were readmitted within 30 days. There was no difference in readmission rate among the 191 patients that received a face-to-face visit ($p = 0.747$). 126 patients were able to teach back two signs of a COPD exacerbation. There was no difference in readmissions between these groups ($p = 0.203$). 49 patients received a follow up phone call. There was no difference in readmission rates between these groups ($p = 0.745$). Since there seems to be no effect of current interventions on 30 day readmissions, a group of practitioners has been formed at our institution to develop an interdisciplinary approach to COPD management.

Conclusions

There seems to be a trend towards significance regarding patient education in the hospital. It is possible that focused interventions regarding patient education and medication counseling will help reduce readmissions. Pharmacist conducted medication counseling will be an important part of this implementation. Final results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe incentives for implementing programs to reduce 30-day COPD readmissions

Explain various strategies to reduce 30-day hospital readmissions

Self Assessment Questions:

What are some strategies CMS is using to promote patient transition from hospital to community?

- A Encouraging pharmacy involvement in both the medication reconciliation
- B: Implementing penalties for 30-day readmission and supporting pre-discharge planning
- C: Rewarding hospitals for shorter patient length of stay
- D: Discouraging hospitals from implementing programs to reduce 30-day readmissions

Despite the inability of hospital programs to reduce 30-day interventions which interventions have shown to reduce 90-day mortality in COPD patients, according to recent literature?

- A Pharmacist conducted medication reconciliation
- B Interdisciplinary approaches to inpatient COPD treatment
- C Promoting patient engagement in self-management
- D Post discharge follow up phone calls to ensure patient adherence

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-342-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF DISCHARGE PRESCRIPTIONS BY EMERGENCY MEDICINE PHARMACISTS IN AN ACADEMIC EMERGENCY DEPARTMENT

Jesse Castillo*, PharmD; Michael Spinner, PharmD, BCPS; Seth Podolsky, MD, MS, FACEP; Stephen Meldon, MD, FACEP; Erick Sokn, PharmD, MS, BCPS; Matthew Campbell, PharmD, BCPS
Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH, 44195
castilj2@ccf.org

Purpose: The Emergency Department (ED) has been described as one of the highest areas in the hospital for preventable adverse drug events. Two studies have demonstrated pharmacist intervention rates ranging from 3.2% to 10.2% during ED discharge prescription review, with some patient populations having higher intervention rates. At Cleveland Clinic, discharge prescription review has not been included in the scope of ED pharmacist services provided. This project evaluated the impact of adding discharge prescription review by emergency medicine (EM) pharmacists to improve patient safety and optimize medication therapy.

Methods: This retrospective observational study was conducted at Cleveland Clinic Emergency Department. ED patients were included if a least 1 discharge prescription was written during daily hours of ED pharmacist coverage from 0700 to 2300. Convenience sampling was utilized by ED pharmacists to identify patients for discharge prescription review with the aid of the hospital's electronic medical record. Primary outcomes include the rate, type, and clinical significance of interventions associated with EM pharmacist review of ED discharge prescriptions. Secondary outcomes include ED and/or hospital re-admission rates within 30 days of the index ED visit and assessment of the association between pre-defined high risk patient criteria and ED pharmacist intervention during discharge prescription review.

Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Recognize the value of EM pharmacist review of ED discharge prescriptions

Identify high risk patient characteristics and ED discharge prescription medication classes associated with EM pharmacist intervention on ED discharge prescriptions

Self Assessment Questions:

Which of the following is an example of EM pharmacist review on ED discharge prescriptions?

- A: EM pharmacist medication reconciliation to a patient admitted to t
- B: Drug information question answered by EM pharmacist, not relate
- C: EM pharmacist intervention on amoxicillin frequency to optimize th
- D: EM pharmacist order verification for a medication to be administer

Which of the following was the most common medication class associated with ED discharge prescription intervention by EM pharmacists?

- A: Antibiotics
- B: Epileptics
- C: Analgesics
- D: Anticoagulants

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-899-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING THE USE OF HEALTH FAIRS IN THE EDUCATION OF PHARMACY STUDENTS

Drew W. Cates, Pharm.D.*, Stacy L. Rowe, Pharm.D., MBA
Sullivan University College of Pharmacy, 2100 Gardiner
Ln, Louisville, KY, 40205
dcates@sullivan.edu

Purpose:

Accreditation standards for pharmacy education, as indicated by the Accreditation Council for Pharmacy Education (ACPE), require colleges and schools of pharmacy to follow "The Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree" guidelines. A standard of ACPE requires promotion of "health improvement, wellness, and disease prevention in cooperation with patients, communities". Another standard ACPE requires of colleges or schools of pharmacy is implementation of service learning to promote professional behavior and experience for students. To properly meet the criteria for accreditation, Sullivan University College of Pharmacy (SUCOP) requires students obtain 80 hours of service learning, 60 hours direct patient care and 20 hours non-direct patient care, prior to progression to their Advance Pharmacy Practice Experiences (APPEs). The faculty and staff of SUCOP precept an array of service learning activities where students assess disease states such as diabetes, hyperlipidemia, and hypertension within an accelerated 3-year doctor of pharmacy program. In an effort to improve student knowledge, our purpose is to evaluate the educational benefit of student pharmacist managed health fairs in the advancement of student knowledge, particularly clinical knowledge, upon acceptance into a doctor of pharmacy program.

Methods:

Students in their first year of didactic courses at SUCOP were asked to take an 11-question survey. Questions assessed participation in a SUCOP-sponsored health fair, students self-assessment communicating with patients, and baseline knowledge of core disease states. Questions were accessible to students through ExamSoft assessment tool. Students were instructed to answer candidly as there was no reward or penalization for correct or incorrect responses. The survey was administered in August and November of 2014 prior to patient care and pharmacotherapeutic knowledge. Student submissions were evaluated using data analysis tools available through ExamSoft.

Results and Conclusion:

Results to be presented during presentation.

Learning Objectives:

Define specific Accreditation Council for Pharmacy Education (ACPE) standards for implementation of service learning.

Indicate the need for baseline knowledge of students prior to participation in pharmacist student-led health fairs.

Self Assessment Questions:

Based on curriculum standards established by ACPE, which of the following must be achieved by graduates through the professional programs curriculum?

- A: Provide patient care based upon sound therapeutic principles.
- B: Manage and utilize resources of the health care system to promot
- C: Promote health improvement, wellness, and disease prevention in
- D: All of the above.

What is JNC8s recommended blood pressure goal for a 32 y/o patient with type 2 diabetes?

- A: < 120/ < 80 mmHg
- B: < 130/ < 80 mmHg
- C: < 140/ < 90 mmHg
- D: < 150/ < 90 mmHg

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-735-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPROVING ADHERENCE TO THE EPIC BEACON AMBULATORY WORKFLOW

*Ellen M Chackunkal, PharmD, Prabha Dhanapal, PharmD., BCPS, BCOP, Meredith Grycki, PharmD, Diana Kostoff, PharmD, BCPS, BCOP Henry Ford Health System, 2799 West Grand Blvd, Detroit, MI, 48208
echacku1@hfhs.org

Computerized physician order entry (CPOE) has been shown to significantly improve chemotherapy safety by reducing the number of prescribing errors. EPIC Beacon is a system of CPOE and electronic medication administration and was implemented in Henry Ford Hospital ambulatory oncology infusion sites on November 9, 2013

The objective of this study is to improve the compliance to the EPIC Beacon workflow in the ambulatory oncology setting. The data obtained through this study will allow us to optimize our current workflow and develop an intervention to increase compliance and improve patient safety.

This study is a randomized, quasi-experimental study of patients who received intravenous chemotherapy at Henry Ford Hospital's ambulatory oncology infusion sites in November 2014 and March 2015. The primary endpoint is to compare the composite compliance rate to the EPIC Beacon workflow before and after a pharmacy initiated intervention. Compliance rate is defined as the following steps completed in chronological order: acknowledgment that treatment parameters have been met, nursing assessment and documentation of vitals, medications and allergies, and lastly, the release of chemotherapy orders to be verified. Based on analysis of the current compliance rate to the EPIC Beacon workflow, an intervention will be identified and implemented in February 2015. Data collected regarding compliance rate will be recollected in March 2015 to reassess the effects of the determined intervention on the compliance rate.

Preliminary results from initial data collection revealed the current compliance rate to the EPIC Beacon workflow is 38 %. The most prevalent cause for non-compliance was documentation of both vitals and allergies after the release of chemotherapy orders or the absence of any documentation for that encounter. An intervention will be identified and implemented in February to target improving compliance in these areas.

Learning Objectives:

List possible interventions to reduce preventable adverse drug events
Describe current literature on the implementation and post-implementation outcomes of EPIC Beacon

Self Assessment Questions:

Which of the following was listed as a solution to reducing preventable adverse drug events by the Institute of Medicine?

- A Prescribers should not use digital technology to obtain information
- B: Optimize use of information technologies in prescribing and dispensing
- C: Electronic prescriptions should not be used as they lead to more problems
- D: Preventable adverse drug events should not be monitored by individuals

What do published articles related to the implementation of EPIC Beacon state regarding workflow of EPIC Beacon post-implementation?

- A New workflows developed to compliment EPIC Beacon have been implemented
- B There have been a high number of medication errors reported with EPIC Beacon
- C There is currently limited published literature analyzing EPIC Beacon
- D Efficiency of workflows within cancer centers improved after the implementation of EPIC Beacon

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-900-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF TERATOGENICITY AND VA PRESCRIBING PATTERNS OF ANTIDEPRESSANTS, MOOD STABILIZERS AND ATYPICAL ANTIPSYCHOTICS IN WOMEN OF CHILD-BEARING AGE

Tiffany N. Chaddick, PharmD*; Jawad Pervez, MD; Laura Esposito, PharmD, BCPS; Laura J. Miller, MD; Kaite Suda, PharmD
Veteran Affairs - Edward Hines, Jr. Hospital, 5000 S 5th Ave, Building 228, Room 1041, Hines, IL, 60141
tiffany.chaddick2@va.gov

Purpose: Approximately half of all pregnancies in the United States are unintended, which means that there may be unintentional exposure to medications in the first trimester. The Food and Drug Administration (FDA) created pregnancy categories for medications; however, these categories have some inherent issues that make using them as a sole determinant of "teratogenicity" problematic. Current data on the Veterans Administration (VA) prescribing patterns of teratogenic medications are based on this categorization. Therefore, we sought to categorize VA formulary SSRIs, SNRIs, mood stabilizers, and antipsychotics with regards to their teratogenicity based on methodologically sound human pregnancy data. Once the medications of interest were categorized, we assessed prescribing patterns as they relate to teratogenic medications as well as contraception. Methods: We conducted a literature review using a systematic quality assessment tool which grades observational studies that assess teratogenicity based on their methodological integrity. To ascertain the teratogen prescribing patterns (based on our classification) of VA healthcare providers, we used the Veterans Integrated Service Network (VISN) 12 data warehouse. We collected data from the past 3 years regarding VA formulary SSRIs, SNRIs, mood stabilizers, and antipsychotics, as well as contraception, prescribed to women of childbearing ages from 18 to 50 years old. We excluded those patients that are determined to be medically unable to conceive, such as transgendered individuals, women with hysterectomies or tubal ligations and/or those who are post-menopausal. In addition, we performed a chart review of a sample of the women included in our data set to see if they had received appropriate counseling on potential risks related to teratogenicity. During this chart review we also evaluated the accuracy of the data warehouse list as it relates to current contraception. Results/conclusions: Results will be presented at the Great Lakes Resident Conference.

Learning Objectives:

List the limitations of the current FDA pregnancy risk category system and discuss the new pregnancy labeling rule for medications
Identify medications from the classes reviewed that may be considered teratogenic based on higher quality human pregnancy data

Self Assessment Questions:

Which of the following is true?

- A The current FDA pregnancy category system does not have inherent limitations
- B: The current FDA pregnancy category system is easy to apply to all medications
- C: The new FDA "Rule" will encompass all prescription medications
- D: The new FDA "Rule" will not apply to prescription medications approved after 2015

Which of the following medications can be considered teratogenic using the literature review presented?

- A Sertraline
- B Lamotrigine
- C Valproic Acid
- D Olanzapine

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-343-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF A PILOT CARE COORDINATION PROGRAM ON COMPLIANCE WITH NALTREXONE EXTENDED RELEASE SUSPENSION FOR INJECTION

Ashley L. Chambers*, PharmD, Stephanie A. Gernant, PharmD, Margie E. Snyder, PharmD, MPH

Dr. Aziz Pharmacy / Purdue University, 7320 E. 82nd St, Indianapolis, IN, 46256

ashley@drazirx.com

Purpose: Evaluate the impact of a pilot care coordination program on patient adherence to extended release naltrexone injection (XR-NTX) for the prevention of opioid and/or ethanol addiction relapse through evaluation of proportion of days covered and self-reported opiate and ethanol use.

Methods: This non-blinded, pre-/post-intervention retrospective chart review will test the efficacy of a care coordination pilot program on outpatient adherence to XR-NTX for the treatment of opioid and/or ethanol addiction within a community pharmacy setting. The care coordination program incorporates transition of care as well as substance abuse, emotional, and social support resources. These resources are provided to the patient at the community pharmacy during their monthly injection as a brochure containing contact information for local support groups, outpatient and counseling programs, employment resources, and substance abuse crisis hotlines. Follow up phone calls, which assess cravings, potential medication side effects, and support needs are provided to patients approximately 2 weeks post injection by the research pharmacist. In addition, patients receive reminder calls prior to scheduled injections and patients who miss their scheduled appointment receive follow up calls to reschedule.

The study protocol will be submitted to the Investigational Review Board in March 2015. Following approval, a retrospective chart review of electronic medical records will occur to collect demographic data, injection administration dates, proportion of days covered, and self-reported opiate/alcohol use.

Preliminary Results: Preliminary results will be presented at the 2015 Great Lakes Residency Conference.

Conclusion: Information obtained from this study may allow for future improvements in addiction medication therapy adherence and continued sobriety for patients.

Learning Objectives:

Explain the mechanism through which extended release naltrexone prevents opiate and alcohol addiction relapse.

Indicate the estimated number of Americans with opioid and alcohol dependence.

Self Assessment Questions:

Extended release naltrexone is which of the following?

- A GABA agonist
- B: Opioid partial agonist
- C: Opioid antagonist
- D: Ssri

Approximately how many Americans were estimated to be opioid dependent in 2012?

- A 0.5 million
- B 1 million
- C 1.6 million
- D 3.1 million

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-344-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EXPERIENCE WITH ERTAPENEM FOR THE TREATMENT OF OSTEOMYELITIS

Connie H. Chen, Pharm.D.*, PGY1 Pharmacy Practice Resident and Stephen W. Wiseman, Pharm.D., Infectious Diseases Clinical Pharmacist

Veteran Affairs - Ann Arbor Healthcare System, 2215 Fuller Road (119), Ann Arbor, MI, 48105

Connie.Chen@va.gov

Purpose: Osteomyelitis is an infection of bone that is one of the most common indications for prolonged courses of outpatient parenteral antimicrobial therapy (OPAT). Ertapenem is a broad-spectrum parenteral antibiotic commonly used to treat osteomyelitis, especially for OPAT, due to its convenient standard once-daily dosing regimen. However, ertapenem is not approved by the U.S. Food and Drug Administration for treatment of osteomyelitis, and only a few small studies have been conducted, despite widespread use for this indication. No information regarding the effectiveness in obese patients is available, complicating therapeutic decisions in a time when obesity is increasingly prevalent. This investigation will describe the safety and effectiveness of ertapenem therapy for osteomyelitis in patients at the Veterans Affairs Ann Arbor Healthcare System and add to the knowledge base for this indication, with a secondary focus on effectiveness in obese patients.

Methods: Veterans who have received at least 2 weeks of appropriate ertapenem therapy for osteomyelitis between January 1, 2002 and April 9, 2014 will be included; estimated sample size is 100 patients. Retrospective chart review will be conducted at baseline and at 6 months follow-up after completion of therapy, through October 9, 2014. Demographics, height, weight, serum creatinine, body mass index, creatinine clearance, duration of therapy, microbiology, concurrent antimicrobial therapy, ertapenem dosing, and mode of diagnosis will be collected. Markers of effectiveness or potential adverse effects, including markers of inflammation, liver function tests, complete blood counts, and basic metabolic panels will be obtained to evaluate tolerability of ertapenem. Clinical cure rate will be evaluated at the end of ertapenem therapy and at 6-month follow-up, as well as reasons for treatment failure. Potential correlation between body mass and effectiveness will also be examined.

Preliminary results: Pending data collection and analysis

Conclusions: Pending data collection and analysis

Learning Objectives:

Identify appropriate candidates for ertapenem therapy for osteomyelitis

Recognize the advantages and limitations associated with ertapenem

Self Assessment Questions:

Which of the following patients is an appropriate candidate for the use of ertapenem?

- A 68 year-old male with diabetic foot infection and associated osteor
- B: 90 year-old female with an infected sacral decubitus ulcer with unc
- C: 52 year-old male with Child-Pugh class B hepatic dysfunction and
- D: 75 year-old male with no known allergies, MSSA osteomyelitis of t

Which of the following factors could influence dosing of ertapenem, according to the approved labeling?

- A Body mass
- B Age
- C Indication
- D Renal function

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-345-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF EMPIRIC GENTAMICIN AND TOBRAMYCIN DOSING IN PEDIATRIC PATIENTS

Justin K. Chen, PharmD, PGY1 Pharmacy Resident
Children's Hospital of Wisconsin, 8915 W. Connell
Ave, Milwaukee, WI, 53226
jchen@chw.org

Purpose: The weight-based empiric antibiotic dosing guidelines for gentamicin and tobramycin implemented by the Children's Hospital of Wisconsin (CHW) recommend 3.75 mg/kg/dose every 12 hours (patients between 30 days old and 3 years old) and 2.5 mg/kg/dose every 8 hours (patients 4 years of age and older). After initiation, serum drug levels are monitored and changes to the empiric dosing regimen are made from these values. This is done to ensure optimum concentration-dependent efficacy while reducing the risk for drug accumulation and subsequent adverse effects, such as nephrotoxicity and ototoxicity. The purpose of this study is to utilize peak and trough serum drug levels in order to determine more appropriate empiric dosing guidelines for pediatric patients based on weight and age. Furthermore, volumes of distribution for gentamicin and tobramycin specific to various pediatric age groups will be determined and compared to existing values in the literature.

Methods: Patients between 0 and 12 years of age who received gentamicin or tobramycin being followed by the CHW Kinetics Service were included in this retrospective review from 2013 to 2014. The following data was collected: age, weight, culture results, susceptibilities, dose, frequency, serum drug levels, ordered doses, number of doses administered, length of treatment, concomitant medications, and renal function labs. Pharmacokinetic parameters such as calculated drug half-life, elimination rate, volume of distribution, and drug clearance were also utilized. Patients without full documentation regarding peak and trough serum drug levels or those with extrapolated peak serum drug levels based off population volume of distribution for age were excluded from analysis.

Results and Conclusions: Data collection and analysis is currently ongoing. The results and conclusions of the study will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the available literature on gentamicin and tobramycin dosing in pediatric patients according to age.

Describe the physiologic changes that occur in pediatric patients as they age, which warrant changes in aminoglycoside dosing regimens.

Self Assessment Questions:

Which of the following patients would qualify for a higher cumulative daily dose of aminoglycosides?

- A Low volume of distribution, low renal clearance
- B Low volume of distribution, high renal clearance
- C High volume of distribution, low renal clearance
- D High volume of distribution, high renal clearance

Which of the following are adverse effects associated with aminoglycosides?

- A Peripheral neuropathy and electrolyte abnormalities
- B Nephrotoxicity and ototoxicity
- C Neurotoxicity and hepatotoxicity
- D Cardiotoxicity and neutropenia

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-346-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY OF NITROFURANTOIN PROPHYLAXIS FOR URINARY TRACT INFECTION (UTI) PREVENTION IN A VETERAN SPINAL CORD INJURY (SCI) POPULATION

Ursula Patel, Pharm.D, BCPS AQ-ID, Alexander Chew, Pharm.D.*,
Katie Suda, Pharm.D., M.S., Charlesnika Evans, PhD
Veteran Affairs - Edward Hines, Jr. Hospital, 5000 South 5th
ave, Hines, IL, 60141
alexander.chew@va.gov

Background: Spinal cord injury (SCI) is associated with increased risk of developing urinary tract infections (UTI). Bladder drainage methods such as indwelling or intermittent catheterization can increase the risk of UTIs. Catheter-associated (CA) bacteriuria results in considerable antimicrobial use in hospitals and long term care facilities and contributes to the problem of resistance and cross-infection. Signs or symptoms of UTI in the SCI population may include fatigue, fever and chills, new leukocytosis, onset of or increased spasticity, dysuria or onset of urinary incontinence. Nitrofurantoin is one FDA-approved option for acute uncomplicated urinary tract infections. At therapeutic doses, nitrofurantoin's bactericidal effect in the urine makes it an effective choice for UTI treatment, when susceptibilities allow. Although nitrofurantoin is frequently used for treatment of UTI in SCI, data regarding efficacy of nitrofurantoin for UTI prophylaxis in this population is scarce.

Purpose: The primary purpose of this study is to evaluate the frequency of bacteriuria and resistance in SCI patients with neurogenic bladder receiving nitrofurantoin for UTI prophylaxis.

Methods: This study is a retrospective review of Veteran Affairs national data of SCI patients prescribed nitrofurantoin for UTI prophylaxis. The primary outcome of the study is the incidence and susceptibility patterns of positive urine cultures from patients receiving prophylactic treatment compared to those who do not receive prophylactic treatment and have >3 positive urine cultures per year. Patients will be included in this study if they are SCI patients with neurogenic bladder, treated with nitrofurantoin for >1 month or had >3 positive urine cultures from October 2011 through September 2012.

Results/Conclusions: Data collection is currently in progress. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the signs and symptoms of UTI infection in the spinal cord injury population

Identify risk factors for antibiotic-resistant organisms

Self Assessment Questions:

1. Which of the following are signs or symptoms a spinal cord injury patient would most likely present with while experiencing a UTI?

- A Muscle cramps
- B Increased spasticity
- C Hyperkalemia
- D Shortness of breath

Which of the following is a risk factor for developing antibiotic-resistant UTIs?

- A Limited mobility
- B Frequent exposure to antibiotics
- C Hospitalization >1 year ago
- D Poor diet

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-347-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECTS OF COMMUNITY PHARMACIST TELEPHONE FOLLOW-UPS ON ADHERENCE AND HOSPITAL ADMISSION RATES IN THE HEART FAILURE POPULATION: A MULTI-CENTER STUDY

Faith J. Childress, PharmD*, Kate Probst, PharmD, BCACP

Sullivan University College of Pharmacy / Walgreens - Louisville, 11391
Decimal Drive, Louisville, KY, 40299

faith.kappas@walgreens.com

Community pharmacists have the skill set needed to perform medication reviews and the ability to impact direct patient care while dispensing medications. Therefore, pharmacists should be utilized to perform comprehensive medication reviews to help decrease medication errors and assist in tracking patients adherence. The objective of this research project is to assess the effect of community pharmacist made telephone interventions on adherence and admission rates in heart failure. Primary endpoints will measure the impact of telephone follow-ups on adherence and the resulting effects on admission rates in patients with heart failure. Participants will be recruited from four community pharmacy locations using a targeted search conducted within Outcomes MTM platform. Comprehensive medication reviews will be completed for potential participants and used to determine eligibility. Patients meeting the following criteria will be invited to participate: 18 years or older, heart failure diagnosis, use of ACE-I, ARBS, beta-blockers and diuretics. Exclusion criteria include: pregnancy, breastfeeding and unwillingness to participate. Patients agreeing to participate will undergo written informed consent. Once enrolled, participants will be contacted every 30 days via telephone. During the telephone intervention, education will be provided; adherence and hospitalizations will be assessed. Refill histories will be available to determine medication possession ratio and used to determine adherence at baseline, throughout the study and upon completion. The participant will be asked a series of questions during the phone interview; how many tablets are left since previous refill, if any dosages have been missed and if they were admitted to the hospital. Patient data will be de-identified, recorded and followed via an Excel Spreadsheet. Primary endpoints include adherence (determined by refilling medications on time within a 4 day window) and hospital admission for any given cause. IRB approval accepted. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the community pharmacists role in telephone based follow-ups to improve adherence in heart failure patients.

Define terms commonly used in medication therapy management and patient adherence monitoring including comprehensive medication review and medication possession ratio.

Self Assessment Questions:

Which of the following is the definition of a CMR:

- A: Comprehensive Medication Record
- B: Complete Medication Review
- C: Comprehensive Medication Review
- D: Complete Medical Record

According to the CDC, heart failure affects roughly ____ people in the United States.

- A 2.9 million
- B 5.1 million
- C 1.9 billion
- D 6.3 billion

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-348-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF KETOROLAC-BASED MANAGEMENT OF POST-OPERATIVE PAIN IN LIVING KIDNEY DONORS

Jacinta E. Chin* PharmD, Maya Campara PharmD BCPS

University of Illinois at Chicago, 833 S Wood St, 164

PHARM, Chicago, IL, 606127230

jacinchi@uic.edu

Purpose: Voluntary donor nephrectomy differs from other surgical procedures in that an otherwise healthy person is subjected to major surgery. Kidney donors tend to be younger, healthier, and less tolerant to opioids compared to other hospitalized patients. Laparoscopic living donor nephrectomy (LLDN) has been associated with decreased length of hospitalization, less parenteral narcotic use, and quicker return to daily activities with similar graft function and survival compared to open living donor nephrectomy. Post-operatively, the goal for patients is to have adequate pain management and to allow for return of normal gastrointestinal function. Ketorolac is a non-steroidal anti-inflammatory drug that is approved by the FDA for post-operative pain management. Its use post-nephrectomy has been associated with decreased hospital stay and need for narcotics without long-term nephrotoxicity. The purpose of this study is to evaluate the length of hospital stay for patients undergoing LLDN and managed under a new protocol that utilizes a ketorolac-based approach with the aim of minimizing opioid use.

Methods: This is a single-center, non-randomized, retrospective and prospective chart review of patients 18 years and older who have undergone LLDN from March 2014 through December 2014. Donors will be followed in the outpatient Transplant Clinic, and data will be collected from their medical chart records for up to 6 months follow-up period. Patients who are on chronic pain management prior to organ donation are excluded. The primary objective is to evaluate length of stay post-protocol change compared to a historical control. Also, the study will examine the safety of the new protocol by monitoring renal function and for adverse effects related to pharmacotherapy. This study has been approved by the Institutional Review Board of University of Illinois Hospital.

Results/Conclusions: Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List factors unique to living donor nephrectomy patients and the need for optimizing post-surgical management

Describe why alternatives to opioids-based pain management strategies should be considered for these patients

Self Assessment Questions:

Which of the following is a concern regarding the use of ketorolac following LLDN?

- A Patient satisfaction
- B: Graft function and survival
- C: Incidence of NSAID-induced adverse events
- D: None of the above

Existing data regarding use of ketorolac following living donor nephrectomy show

- A A permanent decrease in renal function
- B Decreased length of hospital stay
- C Increased need for parenteral opioids
- D Longer time to return of normal activities of daily life

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-349-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TREATMENT OF METHICILLIN-SENSITIVE STAPHYLOCOCCUS AUREUS INFECTION IN CYSTIC FIBROSIS PATIENTS AT A CHILDRENS HOSPITAL

Shelby L Chopp, PharmD*, Leah M Molloy, PharmD, Lokesh Guglani, MD

Children's Hospital of Michigan-Detroit Medical Center, 3901 Beaubien Blvd, Detroit, MI, 48201

Schopp@dmc.org

Purpose: To identify antibiotic regimens prescribed and compare their effectiveness for the inpatient treatment of cystic fibrosis (CF) exacerbations caused by methicillin-sensitive *Staphylococcus aureus* (MSSA).

Methods: This retrospective study will utilize the standardized CF Foundation patient registry, Port CF, and institutional electronic medical records to identify CF patients treated for MSSA pulmonary infections while admitted to Children's Hospital of Michigan within the past 5 years. The primary outcome of the study is identification of antibiotic(s) prescribed for inpatient management of infectious CF exacerbations caused by MSSA. The secondary outcome is change in pulmonary exacerbation (PE) score which encompasses systemic and pulmonary signs and symptoms, radiologic findings, FEV-1 and weight gain. Continuously scaled demographic and clinical variables will be described using means, standard deviations, medians, and interquartile ranges. Categorically scaled variables will be examined using modes, proportions and ratios. Statistically significant differences will be considered achieved at a p-value <0.05. All statistical procedures will be performed using SPSS Version 22.0, IBM Inc.

Preliminary results: A total of 1471 MSSA cultures were identified through the Port CF registry, 110 of these cases were treated on an inpatient basis and included in the evaluation.

Conclusion: Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List common causes of respiratory infection in cystic fibrosis patients
Recognize the strengths and weaknesses of empiric antimicrobial regimens for cystic fibrosis exacerbations

Self Assessment Questions:

Which of the following is not one of the leading causes of pulmonary exacerbations in cystic fibrosis patients?

- A *Pseudomonas aeruginosa*
- B: *Staphylococcus aureus*
- C: *Haemophilus influenzae*
- D: *Klebsiella pneumoniae*

Which is the best empiric antimicrobial regimen for a pulmonary exacerbation in a cystic fibrosis patient?

- A Vancomycin + cefepime
- B Tobramycin
- C Clindamycin + vancomycin
- D Tobramycin + ceftriaxone

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-350-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF HEPARIN-INDUCED THROMBOCYTOPENIA DIAGNOSIS AND MANAGEMENT AT A LARGE MEDICAL CENTER.

Dane C Christ, Pharm.D.*; Liz F Harthan, Pharm.D., BCPS; Cara L Phillips, Pharm.D., BCPS; Yanzhi Wang, PhD

OSF Saint Francis Medical Center, 530 NE Glen Oak Ave, Peoria, IL, 61637

dane.c.christ@osfhealthcare.org

Purpose: Heparin induced thrombocytopenia (HIT) is an antibody mediated adverse drug reaction that can lead to pulmonary embolism, ischemic limb necrosis, acute myocardial infarction, stroke, and death. While the outcomes are severe, incidence is low making HIT difficult to identify and manage. Previous research has shown patients with a low 4Ts score (4Ts) have a low probability of HIT. The CHEST Guidelines recommend the use of a clinical decision making tool such as the 4Ts to form a clinical suspicion of HIT. Currently, the 4Ts is not required prior to further testing at this institution and is thought to be underutilized. This study intends to evaluate utility of the 4Ts and to establish if its use would rule out the need for further diagnostic testing or alternative anticoagulant therapy. **Methods:** This is a retrospective chart review of hospitalized patients 18 years of age and older who have received a platelet factor 4/heparin ELISA (PF4 ELISA) order from April 1st, 2011 to August 31st, 2014. Of the population eligible, 120 charts were reviewed. Patient data collected include patient demographics, department, length of stay, heparinoid received, start and stop date of heparinoid, heparinoid indications, baseline platelet count, date and result of PF4 ELISA, date and result of SRA, alternative anticoagulant (AA) received, start and stop date of AA. A 4Ts was calculated via chart review by a single reviewer. Results and Conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain the differences between the 4-T score, PF4-ELISA, and SRA in regards to utility and clinical use.

Describe the four components of the 4-T score.

Self Assessment Questions:

Which of the following statements is most true?

- A The 4-T score is the "gold standard" for the diagnosis HIT.
- B: The SRA is inexpensive and readily available.
- C: The 4-T score is most useful in ruling out HIT in conjunction with the SRA.
- D: The 4-T score, PF4-ELISA, and SRA are interchangeable.

Which of the following is a component of the 4-T score?

- A Timing
- B Tamponade
- C Thrombosis
- D A & C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-351-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPLIANCE TO A SYMPTOM-TRIGGERED ALCOHOL WITHDRAWAL PROTOCOL AND EFFECTS ON SAFETY

*Emily J. Christenberry, PharmD; Lindsay M. Saum, PharmD, BCPS, GCP

St. Vincent Health, 2001 W. 86th St, Indianapolis, IN, 46260

emily.christenberry@stvincent.org

Purpose: This study aimed to measure the compliance to the Clinical Institute Withdrawal Assessment of Alcohol Scale, Revised (CIWA-Ar) protocol by nursing staff and incidence of adverse drug reactions at a community teaching hospital. Compliance rates and incidence of adverse drug events were compared between the patients on the general medical units and the medical-psychiatric unit. Lastly the results at our institution were compared to the rates in other published findings.

Methods: All adult patients on a general medical unit or the medical-psychiatric unit with an order for the hospital CIWA protocol from January 1, 2014 through June 30, 2014 were included in this retrospective, observational study. Patients were excluded if they were less than 18 years of age, pregnant, incarcerated, have seizures or a seizure disorder unrelated to alcohol withdrawal, or if they were prescribed a scheduled dose of benzodiazepines for alcohol withdrawal. Patients were also excluded if they transferred in or out of the medical-psychiatric or general medicine units. Compliance to the protocol, defined as lorazepam administration for CIWA-Ar scores > 12, no medication administration for CIWA-Ar scores < 12, and no medication administration if a CIWA-Ar was not performed, was recorded for each time the subject was administered the CIWA-Ar or lorazepam. Patient charts were reviewed for physician documentation of an adverse effect, including: sedation, respiratory depression, acidosis, or toxicity. The patients age, sex, length of stay, length of time on the CIWA protocol, and any concurrent CNS depressing medications were also documented to control for potential confounding variables.

Results/Conclusion: Results and conclusion will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the advantages and disadvantages to utilizing a symptom-triggered therapy approach to the treatment of alcohol withdrawal.
Recognize possible adverse effects associated with the use of symptom triggered therapy.

Self Assessment Questions:

Which of the following is a potential disadvantage to the use of a symptom-triggered therapy approach in the treatment of alcohol withdrawal?

- A Lack of compliance to symptom-triggered therapy protocol
- B: Decreased administration of benzodiazepines
- C: Decreased length of treatment for alcohol withdrawal
- D: No difference in incidence of seizures or delirium tremens when compared to standard of care

Which of the following are potential adverse effects associated with symptom-triggered therapy?

- A Excess sedation
- B Respiratory depression
- C Metabolic acidosis
- D All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-352-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPACT ON ANTIBIOTIC UTILIZATION BY INCORPORATING ANTIBIOTIC STEWARDSHIP ACTIVITIES INTO THE FIRST YEAR PHARMACY RESIDENT REQUIRED INFECTIOUS DISEASES -ANTIMICROBIAL STEWARDSHIP ROTATION

Elizabeth Chrzanowska,* PharmD, Jim Cha, PharmD, BCPS, Lynn Boecler, PharmD, MS

NorthShore University HealthSystem, 2650 Ridge Ave., Evanston, IL, 60201

EChrzanowska@northshore.org

Purpose: An antimicrobial stewardship program (ASP) is a program that enhances selection, dosing, route, and duration of antimicrobial agents. There are seven major components suggested as guidelines for ASPs. These factors include: prospective evaluation, formulary guidance, education, de-escalation of therapy, parenteral to oral conversion, cost containment, dose optimization, and microbiology culture response. This institution recently implemented a new workflow for an existing ASP that will include pharmacist teams as well as the pharmacy practice residents. To supplement the infectious disease clinical specialist pharmacists, each team pharmacist receives a message when a patient on their floor has a positive culture and sensitivities. After addressing the results, the pharmacist either recommends a change to the healthcare team or continues present management. The pharmacist then documents the interaction. The primary objective of this project is to determine the impact of these changes on antibiotic utilization and optimization. A secondary endpoint is to determine the rate of Clostridium difficile infections. **Method:** This project was exempt from the Institutional Review Board. A retrospective chart review of inpatient admissions with an active antibiotic order during the following time periods: Nov 1, 2013-Jan. 31, 2014 and Nov 1, 2014-Jan. 31, 2015 was conducted. The project was designed to measure several factors pre and post implementation of ASP including, antibiotic use as days of therapy and defined daily dose, use of restricted antibiotics, utilization of intravenous and oral antibiotics, and cost containment. The following patients were excluded: those admitted to the labor and delivery or obstetrics and gynecology units, ambulatory surgery, emergency room or psychiatry units. Descriptive and categorical statistics will be used to evaluate the data. **Results and Conclusion:** Collection and analysis of the data is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

List 5 of the components of an antimicrobial stewardship program
Identify 2 reasons why antimicrobial stewardship programs are important

Self Assessment Questions:

Which of the following is not a component of an antimicrobial stewardship program?

- A Dose optimization
- B: Formulary guidance
- C: Microbiology culture response
- D: All of the above

Which members of the healthcare team should be involved in antimicrobial stewardship programs?

- A Infectious diseases physicians
- B Pharmacy residents
- C Pharmacists
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-353-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DOSE EFFECT OF SECOND-GENERATION ANTIPSYCHOTIC THERAPY ON INCIDENCE OF DIABETES IN A VETERAN POPULATION

*Elizabeth A. Ciuchta, PharmD; Nicole L. Vaughn, PharmD; Rachel Chandra, PharmD, BCPS; Jenny Ung, PharmD; David A. Jacob, PharmD
Veteran Affairs - Dayton Medical Center, 4100 W. Third St., Dayton, OH, 45428
elizabeth.ciuchta@va.gov

Background: Pharmacoepidemiologic studies have determined an association between second-generation antipsychotics (SGAs), primarily clozapine and olanzapine, and Type II Diabetes Mellitus. However, the risk of new onset Type II Diabetes Mellitus with newer SGAs, including ziprasidone and aripiprazole is not well defined. Thus, additional research is needed to confirm the association between newer SGAs, ziprasidone and aripiprazole, and incidence of Type II Diabetes Mellitus.

Objective: The aim of this retrospective electronic chart review was to assess the risk for Type II Diabetes Mellitus in adult patients at the Dayton Veteran Affairs Medical Center (Dayton VAMC) receiving treatment with SGAs, with a specific focus on aripiprazole and ziprasidone.

Methods: A retrospective review of adult patients at the Dayton VAMC with negative history for Type II Diabetes, who were prescribed aripiprazole, ziprasidone, quetiapine, or olanzapine for at least three months between January 1, 2009 and March 31, 2013, was conducted. The primary outcome was newly treated Type II Diabetes, defined by initiation of an anti-diabetic medication during the follow-up period. Patients were followed from the index date, the date 3 months after the first prescription for a SGA, through one of the following events: (1) prescription filled for anti-diabetic pharmacotherapy; (2) death; or (3) the end of the study period. Data were collected via electronic chart review and the VA Informatics and Computing Infrastructure (VINCI) platform.

Results/Conclusions: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss adverse effects of second-generation antipsychotics, especially those relating to metabolic syndrome.

Describe the effect of the newer second-generation antipsychotics, ziprasidone and aripiprazole, on the incidence of new-onset diabetes.

Self Assessment Questions:

Which of the following are side effects of second-generation antipsychotics?

- A: extrapyramidal symptoms
- B: hyperglycemia
- C: weight gain
- D: b & c

Which of the following is true regarding the CATIE study?

- A: The CATIE study was a double-blind randomized study designed to compare the effectiveness of second-generation antipsychotics.
- B: The study found that the older drugs worked almost as well as the newer ones.
- C: In the CATIE study, olanzapine had the highest percentage of dropouts.
- D: All of the above.

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number: 0121-9999-15-354-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARING ANTIEPILEPTIC MEDICATION PERSISTENCE BETWEEN AGE GROUPS IN A VETERAN POPULATION WITH EPILEPSY

Rachel L. Clark, PharmD*; Melody A. Ryan, PharmD, MPH, BCPS, CGP; Matthew T. Lane, PharmD, BCPS
Veteran Affairs - Lexington Medical Center, 1101 Veterans Drive, Lexington, KY, 40502
rachel.clark3@va.gov

Purpose:

Managing and treating epilepsy can be challenging, especially in the elderly population. Antiepileptic drugs (AEDs) are the mainstay of epilepsy treatment, however many AEDs pose a problem in the elderly population due to decreased tolerability. There is virtually no literature comparing persistence on AEDs between the elderly population and those who are less than 65 years old. The purpose of this study is to determine if there is a significant difference in AED persistence between these two age groups and evaluate which factors are associated with decreased persistence in order to make an informed decision on which AED to initiate in elderly patients with epilepsy to increase persistence.

Methods:

This study was approved by the Institutional Review Board. The electronic medical record system was used to identify patients who initiated an AED between January 1, 2000 and July 1, 2013, and have a diagnosis of epilepsy. Data collection included age at medication initiation, gender, race, marital status, socioeconomic status, urban or rural residence, diagnosis of epilepsy, initial start date of AED, duration of therapy, fill dates, days supply, and total number of medications. The main outcome was the percentage of patients in each age group who remained on the AED for at least 12 months. A log-rank test was performed and a Kaplan-Meier curve was constructed to demonstrate the difference in persistence between the two age groups. A Cox-regression analysis was used to analyze the other variables that were collected including gender, marital status, race, socioeconomic status, urban or rural residence, total number of medications, and adherence according to the Medication Possession Ratio (MPR).

Results/Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the prevalence and incidence of epilepsy in different patient populations.

Identify the challenges of managing epilepsy in the elderly population.

Self Assessment Questions:

The greatest prevalence of epilepsy is among individuals in what age group?

- A: >65 years old
- B: 45-65 years old
- C: 25-45 years old
- D: <25 years old

Approximately what percentage of elderly patients with epilepsy are nonadherent to their AEDs?

- A: 10-20%
- B: 20-40%
- C: 30-60%
- D: 60-80%

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number: 0121-9999-15-355-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF OPPORTUNITIES FOR PHARMACIST INTEGRATION INTO THE DISCHARGE PROCESS

*Diane J. Cluxton, PharmD; Karen Trenkler, PharmD, BCPS; Sameer Shah, PharmD, MPH
Sinai Health System, 15th at Fairfield, Chicago, IL, 60608
diane.cluxton@sinai.org

Purpose: Recent reimbursement strategies by the Centers for Medicare and Medicaid Services (CMS) include financial penalties for unplanned healthcare utilization by patients 30 days post discharge. This pay for performance challenges hospitals to redefine and optimize approaches to transitions of care (TOC), particularly at discharge. This is a critical transition due to limited monitoring once discharged. Medication discrepancies at discharge occur at an approximate rate of 25%, leading to potential and preventable adverse drug events. Medication reconciliation performed by pharmacists at all TOC has been demonstrated to reduce discrepancies and adverse drug events. Currently at this institution, pharmacists do not routinely participate in reconciliation at discharge.

The primary objective of this project is to delineate a role for pharmacists in the discharge process at this institution by identification of safety benefits. Secondary objectives are to identify drug classes and chronic disease states associated with medication discrepancies, specify the required time/task ratios, formulate strategies to clarify existing discharge documentation and optimize processes.

Methods: The study is quality improvement at a single site urban teaching hospital. Over the course of two months, a resident pharmacist provided discharge transition services to chronic disease patients, on any of three adult medical units; diseases targeted were heart failure, diabetes, chronic obstructive pulmonary disease, and atherosclerotic or thromboembolic disease. To facilitate the discharge, medication histories were substantiated by a pharmacist. Prior to discharge, the resident pharmacist reconciled discharge orders, reviewed medication therapy issues, collaborated with prescribers on effective drug therapy management, resolved financial barriers, interacted with allied health professionals and counseled patients. The number of interventions including discrepancies in discharge prescriptions, delineated by severity; medication; number of medications per patient; time requirements and percentage of recommendations accepted will be evaluated.

Results/Conclusions: Data analysis is currently in progress. The results will be presented at GLPRC.

Learning Objectives:

Identify the transition of care where most medication discrepancies typically occur.

Recognize the amount of time required to complete medication reconciliation at discharge.

Self Assessment Questions:

Identify the most common medication discrepancy prior to pharmacist review of medication list.

- A Omission
- B: Duplication
- C: Wrong dose
- D: Wrong drug

State the approximate amount of time required to complete medication reconciliation at discharge.

- A 10 minutes
- B 20 minutes
- C 50 minutes
- D 90 minutes

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-901-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE INCIDENCE OF SPINAL HEMATOMAS IN PATIENTS RECEIVING NEURAXIAL ANESTHESIA WITH THREE TIMES DAILY SUBCUTANEOUS UNFRACTIONATED HEPARIN

Timothy M Cober, PharmD, BCPS*, Payal Gurnani, PharmD, BCPS
Midwestern University / Rush University Medical Center, 555 31st Street, Downers Grove, IL, 60515
tcober@midwestern.edu

Purpose:

Neuraxial anesthesia is an effective method for providing analgesia in various patient populations. Despite its effectiveness, risks associated with this method of analgesia include the development of spinal hematomas. Risk factors associated for the development of spinal hematomas include traumatic epidural placement and timing of epidural placement relative to administration of antithrombotic medications. As most surgical patients require venous thromboembolism (VTE) prophylaxis post-operatively, the risk of spinal hematomas is increased while an epidural is in place. The American Society of Regional Anesthesia (ASRA) recommends twice daily dosing of unfractionated heparin (UFH) for VTE prophylaxis with neuraxial anesthesia as it has been proven safe. In some patients, however, VTE risk may be higher, and a more frequent dosing schedule may be warranted. Currently, ASRA does not include recommendations on the use of three times daily UFH due to a lack of outcome data. The objective of this study is to evaluate the safety and efficacy of three times daily versus twice daily subcutaneous UFH in patients receiving epidural analgesia.

Methods:

This is a single-center, retrospective study evaluating outcomes of patients 18 years or older receiving twice daily UFH from June 2008 to June 2010 versus three times daily UFH from July 2010 to July 2012 with concomitant neuraxial anesthesia. Exclusion criteria include documented VTE or spinal hematoma prior to the study period. Data collection will include: patient demographics, weight, UFH dosing interval, activated partial thromboplastin time (aPTT) prior to and following epidural placement and removal, platelet count prior to and following epidural placement and removal, time from last dose to removal of epidural, concomitant non-steroidal anti-inflammatory drug use, documented VTE, and/or documented spinal hematoma.

Results/Conclusions:

Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify risk factors for the development of a spinal epidural hematoma

Review recommendations for dosing of UFH endorsed by the American Society of Regional Anesthesia (ASRA)

Self Assessment Questions:

Which of the following is a risk factor for spinal epidural hematomas?

- A concomitant antithrombotic medication use
- B: concomitant acetaminophen use
- C: uncontrolled pain
- D: sedation

The American Society of Regional Anesthesia (ASRA) recommends which UFH dosing regimen for VTE prophylaxis with neuraxial anesthesia?

- A 5,000 units UFH once daily
- B 5,000 units UFH twice daily
- C 5,000 units UFH three times daily
- D 10,000 units UFH once daily

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-902-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CONTINUOUS MEDICATION INFUSIONS FOR COMPLIANCE WITH BEST PRACTICES

Sarah E. Cocke, PharmD*; Martina E. Novotny, PharmD
NorthShore University HealthSystem, 2650 Ridge
Avenue, Evanston, IL, 60201
SCocke@northshore.org

Purpose:

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) recommends intravenous (IV) drugs be available in a limited number of standardized concentrations, which may improve safe medication delivery to patients. As an additional safety measure, JCAHO asks that providers include titration instructions for continuous infusions when clinically applicable. This four-hospital health system offers recommendations for drug concentrations and diluents for continuous infusions, but occasionally providers place non-standard infusion orders. The objective of this descriptive review is to identify non-standard drug concentrations or diluents ordered for continuous infusions based upon internal guidelines. Using gathered information, internal guidelines and the electronic medical record (EMR) will be updated to reduce continuous infusions to standard concentrations and stable diluents.

Methods:

This retrospective chart review of continuous medication infusion orders is a quality assurance project and is exempt from review by the Institutional Review Board. Using the EMR, a six-month audit of current ordering practice was reviewed. This data was analyzed using descriptive statistics. Orders deviating from internal guidelines were evaluated to identify opportunities for guideline updates. Updates to the EMR were implemented to better adhere to JCAHO recommendations. Additionally, any drug entries without titration instructions were modified to include titration templates. Providers and pharmacists will then be educated on the importance of using standardized drug concentrations to improve patient safety.

Results:

Forty-one continuous medication infusions were evaluated. Twelve medications (29%) deviated from internal guidelines. Six medications had non-standard concentrations or volumes; nine medications used non-standard diluents. Fifteen medications had titration templates built into the EMR. Further results will be discussed at the Great Lakes Residency Conference.

Conclusions:

Conclusions from this project will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe recommendations from the Joint Commission on Accreditation of Healthcare Organizations and the Institute for Safe Medication Practices to improve safe delivery of intravenous medication infusions
Identify local and national resources for medication safety recommendations and guidelines

Self Assessment Questions:

Which of the following is a recommendation to improve safe delivery of intravenous medication infusions?

- A: Avoid the use of infusion device drug libraries
- B: Utilize commercially-manufactured pre-mixed medications
- C: Limit available infusions to a single standard diluent
- D: Limit available infusions to a single standard concentration

Which of the following organizations provide recommendations for improving the safety of continuous medication infusion delivery?

- A: Centers for Medicare and Medicaid Services
- B: The Joint Commission on Accreditation of Healthcare Organization
- C: San Diego Medication Safety Task Force
- D: Both B and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-736-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF INTERDISCIPLINARY PROCESS CHANGE FOR PICC LINE CAPPING

Angela M Colella, PharmD*; Frank Spexarth, RPh, BCPS; Brandon Bodager, MD; Natalie McDonough, BSN, RN, CCRN; Deb Kastenholz, MSN, RN
Aurora Health Care, PO Box 11243, Milwaukee, WI, 53211
angela.coella@aurora.org

Purpose: Heparin induced thrombocytopenia (HIT) develops in up to 5 percent of patients exposed to heparin. While rare, the condition can be devastating and any heparin exposure, even intravenous line flushes, increases a patient's risk of developing HIT.

At Aurora Health Care (AHC), heparin is the current capping solution for PICC lines. Normal saline has demonstrated non-inferiority to heparin in maintaining PICC line patency when used with positive pressurized caps. Because these caps are standard at AHC, we evaluated and implemented an interdisciplinary process change of replacing heparin with normal saline for PICC line capping.

Objectives: The primary outcome of this process change is non-inferiority of normal saline versus heparin for maintaining PICC line patency. Secondary objectives include AHC system policy change implementation, change in invasive line infection rates, and calculation of potential cost savings.

Methods: To demonstrate non-inferiority, a pilot process change was implemented. Hospitalized patients who had a PICC line placed were included in the pilot, while outpatients and hospitalized patients with a pre-existing PICC line were excluded.

Primary outcome measurements of non-patency include alteplase use and PICC line exchanges due to occlusion. Based on a patency rate of 85% identified in literature and a non-inferiority margin of 5%, a calculated 631 patients in each arm are needed to demonstrate non-inferiority at 80% power ($\alpha = 0.05$).

Results: Retrospective data are being analyzed to determine the baseline patency rate. Normal saline patency will be evaluated as the pilot progresses. Line infection rates will be compared before and after the pilot. Potential cost savings will be estimated based on patency outcomes.

Conclusions: Normal saline has demonstrated historical non-inferiority to heparin for maintaining PICC line patency when used as the capping solution with positive pressurized caps. Similar results are expected at our institution.

Learning Objectives:

Name the primary benefit of using normal saline versus heparin as a peripherally inserted central catheter (PICC) line capping solution.
Identify two measurements available to help evaluate PICC line patency

Self Assessment Questions:

Data used to evaluate PICC line patency includes:

- A: line exchange rates due to occlusion
- B: alteplase use
- C: verbal nurse reporting
- D: A&B

Normal saline was chosen as a PICC line capping solution with positive pressurized caps because:

- A: literature reflects non-inferiority
- B: the cap manufacturers have FDA approval to use normal saline
- C: it reduces the risk of HIT
- D: all of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-737-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DETERMINATION OF INSTITUTIONAL READINESS FOR ONCOLOGY CLINICAL PATHWAYS: EXAMINING VARIATIONS IN CLINICAL PRACTICE

Marissa Collard*, PharmD; Mindy Waggoner, PharmD, BCOP; Melissa Rhoades, PharmD, BCOP; Katie McMillen, PharmD, MPH; Robert Leinss Jr, RPh, MBA

Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 53226

marissa.collard@froedtert.com

Background: As cancer care continues to be an area of increasing complexity and rising costs, hospitals, health care groups, and payors must find new strategies to increase the value of care provided. National guidelines may present treatment options without specific recommendations regarding place in therapy. Oncology clinical pathways are one method being used to provide quality care while preventing unnecessary and costly treatment variations. These pathways are designed to direct providers toward a select number of evidence-based options considering efficacy, safety, and finally cost.

Purpose: The purpose of this project is to describe how current chemotherapy prescribing patterns compare to established clinical pathways, and identify reasons for variation. These results will be used as a baseline of prescribing patterns to provide direction to internal clinical pathway development and implementation.

Methods: The primary objective is to define the percent of patients meeting criteria for oncology clinical pathways receiving active chemotherapy for breast, colorectal, and non-small cell lung cancer which align with established clinical pathways. Secondary objectives include categorizing the reasons patients fall outside clinical pathway recommendations and determining physician knowledge of and perceptions related to oncology clinical pathways. Project objectives will be met by a retrospective chart review of included patients prescribed new start chemotherapy at Froedtert and the Medical College of Wisconsin. Eligible patient charts must have an adjuvant treatment plan or metastatic disease in order to meet criteria for clinical pathways. A target of 100 patient charts will be identified for inclusion. In addition, a targeted survey will be sent out to oncology providers to assess physician perceptions of, attitudes toward, and knowledge of oncology clinical pathways.

Results and Conclusions: Data collection and analysis are currently being completed and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the considerations involved in developing oncology clinical pathways.

Describe the benefits of oncology clinical pathways for patients and health care institutions.

Self Assessment Questions:

Which of the following statements is correct about oncology clinical pathways? Oncology clinical pathways are designed to

- A: Be appropriate options for no more than 40-50% of patients.
- B: Direct treatment options first by efficacy, then potential for toxicity,
- C: Direct providers toward chemotherapy rather than surgery or radiation
- D: Restrict a physician's medical judgment about the best treatment

What benefits have been demonstrated by implementing oncology clinical pathways?

- A: Decreased treatment variation
- B: Improved quality of care
- C: Reduced cost to the institution
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-356-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING PRESCRIBING PATTERNS OF HORMONE REPLACEMENT THERAPY AMONG FEMALE VETERANS AT A VETERANS AFFAIRS MEDICAL CENTER

*Jennifer R. Collins, PharmD, Veronica P. Vernon, PharmD, BCPS, BCACP

Veteran Affairs - Indianapolis VA Medical Center, 1481 W. 10th St, Indianapolis, IN, 46202

jennifer.collins26@va.gov

Purpose: The population of postmenopausal women in the United States is continually growing, which correlates with an increasing female population within the Veterans Affairs Health System. Thus, women's health issues such as menopause are becoming more prevalent within VA medical centers. To date, there is no published information regarding appropriateness of menopausal therapy specifically in female veterans or how these women tolerate hormone therapy. The objective of this study is to determine the number of women who are appropriately prescribed hormone replacement therapy (HRT) without contraindications.

Methods: Institutional Review Board approval has been granted. This study is a retrospective chart review comparing female patients at a VA Medical Center who have been prescribed HRT in the past five years. Patients were identified based on the prescribing of hormone replacement agents from August 1, 2009 through August 1, 2014. Charts are being assessed for appropriateness of HRT by analyzing the following data: smoking status, control of blood pressure and cholesterol, liver function tests, past medical history of migraines, venous thromboembolism, or breast cancer or other estrogen-sensitive malignancy, and family history of breast cancer. This chart review will also assess the type and route of hormone used, prescriber specialty, age of initiation of HRT, and duration of use. The primary outcome will be the number of women who are appropriately prescribed HRT without contraindications. Secondary outcomes include the average duration of HRT, average dose of estrogen, percentage of women on transdermal hormonal therapy versus oral therapy, and number of women who have had a major event while on HRT. Major events will be defined as a deep vein thrombosis, pulmonary embolism, myocardial infarction, stroke, or development of breast or ovarian cancer.

Results: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify health benefits associated with the use of hormone replacement therapy.

List contraindications for the use of hormone replacement therapy.

Self Assessment Questions:

Which of the following is a common health benefit associated with the use of hormone replacement therapy?

- A: Reduction in osteoporotic fractures
- B: Reduction in blood pressure
- C: Prevention of glaucoma
- D: Improved glycemic control

Which of the following is a contraindication for the use of hormone replacement therapy?

- A: Presence of dementia
- B: Previous history of osteosarcoma
- C: Presence of asthma
- D: Previous history of breast cancer

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-357-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TRANSITIONS OF CARE IN A HIGH RISK PATIENT POPULATION AT A DISPROPORTIONATE SHARE HOSPITAL

Binky Cooc, PharmD*, Glenn Allen, PharmD, BCPS, Alison Harber, RPh, Susan Julia, PharmD, BCPS, CACP

Franciscan St. Margaret Health, 5454 Hohman Avenue, Hammond, IN, 46320

Binky.Cooc@franciscanalliance.org

Care transition programs have been implemented in various medical centers throughout the United States. Many approaches have been investigated which resulted in a decrease in 30 day readmission. Few programs have focused on the socioeconomically disadvantaged. The goal of this project is to assess the effect of a pharmacist driven care transitions program in high risk patients with heart failure (HF) and/or chronic obstructive pulmonary disease (COPD) at Franciscan St. Margaret Health Hammond Campus.

The study was granted approval by the Institutional Review Board at Franciscan St. Margaret Health. Through EPIC chart review and multidisciplinary rounds, patients with diagnosis of HF and/or COPD will be identified. The inclusion criteria consists of patients with HF and/or COPD, at least 18 years of age, without cognitive impairment, and are not being discharged to a skilled nursing facility or nursing home. The electronic health record will be used to obtain information pertaining to: patient age, gender, ethnicity, left ventricular ejection fraction, admission date, discharge date, readmission date and reason, and number of discharge medications. Eligible patients will be provided with 30 day supply of free selected discharge medications for HF and/or COPD, disease state and medication discharge counseling, and post-discharge pharmacist-led medication counseling session either through in-person clinic visit or via telephone call 2 to 5 days following discharge. The primary objective is to assess the effect of providing selected free discharge medications on 30 day readmission rate in HF and/or COPD patients. The secondary objective is to assess the effect of pharmacist interventions on 30 day readmission rates in HF and/or COPD patients. Data collections are still in process, results and conclusions will be presented at the Great Lake Pharmacy Residence Conference.

Learning Objectives:

Identify the impact of care transitions program during discharge on healthcare system outcomes in a disproportionate share hospital.

Describe the roles of a clinical pharmacist in a care transitions program during patient discharge in a disproportionate share hospital.

Self Assessment Questions:

What roles can a clinical pharmacist have in a care transitions program during patient discharge?

- A provide 30 day supply of free selected discharge medications for HF and/or COPD
- B: disease state and medication discharge counseling
- C: post-discharge pharmacist-led medication counseling session
- D: all of the above

Care transitions program have been shown to have the following health system outcome(s)?

- A Reduction in 30 day readmission rate
- B Increase total healthcare cost
- C Improve overall health outcomes
- D A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-738-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PROSPECTIVE ANALYSIS OF MEDICATION RECONCILIATION AND DRUG INTERACTION IDENTIFICATION IN THE AMBULATORY CHEMOTHERAPY SETTING

Brandy L. Cooper*, Pharm.D.; Al Fisher, Pharm.D.; Laura J. Acevedo, Pharm.D., RPD

Ingalls Health System, One Ingalls Drive, Harvey, IL, 60426

brcooper@ingalls.org

Purpose:

In addition to the chemotherapy infusions, oncology patients generally receive many other medications for both cancer related issues and comorbid conditions. Many chemotherapy agents are associated with a high number of adverse effects and have a narrow therapeutic index. Although literature describing the occurrence of drug-drug interactions is limited, it is theorized that the incidence is increased among oncology patients as a result of the addition of chemotherapy agents to an already complex medication regimen. In order to ensure patient safety, it is essential that pharmacists have an accurate medication list and reliable mechanism in place to identify potential significant drug-drug interactions. The aim of this study is to prospectively evaluate the accuracy of medication reconciliation and the incidence of drug interactions in the ambulatory chemotherapy setting.

Methods:

This study is a prospective, observational analysis conducted at three satellite outpatient chemotherapy infusion centers. Medication reconciliation was performed by a pharmacist for each patient receiving chemotherapy infusions over the course of five days at each infusion center. The primary outcome is incidence of potential drug-drug interactions between chemotherapy agents and home medications. Secondary outcomes include the number of medication reconciliation discrepancies, the severity of potential drug-drug interactions identified, and the number of potential clinically significant drug interactions not identified due to inaccurate medication reconciliation.

Results: to be presented

Conclusion: to be presented

Learning Objectives:

Discuss current standards regarding medication reconciliation for patients receiving chemotherapy

Recognize potential drug-drug interactions among patients receiving chemotherapy infusions

Self Assessment Questions:

Which of the following statements is correct?

- A Medication reconciliation should only be conducted if a patient is p
- B: All current medications should be reviewed and documented at ea
- C: Medication reconciliation should only be conducted if a patient is a
- D: Review and documentation of all current medications should be co

Which of the following is a possible consequence of drug-drug interactions involving chemotherapy agents?

- A Improved patient outcomes
- B No possible consequence
- C Decreased risk of adverse events
- D Increased risk of adverse events

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-903-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF AND RISK FACTORS FOR LINEZOLID ASSOCIATED THROMBOCYTOPENIA

Marie A Corbo* Pharm.D., Ryan P. Mynatt, Pharm.D., BCPS AQ-ID,
Keith S. Kaye, M.D., Jason M. Pogue, Pharm.D., BCPS-ID
Sinai-Grace Hospital/Detroit Medical Center, 6071 West Outer
Drive, Detroit, MI, 482352624
mcorbo@dmc.org

Purpose: Since its approval in 2000, linezolid has been used to treat infections due to clinically important drug-resistant Gram-positive pathogens. Linezolid is generally well-tolerated, however treatment limiting side effects such as thrombocytopenia have been reported. Standard diagnostic criteria for linezolid associated thrombocytopenia have not been well defined, therefore a variance in prevalence of linezolid associated thrombocytopenia has been reported, ranging from 6-32%. Current literature has identified duration of linezolid therapy, patient body weight, baseline renal insufficiency, baseline platelet count, and age as risk factors for linezolid associated thrombocytopenia. Unfortunately, most analyses looking at risk factors were published overseas and risk factors have not been adequately studied in a population similar to that seen at our institution. Furthermore, the aforementioned variance in definition of linezolid associated thrombocytopenia may influence risk factors identified. The primary outcome of this retrospective case control study will assess the incidence of and risk factors for thrombocytopenia at a large community hospital. Secondary outcomes include identifying the impact definition has on both the incidence and risk factors for thrombocytopenia.

Methods: Patients included in the study will be hospitalized adult patients with linezolid treatment duration ≥ 48 hours and have at least one follow-up platelet count measurement. Exclusion criteria will be age < 18 years and patients with baseline severe thrombocytopenia. Patients will be divided into two groups: those who develop thrombocytopenia (cases) and those who do not (controls). Patient demographics, comorbidities, pertinent labs, linezolid regimen, duration of therapy, use of other agents associated with thrombocytopenia, and concomitant antimicrobial exposures will be recorded and analyzed via bivariate and multivariate analyses as potential risk factors for linezolid-associated thrombocytopenia.

Data is currently under review and all results will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss current literature on the incidence of and risk factors for linezolid associated thrombocytopenia

Describe the effect various definitions of thrombocytopenia have on the incidence of and risk factors for linezolid associated thrombocytopenia

Self Assessment Questions:

Based upon the current literature describing linezolid associated thrombocytopenia, which of the following is true?

- A: Linezolid associated thrombocytopenia is adequately studied in the literature
- B: There is a consistent rate of prevalence for linezolid associated thrombocytopenia
- C: Studies lack a standard definition for linezolid associated thrombocytopenia
- D: Most publications have adequately studied whether linezolid associated thrombocytopenia is a true side effect

Which of the following variables have not previously been linked to linezolid associated thrombocytopenia?

- A: Duration of therapy (> 14 days)
- B: Decreased renal function (CrCl < 30 mL/min)
- C: Low pretreatment platelet levels ($< 241 \times 10^9/L$ platelets)
- D: Vancomycin MIC > 2

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-358-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF AN ASHP ACCREDITED PHARMACY TECHNICIAN TRAINING PROGRAM IN A HEALTH SYSTEM

Amanda Costopoulos*, BS, PharmD; Kate Schaafsma, MS, MBA, PharmD, BCPS; Kristin Hanson, MS, RPh; Chris Sanders, PharmD; Christine Vogt, RPh; Josefina Perez CPhT
Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 532226
amanda.costopoulos@froedtert.com

A lack of advanced training and on-the-job experience decreases the number of pharmacy technician candidates qualified for employment in many health systems, including Froedtert and the Medical College of Wisconsin (F&MCW), making it difficult to hire and retain qualified pharmacy technicians. To meet the demands of expanding pharmacy services at F&MCW and upcoming changes to the Pharmacy Technician Certification Board's (PTCB) qualification for examination and certification, it is essential that F&MCW have the ability to provide pharmacy technicians with advanced education. The purpose of this project is to develop an American Society of Health-System Pharmacists (ASHP) accredited pharmacy technician training program at F&MCW, a health-system including an academic medical center, community hospitals, specialty clinics and primary clinics located in Southeastern Wisconsin.

The method utilized to develop a program meeting ASHP standard for accreditation included five steps. First, the national and local demand for pharmacy technicians is evaluated. Second, a gap analysis of current pharmacy technician training at F&MCW and ASHP pharmacy technician educational objectives is conducted. Third, a committee is formed to assess the information gathered from the gap analysis and develop a vision for the implementation of the program. Fourth, a business plan is written to propose and justify the implementation of the program and lastly, recruitment and application materials are developed.

A summary of the gap analysis and a preliminary design for the implementation of the pharmacy technician training program at F&MCW is ongoing and will be presented at the Great Lakes Pharmacy Residency Conference.

The successful implementation of an ASHP accredited pharmacy technician training program will ultimately aim to increase the number of qualified candidates for hire, the uniformity of training, staff retention and ultimately meet the demands of a growing health system.

Learning Objectives:

Describe the benefits of implementing an American Society of Health-System Pharmacists (ASHP) accredited pharmacy technician training program within a health system

Outline the key steps to implementing an ASHP accredited pharmacy technician training program at Froedtert & the Medical College of Wisconsin (F&MCW)

Self Assessment Questions:

Which of the following is a benefit to implementing an ASHP accredited pharmacy technician training program within a health system?

- A: Decrease the uniformity of pharmacy technician training
- B: Decrease pharmacy technician staff retention
- C: Increase the number of qualified pharmacy technician candidates
- D: Increase the number of qualified pharmacists

At F&MCW, what were the key steps to implementing an ASHP accredited pharmacy technician training program?

- A: Identify the demand, conduct a gap analysis, develop a vision, pre-qualify candidates
- B: Solidifying current training, surveying past employees, piloting a program
- C: Writing a proposal, implementing the plan, surveying for results
- D: Pilot a program, survey current employees, identify areas for improvement

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-739-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

INTERMITTENT VERSUS EXTENDED INFUSIONS OF CEFEPIME IN FEBRILE NEUTROPENIC PATIENTS

Benjamin D Cottongim, PharmD*, S Christian Cheatham, PharmD, Jill K Leslie, PharmD, BCPS, BCOP
Franciscan St. Francis Health, 8111 S. Emerson Ave, Indianapolis, IN, 46237
Benjamin.Cottongim@FranciscanAlliance.org

Purpose:

Beta-lactam antibiotics demonstrate bacterial killing by optimizing the time free drug concentrations remain above the bacteria's minimum inhibitory concentration ($T > MIC$). Cephalosporins, a class of beta-lactam antibiotics, show bacteriostatic activity when $T > MIC$ for 35% to 40% of the dosing interval and bactericidal activity when $T > MIC$ for 60% to 70% of the dosing interval. Cefepime (CPE) is a fourth generation cephalosporin with broad-spectrum activity against gram-positive and gram-negative pathogens including *Pseudomonas aeruginosa*. CPE is recommended as first-line empiric therapy for patients with neutropenic fever and is commonly dosed at two grams every eight hours over a 30-minute infusion. Based on its average serum half-life of two hours and its pharmacodynamics, extending the infusion of CPE over three to four hours will provide optimal attainment of $T > MIC$ for many pathogens. This study aims to compare outcomes of patients with neutropenic fever who were treated with CPE, before and after implementation of extended infusions (EI).

Methods:

This was a retrospective cohort study of adult patients (at least 18 years old) who received cefepime empirically for neutropenic fever from April 1, 2006 to October 31, 2014. The two groups studied consisted of patients who received either 30-minute intermittent infusions (II) or four-hour EIs of CPE. A total of 68 patients were included, 28 patients in the II group and 40 patients in the EI group. The primary endpoint was resolution of fever at 72 hours after initiation of cefepime therapy. Secondary endpoints included resolution of fever at the end of cefepime therapy or neutropenia, all-cause mortality, total length of cefepime therapy, time to absolute neutrophil count (ANC) recovery, and time to resolution of fever.

Preliminary Results:

Preliminary results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List reasons why cefepime is used for the empiric treatment of febrile neutropenia.

Describe the pharmacodynamic properties of beta-lactam antibiotics that are optimized by using extended intravenous infusions.

Self Assessment Questions:

Which of the following correctly describes the pharmacodynamic property of cefepime?

- A: Peak to minimum inhibitory concentration (MIC) ratio
- B: Time above MIC
- C: Area under the curve (AUC) to MIC ratio
- D: Post antibiotic effects

Which of the following correctly describes the rationale for using extended infusions of cefepime in infected patients?

- A: To optimize the time free drug concentrations remain above the MIC
- B: To optimize the peak to MIC ratio needed for bactericidal activity
- C: To shorten the time of neutropenia in patient's receiving cytotoxic chemotherapy
- D: To provide activity against resistant gram-positive organisms including MRSA

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-359-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

HEPARIN PROTOCOL REVIEW

*Diana M. Cowell, Pharm.D.; Philip DiMondo, Pharm.D., BCPS; Heather Tolfree, Pharm.D.

Munson Medical Center, 1105 Sixth St., Traverse City, MI, 49684
dcowell@mhc.net

Purpose: National Patient Safety Goal 03.05.01 states that

"organizations should reduce the likelihood of patient harm associated with the use of anticoagulant therapy." This 391-bed community hospital uses a nurse-driven protocol to adjust heparin therapy. Heparin is a high-use high-risk drug which requires close monitoring in the hospital setting. The primary purpose of this research is to review patient titration and nursing practices in order to determine adherence to the protocol. The second part of this study examined "heparin resistant" patients requiring $\geq 35,000$ units of heparin per day to assess if protocol revisions should be made for this sub-population.

Methods:

A 30-patient retrospective chart review was conducted to assess protocol adherence. Patients were eligible for inclusion if they at least 18 years old, on a nurse-driven heparin protocol at this facility, and received at least 24 hours of therapy. Heparin protocol type (weight-based or non-weight-based with or without a bolus), time to therapeutic targets and deviations from protocol were quantified. A separate retrospective review and analysis of 26 patients who required $\geq 35,000$ units of heparin per day was conducted to identify demographics associated with "heparin resistant" patients.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the importance of achieving therapeutic anticoagulation in patients receiving heparin therapy.

Recognize patients who may be "heparin resistant" and identify other potential therapeutic anticoagulation options.

Self Assessment Questions:

Which of the following protocols has been proven to be most effective at achieving therapeutic heparin targets with 24 hours

- A: Nurse-driven protocols
- B: Pharmacist-driven protocols
- C: Basal-bolus protocols
- D: Weight-based protocols

Which of the following is one proposed mechanism of heparin resistance?

- A: Poor drug manufacturing standards resulting in decreased heparin activity
- B: Binding of heparin to acute-phase reactants resulting in less available heparin
- C: Increased rates of drug-drug interactions due to increased patient comorbidities
- D: New chemical reagents used to evaluate aPTT levels during labor

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-360-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF ACUTE KIDNEY INJURY DURING EMPIRIC THERAPY WITH VANCOMYCIN IN COMBINATION WITH BETA-LACTAM ANTIBIOTICS

Jessica N. Cox, PharmD*; Craig Martin, PharmD, BCPS (AQ-ID); Donna Burgess, RPh; David Burgess, PharmD, FCCP

University of Kentucky HealthCare, 800 Rose Street, H110, Lexington, KY, 405360293

jessica.n.cox@uky.edu

BACKGROUND: Antipseudomonal beta-lactam antibiotics are widely used for the empiric treatment of hospital-related infections and are often used in addition to vancomycin, a glycopeptide antibiotic providing coverage of gram-positive infections including methicillin-resistant *Staphylococcus aureus*. Newer formulations of vancomycin have decreased the potential for associated nephrotoxicity and ototoxicity when used at conventional doses. An increased incidence of nephrotoxicity has been noted when used with aminoglycosides, for extended duration, or when serum trough concentrations were >10mcg/mL. Less information is available about nephrotoxicity associated with vancomycin in combination with beta-lactam antibiotics.

PURPOSE: The purpose of this study is to compare the incidence of nephrotoxicity associated with vancomycin plus piperacillin-tazobactam and vancomycin plus cefepime.

METHODS: This was an Institutional Review Board approved single academic medical center, retrospective study of patients admitted between September 2010 and September 2014 who received a combination of vancomycin and piperacillin-tazobactam or cefepime. Patients were excluded if they had severe chronic or structural kidney disease, required dialysis, were pregnant, had cystic fibrosis, received concomitant intravenous nephrotoxins, or were transferred from another hospital on one of the antibiotics being studied. The primary objective was to compare the incidence of acute kidney injury with the drug combinations. Secondary objectives included the incidence of acute kidney injury based on dose and duration of therapy, in high-risk patients, time to acute kidney injury from initiation of therapy and difference in hospital length of stay.

RESULTS/CONCLUSION: To be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the mechanism of nephrotoxicity associated with vancomycin and the potential contribution of beta-lactam antibiotics on acute kidney injury.

Identify differences between the RIFLE and AKIN classification systems for acute kidney injury.

Self Assessment Questions:

The mechanism of vancomycin nephrotoxicity is most often associated with which of the following?

- A: Infiltration of inflammatory cells within the renal interstitium
- B: Cellular degeneration and sloughing of tubular basement membrane
- C: Stimulation of oxidative phosphorylation and formation of free radicals
- D: Induction of afferent and efferent arteriolar vasoconstriction

Which of the following statements regarding RIFLE and AKIN classification of acute kidney injury is false?

- A: According to RIFLE, acute kidney injury is defined as an increase in serum creatinine
- B: According to AKIN, acute kidney injury may only be considered after a baseline serum creatinine is necessary to define and classify acute kidney injury
- C: Baseline serum creatinine is necessary to define and classify acute kidney injury
- D: The RIFLE classification considers three severity classes (risk, injury, failure)

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-361-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACY INTEGRATION INTO TRANSITIONS OF CARE AS PART OF A MULTI-SITE/MULTI-LEVEL COALITION AT A COMMUNITY HOSPITAL

Brittany J Creek, PharmD*; Diane Marks, RPh, BCPS; Garret Newkirk, PharmD, MS, BCPS; Terry Audley, RPh, FASHP; Thomas Gvora, MD, FACP; Sue Tillman, RN, BSN; Heather Suarez Del Real, RN, DON; Lisa Bentzler, RN

Froedtert Health Community Memorial Hospital, 10050 W. Cortez Circle, Apt. 5, Franklin, WI, 53132

brittany.creek@froedtert.com

Purpose: In 2012-2013 Community Memorial Hospital had a 10.5% 30-day readmission rate from skilled nursing facilities (SNFs), slightly above the overall hospital 30-day readmission rate of 9.3%. Decreasing readmission rates has been identified as a strategic goal of the organization. The Connections of Care Coalition is a voluntary multidisciplinary team developed between Community Memorial Hospital and other community health care facilities that is united to collaboratively support the specific health care needs of the community. One area of focus of the Connections of Care Coalition is to review the medication reconciliation process and to involve pharmacists in the transition of patients to SNFs. The objective of the project is to work as an interdisciplinary team to improve the discharge medication order process and communication during transitions of care from our hospital to local skilled nursing facilities by identifying key issues and initiating pharmacy practice change.

Methods: This quality improvement project will have a pre-post study design. Patients >18 years of age being discharged to SNFs and/or readmitted from SNFs with 30 days will be included. Baseline data will be collected, specific pharmacist processes and interventions will be established, educated on, and implemented, and then post-implementation data will be collected. Plan Do Study Act principles will be applied, as well as the General Electric Work-Out methodology. The exact pharmacist intervention will be developed. The project team is currently considering the ideas of educating inpatient pharmacists and physicians on the specific regulations for skilled nursing facility prescriptions, not printing the after visit summary (AVS) until the pharmacist review is completed, and including the inpatient pharmacy phone number on the AVS for medication questions within 48 hours of discharge.

Results/Conclusions: The project is currently ongoing and results/conclusions will be reported in the final project manuscript.

Learning Objectives:

Discuss the importance of working as an interdisciplinary team to improve the skilled nursing facility discharge process workflow.

Recognize the need for pharmacists to focus on skilled nursing facility discharge medication orders with the aim of increasing patient safety and reducing 30-day readmissions.

Self Assessment Questions:

Which of the following healthcare team members is it important for pharmacists to communicate with during the discharge medication reconciliation process for patients being discharged to skilled nursing facilities?

- A: Nutritionists
- B: Respiratory Therapists
- C: Occupational Therapists
- D: Social Workers/Case Management

Which of the following medications did the project team specifically choose for pharmacists to focus on during discharge medication reconciliation?

- A: Anticoagulants, Narcotics, and Antihypertensives
- B: Antibiotics, Anticoagulants, and Narcotics
- C: Narcotics, Antihypertensives, and Antipsychotics
- D: Antihypertensives, Antibiotics, and Anticoagulants

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-904-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE ASSESSMENT OF A COLLABORATIVE PHYSICIAN-PHARMACIST VACCINE PROTOCOL FOR HEMATOPOIETIC STEM CELL TRANSPLANT RECIPIENTS

Page E. Crew*, PharmD, MPH; Felicia Falvo, PharmD, BCOP; Dan Eastwood, MS; Jayme Cotter, MS, RN, AOCNS, ACNS-BC; Ryan Crass; Mindy Waggoner, PharmD, BCOP

Froedtert Hospital, 9200 West Wisconsin Avenue, Milwaukee, WI, 53226
page.crew@froedtert.com

Background: After a patient receives a hematopoietic stem cell transplant (HSCT), previously-acquired immunity against vaccine-preventable diseases is not retained. Froedtert & the Medical College of Wisconsin (F&MCW) have established an evidence-based vaccine protocol for HSCT recipients designed to ensure appropriate vaccine selection, timing, and titer monitoring after HSCT. Physicians and pharmacists at F&MCW also have a Collaborative Practice Agreement that gives pharmacists the authority to write orders for vaccinations in concordance with the protocol.

Purpose: At present, there is a paucity of literature describing vaccination compliance among patients who have received a hematopoietic stem cell transplant. The purpose of this study is to determine overall compliance with the F&MCW vaccine protocol and identify opportunities for improvement. The primary objective is to define the probability of patient non-compliance at each vaccination time point. The secondary objectives are to assess deviations from the protocol and to identify factors associated with non-compliance to the vaccine protocol.

Methods: All adult patients who received a hematopoietic stem cell transplant at F&MCW between January 1, 2012 and September 1, 2013 will be evaluated for eligibility. Retrospective chart review will be used to identify factors potentially related to compliance and delayed vaccinations. These variables will be examined using Kaplan-Meier or cumulative incidence plots, and compared using the log-rank test. Significant risk factors will be included in a multivariate Cox proportional hazards regression analysis. Variables such as steroid use, vaccination at outside clinics, patient refusal, and lack of scheduled appointments will be evaluated in addition to patient demographic factors.

Results: Data collection is in process. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the evidence-based timeline for re-vaccination of hematopoietic stem cell transplant recipients.

Recognize recent guidelines changes in vaccination recommendations for hematopoietic stem cell transplant recipients.

Self Assessment Questions:

How many months following hematopoietic stem cell transplantation should providers delay vaccination for Measles, Mumps, and Rubella (live)?

- A: 6 months
- B: 12 months
- C: 24 months
- D: It is contraindicated indefinitely

Identify the correct statement regarding vaccination and hematopoietic stem cell transplantation (HSCT).

- A: It is not safe for HSCT recipients to receive vaccines at any time following HSCT
- B: HSCT recipients lose immune system memory following transplantation
- C: Patients do NOT require vaccination against encapsulated bacteria
- D: Live, intra-nasal influenza vaccination is the only vaccine recommended for HSCT recipients

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-362-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST INVOLVEMENT IN A COMMUNITY PARAMEDICINE TEAM

Baely M. Crockett, PharmD; Karalea D. Jasiak, PharmD, BCPS; Todd A. Walroth, PharmD, BCPS; Kerri E. Degenkolb, PharmD, BCPS; Kelly E. Williams, PharmD, BCPP; Andrew C. Stevens, MD; Carolyn M. Jung, PharmD, BCPS

Eskenazi Health, 720 Eskenazi Avenue, Indianapolis, IN, 46202

baely.crockett@eskenazihealth.edu

Purpose:

Develop a pharmacist-imbedded Community Paramedicine Team to assist with care for patients with heart failure, COPD and/or asthma at high risk for readmission.

Methods:

Eskenazi Health partnered with Indianapolis Emergency Medical Services (IEMS) to develop a multidisciplinary care Community Paramedicine Team (CPT) to provide in-home visits to high risk patients with heart failure, COPD and/or asthma. Steps to develop the pharmacists role on this team included defining the pharmacist responsibilities, identifying a tool to assess health literacy, developing a chart documentation tool, and identifying billing opportunities. Further support by the pharmacist team member included applying for grant funding, developing educational materials for paramedics and patients, providing pharmacotherapy instruction to paramedics, and determining patient enrollment criteria.

Conclusions:

Imbedding a pharmacist into a Community Paramedicine Team provides a unique expansion of pharmacy services and a novel approach to address hospital readmissions.

Learning Objectives:

Recognize the role pharmacists play on community-based multidisciplinary teams

Describe the successes and limitations of a pharmacist on a Community Paramedicine Team

Self Assessment Questions:

Which of the following best describes the roles of a pharmacist on a community-based multidisciplinary team?

- A: Counsel on medications and lifestyle
- B: Reconcile medications from discharge to home
- C: Screen for barriers to adherence
- D: All of the above

What is a barrier to providing pharmacist services on a Community Paramedicine Team?

- A: Difficulty identifying patients who would benefit most from the team
- B: Inability to produce sustainable interventions
- C: Lack of resources to determine complete medical and medication history
- D: Limited access to other health care members to ensure a multidisciplinary approach

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-363-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A RETROSPECTIVE REVIEW AND ANALYSIS OF THE CALGARY REGIMEN IN ADULT ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANT PATIENTS

Katie Croegaert, PharmD, PGY2 Oncology Pharmacy Resident*, Katherine Simonsen, PharmD, BCOP, Clinical Pharmacist-Malignant Hematology, Mary Mably, RPh, BCOP, Pharmacy Oncology Coordinator, Mike Reed, RPh, BCOP, BCPS, Clinical Pharmacist, Jill Kolesar, Ph

University of Wisconsin Hospital and Clinics, 600 Highland Avenue, Madison, WI, 53792

kcroegaert@uwhealth.org

Purpose: The CALGARY regimen for hematopoietic stem cell transplantation (HSCT) conditioning was developed to minimize conditioning toxicity and reduce morbidity and mortality associated with GVHD without compromising clinical outcomes. Patients at the University of Wisconsin Hospital who have received the CALGARY regimen experienced significant complications including severe infection, grade IV mucositis and acute GVHD. The purpose of this study is to examine the incidence of conditioning toxicity and mortality within 100 days post-transplant in adult allogeneic HSCT patients.

Methods: A retrospective cohort study of forty-three sequential adult patients who received an allogeneic HSCT between January 1st 2013 and August 31st 2014 was conducted. Eligible patients were identified using the University of Wisconsin HSCT database. Data obtained for patients who received CALGARY was compared to matched-control groups who received busulfan and fludarabine (Flu/Bu) or cyclophosphamide and TBI (Cy/TBI) in the same timeframe. Patients were stratified by the baseline CMV status of the donor and recipient and matched using covariates including: age, incidence of acute GVHD, and degree of donor matching. The primary outcome measure for this study is the incidence of systemic viral infections occurring within 100 days post-transplant. The secondary outcomes are 100-day mortality and re-hospitalization rate. Chi-square tests were used to compare frequency of outcomes between the groups in SAS version 9.3.

Results/Conclusion: In terms of baseline demographics, the CALGARY group was older and included more matched unrelated donor (MUD) transplants, although these covariates were not significant in multivariate analysis. Eleven patients receiving CALGARY and six patients receiving the alternate regimens had a viral infection (odds ratio [OR] = 16.71; $p=0.0026$). Six CALGARY patients died before day 100 versus three patients receiving Flu/Bu or Cy/TBI (OR=10.62; $p=0.0493$). A significantly higher rate of CALGARY patients also required re-hospitalization (N=10) when compared to those receiving the alternate regimens (N=9) (OR=15.78; $p=0.0376$).

Learning Objectives:

Identify factors that may contribute to increased morbidity in patients receiving an allogeneic hematopoietic stem cell transplant.

Recognize the risks observed with the CALGARY regimen in this study compared to alternate conditioning regimens.

Self Assessment Questions:

Which of the following factors may contribute to an increased risk for morbidity in patients receiving an allogeneic hematopoietic stem cell transplant?

- A: Younger age
- B: A high degree of HLA donor-recipient matching
- C: Presence of acute GVHD
- D: Absence of co-morbid conditions

Which of the following outcome measures were observed at a significantly higher rate in patients receiving the CALGARY regimen compared to those receiving the alternate regimens?

- A: Incidence of acute GVHD
- B: 100-day re-hospitalization rate
- C: Incidence of bacterial infection within 100 days post-transplant
- D: Incidence of chronic GVHD

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-364-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF A MULTIDISCIPLINARY PHARMACY AND NURSING HCAHPS COMMITTEE ON HOSPITAL CONSUMER ASSESSMENT OF HEALTHCARE PROVIDERS AND SYSTEMS (HCAHPS) SCORES RELATING TO COMMUNICATION ABOUT MEDICATIONS

Spencer R. Crook, PharmD*, Lawrence A. Frazee, PharmD, BCPS, Kathleen Donley, RPh, MBA, FASHP

Akron General Medical Center, 771 Orchard Street, Wadsworth, OH, 44281
srobertcrook@gmail.com

Purpose: The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey affects hospital reimbursement from government payers. Evidence suggests that pharmacists can improve HCAHPS medication question scores. Extant literature is descriptive with limited statistical analysis. There is little discussion of sustainability using pharmacoeconomic analysis. The objective of this project is to convene a multidisciplinary committee that will meet over 18 months implementing sustainable quality improvements targeted to improve HCAHPS scores at Akron General Medical Center (AGMC). The target questions will be questions 16, 17, and 25 on the HCAHPS survey.

Methods: The Pharmacy and Nursing HCAHPS Committee consists of nursing and pharmacy volunteers. A complete literature search generated a list of initiatives that have been implemented in other institutions with reported improvement in HCAHPS medication question scores. Each idea was rated by committee members in terms of feasibility, sustainability, and quality. These results directed initial committee efforts. Through the process of systematic discussion and implementation, the committee will continue to meet for 15 months. The improvement initiatives will be limited only by the creativity and reach of the committee. Each initiative will be described in terms of effectiveness and sustainability. Measures of effectiveness will include pre- and post-implementation HCAHPS score comparisons. Measures of sustainability will include financial and personnel implications, and qualitative assessments. Financial implications will be expressed as a cost-effectiveness analysis. Personnel implications will be expressed as required FTEs. Qualitative assessments will be described as feedback from key stakeholders. The project was determined to be quality improvement.

Preliminary Results: A pilot program delivering discharge prescriptions to the patient bedside before discharge showed improvement in medication related HCAHPS scores. As a result the service was expanded, and results of the expanded service are pending. A medication information hotline proved to be ineffective. Additional results are pending.

Learning Objectives:

Review the importance of the patient experience in relationship to Value Based purchasing.

Describe the impact of a multidisciplinary committee including pharmacy, nursing, and quality on HCAHPS scores related to medication communication.

Self Assessment Questions:

Which of the following is correct regarding Value-Based Purchasing?

- A: Patient experience survey results are used in calculating an institution's Total Performance Score
- B: The Total Performance Score is the only factor used to determine reimbursement
- C: Healthcare institutions are unaffected financially by Value-Based Purchasing
- D: Health systems have no control over the various components of the Total Performance Score

Which of the following is true regarding multidisciplinary initiatives focused on improving the patient experience?

- A: No communication is necessary between disciplines to achieve patient experience goals
- B: It is usually desirable that each discipline work independently within the health system
- C: Multiple disciplines working together within the health system can improve the patient experience
- D: The patient experience is of little importance, considering the granular nature of the HCAHPS survey

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-740-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

MELATONIN FOR SLEEP RECOVERY IN THE PEDIATRIC INTENSIVE CARE UNIT

Michael Cusumano, PharmD;* David Willman, RPh; McKenzie Ferguson, PharmD; Brandi Strader, PharmD; Sangita Basnett, MD
St. John's Hospital, 800 E Carpenter St, Springfield, IL, 62702
michael.cusumano@hshs.org

Purpose: Patients in adult and pediatric intensive care units have inadequate sleep, disrupted sleep cycles, and abnormal endogenous melatonin secretion patterns. No published data describe the use of melatonin in pediatric intensive care units (PICU). The purpose of this study is to evaluate the association between melatonin administration and sleep recovery following extubation in PICU patients.

Methods: This observational matched-cohort study has been approved by the institutional review board. Patients who received mechanical ventilation in the pediatric intensive care unit since January 1st, 2010, will be included in this study. Patients receiving seven or fewer days of mechanical ventilation will be excluded. The melatonin group will include patients who received two or more doses of melatonin following extubation; these patients will be matched based on nearest age to control patients who did not receive any melatonin. The primary outcome will be the proportion of nursing assessments between 2200 and 0600 during which the patient was asleep; the proportion will be averaged over up to seven nights. Secondary outcomes include length of hospital stay following extubation, Sophia scale scores for benzodiazepine and opioid withdrawal symptoms, days of methadone wean, days of lorazepam wean, and the proportion of nursing assessments between 0800 and 2000 during which the patient was asleep as averaged over seven days. Normally distributed data will be analyzed using paired-sample t-tests in SPSS. Data not normally distributed will be analyzed using Wilcoxon signed-rank tests. A sample size of eight pairs of patients would yield 80% power to detect a 0.5 mean difference in the primary outcome assuming a SD of 0.5.

Results / Conclusions: Eight age-matched pairs of patients have been identified meeting inclusion criteria to date. Complete results and inclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe data supporting the hypothesis that melatonin supplementation may be beneficial for PICU patients

Discuss studies on exogenous melatonin for preventing delirium or for sleep in hospitalized patients

Self Assessment Questions:

What type of data support the use of melatonin supplementation for sleep in PICU patients?

- A Multicenter randomized controlled trials in adult ICU patients
- B: Multicenter observational studies of PICU patients
- C: Single-center randomized controlled trials in PICU patients
- D: Hypothesis-generating observational studies in PICU patients

Which of the following statements is true?

- A PICU patients tend to have normal melatonin secretion patterns
- B At least one RCT found that ramelteon improved sleep quality in P
- C At least one RCT found that exogenous melatonin decreased delir
- D At least one RCT found that exogenous melatonin improved sleep

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-365-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTING A CHANGE CONTROL PROCESS FOR MEDICATION-RELATED CLINICAL DECISION SUPPORT

Emily M. Czerwonka*, PharmD; Sara Shull, PharmD, MBA, BCPS; Jack Temple, MS, PharmD; Sara Pivovar, PharmD; Philip Trapskin, PharmD, BCPS

University of Wisconsin Hospital and Clinics, 600 Highland Ave, F6/158, Madison, WI, 53792
eczerwonka@uwhealth.org

Purpose: To develop a process to ensure clinical decision support (CDS) links within medication records are functional and current with Pharmacy and Therapeutic Committee resources. The following three objectives must be met to achieve this purpose. First, catalog the available CDS (clinical practice guidelines, reference links, alternative medication alerts, and ordering instructions) within the medication record. Second, build a database to optimize the process of CDS introduction and revision. Lastly, facilitate the use of the database through education and database optimization.

Methods: A query of all medication records was completed to obtain current medication order instructions, reference hyperlinks, guideline hyperlinks, and alternative alerts. A gap analysis was completed between medication record CDS and Pharmacy and Therapeutics Committee active resources and guidelines. Meetings were held with managers and staff who oversee the current process to better understand the opportunities for improvement and the description of the ideal change management platform. Coordination with database management occurred to establish the possibilities and limitations of a database build. A series of database tests will be completed prior to the database go-live. Staff who will utilize the database will be trained and supported. The Pharmacy and Therapeutics Committee will be updated to the status of the new database system.

Results/Conclusions: Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the concept of an information system change control process

Describe the use of a database to document, track, and communicate medication-related clinical decision support within the electronic medical record

Self Assessment Questions:

Which of the following is the clinical decision support that the project database was built to manage?

- A Alternative Medication Alerts
- B: Clinical Practice Guidelines
- C: Ordering Instructions
- D: All of the above

Which is a hospital benefit of clinical decision support within order entry?

- A More consistent prescribing practices
- B More evidence based prescribing
- C Increased formulary adherence
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-905-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A NICU-SPECIFIC ANTIBIOGRAM AND ASSESSMENT OF PATIENT SPECIFIC FACTORS ON SUSCEPTIBILITY

Kristen Dabkey, Pharm.D.*; Sarah Wieczorkiewicz, Pharm.D., BCPS; Nicole Rabs, Pharm.D.; Ronda Oram, MD

Advocate Lutheran General Hospital, 1775 Dempster Street, Park Ridge, IL, 60068

kristen.dabkey@advocatehealth.com

Purpose: Antimicrobials are the most commonly prescribed medications in the NICU, with approximately 40-50% of neonates having received at least one antimicrobial during their admission. An antibiogram is a useful tool to guide clinicians towards appropriate empiric antimicrobial selection; however, it reflects local patterns of susceptibility for the entire institution including isolates from the adult patient population. Use of the general antibiogram in the NICU limits the ability to maximize antimicrobial stewardship opportunities with the empiric use recommendations due to suspected differences in resistance patterns between patient populations. The aim of this study was to develop a tailored antibiogram to better aid physicians in selecting more appropriate therapy for patients residing in the NICU at Advocate Lutheran General Hospital (ALGH). Patient specific factors were also analyzed to determine if there was an effect on susceptibility.

Methods: The NICU antibiogram was developed by utilizing data from blood, urine, cerebrospinal fluid (CSF), and respiratory isolates obtained from subjects admitted to the NICU at ALGH between January 1, 2010 and December 31, 2014. The NICU antibiogram describes the susceptibility of antimicrobials at all tested body sites; susceptibility patterns were compared to the standard antibiogram. The NICU antibiogram was further analyzed by body site to determine if there were specific body site-related factors of susceptibility. Lastly, the following patient factors were analyzed to determine if these factors independently influenced susceptibility: birth weight, gestational age, length of stay prior to positive culture, systemic antimicrobial use prior to positive culture, born in-hospital or transferred, and maternal history of Group B Streptococcus (GBS), or chorioamnionitis and related antimicrobial treatment.

Results/Conclusion: Data analysis is pending. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference in April 2015.

Learning Objectives:

Identify limitations of utilizing a standard antibiogram to develop empiric use guidelines for the NICU.

Recognize patient characteristics that have demonstrated influence on antimicrobial susceptibility in a NICU population.

Self Assessment Questions:

Which of the following choices is considered a limitation of susceptibility patterns, as presented in a standard hospital antibiogram?

- A: Data are collected from positive-cultures within the hospital only
- B: Susceptibility is only reported for positive blood cultures
- C: Unit-specific trends may go unnoticed amongst hospital data
- D: Data can be used to guide empiric antimicrobial selection

Which patient characteristic is considered least likely to influence antimicrobial susceptibility?

- A: Length of stay prior to positive culture
- B: History of antimicrobial use
- C: Maternal treatment of GBS
- D: Head circumference

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-366-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

FASTER THAN THE SPEED OF LIGHT: EVALUATION OF MALDI-TOF + ANTIMICROBIAL STEWARDSHIP FOR ANTIMICROBIAL DE-ESCALATION

Erin Damery, PharmD*, Jamie L. Wagner, PharmD, Rachel M. Kenney, PharmD, BCPS, (AQ-ID), Zach R. Smith, PharmD, BCPS, Robert J. Tibbetts, PhD, D(ABMM), Linoj Samuel, PhD, D(ABMM), Susan L. Davis, PharmD

Henry Ford Health System, 2799 West Grand Boulevard, Detroit, MI, 482012689

edamery1@hfhs.org

Purpose

Matrix Assisted Laser Desorption/Ionization Time-of-Flight (MALDI-TOF) is a new technology that has the ability to identify infectious species from a single isolated colony by analyzing a sample's protein profile with mass spectrometry, allowing for more rapid identification of infecting organisms over traditional methods. Use of this technology has the potential to aid antimicrobial stewardship efforts by supporting recommendations for de-escalation of empiric antibiotics based on isolated bacterial organisms before susceptibilities are achieved. The purpose of this study is to evaluate the impact of MALDI-TOF and targeted stewardship interventions on the de-escalation of empiric antibiotic therapy for the treatment of lower respiratory tract (LRT) infections in intensive care units (ICU).

Methods

This is a quasi-experimental, pre-/post-test study with a double pre-test design. The first and second pretest groups will be comprised of patients who received treatment for a LRT infection in the ICU prior to the implementation of MALDI-TOF (group 1) and after MALDI-TOF was initiated but before targeted stewardship activities were started (group 2). The post-test group will include patients who received treatment post MALDI-TOF and stewardship intervention implementation. The first positive bronchial alveolar lavage, mini-bronchial alveolar lavage, bronchial washing, or tracheal aspirate for each patient will be included in the study. The stewardship intervention will consist of MALDI-TOF education to ICU pharmacists combined with prospective audit and feedback. Continuous, normally distributed data will be compared with student's t-test or 1-way ANOVA, and non-normal data will be analyzed using the Mann-Whitney U or Kruskal-Wallis test as appropriate. Categorical variables will be compared via Chi-square test. Time to event analyses will be completed using Kaplan Meier and Cox Proportional Regression as appropriate. A P<0.05 will be considered statistically significant for all comparisons.

Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain how Matrix Assisted Laser Desorption/Ionization Time-of-Flight (MALDI-TOF) can identify infectious species more quickly than traditional methods.

Review the impact of antimicrobial stewardship on the management of infectious diseases.

Self Assessment Questions:

Which of the following explains how MALDI-TOF can identify infectious species more quickly than traditional methods?

- A: MALDI-TOF identifies species directly from a sample sent to the lab
- B: MALDI-TOF utilizes a single colony from the first plate of the culture
- C: MALDI-TOF utilizes colonies from the subculture plate, eliminating false positives
- D: MALDI-TOF cannot identify species faster, but instead serves as a confirmatory test

Which of the following have been associated with antimicrobial stewardship?

- A: Increases in infection related mortality.
- B: Increased duration of antibiotic treatment due to use of less effective antibiotics
- C: Decreases in both inappropriate and overall antibiotic use.
- D: Increased healthcare costs.

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-741-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTICOAGULATION MONITORING IN PEDIATRIC PATIENTS UNDERGOING EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO)

Julie Dang, Pharm.D., Joanna Ditouras, Pharm.D., Kelly Holzhausen, Pharm.D., Michelle Veenstra, M.D., Paul T. Stockmann, M.D.
Children's Hospital of Michigan-Detroit Medical Center, 3901 Beaubien Blvd, Detroit, MI, 48201
jdang@dmc.org

Purpose: Anticoagulation is essential during ECMO to prevent clots within the body and ECMO circuit. Unfractionated heparin (UFH) is the anticoagulant of choice, and appropriate monitoring is challenging due to the lack of standardized therapeutic monitoring parameters for patients during ECMO. The goals of this study are to evaluate heparin infusion rate changes based on various laboratory coagulation parameters and to assess the efficacy of these changes in preventing thrombotic and bleeding complications in pediatric ECMO patients at Children's Hospital of Michigan (CHM). This study may provide insight into future developments of a more streamlined ECMO anticoagulation protocol.

Methods: A chart review was conducted at CHM of all pediatric patients less than 18 years of age on ECMO between January 1, 2013 and February 1, 2015. Data was collected to describe patient characteristics laboratory coagulation parameters, UFH rate adjustments, antithrombin III or fresh frozen plasma administration, and number of bleeding and clotting events. The primary outcome measures evaluated included frequency of heparin dose titrations based on activated clotting time (ACT), anti factor Xa level, or activated partial thromboplastin time (aPTT), number of antithrombin III and fresh frozen plasma administrations, percentage of ECMO circuit or oxygenator changes due to thrombosis, and incidences of bleeding. Secondary outcome measures include survival rates as measured by survival to ECMO decannulation, 30-day survival after ECMO decannulation, infection during ECMO cannulation, and surgical procedures performed while on ECMO. Data will be characterized using descriptive statistics.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review extracorporeal membrane oxygenation (ECMO) and the importance of anticoagulation in ECMO patients.
Describe the use of different laboratory monitoring tests used during ECMO to assess anticoagulation efficacy.

Self Assessment Questions:

Which of the following is not an appropriate laboratory test to utilize to ensure efficacy of anticoagulation in ECMO patients?

- A Activated Partial Thromboplastin Time (aPTT)
- B: Anti Factor Xa Levels (Anti-Xa)
- C: Activated Clotting Time (ACT)
- D: Mean Corpuscular Volume (MCV)

Which of the following is the anticoagulant of choice for patients on ECMO?

- A Low molecular weight heparin (LMWH)
- B Vitamin K antagonists
- C Unfractionated heparin
- D Direct thrombin inhibitors (DTI)

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-367-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

USE OF ANTI-FACTOR XA MONITORING IN HIGH RISK PATIENTS AT A LARGE ACADEMIC MEDICAL CENTER

Gretchen L. D'Arcangelo, PharmD*; Jeff Ketz, PharmD, BCPS; Katie M. Greenlee, PharmD, BCPS-AQ Cardiology
Cleveland Clinic, 26635 Amhearth Circle, Apt #305, Beachwood, OH, 44122
darcang@ccf.org

Purpose: Enoxaparin is a low molecular weight heparin (LMWH) with a more predictable anticoagulant dose-response effect than heparin, and, as such, anticoagulation monitoring is generally unnecessary. However, studies have shown that dose-response effects are variable in patients who are either overweight, underweight or have renal dysfunction. In these high-risk patient populations, anticoagulant monitoring with anti-Xa levels may be necessary to ensure therapeutic response and minimize the risk of bleeding. However, specific recommendations regarding appropriate anti-Xa monitoring and interpretation is currently not available. This study aims to determine the best practice regarding therapeutic enoxaparin use in patients <45 kg, >150 kg, or with renal dysfunction through anti-Xa monitoring at a large academic institution.

Methods: This is a non-interventional, medical chart review that utilized the institutions electronic medical record system to identify adult inpatients that received therapeutic enoxaparin and were either < 45 kg, > 150 kg, or had a creatinine clearance \leq 30 mL/min. Patients who received prophylactic doses of enoxaparin were excluded. The following information was collected for each patient: age, gender, weight, height, BMI, serum creatinine, creatinine clearance, enoxaparin indication, initial dose, any subsequent enoxaparin dose changes, the indication for the change, and finally, the presence and results of anti-Xa monitoring. To determine the presence of bleeding events the following information was assessed: daily hemoglobin levels, the presence of a packed red blood cell transfusion and the use of protamine. Data was collected for the duration of enoxaparin therapy while inpatient, or until enoxaparin therapy was discontinued. Data will be analyzed to determine the average dose that achieved target anti-Xa levels as well as determine the percent of these high-risk patients at target anti-Xa, as well as supratherapeutic and subtherapeutic levels with the corresponding doses.

Results and Conclusions: To be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Recognize the high risk patient populations that warrant anti-Xa monitoring while receiving therapeutic enoxaparin
Describe the current guideline recommendations regarding appropriate anti-Xa monitoring in patients receiving therapeutic enoxaparin

Self Assessment Questions:

What is one advantage of therapeutic enoxaparin over the use of heparin?

- A More effective in preventing recurrent DVTs/PEs
- B: More predictable anticoagulant response
- C: Shorter half life
- D: Higher protein binding activity

Per CHEST guidelines, what is the goal anti-Xa level in patients receiving twice daily therapeutic enoxaparin?

- A 0.1-0.2 units/mL
- B 0.3-0.5 units/mL
- C 0.6-1.0 units/mL
- D > 1.0 units/mL

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-368-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SUSTAINED VIROLOGIC RESPONSE RATES IN A VETERAN POPULATION WITH CHRONIC HEPATITIS C GENOTYPE 1 CIRRHOSIS WITH BOCEPREVIR OR TELAPREVIR-BASED REGIMENS VERSUS SOFOSBUVIR-BASED REGIMENS

*Danielle M. Daunais, Pharm.D.; Cassandra M. Ruoff, Pharm.D., BCPS; Derek C. Cole, Pharm.D.; Suthat Liangpunsakul, M.D.

Veteran Affairs - Richard L. Roudebush Medical Center, 1481 West 10th Street, Indianapolis, IN, 46202

daunaid2@gmail.com

Purpose:

There is limited information in current literature regarding the treatment of Hepatitis C Virus (HCV) genotype 1 in cirrhotic patients. These patients are among those in greatest medical need of treatment, and are often some of the most challenging to treat. As treatment modalities for HCV continue to advance, it is essential that their efficacy in this subgroup population is fully understood. The objective of this study is to assess the efficacy of sofosbuvir-based regimens in comparison to boceprevir or telaprevir-based regimens for patients with chronic HCV genotype 1 cirrhosis at the Indianapolis Veterans Affairs Medical Center (VAMC).

Methods:

All methods for this single-centered retrospective chart review have been approved by the Indiana University-Purdue University Indianapolis (IUPUI) and VA Institutional Review Boards (IRBs). A list of patients >18 years of age with chronic HCV genotype 1 cirrhosis who have been on sofosbuvir-based regimens at the Indianapolis VAMC from 2/1/2014-4/1/2015 will be generated from the computerized patient record system (CPRS). The following data will then be collected from the patients electronic medical records: name, social security number, age, gender, body mass index, race, cirrhosis diagnosis parameters, HCV genotype, IL-28 gene, treatment history, viral counts, history of hepatocellular carcinoma, medication regimen, dose reductions, supportive care measures, complications of therapy, and reason for discontinuation. This data will be pooled and compared to data collected in a previous study of patients with chronic HCV genotype 1 cirrhosis utilizing boceprevir or telaprevir-based regimens at the Indianapolis VAMC from 1/1/2012-8/1/2014. Basic descriptive statistics, including mean, standard deviations, ranges and percentages will be used to characterize the study subjects. Appropriate comparison tests including chi-square test and student t-test will be used for comparison between groups for categorical and continuous variables, respectively.

Results/Conclusions:

To be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify sustained virologic response (SVR) rates associated with sofosbuvir-based regimens in patients with chronic HCV genotype 1 cirrhosis

Describe common adverse effects associated with sofosbuvir

Self Assessment Questions:

In clinical trials, sofosbuvir/simeprevir +/- ribavirin produced the following SVR rates in patients with chronic HCV genotype 1 cirrhosis:

- A 29-41%
- B 42-77%
- C 81%
- D 93-100%

Which of the following is a common adverse effect associated with sofosbuvir?

- A Anemia
- B Headache
- C Thrombocytopenia
- D Psychiatric effects (irritability, mood swings, depression)

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-369-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A COMPARISON OF C. DIFFICILE RECURRENCE RATES WITH DIFFERENT TREATMENT METHODS

Rohini Dav, PharmD*; Lisa R. Young, PharmD, BCPS (AQ-ID); Sima Madhiwala, PharmD, BCPS; Patrick Waters, PharmD, HIV-AVVP
Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Ave, Chicago, IL, 60612

rohini.dave@va.gov

Purpose:

Clostridium difficile (CD) is a gram-positive anaerobic organism known to cause antibiotic-associated diarrhea and colitis. Recurrence of these infections is growing and is seen in up to 25% of patients within 30 days of treatment cessation. Guidelines recommend discontinuation of offending antibiotics at the time of CD infection (CDI) diagnosis to reduce this risk of recurrence. However, for some infections, continuation of antibiotic therapy is necessary. In such cases, some clinicians continue CD treatment concurrently with antibiotics that do not cover CD (referred to as ADNCDs) and prolong the duration of CD treatment by at least 3 days from the stop date of ADNCDs. To date there are no studies evaluating the efficacy of prolonging CD treatment in such a manner and the effects on recurrence rates are unknown, thus no specific recommendations are provided by current guidelines. The purpose of this study is to evaluate the effects on CDI recurrence rates of standard versus prolonged courses of CD treatment when ADNCDs are continued.

Methods:

This study is a retrospective, electronic chart review of patients diagnosed with CDI between January 1, 2003 and December 31, 2013. Patients will be identified through microbiology reports and patients experiencing their first CDI on antibiotics will be included. Subjects will be classified into 2 groups - one consisting of subjects receiving prolonged CDI treatment (defined as 10-14 days of CDI treatment plus an additional ≥ 3 days after completion of ADNCDs), and another group consisting of subjects in whom CDI treatment was stopped while on antibiotics or the same day antibiotics were discontinued. Recurrence rates will be compared between treatment groups. This study will also evaluate recurrence rates in subpopulations, CDI severity, and length of hospitalizations between groups.

Results/conclusions:

Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe current guideline recommendations for the treatment of *C. difficile* infections

Identify risk factors for the development of recurrent *C. difficile* infections

Self Assessment Questions:

What is the standard duration of therapy for the treatment of an initial episode of a *C. difficile* infection?

- A 2-3 days
- B 5-7 days
- C 7-10 days
- D 10-14 days

Which of the following is a risk factor for recurrence of *C. difficile* infection?

- A Prolonged *C. difficile* treatment duration
- B Continued administration of offending antibiotics
- C Short hospital stay
- D Younger age

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-370-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A PHARMACIST OPERATED PERIOPERATIVE ANTICOAGULATION MANAGEMENT CLINIC DURING GASTROENTEROLOGY SURGICAL PROCEDURES

Devin M DeCator*, PharmD; Jason Barnum, PharmD, CDE; Carrie Morrison, PharmD; Angela Green, PharmD

Mercy Health Muskegon, 1500 E. Sherman Blvd., Muskegon, MI, 49444
devin.deicator@mercyhealth.com

Background:

Many invasive procedures have the potential to increase bleeding risk, especially in patients who are taking anticoagulants. Weighing the risks and benefits of suspending anticoagulation therapy and whether to initiate bridging therapy is often hard to determine. Currently, it is recommended by both the American College of CHEST Physicians and the American Society for Gastrointestinal Endoscopy that vitamin K antagonists be held for 5 days before any high risk bleeding procedure. Those at high risk of having a thromboembolic event are recommended to initiate bridging therapy. Based on a retrospective drug utilization evaluation completed at Mercy Health Muskegon, it was found that only 65% of perioperative anticoagulation regimens for gastroenterologic procedures were appropriate based on patient specific factors. This reported percentage decreases to 35% if patients who held their anticoagulant during a low bleeding risk procedure are included; which the guidelines indicate can be continued. Patients who are inappropriately managed during the perioperative process are at an increased risk of experiencing adverse events.

Purpose:

Provide a pharmacist operated perioperative anticoagulation clinic to implement a uniform process for interrupting anticoagulation therapy during surgical procedures that adheres to the current guideline recommendations.

Methods:

Patients will be referred to the perioperative management clinic by gastroenterology surgeons if they are 18 years or older and are currently taking an anticoagulant that will need to be temporarily discontinued for a surgical procedure. The primary outcome measured was the percentage of patient plans adhering to the recommendations in the 2012 ACCP CHEST guidelines. Secondary outcomes evaluated include major adverse events within 30 days post procedure, successful restarting of antithrombotic medications, pharmacist time spent on each patient, and time to therapeutic INR post procedure.

Results/Conclusions:

Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the risk of having a thromboembolic event based on patient specific factors

Select an appropriate candidate for bridging therapy

Self Assessment Questions:

Which of the following is an indication for warfarin?

- A: Thrombocytopenia
- B: Hemorrhagic Stroke
- C: Anemia
- D: Atrial Fibrillation

Which of the following specific factors indicate a patient is at a high risk of having a thromboembolic event?

- A: Atrial Fibrillation- CHADS2 score: 3
- B: Antiphospholipid antibody syndrome
- C: Previous DVT > 12 months ago
- D: Hypertension

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-371-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

LIPOSOMAL BUPIVACAINE VERSUS CONVENTIONAL BUPIVACAINE IN MAJOR ABDOMINAL, ANORECTAL, AND SPINAL SURGERIES: AN ANALYSIS OF EFFICACY AND HEALTH ECONOMIC OUTCOMES

Audra C. DeChristopher*, Pharm.D.; Lindsay K. Benedik, Pharm.D., BCPS, CGP; Marcie A. Malone, Pharm.D.; Kayla P. Swearingen, Pharm.D.; Suzanne L. Van Fleet, Pharm.D.; Craig A. Roten, Pharm.D., BCPS

UC Health - West Chester Hospital, 7700 University Drive, West Chester, OH, 45069

audra.dechristopher@uchealth.com

Purpose: Adequate post-operative pain management is vital for patient satisfaction and to decrease surgical recovery time. The use of multimodal analgesia, including infiltration of a local anesthetic, has been proven to maximize pain control, minimize side effects, decrease the need for post-operative opioid rescue, and is the preferred method of post-operative pain management. Liposomal bupivacaine, a novel extended-release bupivacaine formulation, has been approved for management of post-operative pain in adults. Recent review articles suggest that liposomal bupivacaine may decrease postsurgical pain compared to placebo, improve outcomes by decreasing time to first rescue opioid medication when compared to conventional bupivacaine, and reduce opioid-related adverse events post-operatively, potentially reducing patient length of stay. The objective of this study is to determine the clinical utility of liposomal bupivacaine, with special focus on abdominal, anorectal and spinal surgical patients. **Methods:** This is a retrospective, single-center, cohort study that will evaluate the efficacy and health economic outcomes associated with utilization of intra-operatively administered liposomal bupivacaine or conventional bupivacaine in addition to standard post-operative multimodal analgesia in adult patients undergoing non-emergent, major abdominal, anorectal, or orthopedic, non-traumatic, spine surgeries. The cohorts will be differentiated by the administration of liposomal bupivacaine versus conventional bupivacaine. Co-primary outcomes include total opioid consumption per day (in milligrams of oral morphine equivalents) and total hospitalization cost. Secondary outcomes include pain scores during the first 72 hours postoperatively and presence of opioid-related adverse effects. All study data will be evaluated using statistical methods appropriate for data type and distribution. All tests for statistical significance will be two-sided and based on a significance level of $p = 0.05$. **Results/Conclusions:** Data collection and analysis is currently ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the benefits associated with the utilization of multimodal analgesia in post-operative pain management

Identify the characteristics of liposomal bupivacaine compared to conventional bupivacaine

Self Assessment Questions:

Which of the following analgesic strategy is considered the standard of care for post-operative pain control?

- A: Opioids
- B: Multimodal analgesia
- C: Non-steroidal anti-inflammatory's (NSAIDs)
- D: Local anesthetics

What is the mechanism of action of local anesthetics?

- A: Inhibits cyclooxygenase-1 and 2 (COX-1 and 2) enzymes
- B: Prevents the initiation and conduction of nerve impulses by block
- C: Agonist to mu and kappa receptors in the central nervous system
- D: Blocks GABA-A receptors

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-372-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE PREVALENCE AND SIGNIFICANCE OF ANTIPSYCHOTIC DOSING ON QTC PROLONGATION

Shannon A. DeGrote*, PharmD; Shaiza Khan, PharmD, BCPS; Michael Shuman, PharmD, BCPP

Captain James A. Lovell Federal Health Care Center, 30047 N Waukegan Rd, #108, Lake Bluff, IL, 60044

shannon.degrote@va.gov

Purpose: QTc prolongation is a common black box warning. Primary or congenital prolongation of the corrected QT interval (QTc) is associated with a higher risk for torsade de pointes. However, it is unclear if QTc prolonging drugs carry the same risk. The majority of studies regarding antipsychotics are limited by a variety of factors. The hypothesis is antipsychotics can modestly increase the QTc interval at high doses; however a clinically significant QTc lengthening of ≥ 500 msec is rare at any dose. The purpose of this study is to identify which patients are at risk of QTc prolongation and appropriateness of electrocardiogram (ECG) monitoring.

Methods: A retrospective, cohort study to examine the risk of developing QTc prolongation and torsade de pointes in 200 patients at the Captain James A. Lovell Federal Health Care Center (FHCC) in North Chicago, IL who take antipsychotic medications. The primary objective is to determine the incidence rate and mean of QTc prolongation stratified to dose of five antipsychotics (haloperidol, olanzapine, quetiapine, risperidone, and ziprasidone). The secondary objective is to determine the incidence of QTc of ≥ 500 msec and torsades de pointes stratified to dose. The frequency of QTc prolongation will be analyzed using chi-square and Fishers exact test as appropriate. The average length of QTc prolongation stratified to the dose of antipsychotic will be analyzed using linear regression. A logistic regression controlling for covariates known to prolong the QT interval will also be performed.

Learning Objectives:

Recognize risk factors for QTc prolongation and torsade de pointes.
Review the mechanism of action of QTc prolongation and torsade de pointes.

Self Assessment Questions:

Which of the following is a risk factor for QTc prolongation?

- A: Channelopathies
- B: Liquid protein diets
- C: Furosemide
- D: All of the above

Torsade de pointes is associated with a QTc interval of how many milliseconds?

- A: 300 msec
- B: 500 msec
- C: 450 msec
- D: 400 msec

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-373-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CEFOXITIN MONOTHERAPY VERSUS CEFOTAXIME-METRONIDAZOLE COMBINATION THERAPY FOR THE TREATMENT OF COMMUNITY-ACQUIRED INTRA-ABDOMINAL INFECTION

Jennifer C. Dela-Pena, PharmD*, Jing J. Zhao, PharmD, Kyle P. Murray PharmD, BCPS

Harper University Hospital, 3990 John R, Detroit, MI, 48201

jdela-pe@dmc.org

Purpose: Intra-abdominal infections are associated with significant morbidity and mortality, with rates ranging from 8.7- 32%. Appropriate empiric antimicrobial therapy in community-acquired intra-abdominal infections (CA-IAs) is associated with clinical success and improved patient outcomes. CA-IAs are caused by organisms native to the gastrointestinal tract such as Enterobacteriaceae, Streptococcus spp. and anaerobes. Cefoxitin is active against many of these targeted organisms, however, resistance to cefoxitin among Bacteroides spp. is encountered with increasing frequency. Metronidazole has retained excellent activity against Bacteroides spp.. Whether the addition of metronidazole to cefoxitin results in clinical benefit remains unknown. The purpose of this study is to evaluate clinical outcomes in patients who received cefoxitin monotherapy or cefoxitin and metronidazole combination therapy for the treatment of CA-IAI.

Methods: This is a retrospective cohort study and has been approved by the Detroit Medical Center and Wayne State University Institutional Review Board. The study includes adult patients 18-89 years old who received cefoxitin or cefoxitin and metronidazole for the treatment of CA IAI between January 2010 and July 2014. Patients who have non-intra-abdominal source of infection, risk factors for healthcare-associated infections, documented aerobic gram negative resistance to cefoxitin, or use of any antibiotic with anaerobic activity within 5 days prior to admission will be excluded. The primary outcomes are clinical success defined as the absence of persisting or worsening signs of infection at the end of treatment or hospital discharge as well as clinical failure defined as 30-day all-cause mortality, escalation of antimicrobial treatment, and worsening infection per the treating physician. Secondary outcomes include length of hospitalization, duration of treatment, admission to ICU and 30-day readmission related to initial infection.

Results/Conclusion: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify common pathogens associated with community-acquired intra-abdominal infections.

Review empiric regimens for the treatment of community-acquired intra-abdominal infections.

Self Assessment Questions:

Which organisms are most commonly associated with community-acquired intra-abdominal infections?

- A: Enterobacteriaceae, Staphylococcus aureus and Enterococcus faecalis
- B: Enterobacteriaceae, Streptococcus spp. and anaerobes
- C: Staphylococcus aureus, Enterococcus faecalis and anaerobic org;
- D: Streptococcus spp. Enterococcus faecalis, Stenotrophomonas ma

According to the 2010 Infectious Diseases Society of America guidelines, which of the following can be used as initial empiric monotherapy of community-acquired intra-abdominal infections?

- A: moxifloxacin
- B: ceftriaxone
- C: cefazolin
- D: levofloxacin

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-374-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE REVIEW OF NEOADJUVANT SPLIT-DOSE CISPLATIN PLUS GEMCITABINE FOR PATIENTS WITH UROTHELIAL CARCINOMAS OF THE BLADDER AT THE JAMES CANCER HOSPITAL AT THE OHIO STATE UNIVERSITY

Jessica L Dempsey, PharmD*; Megan Hinkley, PharmD, BCOP; Sherry Mori Vogt, PharmD, BCOP; Jordan Lundberg, PharmD; Amir Mortazavi, MD

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 W 10th Ave, Columbus, OH, 43210

jessica.dempsey@osumc.edu

Purpose: Bladder cancer is the 4th most common cancer in men and the 8th leading cause of cancer related deaths in men annually with an estimated 5-year survival of 50% in patients with muscle invasive disease. When compared to surgery alone, neoadjuvant chemotherapy has been shown to reduce the risk of recurrence after cystectomy, leading to an absence of residual cancer in the surgical specimen and improving survival. Specifically, the use of cisplatin-based chemotherapy has become the backbone of neoadjuvant therapy for invasive bladder cancer by improving response rates and prolonging survival time when compared to surgery alone. Regimens with cisplatin in combination with dose-dense methotrexate, vinblastine, and doxorubicin administered every two weeks (dd-MVAC), or in combination with gemcitabine (GC) are the most commonly used based on complete response rates, PFS, and toxicity profile. Unfortunately, patients with impaired renal function (CrCL <60ml/min) present a particular challenge because full dose cisplatin may prove more harmful than beneficial. Due to this risk, for those patients receiving cisplatin with gemcitabine, the dose of cisplatin may be split over two days to improve tolerability while maintaining dose intensity (split-dose GC), however there is limited data supporting this practice. The purpose of this study was to assess efficacy, safety and tolerability of neoadjuvant split-dose GC (cisplatin given on days 1 and 2) as compared to standard GC (cisplatin given on day 1) and dd-MVAC in patients with invasive urothelial cancers. **Methods:** Patients with invasive urothelial carcinoma who received neoadjuvant chemotherapy with split-dose GC, dd-MVAC or standard GC between January 2010 and August 2014 were included in this retrospective analysis. Descriptive statistics will be used to analyze this data. Kaplan-Meier methods will be used to describe survival data. **Results:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review current literature supporting neoadjuvant chemotherapy in the treatment of invasive urothelial carcinoma.

Report the pathologic and radiographic response rate of patients who received split-dose cisplatin and gemcitabine as compared to dd-MVAC and standard CG in the neoadjuvant setting.

Self Assessment Questions:

Neoadjuvant chemotherapy regimens containing this drug backbone are associated with improved survival compared to surgery alone:

- A: Etoposide
- B: Cytarabine
- C: Ifosfamide
- D: Cisplatin

The goal of split-dose administration of cisplatin is to reduce which of the following toxicities:

- A: Nephrotoxicity
- B: Nausea/vomiting
- C: LFT elevations
- D: Headache

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-375-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPACT OF LIPOSOMAL BUPIVACAINE ON HOSPITAL LENGTH OF STAY IN TOTAL KNEE REPLACEMENT SURGERY

*Emily DenBeste, PharmD, Kimberly Janicek, PharmD, MHA, CPPS
Presence St. Joseph Medical Center, 333 N Madison Ave, Joliet, IL, 60438
emily.denbeste@presencehealth.org

Purpose: Liposomal bupivacaine is used in total knee replacement surgery to produce postsurgical analgesia for up to 72 hours. Decreased pain may lead to earlier patient discharge and decreased nursing home utilization, which results in reduced healthcare costs. The purpose of this study is to determine if liposomal bupivacaine decreases hospital length of stay when compared to plain bupivacaine during knee replacement surgery. This information will be used to determine the future formulary status of liposomal bupivacaine.

Methods: This study was approved by the institutional review board prior to initiation. The study is conducted in unilateral primary total knee replacement surgery patients. All patients that received plain bupivacaine infiltration during surgery between 1/1/14 and 10/31/14 serves as the control group. This will be compared to the treatment arm of a prospective group of 20 patients receiving a single dose infiltration of liposomal bupivacaine. The primary endpoint of the study is hospital length of stay. Other outcomes that will be evaluated are discharge disposition, post operative pain scores, opioid consumption, and thirty day readmission rate. The data will be analyzed to determine if a difference exists in length of stay between the two groups of patients. Upon analysis of the data, a decision will be made if liposomal bupivacaine would be a valuable addition to formulary at this institution.

Results/Conclusion: Data collection is currently ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the difference between liposomal bupivacaine and standard bupivacaine preparations

Describe the potential benefits of prolonged analgesia with liposomal bupivacaine compared to standard bupivacaine preparations

Self Assessment Questions:

What is the approximate duration of action of liposomal bupivacaine?

- A: 12 hours
- B: 22 hours
- C: 52 hours
- D: 72 hours

Which of the following is a potential benefit of using liposomal bupivacaine over standard bupivacaine preparations?

- A: Decreased cost
- B: Increased pain
- C: Decreased length of stay
- D: Increased opioid use

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-376-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPROVING THE SAFETY OF "AUTO-VERIFICATION" OF HIGH-RISK MEDICATIONS AT AURORA HEALTH CARE

Kunal P Desai, PharmD*

Aurora St. Luke's Medical Center, 2801 West Kinnickinnic River Parkway, Milwaukee, WI, 53215

kunal.desai@aurora.org

Purpose: In certain areas (e.g. emergency departments) of the Aurora Health Care (AHC) system, medications are "auto-verified" by the electronic health record with only a few programmed parameters to check against for safety. Refinement of this "auto-verification" process may decrease the potential for medication events since high-risk medications are dispensed in these areas via automated dispensing cabinets. The purpose of this project is to develop clinical tools that allow "auto-verified" medications to be reviewed against a higher caliber set of parameters to increase patient safety while including pharmacist intervention to ensure dispensing of appropriate therapy.

Methods: The initial steps of this project were to create a list of high-risk high-use medications that served to guide the creation of medication specific algorithms containing a more robust set of rules. These rules were then implemented into the electronic health records "auto-verify" process. Post-implementation data will include the quantity of medication orders returned to the pharmacist verification queue that do not fulfill pre-specified parameters and the percentage of those orders that involved further pharmacist intervention. The next steps of this project are to review and refine the current rules, implement additional medication specific algorithms, and present findings to various committees and individuals.

Results/Conclusions: Data collection and analysis are in progress. The results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize novel strategies to improve patient safety through the use of auto-verification of medication orders

Identify the impact of programmed clinical tools on patient safety through the analysis of post-implementation metrics

Self Assessment Questions:

What three baseline parameters were checked during auto-verification of a medication order at AHC (prior to implementation of the medication-specific algorithms)?

- A: Licensed independent practitioner placed the order, patient is >12
- B: Licensed independent practitioner placed the order, patient is >12
- C: Licensed independent practitioner placed the order, patient is <12
- D: Licensed independent practitioner placed the order, dispensing location

The perceived impact of the additional parameters being used for auto-verification of select orders at AHC is:

- A: Increased efficiency
- B: Improved patient outcomes
- C: Improved safety
- D: Both B and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-906-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

PARTNERSHIP FOR PATIENT SAFETY RELATED TO NALOXONE USE FOR OPIOID REVERSAL

Alicia L Dethloff, PharmD*, Carol Tincher, PharmD, Jason Stabnik, RPh

St. Joseph Regional Medical Center - IN, 5215 Holy Cross Pkwy, Mishawaka, IN, 46545

alicia.dethloff@sjrmc.com

The Hospital Engagement Network (HEN) in conjunction with the Centers for Medicare and Medicaid Services (CMS) established a goal of 40% reduction in specified inpatient harms including adverse events due to opioids. The hospitals of the North Central Indiana Patient Safety Coalition (NCIPSC) have been actively engaged in these initiatives. Saint Joseph Regional Medical Center (SJRM) has focused on opioid harm reduction. Opioids are identified as frequently implicated drugs in adverse events due to potency differences among opioids, multiple routes of administration, and inadequate monitoring of patients. Naloxone administration is used as a marker for opioid adverse events in the hospital due to its pure opioid receptor antagonism. This retrospective chart review included patients from SJRM Plymouth and Mishawaka campuses who received an opioid from January 1, 2014 through July 31, 2014. The charts of the patients who received naloxone were reviewed to look for inclusion and exclusion criteria. Analysis included recording details of the events surrounding administration of naloxone in hopes of pinpointing trends in order to implement a change in procedure or policy for hospital staff to reach the goal of a 40% reduction in the use of naloxone for opioid reversals. Strategies for reduction in opioid harms include implementing a dosage strength alert on Pyxis machines for hydromorphone, utilizing the STOP-BANG questionnaire for all patients to assess sleep apnea risk, and reducing routine reversals in procedure areas. An analysis of naloxone use after the implementation of the changes will occur to see if the goal reduction has been met.

Learning Objectives:

Recognize the characteristics of patients at higher risk for oversedation and respiratory depression

Recall the morphine equivalent dose for hydromorphone

Self Assessment Questions:

Which of the following is a characteristic of patients at high risk for oversedation and respiratory depression from opioids?

- A: Male
- B: 70kg adult
- C: No recent opioid use
- D: No other sedating drugs

A physician ordered hydromorphone 1.5mg Q4H PRN for a 55 year old male for post-surgical pain. What is the morphine equivalent dose?

- A: 5mg
- B: 10mg
- C: 15mg
- D: 20mg

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-907-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPING AND IMPLEMENTING A MEDICATION AUTHORIZATION PROGRAM IN AN OUTPATIENT HOSPITAL-BASED INFUSION CENTER

Girish M. Dighe, PharmD*, OhioHealth Riverside Methodist Hospital;
Tara L. Hanuscak, PharmD, MS; Lisa D. Hoffman; Rachel L. Ramos,
PharmD; Tamara L. McMath, MPH; Christy L. Collins

Riverside Methodist Hospital, 3535 Olentangy River
Road, Columbus, OH, 43214

girish.dighe@ohiohealth.com

Purpose: Healthcare reimbursement is complex with frequent changes. Healthcare facilities must be able to adapt to these changes for optimal revenue cycle management. The Center for Medicaid and Medicare Services makes routine quarterly updates which affect claims reimbursement. Outpatient hospital-based infusion therapy reimbursements are affected by payer types and non-standardized clinical criteria imposed by payers. Infusion centers have seen denials on medication claims that may have been prevented if the therapy had been pre-certified/pre-authorized. The objective of the study is to evaluate the financial impact associated with a dedicated medication authorization program focused on pre-certification/pre-authorization of infliximab in an outpatient infusion center.

Methods: A prospective cohort study was conducted to evaluate pre-certification/pre-authorization workflow processes and financial performance between an outpatient hospital-based infusion center and referring practice. Current work flow processes and financial performance for pre-certification/pre-authorization of infliximab infusion therapy have been previously documented. Design and implementation of a dedicated medication authorization team, including patient assistance specialists and clinical staff, will create work-flow processes utilizing electronic resources and third-party vendors to establish a new pre-certification/pre-authorization program. Financial performance, prior-authorization requirements, and reasons for claims denials of infliximab will be evaluated. The pre-certification/pre-authorization program will include enhanced integration between the outpatient hospital-based infusion center and referring practice.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the various stakeholders associated with pre-certification/pre-authorization of high cost pharmaceutical therapies.

Describe pitfalls which may lead to denials for high cost pharmaceutical therapies at an outpatient hospital-based infusion center.

Self Assessment Questions:

Which of the following referring practice stakeholders play a significant role in the pre-certification/pre-authorization process?

- A Infusion Center Scheduler
- B: Primary Benefits Investigator
- C: Physician
- D: Infusion Center Pharmacist

Assuming an authorization process is in place, which of the following pitfalls can result in claim denials?

- A Scheduling
- B Patient education
- C Change in insurance policy/plan
- D Missed infusion appointment

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-742-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE APPROPRIATENESS OF DIABETIC MEDICATION THERAPY TO PREVENT CARDIOVASCULAR DISEASE AND NEPHROPATHY AMONG PATIENTS IN A COMMUNITY HEALTH-SYSTEM

Lara Dilanjan, PharmD*; Ksenia Hankewych, PharmD; Edyta Krupa,
PharmD, BCPS; Tina Zook, PharmD

NorthShore University HealthSystem, 2100 Pfingsten
Road, Glenview, IL, 60026

ldilanjan@northshore.org

Purpose: To assess the appropriateness of diabetic medication therapy, specifically focusing on cardiovascular disease (CVD) and nephropathy prevention, among patients enrolled in a community health center (CHC) and medication assistance program (MAP) in a community health-system

Methods: Blood pressure control, lipid management, use of antiplatelet agents, and smoking cessation have been shown to be effective in the prevention of CVD in diabetic patients. Additionally, the optimization of glucose control and the reduction of blood pressure can slow the progression of nephropathy. Pharmacists in the CHC and MAP are an integral part of the healthcare team in monitoring for appropriateness of therapy, patient education, and compliance to help prevent CVD and nephropathy. By examining prescribing patterns of physicians and making interventions when needed patient therapies can be significantly improved. The outpatient pharmacy prescription processing software will be used to identify patients that are enrolled in the clinic on oral hypoglycemic medications. Medication histories will be reviewed in the pharmacy database to determine other medication therapies including angiotensin converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase inhibitors, and anti-platelet medications. Charts within the electronic medical record will be reviewed to detect clinical markers such as low-density lipoprotein cholesterol (LDL-C), glycosylated hemoglobin (A1C), and blood pressure. Interventions will be made for patients who are not at optimal levels or lacking appropriate medication regimens. Patient allergies, contraindications, and intolerance to medications will also be reviewed as well as adherence using the outpatient pharmacy prescription processing software. This project will help identify the percentage of diabetic patients in the CHC and MAP that are being treated appropriately according to evidence-based literature and the American Diabetes Association (ADA) guidelines.

Results/Conclusions: Data collection and analysis are ongoing. The results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the changes in the updated 2015 ADA guidelines for diabetic patients

List important clinical markers in diabetic patients and the goals for each

Self Assessment Questions:

Which of the following is the target LDL-C goal in diabetic patients?

- A 70-189 mg/dL
- B: 100-130 mg/dL
- C: ≤100 mg/dL
- D: There is no target LDL-C goal

Which of the following factors is used to calculate atherosclerotic cardiovascular disease (ASCVD) by the Pooled Cohort Risk Assessment Equation?

- A Total cholesterol
- B Glycosylated hemoglobin (A1C)
- C Low-density lipoprotein cholesterol (LDL-C)
- D Serum creatinine

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-377-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEMENTIA IN AN AGING VETERAN POPULATION: THE IMPACT OF ESTABLISHED CRITERIA FOR USE ON MEMANTINE PRESCRIBING PATTERNS

Adam Dilich, PharmD*, Kavita Palla, PharmD, BCPS, Barbara Poddig, PharmD, BCPP, Justin Schmidt, PharmD, BCPS

Veteran Affairs - Edward Hines, Jr. Hospital, 5000 S. 5th Avenue, Building 228, Room 1041, Hines, IL, 60141

adam.dilich3@va.gov

Background: Alzheimer's disease (AD) is a significant cause of morbidity in the elderly population and is the most common form of dementia. AD is characterized by cognitive decline, behavioral and psychological symptoms, and decline in function and independence. FDA approved treatments for AD include cholinesterase inhibitors and the NMDA-receptor antagonist (memantine). The Veterans Healthcare Administration (VHA) established Criteria for Use (CFU) to provide a standardized method for appropriate prescribing and monitoring. VHA CFU reflects the American Geriatrics Society and the American Board of Internal Medicine Foundations "Choosing Wisely" campaign, where similar recommendations have been made regarding not prescribing cholinesterase inhibitors for dementia without periodic assessment of perceived cognitive benefit.

Purpose: This is a retrospective review investigating the adherence to VHA CFU for memantine prescribing to treat dementia in a veteran population.

Methods: This study is a retrospective electronic chart review of a selected sample of outpatients who received a prescription for memantine between January 1, 2009 and August 31, 2013 at the Edward Hines, Jr. VA Hospital. Patients who received memantine prior to the index date or for less than 6 months were excluded from this study. Charts were reviewed for the following: age, gender, race, memantine dose, frequency, indication for treatment, dementia staging, documented beneficial response to treatment, and concomitant use of acetylcholinesterase inhibitors, anticholinergics, and/or psychotropic medications. The primary objective is to evaluate adherence to VHA CFU for memantine prescribing in terms of appropriateness of indication, dementia staging, and documentation of clinical benefit within the first 6-12 months of treatment. Secondary objectives are to identify proportions of initial memantine prescriptions not meeting VHA CFU, examine which criteria are not met, and recognize any differences in prescribing between initiating service lines.

Results/Conclusions: Data collection is in progress. Preliminary results will be presented

Learning Objectives:

Describe Veterans Healthcare Administration (VHA) established Criteria for Use (CFU) for memantine prescribing to treat dementia.

Identify clinical parameters that support continued use of memantine.

Self Assessment Questions:

Which of the following are acceptable diagnoses and indications for memantine therapy?

- A Alzheimer's Dementia (AD)
- B Mild Cognitive Impairment (MCI)
- C Mixed dementia (AD + vascular dementia)
- D A and C

Which of the following validated clinical instruments can be used to stage and monitor dementia?

- A Mmse
- B Slums
- C Mini-Cog
- D Moca

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-378-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF OPIOID AND BENZODIAZEPINE PRESCRIPTION AND USE IN THE INDIANA MEDICAID CHILD AND ADOLESCENT POPULATION

Gabriela Dimitrievski*, PharmD, BCPS; Eric L. Scott, PhD; Elayne D. Ansara, PharmD, BCPS, BCPP; Carol A. Ott, PharmD, BCPP

Eskenazi Health / Purdue University, 720 Eskenazi Avenue, Pharmacy Administration, H2-300, Indianapolis, IN, 46202

gabriela.dimitrievski@eskenazihealth.edu

Purpose: The use and abuse of prescription medications has come to establish itself as a national epidemic. Limited data is currently published assessing the prescribing trends and use of medications of abuse or assessing factors for increased likelihood of prescription, use, and potential abuse in the child and adolescent population. Previous data has cited increased prescription of opioids and benzodiazepines in this patient population over the years, as well as increased prescription prevalence of these types of medications in Medicaid patients and patients with mental health disorders. The purpose of this study will be to assess the prevalence of and trends in prescription and use of opioid and benzodiazepines in the Indiana Medicaid child and adolescent patient population.

Methods: This retrospective chart review will analyze Indiana Medicaid prescription claims for opioid and/or benzodiazepine medications filled during the period of July 2012 to June 2014. Patients and associated prescription claims were included for study analysis if patients were <18 years of age, were actively enrolled in Indiana Medicaid during the study period, had claims which resulted in >30 days supply of medication during the study period, and did not meet exclusion criteria. Demographic and descriptive data, prescription trends throughout the study period, chronic use and possible misuse evaluation, and comparative analyses between patients with and without mental health disorders will be assessed.

Results/Conclusions: A total of 3,921 patients met inclusion criteria, with 63.56% of subjects having a documented mental health diagnosis. Subjects with documented mental health diagnoses were at increased likelihood to have claims for benzodiazepines (OR=2.71, 95% CI= 2.36-3.10) or both benzodiazepines and opioids (OR=1.79, 95% CI= 1.54-2.08), but were less likely (OR=0.41, 95% CI=0.34-0.50) to have claims for opioids. Completed results and conclusions will be presented at the 2015 Great Lakes Residency Conference.

Learning Objectives:

Identify the amount of children and adolescents aged 12 to 17 years of age who began abusing prescription medications within the previous year from report, as described in national survey data.

List patient characteristics correlated to increased prescription of opioids in the adolescent population, as cited in the published literature.

Self Assessment Questions:

According to the 2010 National Survey on Drug Use and Health, what fraction of Americans who began abusing prescription medications within the previous year were aged 12 to 17 years old?

- A One-eighth
- B One-third
- C One-half
- D Two-thirds

Which of the following patient characteristics has been found to be correlated to an increased receipt of opioid prescriptions in the adolescent population, as described in the presented literature?

- A Female sex
- B Male sex
- C Geographical location
- D Mental health diagnosis

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-743-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF PSYCHIATRIC CLINICAL PHARMACY SERVICES IN AN ADULT INPATIENT PSYCHIATRY UNIT

Angela H. Dimos*, PharmD, Joshua Unsworth, PharmD, BCPS
Southwest General Health Center, 18697 Bagley Rd, Middleburg
Hts, OH, 44130
adimos@swgeneral.com

Purpose: With the many treatment modalities for mental health conditions, there remains a lack of continuity with the management of depression and other mental health conditions such as schizophrenia, bipolar disorder and generalized anxiety disorder. Present literature supports the benefits of a pharmacist in an inpatient psychiatry unit such as drug monitoring, patient education, treatment recommendations and providing guidance for prescribing. However, the current standard of care at Southwest General Hospitals Oakview Behavioral Health does not include pharmacy services. Medication compliance is one of the major clinical implications to overcome in this population. The purpose of this study is to implement clinical pharmacy services in an inpatient psychiatry unit to assess improvement in patient care. **Methods:** This single centered prospective, randomized trial will assess the impact of implementing psychiatric pharmacy services within an inpatient psychiatric unit. The primary endpoint of this study will assess pharmacy clinical interventions. These clinical interventions will be determined through discharge medication reconciliation upon implementation of a bedside medication delivery service. The opportunity to intervene will be concentrated in the following categories: drug interactions, untreated conditions, inappropriate medication therapy, adverse events, and duplicate medication therapy. The following data will be collected for each intervention: acceptance or declination, recommendation category, notable changes in prescribing patterns, and the amount of time expended. The primary endpoints will be analyzed using descriptive statistics. Pharmacotherapy recommendations will be provided to the psychiatrist and clinical nurse practitioner when appropriate. Secondary endpoints will incorporate clinical pharmacy services that encompass patient education and a twenty-one day follow-up telephone call after discharge. Medications will be reviewed for participants during the study period, including necessary labs to evaluate proper medication use. This study is awaiting Institutional Review Board approval. **Results/conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe clinical services a pharmacist may provide in an inpatient psychiatry setting.
Identify medication optimization interventions during a transitional review at discharge.

Self Assessment Questions:

What is the most common drug therapy problem, in which a pharmacist can intervene, leading to relapse within the mental health population?

- A: Dose adjustments
- B: Medication adherence
- C: Adverse effect monitoring
- D: Formulation optimization

Interventions made by a pharmacist in the transition from discharge to home have shown to reduce 30-day readmission by as much ____%.

- A: 50%
- B: 62%
- C: 75%
- D: 90%

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-379-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING METHODS OF PRESCRIPTION CONSULTATION FOR DIFFERENT LEVELS OF PATIENT RISK

Jennifer Dippel, PharmD*; Prati Wojtal, BS Pharm, MS; Dareen Bleibel, PharmD, BCACP
Aurora St. Luke's Medical Center, 2900 W. Oklahoma
Ave, Milwaukee, WI, 53215
jennifer.dippel@aurora.org

Purpose:

The purpose of this project is to evaluate different prescription consultation methods on patient understanding in high and low risk patient populations. Patients enrolled in the Discharge Prescription Service at Aurora St. Lukes Medical Center currently receive face-to-face prescription consultation in the outpatient pharmacy or at the patients bedside. This project will evaluate different consultation options available to improve the discharge prescription process.

Methods:

A literature evaluation was completed to characterize patients into high and low risk. Based upon this evaluation, units within Aurora St. Lukes Medical Center were chosen to represent these different levels of risk. Patients being discharged from one of these units received one of three different methods of prescription consultation. High risk patients either received face-to-face consultation in the outpatient pharmacy or a real-time video consultation at the patients bedside. Low risk patients received face-to-face consultation or nurse prescription education at the bedside. The patients level of understanding was evaluated according to the number of questions that were accurately answered during a follow-up telephone call. These results were analyzed to determine if alternative consultation methods are just as effective as face-to-face consultations.

Results:

The baseline effectiveness of face-to-face prescription consultation on patient understanding was analyzed in both high and low risk patient populations. Baseline results found 96.1% and 97.3% of high and low risk patients were able to accurately answer at least five out of the eight questions being assessed on discharge prescriptions. The effectiveness of real-time video prescription consultation and nurse prescription education is currently being done and will be presented at the Great Lakes Conference.

Learning Objectives:

List at least five patient counseling standards defined in the Omnibus Budget Reconciliation Act of 1990 (OBRA 90).

Identify three criteria used to categorize patients into high and low risk populations.

Self Assessment Questions:

What is one patient counseling standard that is defined in the Omnibus Budget Reconciliation Act of 1990 (OBRA 90)?

- A: Verification of patient name and date of birth
- B: Intended use of medication
- C: Medication half-life and time to steady state
- D: Analyzing medication adherence

Which of the following criteria can be used to categorize patients into high and low risk populations?

- A: Health insurance deductible
- B: Prescriber credentials
- C: Diagnosis(es)
- D: Patient name

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-744-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INTRAVENOUS BUMETANIDE VERSUS INTRAVENOUS FUROSEMIDE IN PATIENTS WITH HEART FAILURE WITH REDUCED EJECTION FRACTION AND CHRONIC KIDNEY DISEASE

Rachel C. Dobersztyn, PharmD*, Kimberly Ackerbauer, PharmD, BCPS
Joshua DeMott, PharmD, BCPS

Rush University Medical Center, 1653 W. Congress
Parkway, Chicago, IL, 60612

rachel_dobersztyn@rush.edu

Diuretic resistance is commonly observed in patients with heart failure and chronic kidney disease. There are several pharmacokinetic studies comparing intravenous bumetanide and intravenous furosemide postulating benefits of intravenous bumetanide to overcome diuretic resistance. In chronic kidney disease there is a higher likelihood of developing metabolic acidosis leading to competitive inhibition of organic acid transporters by endogenous organic acids. Consequently, there is a decreased secretion of furosemide to its site of action, while bumetanides mechanism of access to the proximal tubule remains uninhibited. Bumetanide is secreted via organic base transporters. To date, there are limited clinical trials evaluating the effect on urine output and renal function between intravenous bumetanide and intravenous furosemide. The purpose of this study is to compare the efficacy of intravenous bumetanide and intravenous furosemide in patients with heart failure with reduced ejection fraction and chronic kidney disease stage II-IV.

In this retrospective cohort study, the efficacy of intravenous bumetanide and intravenous furosemide was measured by net urinary output (milliliter per milligram of drug). Parameters collected included: age, sex, race, admission weight, cardiac medications prior to admission, diagnosis, NYHA functional class, ejection fraction, baseline labs (basic metabolic panel, brain natriuretic peptide). Outcomes data collected included: change in weight at conclusion of intravenous diuresis, net urinary output, net changes in serum creatinine, blood urea nitrogen, and sodium, intravenous diuresis, concurrent nephrotoxic agents, incidence of hypokalemia and hypomagnesemia, incidence of hypotension, and duration of hospitalization. Patients were eligible for enrollment if: eighteen years old or greater, chronic kidney disease stage II-IV, heart failure with reduced ejection fraction, NYHA functional class III-IV, and received intravenous diuresis.

Collection and analysis of the data is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify the three mechanisms of diuretic resistance in patients with chronic kidney disease.

Recall why bumetanide exerts a more potent diuresis in patients with chronic kidney disease.

Self Assessment Questions:

Which of the following statements is correct regarding diuretic resistance in patients with chronic kidney disease?

- A: Loop diuretics exert a more potent diuresis with each dose administered
- B: Loop diuretics block sodium absorption at the Loop of Henle resulting in a more potent diuresis
- C: Loop diuretics exert maximal response within 24 hours of administration
- D: Loop diuretics block sodium absorption at the Loop of Henle resulting in a more potent diuresis

How is bumetanide secretion to the proximal tubule affected in patients with chronic kidney disease?

- A: Bumetanide secretion via organic base transporters is unaffected
- B: Bumetanide secretion via organic base transporters is affected in a dose-dependent manner
- C: Bumetanide secretion via organic acid transporters is unaffected in patients with chronic kidney disease
- D: Bumetanide secretion via organic acid transporters is affected in a dose-dependent manner

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-380-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TRANSITION FROM INTRAVENOUS TO SUBCUTANEOUS INSULIN IN CRITICALLY ILL ADULT PATIENTS

Meagan K. Doolin*, PharmD; Andrew C. Fritschle-Hilliard, PharmD, BCPS; Serena A. Harris, PharmD, BCPS; Todd A. Walroth, PharmD, BCPS; Jessica A. Whitten, PharmD, BCPS

Eskenazi Health, 720 Eskenazi Avenue, Sidney & Lois Eskenazi Hospital
2nd Floor, Indianapolis, IN, 46202

meagan.doolin@eskenazihealth.edu

Purpose: Glycemic control in critically ill patients has been shown to decrease morbidity and mortality. Despite available literature supporting glycemic control, limited guidance exists regarding the transition of intravenous (IV) to subcutaneous insulin. A validated method for accurate transition is important as complications associated with glycemic variability adversely impact outcomes. The purpose of this study is to determine if our current practice for transitioning from IV to subcutaneous insulin provides effective glycemic control.

Methods: This was a retrospective, observational study including adult patients admitted to the burn, medical, or surgical/trauma intensive care units who transitioned from IV to subcutaneous insulin from January 1, 2011 to September 1, 2014. Patients were excluded if they had a diagnosis of diabetic ketoacidosis. Patients were stratified into groups according to their initial dose of basal subcutaneous insulin as a percentage of the prior 24-hour IV requirements. The primary endpoint was the percentage of blood glucose (BG) concentrations within target range (70-150 mg/dL) in the first 48 hours following transition. A sample size calculation was performed a priori to calculate the number of patients needed per group to detect a 10% difference. To provide 80% power, 338 BG concentrations were needed per group.

Preliminary Results: A total of 28 patients with 356 cumulative BG concentrations have been evaluated. Of the total 356 BG concentrations, 184 (52%) were found to be in goal range within 48 hours following transition. BG concentrations were in range most often when transitioned to $\geq 80\%$ basal subcutaneous insulin. However, only one patient was stratified to this group. The majority of the patients included were transitioned to 0-49% basal subcutaneous insulin, which does not appear to provide adequate BG control.

Conclusions: Further data collection is needed to meet sample size in order to determine the most effective strategy for transitioning patients.

Learning Objectives:

State the most appropriate BG range for critically ill adults

Recognize the harmful effects of acute hyperglycemia and glucose variability when transitioning critically ill adults from intravenous to subcutaneous insulin

Self Assessment Questions:

What is the current BG goal recommended in the guidelines for critically ill adults?

- A: <110 mg/dL
- B: 100-150 mg/dL
- C: <200 mg/dL
- D: 200-215 mg/dL

Glucose variability has been associated with which of the following outcomes?

- A: Decreased hypoglycemia
- B: Decreased ICU mortality
- C: Increased hypoglycemia
- D: Increased ICU mortality

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-381-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DURATION OF USE FOR 5-HYDROXYTRYPTAMINE-3 RECEPTOR ANTAGONISTS FOR PROPHYLAXIS OF ACUTE CHEMOTHERAPY INDUCED NAUSEA AND VOMITING IN THE PEDIATRIC POPULATION

Stephanie J. Dorman, PharmD*, Jenny G. Moran, RPh
Children's Hospital of Wisconsin, 8915 W. Connell
Ave, Milwaukee, WI, 53226
sdorman@chw.org

Purpose: The American Society of Clinical Oncology (ASCO) antiemetic guidelines recommend a duration of up to two days after chemotherapy for 5-hydroxytryptamine-3 (5HT3) receptor antagonists for prophylaxis of acute chemotherapy induced nausea and vomiting (CINV). There are no published guidelines for prophylaxis of acute CINV specific to the pediatric population. The objective of this medication use evaluation (MUE) is to assess the duration of use for 5HT3 antagonists utilized for prophylaxis of acute CINV after chemotherapy has been given at this pediatric institution.

Methods: An electronic medical record will identify pediatric patients with a 5HT3 antagonist (ondansetron, granisetron, palonosetron) administered for prophylaxis of acute CINV. The following data may be collected: name of 5HT3 antagonist, duration of 5HT3 antagonist use after chemotherapy, frequency of dosing, concomitant antiemetic drugs as well as documented occurrences of nausea and vomiting. Provider documentation may be utilized to determine the rationale for changes in dosing and duration of antiemetic drugs. The emetogenic potential will be documented based on the chemotherapy administered. This study has been submitted to the Institutional Review Board for approval.

Preliminary Results: A retrospective MUE (4/1/14-9/30/14) was completed to determine the baseline duration of use for 5HT3 antagonists for the indication of CINV. Due to the retrospective nature of an MUE and the volume of orders, the reported mean duration of 5HT3 antagonist use was tracked independent of chemotherapy administration. For ondansetron, 4813 doses (418 orders) were administered to 98 patients for a mean duration of 8.7 days. For granisetron, 493 doses (74 orders) were administered to 23 patients for a mean duration of 6.62 days. And for palonosetron, 3 doses (3 orders) were administered to one patient for 9 days.

Conclusions: Data collection is ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the recommended antiemetic regimens based on the emetogenic potential of chemotherapy agents.

Recognize the similarities and differences in antiemetic drugs and dosing between adult and pediatric patients.

Self Assessment Questions:

What is the recommended treatment to prevent nausea and vomiting from highly emetogenic chemotherapy in pediatric patients?

- A: A 5HT3 antagonist, lorazepam, and a neurokinin-1 receptor antagonist
- B: A 5HT3 antagonist, dexamethasone, and a neurokinin-1 receptor antagonist
- C: A 5HT3 antagonist and lorazepam
- D: A 5HT3 antagonist and dexamethasone

Which of the following statements is correct?

- A: Due to pharmacokinetic differences, higher weight-based dosing of ondansetron is required in pediatric patients.
- B: Reliable pediatric dosing is available for aprepitant, a neurokinin-1 receptor antagonist.
- C: For combination chemotherapy, patients should receive antiemetic therapy on a scheduled basis.
- D: For multiday regimens, antiemetics should be administered only on the first day of therapy.

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-382-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL OUTCOMES OF WEIGHT-BASED VERSUS FIXED-DOSE ORAL SULFAMETHOXAZOLE/TRIMETHOPRIM (SMX/TMP) THERAPY IN HIV-INFECTED PATIENTS WITH PNEUMOCYSTIS JIROVECI PNEUMONIA (PCP)

*Shaina S Doyen, Pharm.D, Daniel B Truelove, PharmD., BCPS (AQ-ID), BCACP, AAHIVP, Andy K Kim, PharmD., Mark R Cox, PharmD., BCPS, Kyle A Weant, PharmD., BCPS, Lynn C Wardlow, PharmD., MBA, BCPS

University of Louisville Healthcare, 530 South Jackson
Street, Louisville, KY, 40202

shainado@ulh.org

Purpose: The Department of Health and Human Services (DHHS) guidelines recommend weight-based intravenous sulfamethoxazole/trimethoprim (SMX/TMP) for the treatment of moderate to severe *Pneumocystis jirovecii* pneumonia (PCP) for HIV-infected patients with the option to switch to oral therapy at fixed dosing after clinical improvement. However, no clinical data exists for SMX/TMP fixed dosing specific to obese or underweight patients. Furthermore, due to the toxicities associated with SMX/TMP, providers may select a lower dose based on tolerability. This could potentially lead to subtherapeutic dosing and inadequate treatment or supratherapeutic dosing in the two populations, respectively.

Methods: The study is a single center, retrospective cohort study to evaluate differences in all-cause mortality in HIV-infected patients that received SMX/TMP fixed dose versus weight-based dosing for the treatment of PCP. Eighty-two patients were identified via inpatient ICD-9 coding for HIV and PCP from April 2008 to December 2013. Patients were included if at least 18 years of age, HIV positive, receive care at the on-site HIV clinic, diagnosed with PCP, and received greater than or equal to 96 hours of SMX/TMP therapy prior to discharge. Patients were excluded if they received greater than 72 hours of consecutive intravenous SMX/TMP therapy or had a CrCl less than or equal to 30 mL/min prior to initiation of SMX/TMP. The 24 patients included were stratified based on a weight of less than or equal to 64 kg, greater than 64 kg, and fixed versus weight-based dosing, to analyze adequacy of dosing. The primary endpoints are inpatient mortality during hospitalization for PCP treatment and mortality within 30, 60, or 90 days from treatment initiation for PCP. The safety endpoints analyzed include nephrotoxicity, pancytopenia, hyperkalemia, and hepatotoxicity.

Results and conclusions: Results from the final data collection will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the limitations of the DHHS Guideline recommendations and the current literature regarding appropriate oral dosing of SMX/TMP in obese and underweight patients

List the potential advantages of providing weight-based dosing for all routes of therapy for patients treated for PCP

Self Assessment Questions:

The DHHS Guidelines recommend which oral dosing regimen after clinical improvement for the treatment of severe PCP?

- A: 15mg/kg/day divided every 6-8 hours
- B: It does not provide a dosing recommendation for oral therapy
- C: 20mg/kg/day divided every 6-8 hours
- D: 2 double strength tablets every 6-8 hours

Which of the following would be a benefit of providing weight-based oral dosing for the treatment of PCP?

- A: Increase the risk of toxicity associated with SMX/TMP
- B: Increase toxicity in underweight patients while ensuring serum drug concentrations are therapeutic
- C: Ensure obese patients do not achieve therapeutic serum concentrations
- D: Minimize toxicity in underweight patients while ensuring serum drug concentrations are therapeutic

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-383-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF ADHERENCE TO TARGET SPECIFIC ORAL ANTICOAGULANT PROTOCOLS

Evan W. Draper, Pharm.D.,* Blake Carley, Pharm.D., Kori Krueger, M.D., Tonja Larson, Pharm.D., and Brandon Parkhurst, M.D.
Marshfield Clinic, 1000 N Oak Ave, Marshfield, WI, 54449
draper.evan@marshfieldclinic.org

Purpose: Atrial fibrillation, deep vein thrombosis (DVT), and pulmonary embolism (PE) are in part managed with anticoagulants. Warfarin is considered the standard of care and is generally managed through anticoagulation services (ACS). New target specific oral anticoagulants (TSOACs), apixaban, dabigatran, and rivaroxaban, are FDA approved to prevent thrombosis in non-valvular atrial fibrillation and for the prevention and treatment of DVT and PE. It is unknown if patients on TSOAC therapy benefit from management by an ACS. It is not mandatory to enroll patients on TSOACs in the ACS. We assess if adherence to anticoagulation service protocols impacts outcomes.

Methods: This is a retrospective assessment of all initial orders prescribed through the computerized provider order entry platform for apixaban, dabigatran, or rivaroxaban from October 19, 2011 to August 21, 2014. Orders will be assessed for adherence to screening and dosing protocols created by the ACS. The screening and dosing protocols provide recommendations based on indication for use, renal function, hepatic function, drug interactions, weight, age, and serum creatinine. The initial dose prescribed by a provider will be compared to the protocols. Orders will be classified as off-protocol or per protocol. Off-protocol categories will include indication, under-dosed, and over-dosed. The percentage of total orders dosed per protocol will be calculated. The outcomes of major hemorrhage and thrombotic event will be compared between the per protocol group and the off-protocol group. Patients will be assessed for enrollment into the ACS. Data will be electronically extracted from the electronic medical record. Ten percent of the extraction will be manually validated. This project was approved by the Marshfield Clinic institutional review board.

Preliminary results: There are approximately 1138 orders for TSOACs during the study period. There are 525 rivaroxaban orders, 400 dabigatran orders, and 213 apixaban orders.

Conclusions: Pending.

Learning Objectives:

Recognize factors that influence dosing of target specific oral anticoagulants.

Name common reasons for non-adherence to target specific oral anticoagulant dosing protocols

Self Assessment Questions:

Which of the following medications requires dose modification in an 83 year old patient weighing 55 kg?

- A Apixaban
- B: Dabigatran
- C: Edoxaban
- D: Rivaroxaban

Which of the following patient characteristics are adherent to Marshfield Clinics Anticoagulation Service protocols for dabigatran 150 mg twice daily?

- A 54 year old with afib, normal eGFR, no DDI
- B 76 year old with afib, normal eGFR, no DDI
- C 60 year old with afib, history of valve replacement
- D 63 year old with DVT, eGFR=28 ml/min

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-384-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

UPDATE ON ECONOMIC IMPACT OF MAJOR ADVERSE DRUG EVENTS: A CASE-CONTROL STUDY USING HOSPITAL CHARGEMASTER DATA

Tara P. Driscoll, PharmD*; Bryan C. McCarthy Jr., PharmD, MS, BCPS; Kristin A. Tuiskula, PharmD; Andrew M. Davis, MD, MPH
University of Chicago Medical Center, 5841 S. Maryland Ave, Rm. TE026 MC0010, Chicago, IL, 60637
tara.driscoll@uchospitals.edu

Purpose: Patient-specific adverse drug events (ADEs) are associated with respective increases in hospitalization costs and length of stay. Literature determining the economic impact of major ADEs is relatively outdated, driving health system administrators to apply an inflation factor to previously published figures to determine current cost avoidance of ADE prevention. The purpose of this study is to determine the economic impact of major ADEs on patient hospitalization costs and length of stay in present time.

Methods: This study has been approved by The University of Chicago Institutional Review Board. ADEs were identified using both voluntary event reporting data and ICD-9 codes for ADEs for patients admitted to The University of Chicago Medicine during the time period of October 1st, 2013 through September 30th, 2014. Using eSimon, a hospital cost accounting system, total cost of hospitalization and length of stay were determined for each of 200 patients who experienced a major ADE (as classified as "E" or higher on The National Coordination Council for Medication Errors Reporting and Prevention [NCC-MERP] Index for Categorizing Medication Errors). A case-control analysis was utilized to determine the economic impact of major ADEs. Data was stored on a password-protected computer, and all analyses were performed using statistics in Microsoft Excel (Redmond, WA).

Results/Conclusion: Data collection and analysis are in process and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the difference between Adverse Drug Reactions (ADRs) and Adverse Drug Events (ADEs).

Identify the economic impact of Adverse Drug Events (ADE) on patient length of stay (LOS) and total hospitalization costs.

Self Assessment Questions:

1. A patient outcome that involves death, is life threatening (real risk of dying), requires hospitalization (initial or prolonged), results in disability (significant, persistent, or permanent), resu

- A Adverse Drug Event
- B: Serious Adverse Drug Event
- C: Adverse Drug Reaction
- D: Serious Adverse Drug Reaction

2. Studies have shown that patients whom experience an Adverse Drug Events (ADE) have _____ length of stay (LOS) and _____ total hospitalization costs.

- A An increased; an increase in
- B A decreased; a decrease in
- C An increased; a decrease in
- D A decreased; a increase in

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-908-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST-LED EDUCATION TO CRITICAL CARE NURSES ON APPROPRIATE UTILIZATION OF SEDATION PROTOCOLS

Katrina L Duckett, PharmD*; Matthew Byrde, PharmD; Vihang Patel, MD; Anil Pattisapu, MD; Dianna Proulx, PharmD, BCPS; Darrell Spurlock PhD, RN, NEA-BC; Brian Stemen, PharmD; Gregory White, RPh

Mt. Carmel Medical Center, 793 West State Street, Columbus, OH, 43222-1551

Katrina.Duckett@mchs.com

Purpose: The Clinical Practice Guidelines for the Management of Pain, Agitation and Delirium in Adult Patients in the Intensive Care Unit (PAD) published in January 2013, although evidence-based, have not been easily accepted by some critical care practitioners. Currently, there is limited data supporting approaches to the successful implementation and compliance to the new sedation practices. This research study will evaluate the acceptability and clinical impact of pharmacist-led nursing education on adherence to the PAD guidelines by evaluating pre and post-education sedation assessments, overall sedative use, pain management approaches, delirium assessments and treatments

Methods: Following approval by the Institutional Review Board a retrospective chart review of adult patients admitted to the Medical Cardiac Surgical Intensive Care Unit (MCSICU), who were mechanically ventilated, and received sedation medications from a pre-defined order set, was completed. A pharmacist-led nursing education, focused on the PAD guidelines and the institution's PAD algorithm, was completed at the midpoint of the study. Follow up, retrospective chart reviews will be completed for three months immediately following the education. The following data will be collected: analgesics and sedatives used, total weekly doses of analgesics and sedatives used between 0700 - 1859 and 1900 - 0659, use of sleep medications, the order in which analgesics and sedatives are given, SBT attempts and failures, total days on the ventilator, and appropriate documentation of RASS, CAM-ICU or behavioral pain scores for each medication change, titration, or PRN use. Acceptability outcomes will evaluate the quality of the education as well as the likelihood that the nurses will make a change in clinical practice based on the education they received. Clinical outcomes will be compared pre- and post-education focusing on changes in sedation practices.

Results: Data collection and analysis currently ongoing.

Conclusions: Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the goals, key concepts, and approaches to the use of appropriate analgesic and sedative agents in critically ill patients. Identify potential benefits of instituting a pain, agitation, and delirium algorithm for mechanically ventilated patients.

Self Assessment Questions:

Which of the following statements describe a key concept of the ICU PAD guidelines?

- A: Optimize sedation management by sedating ICU patients only as
- B: Sleep medications should not be used in sedated patients because
- C: Optimize pain management in critically ill patients by assessing and
- D: Procedure-related pain does not occur commonly in ICU patients

Which of the following statements are expected benefits of implementing an ICU PAD algorithm?

- A: Decreased length of stay in the ICU
- B: Decrease hospital and ICU costs
- C: Decrease duration of mechanical ventilation and mortality
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-385-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF THE FDA WARNING FOR AZITHROMYCIN ON UTILIZATION AT AN ADULT ACADEMIC MEDICAL CENTER

Abby C. Dunker, PharmD*; Natasha N. Pettit, PharmD, BCPS (AQ-ID); Denise M. Kolanczyk, PharmD, BCPS (AQ-Cardiology); Amit Patel, MD
University of Chicago Medical Center, 5841 S. Maryland Ave, Chicago, IL, 60637

Abby.Dunker@uchospitals.edu

Purpose: Azithromycin is a macrolide antibiotic with several Food and Drug Administration (FDA) approved indications. In March 2013, the FDA published a warning that azithromycin can prolong the QT interval which can potentially lead to life-threatening arrhythmias including torsades de pointes. To date, there has been no published literature illustrating the impact of this warning on utilization.

Methods: This is a single center, retrospective, observational study at The University of Chicago Medicine (UCM). Adult patients admitted between July 1, 2012 - February 28, 2013, and April 1, 2013 - November 30, 2013, who were treated with at least 48 hours of azithromycin were included in this analysis. The primary objective was to determine if there is a difference of azithromycin utilization in number of days of therapy per 1000 patient days. Secondary objectives included assessment of compliance with the UCM QTc monitoring guideline recommendations and utilization of alternative antibiotics. Pharmacy utilization reports for inpatient azithromycin orders in the electronic medical record were used to identify patients for inclusion. Information regarding demographics, indication, dose and duration of therapy, utilization of alternative antibiotics, length of stay, risk factors for QT prolongation, and baseline hepatic and renal function were collected. The percentage of days electrocardiograms were ordered in compliance with UCM guidelines was recorded.

Results: A sample size of 317 patients was required to meet 90% power. Preliminary data was analyzed for the primary endpoint including 30 patients in each arm. The data showed 9.82 days of azithromycin per 1000 patient days in the pre-warning group and 5.78 days in the post-warning group (p=0.29). Additional results and conclusions of the study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify risk factors for fatal arrhythmias associated with azithromycin. Review the literature describing the rates of cardiovascular death with azithromycin compared to other or no antibiotics.

Self Assessment Questions:

Of the following factors, which is considered a risk factor for causing fatal arrhythmias in patients treated with azithromycin?

- A: Uncorrected hyponatremia
- B: History of bradyarrhythmia
- C: Compensated heart failure
- D: Diabetes mellitus

In the study by which the FDA obtained most of its evidence to support the warning (Ray, et al.), there was not a statistically significant difference in the rates of cardiovascular death between azithromycin and other antibiotics.

- A: Levofloxacin
- B: Amoxicillin
- C: Ciprofloxacin
- D: No antibiotic

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-909-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

DOSE DEPENDENT EFFECT OF MATERNAL BUPRENORPHINE USE ON RATE AND SEVERITY OF NEONATAL ABSTINENCE SYNDROME

Brent C. Dunn*, Pharm. D., Greg Mateyoke, Pharm. D., Khandi Jundi, MD

St. Joseph Hospital East, 150 North Eagle Creek Drive, Lexington, KY, 40509

brentdunn@sjhlex.org

Purpose: Neonatal abstinence syndrome (NAS) is a compilation of withdrawal signs and symptoms in a neonate that are due to removal of a substance or medication. The majority of NAS cases are due to the exposure of the neonate to substances the mother takes during pregnancy. Maternal opioid use is the most prevalent cause of NAS. At the present time pregnant women who are dependent on opioids are usually switched to methadone or buprenorphine due to a decrease in withdrawal symptoms in the mother and ease of use. Methadone has been well studied. However, buprenorphine has conflicting data on the severity of NAS and the length of stay of neonates. Since there are limited studies on maternal buprenorphine it is unknown if larger doses of buprenorphine have a worse prognosis on neonates. Therefore, this new data must be collected to help verify the positive effect of buprenorphine use in pregnant women and the outcomes of neonates.

Methods: This is a retrospective study done at Saint Joseph East between January 2011- January 2014. The study included all pregnant women with opioid dependency that received buprenorphine during pregnancy. Exclusion criteria included any pregnant women that took other substances besides buprenorphine that cause NAS. The primary endpoint was the comparison of maternal buprenorphine dose per day and the highest NAS score. Secondary endpoints include correlations between maternal buprenorphine dose and neonatal weight and age, length of stay, total morphine or phenobarbital dose per length of stay, and umbilical blood opioid concentration. Also, NAS scores will be compared to umbilical blood concentration and baby gender, age, and weight. Post hoc endpoint looks at correlation of maternal buprenorphine dose with neonates who are treated vs not treated. Results/Conclusions Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss why buprenorphine and methadone are used in opioid dependant pregnant women

Describe how neonates are diagnosed with neonatal abstinence syndrome and when treatment should begin

Self Assessment Questions:

Which of the following is the reason pregnant women that take opioids are switched to methadone or buprenorphine?

- A: Longer half-life causing less withdrawal in the mother
- B: Cheaper medication
- C: Less side effects than other opioids
- D: Methadone and buprenorphine do not cause NAS

Which of the following tests are used to diagnose neonatal abstinence syndrome?

- A: Finnegan Score
- B: RASS scale
- C: Framingham Point Scores
- D: Well's criteria

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-386-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF A CLOSTRIDIUM DIFFICILE BUNDLE ON CLINICAL OUTCOMES: A QUASI-EXPERIMENTAL STUDY

Matthew S. Duprey, PharmD*; Larry H. Danziger, PharmD, FIDSA; Fred A. Zar, MD; Alan E. Gross, PharmD, BCPS

University of Illinois at Chicago, Department of Pharmacy Practice (MC 886), 833 South Wood Street, Ste 164 PHARM, Chicago, IL, 606127230
mduprey@uic.edu

Clostridium difficile is a common infection associated with significant morbidity and mortality. Multiple factors may influence outcomes of *C. difficile* infection (CDI) including choice of treatment, and concomitant drugs including continued use of antibiotics, proton pump inhibitors, and pro/anti motility agents. New treatment guidelines at our institution have instituted a comprehensive treatment bundle to optimize the care of patients with CDI. The purpose of this study is to determine whether bundled therapy improves outcomes in patients with CDI. Patients with CDI prior to treatment bundle implementation will be compared to patients after implementation of the treatment bundle. CDI will be defined as a positive *C. difficile* PCR result and ≥ 3 loose bowel movements per day or evidence of pseudomembranes on colonoscopic endoscopy. Exclusion criteria includes hypotension requiring vasopressors, presence of toxic megacolon, ileus, inability to take oral/enteral medications, and >1 prior CDI.

The primary endpoint is clinical success, defined as resolution of diarrhea for >48 hours on day 10 of treatment or at discharge, whichever occurs first. Secondary endpoints will include time to resolution of diarrhea, adherence to the treatment bundle, length of stay, adherence to the treatment bundle, mortality in the hospital and at 30 days, *Clostridium difficile* relapse at 4 weeks after the end of therapy, and 30 day readmission. Descriptive statistics will be performed on all variables. Continuous data will be evaluated using a Student's T test or Mann-Whitney U. Nominal data will be analyzed using Chi-squared or Fisher's exact test. Multivariate analysis will be conducted to determine independent predictors of treatment failure. This has been approved by the UIHHS Institutional Review Board. Data collection is currently ongoing.

Learning Objectives:

Identify risk factors for *Clostridium difficile* infection (CDI).

Describe interventions which improve patient outcomes in CDI.

Self Assessment Questions:

Which of the following antibiotics is most associated with *Clostridium difficile* infection?

- A: Clindamycin
- B: Doxycycline
- C: Metronidazole
- D: Oxacillin

Which of the following interventions has been shown to improve outcomes in patients with severe CDI?

- A: Acid suppression
- B: Fluoroquinolone
- C: Loperamide
- D: Oral vancomycin

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-387-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF AN EMERGENCY DEPARTMENT ASTHMA MEDICATION DELIVERY PROGRAM: ED DELIVERY-ASTHMA SCRIPT ACCESS PROGRAM (PROJECT ED-ASAP)

Kayla M Durkin, PharmD*, Shannon L Yarosz, PharmD, Kristen E Lamberjack, PharmD, BCACP

Nationwide Children's Hospital, Department of Pharmacy 700 Children's Drive, Columbus, OH, 43205

Kayla.Durkin@NationwideChildrens.org

PURPOSE: Asthma is the most prevalent chronic disease in children. Only 44% of Medicaid insured children pick up oral corticosteroids following asthma exacerbations. Lack of time is one reason for non-adherence. Research at a pediatric hospital outpatient pharmacy (OPP) proved that filling asthma discharge medications at the OPP significantly lowered 30-day revisit rates compared to non-OPP users. The objective of this study is to investigate if ED asthma prescription delivery increases the percent of OPP ED asthma prescriptions filled and decreases asthma ED revisit rates.

METHODS: Nurses will identify children presenting to the ED with signs and symptoms of respiratory distress including, but not limited to, cough wheezing, and shortness of breath. Patients identified will be asked if they would like prescriptions to be delivered from the OPP upon discharge from the ED. Enrolled patients prescriptions will be filled by the OPP and specially trained pharmacy educators (pharmacists, interns, and pharmacy students) will deliver the medication to the patient room with assistance from electronic communication devices as needed for pharmacist counseling or questions. Increase in the percent of ED asthma prescriptions filled by the OPP, 14-day and 30-day asthma ED revisit rates, and patient satisfaction questionnaire answers will be collected. For the primary outcome, using a McNemar test, 43 subjects are required to detect 17.9% difference in prescription capture rate between pre-implementation and post-implementation (22.1% vs 40%) with statistical power >80%, assuming two sided significance level of less than 0.05. Fourteen-day and 30-day ED revisit rates for those who received delivery service will be compared to those who did not receive the service, and answers to patient satisfaction scores will be reported as ordinal and nominal data.

RESULTS and CONCLUSION will be presented at the Great Lakes Pharmacy Resident Conference 2015.

Learning Objectives:

Describe epidemiology and barriers to prescription adherence in pediatric patients with asthma.
Explain implementation and impact of a pharmacy-led discharge counseling service to pediatric asthma patients in the Emergency Department.

Self Assessment Questions:

What is the most chronic disease state among children?

- A Congestive Heart Failure
- B: Asthma
- C: Nephrotic Syndrome
- D: Copd

What is one way to overcome barriers to obtaining prescriptions after a patient is discharged from the ED?

- A Make the family drive somewhere else to pick-up prescriptions
- B Send the family home without medication education
- C Deliver the medications to the patient and provide education
- D Offer the family the prescriptions at cash prices

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-388-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECTIVENESS OF INTRAVENOUS VS. ORAL ACETAMINOPHEN IN POST-OPERATIVE PATIENTS

Chelsea Durnil, PharmD*, Kellie Knight, PharmD, BCPS

Indiana University Health, 1701 North Senate Blvd, AG401, Indianapolis, IN, 46206

cdurnil@iuhealth.org

Purpose: Post-operative pain management traditionally includes the use of opioid analgesics in combination with non-opioid analgesics. This combination of therapy may help reduce unwanted side effects associated with opioid use, such as excessive sedation, respiratory depression, biliary spasm, depression of gastrointestinal motility, and postoperative nausea and vomiting. Appropriate management of post-operative pain has been shown to decrease time to ambulation, shorten length of stay, lower rates of complications, and increase patient satisfaction. The most common non-opioid analgesics used include NSAIDs and acetaminophen. While NSAIDs may be an effective option for pain control, they may not be suitable for all patients due to the possibility of increased post-operative bleeding and deterioration of renal function. Acetaminophen is available as a rectal, oral and IV formulation which is significantly higher in price. The IV formulation can be advantageous for patients who are NPO, patients with post-op nausea/vomiting, neurosurgery patients who cannot receive NSAIDs, patients with vascular injury who cannot use rectal or oral routes and in pediatrics.

Methods: This is a retrospective analysis of post-operative patients > 18 years of age who received oral acetaminophen post-operatively between January 1, 2011 and June 30, 2011 and IV acetaminophen post-operatively between January 1, 2012 and June 30, 2012. The cumulative opioid dose (in morphine equivalents) and percentage of pain scores at goal, during the first 48 hours post-op, were determined for each patient in both groups. Other parameters collected included: age, weight, sex, type of surgery, baseline AST/ALT, opioid medication use prior to admission, and whether additional pain medications were given. Safety parameters included whether the maximum dose of acetaminophen was exceeded and if naloxone administration was required.

Results/Conclusion: Data collection and analysis is currently ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the advantages and disadvantages of using non-opioid analgesics in combination with opioid analgesics for the treatment of post-operative pain.
Review the role of IV acetaminophen in the management of post-operative pain.

Self Assessment Questions:

Which of the following is an advantage of properly managing post-operative pain?

- A Decreased time to ambulation
- B: Increased patient satisfaction
- C: Lower rates of complications
- D: All of the above

Which of the following are risks associated with using NSAIDs in combination with opioids for management of post-operative pain?

- A Post-operative bleeding and deterioration of renal function
- B Pain and deterioration of liver function
- C Visual disturbances and deterioration of renal function
- D Tremors and deterioration of liver function

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-389-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF METRONIDAZOLE USE ON TACROLIMUS BLOOD CONCENTRATIONS IN TRANSPLANT PATIENTS TREATED FOR C. DIFFICILE

Caitlin Early*, PharmD; Jeong Park, MS, PharmD, BCPS; Michael Dorsch, MS, PharmD, BCPS; Kristen Pogue, PharmD, BCPS; Keith Aaronson, MS, M.D.; Sarah Hanigan, PharmD, BCPS
University of Michigan Health System, 1607 Winsted Blvd, Ann Arbor, MI, 48103
cearly@med.umich.edu

Purpose: Two case reports suggest that treatment with metronidazole for C. difficile infections (CDI) further increases blood tacrolimus levels by inhibiting CYP3A4, which has led to its avoidance in our heart transplant patients. The primary objective of this study is to determine the clinical effect of metronidazole on blood tacrolimus levels in transplant patients receiving CDI treatment. Identifying the significance of this interaction may allow us to determine whether an automatic tacrolimus dose change is warranted upon metronidazole initiation or if metronidazole should be avoided. Currently, no robust literature exists to demonstrate a predicted percent increase in tacrolimus levels with metronidazole.

Methods: This is a single center, retrospective cohort study investigating the effects of C. difficile associated diarrhea (CDAD) and its treatment with metronidazole on tacrolimus levels in adult solid organ transplant recipients within the University of Michigan Health System. Patients taking tacrolimus-based maintenance immunosuppression with a positive C. difficile assay between 1/1/09 and 3/31/14 will be included if treated for CDI with either metronidazole or vancomycin. Patients with addition, discontinuation, or dose change in medications known to affect tacrolimus levels (e.g., CYP3A or P-gp inhibitors/inducers) from 4 weeks before a positive C. difficile assay until the end of treatment will be excluded. The mean percent change in dose-normalized tacrolimus levels ($[ng/mL]/mg$) from baseline to CDI symptom resolution will be compared between the two groups using the student's t-test, 2-sided p-value <0.05 considered statistically significant. A difference of at least 30% between the groups will be considered clinically significant. Dose-normalized tacrolimus levels at the time of CDI diagnosis, but prior to treatment initiation will also be compared to baseline in all patients using a paired t-test to evaluate the impact of CDAD on blood tacrolimus levels, 2-sided p-value <0.05 considered statistically significant.

Results: In progress

Conclusion: In progress

Learning Objectives:

Define the proposed mechanism by which diarrhea affects tacrolimus blood levels

Identify the significance of describing the drug interaction between metronidazole and tacrolimus

Self Assessment Questions:

Which of the following likely contributes to elevated tacrolimus blood concentration levels observed with C. difficile associated diarrhea?

- A: Decreased hepatic CYP3A4 activity
- B: Increased intestinal P-glycoprotein activity
- C: Decreased intestinal CYP3A4 and P-glycoprotein activity
- D: Increased intestinal CYP3A4 and P-glycoprotein activity

The purpose of this study was to improve the management of transplant patients suffering from C. difficile infections (CDI) in which of the following ways?

- A: Decrease use of oral vancomycin for patients with mild-moderate CDI
- B: Increase use of oral metronidazole in patients with severe CDI
- C: Increase use of oral metronidazole in patients on cyclosporine immunosuppression
- D: Increase use of IV metronidazole in patients with severe CDI

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-390-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE HEMODYNAMIC EFFECTS OF BETA-BLOCKERS IN PATIENTS WITH ACTIVE COCAINE USE

Jessica M. Efta, Pharm.D.*; Michael A. Peters, RPh, BCPS; Jona Lekura, Pharm.D., BCPS; Ziad G. Sadik, Pharm.D., BCPS
Henry Ford Health System, 13360 Greenview Dr
#105, Southgate, MI, 48195
jefta1@hfhs.org

Purpose: Because of the perceived adverse effects, current practice guidelines recommend against the use of beta-blockers in patients with cocaine abuse and a compelling cardiac indication, mainly coronary artery disease (CAD) or heart failure with reduced ejection fraction (HFrEF). This is primarily based on mechanistic studies reporting unopposed alpha-adrenergic stimulation. However, data regarding the safety of beta-blocker use is conflicting; indicating that beta-blocker therapy in these patients may be safer than previously suggested. In addition, it is theorized that beta-blockers with additional alpha blockade properties may lead to fewer hemodynamic changes. Because of a lack of strong evidence supporting the safety and efficacy of beta-blocker use in these patients, we are conducting this study in order to assess the relative benefits and risk of beta-blocker treatment of patients with CAD and HFrEF with active cocaine use.

Methods: This is an IRB approved retrospective cohort study conducted at our institution. Adult inpatients presenting between June 1, 2011 and May 31, 2014 with a positive urine test for cocaine use and a diagnosis of CAD and/or HFrEF indicated by ICD9 codes will be included in this study. Patients will be excluded if they have a negative urine test for cocaine or have other contraindications for beta-blocker use. Patients will be separated into 3 cohorts based on their therapy: beta-blockers with additional alpha activity, other beta-blocker therapy, and no beta-blocker therapy. The primary endpoint is the change in hemodynamic parameters 24 hours after the initiation of the beta-blocker. Secondary endpoints include changes in hemodynamic parameters at other time points, readmission rates, and adverse effect rates. Categorical data will be analyzed using the Chi-squared test, and continuous data will be analyzed using the ANOVA or Kruskal-Wallis test as appropriate.

Results and conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the proposed mechanism of the potential cardiovascular effects of cocaine when beta-blockers are administered.

Describe current data surrounding beta-blocker use in patients with active cocaine use and a compelling cardiac indication.

Self Assessment Questions:

Which of the following effects is anticipated when selective beta-blockers are administered in the presence of cocaine?

- A: Increased heart rate
- B: Increased myocardial oxygen demand
- C: Coronary vasospasm
- D: Decrease in systemic vascular resistance

Which of the following is true?

- A: Data shows that all beta-blocker use in patients with cocaine abuse is safe
- B: Data shows that all beta-blockers are safe and effective when used in patients with cocaine abuse
- C: Data shows that beta-blockers with additional alpha blockade are safer than other beta-blockers in patients with cocaine abuse
- D: Data regarding beta-blocker use in patients with cocaine abuse is limited

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-391-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE ROLE OF PROCALCITONIN AND LACTATE LEVELS IN PATIENTS PRESENTING WITH SEPSIS AND SEPTIC SHOCK.

Edward Eischen, PharmD*, Sarah Wieczorkiewicz, PharmD, BCPS, Jill Strykowski, PharmD, Arvey M. Stone, MD, Ina Zamfirova, BA
Advocate Lutheran General Hospital, 1775 W. Dempster, Park Ridge, IL 60068
edward.eischen@advocatehealth.com

Background: Assessing lactate levels in patients with sepsis and septic shock is standard practice in the ICU setting to guide fluid resuscitation, provide evidence of end organ damage and hypoperfusion. Procalcitonin has been used to guide initiation and de-escalation of antimicrobials however, has several limitations. While previous studies have shown that individual elevations in lactate or procalcitonin correlate with increased morbidity and mortality, there are limited data that have described the utility of both parameters for risk-stratification. The primary objective is to evaluate the current role of procalcitonin and lactate levels in patients who present with sepsis and septic shock. The secondary objective is to determine the association between procalcitonin and lactate levels and disease severity as measured by Acute Physiology and Chronic Health Evaluation II (APACHE II), Sequential Organ Failure Assessment (SOFA) scores, and mortality.

Methods: Retrospective chart review of all patients who presented with sepsis, septicemia, or septic shock and had at least one procalcitonin and one lactate level reported during January 1, 2013 - December 31, 2014. Data collected will include baseline laboratory values and values at 24, 48 and 72 hours post admission or post sepsis suspicion, procalcitonin and lactate levels, hospital and ICU length of stay, and ICL and inpatient mortality.

Results/conclusions: Data analysis pending. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the role of procalcitonin and lactate levels in sepsis and septic shock.

Identify the limitations of procalcitonin levels.

Self Assessment Questions:

Which of the following procalcitonin levels represents a high risk of progression to severe sepsis or septic shock according to the Food and Drug Administration (FDA)?

- A >0.1 ng/ml
- B: >0.25 ng/ml
- C: >0.5 ng/ml
- D: >2 ng/ml

Which of the following is a limitation to the use of procalcitonin in patients presenting with sepsis and septic shock?

- A Timing of baseline and repeat levels is clearly
- B High sensitivity and specificity of the assay
- C Disease state con-founders causing false negatives or positives
- D Clearly defined reference range

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-745-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CONTROLLED SUBSTANCE WASTE DISPOSAL SOLUTIONS AT AN ACADEMIC MEDICAL CENTER

Sarah J Emanuele, BS, PharmD*; James T Lund, PharmD, MS; Brad C Ludwig, RPh, MS; David M Musa, RPh, MS; Aaron P Webb, PharmD, MS
University of Wisconsin Hospital and Clinics, 600 Highland Avenue, F6/133-162, Madison, WI, 53792
SEmanuele@uwhealth.org

Purpose: The purpose of this project is to evaluate controlled substance disposal solutions which comply with federal regulations and support environmental best practices. The project will identify a narcotic waste disposal solution that will increase compliance and documentation requirements in a manner that improves nursing workflows.

Methods: Key stakeholders from multiple disciplines were identified to serve on a controlled substance waste steering committee to evaluate and support the need for an improved controlled substance disposal system. Nursing staff were surveyed on controlled substance waste practices to determine compliance with current waste disposal policies. In addition, surveys of nursing staff attitudes towards disposal methods were collected. All hospital policies, federal regulations, and guidance documents from environmental agencies were reviewed to determine the ideal characteristics of a controlled substance waste disposal system. Available disposal systems were identified by surveying practice methods at other academic medical centers and searching online product purchasing catalogs. Disposal systems were rated on convenience, security, cost, and sustainability. A comprehensive cost-analysis of six months of controlled substance waste data was performed to estimate the ongoing maintenance costs. A business case was written and proposed to senior hospital management to secure funds for implementation of a new controlled substance waste disposal system.

Implementation of a new controlled substance waste disposal system will occur in the spring of 2015. Standardized workflows will be defined for nursing staff who will utilize the disposal system and pharmacy staff who manage and maintain the disposal system. Outcome measures include number of waste related narcotic discrepancies, nurse-reported compliance with disposal methods written in policy, nurse-reported satisfaction with disposal method, and staff-reported trust in system to render the drug non-recoverable.

Results: Results will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the impact the Disposal Act of 2014 has on hospital controlled substance wasting practices.

Identify available options for proper disposal of controlled substance waste.

Self Assessment Questions:

Which of the following statements is correct pertaining to the new Disposal Act of 2014?

- A Controlled substances are no longer allowed to be disposed of in trash
- B: The DEA relaxed their two-employee integrity requirement for controlled substances
- C: The goal of the disposal act is to encourage public and private entities to dispose of controlled substances
- D: The DEA does not view chemical treatment of controlled substances as disposal

Which of the following is the best place to dispose of a controlled substance patch?

- A Trash receptacle
- B Red Sharps Container
- C Sink/Sewer
- D Secure chemical treatment container to later be incinerated

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-746-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING THE APPROPRIATE USE OF PATIENTS OWN MEDICATIONS IN A DEDICATED OBSERVATION UNIT

Michael Endries*, PharmD, BCPS; Justin Guthman, PharmD; Brook DesRivieres PharmD, MS

Ministry Health - St. Joseph's Hospital - WI, 611 Saint Joseph Ave, Marshfield, WI, 54449

Michael.Endries@ministryhealth.org

Purpose:

Nationwide, the number of hospital observation patients doubled between the years of 2001 and 2009 and continues to rise on an annual basis. Observation status patients are required to pay out-of-pocket for many medications, and these charges result in patient dissatisfaction. The Joint Commission (TJC) and the Centers of Medicare and Medicaid Services (CMS) designate that hospitals may allow patients to use their own supply of medications, however, hospital policies must be in place to ensure medication identity and integrity. This project intends to define appropriate criteria for the use of patients own medications for observation status patients.

Methods:

This quality improvement initiative has been exempt from review by the Institutional Review Board. A baseline assessment of out-of-pocket medication charges for observation status patients was conducted, and the results were analyzed to determine where the use of patients own medications have the opportunity to substantially reduce patient costs. Following the baseline assessment, health system policies and procedures were updated to reflect the appropriate use of patients own medications in observation status. Additionally, provider education was completed to increase awareness of medication reimbursement for patients in observation status to reduce the ordering of medications not essential in the acute treatment period. The primary objective is to define a process for observation status patients to use their own medications while maintaining regulatory compliance. Secondary objectives include optimizing medication availability to a dedicated hospital observation unit to reduce length of stay and improving healthcare provider awareness of the payment model for observation status patients.

Learning Objectives:

List regulatory standards regarding the use of patients own medications in the hospital setting

Define characteristics of a self-administered medication

Self Assessment Questions:

Per TJC which of the following is not a regulatory standard for the use of patients own medications in a hospital setting:

- A The hospital must define when patients' own medications may be
- B: The medication must be visually evaluated to assure integrity
- C: Prescribers must be notified if the use of patients' own medication
- D: Only Medicare Part D patients may use their own medications in o

Which of the following would be considered a self-administered medication according to CMS?

- A Fentanyl 25 mcg IV injection
- B Bisacodyl 10 mg suppository
- C Ondansetron 4 mg orally disintegrating tablet
- D Both B and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-708-L03-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPLEMENTATION OF A PHARMACIST DRIVEN INTERVENTION TO IMPROVE GLYCEMIC CONTROL IN A HOSPITALIZED, NON-CRITICALLY ILL VETERAN POPULATION

Elizabeth F Englin, PharmD, BCPS* and Jennifer A. Koch, PharmD, BCPS, CGP

Veteran Affairs - Clement J. Zablocki Medical Center, 5000 W. National Ave., Milwaukee, WI, 53295

elizabeth.englin2@va.gov

Purpose:

Inpatient hyperglycemia is correlated with negative outcomes including increased hospital stay, infection and mortality. The 2009 American Association of Clinical Endocrinologists/American Diabetes Association established goal blood glucose for non-critically ill patients as less than 180 mg/dL. A study conducted in 2013 at our institution revealed 55% of 1902 fingersticks were less than 180 mg/dL and 48% of the 77 patients had only sliding scale insulin regimens. The objective of this study is to develop, implement and evaluate the effectiveness of pharmacist intervention to improve inpatient glycemic control.

Methods:

This study was exempt from institutional review board approval due to medical center policy for projects conducted for quality improvement purposes. The computerized patient record system is used to identify non-critically ill patients with length of stay greater than 3 days and blood glucose fingerstick greater than 180 mg/dL or less than 70 mg/dL. Patients are excluded if admitted for diabetic ketoacidosis, on systemic steroids, followed by endocrine service or admitted to intensive care unit at any point in admission. Eligible patients are evaluated via chart review and discussion with providers to determine therapeutic recommendation. Additional information gathered will be current hypoglycemic regimen and A1c assessment. Evaluation of new, and reevaluation of existing patients will be done at least every other day. The study will include no more than 100 patients. The primary outcome will be the percentage of fingersticks less than 180 mg/dL and will be compared to prior study data to determine efficacy of intervention.

Summary of preliminary results to support conclusion:

There are no results to date. However data from the 2013 study will be used for comparison. Results will be presented at the Great Lakes Pharmacy Resident Conference in April 2015.

Conclusions:

Conclusions will be presented at the Great Lakes Pharmacy Resident Conference in April 2015.

Learning Objectives:

Define pre- and post-prandial blood glucose goal levels for non-critically ill hospitalized patients according to current guideline recommendations.

Select an appropriate hypoglycemic regimen based upon current guideline recommendations for inpatient glycemic control.

Self Assessment Questions:

According to the 2009 AACE/ADA what is the target pre-prandial blood glucose level for hospitalized, non-critically ill patients?

- A Less than 120 mg/dL
- B: Less than 140 mg/dL
- C: Less than 160 mg/dL
- D: Less than 180 mg/dL

A 70 kg male was on metformin 1000 mg po BID at home for blood glucose management. Upon admission to the hospital for pneumonia, his home metformin was held and he is currently on a sliding scale insulin

- A Continue sliding-scale insulin regimen
- B Continue sliding scale insulin and add metformin 1000 mg po BID
- C Continue sliding scale and add insulin detemir 10 units subcutaneous
- D Continue sliding scale and add insulin detemir 10 units subcutaneous

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-392-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A HOSPITAL SYSTEM MEDICATION SAFETY DASHBOARD

*Anna Escamilla, PharmD; Lindy M. Farwig, PharmD, BCPS; Angela K. Green, PharmD, BCPS; James M. Avila, RPh; Ted L. Woods, RPh
Mercy Health Muskegon, 1500 East Sherman Blvd, Muskegon, MI, 49444
Anna.Escamilla@mercyhealth.com

Purpose: Adverse drug events (ADEs) have a huge impact on the healthcare system in the United States, increasing morbidity and mortality, length of hospital stay, and cost. ADE reporting is vital to improving patient safety. Pharmacists can play a key role in monitoring the reporting of ADEs. One way this can be achieved is by utilizing a dashboard. A dashboard is a useful tool to summarize and present data in an informative manner. It can be used to monitor medication safety, help align staff to focus on common goals, communicate priorities, and measure how a department is performing. The purpose of this study is to develop and implement a medication safety dashboard for Mercy Health.

Methods: This study was a retrospective review evaluating the implementation of a medication safety dashboard. Pharmacists in conjunction with the Medication Safety Committee determined the data points and goals for the medication safety dashboard. The data points chosen include: ADE reporting, medication error reporting, non-formulary drug use, scanning rates of medications, and percent of medication histories completed. Baseline data was collected for both hospital campuses within Mercy Health. Pharmacists and nurses received education about the medication safety dashboard, including the importance of documenting ADEs and medication errors. The primary outcome of this study was to determine the data points to include in the medication safety dashboard. Secondary outcomes were to identify areas of improvement within the dashboard and create an action plan.

Results/Conclusions: Results and conclusions will be presented at the

Learning Objectives:

Review the definitions of adverse drug events and medication errors and identify the differences and similarities between the two.

Discuss the steps of implementing and evaluating a medication safety dashboard.

Self Assessment Questions:

Which of the following is an example of a medication error?

- A: A patient develops red man syndrome during the infusion of vancocin
- B: A patient was prescribed tramadol, but trazodone was dispensed
- C: A patient takes amoxicillin for the first time and develops hives
- D: A patient takes lisinopril every day and is complaining of a cough

Which of the following characteristics of data points should be considered when developing a medication safety dashboard?

- A: Data points address patient safety
- B: Data points are easily obtained
- C: Data points are reliable
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-910-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

TRANSITIONAL CARE: MEDICATION MANAGEMENT IN HIGH RISK PATIENTS DURING AND AFTER-DISCHARGE FROM A COMMUNITY HOSPITAL

*Chioma K Esoga, PharmD, Rachelle Simon, PharmD, BCPS, Dan Kirchhoff, PharmD, Sun Lee-Such, PharmD, BCPS, MBA, Susan Julia, PharmD, BCPS, CACP

Franciscan St. Margaret Health, 5454 Hohman Avenue, Hammond, IN, 463201999

Chioma.Esoga@franciscanalliance.org

Purpose: Medication Management in Care Transitions programs have been implemented throughout the United States in various medical centers. Studies conducted by these programs have shown improved results in reduction of readmission rates and health care costs. These programs primarily focus on enhancing the patient discharge process and the subsequent transition to the community setting. The goal of this project is to assess the effect of the implementation of discharge interventions by a pharmacist on 30-day readmission rates in high-risk patients at a community hospital.

Methods: This study was granted approval by the Institutional Review Board. Patients will be included if they are 18 years of age or older, have a diagnosis of heart failure or COPD, have a working contact phone number, are discharged to home, and are without cognitive impairment. The Electronic Health Record (EHR) will be used to identify patients. Eligible patients will be provided medication counseling upon discharge and follow-up phone calls within five days of discharge. Eligible patients will be offered medication delivery at discharge as well as discharge counseling clinic visits based on a risk stratification score. During follow-up phone calls and visits, patients will be interviewed and responses to a medication compliance questionnaire will be recorded. Based on the responses from the patients during the follow-up phone calls or discharge counseling clinic visits, pharmacist interventions will be made and recorded. The primary efficacy outcome will analyze 30-day all-cause readmission rate and the secondary efficacy outcome will assess types of pharmacist interventions during and after discharge from the hospital.

Results and Conclusions: Data collection is in-progress; results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify the impact of care transitions programs on healthcare system outcomes during and after-discharge from the hospital setting

Describe the pharmacists role in the care transitions process during and after-discharge from the hospital setting

Self Assessment Questions:

The advantages of pharmacist managed care transitions programs include all of the following except:

- A: Improved overall health outcomes
- B: Reduction in re-admission rates
- C: Decrease in total healthcare costs
- D: Increase in healthcare costs

Pharmacist interventions in care transitions program include all of the following except:

- A: Recommending physician follow-up
- B: Reinforcing plan of care after discharge
- C: Educating on medications and disease state
- D: Prescribing new medications

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-393-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF A PHARMACY TRANSITION OF CARE SERVICE

Kirk E Evoy*, PharmD; Ed N Battjes, PharmD

St. Joseph Regional Medical Center - IN,5406 Osage Lake Dr. Apt 1A,Mishawaka,IN,46545

kirk.evoy@sjrmc.com

Purpose: Hospital readmissions within 30 days of discharge can negatively affect both hospital reimbursement and patients' quality of life. This project was designed to test the hypothesis that a pharmacist-and-nurse-run transitions of care service consisting of pharmacist admission medication history and discharge medication reconciliation and counseling in conjunction with longitudinal nurse follow-up post discharge would reduce 30-day hospital readmissions versus those receiving standard care (i.e., no transitions of care support).

Methods: Medicare patients presenting to the hospital with congestive heart failure (CHF), acute myocardial infarction (AMI), and pneumonia (PNA) were included in this study. Pharmacist services provided to patients enrolled in the program included medication history and assessment of potential transitions of care issues on admission, and upon finalization of the discharge medication regimen, medication reconciliation, patient counseling, and additional screening for potential transition challenges, either in-person prior to discharge or by phone immediately after. Additional follow-up was provided by a nurse health coach for 30 days post-discharge. The primary outcome of this study was reduction in 30-day readmissions resulting from transitions of care services versus standard care (i.e., no transitions of care support, based on historical data from 12 months prior to initiation of service) at 6 months. Secondary outcome measures included medication reconciliation discrepancies and pharmacist interventions. Subgroup assessments examined home versus facility discharges and patients receiving both admission and discharge pharmacist services versus those receiving only one such service.

Preliminary Results: Initial 2-month data included 32 patients at least 30 days post-discharge and displayed a 15.6% (0.2% reduction) readmission rate. However, excluding facility discharges (N=22), the readmission rate was 4.5%. Of the 57 total patients receiving the service at 2 months, a mean 2.89 interventions per patient were documented.

Conclusion: Final results and conclusions will be presented at the Great Lakes Residency Conference in March 2105.

Learning Objectives:

Explain how the Hospital Readmission Reduction program impacts hospital reimbursement.

Describe the role of reducing medication errors and increasing patient education in easing the transition from hospital to home and reducing hospital readmissions.

Self Assessment Questions:

Which disease states were initially included by CMS in the Hospital Readmission Reduction Program?

- A: AMI, COPD, and PNA
- B: AMI, CHF, and PNA
- C: CHF, COPD, and PNA
- D: AMI, CHF, COPD, PNA, THA, and TKA

In fiscal year 2015, hospitals with poor readmission rates could lose up to ____% of Medicare dollars if assessed the highest penalty rate?

- A: 1
- B: 2
- C: 3
- D: 4

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-747-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

STUDENT PERCEPTIONS OF DIGITAL BADGES IN A DRUG INFORMATION AND LITERATURE EVALUATION COURSE

Jay R. Fajiculay, Pharm.D.*, Bhavini T. Parikh, Pharm.D., Casey V. Wright, M.S.Ed., Amy H. Sheehan, Pharm.D.

Purdue University/Eli Lilly and Company/FDA,Fifth Third Bank Faculty Office Building c/o Purdue University,640 Eskenazi Avenue,Indianapolis,IN,46202

jfajicul@purdue.edu

Purpose: Effective technology use in the classroom setting has lead to increased student engagement by providing alternative venues to tailor various learning styles. Common classroom technologies are administrative/communicative (e.g., online grade books, email), learning enhanced (e.g., videoconferencing, audience-response), and reflective (e.g., electronic portfolios) in nature. Digital badges allow the ability to unionize all of the above applications by engaging, enhancing, and reflecting student-learning experiences in the academic and professional settings. The purpose of this study is to describe student perceptions of digital badge implementation in a drug information and literature evaluation course and to investigate the potential applicability of digital badges in the pharmacy curriculum. **Methods:** A voluntary electronic survey instrument was emailed to all second-year pharmacy students before and after the implementation of digital badges in a drug information and literature evaluation course at Purdue University College of Pharmacy. Survey items collected data regarding student attitudes and motivation to succeed in the course, perceptions of current teaching practices, prior experiences with technology and digital badges, and thoughts about the use and applicability of digital badges in the classroom setting. **Preliminary Results:** Of 153 students enrolled in the course, 140 (91.5%) completed the pre-survey and 135 (88.2%) completed the post-survey. A total of 106 (75.7%) participants matched unique identifiers as completing both the pre- and post-survey and were included in the final analyses. Eleven (10.4%) participants were awarded at least one digital badge. Preliminary analyses indicate that participants who earned badges reported increased perception in their ability to learn basic course concepts, increased grade satisfaction, increased desire to showcase abilities to family and future employers, and increased desire to showcase course expertise in a way other than grades. Further data analysis is currently in process. **Conclusions:** Conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe student-perceived benefits of digital badges in the classroom setting.

Discuss professional branding associated with the use of digital badges in the academic setting.

Self Assessment Questions:

What element of digital badges may be beneficial for increased student engagement in learning?

- A: Digital badge image
- B: Digital badge description
- C: Digital badge challenges
- D: Digital badge issuing organization

In what venues can digital badges be shared?

- A: Resume / curriculum vitae QR codes
- B: Social media sites (Facebook, LinkedIn)
- C: Website video hyperlinks
- D: Business cards

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-748-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE EFFECTS OF N-ACETYLCYSTEINE TREATMENT IN ADULT LIVER TRANSPLANT RECIPIENTS

Sara J Farrell, PharmD*: Erika Aldag, PharmD, BCPS: Rachel A Pedersen, BA: David J Kramer, MD, FACP: Ajay Sahajpal, MD: Jacob N Clendenon, MD: Vikraman Gunabushanam, MD

Aurora St. Luke's Medical Center, 2900 West
Oklahoma, Milwaukee, WI, 532154330

sara.farrell@aurora.org

Statement of Purpose:

N-acetylcysteine (NAC) has been used in post-liver transplant patients for the proposed mechanism of preventing reperfusion injury. The purpose of this review was to evaluate the efficacy and safety of the NAC use in patients post-liver transplant. Graft survival was examined as the primary outcome with post-operative bleeding requiring an exploratory laparotomy, biliary complications, length of hospitalization, and rejection as secondary outcomes.

Statement of methods used:

The study is a retrospective review of the impact of NAC on liver transplantation. Solitary livers transplanted between January 2010 and June 2014 were included. Continuous variables were compared using Student's t-test. Categorical variables are compared using Chi-Square test. Kaplan-Meier Method and Cox Proportional Hazards model were used to analyze outcomes post-transplant.

Summary of results:

118 livers were included with 50 (42%) receiving NAC post-OLT and 68 (58%) not receiving NAC. The average length of hospitalization post-transplantation in the NAC group was 19.5 +/- 26.4 days vs. 14.1 +/- 11.0 days ($p=0.13$). NAC patients had higher initial post-transplant AST/ALT compared to those who did not receive NAC (2604 +/- 1761 vs. 1192 +/- 1026, $p<0.01$ and 1218 +/- 1059 vs. 617 +/- 562, $p<0.01$, respectively.) Post-operative bleeding in the NAC group was 16% vs. 12% in those who did not receive NAC ($p=0.51$.) The incidence of biliary complications at 1 and 6 months in the NAC group was 6.1% and 18.6% vs. 22.4% and 31.4% in those who did not receive NAC ($p=0.13$.) Graft Survival was similar between NAC and no NAC (91.8% vs. 94.0% at 1 year post-transplant, $p=0.71$.)

Conclusions reached:

Further examination of association between biliary outcomes and NAC in a multivariable model also did not reach statistical significance. This could be due to our limited sample size, or overshadowed by more important variables like donor status.

Learning Objectives:

List three possible post-surgical complications of a liver transplant surgery

Identify three benefits of N-acetylcysteine use in post-liver transplant patients

Self Assessment Questions:

A pharmacist is reviewing the chart of a post-liver transplant patient. Which of the below orders from the surgeon would indicate a possible biliary complication?

- A Doing a repeat endoscopic retrograde cholangiopancreatogram (ERCP)
- B Drawing a repeat INR
- C Calculating a repeat MELD
- D A repeat liver biopsy

Past studies have shown many possible benefits of N-acetylcysteine use in post-liver transplant patients. Which selection below is one of these benefits of NAC use?

- A Increasing MELD
- B Decreasing reperfusion injury
- C Decreasing post-operative bleeding
- D Increasing liver function tests (AST/ALT)

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-394-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY OF TARGET-SPECIFIC ORAL ANTICOAGULANTS IN AN ELDERLY VETERAN POPULATION

Joseph P Fava, PharmD,* Katelyn M Starr, PharmD, BCACP, Jennifer L Clemente, PharmD, BCACP

Veteran Affairs - John D Dingell Medical Center, 4646 John
R, Detroit, MI, 482011916

joseph.fava@va.gov

The target-specific oral anticoagulants (TSOACs) have changed the landscape of anticoagulation in non-valvular atrial fibrillation (AF). However, recent studies involving these agents have indicated higher bleeding rates in the elderly, increased rates of mortality and stroke in non-adherent patients, and higher risk for adverse outcomes with renal dysfunction. Considering that both non-adherence and renal dysfunction are prevalent in elderly patients, the safety and efficacy of these new agents in this population is yet to be determined in a real-world setting. This study will attempt to determine rates of bleeding and thrombosis, as well as patient characteristics associated with adverse events, with the use of these drugs in elderly veterans. This is a non-interventional, single-center, retrospective cohort study. The study protocol has been submitted to the Institutional Review Boards of the Detroit VA Medical Center (DVAMC) and Wayne State University. Subjects include veterans: age > 75 years, receiving dabigatran, rivaroxaban, or apixaban indicated for anticoagulation in non-valvular AF between January 1, 2011 and December 31, 2014. Patients were excluded if they were using one of TSOACs for a different indication, or if the TSOAC was discontinued within seven days. Baseline characteristics collected include age, gender, race, weight, co-morbidities, TSOAC dosage, and significant drug interactions. Creatinine clearance is calculated at baseline and throughout the study period using both actual and no body weight. Baseline risk for stroke/TIA and bleeding are calculated based on the CHADS2 and HAS-BLED scores, respectively. Baseline characteristics for each TSOAC cohort are compared using ANOVA, Kruskal-Wallis, or Chi-squared tests where appropriate. Outcomes measured include the occurrence of stroke, systemic embolism, major bleeding, and minor bleeding. Characteristics of subjects experiencing these outcomes are described in effort to more effectively tailor TSOAC therapy and determine which patients may need more intensive monitoring. Results to be presented.

Learning Objectives:

Identify pharmacokinetic and other attributes of the target-specific oral anticoagulants (TSOACs) that must be taken into consideration when used in elderly patients.

Identify potential safety risks with the use of TSOACs in elderly patients.

Self Assessment Questions:

Which of the following statements is correct regarding dabigatran, rivaroxaban, and apixaban?

- A ONLY dabigatran and apixaban require dose adjustment or close monitoring
- B ONLY dabigatran and rivaroxaban require dose adjustment for creatinine clearance
- C The addition of an antiplatelet medication(s) to a new oral anticoagulant increases the risk of bleeding
- D Higher rates of gastrointestinal bleeding were shown with BOTH dabigatran and rivaroxaban

DB is an 84 YOWM w/ PMH of CAD (CABG 2012), HTN, DM, and GERD with new onset non-valvular AF. He takes Lisinopril 10 mg daily, Metoprolol tartrate 25 mg BID, ASA 81 mg daily, Clopidogrel 75 mg daily

- A Dual-antiplatelet therapy
- B Moderately impaired/fluctuating renal function
- C A and B
- D Drug interaction with concomitant Omeprazole

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-395-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF A GUIDELINE FOR THE TREATMENT OF COMMUNITY ACQUIRED PNEUMONIA WITH RISKS FOR MULTIDRUG RESISTANT ORGANISMS

Ryan Feldman*, Angela Haug, Sara Revolinski, Cathyyen Dang
Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 53226
ryan.feldman@froedtert.com

Purpose: Health care associated pneumonia (HCAP) is a classification designed to screen for patients with community acquired pneumonia (CAP) who are at risk for infection with resistant organisms. The classification currently exists as a system where the presence of any one risk factor as defined by the IDSA guidelines is positive for HCAP and therefore requires treatment for resistant pathogens. This testing definition has very low specificity leading to a high rate of false positives. Approximately one-third of all patients with HCAP are not infected with a multi drug resistant organism (MDRO). The high false positive rate leads to over utilization of broad spectrum empiric antimicrobial therapy and may contribute to antimicrobial resistance. By using a treatment algorithm based on scoring systems and severity of illness, we can increase the specificity of patients identified with risk for MDRO and decrease overuse of inappropriate empiric broad spectrum antimicrobials. The algorithm for treatment is derived from evidence based scoring tools validated in retrospective review studies of microbiologically positive pneumonia patients. It applies severity of illness and quantity of risk factors to determine risk of MDRO and identify patients who would have traditionally had HCAP but would benefit from an antibiotic course appropriate for CAP.

Methods: A six month period before and after implementation will be compared in patients with a discharge diagnosis of pneumonia to evaluate outcomes including initial treatment failure, antibiotic mismatch with cultured organism, and 30-day all cause mortality. Hospital wide education was conducted via learning competencies and scheduled presentations to selected target populations including hospitalists, emergency department, and inpatient pharmacist. Adherence evaluation was conducted via random medical unit audits. Data is reported monthly and analyzed for outcomes and efficacy.

Results: data collection on going.

Learning Objectives:

Describe the current definition of HCAP and its role in deciding treatment for pneumonia
Identify limitations of traditional HCAP definitions regarding identifying patients at risk of multi drug resistant organism infection

Self Assessment Questions:

Which of the following is NOT a traditional healthcare associated pneumonia risk factor?

- A: Residence in a nursing home or long term care facility
- B: Recent hospitalization >2 days in the last 90 days
- C: Residence in a group home with out 24 hour nursing cares
- D: Recent broad spectrum antibiotics in the previous 90 days

HCAP as a binary test where anyone risk factor is positive for needing MDRO treatment has which testing parameters.

- A: Poor sensitivity and specificity
- B: Good sensitivity and specificity
- C: Good sensitivity, poor specificity
- D: Poor sensitivity, good specificity

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-396-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PRIMARY PERCUTANEOUS INTERVENTION BLEEDING RATES IN PATIENTS WHO RECEIVED EITHER BIVALIRUDIN OR UNFRACTIONATED HEPARIN

Emilee T. Feldpausch, PharmD*; William Stewart, PharmD, BCPS
Baptist Health Lexington, 1740 Nicholasville Road, Lexington, KY, 42301
emilee.feldpausch@bhsi.com

Purpose:

Percutaneous coronary intervention (PCI) has become the reperfusion strategy of choice among patients presenting with ST-segment elevation. However, the optimal adjunctive anti-thrombotic therapy, while greatly studied, is still up to debate. The current guidelines recommend the use of either unfractionated heparin (UFH) or bivalirudin. The results of the HEAT-PCCI study call into question the efficacy and safety of bivalirudin as compared to heparin in PCI. The primary objective of this study is to retrospectively evaluate bleeding rates, as based on billing codes, in patients who were admitted for a primary PCI and received either bivalirudin or heparin.

Methods:

The study was approved by the institutions investigational review board (IRB). Billing codes were retrospectively collected from within the institutions database. These codes were utilized to identify patients who received a percutaneous intervention, received either bivalirudin or unfractionated heparin and if the patient had any bleeding complications. The following data will also be collected: age, gender, weight, history of diabetes, platelet count, hemoglobin, hematocrit, route of vascular access, anti-platelets administered, anti-coagulants administered, glycoprotein IIb/IIIa inhibitors administered. All data was recorded without patient identifiers and maintained confidentially.

Results/Conclusions:

Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review current recommendations for adjunctive anti-thrombotic therapy for primary PCIs.

Discuss the methods and the results of the HEAT-PCCI study and how they differ from previous studies

Self Assessment Questions:

to higher frequency of bivalirudin use as compared to UFH during PAMI among other studies, HORIZONS-AMI led primary PCIs due to its potential

- A: Shorter onset of action
- B: Improved safety profile
- C: Lower cost
- D: Improved route of administration

The HEAT-PCCI study inspired the small study done at our institution; What is the fundamental difference between these studies compared to the previous studies?

- A: Increased statistical power
- B: Patient population
- C: Eptifibatide use
- D: Time to anticoagulant administration

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-397-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF PERIPHERAL ANTITHYMOCYTE GLOBULIN

Daniel C. Felix, PharmD*; David R. Hager, PharmD, BCPS; Kimberly Holdener, PharmD

University of Wisconsin Hospital and Clinics, 600 Highland Ave, F6/133, Mail Code 1530, Madison, WI, 53792

dfelix@uwhealth.org

Antithymocyte globulin (ATG) is used for the prevention of transplant organ rejection. Labeling recommends administering ATG through a high-flow vein, such as a central line, to reduce the risk of thrombosis and phlebitis. Risks such as catheter-related bloodstream infections, venous thrombosis, arterial punctures, and central venous cardiac lacerations have been associated with central lines placement in addition to cost of placement and potential delays in care. Due to these potential risks, peripheral administration of ATG has been studied in stable low-risk patients with similar safety and efficacy compared to central line administration.

The primary objective of this project is to implement a process and protocol to administer ATG peripherally and evaluate its efficacy, safety, and cost in treating transplant rejection.

A literature review will be conducted to identify practices and outcomes of peripheral ATG administration. A task force will then be assembled within the Transplant Service Line to develop a protocol and workflow for the administration of peripheral ATG. This protocol will define criteria for patients to receive therapy, finalize admixture recipe for administration, develop administration guidelines with monitoring requirements, and provide guidance on managing potential adverse reactions. Pharmacists will also assist in providing education on the workflow and administration of peripheral ATG. Outcomes of patients receiving ATG in the clinic will be compared to those of patients who previously received therapy in the inpatient setting including the change in inpatient length of stay for the treatment of transplant rejection, change in outpatient reimbursement for administration of ATG, and safety of peripheral ATG administration in outpatient setting.

With the completion of this project, a protocol for the use of peripheral ATG will be developed, a build within the electronic medical record for peripheral ATG will be implemented, and a decrease in inpatient length of stay will be expected.

Learning Objectives:

Describe the benefits of administering antithymocyte globulin peripherally.

Identify the differences in administration between central and peripheral antithymocyte globulin.

Self Assessment Questions:

Which of the following is a benefit of administering antithymocyte globulin peripherally?

- A: Shorter duration of infusion
- B: Decreased rate of infusion reactions
- C: Decreased rate of superficial vein thrombosis
- D: Decreased rate of central line infections

Which of the following is a difference between administering antithymocyte globulin peripherally compared to centrally?

- A: Premedications are not necessary for peripheral administration
- B: Duration of infusion for peripheral administration is at least 6 hours
- C: Dose is added to 500 mL of normal saline for peripheral administration
- D: Heparin and hydrocortisone must be added for peripheral administration

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-398-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

NEXT GENERATION SEQUENCING TO GUIDE TARGETED THERAPY IN A PRECISION GENOMICS CLINIC: THE INDIANA UNIVERSITY HEALTH, SIMON CANCER CENTER EXPERIENCE

Meagan E. Ferguson PharmD*, Natraj R. Ammakkanavar MD, Milan Radovich PhD, Bryan P. Schneider MD, Stacy Nance BSN, Erin Niland BS, and Patrick J. Kiel PharmD

Indiana University Health, 535 Barnhill Drive, Room 3600, Indianapolis, IN, 46202

mferguson2@iuhealth.org

Cancer is a disease of DNA; both somatic and germline mutations can lead to cancer. Next-generation sequencing (NGS) technology has provided insights into cancer biology and genomic research. Along with molecular profiling, NGS can be used to identify druggable driver mutations, and it is emerging as a tool to help guide therapeutic decisions in oncology clinics.

At IUSCC, NGS is being used in patients with rare tumors and those that have exhausted standard of care treatment options. A team of genetic experts, oncologists, pharmacists, and nurses act as a referral tool to identify treatment options for patients. Patients present for two visits. At the first clinic visit, the program is explained to the patient. Cancer biopsy samples are sequenced and the results are discussed at a multidisciplinary tumor board for patient specific treatment recommendations. These recommendations and a description of the genomically identified pathway(s) are present to the patient at the follow up visit. Recommended treatments are given at the discretion of the primary oncologist and patients are followed prospectively by clinic staff for data collection.

This study was a retrospective chart review gathering data from Jan 1, 2014 to November 26, 2014 for patients who received NGS targeted therapy using the IU Health Precision Genomics Clinic data base. The primary objective of this study is to compare the rates of progression free survival (PFS) of therapy selected via NCG to the PFS of the patients previous therapy.

Results and conclusions will be presented in full at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the difference between genome and exome

Recognize the potential benefits of next generation sequencing to a patient with cancer

Self Assessment Questions:

Which of the following is true?

- A: Genome is the protein-coding genes; Exome is the full range of m
- B: Genome is the marker of for DNA replication; Exome is the protei
- C: Genome is the genetic material of an organism; Exome is the full i
- D: Genome is the genetic material of an organism; Exome is the prot

Endonuclease excision repair cross-complementing 1 (ERCC1) mRNA over expression has been associated with resistance to ____ in lung cancer.

- A: Cisplatin
- B: Etoposide
- C: Pemetrexed
- D: Paclitaxel

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-399-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPROVING MEDICATION MANAGEMENT AT HOSPITAL DISCHARGE USING LEAN PROCESSES

Alyssa M. Ferrie, PharmD*; Justin P. Konkol, PharmD, BCPS; Paige N. Pillischafske, PharmD; Amanda S. Pilo, PharmD, BCPS; Jory A. Waldron, PharmD; Anne K. Zechlinski, PharmD, BCPS; Philip W. Brummond, PharmD, M

Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 53226
alyssa.ferrie@froedtert.com

PURPOSE: Lean processes are centered on maximizing value to the customer while eliminating waste. Lean was first used in manufacturing but has been successfully applied to healthcare delivery. The Froedtert Hospital Department of Pharmacy Services has prioritized the use of Lean processes to establish a culture of continuous process improvement and empower staff as the experts to drive change within the organization. Pharmacists at Froedtert Hospital perform comprehensive discharge medication management services which include review of all discharge prescriptions and patient medication lists for accuracy and appropriateness, facilitation of prescription filling, and patient education and medication counseling. Through front-line staff feedback sessions and observation, pharmacy team members identified that there is wide variability in how the discharge medication management process occurs and opportunities to optimize the process. Rework results in increased patient wait time and pharmacist time spent completing the discharge process. The primary objective of this project is to decrease the amount of pharmacist time needed to complete the discharge medication management process.

METHODS: Value stream mapping, Gemba walks, and root cause analysis were used to describe current state and identify waste and problems in the process. Interventions to address identified problems will be applied through a PDSA (Plan, Do, Study, Act) approach. Multiple interventions will be piloted to determine final plan for improvement.

RESULTS/CONCLUSIONS: Pre intervention data was collected via working sampling and electronic medical recording reporting. Pharmacist contact prescribers for prescription issues or clarification of orders on 33% of discharges, 16% of the time pharmacists have to clarify directions, respond to additional patient requests, or resolve insurance coverage and payment issues at the point of patient education, and 26% of discharges have missing prescriptions at time of pharmacist review and discharge medication reconciliation. Post intervention results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe how lean methodology can be used to improve clinical pharmacist processes.

Explain how the the Plan, Do, Study, Act (PDSA) approach was utilized to implement and assess rapid process improvements

Self Assessment Questions:

Which was not an area of waste identified in this project?

- A: Waiting
- B: Defects
- C: Skills
- D: Productivity

Lean can be applied in healthcare to achieve which of the following

- A: decrease staff and resources
- B: minimize waste and maximize value
- C: develop new processes with old thinking
- D: add FTE to solve problems

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-749-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PHARMACY-DRIVEN ORAL CHEMOTHERAPY MONITORING PROGRAM

Kelsey Finch, PharmD*

Columbus Regional Hospital, 2400 E 17th Street, Columbus, IN, 47201
kfinch@crh.org

Purpose:

Without a standardized method of monitoring patients on oral chemotherapy, many undergo delay in initiating therapy and are often lost to follow-up. The purpose of this study is to develop a standardized process for ordering, dispensing, monitoring, and following up on oral chemotherapy medications through a pharmacy-driven monitoring program, and to evaluate the effects of its implementation. Areas that will be assessed will be the time from initial prescription to starting of the medication, number of patients lost to follow up, financial impact of a monitoring program, and overall impact on patient care.

Methods:

Patients who undergo oral chemotherapy treatment will be entered into the pharmacy-driven monitoring program. The following data will be collected through a retrospective chart review in patients on oral chemotherapy: time (days) from initial prescription to patient beginning the medication, number of patients lost to follow-up, whether there was concurrent IV chemotherapy being administered, number of hospitalizations while during treatment, and number of unscheduled follow-up appointments of the patients during treatment, and any data indicating adverse events of chemotherapy that could have been otherwise avoided. Once the program is implemented, the above criteria will be actively recorded for the monitored patients, with the addition of: pharmacist FTE hours spent monitoring the patient population and overall financial impact of the program. All data will be recorded without patient identifiers and maintained confidentially. Data comparison of the historical data versus post-implementation data will be analyzed focusing on the overall financial impact and patient care impact of the monitoring program.

Learning Objectives:

Discuss the different approaches to monitoring and assessing patients responses to oral chemotherapeutic agents.

Recognize the need for pharmaceutical involvement in the monitoring of oral chemotherapeutic agents.

Self Assessment Questions:

Which of the following are appropriate methods of monitoring oral chemotherapeutic agents?

- A: Patient assessment via office appointment
- B: Laboratory value monitoring
- C: Telephone follow-up assessments
- D: All of the above

The main objective of pharmacy-driven monitoring of oral chemotherapy is:

- A: Increased cost for the patient
- B: Increased revenue for the hospital
- C: Increased efficacy and safety of chemotherapy for the patient
- D: Pharmaceutical job security

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-400-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CONSOLIDATION OF OUTPATIENT AND INPATIENT INTRAVENOUS CHEMOTHERAPY PRODUCTION AND DISTRIBUTION AT AN ACADEMIC MEDICAL CENTER

Russell L. Findlay*, PharmD; Jessica Fischer, PharmD, MS; Aaron Webb, PharmD, MS

University of Wisconsin Hospital and Clinics, 742 Bear Claw Way Apt 102, Madison, WI, 53717

rfindlay@uwhealth.org

Purpose: The purpose of the project is two-fold: first, design and implement pharmacy operations that support the consolidation of oncology clinic and inpatient chemotherapy production and distribution during the oncology clinic remodel; second, provide an estimation of the requirements of preparation and distribution of chemotherapy in a fully centralized model.

Methods: A steering committee team is being led to design, implement and evaluate combining oncology clinic and central pharmacy chemotherapy preparation and distribution. Time standards of chemotherapy preparation are being developed through direct observation and will be used in association with dispense workload statistics to estimate full time equivalent (FTE) requirements. Pharmacy technician and pharmacist workflows will be redesigned to support the implementation of remote verification software, streamlined inventory management practices, and new clean room procedures. Chemotherapy cut-off times will be implemented to facilitate operational changes and improve the safety of patient care in oncology units.

Summary of results: Results will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain benefits of centralized chemotherapy preparation and distribution.

Describe the role of chemotherapy cut-off times in a centralized model.

Self Assessment Questions:

1. Which of the following is an expected result of a centralized chemotherapy preparation and distribution model?

- A Improved inventory management
- B Decreased production capacity
- C Increased inventory costs
- D Non-standardized workflows

2. Chemotherapy cut-off times stipulate which of the following?

- A Who prepares the medication
- B The latest hour chemotherapy orders will be processed
- C The latest hour technicians will work
- D The number of nurses who are able to administer chemotherapy

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-750-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF MEDICATION ASSOCIATED WITH QT-INTERVAL PROLONGATION IN THE CRITICALLY ILL.

Anna D. Fiorvento*, PharmD, Linda A. Park PharmD, BCPS, Maria Pusnik, PharmD, BCPS

Detroit Receiving Hospital, 4201 St. Antoine Street, Detroit, MI, 48201

afiorven@dmc.org

Purpose: Critically ill patients have numerous risk factors for development of QT prolongation and the associated adverse cardiac events. Despite American Heart Association monitoring criteria, routine electrocardiogram (ECG) monitoring is often not performed for patients who are prescribed medications associated with QT-interval prolongation. The objective of this study is to identify the incidence and determine the degree of QTc-interval prolongation in medical intensive care patients receiving azithromycin.

Methods: This is a retrospective review of patients admitted to the medical intensive care unit at Detroit Receiving Hospital between January 1, 2011 to July 31, 2014. Exclusion criteria for the study include patients less than 18 years old, pregnancy, and lack of baseline or follow-up ECG surrounding QT-prolonging medication administration. Patients prescribed a pre-specified QT- interval prolonging medication, azithromycin, will be identified via query of the electronic medical record. Baseline demographics (age, gender, race, height, weight, past medical history), home medications, ECG reports (QT interval, corrected QT [QTc] interval, heart rate, rhythm), pertinent laboratory parameters (sodium, potassium, calcium, magnesium) and inpatient medications associated with QT-interval prolongation will be collected. The primary outcome will be the presence of QTc-interval prolongation identified as greater than 450 milliseconds for men and greater than 470 milliseconds for women. Secondary outcomes include presence of significant QTc-interval prolongation, number of drug discontinuations as a result of QT-interval prolongation and episodes of Torsades de Pointes. Descriptive statistics and statistical tests, including Student's t-tests and Pearson's chi-squared, will be done using SPSS version 21. Statistical significance will be defined as a p-value < 0.05.

Learning Objectives:

Define QT-interval prolongation in relation to gender and severity.

Identify risk factors associated with QT-interval prolongation, including commonly-prescribed medications.

Self Assessment Questions:

Which of the following patients would be considered to have a prolonged QTc interval?

- A A 43-year old female with a QTc of 452 milliseconds
- B A 76-year old male with a QTc of 483 milliseconds
- C A 24-year old male with a QTc of 424 milliseconds
- D A 68-year old female with a QTc of 346 milliseconds

Which of the following medication(s) are associated with QT interval prolongation?

- A Azithromycin
- B Metoprolol
- C Ciprofloxacin
- D A & c

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-911-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF HYPERTENSION AND DIABETES MANAGEMENT IN VETERANS TRANSITIONED FROM FACE-TO-FACE (FTF) TO TELEPHONE ANTICOAGULATION CLINIC

Sarah L. Flaherty, Pharm.D., BCPS*; Nicholas Super, Pharm.D.; Brett Geiger, Pharm.D.; Sindhu Abraham, Pharm.D., BCPS; Seema Kapadia, Pharm.D., BCACP; Leena LaForte, Pharm.D.

Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Avenue, Chicago, IL, 60612

Sarah.Flaherty@va.gov

PURPOSE:

Warfarin, a vitamin K antagonist, has long been used for the primary and secondary prevention of thromboembolic events. Its unique pharmacokinetic profile and high susceptibility to drug-drug interactions yield a wide variability in both inter- and intra-personal responses to the medication, necessitating close monitoring and consistent follow-up. Such follow-up, including international normalized ratio (INR) monitoring dose adjustments, and patient education, can be performed safely and effectively by clinical pharmacists. The Jesse Brown VA Medical Center (JBVAMC) Pharmacy Service offers both face-to-face (FTF) and telephone anticoagulation monitoring services to veterans. Veterans are first scheduled in the FTF clinic and are transitioned to the telephone clinic based upon the clinical pharmacists' clinical judgment. Clinical pharmacists often manage other chronic diseases during FTF anticoagulation appointments; however, this is often not possible in the telephone clinic due to shorter allotted appointment times which necessitate a specific focus on anticoagulation. To date, there is no published data on the impact such a clinic transition and subsequent reduction of chronic disease state management may have on patient outcomes. The purpose of this study is to evaluate what impact this clinic transition has on veterans at JBVAMC.

METHODS:

This retrospective case-control study evaluated anticoagulation patients who were transitioned from FTF to telephone clinic anytime between May 1, 2008 and September 1, 2013. Patients who had hypertension and/or diabetes and had adequately documented monitoring parameters were included. The primary objective was to compare the degree of change in the patients' blood pressure and hemoglobin A1c in the year prior to and the year following clinic transition. Secondary objectives included a clinical comparison of the results to evidence-based treatment guidelines, health care utilization rates, and cost analysis.

RESULTS/CONCLUSION:

Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify pharmacokinetic properties of warfarin that can complicate anticoagulation therapy.

Describe the patient outcomes demonstrated in published clinical trials which compared FTF and telephone anticoagulation management.

Self Assessment Questions:

Which of the following is a pharmacokinetic characteristic of warfarin?

- A 12- to 24-hour half-life
- B: Binds to plasma proteins in the serum
- C: Poor oral bioavailability
- D: Metabolized primarily via CYP3A4

Published clinical trials comparing FTF and telephone anticoagulation management have demonstrated which of the following outcomes?

- A Statistically similar rates of therapeutic INRs
- B Statistically higher rates of recurrent thromboembolic events in FTF
- C Statistically lower rates of bleeding events in telephone clinic patients
- D Statistically higher rates of hospitalizations in the FTF clinic patients

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-401-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION AND REORGANIZATION OF PHARMACEUTICAL RESEARCH CENTER (PRC) PHARMACIST WORKFLOW AND OPERATIONS TO MAXIMIZE EFFICIENCY

Rachael C. Fleagle, PharmD*; Susan A. Johnston, PharmD

University of Wisconsin Hospital and Clinics, 600 Highland Ave., F6/133-1530, Madison, WI, 53792

r.fleagle@uwhealth.org

Purpose: The purpose of this project is to define and evaluate pharmacist workflows in the Pharmaceutical Research Center (PRC), query other high-performing investigational drug services, develop and implement strategies to optimize PRC pharmacist efficiency, then compare time devoted to patient care activities pre- and post-implementation of new workflows.

Methods: To identify and evaluate research pharmacist patient care activities and workflows, direct observation of the PRC pharmacists was performed. Of the workflows required for provision of medications to study subjects, direct dispensation, provision through inpatient distribution channels, and provision through an outpatient pharmacy location were selected for evaluation. Process diagrams were developed for each based upon direct observation, targeted protocol review, and steering committee consultation. To evaluate PRC pharmacist time spent on patient care and administrative tasks, work sampling studies and self-reported activity records were utilized. Using the process diagrams and work sampling data, specific pharmacist tasks were outlined. To determine the value of these activities, a survey tool was administered to both PRC pharmacists and staff. Each of the least-valued functions will be evaluated for elimination or delegation to technical staff. Other high-performing investigational drug services at peer academic medical centers were surveyed (via telephone interviews) to compare their research pharmacy processes and workflows with those at the PRC; process maps were developed based upon information provided during these interviews.

This information, in combination with the survey data, will be used to identify opportunities for workflow revision. New workflows will be developed to optimize the use of pharmacist time and resources. PRC pharmacists and technicians will be trained on the new processes, and the changes will be implemented. Direct observation combined with work sampling and self-reported data will be completed and compared to the pre-implementation data.

Results/Conclusions: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the changes in research protocols within the last 15 years.

Describe the methods used to define PRC pharmacist workflows and activities.

Self Assessment Questions:

Which of the following has changed with respect to research protocols?

- A Increased procedures per protocol
- B: Decreased enrollment
- C: Increased data collection requirements
- D: All of the above

Which of the following is a method used to quantify pharmacist time spent on patient care activities?

- A Paging time sampling
- B Observer-recorded time studies
- C Self-reported activity records
- D A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-751-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF PHARMACY SERVICES FOR OSTEOPOROSIS MANAGEMENT IN A VETERANS AFFAIRS MEDICAL CENTER

*Breanne S. Fleming, PharmD, Deanna S. Kania, PharmD, BCPS, BCACP, Veronica P. Vernon, PharmD, BCPS, BCACP

Veteran Affairs - Indianapolis VA Medical Center, 1481 West 10th Street, Indianapolis, IN, 46202

breanne.fleming@va.gov

Purpose: The objective of this study is to design and implement pharmacy services for osteoporosis management in order to enhance screening and treatment rates and improve care for patients at risk for osteoporosis-related fracture.

Methods: Retrospective chart review of patients who met National Osteoporosis Foundation criteria for screening was conducted in order to assess current osteoporosis screening and treatment rates and identify areas for improvement. In close collaboration with endocrinology providers, a pilot pharmacy bone clinic was launched in January 2015. Patients at risk for osteoporosis-related fracture based upon dual-energy X-ray absorptiometry (DXA) scan, World Health Organization Fracture Risk Assessment Tool (FRAX) score, or history of fragility fracture will be referred by an endocrinologist to the pharmacy clinic for further evaluation. Treatment options, adverse effects, and administration considerations will be discussed with the patient, and if appropriate, medication therapy will be initiated. Dietary calcium and vitamin D intake will be reviewed, and medication supplementation initiated as necessary. Patients will be assessed for tolerability and adherence, and then referred back to their primary care provider for further follow-up. Data regarding patient risk factors, previous therapy, treatment considerations, medication tolerability, and adherence will be collected to evaluate the impact of the clinic on patient care.

Summary of Preliminary Results: The charts of approximately 300 patients who underwent DXA screening in the last five years were reviewed to assess treatment rates for osteoporosis. Approximately 50 percent of patients who were screened met National Osteoporosis Foundation recommendations for treatment based on T-score, FRAX, or history of fragility fracture. However, more than 45 percent of patients who were identified with osteoporosis or high fracture risk were never initiated on treatment with a bisphosphonate or other medication.

Conclusions: To be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

List three secondary causes of osteoporosis

Describe the impact of osteoporosis-related fracture on morbidity and mortality

Self Assessment Questions:

Which one of the following is a secondary cause of osteoporosis?

- A: Depression
- B: Hypogonadism
- C: Iron-deficiency anemia
- D: Hypertension

Which of the following is true regarding morbidity and mortality associated with osteoporosis-related fracture?

- A: 3 in 4 women over the age of 50 years will develop an osteoporosis
- B: 30-day mortality following osteoporosis-related fracture is 75%
- C: 50% of patients never regain independence following osteoporosis
- D: Patients who have experienced an osteoporosis-related fracture are

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-402-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PREDICTED CALORIE AND FLUID MANAGEMENT TOOL INTO THE ELECTRONIC MEDICAL RECORD

Laura A. Flynn, PharmD*, Karen M. Kelly, PharmD

NorthShore University HealthSystem, 2650 Ridge Avenue, Evanston, Evanston, IL, 60201

lflynn@northshore.org

Purpose: The parenteral nutrition ordering process requires attention to detail and comprehensive baseline information on a patient's renal function, electrolytes, and nutritional requirements. An accurate assessment of a patient's fluid status is essential, as fluid imbalance can indicate or predict problems with renal function or electrolytes. Currently the clinical information necessary to determine total parenteral nutrition (TPN) components and assess fluid status is located in a variety of places throughout the electronic medical record. The purpose of this project was to implement a dynamic calorie and fluid management tool into the electronic medical record and to assess the impact this tool has on fluid management.

Methods: A taskforce of pharmacists, dietitians, physicians, nurses, and health information technologists met to discuss current TPN and fluid management workflows. A predicted calorie and fluid management tool was built into the test environment of the electronic medical record, using input from this multidisciplinary group. The tool will be validated and implemented into the live environment of the electronic medical record. A retrospective evaluation of the impact of the tool will be conducted, using days to euvolemia as the primary indicator.

Results: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the importance of euvolemia and assessment of fluid and electrolyte status.

Describe the impact of the calorie and fluid management tool on patient care.

Self Assessment Questions:

Monitoring the fluid status is essential for which of the following disease states?

- A: Severe C. difficile
- B: Systolic heart failure
- C: End stage renal disease
- D: All of the above

Which of the following is contained within the prospective fluid and calorie management tool?

- A: The amount of insulin a patient is projected to receive in the next 6
- B: The amount of potassium a patient received 5 days ago
- C: The caloric contribution of an IV medication in D5W administered
- D: The amount of water the patient drank the previous day

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-403-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZING THE EFFECTS OF CORTICOSTEROID INDUCED LEUKOCYTOSIS

Farnaz Foolad*, PharmD; Tammy Nguyen, PharmD, BCPS; Mathew Thambi, PharmD, MPH

University of Illinois at Chicago, 833 S Wood St, Suite 164 (M/C 886), Chicago, IL, 60612

farnazf@uic.edu

Purpose: Leukocytosis is generally defined as a white blood cell (WBC) count greater than 12,000 cells per microliter, a hallmark indicator for the presence of infection. However, it is well documented that the administration of corticosteroids (CS) may induce leukocytosis in the absence of an infection. This may present a confusing picture to clinicians trying to determine the presence of an infection. By comparing patterns of leukocytosis in those with and without infections, it may be possible to identify a distinct pattern that would aid in diagnosing infection in the presence of CS. The objective of this study is to characterize the effect of CS induced leukocytosis.

Methods: This is a single center, retrospective study. Patients will be selected from a report that identifies patients with an inpatient order for corticosteroids. Data will be collected on eligible patients from up to five days prior to steroid initiation to discharge or one month after the initiation of treatment, whichever time period is shorter. Patients will be included if they are 18 years old or greater, have no documented history of corticosteroid use in the previous four weeks, and have a length of stay of at least 5 days. Patients will be excluded if they are diagnosed with a myeloproliferative disease or are receiving other myelosuppressive agents. We will collect the patient age, gender, weight, and BMI on admission. We will collect SCr, albumin, WBC counts, absolute neutrophils, lymphocytes, monocytes, eosinophils, and basophils, corticosteroid name, indication, daily dose, presence of confirmed infection, and type of infection. Lastly, we will collect the total length of stay for each patient. Appropriate statistical tests will be used to evaluate the study objectives.

Results/conclusions: Endpoints remain under investigation as data collection and analysis are currently being completed.

Learning Objectives:

Explain how corticosteroids induce leukocytosis

Describe the patterns in white blood cell line shifts as a result of the administration of corticosteroids

Self Assessment Questions:

By which of the following mechanisms do corticosteroids induce leukocytosis?

- A: Increase the release of WBCs from the bone marrow
- B: Margination of WBCs
- C: Reduction in apoptosis of circulating WBCs
- D: A and C

Why might corticosteroids create a confusing picture for clinicians?

- A: Leukocytosis may be confused for an infectious process
- B: It may result in the inappropriate start of antimicrobials
- C: It may cause an elevation in temperature
- D: A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-752-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PAIN ASSESSMENT IN MECHANICALLY VENTILATED PATIENTS IN THE INTENSIVE CARE UNIT

Melissa L Fowler, PharmD*; Angela M Harding, PharmD; Tamara L McMath, MPH; Christy L Collins, MA

Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH, 43214

melissa.fowler@ohiohealth.com

Purpose: Patients admitted to intensive care units (ICUs) are often exposed to various invasive interventions, such as mechanical ventilation, throughout the course of their hospital stay. As a result of this and subsequent routine care, pain is frequently experienced. The 2013 Clinical Practice Guidelines for the management of pain, agitation, and delirium in adult ICU patients recommend analgesia-first sedation to minimize excessive sedative use and resulting adverse effects. The objective of this study is to compare the appropriateness of analgesic use in the ICU and observe trends seen before and after implementation of nursing education.

Methods: This is an institutional review board approved, single-center, retrospective cohort study of mechanically ventilated patients who were admitted to the MICU, SICU, or C ICU during a two month period prior to and following nursing education. All patients undergoing mechanical ventilation for any reason were evaluated for inclusion in the study. Patients eligible for inclusion were those 18 years of age or older receiving mechanical ventilation for at least 24 hours. Patients treated for alcohol withdrawal, ARDS, head trauma, acute cerebrovascular accidents, neurological insults, or other non-specified neurological events in which acute pain and sedation scores would be difficult to obtain were excluded. Data collection included incidence of inappropriate pain control, average analgesic use, average sedative use duration of ICU stay, duration of hospital stay, number of documented pain scores, number of CAM-ICU positive days, and discharge disposition. Primary endpoints include total amount of analgesics received during mechanical ventilation and rate of appropriate pain assessments. Secondary outcomes include an analysis on sedative use number of documented pain scores, duration of mechanical ventilation, ICU length of stay, and hospital length of stay.

Results & Conclusions: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe current recommendations for pain and sedation based on current guidelines

Discuss validated pain assessment tools that can be utilized for monitoring pain in adult ICU patients unable to self-report

Self Assessment Questions:

At what score should treatment be initiated using the Critical-Care Pain Observation Tool?

- A: 1
- B: 3
- C: 4
- D: 6

Which of the following initial methods of sedation is generally encouraged according to the 2013 Clinical Practice Guidelines for the management of pain, agitation, and delirium in adult ICU patients?

- A: Analgesics
- B: Benzodiazepines
- C: Propofol
- D: Dexmedetomidine

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-405-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF AN INPATIENT AND OUTPATIENT ANTIBIOGRAM AT A VA FACILITY

Ursula C. Patel, PharmD, BCPS AQ-ID; Mallory A. Fowler, PharmD;*
Katie J. Suda, PharmD, M.S.; Charlesnika Evans, PhD
Veteran Affairs - Edward Hines, Jr. Hospital, 5000 S 5th
Ave, Hines, IL, 60141
mallory.fowler@va.gov

Purpose: In order to guide initial empiric antimicrobial treatment and track local resistance patterns, the Clinical and Laboratory Standards Institute recommends healthcare facilities issue an annual cumulative antibiogram. For optimal treatment, it is also recommended to stratify susceptibility data based on population or service location. Generally, patients presenting from and being treated in the community setting have less-severe infections than patients requiring inpatient care. Hospitalized patients and those with increased healthcare exposure tend to have more co-morbidities and are at a greater risk for complicated infections with multidrug resistant pathogens. Studies have found significant differences in antimicrobial susceptibilities for pathogens such as *Staphylococcus aureus*, coagulase-negative *Staphylococcus*, *Enterococcus faecalis*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* when compared between inpatient and outpatient settings. Additionally, broad spectrum antibiotics such as fluoroquinolones, macrolides, broad-spectrum penicillins, and second and third generation cephalosporins are often prescribed at ambulatory care visits, usually without specific cultures available to direct therapy. Use of a hospital antibiogram to guide outpatient prescribing may further lead to inappropriate and overly broad spectrum therapy which can contribute to the already growing issue of antimicrobial resistance. Currently, Edward Hines, Jr. VA Hospital has a single institution-wide antibiogram encompassing all locations. This study aims to create and compare separate antibiograms for cultures obtained from inpatient versus outpatient locations in order to distinguish antimicrobial resistance rates.

Methods: Microbiology data for all cultures obtained between October 1st, 2011 and September 30th, 2014 at Hines were collected. Data was stratified based on whether the culture was from an inpatient or outpatient location. Antimicrobial susceptibilities based on location and overall resistance trends will be compared using Chi-squared or Fishers exact tests.

Results and Conclusions: Results are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize reasons why differences in inpatient and outpatient antibiograms may be present.

Identify risks potentially associated with over prescribing antibiotics to outpatient populations.

Self Assessment Questions:

Ambulatory patients tend to have lower rates of drug resistant pathogens compared to hospitalized patients due to which of the following characteristics?

- A: Older age
- B: Greater use of antibiotics
- C: More acute illness
- D: Fewer co-morbidities

Choosing empiric antimicrobial treatment for ambulatory patients infections based on a hospital antibiogram could lead to which of the following?

- A: Inadequate treatment leading to recurrent infections
- B: Increasing rates of antimicrobial resistance
- C: Lower drug therapy costs
- D: More hospital admissions

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-404-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF AN INVENTORY MANAGEMENT SYSTEM, USING DATA AND WORK FLOW REDESIGN TO ENHANCE THE PATIENT EXPERIENCE

Noah Franz, PharmD; Kate Schaafsma, PharmD, MS, MBA, BCPS;
Kevin Perhach, BS
Froedtert Hospital, 1141 N Old World Third Street, Milwaukee, WI, 53203
noah.franz@froedtert.com

Purpose: Pharmacy has proven their utility to improve patient care and lower cost in the ambulatory care setting, the challenge many institutions are facing is how to justify the additional resource. Froedtert & the Medical College of Wisconsin have justified their pharmacy ambulatory services through increased prescription capture. As our pharmacy practice continues to expand we must continue to expand our prescription capture. In order to compete with larger retail pharmacies we are challenged to provide superior service and having the right drug, in the right place, at the right time.

In the retail pharmacies at Froedtert and the Medical College of Wisconsin there exists a gap in workflow to maintain an accurate inventory. Without maintaining an accurate inventory it creates several challenges to provide superior service while having the right drug, in the right place, at the right time. The outcome of this project is to enhance the patient experience at Froedtert and the Medical College of Wisconsin Community Pharmacies.

Methods: The project has two objectives. The first objective is using our sales data and prescribing trends to set minimum and maximum levels in the perpetual inventory system to optimize our investment in inventory and meet our patients needs. The second outcome is workflow standardization. The current workflow for ordering, stocking, returning, and handling medications will be illustrated on a value stream map. Lean methodologies are being used to identify areas of waste and rework at each step of the workflow. Once areas of waste and rework are identified, key stake holders will meet to develop the future state. Optimizing the current inventory and establishing a more efficient workflow will drive patient satisfaction and financial responsibility.

Results and Conclusion: Data collection and outcomes evaluation are currently being completed and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review how using sales data and prescribing trends to set inventory levels can improve patient satisfaction.

Identify how lean methodologies can be used to identify areas and waste and rework to improve inventory management in the retail pharmacy setting.

Self Assessment Questions:

What method was used to identify areas of waste and rework in our inventory workflow?

- A: Lean
- B: Studer Group
- C: Consultants
- D: Experience

What data was used to optimize our investment in inventory and meet our patient's needs?

- A: Partial fills
- B: Out of Stock
- C: Sales data and prescribing trends
- D: Expired drugs

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-753-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PROSPECTIVE CONVERSION OF PRIMARY CARE APPOINTMENTS TO CLINICAL PHARMACIST APPOINTMENTS: IMPROVING VETERANS ACCESS TO CARE

Hilary R Friedman,* PharmD.; Ellina S Pisetsky, PharmD; Arthur A Schuna, RPH, MS, BCACP, FASHP; Andrew J Wlicox, PharmD
Veteran Affairs - William S. Middleton Hospital, 8001 N Links Way, Milwaukee, WI, 532172920
hilary.friedman2@va.gov

Purpose

The purpose of this project was to improve Veteran access to care by actively opening primary care provider appointments for new or acute care issues through use of clinical pharmacy services.

Methods

A targeted review of one primary care provider panel was performed. Patients were prospectively identified and characterized by having at least one chronic disease state diagnosis that could be appropriately managed by a clinical pharmacist. If appropriate per protocol, the follow up primary care provider appointment was converted to a clinical pharmacist appointment.

Results

Data collected to determine results included type of Clinical Pharmacy visit scheduled, reason for appointment conversion, as well as cost and time saved by the primary care provider. As of current, upon review of the provider panel, one out of every 3 patients (11/31 patients) were managed by primary care for a chronic disease state that was appropriate for a clinical pharmacist to manage. The most common disease states identified as appropriate for clinical pharmacists were hypertension, diabetes, and lipids. The type of clinical pharmacy visits scheduled was split almost evenly between telephone and clinic visits (17 clinic visits, 14 telephone visits). Twenty-one full primary care appointments were saved (68% of total converted appointments).

Conclusion

Preliminary examination of the data suggests a large number of patients seen in primary care can be co-managed by pharmacists. Many full primary care appointments can be saved utilizing pharmacy-run clinics. Most importantly, clinical pharmacists play a key role in improving patient access to primary care.

Learning Objectives:

Identify health care outcomes associated with increased access to primary care in the United States.
Recognize chronic disease states most commonly managed by clinical pharmacists in primary care.

Self Assessment Questions:

Which of the following is NOT a result of increased patient access to primary care?

- A Reducing extraneous use of specialty services
- B: Increased laboratory tests
- C: Decreased total medical expenses
- D: Decreased emergency visits

What are the most common chronic disease states that can be targeted by clinical pharmacists in the primary care setting?

- A Osteoporosis and GERD
- B Diabetes, alcoholism, and hypertension
- C Bronchitis, hepatitis C, and HIV/AIDS
- D Hypertension, dyslipidemia, and diabetes

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-406-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEFINING, STANDARDIZING, AND OPTIMIZING THE ROLE OF PHARMACISTS IN MEDICAL EMERGENCIES

Ilse A Fritz, PharmD*; Joshua R Rekoske, PharmD; Donna S Kieler, PharmD; Amber M Palmer, PharmD; Dustin M Robinson, PharmD
St. Marys Hospital and Medical Center - WI, 700 South Park Street, Madison, WI, 53715
Ilse_Fritz@ssmhc.com

Purpose: This study aims to implement a standardized role of the pharmacist on the medical emergency response (MER) team and to subsequently evaluate the success of this newly defined and expanded pharmacist role. Prior to this study and its pilot phase, pharmacists at St Marys Hospital were not required to attend MERs, also referred to as codes or code blues at other institutions. We hypothesize that by defining the role of the pharmacist on the MER team and providing pharmacist-specific MER training, we will improve pharmacists knowledge about emergency situations as well as increase their comfort level with assisting in these events. Secondly, we predict that this study and pilot phase will improve staff satisfaction with pharmacists participation in medical emergency responses. **Methods:** Proposed workflow changes were presented at operational meetings of the involved disciplines in order to obtain approval of this newly defined role of the pharmacist in MERs. Training materials, based on the American Heart Associations Advanced Cardiac Life Support guidelines, were created specific to the pharmacists role in MERs using slide-based teaching accompanied by hands-on learning. Pharmacists participated in training after completing baseline emergency response knowledge and comfort level assessments. Post-pilot assessments will be completed at the end of the three month pilot period to assess for subject matter retention as well as pharmacists comfort in their MER team role. Baseline satisfaction surveys to analyze staff satisfaction with pharmacists MER participation were completed by nurses and physicians. Post-pilot surveys will be collected at the end of the three month pilot period. **Results/Conclusions:** Study is currently in progress. Preliminary results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain how pharmacists can positively impact a medical emergency response team.

Identify barriers to implementing a new workflow/service for pharmacists

Self Assessment Questions:

How are pharmacists able to assist in medical emergency responses at St. Marys Hospital?

- A Configuring the defibrillator
- B: Preparing medications from the crash cart
- C: Providing compressions during ACLS resuscitation
- D: Serving as the code recorder/documenter

What is a barrier that made implementation of the expanded pharmacist role in MERs difficult?

- A Cost limitations on MER training materials
- B Defining the role of the pharmacist in MERs without being too incl
- C Lack of support from other disciplines for pharmacist participation
- D Multiple hurdles to management approval of expanded pharmacist

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-754-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DESIGN AND IMPLEMENTATION OF A CLINICAL PATHWAY FOR QT/QTc PROLONGATION

Jared M. Frost, PharmD*; Sarah Zukkoor, PharmD, BCPS-AQ
Cardiology; Indrajit Choudhuri, MD

Aurora St. Luke's Medical Center, 141 N. Jackson St. Apartment
#218, Apartment #218, Milwaukee, WI, 53202

jared.frost@aurora.org

Purpose: QT/QTc interval prolongation is a risk factor for the life-threatening ventricular arrhythmia known as torsades de pointes. The pharmacist's role in reducing the risk of drug-induced QT/QTc prolongation using standardized monitoring protocols has been established. However, inpatients may still develop or present with prolonged QT/QTc intervals, regardless of medication initiation. A clinical pathway has not yet been validated for pharmacist monitoring and recommendations on inpatients who have a prolonged QT/QTc interval. Pharmacists can play a key role in ensuring safe medication use, proper electrolyte supplementation, and providing follow-up monitoring in hospitalized patients with prolonged QT/QTc intervals. The purpose of this project was to design, implement, and evaluate a clinical pathway to guide pharmacist monitoring and therapeutic recommendations, and improve outcomes in hospitalized patients with QT/QTc prolongation.

Methods: A clinical pathway which standardizes how pharmacists monitor, assess, and provide recommendations on patients with QT/QTc prolongation was created and implemented into practice at a large tertiary care hospital. Using the electronic medical record combined with an automated ECG filter, patients with true QT/QTc prolongation were identified for pharmacist intervention. Data on the efficacy of using the pathway were collected over a three-month period. Endpoints included number, type, and rate of pharmacist recommendations accepted, most common QT/QTc-prolonging medications, change in number of prescribed QT/QTc-prolonging medications, mean change in QT/QTc, and number of in-hospital cardiac arrests.

Results/Conclusions: The QT/QTc prolongation clinical pathway is currently in the data collection phase. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List three risk factors for QT/QTc prolongation.

Describe how pharmacists can take an active role in correcting QT/QTc prolongation.

Self Assessment Questions:

Which of the following is/are risk factors for QT/QTc prolongation?

- A Hypokalemia
- B: Female gender
- C: Impaired renal function
- D: All of the above

Pharmacists can provide the following recommendation(s) to aid in correcting a prolonged QT/QTc interval:

- A Increase doses of QT/QTc-prolonging medications
- B Supplement electrolytes
- C Discontinue QT/QTc-prolonging medications
- D B and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-407-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZATION OF DRUG OVERDOSES IN AN INCARCERATED POPULATION

Lanting Fuh, PharmD, BCPS*; Hannah L. Hays, MD; Nicole V. Brown, MS; Mary Beth Shirk, PharmD, BCPS, FCCP

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 W
10th Ave, Columbus, OH, 43210

Lanting.Fuh@osumc.edu

Purpose: Little information exists about drug overdose in the imprisoned population. One Australian study found that prisoner drug-related mortality accounted for 26% of the entire states drug-related mortality. Local anecdotal experience suggests that this population is at risk for overdose. Prisoners in Ohio generally have free access to their daily medications and are tasked with self-administration of their doses according to the prescribed schedule, just as individuals who are not in prison. Nurses administer medications on a designated list considered to be inappropriate for "may carry" status. This study aimed to quantify and describe prisoner medication overdose. A secondary outcome was the associated hospitalization costs.

Methods: A single-center, retrospective cohort study was conducted in a 72,000 average annual visit emergency department (ED) at an academic medical center. This ED also serves patients from the Ohio Department of Rehabilitation and Correction (ODRC) who require hospitalization. Adult prisoners with ED encounters between October 15, 2011 and October 14, 2014 and ICD-9 codes that indicated possible drug overdose were included. Patients with positive illicit substance(s) on drug screen results were excluded. The following data were collected: demographics, parent facility, transferring facility, presence of a psychiatric history, presence of previous overdose visits, suicide precaution status, overdose substance(s), medication administrator, medication owner, exposure route, exposure intention, exposure acuity, laboratory values (basic metabolic panel, drug levels, drug screen results), emergency department disposition, length of stay, hospital charge, and outcome. All data were collected solely from The Ohio State University Wexner Medical Centers electronic medical records. Demographics, clinical characteristics, and hospitalization costs were summarized using descriptive statistics.

Results/Conclusion: Data collection is ongoing and final results will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List medications that are commonly implicated in prisoner medication overdoses.

Discuss the financial impact of prisoner overdoses.

Self Assessment Questions:

Which of the following medications is a "may carry" medication in Ohio prisons?

- A Amitriptyline
- B: Lithium
- C: Phenytoin
- D: Warfarin

Medical services account for ___% of prisoner costs and are _____.

- A 5, increasing
- B 10, increasing
- C 15, decreasing
- D 20, decreasing

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-755-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PREDICTABILITY OF DISCORDANCE BETWEEN LDL CHOLESTEROL, NON-HDL CHOLESTEROL, AND LDL PARTICLE NUMBER IN PATIENTS OF A LIPID CLINIC

Joshua W. Gaborcik*, PharmD; Melissa Snider, PharmD, BCPS, BCACP, CLS; Marguerite Hevezi, PharmD, CLS, CDE; Allison Wehr, MS; Kavita Sharma, MD

The Ohio State University Wexner Medical Center, 410 W. 10 Avenue, Columbus, OH, 43210

joshua.gaborcik@osumc.edu

Purpose: Many patients continue to have cardiovascular disease progression and clinical events even after having achieved low-density lipoprotein cholesterol (LDL-C) goals. While LDL-C measures the cholesterol content within an LDL particle (LDL-P), it may not be reflective of the concentration of LDL-P. Cardiovascular risk management relies heavily on LDL measurements so it is important to know whether discordance exists. If discordance is present, LDL-P may better predict cardiovascular events compared to LDL-C and non-high density lipoprotein cholesterol. Discordance has been associated with gender, diabetes status, smoking status, obesity, ethnicity, and metabolic syndrome. The primary objective of this study is to describe correlation of discordance in patients referred to a lipid clinic by exploring associations among patient characteristics and discordance between LDL-C, non-HDL-C, or LDL-P.

Methods: A retrospective, single-center cohort study at The Ohio State University Wexner Medical Center (OSUWMC) Cardiovascular Risk Reduction and Lipid Clinic (CRRLC) was conducted. To be included, patients had to be referred and established care with CRRLCs from January 1, 2009 through December 31, 2012, and obtained an initial traditional lipid profile and LDL-P upon establishment with CRRLC. Data collection included: gender, age, medical insurance, race, height, weight, body mass index, smoking status, primary or secondary prevention, cardiac family history, diabetes, impaired fasting glucose, waist circumference, hypertension, metabolic syndrome, initial LDL-C greater than 190 mg/dL, Framingham 10-year risk assessment, Atherosclerotic Cardiovascular Disease (ASCVD) 10 year and lifetime risk assessment, targets of therapy, initial cholesterol-lowering medications, initial traditional lipid profile, and initial LDL-P measured by nuclear magnetic resonance. ASCVD events were recorded as well as coronary calcium scores, cardiovascular related death, and non-cardiovascular death. Time followed in the study and time to an event occurrence was recorded.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss cardiovascular risk management in terms of lipoproteins when discordance exists

Recall patient characteristics that have been associated with discordance

Self Assessment Questions:

Which of the following lipoproteins better predicts cardiovascular risk when discordance exists?

- A Low-density lipoprotein cholesterol
- B Very low-density lipoprotein particles
- C Low-density lipoprotein particle
- D High density lipoprotein cholesterol

Discordance has been associated with the following patient characteristic(s):

- A Diabetes mellitus
- B Hypertension
- C Metabolic Syndrome
- D Both A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-408-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFYING AND EVALUATING KEY METRICS OF A PATIENT SATISFACTION SURVEY FOR SPECIALTY MAIL ORDER PHARMACIES

*Sunny S Gahley, PharmD, MBA; Marleen K Wickizer, PharmD, AE-C; Julie A Olson, DNP, MS, RN, CQIAA; Robert Topp, PhD, RN

Navitus Health Solutions, 2601 W Beltline Hwy, Suite 600, Madison, WI, 53713

sunny.gahley@navitus.com

Specialty drug spend has significantly increased over the past decade. Managed care organizations are faced with the ever-increasing task of selecting the most clinically appropriate medications while mitigating drug cost for clients. Some managed care organizations have started to develop their own in house specialty mail order pharmacies to help control drug costs. In addition, surveys aid in ensuring patients reach therapeutic goals, remain adherent and understand the purpose of their medications is critical. By using the best available evidence, a specialty pharmacy patient satisfaction survey was created to measure key indicators of patient satisfaction. The cross-sectional survey study used recommendations from URAC and current literature to develop questions relevant for a specialty pharmacy satisfaction survey. Key metrics examined pharmacy practices and evaluated patient interaction with pharmacy staff. These metrics included timeliness of medication delivery, pharmacy staff medication knowledge and optimization of patient care. The survey was then implemented in a specialty pharmacy to assess the validity and reliability. Patient response data will be analyzed to tie satisfaction to current pharmacy workflow and practices. Preliminary analysis indicates high levels of satisfaction for timelines of medication delivery, patient counseling and optimization of care key metrics. A total of 243 responses have been received during the 6 week polling period. Surveys were mailed with each fill starting the week of November 10, 2014 through week ending December 15, 2014. Each category has received at least 96% or greater satisfaction across all measured metrics. Furthermore, the preliminary analysis supports the validity and reliability of the survey.

Learning Objectives:

Identify the key measures needed in a patient satisfaction survey for a mail order specialty pharmacy.

Explain the reasons why a survey for a mail order specialty pharmacy is necessary.

Self Assessment Questions:

What are some reasons why it is necessary to assess patient satisfaction for a specialty mail order pharmacy?

- A aid in patients reaching therapeutic goals
- B help control drug costs for managed care organizations
- C higher satisfaction may result in increased adherence
- D Both A and C

What are the key components that should be measured in a patient satisfaction survey?

- A timeliness of medication delivery
- B pharmacy staff medication knowledge
- C costs associated with medication dispensing
- D Both A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-756-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF READMISSION RATES AND IDENTIFICATION OF RISK FACTORS FOR READMISSION AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT

Michael A. Galbraith*, PharmD; Jona Lekura, PharmD; Long To, PharmD, BCPS; Dee Dee Wang, MD

Henry Ford Health System, 846 Beaconsfield Ave, Apt 2, Grosse Pointe Park, MI, 48230

mgalbra1@hfhs.org

Purpose: Aortic stenosis (AS) is the third most common form of cardiovascular disease. In patients with severe AS where valve replacement is indicated, transcatheter aortic valve replacement (TAVR) represents a novel, less-invasive treatment option. However, the inherent risks after TAVR include embolic and bleeding events.

The current standard of care for antithrombotics after TAVR is aspirin 81mg and clopidogrel 75mg daily for 6 months. However, there is no consensus regarding optimal antithrombotic selection and duration of therapy. The risks of bleeding events and embolic stroke after TAVR are further complicated in patients with atrial fibrillation, a condition in which patients are generally prescribed lifelong systemic anticoagulation. Because this procedure is relatively novel, there is a lack of data describing antithrombotic regimens and long-term outcomes in patients after TAVR. The purpose of this study is to identify readmission rates and identify risk factors for readmission in patients who have undergone TAVR in order to determine optimal antithrombotic selection and duration.

Methods: This investigation is a retrospective case-control study approved by the IRB at Henry Ford Hospital. Patients 18 years or older that received TAVR at Henry Ford Hospital from January 2012 to January 2014 will be included. Patients readmitted after TAVR will be defined as cases, while patients not readmitted after TAVR will serve as the control group. The primary outcome will be readmission rates after TAVR at 30 days and up to one year post-TAVR. Chi-squared or Fisher's exact tests will be performed to detect differences in categorical data as appropriate. A multivariate analysis will be conducted to identify independent predictors for readmission. A pre-specified subgroup analysis of patients with atrial fibrillation will be conducted to determine risk factors for readmission in this population.

Results/Conclusions: Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the complications associated with transcatheter aortic valve replacement (TAVR).

Describe the risks and benefits of antithrombotics after TAVR.

Self Assessment Questions:

Which of the following are possible complications after the TAVR procedure?

- A Stroke or TIA
- B: Major bleeding event
- C: Vascular complications
- D: All of the above

Which of the following combination of antithrombotics is the current standard of care after TAVR?

- A Aspirin alone
- B Aspirin + clopidogrel
- C Aspirin + warfarin
- D Aspirin + ticagrelor

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-409-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST IMPACT ON MEDICATION ADHERENCE AND UNDERSTANDING IN CYSTIC FIBROSIS PATIENTS

Logan K. Gamelier, PharmD*; Isha Malik-Ismail, PharmD; Judith B. Sommers Hanson, PharmD, FAPhA; Sheila M. Allen, PharmD, BCPS
University of Illinois at Chicago/Walgreens, 515 Main St., Apt. 405, Evanston, IL, 60202

logangamelier@yahoo.com

Purpose: Since the average life span of a cystic fibrosis patient has dramatically increased over the past few decades, the number of complex diseases stemming from cystic fibrosis has also increased. The addition of these comorbidities has led to complex medication regimens and high treatment burden, and with cystic fibrosis patients having historically poor adherence rates, it may be imperative to include more pharmacists in cystic fibrosis medication management. This study will assess barriers to medication adherence in cystic fibrosis patients and evaluate a community pharmacist's impact on medication understanding and adherence.

Methods: A large community pharmacy chain will be providing a pharmacist-run educational service to cystic fibrosis patients aged 18 years and older. Patients will be identified for the service during their appointments with their cystic fibrosis health care team. The community pharmacist will meet with the patients that volunteer to participate and conduct a questionnaire to assess for medication adherence and understanding. Based on the questionnaire results, the pharmacist will then counsel the patient and provide education on the role and importance of their medications. Two weeks after the initial visit, the pharmacist will call the patient to briefly review what was discussed in the counseling session and to answer any further questions. Finally, during the patient's next visit to the clinic, which will take place either two or three months after the previous visit, the pharmacist will give the patient a final questionnaire, which includes the content from the first questionnaire plus additional questions to assess for patient satisfaction with the intervention. The collected data will be analyzed using descriptive statistics in order to determine frequency of barriers, assess rates of adherence and population trends, and analyze patient satisfaction after the intervention.

Results/Conclusions: Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify complications and comorbidities of cystic fibrosis.

Describe the medications used in the management of cystic fibrosis.

Self Assessment Questions:

Which of the following is a complication of cystic fibrosis?

- A Arthritis
- B: Hearing impairment
- C: Diabetes
- D: A & C

Which of the following medications works by breaking up the excess DNA in the cystic fibrosis mucus?

- A ivacaftor
- B dornase alpha
- C azithromycin
- D sodium chloride

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-410-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTIBACTERIAL PROPHYLAXIS IN RELAPSED OR REFRACTORY ACUTE MYELOID LEUKEMIA (AML)

*Beejal R Ganti, BS, PharmD. Bernard L Marini, PharmD. Jerod Nagel, PharmD, BCPS AQID. Jerod Nagel, PharmD, BCPS AQID.
University of Michigan Health System, 2203 S. Huron Pkwy Apt 1, Ann Arbor, MI, 48104
beejal@med.umich.edu

A Cochrane review concluded that bacterial prophylaxis following chemotherapy reduced rates of death, infection, and febrile neutropenia, while increasing antimicrobial resistance. As a result, guidelines recommend considering bacterial prophylaxis in patients at risk for prolonged, profound neutropenia. Due to the heterogeneous populations studied and the lack of proven mortality benefit in controlled trials, it is unclear which cancer patients benefit most from prophylaxis. Patients with relapsed or refractory AML have a lower bone marrow reserve, have received particularly aggressive chemotherapy, and thus represent a population where the benefits of bacterial prophylaxis may outweigh the risks. This study aims to determine whether levofloxacin prophylaxis in a cohort of relapsed or refractory AML patients improves patient outcomes.

Beginning December 1, 2013 a protocol was implemented to initiate bacterial prophylaxis on day 1 of re-induction chemotherapy for relapsed or refractory AML. This is a retrospective cohort study comparing outcomes for patients treated with and without levofloxacin prophylaxis. Patients who received clofarabine-, fludarabine-, mitoxantrone- or high-dose cytarabine-based chemotherapy between November 1, 2006 and September 23, 2014 were identified. Adult patients who received at least 1 prior cycle of chemotherapy for AML were included. Patients were excluded if they received broad-spectrum antipseudomonal antibiotics on day 1 of re-induction. The primary outcome was the incidence of bacteremia during neutropenia, or until discharge or death. Secondary outcomes were the incidence of fever, positive cultures, multidrug resistant organisms, intensive care unit admission, broad-spectrum antipseudomonal antibiotics, and death during neutropenia. Subgroup analyses will be performed for regimens and for relapsed or refractory diseases. From previous studies prophylaxis reduces the incidence of bacteremia from 39% to 21%. A sample size of 90 patients for each group is required including a 10% correction factor, with alpha error of 5% and beta error of 20%.

Data collection is in process.

Learning Objectives:

Discuss the proposed advantages of levofloxacin prophylaxis with cancer patients.

List the proposed disadvantages of levofloxacin prophylaxis with cancer patients.

Self Assessment Questions:

All of the following are proposed advantages of bacterial prophylaxis EXCEPT...

- A: Reduces the incidence of febrile neutropenia
- B: Reduces the incidence of gram positive infections
- C: Reduces the incidence of more resistant organisms
- D: Reduces the incidence of gram negative infections

Which of the following is a proven disadvantage of bacterial prophylaxis?

- A: Increased rates of death
- B: Increased incidence of clostridium difficile infections
- C: Increased incidence of more resistant organisms
- D: Increased incidence of febrile neutropenia

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-411-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THROMBOELASTOGRAPHY (TEG) FOR VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS IN LIVER FAILURE PATIENTS

Jennifer L. Garber, PharmD*; Anne E. Rose, PharmD; Jeffrey T. Fish, PharmD, BCPS

University of Wisconsin Hospital and Clinics, 600 Highland Ave, Madison, WI, 53792

JGarber@uwhealth.org

Background

Chronic liver diseases affect over 30 million people annually in the United States. When these patients are hospitalized, questions arise regarding prophylaxis for venous thromboembolism (VTE). It is a commonly held belief that patients with liver failure who have an elevated international normalized ratio (INR) are "auto-anticoagulated," and have a high risk of bleeding. However, this belief has been recently challenged.

In cirrhosis, thrombin generation may be near-normal due to deficiency of both procoagulant and anticoagulant factors, as both are produced by the liver. Additionally, patients with severe cirrhosis may be hypercoagulable, due to an imbalance that may develop between levels of factor VIII and protein C. Traditionally, conventional coagulation screens (prothrombin time, INR) have been used to measure coagulation status in this population; however, these tests do not provide information on the overall balance of coagulation.

Thromboelastography (TEG) is an assessment of clot kinetics, progression, and stability. TEG is commonly used to evaluate coagulation status of liver failure patients in the operating room for transplantation.

Purpose

The purpose of this project is to use TEG to guide the selection of VTE prophylaxis in liver disease patients with high VTE risk.

Objectives

Objectives include utilizing previously adopted VTE risk assessment models (RAMs) to determine VTE risk, and to utilize TEG in liver disease patients with perceived bleeding risk to facilitate the selection of VTE prophylaxis.

Methods

Patients are screened for VTE risk within 24 hours of admission using either the Padua or Caprini RAMs. Clinical pharmacists recommend TEG for at-risk liver failure patients who are not placed on chemical prophylaxis. Based on the results of the TEG, chemical prophylaxis is initiated or mechanical prophylaxis continued.

The results from this study remain under investigation, with data collection and evaluation currently being conducted.

Learning Objectives:

Explain the premise of using TEG to evaluate coagulation status in liver failure patients

Translate TEG results and identify values that may be found in hypercoagulable, normal, or bleeding-prone patients.

Self Assessment Questions:

What TEG result corresponds best with the activity of the intrinsic and extrinsic coagulation pathways?

- A: R time
- B: Alpha angle
- C: Maximum amplitude (MA)
- D: Maximum amplitude (MA)

Which of the following characteristics could be found when evaluating a TEG in a hypercoagulable patient?

- A: Decreased R time
- B: Increased alpha angle
- C: Decreased maximum amplitude (MA)
- D: Both A and B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-757-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF SELECTIVE SEROTONIN RE-UP TAKE INHIBITORS (SSRI) PERSISTENCE ON ADHERENCE TO ORAL HYPOGLYCEMIC MEDICATIONS IN PATIENTS WITH A NEW DIABETES DIAGNOSIS AND CO-MORBID DEPRESSION

Joshua D Gauthier, PharmD*; Terrence B Baugh, PharmD, BCPS; Elizabeth M Ratti, PharmD, BCPS

Veteran Affairs - Battle Creek Medical Center, 6304 Village Green Circle, Apt 2, Portage, MI, 49024

joshua.gauthier@va.gov

Statement of the purpose

Strong evidence suggests medication non-adherence leads to poor health outcomes and that depression severity is related to non-adherence rates. Few studies, however, correlate persistent selective serotonin reuptake inhibitor (SSRI) treatment with adherence to oral hypoglycemic therapy for patients with diabetes mellitus type 2 (DM2) and depression. The purpose of this research project is to determine for patients newly diagnosed with DM2 if there is a correlation between persistent SSRI treatment and adherence to oral hypoglycemic medications (OHM). Utilizing a medication-taking behavior approach minimizes the confounding influence of the bidirectional risk relationship between diabetes and depression.

Statement of methods

Electronic medical and pharmacy records from January 1, 2010 to December 31, 2013 were accessed retrospectively to obtain objective data regarding DM2 and depression diagnoses as well as pharmacy records for study medications. Criterion for inclusion was a depression diagnosis with a treatment plan concurrent with a new DM2 diagnosis that included an SSRI agent and one or more OHM. The primary outcome was adherence to OHM. OHM adherence was compared between SSRI persistent and non-persistent patients. Patient characteristics including demographic information and HbA1C at the start and end of the observation period were compared. Persistence, as the independent variable, was defined as patients who filled an SSRI prescription for at least a 120 day supply during the observation period. Adherence, as the dependent variable, was defined as a medication possession ratio (MPR) of at least 0.80 during the observation period. Summary of (preliminary) results to support conclusion/Conclusions reached

Results and conclusions are pending and will be presented at the conference.

Learning Objectives:

Define the terms persistence and adherence within the context of describing medication-taking behavior

Describe the relationship between SSRI persistence and oral hypoglycemic adherence

Self Assessment Questions:

The following statements regarding adherence and persistence are true

- A Adherence and persistence are synonymous
- B: Measuring persistence can determine if a medication is being over
- C: Adherence can be reported as a medication possession ratio (MPI)
- D: For patients with depression and diabetes, OHM treatment has be

The following statements regarding the relationship between diabetes and depression are true

- A For patients with depression and diabetes, SSRI treatment has be
- B A diagnosis of depression decreases the risk for diabetes develop
- C A diagnosis of diabetes increases the risk for depression developr
- D For patients with depression and diabetes, OHM treatment has be

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-758-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL APPLICATION OF THE HAS-BLED BLEEDING RISK SCORE TO REDUCE MODIFIABLE BLEEDING RISK FACTORS ASSOCIATED WITH ORAL ANTICOAGULATION

Elizabeth Geison, Pharm.D.*; Daisy Peterson, Pharm.D., BCPS; Marcy Glisczinski, Pharm.D.; Angela Paniagua, Pharm.D., BCPS, CGP

Veteran Affairs - Clement J. Zablocki Medical Center, 5000 W National Ave, Milwaukee, WI, 53295

elizabeth.geison2@va.gov

Purpose:

The HAS-BLED (Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile International Normalized Ratio, Elderly (age greater than 65 years), Drugs/alcohol concomitantly) bleeding risk score has been developed and validated as a simple, user friendly tool to assess the individual bleeding risk of patients with non-valvular atrial fibrillation receiving warfarin. This project will be performed to evaluate the impact of pharmacist intervention on reducing modifiable bleeding risk factors by applying the HAS-BLED scoring system in a primary care setting at a Veterans Affairs medical center.

Methods:

The facility's computerized patient record system (CPRS) will be used to obtain demographic, laboratory, and clinical data. The HAS-BLED scoring system will be used to determine patients baseline bleeding risk scores. Modifiable risk factors that will be evaluated include uncontrolled hypertension (SBP greater than 160 mmHg), concurrent non-steroidal anti-inflammatory drug (NSAID) use, and concomitant antiplatelet drug use (aspirin and/or clopidogrel). Pharmacist interventions to reduce these modifiable risk factors will include provider contact to offer blood pressure management by a pharmacist, and patient education and/or provider contact to discontinue use of an unnecessary concomitant NSAID or antiplatelet drug(s). At the conclusion of the project, HAS-BLED scores will be re-calculated for each individual who underwent an intervention. The primary outcome measure is the proportion of patients whose HAS-BLED score was reduced by at least one point. Secondary outcome measures will include: the proportion of patients whose HAS-BLED score was reduced from one stratification level of bleeding risk to a lesser one, the total number of pharmacist interventions made, and the number of pharmacist interventions made of each type (modification of blood pressure, NSAID, or antiplatelet drug use).

Results/Conclusion:

Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the risk factors that comprise the HAS-BLED bleeding risk score.

Identify the modifiable bleeding risk factors incorporated into the HAS-BLED bleeding risk score.

Self Assessment Questions:

What does the "A" stand for in the HAS-BLED bleeding risk score?

- A Age greater than 75 years old
- B: Abnormal kidney/liver function
- C: Additional use of anticoagulants
- D: Alcohol intake greater than 8 drinks per week

In the HAS-BLED bleeding risk score, which of the following is a modifiable bleeding risk?

- A Elderly age
- B Bleeding history
- C Stroke history
- D Concomitant aspirin use

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-412-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF SEDATION IN OBESE CRITICALLY ILL PATIENTS

Yuliya Genkina, PharmD*, Erin Mancl, PharmD, BCPS, Megan Rech, PharmD, BCPS

Loyola University Medical Center, 7438 Franklin St, Apt 5B, Forest Park, IL 60130

ygenkina@gmail.com

Purpose: A light level of sedation has been associated with improved clinical outcomes. Midazolam continues to be a leading sedative drug utilized in intensive care units (ICUs). It is the preferred continuous benzodiazepine due to its rapid time to effect and shorter half-life. Midazolam undergoes hepatic metabolism with formation of active metabolites and has a large volume of distribution due to high lipophilicity. As a result, obese patients and those with renal or hepatic dysfunction are likely to accumulate midazolam causing prolonged duration of sedation and mechanical ventilation. Limited data exists to guide dosing strategies in obese patients requiring mechanical ventilation on continuous midazolam. The purpose of this retrospective study is to determine whether the dosing of midazolam, in combination with fentanyl, maintains obese patients within goal Richmond Analgesia Sedation Score (RASS) compared to non-obese patients. **Methods:** Patients were admitted to Loyola University Medical Center from January 2013 through December 2014 to medical or surgical ICUs. Included patients were 18 years old or older, mechanically ventilated and sedated with fentanyl and midazolam continuous infusions for at least 24 hours to be titrated to a documented goal RASS within 0 to -2. Patients with active seizures, neurological disease, active coronary disease, or receiving epidural or spinal analgesia with narcotics or neuromuscular blocker infusions were excluded. Patients were categorized according to body mass index (BMI) below 30 kg/m² or BMI equal to or greater than 30 kg/m². The primary endpoint was percentage of time at goal RASS during a sedation period up to 28 days. The secondary endpoints included coma-free days, delirium-free days, ventilator-free days, ICU and hospital LOS, cumulative doses of midazolam and fentanyl per 24 hours, and maximum and median rates of midazolam and fentanyl infusions. **Results/Conclusion:** Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify beneficial clinical outcomes of targeting light levels of sedation
Discuss available literature of midazolam use and outcomes in obese versus non-obese critically ill patients

Self Assessment Questions:

Light sedation has been associated with which of the following clinical outcomes?

- A Reduced ICU length of stay
- B: Reduced mortality
- C: Impaired patient mental health after discharge
- D: Increased readmission rates

Which sedative do the Pain, Agitation, and Delirium guidelines recommend as first line for sedation during mechanical ventilation?

- A Midazolam
- B Diazepam
- C Lorazepam
- D Propofol

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-413-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE IMPACT OF GUIDED ELECTRONIC PRESCRIBING OF VITAMIN K IN WARFARIN REVERSAL WITHIN A COMMUNITY HOSPITAL

Stefanie George, B.S., Pharm.D.

Ingalls Health System, 1 Ingalls Dr, Harvy, IL 60426

stgeorge@ingalls.org

Purpose:

Inappropriate utilization of vitamin K in warfarin reversal can lead to subtherapeutic international normalized ratio (INR) values and expose the patient to an increased risk of thrombosis. In 2012, the American College of Chest Physicians (ACCP) provided evidence based guidelines for the use of vitamin K in warfarin reversal. The overutilization of vitamin K is identified as a possible issue within hospital institutions. The goal of this study is evaluate the impact of including guideline recommendations to the vitamin K order set of a computerized physician order entry (CPOE) system.

Methods:

This will be a retrospective, observational study evaluating the use of vitamin K in warfarin reversal patients at Ingalls Memorial Hospital. A chart review will be conducted on inpatients for a six month period evaluating strategies used to correct supratherapeutic INR values resulting from warfarin use. The vitamin K dose, route, formulation, and indication will be evaluated for appropriateness in regards to the current guidelines without modification to the computerized physician order entry (CPOE) system for a period of two months. Additional data collection will include patient demographics (age, gender, race), warfarin indication, warfarin dose, INR at the time of reversal, INR at the end of reversal, signs/symptoms of bleeding, thrombosis, length of hospital stay, and any complications that may arise. The same parameters will be evaluated after adding guideline dosing recommendations to the vitamin K order set within the CPOE system. The primary objective is to evaluate the frequency of deviations from the ACCP warfarin reversal guidelines before and after the CPOE modification.

Results/Conclusions

Results and conclusions to be presented at Great Lakes Residency Conference

Learning Objectives:

Explain the proper indication of vitamin K in warfarin reversal

Select the correct formulation and dose of vitamin K to administer when indicated for warfarin reversal

Self Assessment Questions:

Which international normalized ratio (INR) value would indicate the use of vitamin K in a non-bleeding patient?

- A INR greater than 4
- B: INR greater than 5
- C: INR greater than 10
- D: Vitamin K is not indicated if the patient is not bleeding

Which patient scenario would require the intravenous formulation of vitamin K?

- A The patient has an INR greater than 10
- B The patient requires vitamin K for warfarin reversal but is not tolerating
- C The patient is requiring a non-emergent surgery that is taking place
- D The physician orders intravenous vitamin K

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-414-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PREDICTORS OF RESPONSE IN CALCIUM CHANNEL BLOCKER AND BETA BLOCKER OVERDOSE IN CRITICALLY ILL PATIENTS TREATED WITH HYPERINSULINEMIA EUGLYCEMIA, GLUCAGON, AND INTRAVENOUS LIPID EMULSION THERAPY

Hilary Gerwin, PharmD*; Madeline Foertsch, PharmD, BCPS; Kristen Hillebrand, PharmD, BCPS; Jessica Winter, PharmD, BCPS; Nicole Harger, PharmD, BCPS; Robert Goetz, PharmD, DABAT; Alysha Behrman, RN, MSN; Edward Otten, MD, FACMT, FAWM
UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 45219-2316
hilary.gerwin@uchealth.com

Purpose: Severe beta blocker (BB) and calcium channel blocker (CCB) overdoses are associated with significant morbidity and mortality. Despite this, the management of BB and CCB overdoses are not standardized or well defined. No human randomized controlled trials exist to determine the optimal treatment recommendations for BB and/or CCB overdoses. Animal studies and human case reports provide suggestions for effective management. A wide array of supportive care therapies have been utilized in BB and CCB toxicities, including pharmacologic and extracorporeal measures. Three pharmacologic therapies in particular, hyperinsulinemia euglycemia therapy (HIET), glucagon, and intravenous (IV) lipid emulsion are commonly used in critically ill patients. These therapies are generally reserved for more severe overdoses refractory to initial supportive care measures. The purpose of our study is to evaluate HIET, glucagon, and IV lipid emulsion in BB and/or CCB overdoses and determine predictors of response.

Methods: This study is a single-center, retrospective chart review. A sample of adult patients admitted to the University of Cincinnati Medical Center (UCMC) from June 1, 2004 through June 30, 2014, presenting with a suspected BB and/or CCB overdose with a mean arterial pressure <65 mmHg, who have received one of the aforementioned therapies will be included. This study aims to identify predictors of response surrounding the use of HIET, glucagon, and lipid emulsion in critically ill patients in order to determine optimal treatment strategies. The primary outcome will be to assess hemodynamic response to the investigated therapies. The secondary outcomes will assess survival, lactate clearance, urine output, and length of hospital stay. The safety profile of HIET will also be investigated. A multivariate logistic regression will be performed to identify predictors of response.

Results: Data is currently being reviewed and collected; therefore no results are available.

Conclusions: No conclusions can be made at this time.

Learning Objectives:

Explain the pathophysiology of beta blocker and calcium channel blocker overdose

Discuss available treatment modalities and present the literature for the use of hyperinsulinemia euglycemia therapy (HIET), glucagon, and IV lipid emulsion

Self Assessment Questions:

Which choice best describes the mechanism with which beta blockers decrease cardiac contractility?

- A: Blockade of the beta 1 receptor activates a G-protein coupled receptor
- B: Blockade of the beta 1 receptor interferes with activation of cAMP
- C: Blockade of the beta 1 receptor prevents formation of second messenger
- D: Blockade of the beta 2 receptor interferes with activation of cAMP

What is the proposed mechanism for how high dose insulin exerts its effects on the myocardium in beta blocker and calcium channel blocker overdoses?

- A: Facilitates glucose uptake to meet myocardial metabolic needs
- B: Stimulates beta 1 receptors to improve cardiac contractility
- C: Optimizes electrolyte balance, especially potassium, to improve contractility
- D: Lowers serum blood glucose so that the myocardium can better utilize glucose

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-415-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT, IMPLEMENTATION, AND ASSESSMENT OF CLINICAL PHARMACY SERVICES IN A COMMUNITY HOSPITAL PRE-ADMISSION TESTING (PAT) CLINIC

Kristel Geyer PharmD*; Ann Bachar RPh, BCPS; Chris Vogt RPh; Brian Kasica PharmD; Terry Audley RPh, FASHP; Garret Newkirk PharmD, MS, BCPS; Merle Hackwell RN; Ryan Burch DO

Froedtert Health Community Memorial Hospital, W180N8085 Town Hall Road, Menomonee Falls, WI, 53051

kristel.geyer@froedtert.com

Purpose: Pre-admission testing (PAT) clinics serve to optimize the quality of care for patients undergoing elective surgeries. A multidisciplinary team works to gather information about a patient's medical history pre-operatively to ensure the best possible surgical outcome. Screening patients can reduce the financial burden of unnecessary testing and provide better pre-operative patient care and outcomes. Studies have shown that patient visits to a PAT clinic decrease surgical cancellation and delay rates. The PAT clinic at Community Memorial started in July 2014, with plans for expansion to all elective orthopedic surgeries, and a new clinic space opening in 2016. Pharmacists are integrated in the clinic workflow providing medication histories and perioperative medication management, including anticoagulation bridging therapy recommendations. The purpose of this study is to assess the impact of PAT pharmacy clinical services on same day cancellation rates.

Methods: This is a single center study of patients undergoing elective orthopedic joint surgeries before and after implementation of PAT pharmacy clinical services. Patients undergoing elective orthopedic joint surgery between November 2014 and March 2015 seen by the PAT clinic pharmacist will be compared to historical controls that underwent elective orthopedic joint surgery between January 2014 and June 2014. The primary outcome measure is the composite outcome of cancellation rates and delays in surgery due to medication related events. These events are defined as inappropriate continuation of anticoagulation and antiplatelet medications, and compliance with preoperative instructions for antihypertensive and antidiabetic medications.

Results/Conclusion: Data collection and outcomes evaluation are currently being completed and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify patient inclusion criteria for PAT clinic pharmacy services.

Recognize ways pharmacists can be involved in a PAT clinic setting to optimize patient outcomes.

Self Assessment Questions:

1. Which of the following was considered a patient inclusion criterion for PAT clinic pharmacy services?

- A: All orthopedic surgeries
- B: Knee Arthroplasty
- C: Spinal Fusion
- D: Cardiac surgery

What clinical services do the PAT pharmacists provide at Community Memorial Hospital?

- A: Obtaining accurate medication histories
- B: Anticoagulation bridging management recommendations
- C: Compliance with SCIP guidelines
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-759-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

MIRTAZAPINE AND PRAZOSIN COMBINATION THERAPY FOR POST-TRAUMATIC STRESS DISORDER (PTSD): A CASE CONTROL RETROSPECTIVE STUDY

Amina M Ghalyoun, PharmD*; Yinka Alaka, PharmD; Michael D Shuman, PharmD, BCPP

Captain James A. Lovell Federal Health Care Center, 3001 Green Bay Road, North Chicago, IL 60064

amina.ghalyoun@va.gov

Purpose: Theoretically, doses of mirtazapine ≥ 30 mg result in a dose dependent arousal and subsequently require an increase in the dose of prazosin to counter the effect. The goal of this study is to identify if this phenomenon is occurring in clinical practice by assessing the dose relationship between mirtazapine and prazosin in the veteran population at Captain James A. Lovell Federal Health Care Center. Secondary outcomes include assessing the addition of sleep medications and stratifying groups by etiology of their PTSD: combat versus non-combat.

Methods: This study was approved by the Institutional Review Board. The control group includes patients on combination therapy whom do not experience a dose increase in mirtazapine therapy. The case group includes patients whom experience a dose increase in either mirtazapine or prazosin therapies. Data was obtained through the VISTA computer system by identifying all veterans who have received prazosin or mirtazapine therapies in the past 5 years. Inclusion criteria is as follows: taking both medications for at least 30 days, diagnosis of chronic PTSD, and age 18 years or older. Exclusion criteria includes diagnosis of Parkinsons Disease, primary insomnia prior to initiation of mirtazapine, and unstable bipolar disorder. The following patient data will be collected: age, gender, PTSD etiology, mirtazapine and prazosin issue dates, initial doses, final doses, and final refill dates. Also, initiation of sleep medications, name of the agent, pharmacologic class, documented indication, number of medications, start and stop dates, as well as initial and final doses will be collected. Average mirtazapine dose change will be reported using a mean with a standard deviation. A regression analysis of the doses will be conducted to identify a dose dependent relationship between prazosin and mirtazapine. Addition of sleep medications will be statistically assessed as dichotomous data utilizing the Fishers exact test.

Learning Objectives:

Identify both FDA and non FDA approved medications utilized for the treatment of PTSD

Identify medications commonly utilized for insomnia and their corresponding doses

Self Assessment Questions:

Prazosin is used to treat what symptom of PTSD?

- A: Anxiety
- B: Avoidance
- C: Hypervigilance
- D: Nightmares

Which of the following medication and corresponding dose is used to treat insomnia?

- A: nortriptyline 25mg by mouth nightly
- B: amitriptyline 150mg by mouth nightly
- C: quetiapine 400mg by mouth nightly
- D: both a and b

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-416-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OUTCOMES ASSOCIATED WITH THE UTILIZATION OF RAPID DIAGNOSTIC TECHNOLOGY AND PHARMACIST INTERVENTION IN THE MANAGEMENT OF GRAM-NEGATIVE BACTEREMIA

Allison Gobble, PharmD*, Angela Huang, PharmD, BCPS, Anne Daniels, PharmD, BCPS, AAHIVP, Susan Horsman, PharmD, BCPS, Jordan Dow, MS, PharmD, Nathan Ledeboer, PhD, Sara Revolinski, PharmD, BCPS

Froedtert Hospital, 141 N Jackson St, #218, Milwaukee, WI, 53202

allison.gobble@froedtert.com

Purpose: Gold nanoparticle technology (GNT) rapidly identifies multiple gram-negative organisms and resistance determinants directly from positive blood cultures. Culture identification methods utilizing gold nanoparticle technology can provide results in as little as 12 to 14 hours as compared to traditional methods, which can take up to 24 to 48 hours for identification and an additional 24 to 48 hours to determine resistance. This shortened time to identification is important for two main reasons: ensuring initial empiric therapy is effective against the isolated organism, and providing the opportunity for early de-escalation and reduced antimicrobial exposure. The earlier an organism and its resistance determinants are identified, the sooner effective, targeted therapy can be determined, thus optimizing outcomes for the patient. In addition, literature has shown pharmacist involvement along with rapid diagnostic technology has also been associated with improved patient outcomes. The goal of this study is to demonstrate the impact of both pharmacist intervention and implementation of GNT on the management of gram-negative bacteremias.

Methods: Data will be retrospectively analyzed for three different study groups based on progressive changes in our institutions procedure for identifying and reporting positive blood culture results. The first group includes patients whose positive culture results were reported directly to the provider before GNT implementation. The second group includes patients who had positive culture results reported directly to the pharmacist prior to GNT implementation. The third group includes those whose culture results were reported to the pharmacist after GNT implementation. The primary outcome analyzed is time to optimal antimicrobial therapy.

Results and Conclusion: GNT for gram-negative bacteremias has been implemented. Data is currently being collected and analyzed. Results will be reported at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the resistance determinants identifiable by the gold nanoparticle technology.

Identify negative outcomes associated with the overutilization of broad spectrum antibiotics.

Self Assessment Questions:

Which of the following resistance determinants is not identifiable by gold nanoparticle technology?

- A: Kpc
- B: Ndm
- C: Oxa
- D: Amp-c

Which of the following is an outcome associated with the overutilization of broad spectrum antibiotics?

- A: Increased antimicrobial resistance
- B: Decreased health care costs
- C: Increased rate of Clostridium difficile infections
- D: A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-417-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF BARRIERS TO PROVIDING INTRODUCTORY PHARMACY PRACTICE EXPERIENCES (IPPE) IN THE HOSPITAL SETTING

*Matthew Gibson, PharmD, BCPS, Donnie Sullivan, PhD., Crystal Tubbs, PharmD, FASHP, Jay Mirtallo, MS, RPh, FASHP, Katherine Kelley, PhD.

The Ohio State University Wexner Medical Center, 410 W. 10th Ave., Columbus, OH, 43210

matthew.gibson@osumc.edu

Purpose: The Accreditation Council for Pharmacy Education (ACPE) determines the accreditation standards for pharmacy education. These standards are set for both the didactic and experiential portions of pharmacy education. Students are required to complete a minimum of 300 hours (150 hours in the community setting and 150 hours in the institutional health-system setting) of introductory pharmacy practice experiences (IPPE) during their first three professional years of pharmacy school. These standards challenge U.S. colleges and schools of pharmacy as well as hospitals to provide pharmacy students exposure to contemporary practice models, professional ethics and direct patient care activities. IPPE activities provide the foundation for students to develop an understanding of pharmacy practice prior to beginning advanced pharmacy practice experiences (APPE). Barriers to providing APPE have been well described in the literature and include student readiness, competing priorities of preceptors and logistical issues. However, challenges and barriers to providing IPPE for students in the hospital setting have not been described within the literature. Therefore, the primary objective of this study is to determine the barriers to providing IPPE in the hospital setting.

Methods: Survey questions will be developed by interviewing current IPPE preceptors from various institutions to determine potential barriers and by using literature that describes barriers for APPE. An electronic survey will be distributed to IPPE preceptors to assess student, preceptor, and logistical barriers that potentially exist for providing IPPE in the hospital setting. The survey respondents will have the opportunity answer each question on a 5-point scale from "strongly agrees" to "strongly disagrees".

Results: Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference. A descriptive analysis will be conducted.

Learning Objectives:

Review Accreditation Council for Pharmacy Education (ACPE) standards for experiential education

Report barriers to providing introductory pharmacy practice experiences (IPPE) in the hospital setting

Self Assessment Questions:

Which of the following statements is correct?

- A American Society of Health-System Pharmacists determines accreditation
- B The number of colleges or schools of pharmacy have decreased
- C Accreditation Council for Pharmacy Education (ACPE) requires 150 hours
- D Accreditation Council for Pharmacy Education (ACPE) requires 300 hours

Which of the following statements is correct?

- A There is more information within the literature about the barriers to providing IPPE
- B Accreditation Council for Pharmacy Education (ACPE) recently revised its standards
- C A recent published survey demonstrated that the community setting is the most common site for IPPE
- D Accreditation Council for Pharmacy Education (ACPE) has developed standards for IPPE

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-760-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARATIVE EVALUATION OF THE SAFETY AND EFFICACY OF PHARMACIST-MANAGED PATIENT CONTROLLED ANALGESIA (PCA) VERSUS PROVIDER-MANAGED

Rebecca Gilene, PharmD*, Angela Allsup, PharmD, BCPS
Union Hospital, 935 Antioch Circle North, Apt 21-935, Terre Haute, IN, 47803

rgilene@uhhg.org

Previous studies of patient controlled analgesia (PCA) describe increased patient satisfaction with pain control in addition to a reduction in nursing time. However, adverse effects and abuse persist as significant complications associated with the use of PCA. Historically, pharmacists have been valuable, accessible specialists for the dosing, monitoring, and adjusting of other medications. The aim of this prospective review is to determine the impact of clinical pharmacists on both the efficacy and safety of PCA management as compared to other healthcare providers.

This prospective study will include patients admitted to our community hospital who received PCAs for pain control between September 2014 and February 2015. Current practice for initiation centers on standardized dosing. Per protocol, physicians have the option of selecting one of the following when starting this type of analgesia: opioid naïve, opioid tolerant, or pharmacist-management. When pharmacist-management is chosen, a clinical pharmacist evaluates each patient and provides education before initiating an appropriate regimen.

Subsequently, the clinical pharmacist continues to assess each patient daily and intervenes when necessary. For this study, patients will be stratified by the managing healthcare provider, and clinical outcomes achieved by pharmacist-managed PCA will be compared to outcomes achieved by provider-managed PCA. Each patient will be evaluated by chart review, and data collection will include: type of PCA, subjective pain score, and adverse effects. The primary endpoint is the number of clinical interventions from each provider group. Pain control assessment will be based on subjective pain scores by each patient while receiving PCA therapy. Medication safety will be evaluated by instances of respiratory depression, requirement of opioid antagonists, and occurrences of bowel movements.

Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify goals of therapy for acute pain management in the inpatient setting and recognize the potential benefits of using patient controlled analgesia.

Discuss evidence-based recommendations by the Joint Commission for reduction in the incidence of adverse effects associated with opioid use.

Self Assessment Questions:

Which of the following is a therapy goal for acute pain according to the National Pharmaceutical Council?

- A Avoidance of opioid agents
- B Prompt regimen adjustments
- C Complete elimination of pain
- D Reservation of drug therapy for severe pain

In comparison to oral regimens, the use of opioid PCAs for acute pain is associated with:

- A Increase in nursing time
- B Increase in patient pain scores
- C Increase in adverse events
- D Increase in patient satisfaction

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-418-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PATIENT-CENTERED EDUCATION: A COMPARISON OF TRADITIONAL WARFARIN COUNSELING VERSUS A DESIGNED, EDUCATIONAL SERIES

Lauren E. Glaze, PharmD*, Stacy L. Rowe, PharmD, MBA, Amanda N. Jett, PharmD

Sullivan University College of Pharmacy, 4018 Brookfield Ave, Louisville, KY, 40207

lgaze@sullivan.edu

Purpose: The anticoagulant warfarin has a narrow therapeutic index. The drug is listed by The Institute for Safe Medication Practices as a high-alert medication, meaning it has an increased risk of causing significant harm to a patient when used in error. It is imperative to educate patients on warfarin therapy to improve anticoagulation control, adherence, and reduce adverse events. Healthcare providers have commonly used verbal education and/or written materials to instruct patients on the proper use of warfarin, its adverse effects, and drug interactions. New approaches, such as interactive learning videos, may be necessary to improve patient outcomes.

Methods: Patient education is essential to quality anticoagulant management. Alternative educational methods could prove valuable in warfarin counseling. The use of visual aids, such as videos, will offer patients a different way to learn important warfarin counseling points. Furthermore, the understanding and retention of the education provided is equally as vital to proper warfarin management. Through literature review, it can be concluded that comprehension and recollection of information may be improved if presented in a way that involve the audiovisual senses, versus traditional aural education. With advances in technology and interactive learning, warfarin treatment could be enhanced with the use of audiovisual learning that includes patient's participation, such as with an iPad. Based on evaluation of sources concerning patient education, learning styles, memory, and information recall, an interactive educational video series for warfarin counseling were developed.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall the importance of education for patients on warfarin therapy to improve anticoagulant control, increase adherence, and decrease the risk adverse effects.

Describe the advantages and disadvantages of various methods used for patient education.

Self Assessment Questions:

Based on the presented information, complications from warfarin, such as bleeding, are associated with which of the following?

- A Drug interactions
- B Lack of access to care
- C Knowledge deficits related to warfarin
- D Improper medication storage

Which method of information delivery tends to have the greatest retention for learners after 2 weeks?

- A Verbal receiving (hearing words)
- B Doing (simulation)
- C Receiving/Participating (discussion)
- D Visual receiving (looking at pictures)

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-419-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING THE IMPACT OF THE 2013 ACC/AHA CHOLESTEROL GUIDELINE ON PATIENT CARE IN A PHARMACIST-MANAGED CLINIC AT A VETERANS AFFAIRS MEDICAL CENTER

Brianna E. Glynn, PharmD*, Bianca Lezcano, PharmD, Arthur Schuna, RPh, MS, BCACP, FASHP

Verteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Madison, WI, 53705

brianna.glynn2@va.gov

The 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults represents a significant change in the management of patients with, or at high risk of developing, cardiovascular disease (CVD). At the William S. Middleton Memorial Veterans Hospital in Madison, WI, pharmacists and pharmacy residents play an integral role in the management of chronic diseases such as diabetes and dyslipidemia in Medication Management clinics. The purpose of this study is to evaluate the impact of the revised recommendations related to the use of statin therapy for primary and secondary prevention of CVD in patients referred to Medication Management clinics. Retrospective reviews of electronic health records (EHRs) will be performed to identify patients referred to Medication Management clinics for diabetes and/or lipid management from January 1, 2014 to September 30, 2014. Patients will be included if their laboratory data includes a fasting lipid panel drawn prior to and following the implementation of the guidelines. Data pertaining to veterans age, sex, comorbid conditions associated with CVD, statin intensity prior to and following the implementation of new guidelines, statin benefit group, and estimated 10-year atherosclerotic cardiovascular disease (ASCVD) risk score stratification will be collected. Impact of the guidelines on patient care will be determined by evaluating if patients were treated with appropriate statin intensity based on revised recommendations. Additional metrics to be evaluated include proportion of patients not on appropriate statin intensity, reasons for deviation from guideline recommendations, incidence of statin-related adverse effects after intensification of therapy, and effect of statin intensification on fasting lipid panel values. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify potential barriers to intensification of statin therapy.

Describe methods for pharmacists to improve adherence to 2013 ACC/AHA blood cholesterol guideline recommendations.

Self Assessment Questions:

Which of the following are potential barriers to intensification of statin therapy?

- A LDL <90 mg/dL on lipid panel recheck
- B Patient experiencing muscle pain and weakness
- C Patient unwilling to change current therapy
- D B and C

In which of the following patients should intensification to high intensity statin be considered?

- A 82 year old male with no history of cardiovascular disease
- B 65 year old female without diabetes and baseline LDL less than 70
- C 69 year old male with diabetes and estimated ASCVD risk 13%
- D 55 year old male with LDL 21 mg/dL

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-420-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INDEPENDENT RISK FACTORS FOR SUPRATHERAPEUTIC VANCOMYCIN SERUM TROUGH CONCENTRATIONS IN THE PEDIATRIC INTENSIVE CARE UNIT

Megan E. Goetz*, PharmD, Palak Bhagat, PharmD, BCPS, and Allison Thompson, PharmD, BCPS

University of Chicago Medical Center, 5841 South Maryland Ave., Chicago, IL, 60637

megan.goetz@uchospitals.edu

Purpose: With increased use of vancomycin, minimum inhibitory concentrations have risen resulting in vancomycin failure and a need for more aggressive vancomycin dosing. Guidelines recommend vancomycin dosing guided by serum trough concentrations with goal troughs between 10-20 micrograms per milliliter.

Pediatric patients require higher daily doses of vancomycin per kilogram of body weight compared to adults. Initial dosing regimens are 60 mg/kg/day in four divided doses in patients without renal dysfunction. The need for higher doses has led to supratherapeutic vancomycin trough concentrations, and studies have determined higher total daily doses and supratherapeutic troughs are associated with nephrotoxicity. In intensive care unit patients, these supratherapeutic levels may be due to alterations in pharmacokinetics and pharmacodynamics. This sets a platform for this study to evaluate independent risk factors that predispose pediatric patients in the pediatric intensive care unit (PICU) to supratherapeutic vancomycin serum trough concentrations.

Methods: A retrospective, case-cohort analysis will be conducted via electronic chart review. Patients aged 28 days to 18 years admitted to University of Chicago Comer Children's Hospital PICU for at least 24 hours prior to the supratherapeutic trough, who receive vancomycin for a minimum of 48 hours, and have at least one supratherapeutic vancomycin serum trough concentration are included. Those with pre-existing renal dysfunction, on extracorporeal membrane oxygenation or cardiopulmonary bypass within 7 days, or started on vancomycin at an outside hospital are excluded. Variables for analysis include age, weight, gender, serum creatinine, vancomycin total daily dose, use of loading dose, vasopressor use and agent, and concomitant nephrotoxic agents. The primary outcome is identification of PICU specific risk factors for supratherapeutic vancomycin troughs. Secondary outcomes include time and incidence of supratherapeutic troughs.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the 2009 American Society of Health System Pharmacists (ASHP), Infectious Disease Society of America (IDSA), and the Society of Infectious Disease Pharmacists (SIDP) Vancomycin Guideline Recommendations

Identify predictors for supratherapeutic vancomycin serum trough concentrations

Self Assessment Questions:

According to the 2009 guidelines, which of the following is the recommended initial vancomycin maintenance dose for pediatric patients without renal dysfunction?

- A 5 mg/kg every 6 hours
- B: 10 mg/kg every 6 hours
- C: 15 mg/kg every 6 hours
- D: 25 mg/kg every 6 hours

In previous studies not specific to the pediatric intensive care unit, which of the following have been determined as risk factors for supratherapeutic vancomycin serum trough concentrations?

- A Increased total daily dose of vancomycin
- B Patients ages 13-18 years old
- C Patients weighing greater than 50 kg
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-761-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

BARRIERS AND FACILITATORS TO ANTICOAGULATION SELF-CARE IN MINORITY PATIENTS IN THE UNITED STATES - A HEALTHCARE PROVIDER PERSPECTIVE.

Alexandra Goncharenko, PharmD, PGY1 Pharmacy Practice Resident;* Lisa Sharp, PhD, Associate Professor of Pharmacy Systems, Outcomes and Policy; Marian Fitzgibbon, PhD, Professor of Medicine and Health Policy and Administration; Ben Gerber, MD, PhD, Associate

University of Illinois at Chicago, 833 S Wood St, 164 PHARM, MC 886, Chicago, IL, 606127230

agonch2@uic.edu

Background/Purpose: Many patients, particularly the minority and underserved, treated with oral anticoagulation have access barriers to specialized anticoagulation clinics (ACC). The development of portable INR testing devices makes it possible for patients to monitor their anticoagulation by themselves. However, the uptake of patient self-testing (PST) in the US has been limited, and data on the barriers and facilitators to the implementation of PST is lacking. The aims of this study are to 1) identify healthcare provider perceived barriers and facilitators to the uptake and implementation of PST and 2) evaluate the extent of uptake, barriers and facilitators to PST in ACCs that care for minority and underserved patients.

Methods: We will conduct a cross-sectional survey that will evaluate provider perceived barriers, facilitators and trends in PST of warfarin therapy in US-based ACCs. Survey participants will be identified through the Anticoagulation Forums database, a national network of providers of anticoagulation services with a membership of > 3,000. The survey contains 41 questions about how respondents manage their patients, the demographics of the respondents and of their anticoagulation clinic patients, and perceived barriers and facilitators to patient self-testing. An e-mail with a link to an internet-based survey will be sent to providers with 2 subsequent reminder e-mails at 2 and 3 weeks post initial distribution. The survey will close 4 weeks after initial distribution. Consent to participate will be implied by voluntary completion and return of the survey. The survey instrument will be developed and housed in Qualtrics. All data will be de-identified. Quantitative data will be downloaded into Microsoft Excel and imported into SAS for descriptive analysis. Open-ended questions will be entered and analyzed for thematic content using ATLAS.ti.

Results/Conclusions: Conclusions remain under investigation as analysis is currently being completed.

Learning Objectives:

Define patient self-testing.

Describe the potential benefits of anticoagulation self-testing.

Self Assessment Questions:

Patient self-testing (PST) is defined by which of the following?

- A Patients test their INR at a specialized anticoagulation clinic and a
- B: Patients test their INR at home with a point-of-care INR device and
- C: Patients test their INR at a specialized anticoagulation clinic and s
- D: Patients test their INR at home with a point-of-care INR device and

What are the potential benefits of anticoagulation self-testing?

- A It is a way of providing accessible anticoagulation monitoring to hig
- B It may improve anticoagulation control by increasing the time in th
- C It may decrease poor outcomes such as thromboembolic events, i
- D All of the above.

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-421-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE IMPACT OF CLOSTRIDIUM DIFFICILE INFECTION IN SOLID ORGAN TRANSPLANT PATIENTS

Kyle P. Gordon, PharmD.*; Jamie J. Benken, PharmD., BCPS
University of Illinois at Chicago, 833 South Wood Street, 164
Pharm, Chicago, IL, 606127230
kgordo5@uic.edu

Purpose: An increased rate of Clostridium difficile infection has been reported in the solid organ transplant (SOT) population. Studies have reported variable outcomes of C. difficile infection in this population. This study will evaluate the outcomes of C. difficile in SOT patients compared to the general hospital population. It will also isolate contributing factors to increased infection rates and SOT population outcomes. Information regarding the outcomes of these patients as well as contributing factors will provide necessary information for disease management and prevention.

Methods: This is a retrospective cohort study approved by the University of Illinois Institutional Review Board. Solid organ transplant patients who were diagnosed with C. difficile infection will be included in a chart review assessing incidence, outcomes and contributing factors. The primary endpoint will be a composite endpoint evaluating mortality, incidence of colectomy, relapse rate and recurrence rate. Secondary endpoints include infection rate and evaluation of factors that may contribute to the primary objective. Appropriate statistical tests will be used to evaluate the study objectives.

Results: Data collection is currently in progress.

Learning Objectives:

Define treatment options for Clostridium difficile infections.

Identify risk factors leading to Clostridium difficile infections in solid organ transplant patients.

Self Assessment Questions:

Which factor(s) contribute to the increased incidence of C. difficile infections in solid organ transplant patients?

- A: Gastric acid suppressants
- B: Recent exposure to systemic antibiotics
- C: Recent hospitalization
- D: All of the above

Clostridium difficile infection may be treated with which antimicrobial regimen(s)?

- A: metronidazole 500 mg tablet by mouth every 8 hours for 10-14 days
- B: vancomycin 500 mg IVPB every 12 hours for 10-14 days
- C: vancomycin 125 mg solution by mouth every 6 hours for 10 days
- D: A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-422-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE INCIDENCE OF ADVERSE BLEEDING WITH VARIOUS TRIPLE ORAL ANTITHROMBOTIC THERAPIES (TOAT) IN PATIENTS WITH ATRIAL FIBRILLATION AND CORONARY STENTS

Sabrina Grandi*, PharmD, Kimberly Ackerbauer, PharmD
Rush University Medical Center, 235 W Van Buren St, Apt
2418, Chicago, IL, 60607
sabrina_grandi@rush.edu

Purpose:

Stroke and stent thrombosis are potentially life threatening complications of atrial fibrillation (AF) and coronary stent placement, respectively. Antithrombotic therapy with anticoagulants and/or antiplatelet agents is a crucial aspect of care for these patients. Bleeding risk increases with the addition of each antithrombotic agent. Patients with AF and coronary stents have an indication for triple oral antithrombotic therapy (TOAT) putting them at a higher risk for bleeding events. With the development of several new oral anticoagulants and P2Y12 inhibitors the optimal TOAT combination is unknown. The purpose of this study is to evaluate the most commonly used TOAT regimens and compare the associated incidence of bleeding with each regimen.

Methods:

This is a retrospective cohort study of hospitalized patients at RUMC who received one of six variations of TOAT regimens. Adult patients admitted between October 2010 and October 2014 will be screened for inclusion. Patients will be included if they have a diagnosis of atrial fibrillation and were started on warfarin, rivaroxaban or apixaban for stroke or systemic embolism prevention, as well as, aspirin plus clopidogrel, ticagrelor or prasugrel for prevention of stent thrombosis. Patients who have completed a one, three and/or six month follow-up post-initiation of TOAT prior to December 2014 will be included. The follow-up must have been completed at a Rush affiliated clinic or hospital and will be used to assess for the incidence of adverse events.

Results/Conclusion:

Collection and analysis of the data is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify possible TOAT regimens for a patient with atrial fibrillation and coronary stents

Recognize the risk of bleeding associated with TOAT

Self Assessment Questions:

For a patient with AF and coronary stent, which antithrombotic therapy combination would be correct?

- A: aspirin, clopidogrel, apixaban
- B: clopidogrel, dabigatran, ticagrelor
- C: rivaroxaban, warfarin, aspirin
- D: aspirin, apixaban, rivaroxaban

What is the approximate reported incidence of bleeding events for patients on TOAT?

- A: 10%
- B: 20%
- C: 40%
- D: 60%

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-423-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CHEMOTHERAPY COUNSELING MATERIALS AT AN ACADEMIC MEDICAL CENTER

Emily Gray, PharmD*; Katherine Gwinn, PharmD, ; Sandeep Parsad, PharmD, BCOP; Chadi Nabhan, MD, FACP

University of Chicago Medical Center, 5841 S. Maryland Ave, MC 0010, TE026, Chicago, IL, 60637

emily.gray@uchospitals.edu

Currently, our institution requires off-protocol consent for chemotherapy and provides patients with chemotherapy education by either physicians or nurses in the form of a written hand-out and verbal education. The implementation of this practice stemmed from the set of 31 standards of safe chemotherapy administration created by the American Society of Clinical Oncology (ASCO) and Oncology Nursing Society (ONS) in September of 2009 as well as from updates from the same groups in both 2011 and 2013. Specifically, the set standards addressed 8 specific domains for inpatient, outpatient, and oral chemotherapy administration: staffing, chemotherapy planning, general chemotherapy practice, chemotherapy orders, drug preparation, patient consent and education, chemotherapy administration, and monitoring and assessment. In February and March of 2013 at our institution, a survey was generated and responses collected from 80 patients to examine the knowledge and patient satisfaction of the chemotherapy consent and education process in place at that time. In February 2014, required consent and distribution of non-standardized chemotherapy education materials prior to chemotherapy administration was implemented. The purpose of this project is to evaluate if patients have a better understanding and satisfaction with chemotherapy administration since the implementation of required consent and education prior to chemotherapy administration, and if there is need to further standardize the consent process, education materials, and educators for future chemotherapy recipients.

A post-survey was constructed to evaluate the difference in patient satisfaction and understanding in chemotherapy post-implementation of required consent and non-standardized chemotherapy handout prior to chemotherapy administration. Data from at least 100 patients over a two month period will be collected. Surveys will be included with chemotherapy to be distributed to adult patients undergoing the first or second cycle of chemotherapy. Results will be compared to the pre-implementation survey results. Final results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the domains addressed by American Society of Clinical Oncology (ASCO) and Oncology Nursing Society (ONS) for the standards of safe chemotherapy administration.

Describe the potential advantages to providing consent and chemotherapy education prior to chemotherapy administration.

Self Assessment Questions:

Which of the following is a domain addressed by ASCO and ONS for the standards of safe chemotherapy administration?

- A Evidence-based therapy recommendations
- B: Patient consent and education
- C: FDA approved indications for chemotherapy
- D: Economic impact of chemotherapy administration

Which of the following is considered an advantage to providing consent and chemotherapy education prior to chemotherapy administration?

- A Reduction in patient anxiety about chemotherapy
- B Augmentation of patient anxiety about chemotherapy
- C Reduced patient satisfaction scores
- D Decreased patient knowledge of side effect management

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-762-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

TRANSITIONING NEUTROPENIC FEVER (NF) MANAGEMENT TO THE OUTPATIENT SETTING AND STANDARDIZING THERAPY

Angela A Green* PharmD; Mary S Mably RPh, BCOP; Lucas T Schulz PharmD, BCPS-AQID

University of Wisconsin Hospital and Clinics, 600 Highland Avenue F6/133-1530, Madison, WI, 53792

agreen@uwhealth.org

Purpose: This project aims to standardize neutropenic fever (NF) treatment for adult and pediatric populations, optimize antibiotic selection, route, and duration, and reduce inappropriate admissions and length of stay.

Methods: A multidisciplinary workgroup of infectious disease and oncology physicians, nurses, and pharmacists was assembled to develop an institutional guideline and treatment algorithm to manage NF. The algorithm and guideline are based on recommendations from the American Society of Clinical Oncology (ASCO), the Infectious Diseases Society of America (IDSA), the National Comprehensive Cancer Network (NCCN), current literature, and expert opinion. Guideline recommendations will be operationalized through the development of electronic medical record decision support tools to assist with risk assessment and empiric therapy decisions for patients with NF. The guideline will be distributed electronically and presented at provider education sessions. A retrospective chart review will measure adherence to guideline recommendations, hospital admission rates, length of hospital stay, time to antibiotic initiation and de-escalation, antibiotics chosen, antibiotic route, treatment venue, MASCC scores, and 30-day mortality rates for each NF encounter.

Summary of Results: An interdisciplinary workgroup was successfully assembled for guideline development. Expected results include guideline approval through institutional committees, development of an electronic medical record risk scoring functionality and decision support tool, and improvement of clinical decisions and outcomes. Remaining study results will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe four characteristics that should exclude a patient with NF from outpatient management

Identify two sources of resistance to changing clinical practice

Self Assessment Questions:

Which of the following characteristics should exclude a patient with NF from management in the outpatient setting?

- A MASCC score ≥ 21 points
- B: Receiving oral antibiotics
- C: MASCC score ≤ 21 points
- D: Age < 60

When engaging in initiatives to change clinical practice and therapy management, which of the following can be a source of delay?

- A Approval through institutional subcommittees
- B Physician competence
- C Pharmacist competence
- D National guidelines

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-424-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DUAL ANTIPLATELET PRESCRIBING PRACTICES AND PATIENT OUTCOMES IN VETERANS WITH ACUTE CORONARY SYNDROME

Lindsey Greiner, PharmD*; Petra Flanagan, PharmD, Michael Brenner, PharmD, BCPS-AQ Cardiology

Veteran Affairs - Ann Arbor Healthcare System, 2215 Fuller Road (119), Ann Arbor, MI, 48105

lindsey.greiner@va.gov

Purpose: Acute coronary syndrome (ACS) is a leading cause of hospitalization and death in the United States. Dual antiplatelet therapy (DAPT) consisting of aspirin plus a P2Y12 inhibitor is utilized in the management of ACS. Current guidelines do not favor a specific P2Y12 inhibitor in the management of ACS. Based on available literature, the VA has established national criteria for use for each of the available P2Y12 inhibitors. The purpose of this study is to assess prescribing practices and patient outcomes with different DAPT regimens in veterans with ACS at the VA Ann Arbor Healthcare System (VAAHS). We aim to determine whether DAPT prescribing practices at the VAAHS coincide with national criteria for use, and compare the rates of GI bleeding, secondary cardiovascular events, and/or repeat revascularization procedures among the different DAPT regimens.

Methods: In this retrospective study, a chart review of medical records of veterans diagnosed with ACS and prescribed DAPT consisting of aspirin plus clopidogrel, aspirin plus prasugrel, or aspirin plus ticagrelor at the VAAHS between January 1, 2009 and October 31, 2013 will be reviewed until discontinuation of DAPT or for up to one year following DAPT initiation. Patient demographic information, indication for DAPT, expected and actual duration of DAPT, potential exclusions to DAPT based on VA national criteria for use, reason for discontinuation of DAPT, incidence of concurrent proton pump inhibitor use, incidence of GI bleeding, and incidence of secondary cardiovascular events and/or repeat revascularization will be documented.

Results: Pending data collection and analysis

Conclusion: Pending data collection and analysis

Learning Objectives:

Describe the use of dual antiplatelet therapy in the management of acute coronary syndrome according to current guidelines

Identify patient specific factors which may favor or exclude the use of a specific P2Y12 inhibitor in the management of acute coronary syndrome

Self Assessment Questions:

What is the recommended duration of aspirin in patients with acute coronary syndrome according to current guidelines?

- A 1 year
- B 6 months
- C Indefinite
- D 2 years

2. In which of the following patients would prasugrel be appropriate based on clinical trials and VA Criteria for Use?

- A A 79-year-old female undergoing PCI for NSTEMI
- B A 62-year-old male with history of DM and TIA undergoing PCI for
- C An 80-year-old male with stent thrombosis and unknown adherence
- D A 52-year-old female with an allergy to clopidogrel undergoing PCI

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-425-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF ELECTRONIC HEALTH RECORD ACCESS ON THE ACCEPTANCE OF PHARMACIST-INITIATED MEDICATION RECOMMENDATIONS MADE DURING MEDICATION THERAPY MANAGEMENT SERVICES

Megan J. Grelewicz, PharmD*; Angela K. Green, PharmD, BCPS; Molly B. Heger, PharmD; Angela R. Vander Wall, PharmD; Crystal M. Whelton, PharmD; Tara N. Zdybel, PharmD

Mercy Health Partners, 1500 E. Sherman Blvd, Muskegon, MI, 49444
grelewim@mercyhealth.com

Background: Medication therapy management (MTM) is a service most often facilitated by pharmacists with the purpose of optimizing therapeutic outcomes and reducing the risk of adverse effects. Clinical studies have shown MTM services not only improve adherence and outcomes, but also reduce costs associated with medication use and total health care expenditures. In addition, MTM services are associated with lower mortality, reduced hospitalization, and increased patient satisfaction. MTM services are provided at two community pharmacy locations. One site utilizes an MTM platform along with access to patient electronic health records (EHR), including primary care records and laboratory values, whereas the other site provides MTM services without access to EHR.

Purpose: Evaluate existing methodologies for the delivery of MTM services to determine the impact of EHR access on the acceptance of pharmacist-initiated medication recommendations during MTM services.

Methods: This is a retrospective review comparing the number and type of accepted medication therapy changes recommended by a pharmacist with access to EHR to those made without access to EHR. Patients were included if a medication therapy change was recommended to a physician by a pharmacist during MTM services. The primary objective is to identify the number of accepted medication therapy changes when initiated by pharmacists with and without access to EHR. Secondary outcomes to be measured include the number of Targeted Intervention Programs (TIPs) completed, number of Comprehensive Medication Reviews (CMRs) completed, reimbursement for services, estimated cost avoidance and patient satisfaction.

Results/Conclusion: Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the purpose of medication therapy management.

List benefits associated with medication therapy management services.

Self Assessment Questions:

Which of the following best describes the purpose of medication therapy management?

- A To optimize therapeutic outcomes
- B To reduce the risk of adverse effects
- C To optimize therapeutic outcomes and reduce the risk of adverse effects
- D To optimize therapeutic outcomes and reduce healthcare costs

Which of the following best describes the benefits associated with medication management services?

- A Reduction in costs associated with medication use and total healthcare costs
- B Reduction in costs associated with medication use and total healthcare costs
- C Reduction in costs associated with medication use and total healthcare costs
- D Reduction in total health care expenditures, reduced hospitalization

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-426-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF THE IMPACT AND SUSTAINABILITY OF RESIDENCY PROJECTS, PART I

Troy Gulden* PharmD; Yi Zhou PharmD, BCPS; Melanie Kuester, PharmD, BCPS; Christina White PharmD, BCPS, MBA; Deanna Kania, PharmD, BCPS, BCAP

Veteran Affairs - Indianapolis VA Medical Center, 1481 W 10th Street, Indianapolis, IN, 46202

troy.gulden2@va.gov

Purpose:

The purpose of this project is to propose a new process for selecting and completing resident research projects (RRPs) that have a greater likelihood of having an impact at the Indianapolis VA Medical Center (Indy VAMC).

Methods:

Objective points were established and previous RRP of the Indianapolis VA were analyzed to assess the type of research, originality of research ideas, number of outcomes, date range of data collection, number of residents and preceptors, sample size, limitations, and project "impact." Impact was defined as a project that resulted in a new policy, position, publication, or validated current clinical practices. Projects that did not have a completed manuscript were excluded. In addition, a survey is currently being conducted of previous Indianapolis VAMC graduates to assess the application of RRP on their careers, the aspects of the research process that went well, the aspects of the research process that were difficult, and mentorship during the process. The survey results will be analyzed for trends.

Results:

In phase one, it was found that projects with a narrower date range for data collection (<24 months), larger sample size (n>200), and at least 2.5 preceptors trended to having more "impact". It was also noted that quality improvement projects trended towards impact when compared to clinical research. Survey results are not currently available, but will be presented at the Great Lakes Conference.

Conclusion:

RRPs completed at the Indianapolis VAMC were more likely to have "impact" when they had a narrow date range, a larger sample size, >2 preceptors and focused on quality improvement processes. Using these results as a guideline, a second phase of this project will aim to change future RRP selection process. This project can serve as a proof-of-concept for a larger, multi-site study to find more significant, widely applicable data.

Learning Objectives:

Identify at least three objective characteristics that are more likely to result in an impactful residency research project.

Define a "quality improvement" resident research project.

Self Assessment Questions:

Which of the following demonstrate a trend to more impactful resident research projects?

- A At least 3 preceptors per project
- B Large number of subjects
- C Ample time to complete project
- D All of the above lead to more impactful resident research projects.

Which of the following define a "quality improvement" resident research project?

- A A project that requires an IRB approval, and focuses on clinical ba
- B A project that does not require an IRB approval, and focuses on in
- C A project that requires an IRB approval, and focuses on improving
- D A project that does not require an IRB approval, and focuses on cl

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-763-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

UTILIZATION OF PROCALCITONIN (PCT) GUIDED ANTIMICROBIAL THERAPY IN HOSPITALIZED VETERAN PATIENTS

Kasey L Gussert, PharmD, BCPS*, Jamie S Winner Baldus, PharmD, BCPS-AQID, Christopher M Gries, MBA, MLS (ASCP)CM, William J Blaser, PharmD

Veteran Affairs - Clement J. Zablocki Medical Center, 5000 West National Ave, Milwaukee, WI, 53295

Kasey.Gussert@va.gov

Purpose:

Approximately 30-50% of antimicrobials used within the inpatient setting are inappropriate. New techniques, including biomarkers, are used to assist providers in individualizing antimicrobial regimens based on response to treatment. Procalcitonin (PCT), a biomarker, is released in response to bacterial infections and is strongly associated with severity of disease. The primary objective of this study is to implement an evidence based protocol to assess utilization of PCT levels and the impact on antibiotic duration in patients with lower respiratory tract infections and/or sepsis. The secondary objectives include length of stay, readmission at 30 days, and economic analyses.

Methods:

This study is exempt from Institutional Review Board approval as it is considered a quality assurance analysis. The analysis began with the implementation of an evidence based PCT protocol into the established antimicrobial stewardship program. A retrospective chart review will be conducted on patients admitted with lower respiratory tract infections and/or sepsis during the time period of December 1st, 2013 to February 28th, 2014. This information will then be compared to a retrospective chart review of patients after PCT monitoring implementation during the time period of December 1st, 2014 to February 28th, 2015. Review of the patients medical record will involve documentation of diagnosis, empiric therapy, PCT levels, microbiological and laboratory results, duration of antimicrobial therapy, and co-morbidities.

Results/Conclusions:

Data collection and analysis are currently in progress. Results will be presented at the Great Lakes Pharmacy Residency Conference in April.

Learning Objectives:

Discuss the role of procalcitonin (PCT) monitoring and its impact on duration of antibiotic therapy

Recognize the conditions in which PCT monitoring would be useful and conditions in which it may not correlate with active infection

Self Assessment Questions:

Which of the following are considered biomarkers of infection?

- A Procalcitonin (PCT)
- B C-Reactive Protein (CRP)
- C White Blood Cell count (WBC)
- D All of the above

As outlined in the current literature, in what infections has PCT monitoring shown to be beneficial?

- A Sepsis
- B Acute bacterial skin and skin structure infections
- C Lower respiratory tract infections
- D A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-427-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

BASELINE CHARACTERISTICS AND INR ELEVATION IN PATIENTS RECEIVING ARGATROBAN AND WARFARIN COTHERAPY

Chelsea M. Gustafson, PharmD*; Rachael Y. Prusi, PharmD; Jessica M Cottreau, PharmD, BCPS
Northwestern Memorial Hospital, 251 E Huron Street, Suite LC-700, Chicago, IL, 60611
cgustafs@nm.org

Purpose: Argatroban is a direct thrombin inhibitor that is commonly used in the anticoagulation of patients. Treatment with argatroban is often overlapped and followed by treatment with warfarin, a vitamin K-antagonist. Prothrombin time (PT) is prolonged by direct thrombin inhibitors like argatroban, and because of this prolongation in PT, the International Normalized Ratio (INR) obtained during combined therapy with warfarin and argatroban does not reflect the true effect of warfarin. The elevation in INR caused by argatroban in concurrent therapy with warfarin is variable and can make determining when to discontinue concurrent therapy difficult. The purpose of this study is to identify risk factors associated with INR elevation in patients receiving argatroban infusions and concurrent warfarin.

Methods: This will be a retrospective cohort study of patients who received infusions of argatroban with concurrent warfarin therapy at Northwestern Memorial Hospital. Patients 18 years of age and older who received argatroban for at least 48 hours and received warfarin concurrently will be included. Patients will be excluded from the study if they have an argatroban infusion that was initiated prior to admission at Northwestern Memorial Hospital or do not have a measured INR value prior to the initiation of argatroban or within 12 hours after discontinuation of argatroban. Only the first recorded instance of argatroban infusion with concurrent warfarin therapy for any patient will be included in the study; any subsequent argatroban use will not be included. Multiple patient characteristics will be collected including but not limited to hepatic and renal function, platelet count, indication for anticoagulation, argatroban dose at discontinuation, and concomitant antiplatelet agent use.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the mechanism of action and suggested dosing of argatroban.
Describe the transition from argatroban to oral anticoagulant therapy.

Self Assessment Questions:

Argatroban inhibits the activation of which of the following?

- A Factor X
- B: Protein C and S
- C: Factor V, VIII, and XIII
- D: B and C

Per the package insert, when transitioning anticoagulant therapy from argatroban and warfarin to warfarin alone, argatroban doses up to _____ can be discontinued when the INR is _____.

- A 4 mcg/kg/min; >3
- B 2 mcg/kg/min; >4
- C 4 mcg/kg/min; >4
- D 2 mcg/kg/min; >3

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-428-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A GUIDELINE FOR THE MANAGEMENT OF HIGH-RISK ANTIMICROBIAL/WARFARIN INTERACTIONS ACROSS TRANSITIONS OF CARE

Nghi Ha, PharmD, MPH*; Sarah Hanigan, PharmD, BCPS; Brian Kurtz, PharmD, BCACP; Jerod Nagel, PharmD, BCPS (AQID)
University of Michigan Health System, 1111 E. Catherine St., Room 315, Ann Arbor, MI, 48109
nghih@med.umich.edu

Introduction:

Management of warfarin therapy is challenging, especially when it is co-administered with antimicrobial agents with high drug-drug interaction (DDI) potential. Current, published literature regarding management of warfarin DDIs is limited to the outpatient setting. Thus, a guideline and workflow process was created to optimize the management of warfarin-antimicrobial DDIs identified in the inpatient setting by facilitating timely notification of DDIs, ensuring appropriate dosing modifications, and improving follow-up and communication of DDI to the outpatient setting.

Purpose:

The goal of this study is to assess the effectiveness of the guideline using laboratory and clinical outcomes.

Methods:

A retrospective chart review of all patients on warfarin therapy with concomitant use of anti-microbial agents with high DDI potential during the periods of 3 months prior to the implementation of the guideline and 3 months post implementation of the guideline after a 1-month phase-in period. The guideline included recommendations for empiric warfarin dose adjustment given DDI, documentation of DDI(s) in medical charts, providing discharge counseling, and facilitating transition of care to outpatient anticoagulation providers regarding DDI and expected duration of DDI. Warfarin-antimicrobial DDIs will be identified by MiCharts (EMR System) DDI trigger system. Inclusion criteria include all patients with age ≥18 years, who are on warfarin therapy with a new prescription for antimicrobial(s). Exclusion criteria include patients started on antibiotic with duration of therapy <3 days, patient being bridged for procedure, patients on argatroban, and patients who are started on medication(s), other than antimicrobials, with severe DDI potential ≤5 days prior to antimicrobial DDI initiation and/or during time of interaction. The primary outcome is the prevalence of suboptimal INR control before vs. after guideline implementation. Secondary outcomes are prevalence of major bleeding and thrombosis during the DDI period and within the 30 days post DDI discontinuation.

Learning Objectives:

Identify different mechanisms of interactions between antimicrobials and warfarin.

Identify antimicrobials that require empiric dose modification.

Self Assessment Questions:

Which of the following is a mechanism of drug-drug interaction between warfarin and antimicrobial(s)?

- A Inhibition of CYP 2C9 enzyme
- B: Induction of CYP 1A2 enzyme
- C: Disruption of patients' intestinal flora
- D: All of the above

Empiric warfarin dose reduction is recommended for which of the following antimicrobial per UMHS guideline?

- A Vancomycin
- B Metronidazole
- C Azithromycin
- D Rifampin

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-429-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A COMPARATIVE EVALUATION OF ADVERSE DRUG EVENTS AND INCIDENCE OF STROKE AMONGST THE TARGET-SPECIFIC ORAL ANTICOAGULANTS

Genevieve Hale, PharmD, BCPS*; Sarah Ebaugh, PharmD, BCPS;
Michael Brenner, PharmD, BCPS-AQ Cardiology
Veteran Affairs - Ann Arbor Healthcare System, 2215 Fuller Road, Ann Arbor, MI, 48105
genevieve.hale@va.gov

Objectives: The primary objective of this study is to examine the incidences of bleeding and stroke associated with the use of target specific oral anticoagulants (TSOACs), dabigatran and rivaroxaban, at the VA Ann Arbor Healthcare System (VAAHS). The secondary objectives of this study are to identify non-bleeding adverse drug reactions (ADR), drug-drug interactions, all cause hospitalizations, time to occurrence of bleeding or non-bleeding ADR, time to occurrence of stroke.

Methods: A retrospective chart review will be conducted reviewing data from January 2011 until January 2014. Inclusion criteria includes patients from the VA Ann Arbor Healthcare System (VAAHS) who are newly started on a TSOAC for prevention of stroke in the setting of atrial fibrillation/flutter, enrolled in VAAHS Anticoagulation Clinic, age greater than 18 years, and history of adherence with medication (based on refill records). Exclusion criteria includes prior use of TSOAC, CrCl < 30 mL/min, significant liver disease, concomitant therapy with combined P-glycoprotein and strong CYP 3A4 inhibitors or inducers, active endocarditis, hypersensitivity to dabigatran or rivaroxaban, indwelling epidural/spinal anesthesia, pregnancy, history of non-adherence with medications, receiving care for anticoagulation outside of the VAAHS. Non-adherence will be defined as greater than 45 days between any fill of medication occurring more frequently than once. Descriptive statistics will be used for demographic/baseline information. The Mann Whitney-U test will be used to compare baseline characteristics between the dabigatran and rivaroxaban groups. Chi-square and Fisher's exact tests will be used to compare, as appropriate, the number of bleeds, strokes, non-bleeding ADRs, drug-drug interactions, and hospitalizations between dabigatran and rivaroxaban groups. Student t-tests will be used to analyze time to occurrence of bleeding or non-bleeding ADR and time to stroke for patients that received dabigatran and rivaroxaban. A p-value of <0.05 will denote statistical significance.

Results: Pending data collection

Conclusion: Pending data collection

Learning Objectives:

Explain the incidence and severity of bleeding and stroke associated with dabigatran and rivaroxaban use
Select an appropriate target-specific oral anticoagulant agent for stroke prevention based on the risks and benefits associated with these agents

Self Assessment Questions:

Which of the following describes pharmacological differences between dabigatran and rivaroxaban?

- A Dabigatran is a direct thrombin inhibitor, is less protein bound, and
- B Rivaroxaban is a selective factor Xa inhibitor, is highly protein bound
- C Rivaroxaban is a direct thrombin inhibitor, is highly protein bound,
- D Dabigatran is a selective factor Xa inhibitor, is less protein bound,

Which of the following were found in the RE-LY and ROCKET-AF clinical trials?

- A Dabigatran and rivaroxaban had higher incidences of gastrointestinal
- B Dabigatran and rivaroxaban had higher incidences of strokes compared
- C Dabigatran had a lower rate of dyspepsia compared to warfarin
- D Rivaroxaban had a higher rate of dyspepsia compared to warfarin

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-430-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST BASED OUTPATIENT DIABETES INTERVENTIONS UTILIZING CONTINUOUS GLUCOSE MONITORING

Jeremy M Hall, PharmD*; Joshua J Unsworth, PharmD, BCPS
Southwest General Health Center, 18697 Bagley Road, Middleburg Heights, OH, 44133
jhall@swgeneral.com

Purpose: Diabetes mellitus (DM) continues to be one of the leading diagnosed health issues within the United States, with approximately 21 million Americans diagnosed and an estimated 8.1 million with undiagnosed and unmanaged diabetes. The management of diabetes contributes to approximately \$1 out of every \$5 spent within healthcare on direct costs alone. Pharmacist involvement within a number of practice settings have been shown to decrease healthcare expenses, improve outcomes, prevent admissions, and improve medication adherence. Continuous glucose monitoring (CGM) has shown to be beneficial in the management of uncontrolled diabetes in patients utilizing insulin therapy, patients with newly diagnosed type 1 diabetes, and patients with nocturnal hypoglycemia. The use of CGM has yet to be utilized in the setting of a pharmacist based service. The purpose of this study is to assess the impact of pharmacist interventions based on the results of outpatient CGM.

Methods: Patients identified for eligibility will be assessed prior to discharge. If eligible, the CGM sensor will be placed and calibrated upon discharge by a qualified health care professional. The sensor is worn for 72 hours and then removed and collected by a health care professional. The glucose monitoring data will be uploaded and interpreted by a pharmacist, in comparison with the patients daily point of care testing results, current insulin therapy, diet information, concomitant medications, medication adherence, and pertinent medical history. Insulin regimen and medication adjustment recommendations from the pharmacist will be provided to the patients physician. Initial follow-up with the pharmacist will provide education about medication changes, counseling, and answer any remaining questions. Additional follow up will be obtained to assess the safety and efficacy of the medication changes. This study is awaiting IRB approval.
Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Recognize the impact of uncontrolled diabetes mellitus within the United States healthcare system
Identify the pharmacist's role in using CGM to intervene on suboptimal insulin regimens in patients with diabetes mellitus

Self Assessment Questions:

2010 data from the CDC places diabetes and diabetes related complications as the ____ leading cause of death within the United States?

- A 3rd
- B 5th
- C 7th
- D 9th

Adjusting a diabetes medication regimen based on CGM results will help in correcting which of the following situations:

- A Insulin regimen non-adherence
- B Nocturnal hypoglycemic unawareness
- C Adjustment of oral antidiabetic regimen
- D Treatment of patients in hyperglycemic crises

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-431-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL IMPLICATION OF URINE SCREENING IN VETERANS ON CHRONIC OPIOID THERAPY FOR NONCANCER PAIN

Courtney Hamilton, PharmD *; Erica Lin, PharmD, BCACP; Milica Jovic, PharmD, BCACP; James Kotek, PharmD, BCPS; Claudia Rakhman, PharmD, BCACP

Veteran Affairs - Jesse Brown Medical Center, 820 South Damen Ave, Chicago, IL, 60612

courtney.hamilton2@va.gov

Purpose: Chronic pain is an important issue in the care of the veteran population. In the Department of Veterans Affairs (VA) health system, more than half of patients seen by primary care providers report chronic pain, leading to a high prevalence of chronic opioid therapy. Concurrent with an increase in opioid therapy within the VA and nationwide, there has been a rise in opioid use disorders. Unfortunately, there is a lack of evidence-based guidance to help practitioners definitively predict which patients will develop an opioid use disorder. Instead, universal precautions are recommended for all patients on chronic opioid therapy, which includes reviewing and obtaining pain management agreements and random urine drug screens (UDS). At the Jesse Brown VA Medical Center (JBVAMC), patients on chronic opioid therapy must agree to random blood and/or UDS by signing a Pain Management Agreement. There is evidence that screening patients at baseline and periodically during therapy may improve medication adherence, decrease potential opioid use disorders, and ultimately enhance patient safety. The purpose of this study is to determine how random UDS are being utilized for veterans who have signed a Pain Management Agreement. The focus will be on how often UDS are being conducted and how results are affecting chronic opioid therapy for noncancer pain management.

Methods: This is a retrospective electronic chart review conducted at JBVAMC of patients on chronic opioid therapy for noncancer pain with a Pain Management Agreement obtained from October 6, 2012 through September 30, 2013. The primary endpoints are the percent of patients with baseline UDS conducted when the Pain Management Agreement was obtained and the percent of patients with annual UDS evaluated by a provider.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference taking place April 29 to May 1, 2015.

Learning Objectives:

Discuss the clinical benefit of pain management agreements and urine drug screens

Review potential urine drug screen outcomes and discuss how results may affect opioid therapy management

Self Assessment Questions:

Which of the following may be a benefit of random urine drug screens?

- A: Verify opioid therapy adherence
- B: Identify possible drug diversion
- C: Detect illicit drug use
- D: All of the above

Which of the following would be considered a consistent urine drug screen result for a patient prescribed morphine for pain?

- A: Positive for amphetamines
- B: Positive for marijuana
- C: Positive for opiates
- D: Positive for cocaine

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-764-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPACT OF AN EDUCATIONAL INTERVENTION ON ANTIBIOTIC PRESCRIBING FOR COMMUNITY-ACQUIRED (CAP) AND HEALTHCARE-ASSOCIATED PNEUMONIA (HCAP)

Jennifer M. Hanify Pharm.D.*, Lindsay K. Benedik Pharm.D., BCPS, CGP, David R. Kurtzman Pharm.D., BCPS, Marcie A. Malone Pharm.D., Erica L. Mazzaferri Pharm.D., Alan G. Smulian MD, Kayla P. Swearingen Pharm.D., Suzanne L. Van Fleet Pharm.D

UC Health - West Chester Hospital, 7700 University Dr., West Chester, OH, 45069

Jennifer.Hanify2@uchealth.com

Purpose: While administration of appropriate antibiotics significantly reduces mortality from bacterial infections, up to 50% of antibiotic use has been shown to be inappropriate. This contributes to the development of multi-drug resistant organisms and can lead to serious complications such as Clostridium difficile infection (CDI). One way to address this problem is through promotion of antimicrobial stewardship, which has been shown to decrease the use of inappropriate antibiotics and improve patient outcomes. Providing education that focuses on improving the knowledge and prescribing behavior of healthcare providers is one way to promote antimicrobial stewardship. The purpose of this study is to determine if an educational intervention will decrease the use of broad-spectrum antibiotics for the treatment of both community-acquired (CAP) and healthcare-associated (HCAP) pneumonia. **Methods:** This prospective, single-center, interventional study will examine whether an educational intervention directed at emergency department and hospitalist prescribers will affect antibiotic utilization for the treatment of CAP and HCAP. Patients with an admission diagnosis of CAP or HCAP during a 3 month pre- and post-intervention period will be included. The educational intervention, which will be performed by a pharmacist and an infectious disease physician, will focus on proper diagnosis of CAP and HCAP, empiric antibiotic selection, and de-escalation of therapy. The primary objective is to compare pre- and post-intervention rates of appropriate antibiotic utilization for CAP and HCAP, defined according to national and institutional guidelines. Secondary objectives include comparison of pre- and post-intervention rates of appropriate diagnosis, appropriate antibiotic de-escalation, and CDI. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the complications of antibiotic misuse.

Describe the potential roles of a pharmacist in antimicrobial stewardship

Self Assessment Questions:

Which of the following statements is true?

- A: Antibiotic use in the United States declined between 2000 and 201
- B: The use of fluoroquinolones is associated with a low risk of clostric
- C: Broad spectrum beta lactams such as 4th generation cephalospor
- D: None of the above

Which of the following is an antimicrobial stewardship strategy that can be used to target the point of antibiotic prescribing:

- A: Order form(s)
- B: Education
- C: Prospective review and feedback
- D: A and B

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-432-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A HOSPITALIST-MANAGED POST GRADUATE YEAR ONE (PGY1) PHARMACY RESIDENT LEARNING EXPERIENCE AND ITS EFFECT ON HOSPITALIST-PHARMACIST RELATIONSHIPS

Emily A Hansen, Timothy P Nikstad

Aspirus Wausau Hospital, 333 Pine Ridge Blvd, Wausau, WI, 54401

Emily.Hansen@aspirus.org

Purpose: Pharmacists have proven to be an integral part of the healthcare team in the hospital setting. The objective of this pilot is to implement a hospitalist-managed pharmacy practice rotation to improve patient care, further integrate pharmacy services with hospitalists, and improve the quality of pharmacist-physician relationships.

Methods: This study was submitted to the Institutional Review Board for approval and recognized as quality improvement. Each of the pharmacy practice residents will participate in a five week long hospitalist-managed pharmacy learning experience. Resident's will be assigned a pharmacy preceptor to act as a resource during the learning experience. Resident responsibilities will include patient care during the rotation, medication reconciliation, pharmacokinetic monitoring, glycemia management, antimicrobial stewardship, discharge counseling, and discharge reconciliation. Residents will also attend rounds with the hospitalist, participate in patient discussions, and recommend medication therapy changes when appropriate. Patient care responsibilities and recommendations will be tracked through the EPIC Ivent system. Results reported will be resident time spent, percentage of recommendations accepted, and corrections made by residents in medication reconciliation. Evaluation of inter-professional relationship growth will be measured by specific surveys distributed to hospitalists before and after implementation of the learning experience. The residents will also complete an assessment of the hospitalist as a preceptor, and assess how the rotation matched with specified RLS goals. Secondly measured will be the readmission rate and length of hospitalist patients before and after implementation of the pharmacy resident learning experience.

Results/Conclusion:

Research is ongoing and preliminary results will be presented at the 2015 Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify opportunities to build inter-professional relationships

Reproduce documentation needed to justify new pharmacy services

Self Assessment Questions:

What is the best way to initiate an already identified opportunity for inter-professional relationship growth?

- A: Defer to the opportunity's identifier for further instruction
- B: Devise a step-wise approach to assess the needs and wants of the
- C: Use a standardized approach when presenting the opportunity to the
- D: Focus on details of the opportunities before the whole the picture

Which of the following is most important when implementing a new service?

- A: Set fixed dates for implementation of the service
- B: Construct strict guidelines of included and excluded services
- C: Give a lot of time for the service to get started before reassessment
- D: Thorough documentation of clinical impact of the service

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-433-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

MEDICATION HISTORY AND CONCOMITANT MEDICATION REVIEW IN EARLY-PHASE INVESTIGATIONAL ORAL ANTICANCER CLINICAL TRIALS: PHARMACIST CONSULT SERVICE PILOT

Allison S. Hanson, PharmD*; Angela M. Urmanski, PharmD, BCOP; Emily F. Hoefling, PharmD, BCPS; Kristin H. Busse, PharmD, BCPS; Kate A. Lewis, PharmD; Katrina B. Schroeder, RN, BSN, OCN
Froedtert Hospital, 626 E. Kilbourn, Apt. 308, Milwaukee, WI, 53202

Allison.Hanson@froedtert.com

Purpose: The Hematology/Oncology Pharmacists Association (HOPA) has identified Best Practice Standards for Investigational Drug Services (IDS) including medication histories. HOPA recommends pharmacists review concomitant medications for patients enrolled in clinical trials in an effort to prevent protocol deviations or delays in care due to drug-drug interactions, metabolism interactions or prohibited medications while on study. IDS pharmacists have collaborated with investigational providers and coordinators to initiate an IDS pharmacist consult service. The purpose of this project is to assess the impact of an IDS pharmacist pilot for medication histories and concomitant medication reviews during clinical trial screening.

Methods: Patients were enrolled between October 1, 2014 and January 31, 2015. Eligibility criteria included age greater than or equal to 18, not pregnant, and providing consent to a Phase I, II or III oral, investigational, anticancer clinical trial. Patients who provided consent to a Phase III trial or intravenous medication trial were excluded. The primary objective of this study was to determine the number of medications updated in the prior to administration medication list and to quantify the number of medication recommendations regarding drug-drug interactions. The secondary objective was to determine the percentage of patients on a prohibited medication during screening and to evaluate the number of patients who require a washout period. Descriptive statistics for the type of study, number of medications reviewed, the number of medications updated, added, or removed, the number of prohibited medications, the number of moderate or discouraged medications, the number of drug-drug interactions, the number of drug recommendations provided by the pharmacist and the impact on enrollment will be performed.

Results/Conclusion: The results and conclusions of this project will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the role of the pharmacist in medication histories and concomitant medication reviews for patients enrolled in early-phase clinical trials.

Explain the implications of drug-drug interactions, metabolism interactions and prohibited medications within investigational oral anticancer clinical trials.

Self Assessment Questions:

Which interactions affect the efficacy and safety of oral clinical trial medication?

- A: Metabolism of the clinical trial medication
- B: Metabolism of the concomitant medication(s)
- C: Transporters of medications
- D: Metabolism and transporters of all medications

Which of the following are drug-drug interactions?

- A: Brca1
- B: Cyp450
- C: Her2
- D: Hla-b*5701

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-912-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A PHARMACIST-LED MEDICATION DISCONTINUATION SERVICE BASED ON THE ANTICHOLINERGIC RISK SCALE

Rebecca J. Hanus, PharmD*, Kristina S. Lisowe, PharmD, Jens C. Eickhoff, PhD, Jamie L. Statz-Paynter, RPh, Joseph A. Zorek, PharmD
UW-Madison School of Pharmacy Community Pharmacy Residency Program, 1821 S Stoughton Road, Madison, WI, 53716
Rebecca.Hanus@deancare.com

Objectives:

The primary aim of this study is to determine the physician acceptance rates of medication discontinuation recommendations for elderly patients experiencing polypharmacy based on anticholinergic burden. Secondary aims include comparing acceptance rates based on patient and physician characteristics, and identifying variables associated with recommendation acceptance.

Methods:

Patients ≥ 60 years old who (1) have a primary care physician (PCP) visit in the following two-week window, (2) have had ≥ 3 inpatient hospitalizations or emergency room visits in the past year, and (3) have ≥ 10 active medications on their medication list will be enrolled in this prospective cohort study. Anticholinergic burden for each patient is calculated using the Anticholinergic Risk Scale (ARS). Patients with an ARS score ≥ 3 prompt one or more medication discontinuation recommendations from the pharmacist to the PCP via a shared electronic medical record system. Recommendation acceptance rates will be determined two weeks after the patients PCP visit. Descriptive statistics will be used to characterize patients and physicians. Independent samples t-tests and chi-squared tests will be used to compare patient and physician characteristics and recommendation acceptance rates. Multi-level regression analysis will be performed to identify variables associated with recommendation acceptance.

Results:

To be determined.

Potential Implication:

There is currently no systematic process within this integrated healthcare system to identify and reduce anticholinergic burden in high risk elderly patients experiencing polypharmacy. This study may guide the creation of a targeted medication discontinuation intervention capable of increasing patient safety via technology-leveraged interprofessional collaboration.

Learning Objectives:

Discuss the relationship between adverse drug effects, anticholinergic medications, and the geriatric population

Describe the Anticholinergic Risk Scale

Self Assessment Questions:

Which of the following statements is correct?

- A Geriatric patients do not have any unique characteristics that place
- B: Geriatric patients may be at higher risk of experiencing adverse dr
- C: Anticholinergic medications are completely safe in the geriatric po
- D: There are currently no tools created to help identify potentially har

Which of the following statements most accurately describes the Anticholinergic Risk Scale?

- A The tool introduces some ambiguity as medications can be assign
- B The lower a patient's score, the higher the risk of experiencing ant
- C It is a tool developed to categorize a person's risk for experiencing
- D A person's ARS score is that of the highest risk medication identi

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-913-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

A RETROSPECTIVE CHART REVIEW OF VETERAN PATIENTS CONVERTED FROM BUMETANIDE TO FUROSEMIDE FOR THE TREATMENT OF HEART FAILURE

Denise Harano, PharmD*; Erica Richey, PharmD; Claresta Bergman, PharmD, BCPS; John LaForte, PharmD; Katherine Steel, PharmD; Marco Zambrano, PharmD, BCPS
Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Ave, M/C 119 (Pharmacy), Chicago, IL, 60612
Denise.Harano@va.gov

Purpose: Heart failure (HF) is a serious condition affecting more than five million people in the United States, and it is the leading cause of hospitalizations among patients 65 years and older. Diuretics play a fundamental role in the management of heart failure and loop diuretics remain the cornerstone of treatment for symptoms of systemic and pulmonary congestion. In February 2014, bumetanide experienced a nationwide drug shortage, which necessitated conversion of patients from bumetanide to furosemide at JBVAMC. The purpose of this study is to evaluate the clinical effects of changing drug therapy from oral bumetanide to oral furosemide in veterans with HF at JBVAMC during the bumetanide shortage. **Methods:** This study is a retrospective, cross-over chart review of HF patients at JBVAMC who were converted from oral bumetanide to oral furosemide during the shortage. Patients who meet the following criteria will be excluded from the study: not switched to furosemide during the shortage, on bumetanide for an indication other than HF, did not receive care at JBVAMC during the three month post conversion study period, and had a bumetanide prescription refilled at a non-VA pharmacy during the study period. The primary outcome is the difference in the number of HF decompensations in patients before and after the conversion from bumetanide to furosemide. HF decompensations were defined as: an admission for a HF exacerbation, an emergency room (ER) visit or urgent care visit for worsening of HF symptoms, or a clinic visit with documented worsening of HF symptoms which required one of the following interventions: an increase in the diuretic dose, conversion to a different loop diuretic, or addition of a thiazide diuretic. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role of loop diuretics in heart failure therapy

Identify the pharmacokinetic and pharmacodynamic differences between bumetanide and furosemide

Self Assessment Questions:

Which of the following is true regarding loop diuretics in heart failure therapy?

- A Improves symptoms of congestion
- B: Decreases heart failure progression
- C: Increases survival
- D: Decreases quality of life

Which of the following is a pharmacokinetic feature of oral furosemide that can result in a diminished clinical effect?

- A Hepatic metabolism
- B Protein binding
- C Erratic absorption
- D Fecal excretion

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-434-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLARIFICATION OF DRUG ALLERGY INFORMATION USING A STANDARDIZED PATIENT INTERVIEW

Amy E. Harig*, PharmD; Amy M. Rybarczyk, PharmD, BCPS; Amanda M. Benedetti, PharmD; Jacob P. Zimmerman, PharmD
Akron General Medical Center, 1 Akron General Avenue, Akron, OH, 4431
amy.harig@akrongeneral.org

Purpose: Vague, incomplete or inaccurate allergy histories can be detrimental to patient safety and affect patient care. There is an increased chance of medication error if details of a drug allergy are not documented. Incomplete or inaccurate allergy histories may also result in increased time spent by healthcare providers to clarify an order in question. Previous literature is greater than ten years old, but found that drug allergies are often not completely or accurately documented. These studies showed a pharmacist-conducted interview increased the likelihood of obtaining accurate allergy information, this led to the removal of approximately one-third of labeled allergies. Finally, beta-lactam antibiotics and opioids were the two most common drug classes that patients had reported allergies.

Methods: A prospective quality improvement project of patients admitted to a general medical/surgical floor with at least one documented drug allergy. Patients with the following will be excluded: decline participation not in the room for interview, not A&Ox3, insufficient mental alertness/cognition or patients previously interviewed during the study period. A daily patient list will be generated by Senti7 and a random number generator will be used for patient selection. The team leader will conduct a standardized drug allergy assessment via patient interview. Data collected includes drug, route, reaction, treatment and time since reaction. The primary outcome is the proportion of patients with a clinically relevant change in allergy history after an interview compared to prior documentation. Clinically relevant change is defined as clarification of drug/class, allergy added/removed or reaction added/clarified. Secondary outcomes include number of drug allergies per predefined category before and after patient interview, the association of patient characteristics with the need for a clinically relevant change in allergy history, and the percentage of patients with documented allergies that are discrepant between documentation sources.

Results: To be presented

Conclusions: To be presented

Learning Objectives:

Identify medications that are commonly reported as a cause of a drug allergy.

Describe reasons why correct drug allergy information is paramount.

Self Assessment Questions:

According to previous trials, which drug class accounts for the most drug allergies?

- A Benzodiazepines
- B: Anti-psychotics
- C: Opioids
- D: Fluoroquinolones

What is/are the benefit(s) of having complete drug allergy information?

- A Patient safety
- B Cost saving
- C Efficient use of time
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-914-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF HEMOGLOBIN A1C BEFORE AND AFTER POPULATION MANAGEMENT WITH AN INTERDISCIPLINARY TEAM

Chelsea M Harrison, PharmD*; Susan Cotey, RN, CDE; Cari Cristiani, PharmD, BCPS; Andrea Harris, RN, CDE; Megan A Valente, PharmD; Nana Kobaiyanova, MD; Jennifer Luxenburg, PharmD, BCACP
Cleveland Clinic, 2201 Acacia Park Dr. Apt. 601, Lyndhurst, OH, 44124
harrisonc24@gmail.com

Purpose: The American Diabetes Association (ADA) recommends a hemoglobin (Hgb) A1c <7%, or <8% in select patients. The Centers for Medicare and Medicaid outlined similar recommendations for Accountable Care Organizations (ACO) in 2014, with a goal Hgb A1c <8%. The Cleveland Clinic Medicine Institute target for 2014 was 80% of patients with diabetes to achieve a Hgb A1c <8%. At the Cleveland Clinic Stephanie Tubbs Jones (STJ) Family Health Center, this benchmark was not being met. The interdisciplinary team of physicians, pharmacists, certified diabetes educators, and other healthcare providers initiated a new population management service to identify patients that were not meeting goals of care. The purpose of this project was to evaluate the population management service at STJ Family Health Center.

Methods: The primary objective of the study was to evaluate the change in Hgb A1c in patients with diabetes that had at least two clinical interactions by a member of the interdisciplinary team at STJ. Secondary endpoints included evaluation of the change in Hgb A1c in patients who had clinical interactions by both pharmacist and diabetes educator vs. only one party; and comparison of the percentage of patients with Hgb A1c of <7%, <8%, and <9% before and after interaction with interdisciplinary team. The study is a retrospective chart review with pre-post design in which both the primary and secondary endpoint data will be retrieved through review of study subjects charts within the EPIC database. Patients were identified from a list of patients that underwent population management by the clinical team at STJ. The list identified patients with either a Hgb A1c >8% or those without a Hgb A1c measured within the last year. Patients Hgb A1c were compared before and after clinical interaction with the interdisciplinary team.

Results: To be determined.

Conclusions: To be determined.

Learning Objectives:

Define the 2014 and 2015 goals for patients with diabetes for Accountable Care Organizations (ACO)

Discuss the concept of population management as it pertains to improving patient outcomes

Self Assessment Questions:

Select the correct statement regarding Accountable Care Organization (ACO) goals:

- A In 2014, ACOs had a composite target that included hgb A1c <8%
- B: In 2015, ACOs had a target hgb A1c <7% for patients with diabetes
- C: In 2014, ACOs had a target hgb A1c <9% for patients with diabetes
- D: In 2015, ACOs had a target that included hgb A1c <9% for patient

What is wrong with the following statement: population management is a systematic, reactive method of identifying outlier patients.

- A Population management is not systematic
- B Population management is not reactive
- C Population management is not used to identify outlier patients
- D None, the statement is correct as written.

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-435-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECTIVENESS AND SAFETY OF HYALURONIC ACID INJECTIONS FOR OSTEOARTHRITIS OF THE KNEE IN A VETERAN POPULATION

Patricia Hartke, Pharm.D.*, Brett Geiger, Pharm.D., Lee Ann Carsello, Pharm.D., BCPS, James Kotek, Pharm.D. BCPS, Erica Lin, Pharm.D., BCACP, Nisha Mehta, Pharm.D., Mansi Patel, Pharm.D., BCPS

Veteran Affairs - Jesse Brown Medical Center, 820 S Damen Ave, Chicago, IL, 60612

patricia.hartke@va.gov

Purpose: Osteoarthritis (OA) is characterized by the breakdown of cartilage in joints, leading to bone remodeling, inflammation, and ultimately chronic pain. The knee is the joint most commonly affected by OA. Intraarticular hyaluronic acid injections are hypothesized to provide symptomatic relief of OA by supplementing the naturally occurring hyaluronic acid in joints. Hyaluronic acid injections are currently approved by the Food and Drug Administration (FDA) for use in patients with knee OA who have failed non-pharmacologic treatment and other analgesics. The American College of Rheumatology provided no recommendation regarding the use of hyaluronic acid injections in its guidelines for treatment of knee OA in 2012. In the most recent guidelines published in 2013, the American Academy of Orthopaedic Surgeons did not recommend the use of hyaluronic acid injections in patients with symptomatic knee OA. Hyaluronic acid intraarticular injections remain a non-formulary option for veterans with OA at Jesse Brown VA Medical Center (JBVAMC) who have failed first-line analgesics, intraarticular corticosteroid injections, and various non-pharmacologic interventions. Due to the national guideline recommendations against its use and a recent meta-analysis that found the risks outweigh the benefits, it is important to evaluate the effectiveness and safety of hyaluronic acid injections in veterans at JBVAMC.

Methods: This is a retrospective, electronic chart review of veterans with a diagnosis of osteoarthritis of the knee, who received at least one hyaluronic acid injection in one or both knees at JBVAMC between March 1, 2012 to February 28, 2014. Patient records will be followed for a maximum of 6 months after approval of hyaluronic acid injections.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference taking place April 29 - May 1, 2015.

Learning Objectives:

Review the FDA-approved indication for hyaluronic acid injections.

Identify the available treatment options for osteoarthritis of the knee recommended by the American Academy of Orthopaedic Surgeons.

Self Assessment Questions:

Hyaluronic acid injections are FDA-approved for the treatment of osteoarthritis in which joint?

- A: Shoulder
- B: Knee
- C: Hip
- D: Ankle

According to the 2013 guidelines published by the American Academy of Orthopaedic Surgeons, which of the following is recommended for the treatment of knee OA?

- A: Hyaluronic Acid Injections
- B: Corticosteroid Injections
- C: Systemic nonsteroidal anti-inflammatory drugs
- D: Glucosamine

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-436-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE IMPACT OF AN OBJECTIVE SCORING MODULE WITHIN AN ELECTRONIC MEDICAL RECORD ON TIME TO INTERVENTION FOR PHARMACOKINETICALLY MONITORED MEDICATIONS

Andre Harvin*, PharmD, Crystal Tubbs, PharmD, FASHP, John Mellett, PharmD, Trisha Jordan, PharmD, MS, Daren Knoell, PharmD, Jay Mirtallo, MS, RPh, BCNSP, FASHP, Nicole Brown, MS

The Ohio State University Wexner Medical Center, 410 W. 10th Ave, 396 Doan Hall, Columbus, OH, 432101234

andre.harvin@osumc.edu

Purpose:

Recommendations from the Pharmacy Practice Model Initiative Summit combined with the adoption of the Affordable Care Act of 2013, have tasked organizations with improving quality and outcomes, while maximizing resources and decreasing costs. As a result, pharmacists have the opportunity to expand their clinical roles that can make prioritization of patient care difficult. Evolution of the health care landscape necessitates integration of electronic means to quickly and consistently prioritize patients that require evaluation and/or intervention by pharmacists. A strategy to assist with patient prioritization is to design integrated tools based on core-clinical activities expected of pharmacists that utilize data available in the electronic medical record (EMR). The primary objective of this study is to evaluate the time differences to pharmacist evaluation of vancomycin trough levels pre- and post-implementation of a pharmacokinetic (PK) patient scoring module integrated into the EMR of a large academic medical center; vancomycin will be used as a surrogate for other PK monitored medications within the module. Additionally the study will evaluate if the time differences are dependent on clinical staffing model.

Methods:

A retrospective review was conducted of all patients who received at least three consecutive doses of intravenous vancomycin during a single course of therapy while admitted to one of the OSUWMC hospitals during the study period(s) of 10/1/2012 - 12/31/2012 and 10/1/2014 - 12/31/2014. Patients receiving less than three consecutive doses of vancomycin during a single course of therapy, prisoners, pregnant women, and patients < 18 years or > 89 years of age were excluded for the data analysis portion of this study. Patients were randomized and considered for inclusion in the data collection and analysis portion of the study if they met the above criteria.

Results:

Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference 2015.

Learning Objectives:

Review the pharmacists role for the monitoring of pharmacokinetically monitored medications

Discuss the use of a patient scoring module to prioritize core-clinical activities

Self Assessment Questions:

Which of the following statements is true regarding the use of a patient scoring system?

- A: Can reduce the number of clinical pharmacist FTE's
- B: Results in reduced the costs of drugs per patient day
- C: Can predict patient outcomes and medication-related events
- D: Helps prioritize patient care activities through the use of objective

Which of the following should be considered when designing a patient scoring system?

- A: Evidence-based medicine, scope of practice, and the budget
- B: Evidence-based medicine, practice model, and number of board c
- C: Evidence-based medicine, scope of practice, practice model, and
- D: Evidence-based medicine, administrative support, and scope of pr

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-765-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A GROUP EXERCISE PROGRAM IN A PHARMACIST-RUN DISEASE STATES MANAGEMENT CLINIC

Kathryn E. Hauenstein*, PharmD; Katharine D. Klyczek, PharmD, BCACP; Kathleen B. Haynes, PharmD, BCPS, CDE
Community Health Network- Wellspring Pharmacy, 8725 Algeciras Dr.
#1B, Indianapolis, IN, 46250
khauenstein@ecomunity.com

Purpose: The primary outcome of the study is to determine whether pharmacist counseling combined with a group exercise class increases weight loss in patients with diabetes and/or dyslipidemia. Secondary outcomes include determining whether group exercise classes improve patients hemoglobin A1c, low density lipoprotein (LDL) and high density lipoprotein (HDL) cholesterol, total cholesterol and triglycerides. Other secondary outcomes were to assess improvement in perceptions of gyms and likelihood of joining a gym.

Methods: Study participants attended 1 instructional class about exercise and 11 group exercise classes, focusing on conditioning, led by a certified fitness instructor. Fasting, point-of-care hemoglobin A1c and lipid panel (including triglycerides, HDL, LDL and total cholesterol) were taken at the beginning and end of the study. The participants were weighed each week at the fitness class; percentage of body weight was calculated by the number of pounds lost divided by body weight at the beginning of the study. Patients were asked to complete a pre-study and post-study survey at the final class to assess amount of weekly exercise, feelings toward fitness centers and likelihood of obtaining a gym membership; any change in perception will be noted and reported. Preliminary results: The exercise class has been completed and the post-class lab work was done in early January 2015. Seven of nine patient initially enrolled completed the study. The greatest percentage of body weight lost by one participant was 7.9%. Analysis is ongoing by the principle investigator.

Conclusions: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the prevalence of people that are overweight in the United States.

Discuss reasons that pharmacists are an ideal healthcare professional to aid in patient weight loss.

Self Assessment Questions:

In 2013, the Centers for Disease Control and Prevention reported what percentage of the population over the age of 20 was overweight?

- A 25.6%
- B: 31.4%
- C: 35.1%
- D: 69.0%

Which of the following are ways pharmacists can help patients lose weight?

- A Pharmacists are trained to provide lifestyle counseling
- B Pharmacists often work as part of a multidisciplinary team
- C Pharmacists are trained fitness leaders
- D A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-766-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

A HEALTH SYSTEM SPECIALTY PHARMACY'S IMPACT ON TIME TO TREATMENT AND PATIENT SATISFACTION FOR HEPATITIS C PATIENTS

Ryan Haumschild, PharmD, MBA; Julie Kennerly, PharmD, MS, BCPS, Niesha Griffith, MS, RPh, FASHP; Jennifer Rodis, PharmD, BCPS, FAPhA; Robert J. Weber, PharmD, MS, BCPS, FASHP; Alice Hinton, PhD; and A. James Hanje, MD

The Ohio State University Wexner Medical Center, 1276 North High Street Unit 403, Columbus, OH, 43201

Ryan.Haumschild@osumc.edu

Purpose: Health systems are sharpening their focus on the full continuum of patient care including establishment or expansion of outpatient pharmacy services that are inclusive specialty pharmacy services. Benefits of this model include improved communication between inpatient and outpatient care providers and access to information through the electronic medical record (EMR). One patient population that may greatly benefit from this model is Hepatitis C (HCV) patients, due to the challenges associated with access, cost and significant adherence monitoring requirements. Of particular concern is delays in initiation of HCV therapy when outside pharmacies are used. These delays lead to decreased motivation for treatment, transmission of HCV, progression of the disease, and amelioration of extrahepatic manifestation. By reducing time to treatment, a health system specialty pharmacy can improve patient outcomes and patient and provider satisfaction.

Methods: This is a single center, retrospective, observational, IRB approved study. The primary objective of this study is to measure the difference in time to therapy of a health system specialty pharmacy vs. an outside specialty pharmacy vendor and to analyze patient satisfaction with having a pharmacist in clinic. This will be estimated along with the associated 95% confidence interval for patient receiving their medication from each pharmacy type. A 2-sample t-test will be used to determine if there is a significant difference between mean times. Patient satisfaction will be measured using a validated survey with categorical data. A Chi square test will be used to detect statistical significance.

Preliminary Results: The results of this study are preliminary with 30% of data collected. Time to treatment ranged from 16-90 days with a median of 33 days. Patient satisfaction composite scores ranged from strongly disagree to strongly agree with a median of agree.

Conclusion: Final conclusions are pending and will be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify the current treatment options for hepatitis c patients

Recognize the differences between a health system specialty pharmacy service compared to outside specialty pharmacy services on time to treatment.

Self Assessment Questions:

Which of the following medications is recommended as monotherapy to treat Hepatitis C in genotype 1 patients?

- A Ribivirin
- B: Ledipasvir-Sofosbuvir
- C: Telaprevir
- D: Interferon-alfa

What tool can be leveraged to expedite the prior authorization process?

- A Electronic medical record
- B Fax machine
- C Email
- D Integrated phone system

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-437-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZING CLINICAL DECISION SUPPORT ALERTS WITHIN AN ELECTRONIC HEALTH RECORD AT A LARGE, MULTI-FACILITY HEALTH SYSTEM

Tara E. Haworth*, PharmD; Mike P. Lasley, PharmD, MPA; Leslie K. Kenney, BS Pharm, BCPS

Norton Healthcare, 4001 Dutchmans Lane, Louisville, KY, 40207

tara.haworth@nortonhealthcare.org

Purpose:

Clinical decision support (CDS) is designed to provide healthcare professionals with relevant, patient-specific information and guidance in the clinical decision making process. An ideal alert should demonstrate the five rights: delivery of the right information, to the right person, in the right intervention format, through the right channel, and at the right time in the work flow. In 2012, Norton Healthcare (NHC) transitioned to a complete electronic health record system including a computerized physician order entry (CPOE) system, introducing clinicians to CDS alerts. In June of 2014, NHC's electronic health record system underwent a software version upgrade that changed dose alerts from pop-ups to inline warnings. Since the implementation of CPOE, concerns with CDS alerts have surfaced, including alert fatigue, irrelevant warnings, inaccurate warnings, and interruptive displays. The purpose of this study is to characterize the current state of CDS alerts within a large multi-facility health system.

Methods:

This is a descriptive, multi-center study. All CDS alert categories will be described in this study, including drug-drug, drug-allergy, dose warnings pregnancy warnings, duplicate therapy, and duplicate medication. Information evaluated includes frequency of alerts and override and acceptance percentages of each alert. The primary endpoint is to describe qualitative and quantitative characteristics of CDS alerts. The secondary endpoint is to compare dose warning override rates pre and post software version upgrade.

Results/conclusions:

Data is currently being evaluated; final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the "five rights" of effective clinical decision support alerts.

Discuss current drawbacks of clinical decision support alerts.

Self Assessment Questions:

Which of the following includes the correct "five rights" of effective clinical decision support alerts?

- A information, person, format, channel, and time in the work flow
- B: patient, drug, dose, route, and time
- C: route, person, format, channel, and route
- D: information, person, use, time, and channel

Which of the following is a current drawback of clinical decision support systems?

- A Ability to customize alerts
- B Alert fatigue
- C In-line alerts
- D Limited number of alerts

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-767-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF TECHNOLOGY TO MAXIMIZE FORMULARY MANAGEMENT ACROSS A HEALTH SYSTEM

Amalia Hayes*, PharmD; Leslie K Kenney, BS Pharm, BCPS; Amy L Perpich, PharmD, BCPS

Norton Healthcare, 315 East Broadway, Louisville, KY, 40202

amalia.hayes@nortonhealthcare.org

Purpose: Norton Healthcare is a community health system consisting of four adult hospitals and one pediatric hospital. One system-wide Pharmacy & Therapeutics committee, which meets quarterly, guides formulary decisions and medication policies for all adult hospitals. Business and financial changes to the healthcare model, coupled with the recent implementation of computerized physician order entry (CPOE) and change in wholesalers presented an opportunity for the health care system to optimize technology in the formulary management process.

Methods: This is a descriptive, quality improvement initiative. Three primary areas were identified for opportunities in which technology could assist in streamlining formulary management efforts: 1) Policies/procedures; 2) point of prescribing; and 3) point of purchasing. Plan-do-study-act (PDSA) was chosen as the quality improvement methodology to document measures of improvement and to ensure that project ideas demonstrate improvement prior to widespread implementation.

Results/Conclusions: Existing medication policies were reviewed and revised for alignment with recent changes in the health system, as well as new opportunities identified and implemented to strengthen formulary management. A review of formulary intranet resources utilized by pharmacists was also completed and recommendations for improvement are in progress. In the CPOE system, alternative alerts and best practice advisories were assessed to characterize how improvements could be made to manage the formulary both at the time of order entry and at the time of order verification. Lastly, as part of the recent wholesaler change, a decrease in medications available for purchase was restricted using a new software program. As a result of technology optimization, formulary management has been further standardized and processes implemented that will assist with cost containment and accountability across the health system.

Learning Objectives:

Identify the benefits of a well-managed formulary system

Describe strategies implemented to maximize formulary management across a health system

Self Assessment Questions:

All of the following are identified as benefits of a robust formulary system, except:

- A Valuable cost management tool
- B: All medications are available unrestricted
- C: Safe and appropriate medication use
- D: Consistency throughout the health system

Which of the following is an example of optimizing technology to enhance formulary management?

- A Increase the number of medications available for purchase
- B Delay implementation of CPOE
- C Optimize alternative alerts and best practice advisories
- D Disregard processes for obtaining non-stock medications

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-768-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF DOSE ADJUSTING ENOXAPARIN BASED ON ANTI-XA LEVELS FOR RENAL IMPAIRMENT AND EXTREME BODY WEIGHTS

Kenneth Hecht, PharmD* and Kevin Wohlfarth, PharmD, BCPS
Toledo Hospital/Toledo Children's Hospital, 2142 North Cove
Boulevard, Toledo, OH, 43606
kenneth.hecht@promedica.org

Background:

Dosing of enoxaparin, a low-molecular-weight-heparin (LMWH), in special populations remains controversial. Data is limited for special populations, such as renally impaired ($\text{CrCl} \leq 30 \text{ mL/min}$) and extremes of body weight ($\text{BMI} > 40 \text{ kg/m}^2$ or $\text{BMI} < 18 \text{ kg/m}^2$). Patients with renal impairment and extremes of body weight are at an increased risk of a complication. Previous studies demonstrated a 65% increase in anti-Xa activity in renally impaired patients compared with healthy volunteers over a four day period. In extreme body weight patients, literature suggests these subgroups may have subtherapeutic or supratherapeutic anti-Xa level with current fixed dosing regimens. When using a LMWH it may be prudent to monitor anti-Xa levels in these special populations for safety and efficacy.

Purpose:

The purpose of this study is to evaluate the rate of complications in special populations. Secondary outcomes to be assessed are rate of anti-Xa levels in goal range on initial level and after dose adjustment.

Methods:

This study has both retrospective and prospective components that will include patients 18 years and older admitted to ProMedica Toledo Hospital (PTH) and have at least one of the following: $\text{CrCl} \leq 30 \text{ mL/min}$, $\text{BMI} > 40 \text{ kg/m}^2$, or $\text{BMI} < 18 \text{ kg/m}^2$. This study has been approved by the ProMedica Institutional Review Board and will be conducted by a pharmacy resident with the support of the clinical pharmacy staff. A retrospective chart review will be used to assess complication rate prior to the approval of current PTH enoxaparin guideline and to evaluate current practice. Complications are defined as documentation of venous thromboembolism, frank bleeding, and thrombocytopenia. This will be supplemented by prospective evaluation of dosing based on anti-Xa levels.

Results:

Results and conclusions to be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify special population where obtaining anti-Xa level may be appropriate to assess enoxaparin therapy

Discuss enoxaparin dose adjustment based on anti-Xa levels

Self Assessment Questions:

Which of the following patient characteristics would prompt ordering a low molecular weight heparin anti-Xa level to assess safety and efficacy of enoxaparin? Feature 1: $\text{CrCl} < 30 \text{ mL/min}$ Feature 2:

- A: Features 1, 2, 3
- B: Features 1, 2, 4
- C: Features 1, 3, 4
- D: Features 2, 3, 4

Patient case: A 60 year old female, 80 kg ($\text{BMI} = 29$) has a deep vein thrombosis confirmed by ultrasound. The patient's CrCl is 25 mL/min . She is started on enoxaparin 1 mg/kg (80 mg) every 24 hours.

- A: Continue current dose of 1 mg/kg every 24 hours
- B: Decrease dose by 30% to 0.7 mg/kg every 24 hours
- C: Decrease dose by 20% to 0.8 mg/kg every 24 hours
- D: Hold all doses until anti-Xa is $< 0.5 \text{ units/mL}$

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-769-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CONTINUOUS INFUSION LABETALOL VS. NICARDIPINE FOR HYPERTENSION MANAGEMENT IN STROKE PATIENTS

Jason P. Hecht, Pharm.D.*, Patrick G. Richards, Pharm.D.
St. Joseph Mercy Health System, 5301 E. Huron River Dr., Ann Arbor, MI, 48106
jason.hecht@stjoeshealth.org

Purpose: The AHA/ASA guidelines recognize labetalol and nicardipine as first line options for acute blood pressure lowering in the setting of acute stroke. Prior studies comparing the two agents for this indication have used continuous infusion nicardipine and repeat bolus doses of labetalol. The objective of this study is to compare the administration of continuous infusion labetalol with nicardipine for the acute management of hypertension in acute ischemic stroke (AIS), intracerebral hemorrhage (ICH), and subarachnoid hemorrhage (SAH) patients.

Methods: This is a retrospective observational cohort study that will be submitted to the Institutional Review Board for approval. Our institution's quality institute will identify patients with a diagnosis of AIS, ICH, and SAH that receive a continuous intravenous (IV) infusion of labetalol or nicardipine. We will then collect and review data on age, gender, length of stay, mortality, past medical history, goal blood pressure, time to goal blood pressure, number of dose adjustments required, and use of rescue antihypertensive medications. We will also collect blood pressure and heart rate readings throughout the hospitalization to evaluate safety and efficacy endpoints. The data collected will be recorded without patients identifiers and patient confidentiality will be maintained. The aims of the study will be to compare the two agents in regards to efficacy of acute blood pressure lowering, short term patient outcomes directly related to blood pressure management, ease of administration for practitioners, and safety outcomes.

Learning Objectives:

Describe the mechanism by which elevated blood pressure can induce an acute stroke and worsen outcomes.

Identify an appropriate blood pressure goal and antihypertensive regimen based on guideline recommendations and available primary literature.

Self Assessment Questions:

Which of the following is correct regarding blood pressure in the setting of acute stroke?

- A: Hypertension, but not hypotension, has been associated with negative outcomes.
- B: Hypertension occurs most commonly following an acute stroke as a complication.
- C: Elevated blood pressure occurs in less than 50% of patients following an acute stroke.
- D: Permissive hypertension is appropriate following an ICH for up to 48 hours.

What of the following guideline recommendations has the strongest level of evidence?

- A: Blood pressure goal of $< 180/105 \text{ mmHg}$ following fibrinolytic administration.
- B: Mean arterial pressure goal of $< 110 \text{ mmHg}$ following ICH.
- C: Nicardipine IV continuous infusion is preferred as the first line agent for blood pressure management.
- D: Blood pressure reduction of 15% following AIS with initial blood pressure $> 180/105 \text{ mmHg}$.

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-770-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF DISCHARGE MEDICATION DISCREPANCIES IDENTIFIED BY PHARMACIST REVIEW IN THE COMMUNITY SETTING

Molly Heger, PharmD*; Angela Green, PharmD BCPS; Megan Grelewicz, PharmD; Crystal Whelton, PharmD; Tara Zdybel, PharmD
Mercy Health Muskegon, 1500 E Sherman Blvd, Muskegon, MI, 49444
hegerm@mercyhealth.com

Background:

The thirty-day readmission rate among patients with Medicare is approximately twenty percent in the United States, contributing to approximately \$17.4 billion in annual costs. Adverse drug events, medication non-adherence, lack of primary care follow-up, and medication discrepancies all increase the risk of readmission. Accurately reconciling medications upon admission and discharge can help prevent readmissions. Mercy Health utilizes medication historians to obtain accurate medication histories upon admission in order to reduce medication discrepancies. Upon discharge, the nurse reviews discharge instructions with the patient and pharmacists are not routinely part of this process. Studies have shown pharmacists can have a positive role in improving patient outcomes at discharge, specifically through comprehensive medication management services.

Purpose:

The purpose of this project is to incorporate pharmacist review of the medication documentation with patients after discharge. Pharmacists can identify medication discrepancies, prevent medication errors, and assess patient comprehension of discharge medication instructions. The goal of these pharmacist interventions is to prevent readmissions.

Methods:

This is a retrospective review of patients discharged from the Emergency Department (ED) or hospital, who utilized a Mercy Health outpatient pharmacy and received pharmacist evaluation of their discharge medication instructions. The pharmacist identified medication discrepancies upon review of their medication list and provided patient counseling regarding changes. In addition, pharmacists performed follow-up interventions including calling the patient to evaluate adverse drug events and scheduling a comprehensive medication review (CMR) if needed. Patients were excluded if they were discharged greater than one month prior to presenting to the pharmacy with discharge prescriptions. Primary outcome evaluated was the number of discrepancies identified by the pharmacist post discharge. Secondary outcomes included thirty-day readmission rates, number of adverse drug events, cost avoidance, and the number of patients scheduled for a CMR.

Results/Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify risk factors for hospital readmission.

Outline the process for performing a comprehensive medication review post hospital discharge in the community pharmacy setting.

Self Assessment Questions:

Which of the following increases the risk of hospital readmission?

- A Prompt PCP follow-up
- B: Medication adherence
- C: Adverse drug events
- D: Patient insight into discharge instructions

During review of discharge medication reconciliation pharmacists are able to identify which of the following?

- A Potential drug-drug interactions
- B Therapeutic duplications
- C Medication omissions
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-771-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

INTRAVENOUS VANCOMYCIN PHARMACOKINETIC ASSESSMENT IN OBESE ADULT PATIENTS

Jennifer L. Heidmann, PharmD*; Donald J. Scott, PharmD
Spectrum Health, 100 Michigan Street NE, Grand Rapids, MI, 49503
jennifer.heidmann@spectrumhealth.org

Purpose: A revised vancomycin dosing protocol for patients with a body mass index (BMI) ≥ 30 was implemented. The change required peak-trough monitoring of serum levels after the loading and first maintenance doses with subsequent dose adjustment if necessary. Early attainment of therapeutic troughs has been associated with improved patient outcomes. The objective of this study was to assess patient specific kinetic parameters and serum levels for adult patients treated with vancomycin utilizing the protocol. It also evaluated the protocol for appropriateness and may allow for more specific empiric dosing recommendations in obese patients.

Methods: Patients treated with intravenous vancomycin from September 2014 through December 2014 were screened for inclusion in this retrospective study. Exclusion criteria included dialysis treatment, creatinine clearance < 50 ml/min, quadriplegia, or treatment with vancomycin in the preceding 72 hours. The primary outcome was the assessment of patient specific kinetic parameters for all patients with BMI ≥ 30 . Secondary outcomes included a comparison of kinetic parameters between patients based on BMI stratification and ICU status.

Results: A total of 93 patients were included in the analysis. Patients were 65% male and had an average age of 54 years. The mean serum creatinine at therapy initiation was 0.89 mg/dl. The mean BMI was 37 kg/m², and vancomycin was started in the ICU in 15 patients. The mean calculated maximum and minimum concentrations for all patients were 33.4 mcg/ml (95% CI: 31.5-35.2) and 11.9 mcg/ml (95% CI: 10.8-13), respectively. The mean volume of distribution was 0.44 L/kg actual body weight (95% CI: 0.39-0.48). The elimination rate constant and half-life were 0.129 hours⁻¹ (95% CI: 0.118-0.141) and 6.5 hours (95% CI: 5.9-7.2), respectively. Further analysis is ongoing.

Conclusion: The kinetic parameters calculated in this study are consistent with what is seen in the literature.

Learning Objectives:

Describe the pharmacokinetics of vancomycin in obese patients.

Review the literature supporting dosing recommendations and monitoring of vancomycin in obese patients.

Self Assessment Questions:

Which of the following body size descriptors should be used for empiric vancomycin dosing in obese patients?

- A Actual body weight
- B: Ideal body weight
- C: Adjusted body weight
- D: Body mass index

For which of the following indications would a target vancomycin trough of 15-20 mcg/ml be appropriate?

- A Osteomyelitis
- B Meningitis
- C Cellulitis
- D A and B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-438-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

AN EVALUATION OF VITAMIN D SUPPLEMENTATION ON ASTHMA CONTROL IN PEDIATRIC PATIENTS

Matthew R. Heinsen, PharmD*; Jennifer H. Tobison, PharmD; Leyla Akanli, MD

St. Vincent Health, 2001 W 86th Street, Indianapolis, IN, 46260
matthew.heinsen@stvincent.org

Purpose: Studies in children have shown that vitamin D deficiency is a contributor to increased asthma symptoms and worsening asthma control, decreased lung function, higher odds of hospitalization or emergency department visit and greater medication use. Many limitations of current research involve the lack of repeated or follow up measurements of serum vitamin D. In 2012, outpatient clinics at Peyton Manning Childrens Hospital (PMCH) drafted recommendations for screening and treating children at risk for vitamin D deficiency. While these recommendations did not specifically target asthmatics, it has become common for the pediatric pulmonologists at PMCH to screen, test and obtain repeat, follow up vitamin D levels as part of their practice. The purpose of this study is to evaluate the relationship between vitamin D status and the effects of vitamin D supplementation on asthma control in pediatric patients.

Methods: This retrospective chart review evaluated patients aged 4 through 18 seen at the Peyton Manning Childrens Hospital Pediatric Pulmonary and Sleep Medicine Clinic. Patients were included who had asthma and at least two serum vitamin D measurements (baseline and one follow-up) recorded in their outpatient electronic medical record from November 2013-November 2014. Additionally, an inpatient electronic health record was used to collect data pertaining to asthma exacerbations. The number of asthma exacerbations was collected from the patient charts for the year prior to study enrollment (November 2012 - November 2013) and then during the study period (first visit after November 1, 2013 through November 2014). The primary objective of this study was to determine the relationship between vitamin D status and asthma control. The secondary objective was to evaluate and describe the relationship between vitamin D supplementation and asthma control.

Results/Conclusions: Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Classify vitamin D sufficiency, insufficiency and deficiency using common laboratory parameters.

List the proposed physiologic mechanisms in which vitamin D may protect against asthma

Self Assessment Questions:

According to Endocrine Society Guidelines, Vitamin D deficiency is defined as 25 (OH)D levels less than:

- A 10 ng/mL
- B: 20 ng/mL
- C: 30 ng/mL
- D: 50 ng/mL

Which of the following is a proposed mechanism in which vitamin D may protect against asthma?

- A Enhancing pulmonary immune function
- B Improving responsiveness to steroids
- C Reducing airway remodeling
- D All of the above are mechanisms underlying the protective effects

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-439-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF BARCODE - ASSISTED MEDICATION PREPARATION (BCMP) TECHNOLOGY AT A PEDIATRIC HOSPITAL

*Heather Helsel, PharmD; Meghann Voegeli, PharmD, MS; Aaron Webb, PharmD, MS; Heather Schrant PharmD, MS

University of Wisconsin Hospital and Clinics, 600 Highland Ave, Madison, WI, 53792
hhelsel@uwhealth.org

Purpose: The purpose of this investigation was to assess the impact of implementing barcode - assisted medication preparation (BCMP) technology on workload, safety, and cost for extemporaneously prepared intravenous and oral medications.

Methods: A pharmacy workgroup was assembled to define workflows for pediatric intravenous (IV) and oral extemporaneously prepared medications following implementation of barcode - assisted medication preparation technology (BCMP). In addition, the workgroup identified time and safety metrics for both pre- and post- BCMP technology implementation. Pharmacist and technician workflows were observed and documented pre-implementation to determine medication preparation start and stop times for time studies. Sample time studies were performed via direct observation to determine the total number of observations required to obtain a 90% confidence interval. Data was collected through direct observation to determine time required to prepare pediatric IV and oral medications. Additionally, a medication safety and waste report was developed to document errors. Medication errors and waste were recorded via self - report using a standardized form. Medication errors were then classified by severity. After BCMP implementation, workflows were again observed to determine medication preparation start and stop times for time studies. Medication safety and waste was electronically recorded within the BCMP software. A comparison of workload, safety, and cost before and after BCMP implementation was completed.

Summary of results: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Conclusions: Conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe key metrics to measure when evaluating barcode - assisted medication preparation (BCMP) technology

Describe the benefits of implementing barcode - assisted medication preparation (BCMP) technology to prepare extemporaneous doses

Self Assessment Questions:

Which of the following is a medication safety benefit of using barcode - assisted medication preparation (BCMP) technology?

- A Elimination of pharmacist verification
- B: Visual confirmation of dose
- C: Paper documentation of product dispensed
- D: Inability to verify doses remotely

Which of the following is a perceived benefit of utilizing a barcode - assisted medication preparation technology (BCMP) to prepare extemporaneous doses?

- A Reduction of medication errors
- B Increase in drug waste
- C Decrease in pharmacy workload
- D Reduction of technician full time equivalent (FTE)

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-772-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE HALF-LIFE OF ACETAMINOPHEN AND ITS RELATIONSHIP TO MORTALITY AFTER ACETAMINOPHEN OVERDOSE

Laura Hencken, PharmD*, John Stine, PharmD, BCPS, Mark Mlynarek, RPh, BCPS, Michael Peters, RPh, BCPS

Henry Ford Health System, 2799 West Grand Boulevard, Detroit, MI, 4820
lhencke1@hfhs.org

Purpose: Acetaminophen is a commonly used product that does not come without risks, particularly severe liver damage. Studies have identified risk factors for hepatic failure and mortality in overdose situations. OGrady and colleagues investigated early indicators of prognosis in fulminant hepatic failure and found that pH, prothrombin time, grade of encephalopathy, and serum creatinine correlated with mortality. This led to the development of the Kings College Criteria to predict prognosis in patients with liver failure. Acetaminophen overdose patients regularly have these variables assessed by clinicians. In addition, multiple acetaminophen levels are checked. Acetaminophen is hepatically metabolized by first-order kinetics with a half-life of 2-3 hours. Prescott and colleagues found the mean acetaminophen half-life to be 2.9 hours in patients without liver damage versus 7.6 hours in patients with liver damage prior to the use of acetylcysteine. This study aims to compare acetaminophen half-lives in patients who died versus survived after acetaminophen overdose and treatment with acetylcysteine.

Methods: This is a retrospective case-control study comparing risk factors for mortality in patients who died versus survived after acetaminophen overdose and treatment with acetylcysteine at Henry Ford Hospital. Patients over the age of 18, admitted for acetaminophen overdose between January 2003-October 2013, received acetylcysteine and had two detectable acetaminophen levels will be included and grouped according to survival. The primary analysis will be a comparison of the mean acetaminophen half-life. Half-life will be calculated assuming first order kinetics. Secondary analyses will include a comparison of other risk factors for mortality and mortality rate. Individual matching will occur on the basis of whether or not the patient was a multidrug overdose. Descriptive statistics and comparative statistics will be used to analyze collected data. A $P < 0.05$ will be considered statistically significant for all comparisons. Results and conclusions will be presented at the Great Lakes Conference.

Learning Objectives:

Identify risk factors for mortality in patients who present with an acetaminophen overdose.

Explain the mechanism of acetaminophen toxicity.

Self Assessment Questions:

Which of the following is a known risk factor for mortality in patients who present with an acetaminophen overdose?

- A pH less than 7.3
- B: Grade I encephalopathy
- C: Prothrombin time greater than 50 seconds
- D: Serum creatinine greater than 2 mg/dL

Which of the following statements is correct?

- A Acetaminophen is primarily renally eliminated as unchanged drug
- B Acetaminophen is hepatically metabolized through two pathways:
- C Glucuronidation produces the hepatotoxic metabolite, N-acetyl-p-b
- D Depletion of glutathione leads to increased concentrations of NAP

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-440-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF SEDATIVE EXPOSURE ON LONG-TERM SLEEP QUALITY IN CRITICALLY ILL ADULTS

David Hensler*, PharmD, Kimberly Levasseur-Franklin, PharmD BCPS, Bryan Lizza, PharmD BCPS

Midwestern University, 555 31st Street, Downers Grove, IL, 60515
dhensler@nm.org

Purpose: Survivors of critical illness often experience decreased quality of life following discharge from the intensive care unit (ICU). It has been previously demonstrated that many patients suffer from cognitive impairment, depression, post-traumatic stress disorder, and worsened functional status. Decreased quality of life may not be limited to these domains, as limited evidence exists regarding the effect of critical illness on other neurocognitive outcomes, including sleep quality. Patients admitted to the ICU often require sedation and analgesia to improve comfort and reduce anxiety. Among the sedatives frequently used in the ICU, a number of agents have demonstrated disruption of sleep architecture and the inability to achieve deeper stages of sleep.

However, few data exist on the impact of ICU sedative exposure on long term sleep outcomes. The objective of this study is to identify factors associated with long-term sleep disturbances after ICU discharge.

Methods: This will be a prospective, observational analysis of critically ill adults with respiratory failure or shock admitted to the medical ICU.

Respiratory failure will be defined as a requirement for mechanical ventilation or oxygen delivery via high-flow nasal cannula. Shock will be defined as hypotension requiring vasopressor administration. This study has previously received Northwestern University Institutional Review Board approval. Baseline demographics will include age, weight, gender admission diagnosis, illness severity score (i.e. APACHE IV), and baseline comorbidities. Sleep quality will be measured at the time of enrollment and at 90 days. Two validated sleep assessments will be utilized, including the STOP BANG questionnaire and the Neuro-QOL sleep disturbance short form. Cumulative sedative and analgesic exposures will be converted to lorazepam and fentanyl equivalents for the purposes of interpretation.

Results/conclusions: Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the effects of sedative exposure on sleep physiology

Identify validated instruments for the assessment of sleep disturbances

Self Assessment Questions:

Which of the following statements regarding propofol's effect on sleep physiology is correct?

- A Propofol has no effect on sleep architecture
- B: Propofol increases restorative REM sleep
- C: Propofol induces deep sleep
- D: Propofol disrupts REM sleep

Which of the following instruments provides a valid, reliable tool for the assessment of self-reported sleep disturbances?

- A Glasgow coma scale
- B Neuro-QOL Sleep Disturbance Short Form
- C Richmond Agitation Sedation Scale
- D Riker Sedation-Agitation Scale

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-441-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

METHADONE USE STANDARDIZATION AND TRANSITIONAL CARE EVALUATION

Kathryn A. Hensley*, PharmD; Cynthia Gaston, PharmD, BCPS; Aaron Steffenhagen, PharmD, BCPS

University of Wisconsin Hospital and Clinics, 600 Highland Ave, Mail Code 1530, Madison, WI, 53792

khensley@uwhealth.org

Purpose: This study aims to improve safe and appropriate utilization of methadone for analgesia across all patients, along with opioid tapering after prolonged opioid administration in pediatric patients, throughout UW Health. The primary objectives were to evaluate current methadone inpatient use practice, develop tools to facilitate safe and appropriate use and improve transitions of care for methadone outpatient use.

Methods: A medication use evaluation was performed to evaluate prescribing practices and serious adverse events associated with inpatient methadone use between January 1, 2014 and June 30, 2014. Data collection included demographics, indication for methadone, dose and dose adjustments, prior use of opioids, QTc monitoring and use of interacting medications. A literature review was conducted to support best practice recommendations for safe and appropriate methadone use. From this information, an evidence-based inpatient and ambulatory clinical practice guideline was created. A workgroup of pharmacists, physicians and nurses was established to collaborate on guideline development. Guideline recommendations will be operationalized through decision support tools in the electronic medical record and provider education will be completed. Outcomes of guideline implementation and development of transitions of care tools will be assessed through chart review. Outcome measures will include percentage of pediatric patients weaned with methadone according to guideline recommendations and assessment of QTc monitoring and use of interacting medications in comparison to MUE results.

Summary of results: A total of 86 individual patients received methadone across 101 inpatient encounters during the MUE review period. The home methadone regimen was continued on 80.2% of patients. During their inpatient stay, 22 patients received at least one dose of a medication known to interact with methadone through QTc prolongation, while only 11 had an EKG during that time. Remaining study results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss considerations and monitoring recommendations for patients or methadone therapy

Describe the process for developing and implementing tools to improve clinical decision-making

Self Assessment Questions:

This commonly used antibiotic may lead to additive QTc prolongation when used concurrently with methadone

- A: Ciprofloxacin
- B: Vancomycin
- C: Piperacillin-tazobactam
- D: Ceftriaxone

Which of the following is important when designing and implementing clinical decision-making tools involving multiple healthcare disciplines?

- A: Wait until the last minute before implementation to discuss the tool
- B: Involve all invested parties early in the development process
- C: Only communicate via email with individuals
- D: Send communication house-wide and wait for responses

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-773-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PHARMACIST-PHYSICIAN COLLABORATIVE MANAGEMENT OF HYPERTENSION

Libby Herman*, Pharm.D., Cari Cristiani, Pharm.D., BCPS, BCACP, Giavanna Russo-Alvarez, Pharm.D., BCACP

Cleveland Clinic, 2636 N Moreland Blvd, Apt 22, Cleveland, OH, 44120
hermanl2@ccf.org

Purpose: Hypertension (HTN) is an important risk factor for cardiovascular disease and is reported to be the leading cause of preventable death. Several guidelines recommend implementing a team based approach to achieve and maintain blood pressure (BP) control. The impact of pharmacist intervention on BP outcomes is affected by the level of autonomy. Pharmacists in the Internal Medicine Clinic at Cleveland Clinic operate under a collaborative practice agreement to manage various disease states, including hypertension. The pharmacy consult service for management of HTN has not been formally evaluated as an independent effector of outcomes and given the increasing importance of attaining the core measures to maximize reimbursement, an evaluation of pharmacist-physician collaborative management of hypertension would be beneficial.

Methods: The Institutional Review Board at Cleveland Clinic approved this retrospective study. Patients aged 18-79 years with existing uncontrolled HTN (BP \geq 140/90 mmHg), an ordered consult to pharmacy for management of hypertension, and an initial pharmacy visit between January 1st and December 31st, 2013 will be included and followed until December 31st, 2014. Patients will be excluded if they are pregnant or have end-stage renal disease requiring chronic hemodialysis, an existing consult to nephrology or prior nephrology visits, hyperthyroidism, hyperaldosteronism, Cushing's disease, or previous pharmacy visits for management of hypertension. The primary endpoint of the study is the mean difference in BP at baseline and the first encounter after the last pharmacy visit. Secondary endpoints include the mean difference in BP at baseline and one year after the initial pharmacy visit and the proportion of patients with controlled BP (BP < 140/90 mmHg) at the first encounter after the last pharmacy visit and one year after the initial pharmacy visit.

Results/Conclusions: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define team-based care and the pharmacists role as part of an interdisciplinary team.

Describe the impact of pharmacist intervention on BP outcomes in the outpatient setting.

Self Assessment Questions:

Based on previous studies, how has pharmacist intervention in the outpatient setting affected BP outcomes achieved?

- A: Pharmacist intervention has not significantly impacted BP outcomes
- B: Pharmacist intervention results in worse BP outcomes
- C: Pharmacist intervention results in improved BP outcomes
- D: Pharmacist intervention has demonstrated conflicting results on BP outcomes

Which of the following best defines the reimbursement method utilized by accountable care organizations?

- A: Reimbursement is based upon BP outcomes achieved
- B: Reimbursement is based upon different services provided
- C: Reimbursement is based upon the number of patients seen
- D: Reimbursement is based upon the certain medications prescribed

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-442-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFICATION OF FACTORS ASSOCIATED WITH INCREASED EMERGENCY DEPARTMENT PRESENTATION IN PATIENTS TREATED WITH INTRAVENOUS CHEMOTHERAPY

*Kayla A. Hetrick, PharmD, Vishnuprabha Vogel, PharmD, BCPS, BCOP, Amber Lanae Smith, PharmD, MSc, BCPS, Diana Kostoff, PharmD, BCPS, BCOP

Henry Ford Health System, 2338 Prince Hall Drive, Detroit, MI, 48207
khetric1@hfhs.org

Cancer management accounts for 5 to 12% of annual health care expenditures in the United States. Approximately 40% of patients with cancer present to the emergency department (ED) at least once during the course of treatment. Current literature cites the common reasons that patients with cancer seek emergency care, but fails to elucidate the specific factors or baseline characteristics that predispose these patients. The purpose of this study is to identify characteristics that increase the risk of ED visits, with or without subsequent hospitalization, in patients with cancer undergoing infusion chemotherapy treatment.

This is a retrospective case-control study that includes patients 18 years of age or greater treated with infusion chemotherapy at Henry Ford Health System from January to June of 2014. Cases were defined as the subpopulation that presented to the ED. Data collection included baseline patient, cancer and treatment characteristics. Details about the ED presentation were also recorded and included the following: abnormal laboratory values; vital signs; chief complaints; presentation/admission diagnoses; time/date of presentation; number of ED visits throughout treatment; number of patients subsequently hospitalized. Descriptive statistics were used to analyze baseline characteristics. Inferential statistics were used to identify statistically significant differences in baseline characteristics between cases and controls. Multivariate logistic regression was employed to determine the characteristics that are associated with an increased risk of ED presentation in patients with cancer.

The results and conclusion of this study will be reported at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the significant health care costs associated with the treatment of patients with cancer when compared to other patient subsets

Discuss the most common reasons that cancer patients seek out emergency care services

Self Assessment Questions:

According to a report by the American Society of Clinical Oncology (ASCO), annual cancer care costs are expected to rise from \$104 billion in 2006 to more than what amount in 2020?

- A: \$157 billion
- B: \$162 billion
- C: \$173 billion
- D: \$186 billion

According to current literature, patients with cancer that present to the emergency room most commonly complain of:

- A: Gastrointestinal symptoms
- B: Respiratory distress
- C: Uncontrolled pain
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-443-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZATION OF PEMETREXED TOXICITY IN PATIENTS WITH RENAL INSUFFICIENCY

Jordan L. Hill, PharmD*, Craig A. Vargo, PharmD, Michael B. Smith, PharmD, Jessica C. Streeter, PharmD, David P. Carbone, MD

The Ohio State University Wexner Medical Center, 410 West 10th Avenue, Columbus, OH, 43210

Jordan.Hill@osumc.edu

Purpose: Lung cancer is the most common cancer and the leading cause of cancer death worldwide. Non-small cell lung cancer (NSCLC) accounts for approximately 85% of all lung cancers. Additionally, 65% of NSCLC is of non-squamous cell histology. Pemetrexed has been shown to be effective in the treatment of metastatic non-squamous NSCLC as first-line in combination with a platinum compound, second-line as a single agent, and as single agent maintenance treatment for patients whose disease has not progressed after platinum-based first-line chemotherapy in metastatic non-squamous NSCLC. In previous clinical trials, pemetrexed was well-tolerated with limited myelosuppression or grade 3 or higher non-hematologic toxicities. Pemetrexed is not recommended in patients with a creatinine clearance (CrCl) < 45 mL/min due to increased myelosuppression reported in phase I trials. There are currently no trials examining the safety of pemetrexed in this renally compromised patient population and no standard dose reduction recommendations for patients with a CrCl < 45 mL/min. The primary objective of this study is to determine the safety of dose-reduced pemetrexed in patients with a CrCl < 45 mL/min.

Methods: This is a retrospective case series describing the incidence of grade 3 or higher toxicity in patients with renal insufficiency (CrCl < 45 mL/min) treated with dose-reduced pemetrexed between December 1, 2009 and July 31, 2014 at The James Cancer Hospital and its outpatient clinics. Data collection includes patient demographics (age, gender, race, and weight), performance status, primary malignancy, concomitant chemotherapy agents, calculated CrCl, pemetrexed dose, dose delays, and toxicities. Descriptive variables will be described using Pearson's χ^2 test or Fisher's Exact test (categorical variables) the Student's t-test or Wilcoxon rank-sum test (continuous variables). Survival endpoints will be analyzed using Cox proportional hazards analysis and Kaplan-Meier curves.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify which patients would be appropriate for treatment with pemetrexed

Describe the safety and toxicity profile of patients with renal insufficiency treated dose-reduced pemetrexed

Self Assessment Questions:

For which of the following types of lung cancer is pemetrexed approved?

- A: Metastatic small cell lung cancer
- B: Metastatic squamous cell non-small cell lung cancer
- C: Metastatic non-squamous non-small cell lung cancer
- D: Early stage non-squamous non-small cell lung cancer

Which of the following adverse events were reported to have the highest incidence of grade 3 or 4 toxicity in patients with renal insufficiency treated with pemetrexed?

- A: Nausea
- B: Fatigue
- C: Renal failure
- D: Myelosuppression

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-445-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A DECENTRALIZED PHARMACY RESIDENT ROTATION

John D. Hill, Pharm.D.*; Jonathan Williams, Pharm.D. MS; Julie Barnes Pharm.D.; Amanda Hansen, Pharm.D., MSHA; Erick Sokn, Pharm.D., MS, BCPS
Cleveland Clinic, 9500 Euclid Ave, Cleveland, OH, 44195
hillj7@ccf.org

Statement of Purpose: The purpose of this project was to expand the scope of clinical pharmacy services, provide a unique learning experience for pharmacy residents, and achieve departmental goals for pharmacy clinical coverage.

Statement of Methods Used: Pharmacist workload metrics were analyzed to identify appropriate nursing-units for service expansion. Metrics evaluated included medication orders verified per hour, vancomycin dosing consults, warfarin patient counseling volume, and COPD discharge counseling volume. ASHP residency goals and objectives were reviewed to develop learning descriptions enabling resident participation. Formalized training materials outlining job responsibilities, expectations and patient population were developed and distributed. A pilot utilizing non-resident pharmacists was implemented to assess feasibility and potential resident learning opportunities. The staffing schedule was evaluated to develop a sustainable, resident-driven practice model allowing expanded provision of clinical decentralized pharmacy services.

Summary of Results to Support Conclusion: Based on the pilot study results, non-resident pharmacists will continue to provide nursing-unit based pharmacy services to the piloted patient-care areas. Pharmacy residents will provide nursing-unit based pharmacy services on two previously staffed internal medicine patient-care units. A schedule was developed to facilitate year round coverage by residents utilizing PGY2 residents completing two-week rotations in service areas dedicated to their specialty area during the first half of the year. PGY1 residents will provide month long block rotations covering these services during the second half of the residency year, with combined PGY1/2 residents providing summer coverage. A rotating preceptor will be assigned based on nursing-unit coverage and residency program.

Conclusions Reached: Pharmacy residents can be utilized to provide year-round expansions in pharmacy services while meeting ASHP rotational requirements. Areas for potential expansion utilizing residents should be carefully evaluated utilizing existing metrics and pilot data to achieve manageable workload and educational opportunities.

Learning Objectives:

State factors to consider when expanding pharmacy and resident services

Identify an effective strategy for incorporating a guiding principle of change management into resident rotation expansion efforts

Self Assessment Questions:

Which of the following is an appropriate metric to assess a decentralized pharmacists workload volume?

- A Medication orders verified per hour
- B: Doses dispensed
- C: Pyxis refills
- D: Missing medications

Which of the following guiding principles of change management had the most success in building support for the new resident rotation experience?

- A Prepare for the unexpected
- B Create ownership, not just buy in
- C Practice targeted over-communication
- D Solicit feedback regularly

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-774-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF PHARMACIST MONITORING OF PATIENTS DISCHARGED ON OUTPATIENT PARENTERAL ANTIBIOTIC THERAPY (OPAT)

Jerame K. Hill*, PharmD; Philip Trapskin, PharmD, BCPS; Kerry Goldrosen, PharmD; Jill Strayer, PharmD; Tyler Liebenstein, PharmD, BCPS; Lucas Schulz, PharmD, BCPS - AQID

University of Wisconsin Hospital and Clinics, 600 Highland Avenue, F6/133-1530, Madison, WI, 53792

jhill2@uwhealth.org

Purpose: Assess and redesign our Infectious Diseases clinic pharmacist workflow in order to reallocate time for monitoring of all patients discharged from the University of Wisconsin Hospital on outpatient parenteral antibiotic therapy (OPAT).

Methods: Current pharmacist workflow in the Infectious Diseases clinic at University of Wisconsin Hospital and Clinics (UWHC) was evaluated by direct observation and time studies. Time studies were conducted over an eight week period utilizing the UWHC paging system. The pharmacy informatics team was leveraged to assist in developing electronic medical record (EMR) workflows and tools to expedite identification of OPAT patients and simplify pharmacist monitoring. Time study data and EMR tools were combined to develop a new clinic workflow that included pharmacist monitoring of OPAT patients. Following a two week washout, after EMR tool and new workflow implementation, time studies will be repeated. In order to evaluate the benefit of clinical pharmacist monitoring of OPAT, baseline patient data was retrospectively collected for a three month time frame and will be compared to a post implementation cohort. The primary outcome will be changes in time spent on each clinic activity as well as time spent monitoring OPAT patients. Secondary outcomes will include 30-day readmission rates and adverse drug reactions.

Summary of results: Direct observation and time studies demonstrated that pharmacists spent the majority of their time on direct or indirect patient care (58%). Based on pilot data, most patients discharged on OPAT were treated for skin and soft tissue infections. The informatics team created an EMR tool called a "Smart Form." Clinic pharmacists were involved in the development of the tool and new workflows. Implementation of the new workflow is scheduled for March, 2015. Time study and patient data will be collected after implementation.

Conclusions: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role of technology within the electronic medical record (EMR) in assisting clinic pharmacists in identifying and monitoring patients discharging on OPAT.

Describe the use of time studies in evaluating time spent on value added task versus non-value added task.

Self Assessment Questions:

Which of the following statements is correct?

- A The use of a Smart Form allows investigators to run reports to help
- B: The use of a Smart Form increases the need for documentation and
- C: The use of a Smart Form completely removes the need for the use
- D: The use of a Smart Form increases the complexity of documenting

The time studies discussed in this presentation allow investigators to

- A Determine the exact amount of time it takes to complete a task.
- B Determine the percentage of each day pharmacist spend on a task
- C Determine if a task is adding value to patient care.
- D Determine if a task should be delegated to other staff members.

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-444-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF OCTREOTIDE DURATION ON PANCREAS TRANSPLANT OUTCOMES

Amy Hilliard, PharmD*, Jamie J. Benken, PharmD
University of Illinois at Chicago, 833 S Wood Street, 164
PHARM, Chicago, IL, 606127230
ahilliard@uic.edu

Controlling graft pancreas exocrine secretions has been the pitfall of pancreas transplant success. Pancreas transplantation is performed in diabetic patients with the plan to cure the recipients failing endocrine secretions while keeping intact the recipients pancreas exocrine secretions. Benedetti, et al. conducted a prospective randomized study in 1998 that found a 5 day course of octreotide, the somatostatin analog with inhibitory effects on pancreatic secretions, reduced incidence of technical complications (graft pancreatitis, intra-abdominal infections, and anastomotic leaks) post pancreas transplant. The University of Illinois Hospital and Health Science System changed their octreotide regimen post pancreas transplant in October 2012 from octreotide 100mcg subcutaneously every 8 hours for 5 days post-transplant to the current regimen of octreotide therapy for 2-5 days post-transplant with the duration being the attending physicians preference. The primary objective of this study is to evaluate the effect of octreotide duration post pancreas transplant in all recipients of pancreas transplants at the University of Illinois Hospital from January 2012 to September 2014.

A single-center, non-randomized, comparative design, retrospective and prospective chart review was conducted to observe patients from pancreas transplant to 6 months post-transplant. Patients were included if they were 18 years and older and received any type of pancreas transplant. Primary endpoint was the presence of post-operative complications defined as graft pancreatitis, intra-abdominal infection within 30 days, or anastomotic leak.

Data collection is currently ongoing. Statistical analysis will be performed using SPSS and SAS and final results will be discussed at presentation.

Learning Objectives:

Review risks and benefits of changing octreotide length of therapy
Explain how post-operative complications impact patient outcomes

Self Assessment Questions:

Which of the following is a reason octreotide therapy would be shortened to 2 days versus 5 days post-transplant?

- A To decrease risk of anastomotic leak
- B Side effect of increased blood sugar with octreotide therapy
- C To decrease risk of post-operative ileus
- D B & c

Post-operative complications are associated with

- A increased risk of loss of pancreas graft
- B increased length of hospital stay
- C increased risk for loss of kidney graft (in SPK patients)
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-446-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPROVING SPECIALTY MEDICATION THERAPY MANAGEMENT THROUGH THE DEVELOPMENT AND IMPLEMENTATION OF DISEASE STATE TRAINING PROGRAMS AND ELECTRONIC PATIENT CASE MANAGEMENT MODULES

*Timothy M. Hinkley, PharmD; Andy Pulvermacher, PharmD; Scott Canfield, PharmD; Joe Cesarz, PharmD, MS
University of Wisconsin Hospital and Clinics, 8410 Isaac Drive Apt. 211, Madison, WI, 53717
thinkley@uwhealth.org

Purpose:

The purpose of this project is to develop, implement and evaluate the impact of specialty disease state training programs and patient case management modules on the care provided by ambulatory pharmacists. Targeted disease states include multiple sclerosis, inflammatory conditions, growth disorders, and transplant.

Methods:

Baseline data regarding ambulatory pharmacists knowledge of specialty disease states and medications, as well as their comfort and confidence with educating patients about these conditions and their treatment plans was collected. Additionally, a random cohort of pharmacists was selected to demonstrate competence in the use of specialty medications and surveyed concerning comfort level in the education of patients with self-administered medications.

Training modules were developed to educate all ambulatory pharmacists. Pharmacists were required to take surveys measuring comfort/confidence and disease-state competency before the training, watch the designated training module, and then complete the post-training survey within one. Additionally, a specialty medication device training was held to teach ambulatory pharmacists appropriate administration techniques and relay important information about common self-administered specialty medications. Thereafter, the original cohort of ambulatory pharmacists was reassessed regarding the subjective improvement in comfort and competence of patient training on specialty devices.

Case management modules were also developed and implemented within the electronic medical record (EMR) system to improve compliance with outcome-guided therapy for patients being cared for through UW Health Pharmacy Services and diagnosed with the aforementioned disease states. Important patient and lab information was assessed and recorded, and the EMR functionality generated a note that is permanently documented in a patients chart for all care providers to review. Workflows within the EMR were also designed to allow for direct communication with providers when necessary to facilitate treatment plan modifications or recommend additional follow-up.

Results will be presented at the conference.

Conclusions will be presented at the conference.

Learning Objectives:

Describe the impact of computer-based training modules in specialty disease states on ambulatory pharmacist competency, comfort and confidence.

Explain the impact of designing and implementing specialty pharmacy patient case management software on patient outcomes and quality metrics related to specialty disease states.

Self Assessment Questions:

In 2014, it was reported that specialty medications accounted for nearly 30% of the national total drug expenditures and it is projected to increase to ____ by 2018.

- A 35%
- B 40%
- C 50%
- D 60%

In general, specialty pharmacies software programs will have the capability to:

- A Communicate and utilize their respective healthcare systems' electronic
- B Report out on patient medication adherence.
- C Track patient interventions.
- D B & c

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-447-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

AN EVALUATION OF THE USE OF TRANEXAMIC ACID DURING ORTHOPEDIC SURGERY

Rachel A. Hipp, PharmD*; Ariane K. Schieber, PharmD; Kristin I. Brower, PharmD

The Ohio State University Wexner Medical Center, 396 Doan Hall, 410 W 10th Ave, Columbus, OH, 43210-1234

rachel.hipp@osumc.edu

Purpose:

Tranexamic acid (TXA) is an antifibrinolytic agent used to prevent the breakdown of clots. During surgeries associated with significant bleeding, antifibrinolytic therapy can reduce the need for transfusions. Due to the antifibrinolytic properties of TXA, concern for risk of thromboembolism exists. Several studies have shown using a 1 g dose of TXA in the perioperative period reduces blood loss. More recent literature suggests two doses; one prior to surgery and one prior to surgical site closure further decreases bleeding. The objective of this evaluation is to characterize the use of TXA at The Ohio State University Wexner Medical Center (OSUWMC) health system when administered perioperatively for hip and knee orthopedic surgeries. This assessment includes characterization of dosing regimens and events, including thrombosis and transfusion.

Methods:

A retrospective review will be conducted on patients administered IV or topical TXA for an orthopedic surgery indication between May 1, 2014 and July 31, 2014. Sample size will be determined based on the expected patient volume rather than statistical power. The following patients will be excluded from analysis: patients receiving oral TXA, administered IV in response to a trauma, < 18 years or > 89 years of age, pregnant, or prisoners. Patient characteristic data collected will include: age, gender, height, weight, serum creatinine, hemoglobin, comorbidities, anticoagulant history, and post-operative anticoagulation. Surgical data will include: hospital site, length of admission, procedure type, surgeon, incision and closure time, and FloSeal administration. TXA data will include: dose, time and route of administration. Outcomes data collected will include: thromboembolic events, transfusions, and blood loss. A descriptive analysis will be conducted.

Results:

Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the recommended dosing strategies and routes of administration for tranexamic acid in orthopedic surgeries.

Review the incidence of adverse drug events and poor outcomes associated with tranexamic acid.

Self Assessment Questions:

Which of the following is the most current dosing strategy for tranexamic acid in orthopedic surgery?

- A: 1 gram intravenously prior to incision
- B: 2 grams topically prior to closure of surgical site
- C: 1 gram intravenously prior to incision and 1 gram prior to closure
- D: 1 gram intravenously prior to incision and 2 grams prior to closure

What side effects are of concern after administration of tranexamic acid in orthopedic surgeries?

- A: Tachycardia
- B: Clots
- C: Bleeding
- D: Nephrotoxicity

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-448-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACOKINETIC EXPOSURE MODELING OF AMINOGLYCOSIDES IN ADULT CYSTIC FIBROSIS

Brian M Hoff*, PharmD, Nathaniel J Rhodes, PharmD, Manu Jain, MD, Marc H Scheetz, PharmD, MSc

Northwestern Memorial Hospital, 251 E Huron Street, Chicago, IL, 60610
bhoff@nm.org

Purpose:

Acute pulmonary exacerbations are complications of Cystic Fibrosis (CF) that require aggressive therapy with intravenous antibiotics. Aminoglycosides are administered as high-dose, extended interval (HDEI) schemes as a standard of care for CF exacerbations. Dosing more frequently than every 24 hours (e.g. every 12 hours) has been suggested to improve outcomes [i.e. high-dose, non-extended interval (HDNEI)]. We previously retrospectively evaluated the impact of transitioning from a HDNEI to HDEI aminoglycoside dosing protocol on pulmonary function testing among adult CF patients and found no difference between the two dosing regimens. Drug disposition in patients with CF differ from other patients. Changes in volume of distribution, decreased plasma concentrations, and enhanced renal and non-renal elimination of drugs have been described. The aim of this study is to describe the pharmacokinetic (PK) properties of aminoglycoside antibiotics in adult CF patients and the association various PK parameters have on acute pulmonary exacerbation outcomes as a function of the dosing scheme received.

Methods:

This is a retrospective, observational study of patients admitted to Northwestern Memorial Hospital between January 1, 2005 and January 16, 2014. Eligible patients include males or females > 18 and < 90 years of age. The study was designed to evaluate 1) clinical efficacy between dosing strategies and 2) aminoglycoside exposure and efficacy and toxicity relationships in adult CF patients. Patient demographics and toxicity outcomes will be analyzed Chi-square and Fishers exact tests. BestDose software from the Laboratory of Applied Pharmacokinetics and Bioinformatics at the University of Southern California will be utilized to assess aminoglycoside exposure and patient-specific pharmacokinetic parameters. Multivariate linear and logistic regression analyses will be performed to correlate patient aminoglycoside exposure with clinical outcomes of efficacy and toxicity.

Learning Objectives:

Discuss drug disposition patients with cystic fibrosis.

Describe the toxicities associated with large lifetime cumulative doses of aminoglycoside therapy.

Self Assessment Questions:

Which of the following are ways in which drug position differs in patients with cystic fibrosis?

- A: Increased volume of distribution
- B: Decreased renal and non-renal elimination of drugs
- C: Decreased plasma concentrations
- D: A and C

Which of the following is a toxicity associated with large lifetime cumulative doses of aminoglycoside antibiotics?

- A: Hepatotoxicity
- B: Nephrotoxicity
- C: Pulmonary Toxicity
- D: Cardiac Toxicity

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-449-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF ELECTROLYTE MANAGEMENT IN SURGICAL AND NON-SURGICAL PATIENTS RECEIVING PARENTERAL NUTRITION IN A COMMUNITY HOSPITAL

*Celeste M. Hollensead, PharmD, Shannon J. Allcron, PharmD, BCPS, Claire M. Boomershine, PharmD, BCOP

Owensboro Health Regional Hospital, 1201 Pleasant Valley Road, Owensboro, KY, 42303

celeste.hollensead@owensborohealth.org

Purpose: Achieving and maintaining normal levels of potassium and magnesium are vital for avoiding serious consequences and maintaining normal cellular processes. Many factors influence electrolyte levels and acknowledgement of these factors is imperative when pharmacists adjust the micronutrients of the PN formula. The primary outcome of this study is to compare trends in potassium and magnesium levels between surgical and non-surgical patients receiving PN therapy. Secondly, this study will also seek to evaluate compliance with the institutions potassium-magnesium replacement protocol in those initiated on the protocol while receiving PN.

Methods: This study was approved by the institutional review board prior to data collection. The study includes patients 18 years and older that received PN from May 1, 2012 to May 1, 2014 and had serum potassium and magnesium levels drawn at least every 3 days. Subjects were excluded if under 18 years of age, baseline serum creatinine greater than or equal to 2 mg/dl, simultaneous administration of enteral nutrition or oral nutrition with PN therapy, or received peripheral nutrition therapy. The following information on each subject was documented for the first six days of PN therapy: age, sex, surgical or non-surgical, PN indication, co-morbid conditions, serum creatinine, development of acute kidney injury, serum potassium level, total milliequivalents of potassium in the PN formula, serum magnesium level, amount of magnesium in the PN formula, initiation of electrolyte-impacting medication, potassium-magnesium replacement protocol initiation, and adherence to replacement protocol. Descriptive statistics will be used to report out demographic trends when appropriate. The patient groups will be compared utilizing linear regression to assess the primary outcome.

Results/Conclusions: Data collection and analysis are ongoing and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Name medications that can impact serum potassium levels

Identify disease states that impact serum potassium and magnesium levels

Self Assessment Questions:

Which of the following medications is most likely to impact serum potassium levels?

- A: Lisinopril
- B: Oxycodone
- C: Loratadine
- D: Ropinirole

Which of the following disease states is most likely to impact serum electrolyte levels?

- A: Depression
- B: Congestive heart failure
- C: Gout
- D: Leukemia

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-450-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THROMBOCYTOPENIA IN CRITICALLY ILL PATIENTS RECEIVING CONTINUOUS RENAL REPLACEMENT THERAPY

John Holmes*, PharmD; Heather Bullard, PharmD; Jay Koyner, MD

University of Chicago Medical Center, 5841 S. Maryland Ave, Chicago, IL, 60637

john.holmes@uchospitals.edu

Purpose: Patients may develop severe acute kidney injury (AKI) in the intensive care unit requiring renal replacement therapy (RRT). Hematologic effects of RRT have been documented in patients receiving hemodialysis (HD), but to a lesser extent in patients requiring continuous renal replacement therapy (CRRT). Studies have demonstrated a transient decrease in platelet count in the first 15-30 minutes of HD and an increase in mortality associated with the magnitude of platelet reduction; however this issue has not been examined in patients receiving CVVHD. Concerns regarding thrombocytopenia are justified and warrant further investigation. We sought to determine if CRRT is an independent risk factor for the development of thrombocytopenia. The research project will also evaluate the financial implications of thrombocytopenia during CRRT by capturing the cost of argatroban used as well as the cost and number of platelet-factor 4 or serotonin-release assays sent when heparin-induced thrombocytopenia is suspected. **Methods:** This is a retrospective chart review of critically ill adult medical intensive care unit patients at an academic medical center. Patients with an intensive care unit length of stay greater than 24 hours and initial platelet count greater than 100,000 at least 48 hours prior to ICU admission will be included. Patients who received any RRT 48 hours or less prior to study inclusion, possess intra-aortic balloon pumps, left ventricular-assist devices, are undergoing extracorporeal membrane oxygenation, or underwent less than 24 hours of CVVHD during the study period will be excluded. The primary endpoint will be analyzed utilizing logistic regression while secondary endpoints will be analyzed utilizing either Cox regression analysis or a Student's T-test. **Results/conclusions:** Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the proposed mechanism for the development of thrombocytopenia in critically ill patients receiving continuous renal replacement therapy.

Explain the fiscal implications resulting from the diagnostic workup of heparin-induced thrombocytopenia in patients who become thrombocytopenic while receiving CRRT.

Self Assessment Questions:

The development of thrombocytopenia in critically ill patients receiving continuous renal replacement therapy may be related to which of the following?

- A: Underlying disease states
- B: New or active VTE
- C: Medications
- D: All of the above

Additional costs related to the development of thrombocytopenia in critically ill patients receiving CRRT can manifest in which way?

- A: Alteration of blood flow rates during CVVHD
- B: Possibility of bleeding
- C: Medications and lab tests sent as a result of HIT suspicion
- D: Explaining a low platelet count to a patient's family member

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-451-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTING TRANSITIONS OF CARE IN A HEALTHCARE SYSTEM- A PILOT STUDY ON PATIENTS DISCHARGED ON ANTICOAGULANTS

John P. Holston, PharmD, MBA*, PGY-1 Pharmacy Resident; Amanda Castle, PharmD, BCPS; Kelly McDonald, PharmD, MBA
Norton Healthcare, 315 East Broadway, Louisville, KY, 40202
john.holston@nortonhealthcare.org

Purpose: Hospital readmissions are a focus of the US Patient Protection and Affordable Care Act (ACA). The ACA emphasizes coordination of care across patient transitions as one solution to decreasing unnecessary hospital readmissions. At many hospitals this has led to the development of transitions of care programs focused on reducing readmission rates, lengths of stay, and costs. Pharmacists can make significant contributions to transitions of care programs through their medication knowledge and effective communication of medication information. The purpose of this study is to determine if a pharmacy resource dedicated to transitions of care can impact clinical patient outcomes as well as the outpatient pharmacy business model in patients on anticoagulant therapy.

Methods: This study is a four week, single-center, pilot study with historical control. Eligible patients include those admitted to Norton Hospital, ≥18 years, and discharged on an anticoagulant. During the intervention period identified patients expected to be discharged on an anticoagulant will have admission medication reconciliation completed by a pharmacist and a description of the outpatient pharmacy services will be provided along with an offer to utilize these services. At discharge, counseling will be provided by a pharmacist to patients electing to utilize the outpatient pharmacy while others will receive discharge instructions per nursing standard. Patients receiving both admit and discharge pharmacist transition of care services will be compared with those only receiving the admission service and with those receiving no pharmacist services. Outcomes will include lengths of stay, readmission rates, outpatient pharmacy prescription capture rate, and incidence of adverse drug reactions related to anticoagulants. Quantitative data will be collected on the medication reconciliations performed; including time spent and the number of problems identified and resolved.

Results and Conclusions: Data collection in progress. Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the objective of a transitions of care program.
Recognize the role of pharmacists in a transitions of care program.

Self Assessment Questions:

Which of the following is an objective of a transitions of care program?

- A Reduced patient readmissions
- B Increased patient readmissions
- C Increased hospital costs
- D Reduced hospital revenue

Pharmacists are recognized as key contributors in transitions of care programs because of their:

- A Medication knowledge
- B Improved patient communication surrounding medications
- C Use of sophisticated medical terminology
- D A & B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-452-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

USE OF AN EXTERNAL BENCHMARKING DATABASE TO PROMOTE VALUE-BASED MEDICATION UTILIZATION

Caroline A Holznecht*, PharmD; Justin P Konkol, PharmD, BCPS; Todd A Karpinski, PharmD, MS, FASHP; Jordan F Dow, PharmD, MS
Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 53226
caroline.holznecht@froedtert.com

The purpose of this project is to increase Froedtert & the Medical College of Wisconsin (F&MCW) stakeholders awareness of medication utilization compared with top performing University HealthSystem Consortium (UHC) organizations. Stakeholders include leading administrators, physicians and pharmacists of service lines. The overarching goal is to promote value-based care, defined as optimizing both patient outcomes and medication expenditure.

The UHC Clinical Database/Resource Manager (CD/RM) will be used to identify areas of opportunity within F&MCW by evaluating medication utilization by Medicare Severity Diagnosis Related Groups (MS-DRGs). F&MCWs medication utilization will be compared with UHC organizations that demonstrate preferable patient outcomes, length of stay, and direct cost within the MS-DRG. Further review will be conducted on medications with high utilization at F&MCW compared with these top performing organizations. The influence this data has on F&MCW stakeholders will be evaluated through a survey.

Five MS-DRGs have been identified as having potential cost savings at F&MCW. Currently, the MS-DRG, major and small bowel procedures, is being analyzed. F&MCWs medication utilization has been compared with a peer group of thirteen UHC members with favorable patient and cost outcomes. Data analysis and collaboration with stakeholders is still being conducted to understand the difference in medication utilization at F&MCW compared with the top performers within this MS-DRG.

The potential benefits and challenges of using the UHC CD/RM as a benchmarking tool will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe how a Medicare Severity Diagnosis Related Group (MS-DRG) is assigned during a hospital admission

Identify qualities of a "top performing" compare group

Self Assessment Questions:

1. A Medicare Severity Diagnosis Related Group (MS-DRG) is assigned through the following components of a hospital admission:

- A Primary diagnosis and secondary diagnoses
- B Primary diagnosis and inpatient length of stay
- C Primary diagnosis and medication utilization
- D Primary diagnosis and itemized list of services

A compare group or "top performer" should have the following qualities:

- A Low medication utilization
- B Equivalent or superior patient outcomes
- C Poor patient outcomes
- D High cost index

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-775-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF A MORPHINE VERSUS METHADONE WEAN FOR IATROGENIC WITHDRAWAL IN THE PEDIATRIC POPULATION

Jessica L Hoover, Pharm.D.*; Jennifer L Schultz, Pharm.D., BCPS
Bronson Methodist Hospital, 601 John Street, Kalamazoo, MI, 49007
hooverj@bronsonhg.org

Purpose: Opioids are commonly administered to critically ill children for analgesia and sedation. As a consequence of prolonged sedation, many patients experience opioid withdrawal upon discontinuation of therapy. Both methadone and morphine have been used historically to prevent opioid withdrawal. The purpose of this study is to determine whether the change in iatrogenic withdrawal management in pediatric patients at Bronson Methodist Hospital has effectively and safely shortened the duration of opioid wean.

Methods: This study is designed to be a retrospective cohort study conducted at Bronson Methodist Hospital. It consists of two arms; patients who received a methadone wean after prolonged exposure to opioids and patients who received a morphine wean after prolonged exposure to opioids. The study includes patients <18 years of age, admitted to the PICU between January 1st 2012 and February 28th 2015, and having received morphine or fentanyl continuous infusion for >5 days. Patients are excluded if they are >18 years of age, receiving chronic opioids prior to current PICU admission or pregnant. The primary objective of this study is to assess differences in clinical outcomes prior to and after the incorporation of a standardized morphine wean guideline and order set in the pediatric patients at Bronson Children's Hospital.

Results/Conclusion: Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the patient population at risk for developing opioid induced iatrogenic withdrawal.

Explain advantages and disadvantages to a methadone or morphine withdrawal wean.

Self Assessment Questions:

Which of the following is an advantage of a morphine wean?

- A Unpredictable pharmacokinetics
- B Drug accumulation in renal dysfunction
- C Fewer drug-drug interactions
- D Longer taper

Which item is not evaluated by the Withdrawal Assessment Tool (WAT-1)?

- A Sweating
- B Age
- C Increased muscle tone
- D Tremor

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-453-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF ALVIMOPAN ON POST-OPERATIVE LENGTH OF STAY IN PATIENTS UNDERGOING ELECTIVE BOWEL RESECTION

*Cassandra M. Hopp, Pharm.D.; Kate J. Cain, Pharm.D., BCPS; Angela L. Appel, M.D.; Lisa M. Meyer, Pharm.D., BCPS; Amanda L. Wegenka, Pharm.D.; Andrew J. Borgert, Ph.D.

Gundersen Lutheran Medical Center, 1900 South Ave, La Crosse, WI, 546016281

cmhopp@gundersenhealth.org

Purpose

Alvimopan is a mu-opioid receptor antagonist indicated to help restore bowel function after elective partial large or small bowel resection surgery. Alvimopan has been shown to accelerate gastrointestinal tract recovery and decrease post-operative length of hospital stay when used as part of an accelerated recovery pathway in patients undergoing bowel resection. Our aim is to determine if the initial experience with alvimopan within Gundersen Health System will confer similar benefits.

Methods

Prior to data collection, approval was obtained from the Institutional Review Board for retrospective chart review. Gundersen Health System's electronic health record was used to identify eligible patients who underwent elective bowel surgery from January 1, 2011 through December 31, 2014, based on ICD-9 procedure codes. Patients were divided into two groups, those who received perioperative alvimopan and those who did not. Groups were matched based on age, sex, and type of surgery to minimize inter-group differences. The following data was collected for each patient: age, sex, type of surgery, number of alvimopan doses received, duration of alvimopan therapy, post-operative time to flatus and/or bowel movement, and post-operative length of stay. Patients were excluded if they received only a pre-operative dose of alvimopan and no post-operative dose(s), as well as those who received post-operative dose(s) but no pre-operative dose. The primary endpoint of this study was to determine if the length of hospital stay was decreased in patients who received perioperative alvimopan versus patients who did not receive alvimopan. Secondary endpoints included the time to return of bowel function, and potential cost savings associated with alvimopan use.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe appropriate use of alvimopan including indication, dosing, and duration of therapy

Relate length of hospital stay in patients receiving perioperative alvimopan to that of patients not receiving alvimopan after undergoing elective bowel resection surgery

Self Assessment Questions:

A 78-year-old female patient with recently diagnosed colon cancer is scheduled to undergo a planned hemicolectomy. Her estimated creatinine clearance is 35 mL/min. Which of the following is an appropriate dosing regimen for alvimopan?

- A 12 mg orally 30 minutes prior to surgery, followed by 12 mg orally
- B 12 mg orally beginning the day of surgery and for up to 7 days or until bowel function returns
- C 6 mg orally 90 minutes prior to surgery, followed by 6 mg orally twice daily
- D Alvimopan use is not appropriate in this patient

Studies have shown that alvimopan demonstrates benefit for bowel resection patients in which of the following ways?

- A Accelerates return of bowel function and decrease time to first bowel movement
- B Decreases opioid requirements for adequate post-operative pain control
- C Decreases postoperative length of hospital stay
- D A and C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-454-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECTIVENESS OF TWO GENOTYPE 1 HEPATITIS C VIRUS TREATMENT REGIMENS IN POST-SOLID ORGAN TRANSPLANT PATIENTS

Kari Horn, PharmD* and Michelle T. Martin, PharmD, BCPS, BCACP
University of Illinois at Chicago, 211 East Delaware Pl
#1407, Chicago, IL, 60611
hornks@uic.edu

Purpose

In 2014, the American Association for the Study of Liver Diseases (AASLD) guidelines recommended two treatment regimens for patients with hepatitis C virus (HCV) with genotype (GT) 1 that are post-liver transplant: sofosbuvir (SOF) + ribavirin (RBV), and SOF + simeprevir (SMV), despite the lack of extensive data in treating HCV in solid-organ transplant recipients with these regimens. Our institution utilized both treatment regimens based on the AASLD guidelines. This study will describe the sustained virologic response (SVR12) rates in this difficult-to-treat population at an urban academic medical center.

Methods

This retrospective chart review includes patients who initiated HCV treatment between January 1, 2014 and September 26, 2014. Patients were HCV GT 1, post-solid organ transplant, and treated with SOF and SMV for 12 weeks or SOF and RBV for 24 weeks. The primary outcome is the SVR12 rate, which will be compared to published SVR12 rates from clinical trials. Secondary outcomes will explore any differences in SVR12 rate by baseline characteristics, including GT 1a versus 1b, time elapsed from transplant to HCV treatment, type of solid organ transplant, level of fibrosis at initiation of HCV treatment and renal function. Other secondary outcomes include assessment of change in fibrosis and liver function tests relative to baseline after completion of HCV treatment; proportion of therapeutic and non-therapeutic immunosuppression levels during HCV treatment; requirement for dose adjustments of immunosuppression agents; need for RBV dose adjustments, anemia, epoetin use, and blood transfusions during HCV treatment. Data points will be collected at weeks 0, 4, 8, 12, and 24 for SOF and SMV and weeks 0, 2, 4, 8, 12, 16, 20, 24 and 36 for SOF and RBV.

Results

Data collection is currently ongoing.

Conclusions

Data analysis will be presented at the Great Lakes Pharmacy Resident

Learning Objectives:

Describe advantages and disadvantages of two different treatment regimens for hepatitis C.

Identify pertinent monitoring parameters for the hepatitis C treatment regimens sofosbuvir + simeprevir and sofosbuvir + ribavirin.

Self Assessment Questions:

Which of the following is a disadvantage of the treatment regimens sofosbuvir + simeprevir, and sofosbuvir + ribavirin over interferon-based therapies?

- A Lower incidence of anemias
- B Lower incidence of flu like symptoms
- C Higher cure rates
- D Cost

Which of the following would you use to determine treatment success with simeprevir and sofosbuvir?

- A Immunosuppression levels
- B Hepatitis c viral load
- C Hemoglobin
- D Sodium

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-455-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE INCIDENCE AND RISK FACTORS OF PROPOFOL-ASSOCIATED HYPERTRIGLYCERIDEMIA

Mackenzie D. Horning*, PharmD; Jodi Dreiling, PharmD, BCPS; Nancy Berry, PharmD; Lawrence A. Frazee, PharmD, BCPS
Akron General Medical Center, 1 Akron General Avenue, Akron, OH, 44304
mackenzie.horning@akrongeneral.org

Purpose: Propofol is a lipophilic, intravenous anesthetic utilized for sedation during mechanical ventilation. Hypertriglyceridemia is a reported side effect ranging from 3-10% in pre-marketing trials. However, neither the package insert, nor the 2013 Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit make recommendations regarding triglyceride (TG) monitoring. There have been limited published studies evaluating propofol-associated hypertriglyceridemia. The objective of this study is to investigate the incidence, risk factors, and clinician response of propofol-associated hypertriglyceridemia.

Methods: This is a retrospective, cohort study from January 2009 to November 2014 evaluating the incidence, risk factors, and clinician response of propofol-associated hypertriglyceridemia. Patients were identified via pharmacy dispensing records. Patients eligible for inclusion were those 18 years of age or older who were administered propofol for at least 24 hours and had a TG level drawn while receiving propofol. Pregnant patients were excluded. Data collection included: demographic data, hypertriglyceridemia history, type of critical care patient (medical, surgical, cardiac, neurology, trauma), TG level while on propofol, average propofol dose per day, number of days administered propofol at the time of TG level draw, and clinician response to hypertriglyceridemia. Hypertriglyceridemia has been conservatively defined as a TG \geq 300 mg/dL. The primary endpoint is incidence of propofol-associated hypertriglyceridemia. Secondary endpoints include an evaluation of risk factors linked to propofol-associated hypertriglyceridemia and a description of clinician response. All data has been recorded without patient identifiers and confidentiality is being maintained within a password-protected electronic database. A statistician will aid in the analysis of the data.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the current recommendations for triglyceride monitoring in patients receiving propofol.

Recognize the risk factors identified in previous studies for propofol-associated hypertriglyceridemia.

Self Assessment Questions:

Which of the following best explains triglyceride monitoring recommendations in patients receiving propofol per the pain, agitation, and delirium ICU guidelines?

- A Every 7 days
- B Baseline, every 3-7 days
- C Baseline, every 3-12 months
- D There are no current recommendations in the guidelines

AT is a 25 yo AA male admitted to the SICU after a MVC. He weighs 97 kg, has a PMH of HTN, and has been receiving propofol for 11 days. His current source of nutrition is from tube feeds. Based on ris

- A Zero
- B One
- C Two
- D Three

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-456-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF HEALTH-CARE PROFESSIONAL EDUCATION ON MISSING MEDICATIONS IN A COMMUNITY TEACHING HOSPITAL

Cleve Hosea, PharmD*, Tana E. Hannawa, PharmD, Craig Rodebach, RPh, Sawsan Shayota, PharmD, BCPS
St. Joseph Mercy Oakland, 44405 Woodward Avenue, Pontiac, MI, 48341
Cleve.Hosea@stjoeshealth.org

Purpose: Over the last decade, Saint Joseph Mercy Oakland (SJMO) has implemented several technologies to improve the medication distribution system. Despite the numerous advances in technologies, missing medications has been a continuous challenge for SJMO and other institutions. Timely delivery and administration of medications is the hallmark for optimal patient care. Missing medications have the potential to cause delay in patient care and impact healthcare cost. A study conducted at SJMO revealed that missing medications cost the hospital over \$200,000 annually. One factor that contributes to missing medications could be the lack of understanding regarding medication delivery process. Comprehensive investigation of the source and location of missing medications must be completed before any intervention can be done. To this day, there is limited published literature evaluating the impact of education of pharmacy and nursing staff on missing on missing medications.

Methods: The study is single-center prospective, observational study. The primary objective is to reduce the percentage of all missing medications. The secondary objective is reduced overall cost of missing medications. This study will investigate the reasons for missing medications for one month period. Once the reasons for the missing medication are identified, appropriate intervention such as education will be provided to the health-care professional (ie: nurses and pharmacists) regarding drug distribution system. The descriptive analysis, which includes: location of missing medications, frequencies of various medication classes, types of orders (STAT versus scheduled), and nursing units will be conducted.

Results/Conclusion:
Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Identify causes of missing medications
Identify strategies to reduce the amount of missing medications

Self Assessment Questions:

Which of the following medications are evaluated in this study?

- A Only IV medications
- B: IV, routine, and STAT medications
- C: Only high alert medications
- D: Only topical and IV medications

One possible cause of missing medications is:

- A Lack of understanding regarding medication delivery process
- B Electronic/ technological system error is the only reason behind m
- C Suboptimal medication distribution process
- D Both A & C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-776-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF HYPOMAGNESEMIA ON PROTON PUMP INHIBITORS AT THE HUNTINGTON VETERANS AFFAIRS MEDICAL CENTER - IHOP

Chelsey Houchins, Pharm.D.,* James Allman II, Pharm.D., BCPS, Teka Samson, MD., Ebrahim Sabbagh, D.O., Dennis Lester, Medical Student
Veteran Affairs - Huntington Medical Center, 1540 Spring Valley Drive, Huntington, WV, 25705
chelsey.houchins@va.gov

Purpose: Proton pump inhibitors (PPIs), both prescription and over-the-counter, are widely used for the treatment of acid-related disease states such as dyspepsia, gastroesophageal reflux disease, esophagitis, and peptic ulcers. PPIs are generally considered safe in most patient populations; however, there are several adverse effects that can occur especially with long-term use. Hypomagnesemia is a newer complication arising in the literature following multiple case reports over the past several years. The true incidence of hypomagnesemia associated with PPI use remains somewhat unclear at this time.

Methods: A retrospective chart review was performed on patients at the Huntington VAMC who have been receiving or have received long term PPI therapy (considered > 3 months). Magnesium levels were reviewed to determine incidence of hypomagnesemia with PPI use. Other data identified and analyzed included calcium and potassium levels, PPI prescribed, Loop and thiazide diuretic use, and the need for magnesium supplementation.

Results: Data is currently being collected and analyzed. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss possible mechanisms associated with proton pump inhibitors that may lead to hypomagnesemia in patients using long term.
Identify several side effects that can be associated with low magnesium

Self Assessment Questions:

In 2011, the FDA issued a warning announcing the association between long term PPI therapy and what electrolyte abnormality?

- A Hyponatremia
- B: Hypernatremia
- C: Hypomagnesemia
- D: Hypermagnesemia

According to case reports, how early has low magnesium been reported after starting a proton pump inhibitor?

- A 1 day
- B 1 week
- C 3 weeks
- D 3 months

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-457-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A RESIDENT-LED STUDENT MENTORING PROGRAM ON PHARMACY RESIDENT MENTORING SKILLS

Meredith Howard,* PharmD, BCPS; Sarah Nisly, PharmD, BCPS; Lindsay Saum, PharmD, BCPS, CGP; Jessica Wilhoite, PharmD, BCACP

Indiana University Health, 1701 N Senate Blvd, AG401, Indianapolis, IN, 46202
mhoward11@iuhealth.org

Purpose: Mentoring, both formally and informally, is often credited for having great impact on professional development in many health professions, including pharmacy. Descriptions of mentoring programs are available in the literature; however, little is known about how best to advance the development of mentoring skills, especially in young professionals completing postgraduate training such as pharmacy residents and fellows. Often, these individuals are expected to engage as preceptors and mentors shortly following training but may have little formal experience. The objective of this study was to implement a resident-led student mentoring program and evaluate its effect on the development of resident mentoring skills through resident perceptions.

Methods: Advanced Pharmacy Practice Experience (APPE) students participating in block scheduling from two Indiana pharmacy schools and PGY-1 and PGY-2 pharmacy residents at Indianapolis area programs were contacted for voluntary participation in the program. Students and residents were paired together for the resident to serve as a mentor to the student throughout the program. Residents were provided mentoring information materials at the beginning of the program and routinely throughout. Five sessions (three live and two asynchronous) were held to facilitate mentor-mentee relationships and to discuss various mentoring and professional development topics. Sessions and topics included discussions on curriculum vitae and letter of intent preparation and interview preparedness. Perception surveys were provided to the residents before and at completion of the mentoring program to measure changes in their mentoring comfort and ability.

Results: Twenty-five PGY-1 and PGY-2 residents from four Indianapolis area hospitals participated in the mentoring program. Pre-surveys were completed by 21 participants (84%). Data analysis is currently ongoing.

Conclusions: Final results will be presented and will help determine the impact of a formal mentoring program on resident mentoring skills.

Learning Objectives:

Identify a need for development of resident mentoring skills.

Discuss benefits and challenges of involving residents in the mentoring of pharmacy students.

Self Assessment Questions:

Why is it important for pharmacy residents to develop mentoring skills?

- A: Mentoring skills are necessary for professional development of self
- B: They will be expected to serve in mentoring capacities following program
- C: Pharmacy students/mentees desire resident mentoring
- D: All of the above

What is one challenge faced when attempting to develop mentoring skills?

- A: Lack of formal instruction on how to mentor younger professionals
- B: Access to materials related to mentoring (ie topics to discuss, questions)
- C: Interest of younger professionals in being mentored
- D: Ability to meet face to face for mentoring activities

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-777-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

HEPARIN DOSAGE REQUIREMENTS DURING HYPOTHERMIA VERSUS NORMOTHERMIA IN CARDIAC ARREST SURVIVORS

Kristin Howard, PharmD*; Quinn Czosnowski, PharmD, BCPS; Michelle Deckard, RN, MSN, ACNS-BC, CCRN-CMC

Indiana University Health, Indiana University Health, 1701 N. Senate Avenue, Indianapolis, IN, 46202
khoward7@iuhealth.org

Background:

Targeted temperature management (TTM) has been shown to significantly improve neurologic and overall outcomes following out-of-hospital cardiac arrest. Unfractionated heparin (UFH) is commonly used for systemic anticoagulation when thromboembolic causes of cardiac arrest are suspected. Standard IV UFH dosing has been shown to result in elevated activated partial thromboplastin times (aPTTs) when used in TTM patients post-cardiac arrest, which may predispose patients to an increased risk of bleeding.

Purpose:

The purpose of this study is to determine IV UFH requirements to attain goal aPTTs during TTM (33°C) versus normothermia (36-38°C).

Methods:

Adult patients undergoing TTM at Methodist Hospital between January 1, 2013 and December 31, 2014 were included for analysis in this retrospective chart review if they had orders for therapeutic IV heparin with aPTTs at baseline and during TTM. Data were collected from the TTM database and chart review. Mean patient heparin doses throughout TTM were categorized into one of three ranges and assessed by the percentage of time aPTT values were within the goal aPTT range, supratherapeutic or subtherapeutic. Data from study patients was compared to a matched control group also receiving UFH but not undergoing TTM for comparison.

Data collected includes patient demographic information, in-hospital or out-of-hospital cardiac arrest, co-morbid conditions, baseline coagulation tests, aPTTs throughout TTM, baseline and daily hemoglobin/hematocrit, death during hospitalization, heparin protocol used, anticoagulant(s) prior to admission, intensive care unit and hospital lengths of stay, and major bleeding events. Data specific to heparin includes indication, duration of therapy, bolus dose, initial infusion rate, and cumulative infusion rates required during TTM and for 48 hours following re-warming. Descriptive statistics and student's t-test will be utilized for continuous variables, with Chi-square or Fisher's exact test for categorical variables.

Results:

Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role IV heparin plays in cardiac arrest survivors undergoing targeted temperature management (TTM).

Explain the process of TTM and its benefits in cardiac arrest survivors.

Self Assessment Questions:

Which of the following statements describe the role heparin plays in targeted temperature management (TTM) patients?

- A: Therapeutic IV heparin should not be used in TTM patients
- B: Therapeutic IV heparin is commonly used for systemic anticoagulation
- C: Therapeutic IV heparin is used in all TTM patients
- D: Treatment doses of low molecular weight heparins (LMWH) are preferred

Which of the following statements regarding TTM for cardiac arrest patients is correct?

- A: Patients should be cooled to 28- 30°C for 12 to 24 hours
- B: International Liaison Committee on Resuscitation (ILCOR) has published
- C: TTM has not been shown to significantly improve neurologic and
- D: Data supporting TTM comes from in-hospital PEA/asystole arrests

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-458-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

LEAN METHODOLOGY IN AN OPEN-ARCHITECTURE CLEAN ROOM

Linda Huang*, PharmD; Timothy T Smith, MS, RPh; Brad R Petersen, PharmD, MS

Grant Medical Center, 3600 Reed Rd, Unit 20, Columbus, OH, 43220

Linda.Huang@ohiohealth.com

Purpose: With the impact of United States Pharmacopeia (USP) Chapter 797, health-system pharmacies may need resources to evaluate clean room designs for complying with the sterile IV preparation compounding guidelines. Additionally, lean methodology may be used to increase efficiency and decrease waste in the clean room. The purpose of this project is to evaluate the impact of lean process improvement on sterile IV preparation compounding work flow in an open-architecture clean room. Specific aims include to illustrate current workflow processes, identify and implement areas of improvement for workflow, and to describe challenges as well as advantages of open-architecture clean rooms.

Methods: This study is a prospective, observational, quality improvement project to take place over a 6-month time period from October 2014 through March 2015. Sterile IV preparation compounding of "first doses" (medications dispensed for the first time for a patient) will be observed. Spaghetti diagrams and process mapping will be used to illustrate and evaluate current workflow of compounding first doses for areas of opportunity to increase efficiency. Outcomes of interest include current steps in the work flow process, including time and distance spent on each step. After observing and evaluating current workflow, pharmacists and pharmacy technicians will be engaged in work-outs to gather suggestions and opinions. Changes in workflow will then be implemented and re-evaluated using process mapping. Data will be collected through direct observation, and descriptive statistics will be used to explain the workflow process and identify areas for improvement as well as trends observed.

Results/Conclusions: Results and conclusions will be presented at the 2015 Great Lakes Residency Conference.

Learning Objectives:

State advantages and disadvantages of an open-architecture style clean room

Describe tools used in lean process improvement

Self Assessment Questions:

Which of the following is an advantage of an open-architecture style clean room when compared to a traditional clean room?

- A: Less frequent cleaning requirements
- B: Greater maneuverability
- C: Less strict garbing requirements
- D: Less frequent equipment maintenance requirements

What are the seven (7) wastes in lean process improvement?

- A: Transport, Inventory, Motion, Waiting, Overproduction, Over process
- B: Transport, Inventory, Motion, Waiting, Overproduction, Over analysis
- C: Time, Inventory, Motion, Wasting, Overproduction, Over processing
- D: Transport, Inventory, Motion, Waiting, Overproduction, Over process

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-778-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DETERMINING THE RISK OF ANTIMICROBIAL RESISTANCE IN COMMON BACTERIAL PATHOGENS FOLLOWING ANTIBIOTIC EXPOSURE

Nicholas R. Hudson*, PharmD; Ashley M. Wilde, PharmD, BCPS

Norton Healthcare, 902 Hampshire Dr., Apt A, Louisville, KY, 40207

nicholas.hudson@nortonhealthcare.org

Purpose:

It is well known that antibiotic exposure is associated with decreased susceptibilities, however the extent of exposure needed for different drug/bacteria combinations to develop resistance is not identical. There is also limited data on the temporal relationship between antibiotic exposure and development of a resistant pathogen. The purpose of this study is to elucidate which combinations of organisms and antibiotics are most susceptible to developing resistance, assess how much antibiotic exposure is necessary for development of resistance, and determine the time frame between antibiotic exposure and resistance.

Methods:

This was a retrospective, observational study. Patients were identified by having an initial index culture that was positive for a target organism. Patients were included in the study if they then had a second positive culture from a different admission with the same organism and source and was collected within one year of the index culture. The primary outcomes were drug resistance development for targeted pathogens and the time between antibiotic exposure and development of resistance. The secondary objective was to describe the antibiotics received by patients who develop a resistant pathogen.

Results/Conclusions:

Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the effects on outcomes of empiric antibiotic regimens that have in vitro activity against the infecting organism

Identify the effects of time from antibiotic exposure on the development of antimicrobial resistance

Self Assessment Questions:

Choosing an empiric antibiotic regimen with activity against the infecting organism has been shown to produce which of the following:

- A: Decreased mortality
- B: Increased length of stay
- C: Decreased rates of pneumonia
- D: Decreased readmission rates

Kuster and colleagues found which of the following to be the most important predictor of antimicrobial resistance in patients with invasive pneumococcal disease?

- A: Cumulative dose of antibiotic
- B: Time elapsed from last antibiotic treatment course
- C: Length of antibiotic treatment
- D: Number of antibiotics prescribed

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-459-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

FOSFOMYCIN FOR THE TREATMENT OF COMPLICATED URINARY TRACT INFECTIONS: A RETROSPECTIVE STUDY

Amanda M. Hult, Pharm.D.*; Dean A. Van Loo, Pharm.D.

Bronson Methodist Hospital, 601 John Street, Box 56, Kalamazoo, MI, 49007

hultam@bronsonhg.org

Purpose

Fosfomycin is an antimicrobial agent indicated for the treatment of uncomplicated urinary tract infections in women caused primarily by *Escherichia coli* or *Enterococcus faecalis*. Fosfomycin also has unlabeled indications for males with complicated urinary tract infections and prostatitis; however, there is no current indication for its use in treating pyelonephritis. At Bronson Methodist Hospital, physicians have been prescribing fosfomycin for complicated urinary tract infections when there was no other viable antibiotic option. Given that there is limited evidence and it is not recommended in current guidelines, the purpose of this study is to provide health care providers with data evaluating whether or not fosfomycin therapy is effective for the treatment of complicated urinary tract infections.

Methods

This is a retrospective study of patients ≥ 18 years of age that were admitted to Bronson Methodist Hospital and were treated with fosfomycin for a complicated urinary tract infection. A matched cohort of patients treated with levofloxacin or ceftriaxone for the same indication were also selected to act as a control group. Patients were excluded if they were being treated for kidney stones or urosepsis, had an indwelling catheter during their hospital admission or were pregnant. Primary outcomes were incidence of documentation of clinical resolution of symptoms and incidence of laboratory evidence of resolution of infection as defined by time to normalization of white blood cell count and time to defervescence. Secondary outcomes included incidence of hospital readmission for the same indication, incidence of mortality and adverse events.

Results/Conclusion

Data collection and analysis are ongoing. Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the bacterial organisms that are covered by fosfomycin's spectrum of activity.

Indicate if you would use fosfomycin for the treatment of a patient with a complicated urinary tract infection.

Self Assessment Questions:

Which organisms would be adequately covered by the use of fosfomycin for a urinary tract infection?

- A: Vancomycin-resistant *Enterococcus* species
- B: *Pseudomonas aeruginosa*
- C: *Bacteroides fragilis*
- D: A and B

A male patient with flank pain was admitted to your hospital with a urine culture positive for vancomycin-resistant *Enterococcus faecalis* (VRE). Which treatment regimen would be appropriate for treatment?

- A: Fosfomycin 3g single dose
- B: Fosfomycin 3g every 3 days for 3 doses
- C: Ceftriaxone 1g QD for 14 days
- D: Bactrim DS BID for 7 days

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-460-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A MONITORING TOOL THAT IDENTIFIES CORRELATING RISK FACTORS THAT MAY LEAD TO OPIOID INDUCED RESPIRATORY DEPRESSION IN SURGICAL PATIENTS

*Nicole T. Humbert, PharmD, Cheryl Genord, R.Ph, Dan Markos, MSN, RN, AGCNS-BC

St. Joseph Mercy Hospital, 5301 East Huron River Drive, P.O. Box 995, Ann Arbor, MI, 48106-0995

nicole.humbert@stjoeshealth.org

Purpose: Primary pharmacologic intervention for managing pain in surgery patients are opioid analgesics. During opioid administration there is a potential risk for opioid induced respiratory depression (OIRD). Identifying patients at risk for respiratory depression can reduce adverse events, increase patient safety and improve satisfaction. The Joint Commission recommends patients are screened for respiratory depression risk factors. The objectives of this study are to develop and validate a preoperative OIRD risk index tool to identify high-risk surgical patients and to retrospectively determine contributing iatrogenic factors that may contribute to oversedation and/or respiratory depression in patients who receive naloxone for OIRD.

Methods: This is a retrospective, observational, single-center study to determine the presence of established OIRD risk factors in surgical inpatients. Patient risk factors include: age, airway obstruction, cardiac, hepatic, pulmonary, renal diseases, and surgery type. The patient population will be divided into two groups: patients who did not receive naloxone during the post-operative period and patients who received naloxone for OIRD. Analysis will occur to determine the number and type of risk factors observed for each group. Iatrogenic factors will be evaluated in the patients who receive naloxone. A multifactorial risk index will be developed using this information to determine patients that are at low, moderate and high risk for OIRD. This will be used to determine if the patients who were low risk had different iatrogenic factors than high risk patients. The iatrogenic risk factors found in our hospital population will be used to make recommendations on how we monitor and/or treat high risk patients identified from the multifactorial risk index tool.

Results: Statistically significant risk factors are hepatic dysfunction, renal dysfunction, cardiac dysfunction, type of surgery and OSA.

Conclusion: There are iatrogenic and patient specific risk factors that play a role in a post-surgical patient developing OIRD and requiring naloxone administration.

Learning Objectives:

Recall the risk factors for opioid induced respiratory depression (OIRD).

Select a patient at high risk for developing OIRD.

Self Assessment Questions:

What is a major risk factor for developing OIRD?

- A: Age < 60 years old
- B: History of pneumonia
- C: GFR < 30
- D: Female

Which patient has the greatest risk of developing OIRD?

- A: 89 y/o male with a GFR of 26, history OSA, a-fib, liver dysfunction
- B: 26 y/o female with a GFR of 70 and a BMI of 36
- C: 77 y/o male with a BMI of 32
- D: 56 y/o female with a GFR of 65, BMI of 32, undergoing a total knee

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-915-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

UTILIZATION OF COLONY STIMULATING FACTORS AND THE EFFECTS ON NEUTROPENIC FEVER

Alexandra M Hurst, PharmD*; Ryan Shely, PharmD, BCPS; Kimberly B Flynn, PharmD, BCPS; Greg Mateyoke, PharmD
St. Joseph Hospital East, 3901 Rapid Run Dr, Apt 521, Lexington, KY, 40515
alexandrahurst@sjhlex.org

Purpose: Colony stimulating factors (CSF) are biologic agents that regulate proliferation, differentiation, survival, and activation of myeloid cells. These agents are used in oncology to reduce incidence of neutropenia during myelosuppressive therapy. Studies have shown use of CSF decreases episodes of neutropenic fever (FN) and infection. CSF use is also associated with fewer dose reductions and delays. Guidelines recommend CSF prophylaxis in patients receiving chemotherapy with risk for FN greater than twenty percent. However, practice variations still exist between physicians. The purpose of this study is to determine if variations in CSF use among collaboration sites correlates with incidence of FN.

Methods: This research will be conducted as a multi-center, retrospective, observational cohort study. The study will include patients who received chemotherapy regimens with high or moderate risk of causing neutropenic fever at Saint Joseph East or Saint Joseph Hospital Oncology Clinics from July 2012 to July 2014. The primary endpoint will be rate of hospitalizations for neutropenic fever. Secondary endpoints will include dose delays, dose reductions, incidence of neutropenia, and cost analysis. Data will be obtained utilizing a pre-printed data collection sheet using electronic medical records. Categorical data will be evaluated utilizing the chi-squared test (χ^2) and Fisher's exact test where appropriate. Continuous data will be evaluated utilizing the Student's t-test, or ANOVA where appropriate. An a priori alpha of 0.05 will be set for significance. Data analysis will be performed using Microsoft Excel and SAS statistical software. These methods have been determined to meet federal exemption criteria by the Western Institutional Review Board.

Learning Objectives:

Review background and literature on colony stimulating factor use in chemotherapy

Outline national guidelines for prophylaxis with colony stimulating factors

Self Assessment Questions:

Which of the following agents are FDA approved for the prevention of chemotherapy-induced neutropenia?

- A Filgrastim
- B Tbo-filgrastim
- C Pegfilgrastim
- D All of the above

According to NCCN guidelines, prophylactic use of colony stimulating factors for febrile neutropenia are recommended for

- A Patients at intermediate risk for febrile neutropenia
- B All patients receiving chemotherapy
- C Patients at high risk for febrile neutropenia
- D Prophylactic use of colony stimulating factors is not recommended

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-461-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTING PHARMACY-DRIVEN SMOKING CESSATION CONSULTING SERVICE FOR CANCER PATIENTS RECEIVING CHEMOTHERAPY AT A COMMUNITY HOSPITAL

Meher F. Husain, PharmD*; Tim Clark, PharmD BCPS
Henry Ford Macomb Hospital, 15855 19 Mile Road, Sterling Heights, MI, 48038
mhusain2@hfhs.org

Purpose: Smoking cigarettes is a known risk factor for cancer and many chronic diseases, therefore much emphasis is placed on cessation. Specifically in cancer patients, smoking cessation maintains a strong role of importance after diagnosis because smoking can impact and/or interfere with cancer treatment. Many patients that choose to continue to smoke are unaware of the additive detrimental effects of smoking after a cancer diagnosis and receiving chemotherapy. Henry Ford Macomb Hospital currently does not have a service in place to provide this specific education to patients. The goal of this study is to implement a pharmacy-driven smoking cessation consulting service for chemotherapy patients.

Methods: In this prospective study approved by the Henry Ford Hospital Institutional Review Board, charts of patients with scheduled appointments in the Cancer Care Center will be reviewed. Patients will be identified as possible candidates based on their recent diagnosis and listed smoking history. Oncologists and nurses will identify patients that may be potential participants. These patients will be met at the time of their appointment and provided with a consent form. Once consent is granted, a recommended treatment plan will be formulated based on their responses to a questionnaire. If they choose to not take part in the study, a business card will be provided in the event that they change their mind. Once a consent form is signed, the interview questionnaire will be completed. The primary outcome of a reduction of smoking will be self-reported by the patients.

Results: Data is currently being collected and results will be presented at a Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the benefits of smoking cessation for patients with a diagnosis of cancer and receiving chemotherapy.

Identify efficacious options for smoking cessation.

Self Assessment Questions:

Which of the following is not a benefit of smoking cessation in cancer patients receiving chemotherapy?

- A Decreased risk of a secondary cancer
- B Decreased rate of tumor growth
- C Less side effects from chemotherapy
- D Cure cancer

What option is not considered for smoking cessation?

- A Varenicline
- B Nicotine replacement therapy
- C Electronic cigarettes
- D Behavioral modifications

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-779-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING AN ANTIMICROBIAL STEWARDSHIP PROGRAM: TIME COST-AVOIDANCE, AND TARGETED INTERVENTIONS

*Amy S. Husak, PharmD; Samuel H. Wornall, PharmD, BCPS
St. Claire Regional Medical Center, 222 Medical
Circle, Morehead, KY, 40351
amy.husak@st-claire.org

Purpose: The goal of an antimicrobial stewardship program is to optimize the use of antibiotics to improve patient outcomes, decrease resistance, and decrease costs. Interventions are made by communicating with the care team to ensure the most appropriate and cost-effective antibiotic regimen is used. The purpose of this study is to improve the efficiency and effectiveness of the process of making targeted interventions within an antibiotic stewardship program. The information obtained from this study will be used to eliminate ineffective intervention targets and propose new possible targets.

Methods: This study was approved by the Institutional Review Board. An infectious disease pharmacist will be timed while attempting to find and make interventions from the following targeted lists: IV to PO, empiric, high cost, culture, and consult. This prospective time data will be applied to retrospective data kept by the stewardship program. The goal is to find the least productive and least efficient types of targeted interventions made July 1st 2013 - June 30th 2014. Targeted interventions will be evaluated based on percent yield per time spent. Secondary outcomes may include correlation between efficiency and effectiveness of intervention in relation to antibiotic and antibiotic regimen, physician service, method of contact, and infectious diagnosis. The information obtained from this study will be used to propose new targets for the antimicrobial stewardship program.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the value and the need for strong antimicrobial stewardship programs in our hospitals.

Explain the difference between evaluating an antimicrobial stewardship program through an outcome measure versus a process measure.

Self Assessment Questions:

According to an epidemiological study by Kleven, et al and the IDSA in "Combating Antimicrobial Resistance: Policy Recommendations to Save Lives," what kills more Americans than emphysema, HIV/AIDS,

- A Diabetes
- B: Mrsa
- C: Alcoholism
- D: S. pneumoniae

Some targeted antibiotic lists may be better at revealing opportunities to make interventions than other targeted lists. Comparing the usefulness of these lists is:

- A An outcome measure
- B A process measure
- C A dual measure
- D A therapeutic measure

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-780-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFYING THE OPTIMAL MODEL OF AN INPATIENT PHARMACIST-DIRECTED ANTICOAGULATION SERVICE

*Lisa Hutchinson, PharmD, James Kalus, PharmD, BCPS (AQ CV),
Jona Lekura, PharmD, BCPS
Henry Ford Health System, 2799 West Grand Boulevard, Detroit, MI, 4820
lhutchi4@hfhs.org

Purpose: Anticoagulants are commonly used medications that are associated with both medication errors and adverse events. As a result, individual institutions have sought different ways to safely and effectively manage inpatient anticoagulation. The objective of this study was to identify the optimal staffing model of an inpatient pharmacist-directed anticoagulation service for the management of patients who are anticoagulated with warfarin.

Methods: This IRB-approved, retrospective study at Henry Ford Hospital (HFH) evaluated a pharmacy-directed anticoagulation service before and after a change in staffing model. Patients were included in the study if they were aged ≥ 18 years old, newly started on warfarin during their hospitalization, and if they were eligible to enroll in the Henry Ford Anticoagulation Clinic. Patients were excluded from the study if they were not discharged on warfarin or if they were discharged to a rehabilitation facility. The primary end points included both a transition of care metric and a composite patient safety end point. A patient was considered compliant with the transition of care metric if 100% of the following were met: patient education documented in the medical record, a written pharmacist discharge note, appropriate discharge instructions given to the patient at the time of discharge, and both enrollment in the HFH anticoagulation clinic and an INR drawn within 5 days of discharge. The patient safety composite end point was measured within 30 days of discharge and included episodes of major bleeding, thromboembolism, or a supratherapeutic INR, defined as ≥ 5 . Chi-square test and Fishers exact test were used in the analysis of the primary end points.

Conclusion: Data and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe different models of a pharmacist-led inpatient anticoagulation service

Explain the impact of an inpatient anticoagulation service managed by pharmacists on both transition of care and patient safety

Self Assessment Questions:

With regard to anticoagulation, the Joint Commissions Hospital National Patient Safety Goals state which of the following:

- A Anticoagulation must be managed by a dedicated anticoagulation
- B: Take extra care with patients who take medicines to thin their blood
- C: Pharmacists should ensure that medicines to thin the blood are accurate
- D: The Hospital National Patient Safety Goals do not address anticoagulation

Studies have shown that an anticoagulation service managed by pharmacists improve which of the following outcomes:

- A Patient compliance
- B Healthcare costs
- C Transition of care
- D Therapeutic INRs

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-781-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PHARMACY DRIVEN OPIOID MANAGEMENT CLINIC AND ELECTRONIC CONSULTS IN THE PRIMARY CARE SETTING: A RETROSPECTIVE CHART REVIEW

Angela Hwang, Pharm. D.*, Jacqueline Dages, Pharm. D., BCPS, Daniel Cornett, Pharm. D., BCPS

Veteran Affairs - Cincinnati Medical Center, 8691 Harper Point Drive, Apt B, Cincinnati, OH, 45249

angela.hwang3@va.gov

Purpose: The opioid management (OPM) clinic is a newly implemented primary care pharmacy-driven clinic addressing the need for appropriate treatment and monitoring of patients with chronic non-cancer pain prescribed chronic opioid therapy at the Cincinnati VA Medical Center. Electronic consults (E-consults) are also available to providers for chart review and recommendations by pharmacists. The primary objective of the study is to evaluate the effectiveness of the OPM clinic and E-consults in improving compliance with recommendations for prescribing and monitoring chronic opioid therapy.

Methods: Retrospective chart review from electronic medical records of patients enrolled in OPM clinic and completed E-consults will be conducted. The study period will be from time of enrollment in OPM or completion of E-consult over the course of 3 months. All patients enrolled in the clinic will be eligible for inclusion. Exclusion criteria include cancer diagnosis, dual management with specialized Pain Clinic use of methadone for substance dependence, and E-consults focused solely on methadone and EKG monitoring. Primary outcome measures are based on a modified Office of Inspector General (OIG) criterion for chronic opioid prescribing: documentation of pain diagnosis; opioid dose reduction; breakthrough opioid dose <50% of total daily dose; annual opioid management agreement; urine drug screens; appropriate EKG monitoring for patients on methadone; documentation of pain scores; and daily morphine equivalence (DME) <120. Secondary outcomes are comparative analysis of OPM clinic versus E-consults with regard to the modified OIG criteria, net change in DME, rate of opioid discontinuation, and sub-analysis of individual components of the OIG criteria.

Results/Conclusions: Data collection and evaluation are currently being conducted and will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify criterion on the modified Office of Inspector General checklist for chronic non-cancer pain management.

Discuss risks and benefits associated with chronic opioid use.

Self Assessment Questions:

Which of the following are included in the modified Office of Inspector General criterion?

- A: Documentation of concurrent benzodiazepine use
- B: Appropriate assessment of pain scores
- C: Discontinuation of opioid medications
- D: Goal daily morphine equivalence less than 400

Risk(s) of chronic opioid use include:

- A: Potential for abuse and misuse
- B: Increased risk of constipation and confusion
- C: Higher incidence of mortality
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-462-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF CLINICAL AND PHARMACOECONOMIC BENEFITS RELATED TO BIVALIRUDIN USE IN PERCUTANEOUS CORONARY INTERVENTION

Anthony L Ibrahim, PharmD*, Richard Valone, PharmD, Rox Gatia II, PharmD BCPS, Nishtha Sareen MD

St. Joseph Mercy Oakland, 44405 Woodward Avenue, Department of Pharmacy, Pontiac, MI, 48341

anthony.ibrahim@stjoeshealth.org

Purpose:

Bivalirudin use in patients undergoing percutaneous intervention (PCI) has been associated with lower risk of bleeding, while achieving similar ischemic outcomes as heparin + glycoprotein IIb/IIIa inhibitors (GPI) or provisional use of GPI. The increased cost of bivalirudin may be offset, if its use is associated with less bleeding events. Furthermore, results from HEAT-PPCI have introduced recent controversy indicating that heparin monotherapy outperformed bivalirudin. Nonetheless, heparin + GPI or bivalirudin remain the most commonly used antithrombotic strategies at our institution and thus merit investigation. The purpose of this study was to retrospectively evaluate if bivalirudin is associated with any economical or clinical advantages over heparin based regimens in patients who underwent PCI at a community teaching hospital.

Methods:

The study was designed as a retrospective cohort study of patients that underwent PCI over a two-month period. The two antithrombotic strategies evaluated were bivalirudin and heparin + GPI. Electronic health records were reviewed to collect patient demographic information past medical history, renal function, medications on admission, and at discharge. A cardiology fellow physician evaluated the angiograms to assess the TIMI defined thrombus burden. There were three pre-specified primary outcomes: the composite of TIMI defined major and minor bleeding, all-cause mortality, and the composite of ischemic events (myocardial infarctions and stent thrombosis) with the latter two outcomes to be evaluated in hospital, at 30 days and at 60 days. The secondary outcome will evaluate the mean cost associated with each thrombotic strategy by taking into account length of stay, clinical bleeding data points and 30-day readmission rates. This study was reviewed and approved by the Institutional Review Board.

Results & Conclusion:

Data analysis is in progress. Results and conclusion to be presented at the Great Lakes Residency Conference 2015

Learning Objectives:

Recall the appropriate dosing of eptifibatide in patients with renal insufficiency

Classify bleeding events according to the TIMI scale

Self Assessment Questions:

The appropriate infusion rate for eptifibatide in a patient with an estimated creatinine clearance (CrCl) < 50 mL/min is?

- A: 2 mcg/kg/min
- B: 1 mcg/kg/min
- C: 0.5 mcg/kg/min
- D: 1 mg/kg/min

2. Which of the following may be classified as a TIMI defined Major bleed?

- A: Clinically overt bleeding that results in hemoglobin loss of <3 g/dL
- B: Clinically overt bleeding that results in hemoglobin loss of <3 g/dL
- C: No observed blood loss associated with a decrease in hemoglobin
- D: Any intracranial bleeding

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-463-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A MENTAL HEALTH CLINICAL PHARMACIST ON HBIPS 5 CORE MEASURE ADHERENCE: A DEPARTMENT OF VETERANS AFFAIRS QUALITY IMPROVEMENT ANALYSIS

Michael Ignatovich, Pharm.D.; Barbara Kasper, Pharm.D., BCACP;
Farahnaz Jahangirian, BS, Pharm.D.; Nikunj Patel, Pharm.D.

Veteran Affairs - Illiana Health Care System, 2200 N Vermilion Ave, Apt 506, Danville, IL, 61832

Michael.Ignatovich@va.gov

Purpose:

The Hospital-Based Inpatient Psychiatric Services (HBIPS), consisting of seven quality measures, were implemented to help improve psychiatric patient care. The goal of HBIPS-5 is to increase the percentage of patients discharged on multiple antipsychotics (APs) with appropriate justification. This quality improvement analysis was designed to evaluate the impact of a clinical pharmacist on improving prescriber adherence to HBIPS-5 within VA Illiana Health Care System (VAIHCS).

Methods:

This analysis was reviewed by a local committee and approved as a quality improvement project. A retrospective chart review was performed to retrieve data. Treatment groups were divided into the inpatient psychiatric team with a clinical pharmacist (Team A) and the inpatient psychiatric team without a clinical pharmacist (Team B). Efficacy of pharmacist intervention was determined by difference in percentage of patients meeting HBIPS-5 between the two teams. The primary endpoint was defined as the percentage of patients meeting the HBIPS-5 core measure. The secondary outcome was defined as the percentage of patients readmitted to the mental health ward within 30 days.

Results:

A total of twenty-five patients met full criteria for study enrollment onto Team A (n=7) or Team B (n=18). Six patients in Team A (85.7%) and fourteen patients in Team B (77.8%) achieved the prespecified primary endpoint of meeting HBIPS-5. The secondary endpoint of 30-day readmission was seen in four patients in Team B (22.2%) vs none in Team A (0%).

Conclusions:

Because this study was not powered to detect a difference between endpoints, statistical significance could not be measured. However, the available data suggests a trend toward improvement in adherence to HBIPS-5 in the pharmacist-associated healthcare team, as well as reduction in 30-day readmission rates. Although firm conclusions cannot be reached, this quality improvement analysis helps demonstrate the potential benefit that clinical pharmacists can offer in psychiatric care.

Learning Objectives:

Define the HBIPS-5 core measure and its associated qualification criteria
Discuss the outcomes seen between treatment groups in this quality improvement analysis

Self Assessment Questions:

Which of the following is NOT a part of HBIPS-5 criteria for appropriate justification of multiple antipsychotics?

- A Cross-titration with the goal outlined as AP monotherapy
- B Documentation of severe schizophrenia or schizoaffective disorder
- C Three or more trials of AP monotherapy
- D Augmentation with clozapine

What were the outcomes seen in the study between the clinical pharmacist-associated team (Team A) and team with no clinical pharmacist (Team B)?

- A The presence of a clinical pharmacist improved adherence to HBIPS-5
- B The presence of a clinical pharmacist improved adherence to HBIPS-5
- C The presence of a clinical pharmacist did NOT improve adherence
- D The presence of a clinical pharmacist did NOT improve adherence

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-464-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

FEASIBILITY OF PRE-OPERATIVE MEDICATION HISTORIES COLLECTED BY PHARMACY STUDENTS: A PILOT STUDY

Joshua S. Ilenin, PharmD*; Jennifer L. Rodis, PharmD, BCPS, FAPhA;
Jennifer S. Elliott, PharmD, BCPS; Maria C. Pruchnicki, PharmD, BCPS
Tamara L. McMath, MPH; Christy L. Collins, MA; Nicholas J. Fagan,
PharmD Candidate; Lok I. Tang, PharmD Candidate

Riverside Methodist Hospital, 3535 Olentangy River Rd., Columbus, OH, 43214

Joshua.Ilenin@ohiohealth.com

Purpose: Medication reconciliation is a key aspect of delivering safe care to patients throughout their hospital stay. A major component of medication reconciliation is collecting an accurate home medication history at the time of admission. Pharmacy technicians and students have been increasingly utilized for medication history activities in the emergency department; opportunities exist to expand this model to other points of entry into the hospital. The objective of this study is to evaluate the impact of an Advanced Pharmacy Practice Experience (APPE) rotation involving student-led medication histories in a hospital pre-operative unit and determine if students can efficiently and effectively collect accurate home medication lists in this patient population.

Methods: A prospective, single-center pilot study was conducted during a five month data collection period from September 4, 2014 to January 30, 2015. All patients age ≥18 admitted to OhioHealth Riverside Methodist Hospital for an inpatient surgical procedure were eligible to participate in this study. One APPE student was assigned to the pre-operative unit each month and paired with different nurses each day for an eight-hour shift. During this time the student collected medication histories for patients assigned to these nurses. Students received training to ensure they can independently collect medication histories prior to beginning the rotation. The following data is being collected from electronic medical records to evaluate objectives: number and type of interventions made, methods used to gather medication information, time per medication history, and proportion of surgery patients seen by the students. Interventions made by pharmacists in the post-anesthesia care unit (PACU) will be tracked in order to evaluate the accuracy of medication histories completed by the pharmacy students.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the frequency and type of medication discrepancies identified by pharmacy students as a part of the medication history taking process
Report the accuracy of medication histories collected by pharmacy students compared to a pharmacist.

Self Assessment Questions:

Which of the following was the most common of the interventions documented by pharmacy students during the medication history process?

- A Clarified Missing Dose
- B Clarified Incorrect Allergy
- C Clarified Missing Frequency
- D Clarified Dosage Form

What was the average documented time spent by pharmacy students collecting medication histories in the pre-operative unit?

- A 2 minutes
- B 8 minutes
- C 15 minutes
- D 26 minutes

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-782-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION AND REALLOCATION OF PHARMACIST WORKLOAD WITHIN A FOUR HOSPITAL HEALTH-SYSTEM.

Sheryle Y Ishimoto, PharmD*; Josie E Petty-Klink, PharmD
NorthShore University HealthSystem, 9600 Gross
Point Road, Skokie, IL, 60076
sishimoto@northshore.org

Purpose: The number of pharmacy students and residents in the institutional setting has steadily increased. Creating a more streamlined workflow could potentially increase overall employee engagement while keeping staffing costs down. Pharmacy students and residents are valuable tools to assist pharmacists with daily tasks. Revision of resident and student responsibilities will provide an opportunity to reorganize the pharmacist workflow.

Methods: This evaluation was exempt from the Institutional Review Board as data collected will be utilized as quality improvement within the health system. Productivity data was collected retrospectively from October 1, 2013 to September 30, 2014 to assess baseline workload distribution amongst pharmacy students, residents, and pharmacists including: number of orders verified, initial interventions, patients educated, notes written, and medication reconciliations completed. A taskforce was developed to compare the pharmacist workload between sites within the health system to determine areas of improvement and efficient utilization of resources. A survey will be conducted before and after redistribution implementation to measure changes in employee satisfaction and perceptions of equitability across the hospital sites. The survey content will be validated by two pharmacists independent of knowledge of this project.

Results/Conclusions: Result and conclusions will be presented at the Great Lakes Resident Conference.

Learning Objectives:

Review the workload distribution amongst pharmacists in a multisite organization.

Discuss difficulties and roadblocks of evaluating pharmacist workload at sites with different workflows.

Self Assessment Questions:

All are measurable indicators that can be collected to determine pharmacist workload EXCEPT:

- A Orders verified
- B: Notes written
- C: Answering drug information questions
- D: Medication reconciliations completed

Utilization of pharmacy students and residents will allow more efficient use of pharmacy resources resulting in:

- A Decreased work satisfaction
- B More opportunities to focus on clinical services
- C Higher employee cost within the department
- D Direct patient care for larger patient volumes

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-783-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST-INITIATED HEPATITIS C VIRUS SCREENING AT AN OUTPATIENT PHARMACY TO INCREASE AWARENESS AND LINK TO CARE AT THE MEDICAL CENTER

Nadine Y. Isho, Pharm.D.*, Michelle T. Martin, Pharm.D., BCPS,
BCACP, Marlowe Djuric-Kachlic, Pharm.D., Jennifer Chan-Marcelo,
Pharm.D.

University of Illinois at Chicago Community Pharmacy Residency, 840 S.
Wood St, Chicago, IL, 60612
nisho2@uic.edu

Purpose: The Centers for Disease Control and Prevention (CDC) estimates that patients born between 1945 and 1965 account for approximately 75% of all hepatitis C virus (HCV) infections in the United States. Since 2012, 4 agencies have addressed this statistic by updating their HCV screening recommendations to include a one-time screening for all patients born between 1945 and 1965, regardless of other risk factors. The primary objective of this study is to screen for HCV in patients born between 1945 and 1965 in an outpatient pharmacy setting. Secondary objectives include linking patients with a positive HCV antibody to care by providing the patients with a follow-up appointment at the medical center, and assessing patients HCV awareness and knowledge before and after HCV education is provided.

Methods: This was a prospective study designed to screen for HCV in patients born between 1945 and 1965. Patients at the medical center were recruited from the affiliated outpatient pharmacy. The investigator provided education about disease prevalence, modes of transmission, symptoms, screening, treatment, and disease progression while awaiting results of the HCV antibody test. Patients were given a pre- and post-questionnaire regarding their knowledge of HCV information to assess how education provided by a pharmacist may increase knowledge about HCV. Patients with a positive HCV antibody test result were linked to care by providing them with a follow-up appointment at the medical center for confirmatory testing.

Results and Conclusion: Data collection and analysis will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the percentage of the US patient population with hepatitis C virus who are born between 1945 and 1965

Describe the advantages of a pharmacist-initiated hepatitis C virus screening program in the community setting

Self Assessment Questions:

What percentage of the US population with hepatitis C virus are born between 1945 and 1965?

- A 25%
- B: 50%
- C: 75%
- D: 90%

Which of the following is a benefit of hepatitis C screening availability in a community pharmacy setting?

- A Community pharmacists are accessible to patients
- B Community pharmacists have a large patient base born between 1945 and 1965
- C Community pharmacists are able to assist with increasing awareness
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-465-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING PHARMACISTS' KNOWLEDGE AND APPROACH TOWARDS MEDICATION ADHERENCE

Kimberly S. Plake, PhD; *Raven S. Jackson, PharmD; Stephanie J. Arnett, PharmD, BCACP, CDE

Walgreens - Purdue University, 873 W Carmel Dr, Indianapolis, IN, 46032
raven.jackson@walgreens.com

Purpose: The purpose of this study is to identify opportunities for improving patient medication adherence programs in community pharmacy settings by assessing pharmacists knowledge and opinion regarding their patients medication adherence. **Methods:** This non-randomized, survey-based study aims to assess community pharmacists knowledge of current medication adherence standards and statistics. The study will also address pharmacy-team involvement, pharmacist-patient interactions, and current system-based programs as they relate to patient medication adherence. A 20-question Qualtrics-based survey will be emailed to current Indiana pharmacists via representatives of the Indiana Pharmacist Alliance (IPA) and also to community pharmacists affiliated with Purdue University residency programs. Participants will have one month from the date of receiving to complete the survey. Only data from community pharmacists will be used in data analysis (participants from other areas of pharmacy will not be able to complete the survey based off an initial opt out question). Following one month of data collection, the resident and research team via Qualtrics statistical analysis technology will analyze the survey results. The study's protocol is scheduled to be submitted for approval to the Purdue University Investigational Review Board in February 2015. **Results:** Pending. **Conclusion:** Results from this study will potentially be used to assess quality improvement initiatives for community pharmacy medication adherence programs across various settings.

Learning Objectives:

Recognize the need for medication adherence education amongst community pharmacists

Identify opportunities for continuous quality improvement regarding medication adherence programs in community pharmacy

Self Assessment Questions:

Approximately what percentage of all patients receive their medication from a 'brick and mortar' community pharmacy?

- A 50
- B: 60
- C: 70
- D: 80

Approximately what percentage of patients stop taking their medication within the first 6 months without the authorization of a physician or health care provider?

- A 50
- B 60
- C 70
- D 80

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-784-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

HEPARIN NOMOGRAM ASSESSMENT AND REVISION BASED ON ANTICOAGULATION INDICATION

Minu A. Jacob, Pharm.D.*; Elizabeth Petrovitch, Pharm.D., BCPS; Lynette Moser, Pharm.D.

Harper University Hospital, 3990 John R, Detroit, MI, 48201
mjacob2@dmc.org

Purpose: Pharmacists manage heparin dosing within the Detroit Medical Center (DMC) using three indication-specific heparin nomograms. Recent quality assurance data suggests the current nomograms do not consistently achieve goal aPTT within twenty-four hours of initiation, which may have implications in mortality benefits for patients such as those with acute pulmonary embolism. While reliable anticoagulation can be achieved with alternative anticoagulants, heparin is the best option in some patient populations and optimization of nomogram based dosing is needed. This study aims to improve aPTT target appropriateness and time to reach target aPTT of heparin dosing within the DMC.

Methods: This study evaluates a retrospective cohort of adult patients admitted to an inner city, academic medical center in Detroit, Michigan spanning three phases. In phase I, current heparin dosing, incidence of subtherapeutic, therapeutic, and supratherapeutic aPTTs, adverse events, and the mean heparin dose (units/kg/hr) that equates to therapeutic aPTT will be collected. Phase II will focus on revising nomograms based on Phase I results, staff education and nomogram implementation. In Phase III the revised nomograms will be evaluated based on the parameters in Phase I. The electronic medical record will identify patients eighteen to eighty-nine years old initiated on intravenous heparin dosed by pharmacy. Information to be collected will include patient demographics, co-morbid disease states, anticoagulant and dosing information, pertinent laboratory values, bleeding and thrombosis data, and hospital length of stay. The primary endpoint is to compare the proportion of patients who achieve a therapeutic aPTT within twenty-four hours and rates of major bleeding before and after nomogram revision. Secondary endpoints will evaluate the rates of minor bleeding, thrombosis, and number of lab draws completed before and after heparin nomogram revision.

Results/Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe the benefits of achieving target aPTT within twenty-four hours of intravenous heparin initiation.

Discuss the methods of assessment and impact of heparin dosing nomogram revisions at the Detroit Medical Center on time to target aPTT and rates of major bleeding and thrombosis.

Self Assessment Questions:

For which of the following indications has achieving a target aPTT within 24 hours shown to decrease mortality?

- A Acute coronary syndromes
- B: Pulmonary embolus
- C: Peripheral arterial disease
- D: Mitral valve replacement

What is the heparin dosing recommendation for NSTE-ACS according to the CHEST 2012 guidelines?

- A 70 units/kg bolus and 15 units/kg/hr infusion
- B Target 1.8 to 2.3 times the baseline aPTT
- C Target 1.5 to 2.5 times the baseline aPTT
- D Fondaparinux is recommended over unfractionated heparin

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-466-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TRENDING CREATININE CLEARANCE IN CRITICALLY ILL SEPSIS PATIENTS: WHEN TO RENALLY DOSE MEDICATIONS

Elizabeth G Jacob, PharmD*, Casey D Garman, PharmD, Travis R Tanner, PharmD, Kin O Chan PharmD, Nipa M Patel, PharmD
Kettering Medical Center, 3535 Southern Avenue, Kettering, OH, 45429
elizabeth.jacob@khnetwork.org

Purpose: The purpose of this study is to evaluate trends in creatinine clearance (CrCl) in patients with sepsis in order to determine candidacy for a pharmacy-driven renal dosing protocol. The primary outcome is the percentage of critically ill patients that have a stable CrCl within 48 hours of admission to the intensive care unit (ICU). Secondary outcomes include degree of change in CrCl and number of hours to achieve a stable CrCl. The results will be used to determine appropriate utilization of a renal dosing protocol in the setting of life-threatening infection such as sepsis.

Methods: This is a retrospective, single-center chart review of patients admitted to the ICU at Kettering Medical Center with the primary diagnosis of sepsis from June 1, 2013 to June 1, 2014. All patients 18-89 years of age and a sepsis diagnosis were included. Patients were excluded if discharged ≤ 48 hours of admission, or were receiving dialysis. Data collection included: age, gender, weight, height, and serum creatinine. CrCl measurements were collected for 5 consecutive days following admission to the ICU until discharge from the hospital or death of patient. The Cockcroft and Gault equation was used to calculate creatinine clearance as it is used at Kettering Medical Center. Preliminary Results: There was no significant gender related differences in CrCl ($p > 0.05$). There was a significant improvement in CrCl over the 5 days ($p < 0.001$) of admission. There was a significant, negative association between age and CrCl on all 5 days ($p < 0.01$). CrCl stability timing data pending.

Preliminary Conclusion: Acute kidney injury secondary to sepsis improves rapidly over the initial 5 days of admission to the ICU, and therefore, renally dosed medications, especially antibiotics, should not be adjusted until the patient has reached a stable CrCl.

Learning Objectives:

Recall antibiotics indicated for the treatment of sepsis that require renal dose adjustments

Recognize the significance of premature antibiotic dose adjustment in patients with a sepsis diagnosis

Self Assessment Questions:

What is the potential significance of premature antibiotic renal dose adjustment in critically ill patients?

- A: The patient may receive adequate antibiotic dosing and improve
- B: The patient may be under-dosed which could result in worsened
- C: The patient may experience more agitation and delirium
- D: There is no significance in decreasing antibiotic doses in the critically ill

Which of the following antibiotics does not require renal dose adjustment

- A: Ceftriaxone (Rocephin®)
- B: Piperacillin/tazobactam (Zosyn®)
- C: Cefepime (Maxipime®)
- D: Aztreonam (Azactam®)

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-467-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INITIAL HEPARIN DOSING FOR PEDIATRIC INTENSIVE CARE UNIT PATIENTS REQUIRING EXTRACORPOREAL LIFE SUPPORT

Carissa D. Jacobs*, Pharm.D.; Douglas A. Campbell, RRT; Morgan R. Cole, Pharm.D., BCPS; Emily K. D'Anna, Pharm.D.; Jessica L. Sturgill, RRT

Spectrum Health, 100 Michigan St NE, MC001, Grand Rapids, MI, 49503
carissa.jacobs@spectrumhealth.org

Purpose: The purpose of this study was to assess initial unfractionated heparin dosing practices for anticoagulation in pediatric intensive care unit (PICU) patients requiring extracorporeal life support (ECLS) at Helen DeVos Children's Hospital (HDVCH).

Methods: A single-center retrospective chart review was performed on pediatric patients admitted to the PICU and initiated on ECLS from May 1st, 2006 to August 31st, 2014. Exclusion criteria included neonatal patients with a gestational age less than 37 weeks, patients greater than 18 years, renal failure prior to ECLS initiation, duration of ECLS less than six hours, and contraindications to ECLS. Unfractionated heparin infusion rates, bolus doses and activated clotting times (ACT) were assessed over the first 24 hours following a patient's initiation on ECLS. Current practice at HDVCH directs initiation of the unfractionated heparin infusion at 10 units/kg/hr and subsequent titration to target ACT. Supplementary data gathered, when available, were activated prothrombin time, heparin anti-Xa, and antithrombin III levels. The primary endpoint of this study was to determine the time from initiation of ECLS to therapeutic anticoagulation which was defined as an ACT of 170-190 seconds. Secondary objectives were to assess the percent of patients within goal therapeutic ACT range at 4, 6, 12, and 24 hours and the time within goal therapeutic ACT range over 24 hours.

Results: Twenty-two of 37 pediatric patients have been identified as meeting inclusion criteria. Preliminary data suggested the average time to reach therapeutic ACT was 3.9 hours. The percentage of patients within therapeutic ACT range was 25% over 4 hours, 25% over 6 hours, 33.8% over 12 hours, and 48.7% over 24 hours.

Conclusion: Interim analysis demonstrates that anticoagulation practice in pediatric ECLS patients in at HDVCH are not maintaining target ACT goals.

Learning Objectives:

Explain the role of unfractionated heparin in ECLS

Describe methods to monitor unfractionated heparin infusions on ECLS

Self Assessment Questions:

Which of the following is a risk factor for clotting in an ECLS circuit? I. Foreign surfaces II. Activated platelets III. Consumptive coagulopathy

- A: I and II
- B: I and III
- C: II and III
- D: I, II, and III

What is ELSOs recommended goal for ACT when monitoring?

- A: 170 - 190 seconds
- B: 180 - 220 seconds
- C: 300 - 500 seconds
- D: 75 - 125 seconds

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-468-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EMERGENCY MEDICINE PHARMACIST IMPACT ON DOOR-TO-NEEDLE TIME IN PATIENTS WITH ACUTE ISCHEMIC STROKE

Joshua S. Jacoby, PharmD*, Lisa Dumkow, PharmD, BCPS, Muhammad Farooq, MD, FACP, FAHA, G. Robert DeYoung, PharmD, BCPS, Kasey Bucher, PharmD, BCPS

Mercy Health Saint Mary's, 200 Jefferson Avenue SE, Grand Rapids, MI, 49503

joshua.jacoby@mercyhealth.com

PURPOSE: Recombinant tissue plasminogen activator (rtPA, alteplase) is a thrombolytic agent used in the treatment of acute ischemic stroke (AIS). Multiple studies have correlated early administration of rtPA with improved neurological outcomes following AIS. The American Heart Association and the American Stroke Association recommend a door-to-needle time (DTN), defined as the time from emergency department (ED) admission to administration of rtPA, of less than 60 minutes. At Mercy Health Saint Mary's (MHSM), emergency medicine pharmacist (EMP) services are available approximately 10 hours each day. The primary objective of this study is to evaluate the impact of EMP involvement in AIS care on DTN times in the ED at MHSM. Secondary objectives include evaluating changes in functional and neurological status, rate of symptomatic intracranial hemorrhage, rate of in-hospital mortality, and discharge location.

METHODS: This IRB-approved, retrospective, cohort study was conducted using the MHSM electronic medical records database. Data were collected from a sample of 100 consecutive patients who received rtPA between November 1, 2012 and August 30, 2014. Patients were included if they had a preliminary diagnosis of AIS. Patients were excluded if they received rtPA at an outside medical facility prior to transfer to MHSM, were not administered rtPA, or received rtPA for another indication. Outcomes were assessed using the Chi-square test (nominal data), Mann-Whitney U test (ordinal data), and Student's t test (continuous data) as appropriate.

RESULTS: The participation of an EMP in the management of patients with AIS was associated with a significant improvement in DTN time (median 45.5 vs. 58 minutes, $p=0.004$). There were no significant differences between groups with regard to secondary outcomes.

CONCLUSIONS: The involvement of an EMP in AIS care in the ED is associated with a significant improvement in DTN times which available evidence suggests leads to improved patient outcomes.

Learning Objectives:

List advantages of shortening the door to needle time in patients with acute ischemic stroke

Discuss advantages of having an emergency medicine pharmacist participate in the initial care of patients with acute ischemic stroke

Self Assessment Questions:

Which of the following has been shown to be true with early administration of rtPA?

- A: Increased odds of a favorable outcome
- B: Decreased risk of complications, including symptomatic intracranial
- C: Increased odds of hemorrhage in non-stroke patients
- D: Answers A and B

Which of the following are advantages of having an emergency medicine pharmacist participate in the initial care of patients with suspected AIS?

- A: Improvement in DTN time
- B: Improvement in TLKW-to-door time
- C: Non-stroke patients are less likely to receive rtPA
- D: Answers A and C

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-469-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

UTILIZATION AND EVALUATION OF NON-CORE CHEMOTHERAPY REGIMENS WITHIN AN ACADEMIC MEDICAL CENTER

Jason R. Jared*, PharmD; Mary Mably, RPh, BCOP; Rory Makielski, MD; Michael Reed, RPh, BCOP, BCPS; Michael Fallon, PharmD, BCOP; Glenn Liu, MD; Daniel Mulkerin, MD; Natalie Callander, MD; Jill Kolesar, PharmD, BCPS, FCCP

University of Wisconsin Hospital and Clinics, 600 Highland Ave., Madison, WI, 53792

jjared@uwhealth.org

Purpose: Uniformity of evidence-based chemotherapy prescribing via approved core regimens provides additional systems-based safety at the University of Wisconsin Hospital and Clinics (UWHC). Non-core chemotherapy regimens (NCCRs) are non-standard-of-care regimens requested by treating physicians on individual patient basis. NCCR requests include high quality published evidence and clinical justification for that patient case. Clinical justification can include previous failure of core regimens, comorbidities precluding core regimens, rare malignancies, or new agents/regimens not approved for core regimen use. UWHC Chemotherapy Council, a Pharmacy & Therapeutics subcommittee, assesses all NCCR requests and determines approval status upon submitted efficacy, safety, and patient-specific factors. The purpose of this project is to describe NCCR utilization, efficacy, and patient-centered outcomes in hematology/oncology patients receiving NCCRs at UWHC.

Methods: This study is a retrospective chart review including a two-phase utilization and outcomes evaluation of patients receiving NCCRs at UWHC. Phase I is a demographics and utilization assessment of patients receiving NCCRs between January 1st, 2011 and July 31st, 2014 and includes patient age, sex, performance score, malignancy, and justification for NCCR use. Based upon phase I results, malignancy subgroups will be selected and evaluated for patient-specific outcomes in phase II. The selected patients will be evaluated on regimen and clinical outcomes including disease stage, regimen duration, NCCR discontinuation reason, subsequent chemotherapy, overall survival, and time from NCCR until death.

Results: Within phase I, 308 patient-specific NCCR requests were submitted from January 1st, 2011 to July 31st, 2014. The most commonly submitted reason for NCCR use was modification of a core regimen (33%), followed by patient-specific factors (29%) and salvage therapy (22%). Phase II data collection and analysis is ongoing.

Conclusions: NCCR use at UWHC provides chemotherapy regimen tailoring and personalization for individual patient needs. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define the role and systems-based safety provided by the University of Wisconsin Hospital and Clinics Chemotherapy Council

Describe the current state of non-core chemotherapy regimen utilization and associated clinical outcomes at the University of Wisconsin Hospital and Clinics

Self Assessment Questions:

What is the role of the UWHC Chemotherapy Council?

- A: Monitor chemotherapy drug expenditure for the oncology service line
- B: Propose new guidelines for clinical oncology practice
- C: Assess adherence to national oncology treatment guidelines
- D: Approve core and NCCRs for hematology/oncology patients

What is the most commonly cited reason by treating physicians for requesting a NCCR?

- A: Salvage therapy
- B: Modification of a core regimen
- C: Patient-specific factors
- D: Newly approved therapeutic agent

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-470-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF METFORMIN PRESCRIBING PATTERNS BASED ON ESTIMATED GLOMERULAR FILTRATION RATE IN PATIENTS WITH RENAL INSUFFICIENCY

Andrea M. Jarzynski*, Pharm. D.; Jennifer L. Lathrop, Pharm. D., BCACP; Danielle R. Kato, Pharm. D.

Veteran Affairs - Aleda E. Lutz Medical Center, 1500 Weiss St, Saginaw, MI, 48602

andrea.jarzynski@va.gov

Evaluation of metformin prescribing patterns based on estimated glomerular filtration rate in patients with renal insufficiency

Andrea M. Jarzynski*, Pharm. D.; Jennifer L. Lathrop, Pharm. D., BCACP; Danielle R. Kato, Pharm. D.

Aleda E. Lutz Veterans Affairs Medical Center, 1500 Weiss Street, Saginaw, MI 48602

andrea.jarzynski@va.gov; 989-497-2500 ext. 11707

Purpose: The purpose of this study was to assess the appropriateness of metformin doses in patients with mild to moderate renal insufficiency after the Veterans Integrated Service Network (VISN) 11 converted from serum creatinine cutoffs to estimated glomerular filtration rate (eGFR) based dosing. In addition, newly eligible patients for metformin therapy were identified, along with any adverse effects.

Methods: The data warehouse was used to identify all patients with diabetes, using ICD 9 codes, that had an eGFR resulted between June 1, 2013 and September 30, 2014. Two hundred charts were randomly selected and reviewed using the Computerized Patient Record System (CPRS). Patients age during the study period, sex, eGFR, serum creatinine, metformin dose, any contraindications or intolerances to metformin, and documented lactic acidosis were obtained from patient charts during the extensive chart reviews. Patients that had an eGFR greater than 60 ml/min/1.73 m² at any time during the study period were excluded. Data was analyzed using descriptive statistics and is presented using quantitative descriptors.

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the advantages of dosing metformin based on eGFR versus serum creatinine.

Identify the potential risks of metformin use in patients with renal insufficiency.

Self Assessment Questions:

The package insert of metformin states a serum creatinine of ≥ 1.4 mg/dL in females and ≥ 1.5 mg/dL in males as a contraindication due to which of the following?

- A: Renal calculi
- B: Lactic acidosis
- C: Hypoglycemia
- D: Heart failure

What is an advantage of dosing metformin based on eGFR?

- A: Better glucose control due to patient being able to remain on treat
- B: Higher incidences of lactic acidosis
- C: More hypoglycemia episodes
- D: None of the above

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-471-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSOCIATION BETWEEN TACROLIMUS TROUGH CONCENTRATION AND ACUTE REJECTION IN ADULT LUNG TRANSPLANT RECIPIENTS.

Natalia Jasiak, PharmD, BCPS; Yihan Sun, PharmD Candidate; Linda Stuckey, PharmD, BCPS; Jeong Park, MS, PharmD, BCPS

University of Michigan Health System, 1771 Plymouth Rd, APT 306, Ann Arbor, MI, 48105

njasiak@med.umich.edu

Purpose: Acute rejection (AR) is a major risk factor for bronchiolitis obliterans syndrome (BOS), a frequent cause of mortality in lung transplantation. AR can potentially be avoided by optimizing tacrolimus trough concentrations. However, the concentration-effect relationship is poorly defined in lung transplant population. The purpose of this study is to design dosing and therapeutic monitoring strategies for optimal tacrolimus trough concentrations, which will potentially minimize the risk of AR in lung transplant recipients. Our primary hypothesis is that lower tacrolimus exposure during the immediate post-transplant period is associated with a higher incidence of early AR.

Methods: This retrospective case-control study will review adult patients who received a lung transplant between January 2009 and June 2014. Patients will be included if they were started on tacrolimus within 3 days post-transplant in addition to an antiproliferative agent and a steroid taper. Patients will be excluded if they received an antibody induction agent, did not have a tacrolimus trough level on post-operative day (POD) 3, 4, 5, 6, or 7, discontinued tacrolimus before the first episode of AR or POD 90, or died during the first 90 days after transplant. Eligible patients will be divided into two groups: patients who developed AR within POD 90 [case] and patients without AR [control]. To detect a difference in tacrolimus trough concentrations between the case and control groups, a Student's t-test ($\alpha = 0.05$) will be performed. A receiver operator characteristic (ROC) curve will be constructed to assess the relationship between tacrolimus trough concentrations and AR within 90 days post-transplant. Results of the ROC curve will be used to define a cutoff value for tacrolimus trough concentration that predicts AR risk. This study received approval from the Institutional Review Board.

Learning Objectives:

Identify risk factors for acute rejection post-lung transplantation.

Recognize the association between acute rejection and tacrolimus trough concentrations in the early post-transplant period.

Self Assessment Questions:

Which of the following risk factors have been associated with acute rejection post-lung transplantation?

- A: PRA greater than 10%
- B: HLA mismatch
- C: Non-O blood group donors
- D: All of the above

Which of the following is true regarding the literature discussed in this presentation?

- A: Borobia and colleagues demonstrated that tacrolimus trough conc
- B: A study published in the Journal of Heart and Lung Transplantation
- C: A study by Snell and colleagues, published in the Annals of Transp
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-472-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT ASSESSMENT ON PATIENT OUTCOMES IN A PHARMACIST-MANAGED MIGRAINE CLINIC.

*MaryBeth Jegerski, PharmD; Emily M Chappo, PharmD
Indiana University Health, 1701 N Senate Blvd, AG
401, Indianapolis, IN, 46202
mjegerski@iuhealth.org

Purpose:

Migraines are a debilitating type of headache with no cure currently available. Patients are often started on abortive and preventative medications designed to decrease the length and occurrence of migraines, respectively. Patients often need to try multiple abortive and preventative medications before finding ones that work. Additionally, many patients struggle with adherence and adverse effects of the preventative medication leading to more reliance on abortive therapy. Patients may also overuse over the counter medications as they try only use abortive medications for their worst headaches. As medication experts, pharmacists can provide the close monitoring of migraine therapy and therapeutic lifestyle recommendations to ensure optimal outcomes in patient migraine care. A pharmacy-driven protocol was developed to assist neurologists in managing migraine patients. The purpose of this study is to assess the pharmacist interventions on patient migraine outcomes after initiation of the protocol.

Methods:

A single-center, retrospective study was conducted to evaluate patient outcomes in a pharmacist-managed migraine clinic. Patients included in the study were greater than 18 years of age and were seen by the clinic pharmacist between September 1, 2014 and February 14, 2015. Exclusion criteria include patients who did not complete a follow up appointment with the pharmacist and if the patient changed referring provider prior to completing two appointments. Electronic medical records were used for data collection. The primary endpoint was the change in headache frequency from baseline after pharmacist intervention. The secondary efficacy endpoint was the change from baseline in patient quality of life using the Migraine-Specific Quality of Life Questionnaire Version 2.1 (MSQv2.1)

Results/Conclusion:

Final data analysis and conclusion will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the medications and therapeutic lifestyle changes recommended for prevention and treatment of migraines.

Review current migraine questionnaires available and their purpose in assessing migraines

Self Assessment Questions:

Which of the following medications is FDA approved for prevention of migraines?

- A Gabapentin
- B: Topiramate
- C: Warfarin
- D: Verapamil

What does the MSQv2.1 evaluate and over what time period?

- A Ability to function over the past 4 weeks
- B Disability from headache over the past 3 months
- C Healthcare related quality of life over the past 4 weeks
- D Effectiveness of migraine therapy over the past 3 months

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-473-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPROVING STERILE PRODUCT DISPENSING PROCESSES USING LEAN THINKING

Chad G. Johnson*, PharmD, MBA; Chris Sanders, PharmD; Nancy Brierton, RPh; Kathleen Jendusa, CPhT; Taleeka Jordan, CPhT; David Oxencis, PharmD; Matthew Wolf, PharmD, MS; Philip Brummond, PharmD, MS

Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 53226

chad.johnson@froedtert.com

PURPOSE: Lean thinking (Lean) is a philosophy that states that any activity that does not directly create value for the end customer is wasteful. Froedtert Hospitals Department of Pharmacy Services has prioritized Lean initiatives to improve operational efficiency and reduce waste. Pharmacy team members determined sterile product preparation waste as an area of inefficiency. Currently, about 25% of dispensed sterile product medications are returned unused to the inpatient pharmacy, many with short beyond-use dates that are often expired or nearly expired when returned. These medications must be discarded once expired, accounting for greater than \$300,000 in annual sterile product waste. Current sterile product dispensing processes will be evaluated to minimize waste and unnecessary drug cost. The primary outcome of this study is to reduce the amount of IV medication waste by 25%. Secondary measures include reducing the number of returned doses, turnaround time, lead time, and technician rework. By improving the current process for sterile product dispensing and delivery, a reduction in medication returns could have a positive impact on pharmacy department resources.

METHODS: Current state value stream mapping and other Lean tools were used to identify gaps in the current workflow. Root causes of identified gaps were determined by cleanroom and central pharmacy staff and interventions were proposed as solutions. Interventions will be piloted and assessed for their impact on medication waste and ability to reduce non-value added tasks.

RESULTS/CONCLUSIONS: Results of interventions and impact on IV waste will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain how Lean thinking can be applied to IV cleanroom operations

Describe the tools that can be used to identify non-value added activities within sterile product preparation

Self Assessment Questions:

Which of the following is the most consistent with Lean principles?

- A Make large process decisions with minimal employee input
- B: Eliminate non-value added activities
- C: Keep a large inventory to maximize efficiency
- D: Add process steps to improve safety and quality checks

Which of the following tools may be used during a Lean process improvement project?

- A Gemba walks in work areas
- B Value stream mapping
- C Frontline staff engagement
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-786-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF ACUTE POST-OPERATIVE PAIN MANAGEMENT FOLLOWING ELECTIVE TOTAL KNEE ARTHROPLASTY

Alice E. Johnson, PharmD*, Mike J. Lewandowski, PharmD, BCPS,
Andrew J. Borgert, PhD

Gundersen Lutheran Medical Center, 511 Bennora Lee Ct, La
Crosse, WI, 54601

aejohns1@gundersenhealth.org

Purpose:

Proper pain management is essential to post-operative care following total knee arthroplasty (TKA). Current evidence demonstrates well-controlled post-operative pain leads to earlier mobilization, shortened hospital stays, reduced hospital costs, and increased patient satisfaction. Multi-modal pain management is one approach to combat post-operative pain. This study will examine the potential benefit of a single pre-operative gabapentinoid on post-operative pain scores and opioid consumption. It will do this by comparing patients undergoing TKA at our institution to patients in Clarkes randomized, double-blinded, placebo-controlled trial titled "Peri-operative gabapentin reduces 24 h opioid consumption and improves in-hospital rehabilitation but not post-discharge outcomes after total knee arthroplasty with peripheral nerve block" published in the British Journal of Anaesthesia in March of 2014.

Methods:

Approval through the Institutional Review Board was obtained prior to data collection. Eligible patients include those undergoing elective total knee replacements within the predetermined time period. Patients will be excluded if they are undergoing non-elective arthroplasty, currently on chronic gabapentin or pregabalin therapy, or have a known allergy to gabapentin or pregabalin. The study will examine pain scores using a patient reported numeric scale and opioid usage measured in intravenous morphine-equivalents. A retrospective chart review will be accomplished utilizing the electronic medical record. The data collected for each patient will include: age, sex, pain scores at six, twelve and twenty-four hours post-operatively, and opioid usage in the first twenty-four hours post-surgery. This data will then be compared to Clarkes study using appropriate statistical analysis as defined by a biostatistician. Results/Conclusions:

Data collection is ongoing. Final results and conclusions will be presented at Great Lakes Pharmacy Conference in April, 2015.

Learning Objectives:

Identify different agents that may be used as part of multi-modal peri-operative pain management

Discuss the properties of gabapentinoids which make this class appealing as a part of multi-modal pain management

Self Assessment Questions:

Which medication classes have been used in multi-modal peri-operative pain management?

- A: Gabapentinoids
- B: Nonsteroidal anti-inflammatory drugs
- C: Acetaminophen
- D: All of the above

Which property of gabapentin makes it an appealing agent for multi-modal analgesia?

- A: Unique mechanism of action
- B: Unchanged elimination in the setting of renal dysfunction
- C: Lack of sedating side effects
- D: Protein binding

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-785-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE USE OF LEFLUNOMIDE FOR THE PREVENTION OF BK NEPHROPATHY IN RENAL TRANSPLANT RECIPIENTS- A SINGLE CENTER EXPERIENCE

Srijana D. Jonchhe, PharmD, BCPS**, Nicole R. Alvey, PharmD, BCPS
Aimee C. Hodowanec, MD, Edward F. Hollinger, MD, PhD

Rush University Medical Center, 1653 W. Congress
Parkway, Chicago, IL, 60612

srijana_jonchhe@rush.edu

The purpose of this study was to compare the efficacy of leflunomide in combination with reduced immunosuppression versus reduction of immunosuppression alone for the prevention of BK nephropathy in renal transplant recipients.

This single-center, retrospective chart review included transplant recipients with a detectable plasma BK viral load between February 2011 and July 2014. All patients at least 18 years of age who received a kidney or kidney-pancreas transplant were included. Patients who developed BK virus nephropathy before any therapeutic intervention was implemented were excluded. The primary outcome was BK virus-induced nephropathy. Secondary outcomes include clearance of BK viremia and patient and graft survival.

A total of 56 patients were included in the analysis: 38 in the leflunomide in combination with reduced immunosuppression group (LEF group) and 18 in the reduction of immunosuppression alone group (IS group). The incidence of BK nephropathy was 24% in the LEF group versus 0% in the IS group ($p = 0.05$). Over the course of study follow-up, 58% of patients in the LEF group cleared the BK virus versus 83% of the IS group ($p = 0.07$). The median time to clearance of BK was 308 days in the LEF group and 71 days in the IS group. Overall, patient and graft survival were good in both groups. There was 1 patient death and 2 graft losses in the LEF group and 3 patient deaths in the IS group.

Reduction in immunosuppression remains the gold standard for prevention of BK nephropathy. The results of this study indicate that the addition of leflunomide does not obviate the need to aggressively reduce immunosuppression. Further analysis of the overall level of immunosuppression in both treatment groups and its effect on progression of BK is warranted.

Learning Objectives:

Describe the complications and risk factors associated with BK virus in transplant recipients.

Identify potential management strategies for renal transplant recipients with BK viremia.

Self Assessment Questions:

Which of the following is true regarding BK viremia in renal transplant recipients:

- A: Risk factors include younger age and reduced immunosuppression
- B: BK viremia may clinically progress to hemorrhagic cystitis
- C: Tubulointerstitial nephropathy may occur in up to 10% of patients
- D: Recipients are no longer at risk after 1 year post-transplant

Which of the following treatment strategies is currently first-line therapy for patients with BK viremia?

- A: Replacement of antimetabolite with leflunomide 40mg PO daily
- B: Reduction in maintenance immunosuppression
- C: Initiation of ciprofloxacin 500mg PO twice daily
- D: Intravenous cidofovir 1mg/kg every 2 weeks

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-474-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A DISCHARGE PHARMACIST SERVICE ON MEDICATION ADHERENCE AND HOSPITAL READMISSIONS

Heidi K. Jones, PharmD*; Nicholas R. Gnadt, PharmD
Meriter Hospital, 1353 MacArthur Rd, Madison, WI, 53714
1hjones@meriter.com

Purpose: In the United States, medication non-adherence rates can vary from 30% to 50%, and this non-adherence, especially for medications used in chronic disease management, is associated with disease exacerbations, hospital readmissions, increased emergency room visits, and increased mortality. Increasing patients capacity for self-care at discharge, such as ensuring the patient has a 1 month supply of any new medications at discharge, can significantly improve outcomes and decrease readmission rates, as can having at least two people be involved in the discharge process. In particular, having a pharmacist involved in the discharge process, providing medication reconciliation and targeted patient education, has been associated with lower 30-day readmission rates and fewer emergency department visits. The clinical impact of Meriter-UnityPoint Health's discharge pharmacist service has not yet been assessed. This project aims to investigate whether this service, which includes bedside delivery of discharge medications and targeted medication education by a pharmacist, can improve clinical outcomes.

Methods: Patients discharged between January and August 2014 from floors participating in the discharge pharmacist service pilot program and who had prescription insurance through Physicians Plus Insurance made up three groups: those who used the discharge service, those who did not use the discharge service but still filled their prescriptions at the hospital's outpatient pharmacy at the time of discharge, and those who did not fill new prescriptions prior to leaving the hospital. Insurance claim data for the 6-month period after discharge were analyzed for each patient. The primary endpoints were primary adherence, refill persistence, and medication possession ratio over the 6 months after discharge, as well as 30-day, 60-day, 90-day, and 6-month readmission rates. The secondary outcomes were the effects of prescription cost on adherence and persistence.

Results/Conclusions: Data collection and analysis are in progress. Findings will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance of medication adherence and persistence in relation to patient health.
Describe the potential benefits of a discharge pharmacist service in an inpatient setting.

Self Assessment Questions:

Which of the following is a potential benefit of implementing a discharge pharmacist service?

- A: Increased readmissions
- B: Decreased patient understanding of their medications
- C: Increased prescription fill persistence
- D: Decreased primary adherence

Increased medication adherence has been associated with:

- A: Increased emergency room visits
- B: Increased overall health care costs
- C: Increased mortality
- D: None of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-787-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF OUTCOMES IN PATIENTS RECEIVING A BETA-LACTAM VERSUS VANCOMYCIN FOR METHICILLIN-SUSCEPTIBLE STAPHYLOCOCCUS AUREUS BACTEREMIA.

Sara J. Jones, PharmD*; Stacy E. Schmittling, PharmD, BCPS; Janak Koirala, MD, MPH, FACP, FIDSA; Scott J. Bergman, PharmD, BCPS (AQ-ID)

St. John's Hospital, 444 West Canedy Street, 444 West Canedy Street, Springfield, IL, 62704
sara.jones1@hshs.org

Purpose:

The primary objective of this study is to evaluate the efficacy of vancomycin versus beta-lactams in the treatment of methicillin-susceptible *Staphylococcus aureus* (MSSA) bacteremia. The secondary aim of the study is to determine if a difference exists in the efficacy of treatment for MSSA bloodstream infections based on vancomycin minimum inhibitory concentrations (MIC).

Methods:

This is a retrospective chart review of patients with MSSA bloodstream infection at HSHS St. John's Hospital in Springfield, Illinois. Adult patients will be included if they have a documented case of MSSA bacteremia upon initial blood culture from July 1, 2009 to June 30, 2014. Patients will be placed into two groups based on antimicrobial therapy with vancomycin or anti-staphylococcal beta-lactams. Efficacy will be determined by all-cause mortality. Secondary endpoints include hospital length of stay, treatment duration, and time to bacterial clearance (negative blood culture), vancomycin and anti-staphylococcal beta-lactam MIC for all *Staphylococcus aureus* isolates from blood cultures, reported beta-lactam allergies, and adverse events. Categorical data will be analyzed using the chi-squared test. Continuous data will be analyzed using Student's t-test. Multivariate regression analysis will be used to evaluate the impact of potential confounding variables.

Results:

Upon initial review, 220 patients will be included with positive MSSA blood cultures.

Conclusion:

Conclusions will be determined pending analysis of results.

Learning Objectives:

Identify risk factors for increased morbidity and mortality for methicillin-susceptible *Staphylococcus aureus* bloodstream infections.
Discuss optimal antibiotic therapy for the treatment of methicillin-susceptible *Staphylococcus aureus* bacteremia.

Self Assessment Questions:

Which antibiotic would be the best option to initiate in a patient with MSSA bacteremia?

- A: Vancomycin
- B: Linezolid
- C: Oxacillin
- D: Penicillin

Which of the following is a risk factor for increased morbidity and mortality due to MSSA bacteremia?

- A: Decreased vancomycin minimum inhibitory concentration
- B: Penicillin allergy
- C: Rapid clearance of bacteria from blood cultures
- D: Use of bactericidal antimicrobials

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-475-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A PHARMACIST DRIVEN TRANSITIONS OF CARE PROGRAM: A FOCUS ON HIV POSITIVE PATIENTS TRANSITIONING FROM AN INPATIENT TO OUTPATIENT SETTING

Octavia R. Jordan, PharmD*; Amber Lanae Smith, PharmD, MS, BCPS; Priyasha Patel, PharmD Candidate; Norman Markowitz, MD; Indira Brar, MD; John McKinnon, MD; John R. DiLodovico, RPh

Henry Ford Health System, 9588 Wheatgrass Ln, Belleville, MI, 48111
ojordan1@hfhs.org

Purpose: In the United States there are approximately 1.2 million people who are living with HIV. Only 30% of HIV positive patients are currently virally suppressed. This is due to a lack of engagement in care. The purpose of this study is to assess the impact of a pharmacist driven transitions of care (TOC) program on the safe use of antiretroviral therapy and patient compliance with outpatient follow-up visits. The data collected will be utilized to enhance transition of care services targeting HIV positive patients.

Methods: This Institutional Review Board at Henry Ford Hospital approved this quasi-experimental cohort study. Patients were included in the intervention arm if they were discharged from the hospital with an HIV diagnosis and received a transition of care pharmacy consult; the control arm included patients who did not receive the consult. Patients were excluded if the patient was from an outside facility or if the patient was less than 18 years of age. The primary endpoint was adherence with first follow-up appointment. Secondary endpoints included documentation of TOC activities (i.e., assessment of barriers to compliance, patient education, reported adverse drug reaction, and number of drug related problems) and time to follow-up visit. Baseline data collection included patient demographics, barriers to access, antiretroviral regimen, drug related problems, CD4+ counts, viral loads, opportunistic infection assessment, and opportunistic infection regimen. Similar data was collected at follow-up appointments. Data analysis included descriptive statistics for patient demographics, Chi-squared or Fishers Exact test for categorical data, and student t-test or Mann Whitney-U for continuous data. Multiple logistic regression was utilized to control for confounding variables including: treatment unit, reason for admission, type of therapy, and discharge day.

Learning Objectives:

Identify the proportion of individuals living with HIV/AIDS at each stage of care

Select the most common drug related problems that occur during transitions of care

Self Assessment Questions:

What percentage of patients is currently "Engaged in Care" for the management of their HIV?

- A: 30%
- B: 37%
- C: 40%
- D: 86%

Which of the following is NOT one of the most common drug related problems occurring in hospitalized HIV positive patients?

- A: Adverse drug reactions
- B: Drug-drug interaction
- C: Incorrect drug combinations
- D: Incorrect scheduling

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-916-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A SUSTAINABLE BENCHMARKING PROCESS FOR COST-SAVINGS INITIATIVES WITHIN A VA MEDICAL CENTER

*Miranda L. Jordan, PharmD, BCPS; Christina A. White, PharmD, MBA, BCPS; William X. Malloy, MS, PharmD, BCPS

Veteran Affairs - Indianapolis VA Medical Center, 1481 West 10th Street, Indianapolis, IN, 46202

miranda.jordan2@va.gov

Purpose: Within the VA, several benchmarking practices offer ways to compare sites regionally and nationally to guarantee metrics are met and to identify areas for improvement. Within the Indianapolis VA pharmacy department, three benchmarking tools are used, two of which are generated by the VA national office, and one of which is created internally by the departments management analyst. The three different report formats have made the process of making meaningful comparisons to other facilities difficult. Pharmacists outside of the administrative office lack an understanding of the various tools and the reports produced, which results in a lack of clinical and operational staff involvement in determining where to focus cost containment efforts. The purpose of this study is to use LEAN techniques to create a sustainable benchmarking method for generating cost-savings initiatives.

Methods: The current benchmarking processes were mapped to ascertain their overall relevance for this facility. The internally created tool presented the greatest potential for modification due to recognized metrics (cost/unique patient and cost/30 day prescription) and appropriate comparisons to VAs of similar size and complexity. Current gaps included no incorporation of clinical outcomes, no linking of inpatient and outpatient data, and an overall lack of automated processes for reporting. The future state is an outpatient drug cost dashboard, which includes ten drugs determined by considering drug cost, extent of pharmacy influence over the drugs usage, and this facility's patient population as a whole. The top ten drug expenditures for every quarter of fiscal year 2015 were chosen as a starting point for analyzing drug costs. A custom ProClarity report will be created and submitted to the Clinical Data Warehouse to further automate the benchmarking system, incorporate clinical outcomes, and allow the dashboard to become interactive.

Results/Conclusions: To be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe best practices for benchmarking drug expenditures

Identify mechanisms to further engage clinical staff in cost containment initiatives

Self Assessment Questions:

Which of the following is not a best practice for benchmarking drug expenditures?

- A: Comparison with facilities of similar size/complexity
- B: Inclusion of clinical outcomes as a benchmarking metric
- C: Attempting to identify exact facility comparisons
- D: Benchmarking internally and externally

Which of the following is the biggest barrier leading to clinical staff disengagement regarding cost data?

- A: Ability to automate data
- B: Timing of pricing updates leading to inaccurate cost data
- C: Lack of visually appealing data located within one intuitive tool
- D: Lack of familiarity with metrics

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-788-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF INTRAVENOUS ACETAMINOPHEN (OFIRMEV) ON OPIOID USE IN POST-SURGICAL PATIENTS

Morgan M. Joyce, PharmD*, Mike Short, PharmD, Alisa Groesch, PharmD, Mark Ruscini, PharmD, Khushbu Italia, PharmD Candidate
Memorial Medical Center of Springfield, 701 North First Street, Mailbox 86, Springfield, IL, 627810001
joyce.morgan@mhsil.com

Background

Acute pain management in post-operative patients is often approached with multiple analgesic and opioid medications. The use of opioids in pain management is associated with dose-dependent adverse effects such as constipation, nausea, vomiting, respiratory depression and sedation. In an operative (and post-operative) setting in which an intravenous agent is preferred for pain control, IV acetaminophen poses an attractive option due to its reported efficacy and adverse effect profile.

Objective and Purpose

The primary objective of this study is to determine if IV acetaminophen decreases opioid use in acute pain management in post-surgical patients in comparison to oral acetaminophen. Secondary objectives include assess of length of hospital stay, time to first bowel sound, time to first bowel movement and subjective pain scores 24 to 48 hours post-operatively.

Methods

This study is a retrospective case-control study designed to evaluate the impact of opioid use and patient outcomes in patients that received IV acetaminophen compared to oral acetaminophen. The study will be conducted utilizing data from Memorial Medical Center. Patients receiving at least one dose of IV acetaminophen from April to June 2014 will be included. Cases and controls will be matched on demographic information, surgery type and severity. Other data collected include: sex, age, doses of IV or oral acetaminophen received, amount of opioid received (in morphine equivalents) in the first 24 to 48 hours post-operatively, time to first bowel sounds, time to first bowel movement, pain scores in the first 24 to 48 hours post-operatively. Exclusion criteria include mortality and patients with incomplete records. Statistical analysis will include student t-test, Kaplan-Meier curves, and Mann-Whitney tests.

Results & Conclusions: To be determined

Learning Objectives:

Identify the pharmacokinetics, pharmacodynamics and adverse effects of intravenous acetaminophen

Recall advantages and disadvantages of utilizing intravenous acetaminophen in a clinical practice setting

Self Assessment Questions:

Which of the following is correct about intravenous acetaminophen?

- A: Intravenous acetaminophen is equal in cost to oral acetaminophen
- B: Intravenous acetaminophen administration may decrease opioid use
- C: Intravenous acetaminophen is only approved for use in patients with
- D: Intravenous acetaminophen is known to cause respiratory distress

Previous research has suggested that intravenous acetaminophen may be more favorable than oral acetaminophen due to which of the following reasons?

- A: Clinical benefits (decreased opioid use, lower pain scores, quicker
- B: Intravenous acetaminophen is less costly than oral acetaminophen
- C: Less opioids were consumed by patients who received intravenous
- D: Both A and C

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-789-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING THE USE OF ANTICOAGULANTS TO IMPROVE POST-SURGICAL BLEEDING RATES AT AN ACADEMIC MEDICAL CENTER

Janelle Juul, PharmD*, Anne Zechlinski, PharmD, BCPS; Kristin Hanson, MS, RPh; Lindsey VerBunker, PharmD; Sophia Vainrub, PharmD, BCPS; Leah Holschbach, PharmD; Beth Lanham, RN, BSN, MBA

Froedtert Hospital, 9200 West Wisconsin Ave, Milwaukee, WI, 53226

janelle.juul@froedtert.com

Intravenous and oral anticoagulant agents are utilized in both the prevention and treatment of venous thromboembolism (VTE) and in the management of a variety of disease states. An all too common clinical dilemma for practitioners is the management of anticoagulation in the perioperative setting. Various government agencies have targeted adverse outcomes related to the general and perioperative use of anticoagulation as an area within institutions that warrants increased monitoring and evaluation. To improve the management and use of anticoagulants during the postoperative period and reduce postoperative bleeding rates at Froedtert and the Medical College of Wisconsin, it is crucial to better understand the factors that are contributing to an increased number of bleeding events. The primary objective of this project is to compare post-surgical patients on anticoagulation who experienced a bleeding event to a matched cohort of post-surgical patients that did not bleed while on anticoagulation during the same time period.

Patients with an adverse outcome of bleeding related to anticoagulation exposure identified via University Health System Consortiums (UHC) Partnership for Patients (PFP) reports and surgical patients with ICD-9-CM coding for postoperative hemorrhage or postoperative hematoma were included in data collection. The non-bleeding group was matched to the bleeding group using time period, discharge service line and the requirement of being on one or more anticoagulants post-operatively. Comparison between the two matched cohorts will help to identify factors contributing to the rate of bleeding due to anticoagulation exposure. Specific factors being considered include coadministration of multiple agents, administration time of anticoagulant postoperatively, and use of bridging therapy. Differences between the two groups will help distinguish a targeted intervention that may decrease the rate of bleeding events.

Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the various government agencies that have targeted adverse outcomes related to anticoagulation exposure.

Describe potential factors that could contribute to an increased risk of bleeding in surgical patients.

Self Assessment Questions:

Which of the following agencies is targeting adverse outcomes related to anticoagulation exposure?

- A: The Agency for Healthcare Research and Quality
- B: Care Quality Commission
- C: National Patient Safety Agency
- D: Food and Drug Administration

Which of the factors below is most likely to contribute to an increased risk of bleeding in surgical patients?

- A: Use of an NSAID 3 weeks prior to surgery
- B: Anticoagulation administration 3 hours postoperatively
- C: Use of vitamins 7 days prior to surgery
- D: Clopidogrel held for an appropriate duration prior to surgery

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-476-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

QUALITY ASSURANCE OF PHARMACY-LED ANTICOAGULATION CLINIC

*Katie B Kaczmariski PharmD, CTTS; David Axt PharmD, BCPS, CTTS; Mara Kieser MS, RPh; Amanda Margolis PharmD, MS, BCACP
UW-Madison School of Pharmacy Community Pharmacy Residency Program, W12802 County Road A, Bowler, WI, 54416
katie.kaczmariski@gmail.com

Objectives:

The objective is to examine the quality of anticoagulation therapy and clinical outcomes of a pharmacist-led anticoagulation clinic in an Indian Health Service family practice setting. In addition, our secondary objective is to assess current patient perceived satisfaction with the pharmacy clinic versus their previous care. Previous research into pharmacy-led anticoagulation clinics suggests patients may achieve better clinical outcomes when managed by a specialized team. Our goal is to assure that the pharmacy-led anticoagulation clinic is providing patients with anticoagulation management at least comparable to their previous care, while providing satisfactory customer care.

Methods:

The study design is a retrospective quality assurance analysis collecting data from a paired patient population from April 22, 2013 - October 21, 2013 (6 months) in usual care, and from April 22, 2014 - October 21, 2014 (6 months) monitored by a pharmacist-led anticoagulation clinic. Patients included in this review will meet the following parameters: >18yo, require warfarin therapy for at least 3 months, must have warfarin therapy managed by clinic practitioners, and have been on warfarin for a minimum of 3 months. This study will be evaluating time in therapeutic range (TTR), critical sub-therapeutic and supra-therapeutic INRs, as well as adverse events related to anticoagulation therapy. A satisfaction survey is to be administered to patients to assess their satisfaction with the level of care they are receiving in the anticoagulation clinic compared to their previous care.

Preliminary Results:

Pending

Learning Objectives:

Review the indications for anticoagulation with warfarin therapy.

Identify instances where INR may be affected and closer monitoring would be pertinent.

Self Assessment Questions:

Which of the following is an indication for treatment with warfarin indefinitely.

- A Provoked DVT with resolution of cause
- B: Atrial fibrillation with CHADS2 score of 0
- C: Atrial fibrillation with CHADS2 score of 2
- D: Uncontrolled hypertension and hyperlipidemia

In which instance would you want to draw an INR sooner than 4 weeks in a patient with a stable INR x 6 months.

- A Patient has quit smoking 1 year ago.
- B Patient has course of Bactrim started.
- C Patient has ACE-inhibitor dose increased.
- D Patient has started moderate exercise.

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-477-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TIMING OF BROAD SPECTRUM ANTIBIOTICS IN THE MANAGEMENT OF SEPSIS AND IMPACT ON MORTALITY: A SINGLE CENTER REVIEW

Amanda M Kage, PharmD*; Sara R Weidert, PharmD, BCPS; Michelle I Brenner, PharmD, BCPS; Breanna L Carter, PharmD, BCPS
Ministry Health - St. Joseph's Hospital - WI, 611 N Saint Joseph Ave, Marshfield, WI, 54449
amanda.kage@ministryhealth.org

Purpose: Literature suggests mortality can be decreased by approximately eight percent when antibiotics are administered in less than one hour after sepsis recognition. Despite nationwide efforts to implement awareness initiatives to decrease sepsis-related mortality, up to 68 percent of patients do not receive antibiotics within three hours. The objective of this study is to evaluate the impact of time to antibiotic administration on mortality in patients presenting with sepsis at a tertiary care teaching hospital. Secondary analyses include length of stay, utilization of the sepsis order set, and obtainment of blood cultures prior to antibiotic administration.

Methods: A retrospective chart review from April 2014 through December 2014 was conducted to determine the impact of time to antibiotic administration on mortality in patients with sepsis. This quality improvement initiative has been exempt from review by the Institutional Review Board. Patients included in this study were identified by Diagnosis Related Group codes for septic shock and severe sepsis, but further chart review was used to determine if the patient met sepsis criteria as defined by the Surviving Sepsis Campaign International Guidelines for the Management of Severe Sepsis and Septic Shock. Exclusion criteria included patients transferred from another facility arriving more than three hours after sepsis recognition and patients less than 19 years of age. Data collected will include patient demographics, pertinent labs, antibiotic selection, and timing of antibiotic administration classified as the following: those receiving antibiotics in less than one hour, those receiving antibiotics from one to three hours, those receiving antibiotics at greater than three to six hours, and those receiving antibiotics at greater than six hours. Analyzed data will be presented to key stakeholders for decision making and process improvement implementation. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the components of the 3-hour bundle used in sepsis management

Identify recommendations of the Surviving Sepsis Guidelines regarding timing of antibiotics in the treatment of septic shock

Self Assessment Questions:

Which of the following is a component of the 3-hour bundle?

- A Administration of vasopressors to maintain a MAP of 65 mmHg or
- B: Administration of 15 mg/kg crystalloids for fluid management
- C: Obtainment of blood cultures prior to antibiotic administration
- D: Measurement of central venous pressure

To decrease overall mortality, the Surviving Sepsis Guidelines recommend empiric antibiotic therapy be initiated:

- A Within thirty minutes of sepsis recognition
- B Within one hour of sepsis recognition
- C Within three hours of sepsis recognition
- D Within six hours of sepsis recognition

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-478-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECTS OF INTRAVENOUS IRON ADMINISTRATION IN PATIENTS WITH ACUTE HEART FAILURE

Bonnie Kaminsky, PharmD*; Kristen Pogue, PharmD, BCPS (AQ CV); Michael Dorsch, PharmD, MS, BCPS (AQ CV); Sarah Hanigan, PharmD, BCPS; Todd Koelling, MD

University of Michigan Health System, 2755 Windwood Dr., #222, Ann Arbor, MI, 48105

kaminskb@med.umich.edu

Purpose: Iron deficiency anemia is common in heart failure patients and is associated with poor patient outcomes. Several studies have examined the utility of intravenous iron administration in ambulatory patients with heart failure and have associated treatment with improvements in functional capacity and clinical status. Recently, a small study has also associated intravenous iron therapy with increase in hematologic parameters in acute heart failure. The purpose of this study is to evaluate patient outcomes associated with the current intravenous iron repletion strategies utilized in patients with acute heart failure admitted to the University of Michigan Health System.

Study Design: This study was conducted as a single-center, retrospective analysis of matched cohorts and was approved by the University of Michigan Institutional Review Board. The study included patients admitted to the University of Michigan Health System between January 2010 and August 2014 for heart failure who had low iron studies upon admission. Patients were grouped into cohorts based on the receipt of intravenous iron therapy and were matched between the study groups on the basis of age, gender, and ejection fraction. The primary outcome assessed was percent change in hemoglobin within 30 days. Secondary outcomes included 30-day readmission rate, time to readmission, and the rate of documented adverse events associated with intravenous iron therapy.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the pathophysiology of anemia in heart failure.

Identify clinical benefits associated with the receipt of intravenous iron in patients with heart failure.

Self Assessment Questions:

What factor may contribute to the development of anemia in patients with heart failure?

- A: Electrolyte abnormalities
- B: Aggressive diuresis
- C: Renal dysfunction
- D: Erythropoietin hyper-responsiveness

Previously published literature has associated which of the following benefits with the receipt of intravenous iron therapy in heart failure?

- A: Reduction in all cause mortality
- B: Reduction in hospital length of stay
- C: Prolonged time to occurrence of renal dysfunction
- D: Improved patient global assessment score

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-479-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARING OUTCOMES IN PANCREAS TRANSPLANT RECIPIENTS WITH DIFFERENT GOAL TACROLIMUS TROUGH LEVELS

Kristin N. Kaneshiro PharmD*; Elizabeth A. Hetterman PharmD, BCPS; Patricia M. West-Thielke, PharmD, BCPS; University of Illinois Hospital & Health Sciences System, Chicago, IL

University of Illinois at Chicago, 833 S Wood St, Suite B16, Chicago, IL, 60612

kekei@uic.edu

Background: Pancreas transplantation is a treatment option for Type 1 diabetics with severe glycemic lability and is conducted simultaneously with or following kidney transplantation for ESRD due to diabetic nephropathy. Calcineurin inhibitors such as tacrolimus are a mainstay of post-transplant immunosuppression but are not without significant adverse effects, notably nephrotoxicity and neurotoxicity. Efficacy and toxicity are thought to correlate with trough levels, and due to inter-individual variability in absorption and metabolism of tacrolimus, therapeutic drug monitoring has been standard of care for many years. In April 2012, the University of Illinois revised its pancreas transplant immunosuppression protocol to target higher tacrolimus trough concentrations due to concerns over increased incidence of rejection in pancreas transplant recipients compared to other organ recipients. There is a paucity of data regarding optimal tacrolimus troughs in pancreas transplant recipients. Tacrolimus narrow therapeutic index warrants an evaluation of outcomes in these patients to weigh risks of increased toxicity against the potential for decreased incidence of rejection. **Methods:** This UIC IRB-approved retrospective matched cohort study will compare outcomes in two cohorts of patients aged 18 and older who received pancreas transplants at UIC either before or after implementation of the revised protocol. Data will be collected via chart review and analyzed via SPSS. Data to be collected at time of transplant and at each clinic follow up visit includes patient demographics and anthropometrics, comorbidities, renal function, type of transplant, donor and recipient viral serologies, immunosuppression regimen, and incidence of rejection and opportunistic infections. **Outcomes assessed:** The primary objective is to determine whether higher target tacrolimus troughs reduce the incidence of rejection in pancreas transplant recipients. Secondary objectives include comparing the incidence of nephrotoxicity, neurotoxicity, incidence of pancreas graft loss, patient mortality, and incidence of opportunistic infections. **Results/conclusions:** results are not available as data collection is ongoing.

Learning Objectives:

Explain the rationale for tacrolimus therapeutic drug monitoring

Recognize the risks and benefits of targeting higher tacrolimus trough concentrations.

Self Assessment Questions:

Why is it important to routinely monitor tacrolimus trough levels?

- A: Efficacy relates to drug concentrations.
- B: There is significant inter-patient variability in absorption and metabolism.
- C: Tacrolimus has a narrow therapeutic index.
- D: All of the above are true.

How is tacrolimus thought to exert nephrotoxic effects?

- A: Direct cellular toxicity
- B: Suppression of tissue macrophages that protect the kidney from injury
- C: Vasoconstriction of afferent arteriole
- D: Crystallization within the glomerulus

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-480-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A NURSING-DRIVEN SEDATION PROTOCOL WITH CRITERIA FOR INFUSION INITIATION IN THE SURGICAL INTENSIVE CARE UNIT

Justin B. Kaplan, Pharm.D.*; Daniel S. Eiferman, MD; Jennifer MacDermott, MS, RN, ACNS-BC, NP-C, CCRN; Gary Phillips, MAS; Claire V. Murphy, Pharm.D., BCPS

The Ohio State University Wexner Medical Center, Department of Pharmacy, 410 West 10th Avenue, 368 Doan Hall, Columbus, OH, 43210
justin.kaplan@osumc.edu

Purpose: Nursing-driven sedation protocols reduce duration of mechanical ventilation (MV), intensive care unit (ICU) length of stay, and hospital length of stay in medical ICU patients. Pain related to trauma or surgery may make components of these protocols inappropriate for patients in the surgical intensive care unit (SICU). Few studies have assessed the impact of protocolized sedation in the SICU population. A sedation and analgesia protocol with criteria for infusion initiation was implemented in the SICU at our institution in April 2011. The objective of this study was to determine the impact of the nursing-driven SICU sedation protocol on duration of MV.

Methods: A single center, retrospective cohort study compared duration of MV before and after protocol implementation. Patients aged 18 to 89 years old admitted to the SICU who required at least 24 hours of MV were included (pre-implementation from November 2009 to October 2010; post-implementation from November 2011 to October 2012). Patients were excluded if they were transferred from another ICU, mechanically ventilated prior to admission, sustained traumatic brain injury, had indications for deep sedation, transitioned to comfort care or were terminally extubated within 7 days of SICU admission. Patients were also excluded if they were admitted to the neurosurgery, neurovascular, or burn services. The primary outcome was ventilator-free days at day 28. Statistical analysis was performed using multivariate linear regression modeling adjusting for age, reason for SICU admission, Charlson Comorbidity Index, Simplified Acute Physiology II score, and opioid exposure prior to admission. Secondary outcomes included percentage requiring continuous opioid or sedative infusions, cumulative opioid and sedative requirements, percentage of sedation scores within target range, incidence of delirium, percentage requiring scheduled antipsychotics for delirium, incidence of self-extubation, restraint requirements, and ICU and hospital length of stay.

Results: Data analysis is currently being conducted. Preliminary results will be presented.

Learning Objectives:

Identify differences between medical and surgical intensive care populations that make it difficult to extrapolate sedation literature from one to the other

Recognize which components of sedation protocols may be inappropriate for a surgical intensive care population

Self Assessment Questions:

Which of the following characteristics of a SICU population may make it difficult to extrapolate previous sedation literature from the medical ICU population?

- A: Lower acuity of illness
- B: Higher nurse to patient ratio
- C: Ongoing pain from trauma or surgery
- D: More patients receiving parenteral nutrition

Which of the following components of sedation and analgesia protocols may be inappropriate for SICU patients?

- A: Frequent assessment of sedation and pain scores
- B: Daily interruption of sedatives and analgesics
- C: Spontaneous breathing trials
- D: Initiation of continuous infusion sedatives when unable to use bolus

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-481-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE IMPLEMENTATION AND EVALUATION OF A LIVE ONLINE CHAT SERVICE VIA A SPECIALTY PHARMACY WEBSITE

Kanika Kapoor*, PharmD; Michael Crowe, PharmD, MBA, CSP, FMPA; Stephen Lott, PharmD; Jennifer Hagerman, PharmD, AE-C; Gary Rice, MS, MBA, CSP

Diplomat Specialty Pharmacy, 4100 S. Saginaw Street, Flint, MI, 48507
kkapoor@diplomat.is

Purpose: The use of technology to improve patient care interventions in health care settings has been increasing greatly. With the growth of different modes of communication, the use of an online chat service could potentially be valuable for patient interaction with pharmacists. This pilot study was designed to implement and assess the use of a live online chat service. This service will allow patients to ask pharmacy staff questions regarding their medications through an interface on a specialty pharmacy website. The objectives are to assess utilization, patient satisfaction, and feasibility analysis of this service.

Methods: The online chat service will be implemented on a specialty pharmacy website. All patients will have access to the chat service, but it will be promoted only to patients being treated for chronic hepatitis C and multiple sclerosis. In the scenario where insufficient chats are generated with the previously mentioned patient populations, the service promotion will be expanded to patients treated for human immunodeficiency virus and Crohn's disease. The software being used will be HIPAA-compliant and adequately encrypted to ensure patient data is secure. Information on patient demographics, associated disease state, question type, and other data points will be gathered for analysis to develop an understanding about the patient populations that would utilize this service to communicate with their pharmacy. Patients will be prompted to complete an automated survey post-chat which will assess satisfaction. The survey will also collect recommendations for service improvement. Lastly, a feasibility analysis of the service will be performed and a recommendation for future utilization will be made.

Results/Conclusions: Data analysis and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the purpose of an online chat service in a pharmacy setting.

Explain the elements for implementation of an online chat service within a pharmacy organization.

Self Assessment Questions:

What is the purpose of an online chat service in a pharmacy setting?

- A: Provide patients increased access to pharmacists.
- B: Act as a substitution to emergency services.
- C: Complete prior authorization processes.
- D: To increase the number of hits on the website.

Which of the following is a method used to ensure HIPAA-compliance with the storage of online chat transcripts?

- A: Executing a Business Associate Agreement (BAA).
- B: Ensuring all chat transcripts are stored only by the pharmacy.
- C: Using a non-encrypted server to transfer transcripts.
- D: Using HTTP instead of HTTPS for secure internet communication.

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-790-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST IMPACT ON NUMBER OF ANTIBIOTIC DAYS PRESCRIBED FOR NON-SUSCEPTIBLE INFECTIONS DISCHARGED FROM THE EMERGENCY DEPARTMENT

Ian Karall*, Pharm.D., Gary Peksa, Pharm.D., BCPS, Kaitlin Starosta, Pharm.D., BCPS

Rush University Medical Center, 1653 W. Congress Pkwy., Chicago, IL 60612

ian_karall@rush.edu

Inappropriate anti-infective use is perhaps the most important preventable cause of antimicrobial resistance. Failed antibiotic treatment due to resistant pathogens is associated with increased morbidity, mortality, hospital readmission rates, and overall health care costs. Emergency Departments (EDs) present a unique challenge for antibiotic stewardship, as initial prescribing and culture follow-up practices may be impacted by the high volume and quick turnover rate of patients. Inclusion of an emergency medicine pharmacist (EPH) in antimicrobial stewardship programs is recommended by The Infectious Diseases Society of America and the Society for Healthcare Epidemiology. Studies utilizing an EPH in an ED setting demonstrate a reduction in time to culture follow-up and a decrease in readmission rates. Beginning November 1, 2013, Rush University Medical Center (RUMC) ED modified its approach to culture follow-up by implementing an EPH-managed program in collaboration with ED physicians and advanced practice providers. This study aims to compare the total number of antibiotic days prescribed before and after implementation of an EPH-managed culture follow-up program for patients discharged from the ED.

This study will utilize an electronic microbiology database to identify patients treated in the ED for positive urinary tract or skin-and-soft-tissue infections between March 2013 and August 2014 at RUMC. From this group, patients warranting a change in outpatient antibiotic therapy resulting from non-susceptible pathogens will be included for evaluation. Electronic medical records will be used to collect data, including: patient demographics, concomitant medications, serum creatinine, hepatic function, culture results and corresponding pathogen sensitivities, antimicrobial prescribed, number of antibiotic days prescribed, occurrence of drug-related adverse events, and revisits to the ED. The number of antibiotic days prescribed will be compared in 8-month time periods before and after the addition of an EPH to the culture follow-up program.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss barriers to antibiotic stewardship in an ED setting

Describe the advantages of having an EPH-managed ED culture follow-up program

Self Assessment Questions:

Which of the following is not a barrier to antibiotic stewardship in the ED

- A: Frequent discharge prior to final culture and sensitivity results
- B: Slow patient turnover
- C: High daily censuses
- D: Multiple practitioners with varying prescriptive tactics

Which of the following is not an advantage of an EPH-managed culture follow-up program?

- A: Patient profile review by a medication expert
- B: Extra review of each patient by another discipline
- C: EPH-directed antibiotic counseling
- D: Ambiguity regarding culture follow-up responsibility

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-482-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF LACTIC ACIDOSIS WITH METFORMIN USE IN VETERANS WITH RENAL DYSFUNCTION

Stephanie J. Kasten, PharmD*; Arthur A. Schuna, RPh, MS, FASHP, BCACP; Denise L. Walbrandt Pigarelli, PharmD, BC-ADM, RPh
Veteran Affairs - William S. Middleton Hospital, 1600 Overlook Terrace, Madison, WI, 53705

Stephanie.Kasten@va.gov

Purpose: It has been well-documented that metformin is an efficacious and relatively safe medication for the treatment of Type 2 diabetes mellitus in the general population. However, there is limited guidance for the use of metformin in patients with renal dysfunction, particularly in older adults. There has been dispute whether or not serum creatinine is the most accurate measure of renal function and whether a serum creatinine cutoff should dictate metformin use. Given this, providers are now prescribing metformin outside of its FDA-approved parameters. The primary concern with this practice is the risk of metformin accumulation leading to lactic acidosis, which is otherwise a rare adverse reaction. The purpose of this study is to evaluate the safety of metformin use in patients with renal dysfunction at the William S. Middleton Memorial Veterans Hospital. Additionally, the current provider prescribing practices and patient-specific risk factors will be analyzed.

Methods: A retrospective chart review will be performed for approximately 350 patients with an eGFR <60 mL/min and serum creatinine result between October 8, 2012, and October 8, 2014 as determined by a computer generated list. The primary outcome is the incidence of lactic acidosis as defined by a plasma lactate level >4 meq/L and provider diagnosis. Secondary outcomes include time to primary outcome, metformin dose adjustments made (if any), and if a patient had concurrent risk factors causing them to be more susceptible to lactic acidosis development. Data collected and reviewed will include age, gender, comorbidities, metformin dose with adjustments, refill history, metformin prescriber with area of practice, lactate levels and serum pH (as applicable), and eGFR and serum creatinine values with date drawn.

Results/Conclusion: The results and conclusion are still pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review current guidelines and literature available to guide the dosing of metformin in renal dysfunction.

Discuss the benefits and concerns of metformin use in a population with decreased renal function.

Self Assessment Questions:

According to the metformin package insert, which of the following patients is eligible for initiation of metformin therapy:

- A: A 66-year old woman with a SCr of 1.4 mg/dL
- B: A 81-year old woman with a SCr of 1.4 mg/dL
- C: A 66-year old male with a SCr of 1.4 mg/dL
- D: A 81-year old male with a SCr of 1.4 mg/dL

Which of the following is a risk factor that would cause a patient on metformin to be more susceptible to the development of lactic acidosis?

- A: Uncontrolled hypertension
- B: Malabsorptive disorder
- C: Concomitant warfarin therapy
- D: Concomitant insulin therapy

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-483-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECTS OF A PHARMACIST-DEVELOPED PROTOCOL TO TREAT MRSA INFECTIONS WHEN SUSCEPTIBILITY PATTERNS SUGGEST VANCOMYCIN RESISTANCE (MIC GREATER THAN OR EQUAL TO 2) IN A COMMUNITY HOSPITAL

Ryan F Kates* PharmD, Kathryn Jost PharmD, Jennifer Bonnell PharmD
Vista Medical Center East, 729 W Jonathan Dr, Round Lake, IL, 60073
ryan_kates@chs.net

Purpose:

Vancomycin is considered the standard for treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) infections. At Vista Medical Center East (VMCE) the percentage of MRSA cases with an MIC ≥ 2 has increased from 55% to 84% in the last year.

By treating patients who have a suspected MRSA infection empirically with linezolid, VMCE has the potential to decrease length of antibiotic course, hospital stay, and time to clinical improvement. Developing a protocol to identify patients who would benefit from this empiric treatment with an alternative agent will help to streamline this process.

Methods:

The research project consists of a retrospective and prospective chart review. A microbiology report was pulled identifying patients admitted to VMCE from January 2014 through March 2014, presenting with a culture and sensitivity result of MRSA with a MIC ≥ 2 to Vancomycin. The retrospective chart review was conducted with the following information being collected: basic patient demographics, length of hospital stay, duration of antibiotic therapy, time to clinical improvement (evidenced by a normal white blood cell count, afebrile, repeat negative cultures), time to therapeutic trough level of vancomycin (if applicable), and any alternative MRSA antibiotics used instead of vancomycin. A protocol has been developed that will allow pharmacists to dose and monitor linezolid for patients who present with a suspected vancomycin-resistant MRSA infection, depending on the indication. This protocol has begun to be implemented throughout the hospital and will continue as such until March 31. A prospective chart review will be performed examining the same criteria.

Learning Objectives:

Identify the differences between vancomycin and linezolid in terms of dosing and monitoring.

Recognize which patients should be transitioned to an alternative agent to cover for MRSA infections.

Self Assessment Questions:

Which of the following is true in regards to linezolid, but not vancomycin?

- A Linezolid is dosed in accordance with a patient's renal function
- B: Linezolid covers some common gram negative bacteria (i.e. *E. coli*)
- C: Linezolid comes in both oral and intravenous formulations
- D: Linezolid combined with antidepressants can lead to serotonin syn

Which of the following patients would be most appropriate to receive treatment with linezolid?

- A A patient with a gram negative rod bacteremia
- B A patient on sertraline with a MSSA wound (vancomycin MIC = 2)
- C A patient with MRSA cellulitis (vancomycin MIC = 2) with elevated
- D A patient with MRSA pneumonia (vancomycin MIC = 2) with throm

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-484-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A DAILY MEDICATION LIST TO IMPROVE PATIENT SATISFACTION SCORES

Alexandra L. Katula PharmD*; Justin P. Konkol PharmD, BCPS; Sarah M. Crober PharmD, BCPS; Joanne Antonopoulos PharmD, BCPS; Kimberly E. Knoernschild PharmD, BCPS; Anne C. Franzene PharmD
Froedtert and the Medical College of Wisconsin, Froedtert Hospital 9
Froedtert Hospital, 9200 W. Wisconsin Ave, Milwaukee, WI, 53228
alexandra.katula@froedtert.com

Purpose: Value-based purchasing (VBP) programs were designed to compensate hospitals based on quality performance in a variety of domains including the "Patient Experience of Care" domain which measures performance using the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. The survey contains a Communication About Medicines (CAM) domain which assesses patients' perceived knowledge surrounding new medications administered during hospitalization. During the 2014 fiscal year Froedtert Hospital scored 69.59% within the CAM domain, falling 2.26% below the national benchmark of 71.85%. The primary purpose of this project is to determine if utilizing a daily medication list as an educational tool for patients will improve CAM HCAHPS scores.

Methods: Three pilot units achieving CAM HCAHPS scores below the average Froedtert Hospital score of 69.59% for the 2014 fiscal year were selected for project implementation. Baseline CAM HCAHPS scores on pilot units were collected from the months of November through January. During the subsequent three-month study period, February through April, the medication list will be generated from the electronic health record and utilized by nursing and pharmacy staff on pilot units to provide daily education to patients about medication regimen changes. Prior to discharge, patients on pilot units will be asked to complete a survey to collect feedback on the utility of the medication list as a teaching tool. In addition, it is estimated that 650 patients on pilot units will be selected to complete an HCAHPS survey during the study period. CAM HCAHPS scores for pilot units during the study period will be compared to those obtained at baseline to assess for a trend toward score improvement. Results will be reviewed to determine impact and next steps.

Results and Conclusions: Data collection and outcomes evaluation are currently being completed and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify why utilization of daily patient medication list may be useful for patients during their hospital stay.

Describe the workflow associated with implementing a daily patient medication list in an academic medical center.

Self Assessment Questions:

Which domain within the HCAHPS survey does the daily patient medication list target?

- A Communication With Doctors
- B: Responsiveness Of Healthcare Staff
- C: Communication About Medications
- D: Discharge Information

Which of the following healthcare provider teams assisted with project implementation?

- A Physicians
- B Physical Therapists
- C Respiratory Therapists
- D Nurses

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-791-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF SEIZURE OCCURRENCE AND LEVETIRACETAM DOSING IN ACUTE NEUROLOGIC INJURY

Kelsey J Kauffman, PharmD*; Mary Beth Shirk, PharmD, BCPS, FCCP; Nicole V Brown, MS; Guhan Rammohan, MD, FACEP

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 West 10th Avenue, Columbus, OH, 43210

kelsey.kauffman@osumc.edu

Background: The acute recovery period of patients with many types of head injury can be complicated by seizure. Patients presenting with acute neurologic injury, including intracranial hemorrhage (ICH), subarachnoid hemorrhage (SAH), and traumatic brain injury (TBI), receive seizure prophylaxis. Largely due to ease of use, levetiracetam (LEV) has become the agent of choice for seizure prophylaxis in many patients with acute neurologic injury at our institution. Yet optimal dosing of LEV for seizure prophylaxis in these populations has not been firmly established in the literature.

Purpose: To examine the influence of LEV dose on seizure occurrence.

Methods: The study was a single center retrospective cohort of patients admitted between November 1, 2011 and October 31, 2014. Inclusion criteria were age ≥ 18 years, receipt of LEV for seizure prophylaxis and discharge diagnosis of ICH, SAH, and/or TBI based on ICD-9 codes.

Exclusion criteria were prior history of seizure disorder or head tumor, seizure occurrence after injury but prior to first LEV dose, transfer from an outside hospital department other than an emergency department, continuous neuromuscular blockade during the first 7 days of admission, death within 7 days of admission, and a discharge diagnosis of anoxic brain injury. The primary objective was to examine the relationship between seizure occurrence and LEV dose (mg/kg/day) within the first seven days of hospitalization. The secondary study outcome was the relationship between seizure occurrence and time from hospital arrival to first LEV dose administration. Logistic regression analysis was used to assess the relationship between seizure occurrence and LEV dose, as well as seizure occurrence and time to first LEV dose from hospital arrival.

Results and Conclusions: Complete data and conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the estimated seizure frequency following acute neurologic injury

Recall the appropriate duration of seizure prophylaxis following acute neurologic injury

Self Assessment Questions:

Which of the following best describes the estimated seizure frequency following acute neurologic injury in patients who do not receive seizure prophylaxis?

- A < 2%
- B: 2 - 25%
- C: 25 - 50%
- D: > 50%

What is the recommended duration for seizure prophylaxis following severe traumatic brain injury?

- A 3 days
- B 5 days
- C 7 days
- D 10 days

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-485-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF FOLFOX DOSE ADJUSTMENT STRATEGIES AT A MULTICENTER AMBULATORY ONCOLOGY CLINIC

Nathan M Kawamura, PharmD*; George Carro, RPh, MS, BCOP; Wendy Hui, PharmD, BCOP; Abigail Harper, PharmD, BCOP; Cheryl Jee, PharmD, BCOP; Amanda Blankenship, PharmD; Shannon Gavin, PharmD; Anna Palafox, PharmD, BCOP; Ashton Hullett, PharmD

NorthShore University HealthSystem, 2650 Ridge Ave, Evanston, IL, 60201
nkawamura@northshore.org

Purpose

The FOLFOX regimen, which contains fluorouracil, oxaliplatin, and leucovorin is a common regimen mainly used to treat gastrointestinal cancers (e.g., colorectal, pancreatic, and esophageal). Common dose-limiting toxicities (DLTs) include neutropenia, thrombocytopenia, and neuropathy.

DLTs associated with FOLFOX often lead to dose reductions and/or the addition of granulocyte-colony stimulating factor (G-CSF) support. A retrospective analysis performed by Smoragiewicz et al. concludes that overall survival and relapse free survival is not affected by the dose intensity of FOLFOX.

There is currently no standardized algorithm in our institution for adjusting FOLFOX doses and/or adding G-CSF support when patients experience DLTs. The dose of one or multiple agents may be reduced, one or more agents may be omitted, and/or G-CSF support may be added. There is also variability as to how much one reduces a dose (e.g. 10% vs. 20%).

The purpose of this review is to describe the various strategies used by providers when adjusting the FOLFOX regimen at NorthShore University HealthSystem. Based on the findings, a standardized approach will be proposed to adjust the FOLFOX regimen. This would lead to less confusion among other healthcare providers and a potential decrease in cost.

Methods

This retrospective chart review includes all patients who received FOLFOX between August 1, 2012 and July 31, 2014 across three cancer centers at NorthShore University HealthSystem. During this timeframe there were 295 patients who received the FOLFOX regimen. Data collected include cancer diagnosis, treatment intent, chemotherapy dose, G-CSF utilization, duration of treatment, reason for dose reduction/omission or addition of G-CSF support, age at time of treatment initiation, sex, and time to progression (defined as time from initiation of FOLFOX to disease progression).

Summary of results to support conclusion

Results and conclusions to be presented at Great Lakes Pharmacy Conference

Learning Objectives:

Recognize common malignancies where Folic Acid, Fluorouracil, Oxaliplatin (FOLFOX) may be utilized

Identify common adverse events that may affect the dosing of FOLFOX

Self Assessment Questions:

The FOLFOX regimen is most commonly used in which setting?

- A Breast cancer
- B: GI cancers
- C: Lung cancer
- D: Leukemias

What is a common adverse event of oxaliplatin that may lead to a dose reduction?

- A Hypertension
- B Alopecia
- C Ototoxicity
- D Neuropathy

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-792-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF DRUG INTERACTIONS IN PATIENTS ON WARFARIN WHICH MAY INCREASE THE RISK OF MAJOR BLEEDING EVENTS

Meredith M. Kean, PharmD*; Sara A. Griesbach PharmD, BCPS, BCACP; Kori Krueger MD; Brandon Parkhurst MD; Melissa Mikelson RN, BSN

Marshfield Clinic, 1000 North Oak Avenue, Marshfield, WI, 54449
kean.meredith@marshfieldclinic.org

Purpose: Warfarin is an anticoagulant commonly prescribed to prevent thromboembolism. Many drugs used in combination with warfarin increase a patient's risk of bleeding. The purpose of this study is to assess whether drug interactions were present in patients on warfarin maintenance therapy who experienced a major bleeding adverse event. The goal is to assess which medications may increase the incidence of major bleeds and provide information to enhance protocols and monitoring techniques within Marshfield Clinics anticoagulation service. **Methods:** This retrospective study has been approved by the Marshfield Clinic Institutional Review Board. Patients over the age of 18 enrolled in Marshfield Clinics warfarin Anticoagulation Service who experienced a major bleeding event on maintenance warfarin therapy between March 1, 2011 and September 30, 2014 will be included. Maintenance therapy will be defined as more than 30 days of warfarin therapy. Patient must have a Marshfield Clinic primary care provider to be included in this study. Major bleeding events will be defined as bleeds resulting in hospitalization, blood transfusion, or death. We plan to further investigate which drug(s) may have contributed to the major bleeding adverse event. Patients who experienced a major adverse bleeding event that had an interacting medication initiated within 2 weeks of a major bleed will be grouped and matched by case controls. To gather further information about which drugs could have contributed to the major adverse bleeding event, another data pull will be conducted to pull all medications the patients were on within 30 days of the major adverse bleeding event date from the electronic medication prescribing platform. Statistical analysis will be performed by a biostatistician. **Results/Conclusions:** Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the difference between pharmacokinetic and pharmacodynamic drug interactions with warfarin.

Review the basic metabolism of warfarin.

Self Assessment Questions:

Which of the following medications has a known pharmacokinetic drug interaction with warfarin?

- A: aspirin
- B: loratadine
- C: amiodarone
- D: sertraline

The S enantiomer of warfarin is primarily metabolized by which CYP450 enzyme?

- A: Cyp2c19
- B: Cyp2c9
- C: Cyp3a4
- D: Cyp2c8

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-793-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL IMPACT OF MALDI-TOF MS FOR RAPID ORGANISM IDENTIFICATION ON TIME TO EFFECTIVE ANTIMICROBIAL THERAPY

Emily Kearney, Pharm.D.*, Curtis Smith, Pharm.D.

Sparrow Health System, 1215 E. Michigan Ave., Lansing, MI, 48912

Emily.Kearney@Sparrow.org

Matrix-Assisted Laser Desorption Ionization Time-Of-Flight Mass Spectrometry (MALDI-TOF MS) is a rapid bacteria identification technique. It utilizes mass spectrometry by a laser causing ionization of the bacteria to be identified from the positive culture. The mass spectrum produced is as unique to the bacteria as the fingerprint of the patient from which the culture was obtained. This technique is able to identify a wide variety of organisms from positive blood, urine, respiratory tract, or wound cultures. Yet there is still a question of how much benefit this identification technique can bring to a health-system. This study aims to analyze the effect of using MALDI-TOF MS on time to targeted antimicrobial therapy in patients in the critical care units (ICU, CCU, and NTICU) at Sparrow Hospital. This is a prospective, observational study with a pre-post test design and a control group. All infected patients with a positive culture identified by MALDI-TOF MS and being treated with empiric antibiotics are in the intervention group. A historical cohort is matched to each patient in the intervention group by unit, pathogen, and location of culture. The primary outcome is time to targeted antimicrobial therapy. A subgroup analysis of time until first antimicrobial adjustment, average number of adjustments, number of cases with no adjustments, total days of antibiotics, total length of stay, and length of stay in unit. A student t test will be used for continuous data that is normally distributed and Mann-Whitney U test if there isn't normal distribution. A Chi square test will be used to analyze nominal data. In order to detect a difference of time in hours to targeted antimicrobial therapy with a power of 0.9 and alpha of 0.05 the aim is to include 90 patients. Results and conclusion will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe MALDI-TOF mass spectrometry and its use in microbiology.

Explain the impact of MALDI-TOF mass spectrometry in clinical practice

Self Assessment Questions:

What is the most rapid amount of time to identify one organism sample using MALDI-TOF mass spectrometry from the time the culture is positive to the organism being identified?

- A: 1 hour
- B: Less than 10 minutes
- C: 24 hours
- D: 24-48 hours

What was MALDI-TOF mass spectrometry combined with in clinical trials to maximize its positive impact?

- A: Traditional culture and sensitivity
- B: Improved culture collection technique
- C: Antimicrobial stewardship interventions
- D: Infectious disease physician consult

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-486-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF A HEPARIN SLIDING SCALE PROTOCOL IN PATIENTS WITH FIRST DIAGNOSED DEEP VEIN THROMBOSIS OR PULMONARY EMBOLISM

Amy L. Kelley*, PharmD, Shelley A. Kloch, PharmD, Derek L. Grimm, PharmD, BCPS, Jennifer E. Confer, PharmD, BCPS
Cabell Huntington Hospital, 34 Chester Dr. Apt 306, Scott Depot, WV, 25560
amy.sharp@chhi.org

Purpose: A weight based intravenous unfractionated heparin (IV UFH) dosing protocol was initiated in July 2011. A formal evaluation of this protocol will evaluate strengths and weaknesses to optimize patient outcomes. The primary purpose of this study was to evaluate the application and therapeutic efficacy of a weight based, IV UFH sliding scale in patients diagnosed with their first incidence of deep vein thrombosis or pulmonary embolism and, assess adverse effects associated with the use of this protocol.

Methods: This study has been approved by the Marshall University Institutional Review Board and is a retrospective chart review of patients admitted to our facility between July 1, 2010 and July 31, 2014 who were diagnosed with their first incidence of deep vein thrombosis or pulmonary embolism and initially treated with IV UFH dosed sliding scale protocol. Therapeutic efficacy of the IV UFH protocol was assessed by time to first therapeutic aPTT level with a goal of less than 24 hours. For incidence of safety, major and minor bleeding events and incidence of heparin induced thrombocytopenia (HIT) were collected. The primary outcome was achievement of therapeutic aPTT level (greater than 55 seconds) within 24 hours of initiation. Secondary outcomes included time to therapeutic aPTT, major and minor bleeding events, incidence of heparin induced thrombocytopenia, anticoagulant selection if aPTT remains non-therapeutic greater than 48 hours, and day of other anticoagulant administration.

Results: For the primary outcome, 87.8 percent of patients had therapeutic aPTT levels (greater than 55 seconds) within 24 hours of initiation with majority in less than 12 hours. The safety analysis has yielded no patients with major bleeding, 2 with minor bleeding, and no incidence of heparin induced thrombocytopenia. Further results to be reported at the Great Lakes Residency Conference.

Conclusion: To be reported at the Great Lakes Residency Conference.

Learning Objectives:

Explain the importance of obtaining therapeutic aPTT levels after deep vein thrombosis or pulmonary embolism.

Describe the possible adverse effects associated with IV unfractionated heparin administration.

Self Assessment Questions:

Deep vein thrombosis and pulmonary embolism reoccurrence is associated with failure to reach therapeutic aPTT levels in less than _____ hours.

- A: 72 hours
- B: 24 hours
- C: 98 hours
- D: 120 hours

Which of the following adverse effects is associated with IV unfractionated heparin administration?

- A: Thrombotic thrombocytopenic purpura
- B: Idiopathic thrombocytopenic purpura
- C: Disseminated intravascular coagulation
- D: Heparin induced thrombocytopenia

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-487-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF IDEAL BODY WEIGHT DAPTOMYCIN DOSING ON THE DEVELOPMENT OF DAPTOMYCIN NON-SUSCEPTIBLE ENTEROCOCCAL INFECTIONS

Ronald E. Kendall, Pharm.D.*, Warren E. Rose, Pharm.D., Margaret R. Jorgenson, Pharm.D., Katelyn R. Richards, Pharm.D., Jeannina A. Smith, M.D., Lucas T. Schulz, Pharm.D., BCPS AQ-ID
University of Wisconsin Hospital and Clinics, 4348 Bagley Parkway, Madison, WI, 53705
rkendall@uwhealth.org

Daptomycin is a lipopeptide antibiotic approved for the treatment of complicated skin and skin structure infections and right-sided endocarditis, including bloodstream infections, caused by either methicillin-susceptible or methicillin-resistant *Staphylococcus aureus*. Off-label daptomycin use tends to be preferred for serious infections such as sepsis from intra-abdominal vancomycin-resistant *Enterococcus*. Dosing is weight-based, and two trials have indicated that ideal body weight (IBW) dosing may be sufficient. Concern has been raised about the daptomycin concentration necessary to prevent the emergence of resistance during therapy. *Staphylococcus aureus* and *Enterococcus* models indicate that doses of at least 10 mg/kg may be needed. Since changing to IBW dosing of daptomycin at the University of Wisconsin Hospital and Clinics in 2010, adverse effects have likely been prevented and drug cost savings have been realized. However, the possibility that IBW dosing may lead to DNSE in vivo and clinical and microbiological treatment failure is unknown.

This is a single-center, retrospective observational study at UWHC in Madison, Wisconsin. All patients with 2 positive cultures from *Enterococcus* infections treated with daptomycin will be screened. Minimum inhibitory concentrations (MICs) are performed on Microscan, with an E Test verification when MICs are greater than 4 mcg/mL. Risk factors for the development of DNSE will be assessed using the same methods as previous trials. Saved isolates of pre-daptomycin susceptible *Enterococcus* and post-daptomycin DNSE will be collected and in vitro laboratory modeling will be performed to replicate the clinical scenario and test the effect of changing variables such as dosing and the presence of synergistic agents.

The primary outcome is the rate of development of DNSE in vivo. Secondary outcomes will include the identification of institution-specific risk factors for DNSE development and clinical, microbiological and safety outcomes. Institutional guidelines will be modified to include strategies to most effectively, safely, and cost-effectively treat *Enterococcal* infections.

Learning Objectives:

Recognize risk factors for the development of daptomycin non-susceptible *Enterococcus*.

Discuss therapeutic strategies to prevent the resistance of *Enterococcus* to daptomycin.

Self Assessment Questions:

Which of the following is likely a risk factor for daptomycin non-susceptible *Enterococcus*?

- A: Immunosuppression
- B: APACHE-2 scores less than 5
- C: Concomitant beta-blocker therapy
- D: Recent travel to the Ohio River Valley

What is one hypothesized strategy for preventing the emergence of resistance to daptomycin during therapy?

- A: Starting drotrecogin alfa therapy
- B: Increasing the dose of daptomycin
- C: Discontinuing concomitant beta-lactams
- D: Daptomycin and vancomycin combination therapy

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-488-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

NEPHROTOXICITY RISK AND THE USE OF CONCOMITANT VANCOMYCIN AND PIPERACILLIN/TAZOBACTAM

Aamna R. Khan, PharmD* PGY-1 Pharmacy Practice Resident;
Francine Salinitri, PharmD; Raymond Cha, PharmD; Lama Hsaiky,
PharmD, BCPS

Oakwood Hospital and Medical Center, 18101 Oakwood
Blvd, Dearborn, MI, 48124

aamna.khan@oakwood.org

Purpose: In current literature, there is a 1.0–42.6% rate of vancomycin associated nephrotoxicity among a variety of patient populations. Up to 50% of patients with Acute Kidney Injury (AKI) do not survive. Patients who do survive have increased morbidity and prolonged hospitalization. Current reports suggest that higher rates of nephrotoxicity may be associated with vancomycin when used in combination with piperacillin/tazobactam. Numerous studies have evaluated the incidence of nephrotoxicity in this combination therapy population, but none have focused on the patient-specific risk factors that may predispose a patient to nephrotoxicity. Currently, abstracts are the only available studies that evaluate patient specific risk factors. The information they contain is quite heterogeneous, making it difficult to extrapolate to clinical practice. The purpose of this study is to determine if there are risk factors that predispose a patient to nephrotoxicity when treated with vancomycin and piperacillin/tazobactam. **Methods:** This retrospective, case control, single center study includes 200 study subjects with documented coadministration of vancomycin and piperacillin/tazobactam between the dates of January 2013 and January 2015. Subjects were included if they were older than 18 years of age and if they received at least 24 hours of therapy overlap. Endpoints include incidence of nephrotoxicity among vancomycin and piperacillin/tazobactam recipients, as well as incidence of patient specific risk factors such as hypotension, age, obesity, vancomycin trough prior to nephrotoxicity, and comorbidities. The study protocol has been approved by our affiliated institutional review boards. **Results and Conclusions:** Data is currently being analyzed and will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the percentage of patients with acute kidney injury that do not survive

Classify acute renal dysfunction using RIFLE (Risk, Injury, Failure, Loss of kidney function, End-stage kidney disease) criteria categories from the Kidney Disease: Improving Global Outcomes (KDIGO) Clinical Practice Guideline for Acute Kidney Injury.

Self Assessment Questions:

What is the RIFLE criteria category for acute renal dysfunction in a patient with a SCr x 2 from baseline, or GFR decrease > 50%?

- A Risk
- B: Injury
- C: Failure
- D: Loss

Up to what percent of patients with acute kidney injury do not survive?

- A 33%
- B 76%
- C 18%
- D 50%

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-918-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

QUALITY AND SAFETY IMPROVEMENTS IN ANTICOAGULATION TRANSITIONS OF CARE

Sadaf Khan*, PharmD. Molly Rockstad, PharmD., BCPS

John H. Stroger Jr. Hospital, 1969 West Ogden Ave., Department of
Pharmacy LL175, Chicago, IL, 60612

sakhan3@cookcountyhhs.org

PURPOSE: Warfarin has been implicated with a significant risk for adverse events, many of which occur during the period following discharge. Due to risks associated with anticoagulants, the Joint Commission released requirements intended to reduce risk of patient harm, citing patient education as a vital component of an anticoagulation program. The purpose of this study is to evaluate a pharmacist led warfarin education service for patients newly enrolled for warfarin monitoring at a hospital based anticoagulation clinic while admitted as an inpatient. The goal of the program is to improve patient safety, standardize patient education, improve communication between inpatient and outpatient providers, and shorten transition time.

METHODS: This warfarin education service took place at a teaching hospital that provides primary, tertiary, and specialty services to an underserved population. The warfarin education service consisted of a clinical pharmacy team which provided education to patients accepted to the clinic while admitted to the hospital's medical wards. Data collection for this Institutional Review Board approved study began in January 2015. The evaluation consisted of a retrospective chart review of patients scheduled for new anticoagulation clinic visits between August 2014 and December 2014. Based on the target population of the service, patients referred from outpatient clinics, the emergency department, or trauma units were excluded from analysis. Data collected included indication for warfarin, time between start of treatment and first clinic appointment, dose at discharge and at initial clinic appointment, INR at discharge and at initial clinic appointment, incidence of documented warfarin related bleeding, incidence of new thrombosis formation, and adherence to scheduled appointment. Patient identifiers were removed from the data collected and confidentiality maintained. Based on current clinic data, a total of 100 patients were expected. **RESULTS/CONCLUSION:** Data collection and analysis in progress and will be presented at Great Lakes Residency Conference.

Learning Objectives:

Describe the rationale behind establishing anticoagulation monitoring transition of care programs

Discuss the potential benefits of a pharmacist managed anticoagulation teaching service

Self Assessment Questions:

The Joint Commission requires which of the following from anticoagulation therapy programs to reduce patient harm:

- A Patient education
- B: Genetic testing for all patients newly initiated on warfarin
- C: Telephone follow-up during transition of care period
- D: Follow-up appointments within 1 month of discharge from hospital

Studies have shown which of the following as a potential benefit of pharmacist managed anticoagulation teaching services:

- A Improved communication between inpatient and outpatient staff
- B Lower rate of readmission for anticoagulation-related issues
- C Greater number of patients undergoing warfarin genotyping
- D Both A & B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-917-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

CORTICOSTEROID DOSING RELATIONSHIP TO DURATION OF MECHANICAL VENTILATION IN ADULT PATIENTS WITH ACUTE CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) EXACERBATIONS

Katherine Kielts, PharmD*; Jennifer McCann, PharmD, BCPS; Brent Toney, DO; Emily Cochard, MD

St. Vincent Health, 2001 W. 86th St, Indianapolis, IN, 46260

kkielts@stvincent.org

Purpose: Acute COPD exacerbations are documented as one of the top ten causes of hospitalization in the United States. Consequences of frequent exacerbations include a more rapid decline of lung function, decreased quality of life, and 1 year mortality rates up to 40% in those patients requiring mechanical ventilation.

Systemic corticosteroids reduce the severity of dyspnea, need for mechanical ventilation, length of intensive care unit (ICU) stay, and rate of 30 day hospital readmission. Although considered a standard of care, data is lacking on the optimal dose and duration of corticosteroid use in patients who require mechanical ventilation. In addition, variability in steroid prescribing is observed at St. Vincent Indianapolis Hospital in this patient population. The purpose of this study is to describe the relationship of steroid dosing to clinical outcomes and adverse effects in patients with acute COPD exacerbations requiring mechanical ventilation.

Methods: This is a retrospective descriptive study of patients admitted to the ICU who required mechanical ventilation for acute COPD exacerbations, between September 1, 2013 and August 31, 2014. The study objective is to describe the duration of mechanical ventilation, hospital and ICU length of stay, and adverse effects based on steroid dose administered. Patients were included if they were mechanically ventilated for ≥48 hours and had a diagnosis of COPD with acute exacerbation, emphysema, or acute respiratory failure. Patients were excluded if they had a diagnosis of acute pulmonary embolism, acute respiratory distress syndrome (ARDS), and/or sepsis during the same hospitalization, history of pulmonary fibrosis, were immunocompromised, or were ventilator dependent prior to admission.

Results/Conclusion: Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the clinical rationale for steroid use in acute exacerbations of COPD

Identify differences in treatment with corticosteroids between patients who are mechanically ventilated and those who are not mechanically ventilated

Self Assessment Questions:

Steroid use is associated with which of the following benefits in an acute exacerbation of COPD?

- A: Reduce the rate of concomitant antibiotic use
- B: Increase patient acceptance of smoking cessation programming
- C: Decrease ICU length of stay
- D: Decrease the use of oral bronchodilators, such as theophylline

Which of the following statements is true?

- A: Current GOLD Guidelines recommend prednisone 40mg daily x 5
- B: Existing literature on corticosteroid use in COPD exacerbations recommends low-dose therapy
- C: Mechanically ventilated patients are routinely included in the majority of clinical trials evaluating corticosteroid use in COPD exacerbations
- D: Existing literature on corticosteroid use in COPD exacerbations recommends high-dose therapy

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-489-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY AND EFFICACY OF INTRAVENOUS CHLOROTHIAZIDE VERSUS ORAL METOLAZONE IN COMBINATION WITH LOOP DIURETICS IN ACUTE DECOMPENSATED HEART FAILURE

Philip K. King, PharmD, BCPS*, Alexander J. Ansara, PharmD, BCPS
Indiana University Health / Butler University, 1119 Sterling St, Apt 9, Indianapolis, IN, 46201

philkingpharmd@gmail.com

PURPOSE: Heart failure remains a leading cause of morbidity and mortality affecting over five million individuals in the United States. One of 9 deaths include heart failure as a contributing cause. Patients with acutely decompensated heart failure (ADHF) are at high risk for extended hospital stays with early and frequent readmissions. High readmission rates are associated with substantial reductions in hospital reimbursement from the Centers for Medicare and Medicaid Services. In addition, ADHF frequently leads to dangerous complications, such as fluid and electrolyte abnormalities, acute kidney injury, and cardiogenic shock. The management of most cases of ADHF relies heavily on aggressive fluid removal with intravenous loop diuretics. Vasodilators and inotropic medications may also be used depending on whether patients are hypertensive or with a low cardiac index. Patients not responding to monotherapy with loop diuretics may require additional diuretics that block sodium reabsorption later in the distal tubule, such as, intravenous chlorothiazide or oral metolazone, to aid in fluid removal. Current literature directly comparing these two agents does not exist. Therefore, the purpose of this study is to compare intravenous chlorothiazide and oral metolazone in order to determine if either agent is safer or more effective. **METHODS:** This retrospective chart review will seek to identify 100 patients in each group, with data extracted from January 2007 to December 2014. Patients will be adults age 18 or older admitted for ADHF, either chlorothiazide or metolazone concurrently with loop diuretics. Primary efficacy outcomes will include hospital length of stay, 30-day hospital readmission rates, daily weight loss, diuresis 2 to 4 hours post-thiazide dose, and time to achieve clinical euvolemia. Primary safety outcomes will include incidence of acute kidney injury, hypotension, and electrolyte abnormalities. Descriptive and inferential statistics will be used as appropriate. **RESULTS/CONCLUSIONS:** Analysis will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the primary treatment modalities used in acute decompensated heart failure.

Recognize appropriate use of thiazide diuretics in acute decompensated heart failure.

Self Assessment Questions:

Which treatment change is most often needed for patients presenting with Subset II classification of acute decompensated heart failure?

- A: Inotropes, such as milrinone or dobutamine, are most often needed
- B: Increased doses of intravenous loop diuretics are necessary to improve diuresis
- C: Intravenous vasodilators are indicated in the majority of symptomatic patients
- D: Initial combination therapy of intravenous vasodilators, inotropes, and diuretics is most effective

Select the most appropriate scenario to add on a thiazide diuretic for a patient with acute decompensated heart failure.

- A: 62 yom on nitroprusside 3 mcg/kg/min with SPB 110 mmHg who is euvolemic
- B: 71 yof with SBP 92 mmHg and worsening renal function on intravenous furosemide
- C: 59 yom receiving ultrafiltration at a rate that is limited by symptoms
- D: 77 yof receiving nitroglycerin at 40 mcg/min with intravenous bumetanide

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-490-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE VALIDATION OF AN EMPIRIC ANTIBIOTIC ALGORITHM FOR THE TREATMENT OF SEPSIS

Ashraf A. Kittaneh*, PharmD, Tara L. Fisher, PharmD, BCPS, Tamara L. McMath, MPH, Christy L. Collins, MA
Riverside Methodist Hospital, 3535 Olentangy River Rd., Columbus, OH, 43214
ashraf.kittaneh@ohiohealth.com

Purpose: Current strategies for empiric antibiotic therapy in sepsis include initiation of broad-spectrum agents, regardless of suspected source of infection. In situations where a suspected source of infection is present, this approach may be considered an inappropriate use of antibiotic therapy, as it does not target antibiotic coverage against the most likely pathogens that stem from the possible source. The objective of this study was to determine if empiric antibiotic selection, guided by an algorithm based on source of infection, is appropriate compared to cultured pathogenic results.

Methods: A single-center, retrospective review of all adult patients admitted with a diagnosis of sepsis, including simple sepsis, severe sepsis, and septic shock secondary to suspected pneumonia, intra-abdominal, genitourinary, or *Clostridium difficile* infections was performed. Patients diagnosed with sepsis of unknown origin were excluded. The algorithm used was developed in conjunction with the institutional infectious disease service, and recommendations for antibiotic selection were based on targeting the most likely pathogens for each suspected source of infection. The following data were collected: patient age, gender, sepsis diagnosis, suspected source of infection at admission, suspected source of infection after 24 and 48 hours, antibiotic therapy chosen, antibiotic therapy proposed by the algorithm, and bacterial pathogens cultured. Validation of the algorithm occurred by determining if the recommended antibiotic therapy provides coverage against cultured bacteria or if cultures were negative.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the potential benefits of utilizing suspected source of infection to guide antibiotic selection.

Identify the instances in which empiric antibiotic recommendations via the algorithm were validated.

Self Assessment Questions:

Which of the following is a benefit of utilizing suspected source of infection to guide empiric antibiotic selection?

- A: Patients will receive broad-spectrum antibiotics
- B: Shorter duration of treatment
- C: Earlier optimization of antimicrobial therapy
- D: Increased drug costs

Which suspected source of infection was associated with the most algorithm failures?

- A: Pneumonia
- B: Genitourinary
- C: Intra-abdominal
- D: *C. difficile*

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-491-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF AN APPENDICITIS CLINICAL TREATMENT PATHWAY ON READMISSION RATES IN CHILDREN

Alexis E. Klefeker, PharmD*; Laurel L. Mulder, MD Candidate; Erin A. Elder, MD Candidate; Emily T. Durkin, MD; Christie J. Van Dyke, PharmD, BCPS
Spectrum Health, 100 Michigan Street NE, Pharmacy Dept. MC001, Grand Rapids, MI, 49503
alexis.klefeker@spectrumhealth.org

Purpose: Acute appendicitis is the most common urgent surgical condition encountered in children; however, limited consensus and available data exist regarding antibiotic choice, route of administration, and treatment length to guide therapy. The purpose of this study was to assess the impact of the appendicitis clinical treatment pathway introduced at Helen DeVos Children's Hospital of Spectrum Health (HDVCH) by comparing readmission rates before and after implementation. **Methods:** A retrospective cohort study was performed which included pediatric patients who were admitted with a diagnosis of appendicitis between October 2012 and October 2014. Patients were stratified into two groups based on whether they were admitted with a diagnosis of appendicitis before or after the clinical treatment pathway implementation in October 2013. In addition to readmission rate, data collected included: demographics, surgical course, antibiotic administration, adverse effects, clinical response, and abscess formation. Good clinical response was defined as no fever or ileus and ability to tolerate oral intake at 48 hours postoperatively as outlined by the HDVCH clinical treatment pathway. Secondary objectives included investigating the rate of abscess formation, antibiotic treatment duration, antibiotic treatment selection, and adherence to the standard clinical treatment pathway. **Results:** To date, 95 patients in the pre-implementation group and 97 patients in the post-implementation have been evaluated. Preliminary data showed no significant difference in 30-day readmission rates (1% vs. 5%, $p = 0.052$) before and after clinical treatment pathway implementation. Analysis of additional data will be presented at the 2015 Great Lakes Pharmacy Resident Conference. **Conclusions:** In pediatric patients diagnosed with acute appendicitis, the rate of readmission was similar in patients treated before and after implementation of a clinical treatment pathway.

Learning Objectives:

Describe the recommended clinical pathways for management of patients with suspected acute appendicitis.

Define recommended antimicrobial therapy for patients who receive a diagnosis of appendicitis.

Self Assessment Questions:

As outlined by the Infectious Disease Society of America (IDSA) Guideline for Diagnosis and Management of Complicated Intra-abdominal Infection in Adults and Children, pathway design for the care of p

- A: Surgeons, infectious disease specialists, and pharmacists
- B: Infectious disease specialists, emergency medicine physicians, and
- C: Nursing providers, radiologists, and social workers
- D: Radiologists, pharmacists, and physical therapists

IDSA Guidelines recommend antimicrobial coverage for which of the following groups of organisms in patients with a diagnosis of appendicitis?

- A: Facultative and aerobic gram-negative organisms
- B: Anaerobic organisms
- C: Multi-drug resistant gram-negative organisms
- D: A and B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-492-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF AN EVIDENCE BASED ELECTRONIC ORDER SET IN AN EMERGENCY DEPARTMENT

Jeremy J. Klein*, PharmD, Pharmacy Practice Resident; Jeremy S. Hilty, PharmD, BCPS; Jennifer M. Blanchard, PharmD, BCPS
Veteran Affairs - Cincinnati Medical Center, 3200 Vine St, Pharmacy
Service 119, CINCINNATI, OH, 45220
jeremy.klein@va.gov

Purpose: The current medication ordering process at the Cincinnati Veteran Affairs (VA) medical center emergency department (ED) is done primarily via hardcopy orders and does not uniformly utilize electronic orders in the computerized patient record system (CPRS), creating inconsistent documentation of medication therapy with the potential for omissions or duplications. The objective of this project is to design a user-friendly and informative ED order set in CPRS. The implementation of such an order set stands to streamline the ordering process, enable prospective pharmacist review, improve documentation, and facilitate the goal of maintaining timely and efficient care to our diverse veteran population.

Methods: Data collection will include conducting an internal review of the current emergency department ordering process; surveying our providers locally and at other facilities for best practices and needs for an electronic order set; and performing an evidence based emergency department guideline literature search focusing on ED sensitive disease states and utilizing nationally recognized sources. With the assistance of informatics and pharmacy, a CPRS order set will then be designed to address the needs and focuses identified from the aforementioned analyses, as well the goals and requirements for ED care set forth by the Joint Commission and other accrediting bodies. The proposed order set shall then be reviewed and approved by the Pharmacy and Therapeutics committee (P&T) and Clinical Executive Board (CEB) prior to implementation. Results of the survey and progress on the ED order set will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of electronic order sets in the emergency department and potential challenges to their use.

Outline steps necessary to implement an electronic order set in the emergency department.

Self Assessment Questions:

Which of the following is an advantage of electronic order sets coupled with an electronic medical record?

- A Reduction in the time for patients to be administered medication
- B Allows for prospective pharmacist review
- C Creates the potential for bedside medication administration barcode
- D All of the above

Given that the emergency department is a unique environment, what is recommended regarding creation of ED order sets?

- A Use existing order sets from an intensive care unit
- B Balance complexity of the order set with an efficient user response
- C Wait until after the order sets have been rolled out to provide training
- D Only consult ED physicians since the order set is being designed for them

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-919-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

LEVERAGING RAPID PATHOGEN IDENTIFICATION WITH ANTIMICROBIAL STEWARDSHIP ACTIVITIES IN BLOOD STREAM INFECTIONS IN A TERTIARY CARE HOSPITAL'S INTENSIVE CARE UNITS

Sarah J. Klemm, PharmD*, Valerie L. Ravenna, PharmD, BCPS
Aurora St. Luke's Medical Center, 2900 W. Oklahoma
Ave., Milwaukee, WI, 53215
sarah.klemm@aurora.org

Purpose: Blood stream infections (BSI) are associated with high rates of morbidity and mortality. Timely initiation of appropriate antibiotics is key to improving clinical outcomes. However, conventional identification of pathogens is based on various time-consuming procedures that can delay administration of appropriate antibiotics. Rapid diagnostic testing via matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) with integration of stewardship activities has demonstrated improved clinical and financial outcomes. The objective of this project is to evaluate the impact of the use of MALDI-TOF integrated with prospective pharmacy antimicrobial stewardship interventions on time to effective antibiotics in BSI in the intensive care units (ICU). **Methods:** This pre- and post-intervention study was undertaken at a single-center tertiary care center with 128 ICU beds. Evidence-based recommendations for the treatment of BSI were developed. A workflow for pharmacists was created to assist in intervention strategies for BSI treatment. Currently, a dedicated pharmacist receives real-time notification of positive blood cultures with organism identification by MALDI-TOF in all ICU patients; pertinent patient information is then reviewed and managing physicians contacted to optimize therapy according to treatment recommendations. Patients are then reviewed daily by the pharmacist to facilitate de-escalation as additional susceptibilities become available. All adult patients admitted to the ICU with positive blood cultures not deemed to be contaminants will be included. The primary outcome evaluated is time to effective antimicrobial. Additional data collected will include patient demographics, isolate susceptibilities, treatment data, intervention acceptance rate, 30-day in-hospital mortality, length of stay, and readmission rate. Outcomes will be compared to a retrospective cohort of ICU patients with positive blood cultures identified through conventional techniques prior to MALDI-TOF use. **Results/Conclusion:** Data collection is currently in progress. Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the impact of Matrix Assisted Laser Desorption Ionization Time-of-Flight (MALDI-TOF) on time interval from clinical presentation to effective antimicrobial therapy in blood stream infections.

Explain how rapid pathogen identification with MALDI-TOF can improve patient care.

Self Assessment Questions:

Which of the following statements is true based on current literature regarding MALDI-TOF in blood stream infections?

- A MALDI-TOF integrated with antimicrobial stewardship activities decreases
- B MALDI-TOF integrated with antimicrobial stewardship activities increases
- C MALDI-TOF integrated with antimicrobial stewardship activities has no effect
- D MALDI-TOF without antimicrobial stewardship activities decreases

Based on the current literature, which of the following patient care outcomes have been associated with the use of MALDI-TOF integrated with antimicrobial stewardship activities in blood stream infections?

- A Increased length of ICU stay
- B Increased hospital readmissions
- C Decreased mortality
- D Decreased patient satisfaction

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-794-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PHARMACIST-MANAGED DYSLIPIDEMIA PROGRAM ON MEDICATION ADHERENCE AND MEDICAL COSTS

Megan M Kline, PharmD*; Cindy A Wirth; Anu B Dhamecha, PharmD; Erin J Weber, PharmD, BCACP; Chauntae M Reynolds, PharmD, BCACP, CDE

Community Health Network- Wellspring Pharmacy, 1240 Broadway Street #106, Indianapolis, IN, 46202
mkline@ecomunity.com

Purpose: Dyslipidemias are ranked as one of the disease states with the highest avoidable costs. In 2012, non-adherence to cholesterol-lowering medications accounted for \$44 billion in avoidable costs. Studies have correlated a high rate of adherence to hospitalization prevention and decreased medical costs. This study sought to determine if Bridges to Health, a pharmacist-run disease state management program, improved adherence to cholesterol-lowering medications and overall medical costs.

Methods: In this retrospective matched cohort, we compared participants in the Bridges to Health program to a matched control group. The primary objective of this study was to measure overall adherence to cholesterol medications and its impact on medical costs. Adherence was defined as taking a medication >80% of the time. Medical costs were defined as all costs paid by the insurance company excluding pharmacy costs (i.e. prescriptions). Insurance claims data was used to obtain refill records and medical costs. Medication possession ratio was then used to calculate the patients overall adherence between the dates of July 1, 2013 and July 1, 2014.

Results: Patients enrolled in Bridges to Health were not statistically significantly more adherent, defined as taking their medications >80% of the time, to their medications when compared to the control group (p=0.289). There was no statistically significant difference between the groups when looking at overall medical costs (p=0.6). Secondary results will be discussed further at Great Lakes Pharmacy Resident Conference

Conclusions: Adherence to medications and reduction of medical costs is a multi-factorial process, of which pharmacists play a vital role. In this study, we did not demonstrate improved adherence to medications or medical costs. Further conclusions will be discussed at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define adherence and its correlation with primary outcomes, healthcare utilization, and cost

List the different methods used to determine medication adherence

Self Assessment Questions:

In the study performed by Sokol et al, which of the following primary endpoints was determined to be lower in the 80-100% adherence arm?

- A: Myocardial Infarction
- B: Hospitalization
- C: Stroke
- D: Death

Which of the following were used to determine adherence in this study?

- A: Pharmacy Benefit Manager Claims
- B: Medication Possession Ratio
- C: Proportion of Days Covered
- D: Both A and B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-795-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF AN ORAL CHEMOTHERAPY PROGRAM TO SUPPORT SPECIALTY PHARMACY ACCREDITATION

Hilary M Knaack (Thomas)*, Katherine Hanger

University of Cincinnati/Community Pharmacy Care, 234 Goodman Drive, Cincinnati, OH, 45239

Hilary.thomas2@uchealth.com

Purpose

The use of costly specialty drugs, such as oral chemotherapy agents, is growing. In order to use these drugs successfully, patients often require much monitoring, education, and adherence. Specialty pharmacies have shown the ability to improve adherence and decrease overall health costs when dispensing these drugs, so many payers are requiring specialty drugs be dispensed from specialty pharmacies. Accreditation is a tool for specialty pharmacies to gain access into this market. A pharmacy driven oral chemotherapy management program fulfills many of the clinical standards required by accrediting organizations.

Methods

The primary objective of this project is to develop and implement an oral chemotherapy clinical management program that meets accreditation standards. This will involve performing a gap analysis and a needs assessment, developing a process for documentation, and providing counseling on indication, regimen, administration, common side effects, and safe handling. Pharmacists will provide dose accuracy verification, adherence screening and counseling, efficacy and toxicity monitoring, and financial assistance.

Summary of (preliminary) results

Pharmacists in the hematology oncology outpatient clinic and inpatient unit are contacting all patients newly started on an oral chemotherapy agent. These pharmacists are located on the hematology/oncology inpatient unit and share office space with oncologists and nurse practitioners in the outpatient clinics. These pharmacists are using a newly created documentation flowsheet to allow for standardization of patient interviews and efficient documentation and report production. The patients are contacted by the clinical pharmacist after being prescribed a newly started oral chemotherapy agent by using an oral chemotherapy inbasket notification system.

Conclusions

Expected results include enrollment of patients, completion and documentation of clinical pharmacist tasks and interventions, patient knowledge throughout their enrollment, and patient adherence. Data is currently being collected and reviewed. Conclusions will be determined and presented at the Great Lakes Pharmacy Resident Conference once evaluation is complete.

Learning Objectives:

Identify important counseling points when counseling on oral chemotherapy.

Describe characteristics of a desirable documentation system for an oral chemotherapy program.

Self Assessment Questions:

Which of the following are important counseling points when discussing an oral chemotherapy agent?

- A: Date that prescription was written
- B: Administration and possible side effects
- C: Pharmacist credentials
- D: FDA approval date

Which of the following are desirable characteristics of a documentation system for an oral chemotherapy program?

- A: Standardization and ability to report
- B: Most documentation should be free text
- C: Inability to integrate into progress notes
- D: No allowance of additional comments outside of pre-built options

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-796-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF ACUTE KIDNEY INJURY IN PATIENTS RECEIVING VANCOMYCIN PLUS TRADITIONAL- VERSUS EXTENDED-INFUSION PIPERACILLIN-TAZOBACTAM IN A VA MEDICAL CENTER

Mark R. Knaub, PharmD*, Lisa R. Young, PharmD, BCPS-AQ ID, Patrick W. Waters, PharmD, AAHIVP

Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Avenue, Chicago, IL, 60612

mark.knaub@va.gov

Background: Piperacillin-tazobactam (PT) and vancomycin are broad-spectrum antibiotics often used in combination to treat moderate-to-severe healthcare-associated infections. Although these antibiotics have excellent efficacy, emerging data suggest an increased risk for acute kidney injury (AKI) with concomitant administration. Two dosing strategies are used for PT to optimize its efficacy: traditional- and extended-infusion dosing. For patients with normal renal function, traditional-infusion dosing utilizes a 30-minute infusion administered every 4 to 6 hours, whereas extended-infusion dosing is administered as a 4-hour infusion every 8 hours. Recent literature suggests an increased incidence of AKI with concomitant use, but does not specifically identify which dosing strategy for PT was utilized. These differences in infusion duration and frequency may be important factors in the development of AKI in those patients who receive both PT and vancomycin.

Purpose: The purpose of this study is to compare the incidence of AKI between traditional-infusion and extended-infusion PT in combination with vancomycin at Jesse Brown VA Medical Center.

Methods: This is a retrospective, electronic chart review of hospitalized, non-critically-ill adults, who received either the combination of traditional infusion PT and vancomycin or extended-infusion PT and vancomycin for at least 72 hours. Our institution implemented extended-infusion dosing in February 2010. Data for traditional-infusion PT was collected for patients admitted from January 1st, 2006, to December 31st, 2008. Data for extended-infusion PT was collected for patients hospitalized from January 1st, 2011, to December 31st, 2013. The primary endpoint of this study is the incidence of AKI between treatment groups. Secondary endpoints include the incidence of AKI in selected subgroups, 30-day mortality, and length of stay.

Results/Conclusions: Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the role of piperacillin-tazobactam and vancomycin for treatment of severe, healthcare-associated infections

Describe the differences between traditional-infusion and extended-infusion dosing of piperacillin-tazobactam

Self Assessment Questions:

Why are piperacillin-tazobactam and vancomycin commonly administered concomitantly?

- A To provide double coverage of multi-drug resistant organisms, such as
- B To provide broad-spectrum coverage against gram-positive and gram-negative
- C To treat uncomplicated, community-acquired infections
- D To provide broad-spectrum coverage against bacterial, viral, and fungal

When comparing PT extended-infusion to traditional-infusion dosing in patients with normal renal function, which of the following is true?

- A A larger total daily dose is administered with extended-infusion PT
- B A higher peak serum concentration is obtained with extended-infusion PT
- C Free drug concentration is above the MIC for a longer period of time
- D It takes less time to achieve serum concentration above the MIC with

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-797-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DIFFERENCES IN THE APPLICATION OF PBM CRITERIA FOR USE FOR NON-FORMULARY MEDICATIONS AMONG TWO VA MEDICAL CENTERS

Christopher A. Knefelkamp*, PharmD, Leigh A. Moffett, PharmD, Bill Malloy, PharmD

Veteran Affairs - Indianapolis VA Medical Center, 1481 West 10th Street, Indianapolis, IN, 46202

christopher.knefelkamp@va.gov

Purpose: To evaluate the differences in the application of Pharmacy Benefits Management (PBM) criteria for use for non-formulary drug evaluations in VA facilities. The data collected will provide insights into how pharmacists evaluate non-formulary medication requests, whether or not criteria for use are available. Data obtained may also further aid VA PBM in the design and implementation of criteria for use, along with drug restriction and formulary management.

Methods: Data collection and analysis from two de-identified VA medical centers will be completed via chart review in the respective Decentralized Hospital Computer Program (DHCP) and Computerized Patient Record System (CPRS) patient medical record applications. Data collected include: non-formulary denial rates between the two facilities, most commonly denied medications within each facility, total number of denials for each medication, specific rationale for denial, recommendation of alternative option(s) following a non-formulary medication denial, and cost of the requested item versus formulary item. Additional data will be collected regarding the analysis of the processes pharmacists use when reviewing non-formulary requests, including, but not limited to, the application of PBM criteria for use. This will be accomplished via the distribution of a Voice of the Customer for pharmacists.

Preliminary results: Analysis of Facility A data revealed the majority of pharmacists applied clinical judgment and expertise in evaluating non-formulary drug requests. The primary factor considered when evaluating non-formulary requests was patient specific characteristics, leaving large room for clinical interpretation and variability within pharmacists. The top reason reported by pharmacists for the denial of a non-formulary medication request at Facility A was due to a patient not being properly trialed on a formulary agent for the same indication.

Conclusions Reached: Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recall the top pharmacist-reported reasons for the denial of a non-formulary medication at Facility A and Facility B.

Discuss the process by which pharmacists review non-formulary medication requests at Facility A and Facility B

Self Assessment Questions:

Which of the following was reported by pharmacists at Facility A to be the most common reason for the denial of a non-formulary drug request?

- A Requested drug contraindicated for patient
- B No previous trial of preferred formulary agent
- C Alternative drug more appropriate for patient specific factors
- D Cost of non-formulary agent relative to formulary agent

Which of the following was identified by pharmacists at Facility A as the most important factor to be considered when approving a non-formulary drug request?

- A Accordance with published guidelines
- B Patient-specific factors and outcomes
- C Cost
- D Department/facility/national policy

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-493-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

LOW DOSE KETAMINE FOR POST-OP ANALGESIA

Hanna L Knurr*, PharmD; Michael S Nyffeler, PharmD, BCNSP
Meriter Hospital, 202 S Park St, Madison, WI, 537151596
hknurr@meriter.com

Purpose: Ketamine, a NMDA receptor antagonist, has recently regained popularity as an acute analgesic. Evidence has shown that post-operative low dose ketamine infusions can significantly decrease opioid use and patient reported pain scores post operatively. NMDA blockade has desirable effects on neural receptor regulation that prevent the development of chronic pain as well as opioid tolerance. Ketamine also stimulates the respiratory center in the CNS, counteracting respiratory depression caused by opiates. These effects make ketamine a desirable addition to multi-modal pain management in patients at high risk of developing chronic pain post-operatively as well as patients who have baseline opioid tolerance.

Methods: This quality improvement project assesses the efficacy of post operative ketamine infusions dosed per protocol in patients at high risk of chronic pain. The study population includes patients undergoing major spinal procedures with a baseline daily opioid use of greater than or equal to 60mg morphine equivalents per day at the time of admission. Patients will be excluded if they have contra-indications to ketamine, including uncontrolled hypertension, elevated intraocular or intracranial pressure, uncontrolled psychiatric illness, or hypersensitivity to ketamine. Patients will receive low dose ketamine infusions post-operatively per infusion protocol. The comparator group will be patients identified by a retrospective chart review that meet inclusion criteria that did not receive ketamine. Controls will be matched to the ketamine group patients by procedure, baseline opioid use, gender, and age. Data collection will include: length of stay, time to achievement of physical therapy goals, adverse effects, and daily opioid use. A second retrospective analysis will assess patients who received post-operative ketamine before the protocol was put in place with a similarly matched comparator group.

Results/Conclusions: Data collection is ongoing and findings will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify appropriate patients who may benefit from the addition of low dose ketamine to their multi-modal pain regimen.

Describe monitoring parameters for low-dose ketamine infusions when used to treat acute pain.

Self Assessment Questions:

Which of the following patients would likely benefit from low dose ketamine therapy?

- A: An elderly patient undergoing a total knee arthroplasty with chronic
- B: A young previously healthy patient with no chronic medications and
- C: A middle aged patient with chronic neuropathy treated with oxycodone
- D: A young patient with chronic pain secondary to a motor vehicle accident

Which assessment is recommended for monitoring patients receiving low dose ketamine for infusion?

- A: Opioid Withdrawal Symptom Assessment (i.e. COWS)
- B: Delirium/Hallucination Assessment
- C: Urine Analysis
- D: Complete Blood Count

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-494-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DESIGN AND IMPLEMENT ROLE-BASED COMPETENCY PROGRAMS FOR PHARMACISTS IN VARIOUS PHARMACY SETTINGS WITHIN A HEALTH-SYSTEM

Elizabeth Koczera*, PharmD; Anne Zechlinski, PharmD, BCPS; Kate Schaafsma, PharmD, MS, MBA; Kelly Sackerson, PharmD, BCPS; Eve Segal, PharmD; Canice Coan, PharmD, BCACP; Liza Papi
Froedtert Hospital, 10242 W Fountain Ave, 1206, Milwaukee, WI, 532249500
elizabeth.koczera@froedtert.com

Background: It is important that every pharmacy follow practice standards to provide patient care services that are safe and efficacious. To meet practice requirements, pharmacy staff must maintain certain competencies for their job role. Changes to pharmacy practice are crucial and inevitable. Continuous competency assessments are necessary to ensure pharmacists have the knowledge and skills necessary to perform high quality work.

Purpose: The primary objective of this project is to create an assessment framework to ensure that pharmacists complete necessary competencies based on their responsibilities in four hospital settings: community retail, acute care, ambulatory care, and ambulatory oncology.

Methods: This is a prospective, interventional project to implement frameworks in four hospital settings. To create these frameworks, assessments currently in place through the hospital's electronic training system will be gathered and organized by pharmacists' job role. Focus groups from the hospital settings will identify necessary competencies. The newly developed framework will include all identified competencies and be administered via the hospital's training system and will have the capacity to schedule assessments, alert employees, communicate results, and track live and electronic competency completion for every employee. A list of completed competency assessments will be generated and distributed to employees and managers to ensure timely competency completion.

Results: To assess whether the framework has improved assessment completion, the percent of employees assigned required competencies and the percent of competencies that are successfully completed will be reviewed before and after framework implementation. A post-analysis will consist of reviewing the percentage of required competencies assigned to the responsible individuals, percentage of successfully completed competencies, time to remediation for incomplete competencies, outcomes from remediation, and satisfaction with competency assessment framework. A gap analysis will quantify additional changes needed to bring the framework to future goals.

Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the process of developing a competency assessment framework for pharmacists based on pharmacy setting.

Discuss the benefits and challenges of creating unique competency assessment frameworks based on pharmacists' roles.

Self Assessment Questions:

Which of the following are results of successful competency assessment programs?

- A: Documentation that a pharmacist is competently performing job-related tasks
- B: Development of knowledge and skills required to perform current job
- C: Identification of necessary additional training
- D: All of the above

According to the American Society of Health-System Pharmacists (ASHP), every hospital pharmacy should assess that staff maintain specific competencies to ensure that staff are providing quality patient care.

- A: Medication-use policy development
- B: Drug product procurement and inventory management
- C: Reimbursement planning
- D: Preparing, packaging, and labeling medications

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-798-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL EFFICACY OF TRADITIONAL VERSUS ALTERNATIVE DOSING MEROPENEM IN CRITICALLY ILL PATIENTS: A MULTICENTER RETROSPECTIVE REVIEW

Angel N. Kohane, Pharm.D.*; Jennifer Wright, Pharm.D.; Eric Nordman, Pharm.D.C. Purpose: The primary purpose of this study is to evaluate the clinical efficacy of traditional dosing versus alternative dosing meropenem in critically ill patients. D. Meth

St. Elizabeth Healthcare, 1 Medical Village Dr, Edgewood, KY, 41017
angel.kohane@stelizabeth.com

Purpose: The primary purpose of this study is to evaluate the clinical efficacy of traditional dosing versus alternative dosing meropenem in critically ill patients.

Methods: This study was granted exempt status the Institutional Review Board at St. Elizabeth Healthcare. All patients receiving meropenem were identified by retrospective review of the hospitals electronic medical record system. All patients greater than or equal to 18 years of age admitted to the ICU between January 2013 and December 2014 and treated with meropenem for at least three days were included in the study. Patients were excluded if: they had a history of seizure disorders cystic fibrosis, were pregnant, had bacterial meningitis or Acinetobacter baumannii infection with MIC >4, received doses greater than 1 g every 8 hours, and who were allergic to carbapenems. Data collected on all patients, if available, included: demographics (age, sex, ethnicity, height, weight); baseline serum creatinine and creatinine clearance; any changes in serum creatinine and creatinine clearance resulting in a dose/frequency change; comorbidities; white blood cell count (WBC) at the initiation of meropenem therapy; time to normalization of WBC count; source of infection; culture and sensitivity results; length of ICU stay; length of hospitalization; length of mechanical ventilation; duration of meropenem therapy; reason for discontinuation of therapy; other antibiotics given concurrently with meropenem; adverse effects; and mortality.

Results/Conclusion: Data collection is currently ongoing. Final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review pharmacokinetic properties of the carbapenem antibiotic, meropenem

Discuss alternative and traditional dosing strategies of meropenem.

Self Assessment Questions:

Which of the following is the most important parameter that predicts the antimicrobial efficacy of meropenem?

- A The drug concentration above the minimum inhibitory concentration
- B The percentage of the dosing interval (time, T) that the drug concentration is above the minimum inhibitory concentration
- C The post-antibiotic effect (PAE)
- D The area under the time curve (AUC)

The proposed benefits of alternative dosing over traditional dosing include:

- A Exposing the patient to more meropenem for longer periods of time
- B Similar %T>MIC and clinical efficacy while decreasing total exposure
- C Cost savings due to decreased drug acquisition
- D B and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-799-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PNEUMOCOCCAL VACCINATION RATES IN AN URBAN OUTPATIENT CLINIC BEFORE AND AFTER IMPLEMENTATION OF A CLINICAL REMINDER INITIATIVE

*David Koren, Pharm.D., Andrea Pallotta, Pharm.D., Elizabeth Neuner Pharm.D., Marc Willner, Pharm.D., Jeffrey Clark, R.Ph., Susan Rehm, M.D.

Cleveland Clinic, 11017 Clifton Boulevard Upper
Apartment, Cleveland, OH, 44102
korend@ccf.org

Background: In 2015, two different vaccines against prevalent serotypes are available in the United States, the Pneumococcal Polysaccharide Vaccine (PPSV-23) and the Pneumococcal Conjugate Vaccine (PCV-13). Adult (19-64 years) guidelines by the Advisory Committee on Immunization Practice and the Centers for Disease Control and Prevention were revised in October 2012 for prevention of pneumococcal disease in patients with immunocompromising conditions or functional/anatomical asplenia. Three risk-categories of patients were created, each with differing vaccine recommendations. Given complex prescribing recommendations and 2012 reported national pneumococcal vaccination rate of 20%, Clinical Decision Support (CDS) was implemented within our Electronic Health Record (EHR) to assist in determining eligibility and increasing vaccination rates. The current study serves to assess the impact of CDS implementation on pneumococcal vaccination rates.

Objectives: (1) To evaluate pneumococcal vaccination rates amongst vaccine eligible patients in an outpatient ID clinic pre/post CDS implementation. (2) To describe indications amongst patients for receiving pneumococcal vaccination. (3) To describe vaccination rates based on provider type. (4) To characterize administration of PCV-13 versus PPSV-23.

Methodology: The Institutional Review Board of the Cleveland Clinic approved this study as a pre/post implementation retrospective medical chart review. The hospitals EHR identified adult patients with completed appointments by a licensed independent practitioner between ages of 19-64 years and qualifying diagnoses warranting pneumococcal vaccination between September 1 and December 31, 2013 (pre-group) and September 15 2014 through January 15 2015 (post-group). Vaccination rates were determined as the percent of eligible patients who received pneumococcal vaccines at an Infectious Diseases appointment. With an estimated baseline vaccination rate of 20%, 362 patients per group were necessary at an alpha-level of 0.05 to provide 80% power to discern a 46% change. Data was maintained confidentially and analyzed by descriptive or inferential statistics as appropriate.

Results and conclusions: To be determined

Learning Objectives:

Review recent changes to pneumococcal vaccination recommendations

Discuss the application of clinical decision support in pneumococcal vaccination rates at Cleveland Clinic

Self Assessment Questions:

According to current CDC/ACIP recommendations: Which pneumococcal vaccinations should a patient between the ages of 19-64 receive with an associated "high-risk" diagnosis?

- A One Pneumococcal Conjugate Vaccine (PCV-13)
- B One Pneumococcal Polysaccharide Vaccine (PPSV-23)
- C One PCV-13 and Two PPSV-23
- D One PCV-13 and One PPSV-23

How does the Cleveland Clinic Health System best-practice alert assess if a patient is eligible for vaccination?

- A Scans the "Problem list" for associated diagnoses
- B Integrates existing vaccination records
- C Incorporates the Health Maintenance Record to create a timeline
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-495-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A PHARMACY MULTI-STEP PROCESS IN TRANSITIONS OF CARE

Bianca Korkis, Pharm.D*, Jesse Shuster, Pharm.D., BCPS, Lynette Moser, Pharm.D.

Harper University Hospital, 3990 John R, Detroit, MI, 482012018
bkorkis@dmc.org

Purpose: At a large teaching institution, the pharmacy "transitions of care (TOC)" process has undergone important expansions in an effort to improve patient outcomes. In this expanded process, pharmacists and student pharmacists are involved in obtaining medication histories, providing patient education, collaborating with prescribers to optimize therapy, facilitating patients access to medications, and following-up with patients post-discharge. The purpose of this study is to determine the impact of the expanded TOC process on hospital readmissions and emergency department (ED) visits, as well as quantify and describe the pharmacist activities that take place at each TOC patient encounter.

Methods: This study is a retrospective data analysis of all patients receiving pharmacy transitions of care services under the standard process and the expanded process from November 2014 to December 2014. Patients who were taken care of under the expanded TOC process are being compared with patients who were cared for by a pharmacist or technician under the standard TOC process in a 1:2 fashion. All data is being collected using the hospital's electronic medical record (EMR). Primary outcome measures include emergency department (ED) visits and hospital readmissions that occur within 14 days and 30 days after discharge. This data will be collected from the EMR and compared between groups using the chi-squared test. Documented medication-related interventions made by the pharmacist throughout the entire process will be analyzed using descriptive statistics. In the expanded TOC group only, documented pharmacy interventions made post-discharge will be collected from a standardized form and analyzed with descriptive statistics.

Learning Objectives:

Identify the reasons for gaps or errors made in relation to patient care when patients are being transitioned into or out of the healthcare setting. Describe ways in which pharmacy personnel can improve a patient's care during the transitions of care period.

Self Assessment Questions:

Out of these, which is likely the most significant cause of medication reconciliation-related error during transitions of care?

- A: Lack of communication between the patient's providers
- B: Lack of compassion for the patient's needs
- C: Lack of knowledge about how the patient's medications work
- D: A and B

Which of the following functions can a pharmacist take part in to help improve patient outcomes during transitions of care?

- A: Reconciling patient medications upon admission
- B: Prescribing medications to the patient
- C: Following-up with the patient post-discharge
- D: A and C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-496-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EARLY-ONSET PATHOGENS AND INFLUENCE OF MULTIDRUG RESISTANT PATHOGEN RISK FACTORS BETWEEN CRITICALLY ILL PATIENTS WITH VENTILATOR-ASSOCIATED PNEUMONIA: THE TIME MACHINE 2 STUDY

Desiree E. Kosmisky, PharmD*; Chris Droege, PharmD; Neil Ernst, PharmD; Kristen Hillebrand, PharmD, BCPS; Shaun Keegan, PharmD, BCPS; Eric W. Mueller, PharmD, FCCM, FCCP

UC Health - University Hospital (Cincinnati), UC Health - University of Cincinnati Medical Center, 234 Goodman St, ML 0740, Cincinnati, OH, 45219

Desiree.Kosmisky@UCHealth.com

Purpose: Ventilator-associated pneumonia (VAP) is associated with increased mortality, duration of mechanical ventilation, and intensive care unit (ICU) length of stay. Early-onset VAP is classified as occurring less than five days after hospitalization, whereas late-onset VAP occurs in those hospitalized for five or more days. Infectious Diseases Society of America guidelines recommend empiric antibiotic strategies by time of onset and presence of multi-drug resistant organism (MDRO) risk factors. Selection of initial appropriate antimicrobial therapy has been associated with decreased mortality. Significant variation has been reported in pathogen prevalence in early- and late-onset VAP. It is hypothesized that after adjusting for MDRO risk factors that there will be a significant inter-ICU and inter-population variation in pathogen prevalence.

Methods: This single-center, retrospective chart review will evaluate pathogens isolated in the medical, surgical/trauma, cardiovascular, neuroscience, and burn ICUs at the University of Cincinnati Medical Center from August 2012 to December 2014. Adult patients with microbiologically confirmed VAP, defined as a bronchoalveolar lavage culture with at least 10,000 CFU/mL, will be included. Research objectives include determining the inter-ICU and inter-population variability of pathogens responsible for early- versus late-onset VAP after adjusting for MDRO risk factors, evaluating the impact of MDRO risk factors as predictors of the actual development of MDROs, and estimating the rates of appropriate empiric antimicrobial therapy based on UCMC-specific VAP recommendations. A multivariate analysis will be performed to determine variables that have a statistically significant impact on MDRO development. Sensitivity, specificity, and positive and negative predictive values will also be calculated. Rates of appropriate empiric antibiotic coverage with at least one agent will be calculated for each ICU and subgroup for both the early- versus late-onset VAP treatment recommendations.

Results/Conclusions: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List multi-drug resistant organism (MDRO) and health-care associated pneumonia (HCAP) risk factors.

Recognize organisms commonly associated with early- versus late-onset VAP.

Self Assessment Questions:

Which of the following organisms is most likely to be isolated in a patient with late-onset VAP?

- A: Haemophilus influenzae
- B: Pseudomonas aeruginosa
- C: Streptococcus pneumoniae
- D: Escherichia coli

Which of the following increases the risk of VAP caused by a multi-drug resistant organism?

- A: Emergency department visit within the previous 90 days
- B: Course of antibiotics within the previous 180 days
- C: Residence in a nursing home or long-term care facility
- D: Current hospitalization of 3 or more days

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-497-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

FUNGUS AMONG US: THE STANDARDIZATION OF ANTIFUNGAL PROPHYLAXIS IN HIGH-RISK LIVER TRANSPLANT PATIENTS AND ANALYSIS OF LONG-TERM ANTIFUNGAL USE FOR INVASIVE INFECTIONS

Sara M Koth, PharmD*; Lucas T Schulz, PharmD, BCPS AQ-ID; David R Hager, PharmD, BCPS; Katelyn R Richards, PharmD
University of Wisconsin Hospital and Clinics, 600 Highland Ave, Madison, WI, 53792
skoth@uwhealth.org

Invasive fungal infections (IFIs) are associated with increased mortality, length of hospital stay and overall cost. Liver transplant recipients are at a high risk for IFIs because of the immunosuppression required and risk factors associated with surgery. In June 2013, the United Network of Organ Sharing (UNOS) instituted the Share 35 Regional policy, which has led to the more frequent transplantation of higher MELD patients, who are sicker and at an increased risk of IFIs. IFIs are prevalent not only in solid organ transplant recipients but in all immunocompromised patients. The goal of this project is to improve the use of antifungal medications for IFIs by standardizing prophylaxis in high-risk liver transplant patients and evaluating the duration, efficacy and tolerability of long-term antifungal use.

A chart review of liver transplant recipients from 7/1/2009 through 6/30/2013 is being conducted to evaluate the number of high-risk patients, rate of appropriate antifungal prophylaxis and incidence of IFIs. A clinical practice guideline and delegation protocol have been proposed to define the risk factors associated with development of IFIs and guide the prescribing of prophylactic antifungal medications for high-risk patients. Following approval and implementation of the guideline and delegation protocol, adherence to the guideline, incidence of IFI and the possibility of additional risk factors will be assessed via manual chart review of all patients who receive a liver transplant.

To evaluate use of long-term antifungal medications for invasive infections, a chart review of patients who have received at least six months of therapy with systemic itraconazole, posaconazole, voriconazole or liposomal amphotericin B from 7/1/2011 through 6/30/2014 will be conducted. This chart review will evaluate infecting organism, location of infection, source of immunosuppression if present, antifungal medication, dose and duration, adverse effects, emergence of resistance and clinical outcomes.

Learning Objectives:

Define the known risk factors for invasive fungal infections in liver transplant recipients.

Discuss the importance of assessing adherence to a guideline when evaluating the efficacy of its recommendations.

Self Assessment Questions:

Which of the following is a known risk factor for invasive fungal infection in liver transplant patients?

- A: Age greater than 50 years
- B: End-to-end choledochocholedochostomy
- C: Retransplantation
- D: MELD score greater than 20

Which of the following is being assessed post-implementation of the antifungal guideline?

- A: Adherence to the guideline
- B: Adverse effects
- C: Induction agent used
- D: Efficacy of echinocandin prophylaxis

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-498-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ADVANCED DIABETES TRAINING FOR THE COMMUNITY PHARMACIST: A PILOT STUDY

Jasmine D. Gonzalvo, PharmD, BCPS, BC-ADM, CDE, Emily J. Kruckeberg, PharmD
Purdue University, 101 Orchard Hills Dr. Apt 8, Jeffersonville, IN, 47130
e-kruckeberg@onu.edu

Purpose

To determine the percentage of community pharmacists in Indiana with advanced diabetes training. Identify the perceived benefits and barriers these pharmacists feel towards obtaining advanced diabetes training and their intent and interest in pursuing advanced training in the future.

Methods

This pilot study encompasses over a thousand community pharmacists in the state of Indiana from various settings including mass merchant, retail chain and grocery store pharmacies whom were randomly contacted via telephone and invited to participate in a survey regarding advanced diabetes training. Their contact information was generated through internet searches for pharmacy phone numbers and addresses. The survey inquired if the pharmacists currently have advanced diabetes training, their perceived benefits and barriers of obtaining advanced diabetes training, their intention on pursuing or renewing the training in the future, and necessary demographic information. The survey also assessed the pharmacists knowledge of and interest in pursuing a new diabetes licensure option. Participants were given the option to decline answering questions at any time. Pharmacy student volunteers were recruited and subsequently received survey administration training. The survey was tested on a small group of subjects for readability and to establish an approximate time frame for administration prior to collecting data. Additionally, a focus group provided additional feedback to refine the survey items before surveys were administered. Primary and secondary objectives will be evaluated using descriptive statistics. IRB approval was received in September 2014.

Summary of Preliminary Results

Data collection is currently in progress. Results will be presented at the Great Lakes Residency Conference.

Conclusions reached

Conclusions pending study results.

Learning Objectives:

Discuss the percentage of and perceptions of community pharmacists with regard to advanced diabetes training

Name benefits of a diabetes educator licensure for community pharmacists

Self Assessment Questions:

What benefit or benefits does diabetes education provide to patients?

- A: Decreased A1C
- B: Improved medication adherence
- C: Improvement in blood pressure management
- D: All of the above

What does the diabetes educator license option provide pharmacists?

- A: It may open the door for reimbursement from Medicare and private
- B: It is the only opportunity pharmacists have at educating patients at
- C: It grants pharmacists prescribing rights regarding diabetes manag
- D: It provides no more benefit to pharmacists than the other current a

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-800-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF INTRAVENOUS HYDRALAZINE, LABETALOL, AND ENALAPRILAT IN HYPERTENSIVE CRISIS

Janice Kulik, Pharm.D.* and Beena Cheriyan, Pharm.D.
St. Joseph Mercy Hospital, 5301 East Huron River Drive, PO Box 995, Ann Arbor, MI, 48106
Janice.Kulik@stjoeshealth.org

Due to the unpredictable and potentially drastic blood pressure lowering effects of intravenous (IV) hydralazine, the 2007 CHEST guidelines recommend avoiding its use in a hypertensive crisis. Despite this fact, intravenous hydralazine is commonly prescribed in many institutions. The objective of this study is to compare the safety and efficacy of blood pressure lowering with IV hydralazine, labetalol, and enalaprilat in a hypertensive crisis and identify risk factors that may contribute to hydralazine's adverse blood pressure effects. We hope our study will be a useful contribution to the literature and will improve the safety of the management of hypertensive crisis.

This is a retrospective, observational cohort study that has been approved by the Institutional Review Board. The electronic medical record will be queried to identify patients who had received IV hydralazine, IV labetalol, or IV enalaprilat for hypertension. Patients who are <18 years old, pregnant, or a surgical patient will be excluded from the study. The following data will be collected on each patient: patient age at admission, gender, height, weight, past medical history, medications given, doses, timing of doses, number of doses, systolic and diastolic blood pressures at administration, blood pressure nadir, time of blood pressure nadir, other antihypertensive medications received, hypertensive symptoms, and adverse events. This data will be analyzed to determine the efficacy and safety of blood pressure lowering with IV hydralazine, labetalol, and enalaprilat. The data will also be examined to determine whether there are certain risk factors that may contribute to adverse events in patients with hypertensive crisis.

The results and conclusion are to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the principles of blood pressure management in hypertensive crisis.

Discuss the pharmacokinetics and pharmacodynamics of IV labetalol, enalaprilat, and hydralazine.

Self Assessment Questions:

What is the recommendation for blood pressure lowering in hypertensive urgency?

- A: IV medications are preferred to gradually reduce BP to <120/<80 mmHg
- B: IV medications are preferred to quickly drop BP to <160/<110 mmHg
- C: Oral medications are preferred to slowly lower BP over 24-48 hours
- D: Oral medications are preferred to reduce BP by about 30% in the first 1 hour

Which of the following correctly describes IVP hydralazine?

- A: The duration of hydralazine's effect on BP can last up to 12 hours
- B: IVP hydralazine causes predictable BP lowering in pediatric patients
- C: Hydralazine has a half-life of approximately 9 hours
- D: Hydralazine's onset of action is about 30 to 60 minutes

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-499-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CONTINUATION OF A TELEPHONE CARE MANAGEMENT STRATEGY TO REDUCE HEART FAILURE READMISSIONS

Darya Kupershteyn, PharmD*, Hanna Jeong, PharmD, BCPS, Jeff Thiel PharmD.
NorthShore University HealthSystem, 2650 Ridge Ave, Evanston, IL, 60201
dkupershteyn@northshore.org

Purpose:

There are an estimated six million Americans living with heart failure (HF); a condition that has become one of the most common causes of hospital visits and readmissions. As a result, the Centers for Medicare and Medicaid Services (CMS) began publicly reporting 30 day mortality and readmission measures in 2007 and in 2012 started the Hospital Readmission Reduction Program. Since then, there has been a growing interest in implementing policies and programs that aim to reduce hospital readmission rates. The purpose of this project is to continue the implementation of a pharmacy-based telephone management strategy with the goal of reducing heart failure readmission rates in a multi-hospital health system.

Methods:

This is the continuation of a previous prospective evaluation that was started in February 2014 and is currently being implemented at the same four hospitals within a health system. This project is exempt from IRB review. Patients were included if they are over 18, have a history of heart failure, and are discharged to home or a skilled nursing facility. Patients were excluded if they were discharged to hospice or a nursing home, have dementia, or refused counseling. Patients who met the inclusion criteria were contacted 72 hours post-discharge by a pharmacist resident or a fourth year pharmacy student and again 20 days after discharge. The pharmacist or student provided counseling specifically targeted to HF, answered any additional questions, and referred the patient to their physician when appropriate. Calls were made from February 2014 to January 2015 and the readmission rates were compared to the previous year as well as month to month.

Results/Conclusion:

The result of the previous project found a reduction in heart failure readmission rates but was not adequately powered to find statistical significance. Further results and conclusions are pending and will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the trend of 30-day heart failure readmission rates

Discuss the impact of pharmacist counseling on the detection and resolution of medication related issues

Self Assessment Questions:

What percent of Medicare patients with heart failure are readmitted to the hospital within 30 days of discharge?

- A: 10%
- B: 20%
- C: 40%
- D: 60%

What is the most common drug-related issue detected by pharmacists during post-discharge counseling?

- A: Unexplained discrepancies in discharge medication orders
- B: Problems with adherence to medication regimen
- C: Early detection of side effects
- D: Problems with affording medications

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-500-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECTS OF OMEGA-3 FISH OIL FOR THE TREATMENT OF PARENTERAL NUTRITION-ASSOCIATED LIVER DISEASE (PNALD) IN INFANTS

Ken Kurek*, PharmD., Roger Wilcox, PharmD., BCPS, Jessica L. Jacobson, PharmD., BCPS, Celina Scala, MS, RD, LDN, CNSC, Inessa Normatov, MD.

Rush University Medical Center, 903 S. Ashland, 1201B, Chicago, IL 60607
kenneth_j_kurek@rush.edu

A large proportion of infants who depend upon parenteral nutrition (PN) because of intestinal failure will develop cholestatic liver disease. Soybean based lipid emulsions (SOEs) are the only lipid emulsions approved for use in the United States. SOEs contain omega-6 long-chain polyunsaturated fatty acids and phytosterols, which are believed to be a major contributing factor in the development of cholestasis. Ursodiol has long been used as a treatment modality for PNALD; unfortunately not all patients respond to ursodiol therapy. Strong evidence exists for the role of intravenous (IV) omega-3 fish oil lipid emulsions (FOLEs) in treating PNALD; however, IV FOLEs are only available through compassionate use protocols. Enteral omega-3 fish oil supplementation has shown potential in case reports as an adjunct to ursodiol therapy for the treatment of PNALD. The purpose of this study is to compare the effects of combination therapy with ursodiol and enteral omega-3 fish oil to that of ursodiol monotherapy.

This study was approved by the Institutional Review Board. This research is a retrospective review of electronic medical records. PN-dependent infants admitted to RUMCs NICU between January 1st, 2009 and November 31st, 2014 with an elevated direct bilirubin (DB) >2 mg/dL who received either ursodiol alone or ursodiol and enteral omega 3 fish oil were included. Infants with liver disease attributed to non-PN causes or those receiving IV FOLE were excluded. The primary endpoint was to compare the time to normalization of DB, defined as the number of days from peak DB until DB <2 mg/dL, between those infants who received ursodiol monotherapy and those who received both ursodiol and enteral omega-3. Secondary outcomes included evaluation of length of hospital stay and the incidence of adverse effects leading to therapy discontinuation between the two treatment groups.

Results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Identify the current treatment strategies for PNALD.

Discuss the preliminary data, assessing the effect of combination therapy of ursodiol and enteral omega-3 in infants with PNALD.

Self Assessment Questions:

Which of the following is a treatment modality that requires compassionate use protocols to treat PNALD?

- A: Ursodiol
- B: Phenobarbital
- C: Intravenous fish oil lipid emulsions
- D: Enteral omega-3 fish oil

In PNALD, enteral omega-3 fish oil should be used in which of the following situations?

- A: As an adjunct to ursodiol therapy
- B: As a replacement/substitute for ursodiol therapy
- C: Once the direct bilirubin is >2 mg/dL for two consecutive measures
- D: A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-501-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PREDICTIVE VALUE OF NASAL METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS POLYMERASE CHAIN REACTION SCREENING FOR MRSA PNEUMONIA

Noelle Kwan, PharmD*, Tom Dilworth, PharmD, BCPS, Ramy Elshaboury, PharmD, BCPS, Rahim Mohammadali, PharmD, BCPS, Cara Burditt, PharmD, BCOP, Phillip Olley, PharmD, BCPS, Andrew Ensing, PharmD

Wheaton Franciscan – St. Joseph Campus, 2332 N Oakland Ave Apt 203, Milwaukee, WI, 53211

noelle.kwan@wfhc.org

Purpose: The rise of infections due to methicillin-resistant *Staphylococcus aureus* (MRSA) has led to increased prescribing of empiric antibiotics with MRSA coverage. Recent studies suggest that the nasal MRSA polymerase chain reaction (PCR) may be able to inform de-escalation of empiric anti-MRSA therapy in patients with suspected MRSA pneumonia. The objectives of the study are i) to determine the incidence of MRSA pneumonia in the patients admitted to the adult intensive care unit (ICU) and ii) to determine the predictive value of the nasal MRSA PCR for MRSA pneumonia. These results will be used to inform local, pharmacist-led antimicrobial stewardship initiatives aimed at reducing anti-MRSA antibiotic use.

Methods: This is a retrospective study of adult patients admitted to the ICU at two non-academic community hospitals from January 1, 2013 to December 31, 2013. Patients who had i) a nasal MRSA PCR, ii) blood or respiratory cultures obtained within 7 days of the PCR, and iii) a confirmed diagnosis of pneumonia defined as having radiographic evidence of cavitation or infiltrate and at least two pre-defined clinical signs or symptoms were included in the study. Pertinent patient data collected from the electronic medical record include: sex, age, type of pneumonia with which the patient was diagnosed, risk factors for healthcare-associated pneumonia, any blood or respiratory cultures yielding positive MRSA growth during the ICU admission, empiric antibiotics received, and when cultures were obtained in relation to the first dose of antibiotics. The incidence of MRSA pneumonia in the study population and the predictive value of the nasal MRSA PCR for MRSA pneumonia were calculated. This study was approved by the Institutional Review Board.

Results/Conclusion: Currently in progress and will be presented at the Great Lakes Conference.

Learning Objectives:

Recognize the relationship between the incidence of MRSA pneumonia and predictive value of the MRSA nasal PCR

Discuss the utility of the nasal MRSA PCR screening in tailoring anti-MRSA therapy

Self Assessment Questions:

Which of the following statements regarding the incidence of MRSA pneumonia and the predictive value of the MRSA PCR is true?

- A: High MRSA incidence is associated with high negative predictive value
- B: High MRSA incidence is associated with low positive predictive value
- C: Low MRSA incidence is associated with high negative predictive value
- D: Low MRSA incidence is associated with high positive predictive value

The nasal MRSA PCR results are unaffected if it is obtained on average within _____ of antibiotic administration.

- A: 3 days
- B: 2 weeks
- C: 6 months
- D: 1 year

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-502-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

GAP ANALYSIS AND PILOT PROGRAM IMPLEMENTATION FOR URAC SPECIALTY PHARMACY ACCREDITATION

Morgan W Labhart Pharm.D.*, Anna Gibson RPh

Deaconess Health System, 600 Mary Street, Evansville, IN, 47710

morgan.labhart@deaconess.com

Purpose: According to some estimates, specialty drugs will account for approximately 40 percent of a health plans drug spend by 2020. The high cost for regimen failure has led to some health plans requiring pharmacies to become accredited in order to receive payment. Many leading health plans and the Patient Protection and Affordable Care Act (PPACA) recognize URAC as a valid accrediting body. The objective of this project is to perform a gap analysis and use those findings to develop a pilot program with the goal of applying for URAC specialty pharmacy accreditation for a hospital owned outpatient pharmacy.

Methods: Using URACs Specialty Pharmacy Accreditation Guide (SPAG), Version 2.1, a gap analysis was performed, using a modified version of a published tool. The current pharmacy and hospital policies and procedures were reviewed and entered into the gap analysis tool. Each standard was assigned one of three criteria as follows: Full, current medical center policy/procedure exists and completely satisfies the standard; Partial, current medical center policy/procedure exists but does not completely satisfy the standard; None, no current policy/procedure exist to satisfy the standard. First, standards that qualified as "partial" or "none" were assigned an action plan to map out how policies and procedures should be modified or created to satisfy the standard. Then policies and procedures were written or modified in order to comply with URAC standards. Next, these policies and procedures were used to develop a pilot program with the purpose of gathering information for future implementation of an outpatient specialty pharmacy with accreditation from URAC. This project does not require data from human subjects and is exempt from IRB approval.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the services provided by an Utilization Review Accreditation Commission (URAC) accredited specialty pharmacy.

Describe common obstacles encountered in the implementation of a hospital owned, outpatient specialty pharmacy.

Self Assessment Questions:

Which of the following is true regarding services provided by an URAC accredited specialty pharmacy?

- A Call center for clinical questions available during business hours
- B: Patient follow up for first fill only
- C: Advocate for patient access to drugs
- D: Specialty pharmacy interactions involve the patient, physician, and

Which of the following is a common obstacle encountered in the implementation of a hospital owned, outpatient specialty pharmacy?

- A Limited drug access
- B Obtaining patient buy-in
- C Limited information on specialty medications
- D Lack of accrediting bodies

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-801-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST INTERVENTION ON THE TIMING OF APPROPRIATE ANTIMICROBIAL THERAPY IN PATIENTS DIAGNOSED WITH SEPTIC SHOCK

Melanie E. Laine, PharmD*; Alexander H. Flannery, PharmD, BCPS; Craig A. Martin, PharmD, BCPS (AQ ID); Jeremy D. Flynn, PharmD, BCPS, FCCM, FCCP

University of Kentucky HealthCare, 800 Rose Street, Room H110, Lexington, KY, 405360293

melanie.laine@uky.edu

Purpose: Septic shock is a deleterious host response to infection resulting in organ dysfunction secondary to refractory hypotension, and is associated with significant morbidity and mortality. It is widely accepted that patients diagnosed with severe sepsis or septic shock should receive appropriate, broad spectrum antibiotics within one hour of symptom onset. Studies looking at timeliness of antibiotic administration have shown up to a 7% increase in mortality for each hour delay in antibiotic administration. The 2012 Surviving Sepsis Campaign recommends a bundled approach to severe sepsis and septic shock management. At University of Kentucky HealthCare (UK), pharmacy residents respond to sepsis bundle activations as part of a 24-hour On-Call Program. Pharmacists are uniquely qualified to provide a thorough assessment of patient history, previous cultures, and recent antimicrobial use, which is necessary in deciding empiric antimicrobial therapy with the increasing number of multi-drug resistant organisms. The purpose of this study is to determine the frequency and types of interventions pharmacists make regarding initial antimicrobial therapy in septic shock, and if these interventions are associated with reduced time to appropriate antimicrobial therapy and improved outcomes compared with historical controls.

Methods: This is a retrospective, matched cohort study involving patients ≥ 18 years of age with a diagnosis of septic shock from January 2012-September 2014. Patients treated with the UK sepsis bundle will be matched to controls using University HealthSystem Consortium expected mortality and service line. The primary endpoint is timing of appropriate antimicrobial administration based on cultures/sensitivities, and secondary outcomes include mortality and ICL and hospital length of stay. Pharmacist intervention will also be determined and characterized. Data will be analyzed using Wilcoxon Rank Sum or Students t-test for continuous data and chi-squared analysis or Fishers exact test for categorical variables.

Results/Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review guideline recommendations and literature for timing of appropriate antimicrobial therapy in septic shock.

Identify interventions by pharmacists that can impact appropriate empiric antimicrobial therapy.

Self Assessment Questions:

According to the 2012 Surviving Sepsis Campaign, empiric antimicrobial therapy for severe sepsis or septic shock should:

- A Be administered within four hours of symptom recognition
- B: Be selected according to suspected source, culture history, recent
- C: Never include fungal coverage as gram positive and gram negative
- D: All of the above

Which of the following represent example(s) of potential pharmacist interventions in regard to empiric antimicrobial therapy for patients with septic shock?

- A Recommending double coverage for Pseudomonas aeruginosa
- B Recommending micafungin for a patient who is receiving total parenteral nutrition
- C Recommending meropenem instead of cefepime based on culture
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-802-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF DURATION OF THERAPY FOR NON-LACTOSE FERMENTING GRAM NEGATIVE VENTILATOR-ASSOCIATED PNEUMONIA

Elizabeth A. Lakatos*, PharmD; Neil E. Ernst, PharmD; Christopher A. Droege, PharmD; Madeline Foertsch, PharmD, BCPS; Sheila C. Takieddine, PharmD, BCPS; Eric W. Mueller, PharmD, FCCM, FCCP
UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 45219
Elizabeth.Lakatos@UCHealth.com

Purpose: The most effective duration of treatment with antimicrobials for Ventilator Associated Pneumonia (VAP) has been investigated, but results are conflicting. Non-lactose fermenting Gram negative bacilli (nlfGNB), including *Pseudomonas*, *Acinetobacter* and *Stenotrophomonas*, have accumulated the most conflicting data. A landmark trial found higher rates of VAP recurrence in patients treated with a short- versus long-course of antibiotics, yet the long-course treatment group had higher rates of resistant organisms when recurrence ensued. Research utilizing repeat respiratory cultures identified that the majority of *Pseudomonas* VAP required 14 days of treatment, while other nlfGNB usually required ten days of treatment. Other retrospective studies have found no difference in recurrence between treatment duration groups. Controversy has developed in deciding the proper treatment duration for nlfGNB VAP. The purpose of this study is to compare the rate of VAP recurrence between short-moderate- and long-course antibiotic treatments.

Methods: This is a single center, retrospective chart review of critically-ill adult patients with nlfGNB VAP after at least 48 hours of mechanical ventilation. Treatment groups will be stratified by duration as six to eight days (short), nine to 12 days (moderate) and greater than 12 days (long). The primary endpoint is the incidence of VAP recurrence, defined as any VAP re-infection within one week of discontinuation of antibiotics for the initial VAP occurrence. Secondary end points include the incidence of relapse, defined as VAP due to the original organism, superinfections, defined as VAP due to any organism other than the original pathogen, multi drug-resistant organisms (MDRO) and in-hospital mortality between MDRO and non-MDRO recurrences. A subgroup analysis will be conducted including only patients that received empiric antibiotics with activity against the resulting pathogen(s). A three way statistical comparison between groups will involve an analysis of variance for each outcome.

Results: Data collection and analysis are ongoing.

Learning Objectives:

Describe the characteristics and definition of VAP.

Identify common pathogens associated with VAP and the guideline recommended durations of treatment.

Self Assessment Questions:

The diagnosis of VAP includes which of the following?

- A: Positive sputum cultures
- B: Purulent sputum
- C: Fever >38.5 C
- D: WBC \geq 10,000 cells/uL, or WBC \leq 5,000 cells/uL

Which of the following pathogens can most likely be ruled out if a preliminary culture reports a non-lactose fermenting Gram negative bacilli?

- A: *Pseudomonas aeruginosa*
- B: *Acinetobacter baumannii*
- C: *Serratia* spp.
- D: *Stenotrophomonas maltophilia*

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-503-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE EFFICACY, SAFETY, AND COST-EFFECTIVENESS OF TRANEXAMIC ACID USE DURING ELECTIVE ORTHOPEDIC SURGERY

*Connie M. Lam, PharmD; Alicia J. Juska, PharmD, BCPS
Swedish Covenant Hospital, 5145 North California Avenue, Chicago, IL, 60625
clam@schosp.org

Purpose:

The study objective was to evaluate whether tranexamic acid administration during elective hip and knee arthroplasties would minimize bleeding and blood transfusions, thereby minimizing costs, without increasing the risk for clotting complications. Primary outcomes included blood loss, change in hemoglobin, number of blood transfusions, and hospital length of stay. Secondary outcomes included 30-day hospital readmission for venous thromboembolism and incidence of complications.

Methods:

Electronic medical records for patients who underwent an elective hip or knee surgery between June 1, 2013 and June 30, 2014 were evaluated retrospectively. Fifty-eight patients were included in the study with 29 patients in both the tranexamic acid and placebo groups. Subjects were matched by procedure with 17 total hip and 12 total knee arthroplasty patients in each group. Data were analyzed using a t-test and Fisher's exact test.

Results:

On average, control groups as compared to the tranexamic acid groups had a trend towards greater intra-operative blood loss in total hip (432mL vs. 347mL; $p=0.25$) and total knee (83mL vs. 71mL; $p=0.56$) arthroplasties. There were fewer blood transfusions in the control groups than in the tranexamic acid groups for the total hip (10 vs. 3; $p=0.01$) and total knee (3 vs. 1; $p=0.3$) arthroplasties. The mean decrease in hemoglobin on post-operative day 1 from baseline for control vs. tranexamic acid groups for total hip arthroplasty patients was 3.95mg/dL vs. 2.67mg/dL ($p=0.02$) and 2.67mg/dL vs. 1.52mg/dL ($p=0.05$) for total knee arthroplasty patients. No significant difference was found in hospital length of stay between the groups for patients who underwent total hip (4.11 days vs. 4 days; $p=0.8$) and total knee (4.33 days vs. 4.17 days; $p=0.7$) arthroplasties.

Conclusion:

Use of tranexamic acid during total hip or knee arthroplasties may minimize blood loss, blood transfusions, and associated costs.

Learning Objectives:

Discuss the mechanism of action of tranexamic acid

Explain the rationale for using tranexamic acid during orthopedic surgeries

Self Assessment Questions:

What is the mechanism of action of tranexamic acid?

- A: Plasminogen activation inhibition
- B: Thrombin generation
- C: Activation of clotting factors
- D: All of the above

What is a possible benefit of using tranexamic acid during total hip and knee arthroplasties?

- A: Decreased risk of pulmonary embolism
- B: Decreased need for blood transfusions
- C: Decreased risk of deep vein thrombosis
- D: All of the above

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-504-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY AND EFFICACY OF 2 INSULIN REGIMENS FOR THE TREATMENT OF HYPERKALEMIA IN RENAL INSUFFICIENCY

Heather A LaRue, PharmD, BCPS*; Gary D Peksa, PharmD, BCPS
Rush University Medical Center, 1653 W Congress
Pkwy, Chicago, IL, 60612
heather_larue@rush.edu

Purpose: The optimal dosing regimen of intravenous (IV) insulin for the treatment of hyperkalemia has not been well-defined in the literature. It is important to define the ideal regimen in order to maximize efficacy of treating hyperkalemia while minimizing hypoglycemia from insulin therapy. Certain groups of patients are at a higher risk of hypoglycemia with insulin treatment, in particular those with renal dysfunction. The purpose of this study is to investigate the safety and efficacy of 2 different insulin doses to treat hyperkalemia in patients with renal insufficiency.

Methods: The analysis will be completed through a retrospective chart review between January 2008 and November 2014. Two groups of patients will be compared: those that have received 5 units or 10 units of IV insulin regular for hyperkalemia. Inclusion criteria will include presence of renal insufficiency or acute kidney injury, treatment initiated in the emergency room, and a serum potassium level greater than 5 mEq/L. Exclusion criteria will include pregnancy, age less than 18 years, or lack of blood glucose measurements within 5 hours after insulin administration. The primary outcome will be rates of hypoglycemia, and the secondary outcome will be the magnitude of potassium-lowering after insulin therapy.

Results/Conclusions: Data collection and analysis is currently in progress and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define common treatments for hyperkalemia

Identify potential risk factors for hypoglycemia after insulin therapy for hyperkalemia

Self Assessment Questions:

Which patient characteristic has been associated with an increased risk of hypoglycemia post-insulin administration?

- A: High body weight
- B: Renal Insufficiency
- C: Diabetes
- D: Elderly

What is a common treatment for hyperkalemia?

- A: IV insulin regular
- B: Continuous infusion insulin
- C: SQ insulin regular
- D: SQ insulin detemir

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-505-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF NEUROMUSCULAR BLOCKING AGENTS IN THE MANAGEMENT OF ACUTE RESPIRATORY DISTRESS SYNDROME

Jennifer N. Lashinsky*, PharmD, Melissa Pleva, PharmD, BCPS, BCNSP, Jim Miller, PharmD, BCPS, Simona Butler, PharmD, BCPS, Arnold Andreason, PharmD, Melissa Tai, PharmD Candidate 2015, Cesar Alaniz, PharmD, Valerie Takyi, MD, Lena Napolitano, MD, Robert H

University of Michigan Health System, 1111 E. Catherine Street, Victor Vaughan Bldg., Rm 322, Ann Arbor, MI, 48109
jlashins@med.umich.edu

Purpose:

Early neuromuscular blockade with cisatracurium in patients with acute respiratory distress syndrome (ARDS) has been shown to increase survival and ventilator free days without increasing muscle weakness, barotrauma or organ failure. Generally, cisatracurium is dosed by titration to physiologic effect through train-of-four monitoring; however, the recent study that demonstrated a mortality benefit used a fixed dose method. Consequently, some practitioners have adopted the use of fixed dose cisatracurium for ARDS, while others continue dosing by titration to effect. This study will evaluate the outcomes of patients receiving titrated cisatracurium via train-of-four monitoring in the management of ARDS.

Methods:

This retrospective study will include adult (> 18 years) critically ill patients at an academic medical center who received neuromuscular blocking agent (NMBA) therapy for early ARDS from January 2011 to May 2014. Patients in whom it was determined to withhold life-sustaining treatment, were pregnant or had a prior diagnosis of severe chronic respiratory disease requiring long-term oxygen therapy or mechanical ventilation will be excluded. Data to be collected includes ventilator settings, physiologic variables and demographic data regarding the subjects gender, age, body weight, admitting diagnosis, use of concomitant agents and type of ICU. Lastly, neuromuscular blocking agent, dose and duration of therapy will be documented. The primary outcome will be in-hospital mortality and will be compared to the results of the study by Papazian et al. Secondary endpoints include duration of NMBA treatment, incidence of new organ failure, and ventilator free days. Statistical analysis will involve chi-square test for nominal data and Student's t-test for continuous data. This study was approved by the Institutional Review Board.

Results/Conclusions:

Data is currently under review and all results will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the pathophysiology of ARDS and current challenges facing clinicians in effective management of ARDS

Discuss the role of neuromuscular blocking agents and the impact of different dosing strategies on outcomes in patients with ARDS

Self Assessment Questions:

Which of the following is true regarding the management of acute respiratory distress syndrome?

- A: A variety of therapies have been evaluated and found to have significant impact on outcomes
- B: Management should be targeted at the underlying cause
- C: Ventilator settings have no impact on progression to lung injury
- D: Cisatracurium is the only neuromuscular blocking agent used for titration

The use of neuromuscular blocking agents in ARDS has been shown to improve which of the following outcomes?

- A: Mortality
- B: Muscle weakness
- C: Ventilator free days
- D: Both A and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-506-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL AND ECONOMIC OUTCOMES OF DIABETES MANAGEMENT AT AN OUTPATIENT CLINIC WITHIN AN URBAN COMMUNITY HOSPITAL SYSTEM

Irvin H. Lau*, PharmD; Anupa Patel, PharmD, BCPS, CDE
Sinai Health System, 51 Castle Rock Lane, Bloomingdale, IL, 60108
irvin.lau@sinai.org

Purpose:

Pharmacist involvement in diabetes management has demonstrated significant improvement in clinical outcomes for patients who continue to have uncontrolled diabetes. However, there have been few studies to evaluate this impact on the low-income urban population at the highest risk of chronic complications due to uncontrolled diabetes. The purpose of this study is to assess the clinical impact of pharmacy-involved diabetes management at an outpatient clinic within an urban community safety net hospital system and to associate the clinical outcomes with an economic value.

Methods:

This single center retrospective chart review will compare clinical outcomes between patients who are enrolled in diabetes management at a hospital-associated outpatient clinic and patients who are not enrolled in the program but are managed by the same doctors at the clinic. The diabetes management team includes a pharmacist, registered dietitian, licensed clinical social worker, and registered nurse. The intervention involves additional diabetic counseling, medication and appointment management with the team in conjunction with the regular physician appointment. Patient characteristics such as age, gender, ethnicity, number of comorbid disease states, and insurer type were collected at baseline. Laboratory values such as glycosylated hemoglobin (A1c) and low-density lipoprotein (LDL) were assessed at baseline and after one year of intervention. Process measures include eye, foot, and microalbumin examination status. Economic assessments were performed by assessing the number of hospitalizations related to diabetic complications, hospitalization costs, number of visits to the outpatient care clinics and the cost of each visit for the pre- and post-index year. All data will be recorded without patient identifiers and maintained confidentially. Laboratory evaluations and clinical outcomes will then be correlated with the economic costs associated with providing optimal patient care.

Results/Conclusions:

The results and conclusions will be presented at the Great Lakes Conference.

Learning Objectives:

Define the role of a pharmacist in a diabetes management program
Identify relevant clinical and process parameters for a comprehensive diabetes evaluation

Self Assessment Questions:

The role of a pharmacist in diabetes management includes all of the following except:

- A Optimization of diabetes medication therapy
- B Performing the annual dilated eye exam
- C Customized diabetes education
- D Decreasing barriers for patient access to medications

Which of the following is not a component of a comprehensive diabetes evaluation as recommended by the ADA?

- A Hemoglobin A1c test every year
- B Annual lipid panel test
- C Annual diabetic retinopathy exam
- D Annual comprehensive foot exam with pedal pulse palpation and r

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-507-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

APPROACH TO THE CARDIOVASCULAR PATIENT WITH ASPIRIN ALLERGY:

Bola Lawuyi, Pharm.D*, Princess Ogbogu, M.D, Nabeel Farooqui, M.D, Konstantinos Boudoulas, M.D, Danielle Blais, Pharm.D, BCPS
The Ohio State University Wexner Medical Center, 410 W. 10th Ave 368 Doan Hall, Columbus, OH, 43212
bola_lawuyi@osumc.edu

Purpose

Dual antiplatelet therapy has been shown to reduce major adverse cardiovascular events in patients with coronary artery disease (CAD), however some patients with CAD are not discharged on aspirin (ASA) due to an allergy. ACCF/AHA guidelines for CAD and percutaneous coronary intervention provide limited guidance on the treatment approach in patients with ASA allergies. The purpose of this study is to evaluate the safety and efficacy of an ASA desensitization protocol, describe the approach to the cardiovascular patient with ASA allergy and the role of the pharmacist.

Methods

Patients admitted to a tertiary academic hospital between January 2008 and September 2014 with CAD, ASA allergy and an indication for ASA were included. Data collected included baseline demographics, ASA indication, type of allergy (cutaneous, respiratory or systemic), type of protocol or challenge, pharmacy preparation time, requirement for rescue medications, patients discharged on ASA and continuation of ASA past 30 days as documented in the electronic medical record. To enhance the efficiency of the ASA desensitization process an order set and policy were developed in December 2013. The primary efficacy outcome was percent of patients who underwent a successful desensitization, defined as completion of desensitization and ability to be discharged on ASA. The primary safety outcome was percent of patients requiring a rescue medication during desensitization.

Results

Of patients admitted with an ASA allergy, 52 underwent an ASA desensitization or challenge. Baseline characteristics of the population consisted of 48 % male and mean age of 59. Of these patients, 98% were successfully desensitized. However, 9.6 % of patients required rescue medications. Pharmacist time for protocol preparation before and after the order set was implemented was 108 and 30 minutes respectively.

Conclusion

This describes an efficient process for safely and effectively desensitizing patients with CAD to ASA with an ASA allergy.

Learning Objectives:

Discuss the importance of aspirin desensitization in patients with CAD and aspirin allergy.

Recognize the role of the pharmacist in desensitizing patients with CAD and aspirin allergy.

Self Assessment Questions:

Describe the three most common types of true aspirin allergies.

- A Systemic, nasal polyps, allergic rhinitis
- B Systemic, cutaneous, aspirin exacerbated respiratory disease
- C Conjunctivitis, laryngeal edema, anaphylaxis
- D Systemic, chronic urticaria, nasal polyps

Explain the mechanism of ASA desensitization.

- A Small incremental dosages, increase leukotriene production, up re
- B Large incremental dosages decrease leukotriene production, down
- C Small incremental dosages, decrease leukotriene production, down
- D Large incremental dosages increase leukotriene production, up re

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-508-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF A PHARMACIST-RUN POPULATION HEALTH PROGRAM

Danielle L Leach*, PharmD; Katherine J Hartkopf, PharmD, BCACP; Carrie J Boeckelman, RPh, BCACP

University of Wisconsin Hospital and Clinics, 5019 Sheboygan Ave, Apt 315, Madison, WI, 53705

dleach@uwhealth.org

Purpose: As pharmacy practice continues to evolve towards more team-based care and patient-centered medication therapy management, pharmacists have a greater role in population health. Studies have shown that pharmacist-run comprehensive medication reviews (CMRs) improve the quality outcomes of patients with chronic disease states. Currently, UW Health does not have a standardized program, visit structure, or defined staffing model whereby ambulatory pharmacists designate time for CMRs. The purpose of this project is to implement a standardized, pharmacist-run CMR program and improve the quality outcomes of UW Health pharmacy patients.

Methods: A steering committee of stakeholders was created to guide implementation of the program. The National Quality Measures Clearinghouse and the Wisconsin Pharmacy Quality Collaborative Program were used to determine patient quality metrics to be tracked. Program pilot locations were determined by room availability and patient populations. A proposed number of pharmacists and operating times for each location based on potential patient volume were presented to and approved by the steering committee. Methods of documentation were reviewed and standardized. A complete workflow outline, resources, and training were provided to participating staff prior to implementation. Evaluated outcomes include CMR visit completion and no-show rates, time spent on specific medication review tasks, specified patient quality outcomes, and the total reimbursement collected for services provided.

Results/Conclusions: Expected results include a standardized CMR visit process, a CMR program with a sustainable staffing model, and an expanded role for UW Health pharmacists to optimize patient outcomes and practice at the top of their licenses in a manner consistent with contemporary pharmacy practice. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe at least two benefits of a pharmacist-run comprehensive medication review service based on literature.

Discuss at least two barriers and possible solutions to implementing a comprehensive medication review service.

Self Assessment Questions:

Which of the following is a benefit of pharmacist-run comprehensive medication review services?

- A They are free to the patient no matter what payer they have
- B They improve patient quality outcomes
- C They increase overall healthcare costs
- D They eliminate the need for follow up appointments

Which of the following is a significant barrier to efficient comprehensive medication review documentation?

- A Attendance at live training sessions on medication therapy management
- B Use of a group communication listserve to answer documentation
- C Multiple levels of documentation in different software platforms
- D Prepopulated text phrases that require users to fill in the blanks

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-803-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

BRIDGING THE PHARMACOTHERAPY GAP BETWEEN INPATIENT AND OUTPATIENT ISLANDS

Derrick S. Ledvina, Pharm.D.*; Lee P. Skrupky, Pharm.D., BCPS; Jeffrey J. Waise, Pharm.D.

Aurora BayCare Medical Center, 2845 Greenbrier Rd, Green Bay, WI, 54311

Derrick.Ledvina@aurora.org

Purpose: Although many medication issues identified by pharmacists are reconciled prior to discharge, hospitalists are understandably hesitant or unable to address some pharmacotherapy issues that would be best managed by outpatient providers (OPs). Currently, a communication gap exists between inpatient pharmacists and OPs resulting in a lack of optimal pharmacotherapy after patient discharge. The objective is to pilot a pharmacotherapy recommendation process between inpatient pharmacists and OPs to further optimize patient care. **Methods:** A new process of communicating medication changes and recommendations to OPs was proposed and piloted via collaboration of inpatient pharmacists, hospitalists and OPs. Inclusion criteria for the pilot were as follows: patients on the hospitals medical/surgical 3 unit with an attending hospitalist and Aurora OP and met at least one of five high risk criteria (CrCl <50 ml/min at discharge, CHF, diabetes with insulin requirement, discharged on anticoagulant, ≥5 chronic medications). Qualified patients were assessed for specified pharmacotherapy interventions upon discharge medication reconciliation review by the inpatient pharmacist assigned to that unit. An electronic communication tool was developed to send a summary of medication changes made during the inpatient stay and any additional pharmacotherapy recommendations requiring OP attention. OP responses were identified by accessing the electronic medical record and follow-up visit documentation. Primary outcomes to be assessed include the quantity of recommendations generated by inpatient pharmacist and the OP responses. The pilot was implemented on December 15th and will be conducted until April 1st. A survey of the stakeholders will also be performed upon completion of the pilot to obtain feedback and assess the perceived value of this service. **Results/Conclusion:** Forty-two patients met inclusion criteria between December 15th and January 15th. Pharmacotherapy recommendations were sent to OPs for 18 (43%) of these patients. Additional results and conclusions will be presented at the Great Lakes Residency

Learning Objectives:

Identify patient characteristics that are considered high-risk for hospital readmission

List three barriers to creating a pharmacotherapy communication process between inpatient and outpatient providers

Self Assessment Questions:

Which of the following is a barrier to implementing a discharge pharmacotherapy communication process between inpatient and outpatient providers?

- A Lack of a common communication tool used between different ins
- B Pharmacy technician availability to assist with new service
- C Pharmacist availability to perform the new service
- D A and C

Which clinical factor may place patients at higher risk of readmission?

- A Use of less than 5 chronic medications
- B Diagnosis of Heart failure
- C Diagnosis of allergic rhinitis
- D Normal Renal Function

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-509-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFICATION OF CHARACTERISTICS ASSOCIATED WITH PROLONGED HOSPITAL LENGTH OF STAY IN NEONATAL ABSTINENCE SYNDROME (NAS)

Pauline Lee*, PharmD; Deborah Raithel, PharmD, BCPS; Sudhir Sriram MD; Elisabeth Simmons, PharmD, BCPS

University of Chicago Medical Center, 625 W. Madison St., #2305, Chicago, IL, 60661

pauline.lee@uchospitals.edu

PURPOSE. The use of opioids and other addictive substances during pregnancy can lead to the development of Neonatal Abstinence Syndrome (NAS) in the newborn. NAS is comprised of acute symptoms such as excessive crying, rapid breathing, and irritability in response to the cessation of opiate exposure. NAS is initially treated with supportive care and may require pharmacological management for severe cases. Neonatal hospital length of stay (LOS) is variable; however stays up to 62 days were reported. There is no evidence-based treatment protocol, but many institutions have developed institution-specific protocols that have resulted in decreased hospital LOS and duration of treatment. Currently, there is no protocol at University of Chicago Medicine (UCM), Comer Childrens Hospital. The primary objective is to determine maternal and neonatal characteristics associated with prolonged hospital LOS in neonates with NAS. **METHODS.** A retrospective cohort analysis of neonates who received morphine for the treatment of NAS at UCM will be conducted. Maternal and neonatal characteristics will be collected to evaluate associations with prolonged hospital LOS. Data collection will include maternal characteristics--age, race, marital status, drug exposure, drug exposure duration, mode of delivery; and neonatal characteristics--gestational age, birth weight, length, head circumference, gender, feeding, hours of life to NAS score > 8, initial NAS score, mean NAS score in the first 48 hours of life, peak NAS score during the beginning of treatment, time to first morphine dose, initial morphine dose given every four hours, peak morphine dose given every four hours, opioid treatment duration, total opioid exposure during hospitalization, and use of adjunctive treatment. **RESULTS:** Data collection is ongoing and results will be presented. The results will be used to develop a protocol to implement at UCM with a future goal to evaluate the efficacy of the protocol in reducing hospital LOS.

Learning Objectives:

Recognize the pathophysiology, signs and symptoms, and treatment of neonatal abstinence syndrome.

Describe the potential impact of a NAS treatment protocol.

Self Assessment Questions:

Neonatal abstinence syndrome symptoms consist of:

- A Excessive crying
- B: Increased urination
- C: Uncontrollable coughing
- D: Hypoactive reflexes

Institution-specific neonatal abstinence syndrome treatment protocols have been shown to:

- A Increase duration of therapy
- B Reduce hospital length of stay
- C Increase the need for higher doses
- D Eliminate the need for the scoring tool

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-510-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF COMMUNITY BENEFIT PROGRAMS UTILIZING INPATIENT PHARMACY STAFF AND PHARMACY RESIDENTS

Alice Lee, PharmD*; Tina Zook, PharmD; Matthew Biszewski, PharmD, BCACP

NorthShore University HealthSystem, 2100 Pfingsten Rd, Glenview, IL, 60026

alee3@northshore.org

Purpose

Healthy People 2020 identified a need for increasing the quality, availability, and effectiveness of educational and community-based programs. In January 2015, the National Governors Association stated that "health care experts increasingly agree that including pharmacists on chronic care delivery teams can improve care and reduce the costs of treating chronic illnesses." American Society of Health-System Pharmacists (ASHP) addressed this issue in their 2014 update of the PGY1 Accreditation Standards. These updates include ongoing commitment to advancing the pharmacy profession as an additional preceptor qualification standard. Preceptors can meet the new standards by providing wellness programs and by assessing residents performances. The purpose of this project is to implement sustainable community benefit programs and to increase pharmacists opportunities within a health system in order to meet ASHP preceptor standards.

Methods

Community benefit pharmacy programs will be implemented in collaboration with neighboring nursing homes and assisted living facilities. Two distinct services will be implemented including discussion regarding drug and disease state information and a review of patient medications. A survey was distributed to identify a key task force.

Results/Conclusions:

The survey responses showed that approximately 79% of inpatient pharmacists were interested in providing the proposed services and 68% claimed meeting ASHP preceptor criteria. The actual number of preceptors meeting criteria remains to be verified. Program implementation is currently in progress.

Learning Objectives:

Identify potential benefits of implementing community benefit pharmacy services

Discuss strategies to overcome barriers pertaining to program implementation and sustainability

Self Assessment Questions:

Which of the following is a potential quantifiable benefit to implementing sustainable community benefit pharmacy programs?

- A Decrease pharmacy residents' ability to engage with community
- B: Increase the number of pharmacists that meet ASHP preceptor standards
- C: Establish pharmacy presence and decrease awareness of pharmacy services
- D: Decrease patient understanding of health wellness

What is a potential solution for overcoming program sustainability barriers?

- A Identify key point-persons for program management and establish communication
- B Provide services sporadically throughout the year as interested residents are available
- C Exclude management in any program-related decision-making
- D Address concerns only as they arise instead of identifying potential barriers

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-511-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACOTHERAPY OF VENTRICULAR ASSIST DEVICE INFECTIONS

Amy L. Lehnert, PharmD*; Sara D. Brouse, PharmD, FCCP, BCPS, AQ Cardiology; Maya E. Guglin, MD, PhD
University of Kentucky HealthCare, 3212 Polo Club Blvd, Lexington, KY, 40509
amy.lehnert@uky.edu

Purpose: One of the largest obstacles for successful left ventricular assist device (LVAD) implantation is the frequency of infection. LVAD-associated infections (LVADIs) are serious complications that can prevent or delay transplantation for patients eligible to receive a donor heart, and significantly increase mortality for patients who receive an LVAD as destination therapy. While possible risk factors for LVADIs have been identified in several clinical trials, no guidelines or published recommendations exist for the management of LVADIs once they occur. Our study looks to characterize the current pharmacologic management, pathogen etiology, and clinical manifestations of LVADI at our institution and allow us to consider a treatment protocol tailored to our patient population. It is hypothesized that patients who are treated with broad-spectrum antimicrobial therapy and longer durations at the time of the initial infection have better outcomes than those treated with shorter courses of narrow spectrum antimicrobial therapy.

Methods: Patients ≥ 18 years of age implanted with LVADs between August 2009 and March 2014 at our institution were screened for inclusion in this retrospective study. Patients were included if an LVADI was documented and treated at our institution, and were stratified into two groups based on whether the initial infection was treated with ≤ 2 weeks or > 2 weeks of antibiotics. LVADI was defined as all infections occurring in the presence of an LVAD that may or may not have been directly attributable to the LVAD therapy but warranted special consideration because of the presence of LVAD. Secondary objectives include the incidence of microbiological cure, relapse, or re-infection, requirement for suppressive antibiotic therapy, and incidence of device explantation, heart transplant, and mortality.

Results/Conclusions: This study is under investigation with results and conclusions to be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss possible sources and common pathogens for ventricular assist device-related infections

Describe clinical implications and complications associated with ventricular assist device-related infections

Self Assessment Questions:

Which of the following infection source and pathogen type are most common in ventricular assist device related infections?

- A: Driveline infections are most common, and typically involve gram-negative bacteria
- B: Driveline infections are most common, and typically involve gram-positive bacteria
- C: Pump/cannula infections are most common, and typically involve gram-negative bacteria
- D: Pump/cannula infections are most common, and typically involve gram-positive bacteria

Which of the following is possible clinical complication associated with ventricular assist device-related infections?

- A: Delay in heart transplant
- B: Decreased antimicrobial resistance
- C: Death
- D: Both A and C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-804-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

INFECTIOUS COMPLICATIONS WITH PLASMAPHERESIS IN COMBINATION WITH ANTITHYMOCYTE GLOBULIN COMPARED TO ANTITHYMOCYTE GLOBULIN ALONE IN THE TREATMENT OF ACUTE REJECTION

Abbie D. Leino PharmD*, Amanda L. Hulbert PharmD, April Delahunty PharmD, Amer Rajab MD PhD, Amy Lehamn MAS, Jon Von Visger MD PhD, Holli A. Winters PharmD

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 West 10th Ave, Columbus, OH, 43210
abbie.leino@osumc.edu

Purpose: The primary objective of this study was to compare the incidence of infection in the first year following treatment initiation for AR among patients (pts) who received PP and ATG vs ATG alone.

Methods: This is a single-center, retrospective cohort study of kidney transplant recipients (KTR) treated for biopsy proven AR (AMR and/or ACR) between 1/2002 and 6/2013. Pts were included if they were a KTR between 18 and 89 years of age and were treated for AR with either PP and ATG during the same hospital admission or ATG alone. Pts could also be treated with steroids and/or IVIG. Pts were excluded if they received rituximab, eculizumab, OKT3, or bortezomib.

Results: Preliminary data for seventy-nine pts has been evaluated. There was no difference in infection rate during the 1 year study period (26/46 (56.5%) ATG+PP vs. 14/33 (42.4%) ATG alone, $p=0.2$). The types of infection identified were similar between groups. There was a trend towards a higher incidence of UTI, pneumonia, and bacteremia in the combination group. The median time to infection in the ATG and PP group was 7 days (range 0-225) and 81.5 days (5-336) for ATG alone ($p=0.2$). Review of the Kaplan-Meier estimate suggested ATG and PP might be associated with a higher risk in the first 60 days (19/46 (41.3%) ATG+PP vs. 5/33 (15%) ATG alone, $p=0.01$). Additional analysis is pending.

Conclusion: The incidence of infection at 1 year was not different between groups. However, these results suggest pts treated for AR with the combination of ATG and PP were at increased risk of infection during the first 60 days following treatment.

Learning Objectives:

Identify the therapeutic modalities used to treat acute rejection of the transplanted kidney.

List reasons kidney transplant recipients are at increased risk of infection.

Self Assessment Questions:

Which of the following is a medication commonly used in the treatment of cellular rejection?

- A: Bortezomib
- B: Intravenous immunoglobulin
- C: Antithymocyte globulin
- D: Eculizumab

Which of the following is the most important risk factor for infection in renal transplant recipients?

- A: Vesicoureteral reflux
- B: Community infection exposure
- C: Immunosuppression
- D: Donor infection exposure

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-512-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

WARFARIN REVERSAL IN THE SETTING OF INTRACRANIAL HEMORRHAGE: NON-ACTIVATED VERSUS ACTIVATED FOUR FACTOR PROTHROMBIN CONCENTRATES

Mary M Lenefsky*, PharmD; Kimberly Levasseur-Franklin, PharmD, BCPS; Deepika Pereira, PharmD, BCPS; Michael Postelnick, RPh, BCPS, AQ-ID; Kasey Greathouse, PharmD, BCPS

Midwestern University / Northwestern Memorial Hospital, 4950 N Marine Drive #1008, Chicago, IL 60640

mledefsk@nm.org

Purpose: Intracranial hemorrhage (ICH) is a significant cause of morbidity and mortality. Patients taking warfarin constitute 12-14% of patients who experience an intracranial hemorrhage. The mainstay of medical management for an ICH is rapid reversal of the international normalized ratio (INR). Options for reversal include either fresh-frozen plasma (FFP), recombinant factor VIIa, or prothrombin complex concentrates (PCCs) in addition to vitamin K. FEIBA is an activated, four factor PCC that rapidly reverses INR. However, FEIBA does not carry an FDA approved indication for reversal of warfarin in acute major bleeding Kcentra, a non-activated four factor PCC, is a newly approved PCC that carries an FDA approval for the reversal of warfarin in acute major bleeding. In March of 2014, Northwestern Memorial Hospital changed its formulary PCC from FEIBA to Kcentra to coincide with the new FDA approval. Currently, there is no literature comparing FEIBA and Kcentra for the reversal of warfarin in an ICH. The goal of this study is to retrospectively review patient medical records to determine if there is any difference in hematoma expansion, INR reversal, and thrombotic complications in patients treated with FEIBA versus Kcentra.

Methods: This will be a retrospective cohort study at Northwestern Memorial Hospital occurring from January 2012 through December 2014. Patients who received either FEIBA or Kcentra for the reversal of warfarin in the setting of an intracranial, subdural, or intraparenchymal hemorrhage will be included. Patients will be excluded if there is incomplete laboratory data. Baseline demographics and clinical laboratory parameters will be collected on a standardized data collection tool. The primary endpoint will be change in INR. Secondary endpoints will be hematoma expansion, presence of thrombotic complications, as well as intensive care unit and hospital length of stay.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the risk of intracranial hemorrhage in patients taking warfarin
Describe the options for reversal of INR in patients taking warfarin

Self Assessment Questions:

Patients taking warfarin constitute what percent of patients who experience an intracranial hemorrhage?

- A: 10%
- B: 95%
- C: 12-14%
- D: 1%

Which of the following are options discussed for the reversal of INR in patients taking warfarin?

- A: FEIBA, Kcentra, Heparin
- B: FFP, Vitamin K
- C: Protamine, Vitamin K
- D: FFP, Vitamin K, Factor VIIa, FEIBA, Kcentra

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-513-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF CENTRALLY ACTING A2 AGONISTS FOR ALCOHOL WITHDRAWAL SYNDROMES IN THE CRITICALLY ILL

Christopher R. Leong, Pharm.D.*, Bryan D. Lizza, Pharm.D., BCPS, Eri J. Rachwalski, Pharm.D, BCPS, Craig Cooper, Pharm.D. BCPS
Northwestern Memorial Hospital, 251 East Huron St, Chicago, IL 60611
cleong@nm.org

Background

Alpha-2 agonists have shown to be beneficial patients with alcohol withdrawal syndrome as adjunctive therapy by blunting the adrenergic response and thus reducing the required dose of benzodiazepines. Currently, there are no studies that compare the use clonidine and dexmedetomidine in this setting.

The purpose of this retrospective study is to compare the benzodiazepine sparing effect of clonidine and dexmedetomidine in patients with alcohol withdrawal in the medical intensive care unit (MICU).

Methods

This retrospective matched cohort study evaluated patients who received either clonidine or dexmedetomidine as adjunctive therapy to benzodiazepines for alcohol withdrawal at an academic medical center. The primary endpoint of this study is the mean difference in benzodiazepine dose from 24 hours prior to the initiation of the alpha-2 agonist and the 24 hours after its initiation, expressed as lorazepam equivalents. Secondary endpoints include length of ICU stay, length of hospital stay, incidence of intubation, and hypotension. This study was approved by the Institutional Review Board at Northwestern Memorial Hospital.

Results/Conclusions:

Findings of this retrospective cohort study will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Discuss the role of a2 agonists in alcohol withdrawal.

Indicate situations in which addition of an a2 agonist may be appropriate

Self Assessment Questions:

Which of the following describes the proposed mechanism of a-2 agonists in alcohol withdrawal?

- A: Blunting the adrenergic response
- B: Sedation for the treatment of agitation
- C: Treatment of hypertensive episodes during withdrawal
- D: Synergistic effect of GABA receptors

Which of the scenarios best describes the place in therapy for an a-2 agonist in alcohol withdrawal?

- A: First line therapy before benzodiazepines
- B: First line therapy with concomitant benzodiazepines
- C: Second line as adjunct therapy to benzodiazepines
- D: Second line therapy as monotherapy

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-514-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING DECITABINE-ASSOCIATED TOXICITIES IN PATIENTS WITH RENAL IMPAIRMENT COMPARED TO NORMAL RENAL FUNCTION

Lauren B Levine*, PharmD; Julianna Roddy, PharmD; Miryoung Kim, PharmD; Alison Walker, MD

The Ohio State University Wexner Medical Center, 1823 Aschinger Blvd, Columbus, OH, 43212

lauren.levine@osumc.edu

Decitabine, a hypomethylating agent, is a therapy option in acute myeloid leukemia (AML) and myelodysplastic syndromes (MDS) for patients that cannot tolerate high-intensity treatment. Decitabine has not been studied in patients with a serum creatinine of 2 mg/dL or greater. Therefore, there is limited guidance on the use of decitabine for the treatment of hematologic malignancies in patients with renal impairment.

The purpose of this study was to compare decitabine-associated toxicities during cycle 1 of AML or MDS therapy between three patient groups: normal renal function (creatinine clearance greater than 60 mL/min), moderate renal dysfunction (creatinine clearance 30 to 59 mL/min), and severe renal dysfunction (creatinine clearance less than 30 mL/min).

This was a retrospective cohort study. Clinical data was collected on patients treated with decitabine between January 1, 2008 and July 31, 2014 at The James Cancer Hospital at The Ohio State University. Patients 18 to 89 years of age with a diagnosis of AML or MDS who received at least one cycle of decitabine therapy were included and placed into one of the three renal function categories based on Cockcroft and Gault calculations. Adverse events associated with decitabine during cycle 1 of therapy were collected, graded, and compared between the three renal function groups. Secondly, we collected and compared data between the three groups on cycle 2 decitabine dose adjustments, delays, or discontinuations due to cycle 1 toxicity; hospital length of stay; mortality within 30 days; median time to absolute neutrophil count (ANC) recovery; median time to platelet count recovery; and the use of granulocyte colony stimulating factor (G-CSF) during cycle 1 of therapy.

These results will provide insight into the impact of renal function on decitabine toxicity and determine if further exploration is needed for decitabine dose adjustments in renal impairment. The results of this study will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the most common decitabine toxicities.

Explain the impact of renal function on decitabine toxicity.

Self Assessment Questions:

Which of the following is the most common decitabine toxicity?

- A: Cardiotoxicity
- B: Myelosuppression
- C: Nausea
- D: Peripheral edema

According to the package insert, decitabine has been studied up to which serum creatinine?

- A: 1.5 g/dL
- B: 2 g/dL
- C: 3 g/dL
- D: 4 g/dL

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-515-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RISK FACTORS FOR THE DEVELOPMENT OF INFECTION WITH ESBL ORGANISMS IN A VETERAN POPULATION WITH SPINAL CORD INJURY

Ryan LeWan*, Pharm.D., Ursula C. Patel, Pharm.D., BCPS AQ-ID, Charlesnika Evans MPH, PhD, Katie Suda, Pharm.D., MS

Veteran Affairs - Edward Hines, Jr. Hospital, 5000 S. 5th Avenue, Hines, IL, 60141

ryan.lewan@va.gov

PURPOSE: Extended spectrum β -lactamase (ESBL) is an enzyme produced by gram-negative bacteria that confers resistance to a wide variety of antibiotics, including extended spectrum cephalosporins. Infections with ESBL-producing organisms are associated with prolonged hospital stay and an increase in morbidity and mortality, with ESBL bloodstream infections associated with a 57% higher mortality rate as compared to infections caused by a non-ESBL producing strain. With underlying disease pathology that predisposes them to frequent hospitalizations and invasive medical interventions, patients with spinal cord injury or disorder (SCI/D) are particularly vulnerable to infection with resistant organisms. Currently, limited data exist on the burden of resistant infections in Veterans with SCI/D and their impact on health outcomes. The primary purpose of this study is to determine risk factors for the development of systemic infection with ESBL-producing Enterobacteriaceae in the Veterans Affairs SCI/D patient population. The secondary aim of this study will be to evaluate outcomes in SCI/D patients that develop ESBL-related infections.

METHODS: The present study will involve a case-case-control retrospective analysis of national VA medical, pharmacy, and microbiology data from January 1, 2012-December 31, 2013 from patients with SCI/D treated at any VA facility. All adult patients with SCI/D cared for at VA facilities during the study time period will be included. Case and control groups will be further defined by microbiology results. Data regarding patient demographics, prior antibiotic/healthcare use, site of positive culture, level of spinal cord injury, presence of urinary catheter and gastrostomy/jejunostomy tubes, and mortality will be collected and analyzed.

RESULTS/CONCLUSIONS: Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List potential risk factors for developing an ESBL infection

Explain why individuals with SCI/D are considered higher risk for infection with resistant microorganisms compared to the general population

Self Assessment Questions:

Which of the following characteristics is (are) associated with increased rates of ESBL infection?

- A: Prior antibiotic exposure
- B: Poor dentition
- C: Mechanical ventilation
- D: A & C

Which of the following are characteristics of underlying disease pathology that predispose the SCI/D population to healthcare acquired infections?

- A: Neurogenic bladder
- B: Development of pressure ulcers
- C: Frequent/chronic use of invasive medical devices
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-516-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF OUTCOMES OF HIGH-DOSE METHOTREXATE WITH OR WITHOUT RITUXIMAB IN PRIMARY CENTRAL NERVOUS SYSTEM LYMPHOMA

Rachael M Lewis, PharmD*; Patrick J Kiel, PharmD, BCPS, BCOP
Indiana University Health, 1701 N Senate Blvd, Dept of
Pharmacy, Indianapolis, IN, 46202
rlewis7@iuhealth.org

Purpose: Primary central nervous system lymphoma (PCNSL) is a rare form of non-Hodgkin lymphoma with a poor prognosis and limited standardized therapeutic options. While high-dose methotrexate has been accepted as the backbone of therapy, evidence has shown that the addition of a secondary agent may improve outcomes. However, there is little data supporting one adjunctive agent over another. The positive results of rituximab with other diffuse large B cell cancers encouraged its use in PCNSL. Despite concern about the ability to cross the blood brain barrier, rituximab has been used in addition to high-dose methotrexate for PCNSL. The purpose of this study is to compare the efficacy outcomes of methotrexate alone and with rituximab. Additionally, this study will perform an analysis of risk factors for nephrotoxicity associated with each regimen.

Methods: A single-center, case-control, retrospective chart review of patients 18 years and older who received high-dose methotrexate for a previously untreated diagnosis of diffuse large B-cell (DLBC) PCNSL at IU Health Simon Cancer Center will be conducted. Patients will be excluded if they have active systemic lymphoma, histology other than DLBC, or if the patient is immunosuppressed. Data to be collected will include: age, sex, BSA, creatinine clearance at baseline and over course of treatment, details on their chemotherapy regimen and concomitant nephrotoxic medications. Primary endpoints to assess efficacy are complete response rate, median progression free survival, and overall survival. Secondary endpoints will be risk factors for nephrotoxicity.

Results: Results and conclusions to be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Explain dosing and monitoring of high-dose methotrexate for PCNSL
Identify an appropriate prevention plan for methotrexate toxicity

Self Assessment Questions:

Which of the following statements is (are) true regarding administration of high-dose methotrexate for PCNSL? I. Doses at 3.5-8 g/m² to increase penetration across the blood brain barrier II. Should be

- A I, III and IV
- B I only
- C Iv, v
- D Ii, iv, v

Patient case: a 56 year old, 84kg male is being admitted for treatment of his recently diagnosed primary CNS lymphoma. He followed his preadmission instructions and his urine pH is 8. After hearing a

- A Sodium bicarbonate 1300mg PO TID PRN for urine pH >7.
- B Leucovorin 25mg PO Q6H to begin at 24 hours after completion of
- C IV fluids: 0.9% Sodium Chloride at 125ml/hr
- D Draw methotrexate level 1 hour after completion of methotrexate iv

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-517-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING THE IMPACT OF THE 2013 ACC/AHA CHOLESTEROL GUIDELINE ON PATIENT CARE IN A PHARMACIST-MANAGED CLINIC AT A VETERANS AFFAIRS MEDICAL CENTER

Bianca Lezcano, PharmD*, Brianna E. Glynn, PharmD, Arthur Schuna, RPh, MS, BCACP, FASHP
Veteran Affairs - William S. Middleton Hospital, 6500 Overlook
Terrace, Madison, WI, 53705
bianca.lezcano2@va.gov

The 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults represents a significant change in the management of patients with, or at high risk of developing, cardiovascular disease (CVD). At the William S. Middleton Memorial Veterans Hospital in Madison, WI, pharmacists and pharmacy residents play an integral role in the management of chronic diseases such as diabetes and dyslipidemia in Medication Management clinics. The purpose of this study is to evaluate the impact of the revised recommendations related to the use of statin therapy for primary and secondary prevention of CVD in patients referred to Medication Management clinics.

Retrospective reviews of electronic health records (EHRs) will be performed to identify patients referred to Medication Management clinics for diabetes and/or lipid management from January 1, 2014 to September 30, 2014. Patients will be included if their laboratory data includes a fasting lipid panel drawn prior to and following the implementation of the guidelines. Data pertaining to veterans age, sex, comorbid conditions associated with CVD, statin intensity prior to and following the implementation of new guidelines, statin benefit group, and estimated 10-year atherosclerotic cardiovascular disease (ASCVD) risk score stratification will be collected. Impact of the guidelines on patient care will be determined by evaluating if patients were treated with appropriate statin intensity based on revised recommendations. Additional metrics to be evaluated include proportion of patients not on appropriate statin intensity, reasons for deviation from guideline recommendations, incidence of statin-related adverse effects after intensification of therapy, and effect of statin intensification on fasting lipid panel values.

Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize what statin intensity is recommended for ASCVD prevention in the four statin benefit groups.
Classify statin medications into the appropriate intensity category.

Self Assessment Questions:

Based on the 2013 ACC/AHA blood cholesterol guidelines, a 66 year old male with recent history of myocardial infarction s/p coronary artery bypass graft warrants treatment with what statin?

- A Lovastatin 20mg daily
- B Atorvastatin 40mg daily
- C Rosuvastatin 10mg daily
- D Simvastatin 40mg daily

Which of the following is considered a moderate intensity statin?

- A Simvastatin 10mg daily
- B Rosuvastatin 20mg daily
- C Pravastatin 80mg daily
- D Atorvastatin 40mg daily

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-518-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST-PROVIDED PATIENT EDUCATION ON PRIMARY MEDICATION NON-ADHERENCE RATES FOR CHRONIC DISEASE STATE PRESCRIPTIONS IN A COMMUNITY PHARMACY SETTING

Jacqueline LHeureux*, PharmD, Jeffrey Hamper, PharmD, Caitlin Malone, PharmD, Susan R. Winkler, PharmD, BCPS, FCCP

InstitutionSite

Jewel-Osco Pharmacies/Midwestern University Chicago College of Pharmacy, 1225 Naper Blvd., Naperville, IL, 60540

jacqueline.lheureux@albertsons.com

Purpose: Adherence to essential medications for chronic disease states has become a public health priority. Medication adherence is crucial to improving the health of patients and decreasing the overall cost of healthcare; it is important to healthcare professionals, patients, and prescription insurance providers. The purpose of this study is to determine how pharmacist-provided patient education regarding abandoned prescriptions affects Primary Medication Non-adherence (PMN) rates for hypertension, cholesterol, diabetes, and chronic obstructive pulmonary disease (COPD) medications in a community pharmacy setting.

Methods: This is a prospective, multi-site, interventional study. Eligible subjects will be identified using the out of date reports for prescriptions (10 days post prescription processing) each day. Subjects will be included if they are male or female >18 years of age and are electronically prescribed a newly initiated prescription for hypertension, diabetes, cholesterol, or COPD. A pharmacist will call study subjects after identification of abandoned prescriptions, which is defined as failure to pick up the prescription within 10 days. All participants will be asked to provide informed consent at the time of the phone call. During the phone call, the pharmacist will provide a survey to determine subjects barriers to adherence and provide education to address the barriers indicated. The patients physician will receive a fax informing them of the non-adherence and the outcome of the intervention. A chi-squared test will be used to compare the intervention group and control group in relation to adherence. Percentages will be used to compare the barriers to PMN in the intervention group.

Results/Conclusion: Research is in progress. Data and analysis will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the common barriers to medication adherence in patients with chronic disease states.

Explain the components of the adherence triad and the role community pharmacists play in this triad.

Self Assessment Questions:

Which of the following is a barrier to medication adherence?

- A The patient states they are experiencing no side effects from their
- B: The patient states they are taking an inexpensive, affordable gene
- C: The patient states they do not need medication as they feel fine w
- D: The patient states their pharmacy is friendly and

Which of the best defines the adherence triad?

- A It is an integral relationship between the patient, the provider, and
- B It is a vital relationship between the physician, the pharmacist, and
- C It is a balance the patient has between their physician, the pharma
- D It is a balance of the patient's medications, diet, and exercise

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-519-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND REFINEMENT OF AN ELECTRONIC TRIGGER TOOL FOR ACTIVELY DETECTING ADVERSE DRUG EVENTS

Dennison Lim, PharmD*; Joe Melucci, MBA; Milisa K. Rizer, MD, MPH; Beth Prier, PharmD, MS; Mahmoud Abdel-Rasoul, MS, MPH; Robert J. Weber, PharmD, MS

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 W 10th Ave, Columbus, OH, 43210

Dennison.Lim@osumc.edu

Purpose: Voluntary reporting fails to identify more than ninety percent of adverse events that occur in hospitalized patients. Trigger-based tools have demonstrated high sensitivity and specificity for adverse events and integration into an electronic health record could greatly improve the efficiency of detection. This study aims to determine if the addition of clinical criteria to an integrated electronic trigger tool will improve the positive predictive value (PPV) of antidote medication (trigger drug) administration for adverse drug events (ADE).

Methods: The Ohio State University Wexner Medical Center is a 1,367-bed academic medical center that includes the 306-bed James Cancer Center and the 150-bed Ross Heart Hospital. Patients 18-89 years of age at The James and Ross hospitals with administrations of flumazenil, naloxone, pyridostigmine, or protamine were eligible for inclusion. Trigger drugs administered within 24 hours of admission were excluded. Trigger drug administration sent an electronic message to two pharmacist reviewers to determine the presence of an ADE. The PPV was defined as the number of messages identifying a true ADE over the total number of messages sent. Additional clinical criteria were required to be met before messages were sent. The clinical criteria for each trigger were refined after each month (defined as 30 days), for a total of 3 months, to reduce false positive messaging. Positively identified ADEs required unanimous agreement amongst reviewers, confirmation by our physician validator, and error categorization using the NCC MERP index. The primary endpoint will be the PPV of the trigger tool for months 1 through 3. Secondary endpoints included PPV, negative predictive value, false positive rate, false negative rate, sensitivity, and specificity of each trigger drug, overall and in each month.

Results/Conclusions: Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the current methods for surveillance and detection of adverse events.

Discuss the limitations of the Institute for Healthcare Improvement trigger tool and an integrated electronic trigger tool.

Self Assessment Questions:

Which of the following is a limitation of traditional methods for adverse event detection?

- A Voluntary reporting captures a majority of adverse events
- B: Chart reviews can be done with relative haste and few resources
- C: There are no opportunities for intervention when adverse events a
- D: It is possible to screen all patients for adverse events prior to disc

Which of the following is TRUE regarding the use of electronic trigger tools to detect adverse drug events?

- A When refined, the trigger tool will capture every adverse drug ever
- B The clinical criteria established at The Ohio State is broadly applic
- C All potential triggers will have the same predictive value at every ir
- D Responding to real-time trigger administration messages can unce

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-920-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF THE ADULT TOTAL PARENTERAL NUTRITION PROCESS IN A MULTI-HOSPITAL HEALTHCARE SYSTEM THROUGH ELECTRONIC HEALTH RECORD BUILD

Emily T Lin, PharmD, Pharmacy PGY-2 Informatics Resident*, Andrew Kolinski, PharmD, BCPS

Aurora Health Care, 3305 W. Forest Home Ave, Milwaukee, WI, 53215
emily.lin@aurora.org

PURPOSE

The medication use process associated with Aurora Health Care (AHC) total parenteral nutrition (TPN) workflow is a multi-step, multi system process that does not make maximal use of currently available technology. Manual transcription of medication orders during multiple steps of the process and paper-driven monitoring of therapy, result in inefficiencies with an inherent risk of transcription error. The objective of this project is to maximize the use of available technology within the TPN workflow by building an optimized TPN medication record, eliminating the risk of transcription error through utilization of an electronic health record (EHR), Epic, to TPN compounding, Baxa, interface, and increasing transparency of TPN monitoring by implementing an electronic clinical monitoring tool.

METHODS AND PROCEDURES

An internal review of the current interdisciplinary TPN process, including order entry within the EHR and TPN software, order manipulation, product preparation, and clinical monitoring was conducted. Build within the EHR was then performed, while considering parenteral nutrition guidelines and reported medication errors related to TPNs. Specific pieces of build consisted of the development of a new medication record offering ion-based ordering, enabling the transfer of a generated flat file from Epic to the Baxa server for order transmission, and development of electronic clinical monitoring tools. A TPN workgroup consisting of an interdisciplinary team (dietitians, physicians, pharmacists) provided insight and feedback for the EHR enhancements. Implementation of build will occur following workgroup review and thorough testing.

RESULTS

Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss medication errors which may occur with total parenteral nutrition (TPN) therapy.

Identify how informatics can be utilized to streamline TPN workflows and improve patient safety.

Self Assessment Questions:

Which of the following is an important consideration when reviewing TPN processes and making modifications in the EHR?

- A: Always use hard stops and multiple pop up alerts in windows for a
- B: Anticipate TPN shortages and ensure processes and workflows ca
- C: Reported TPN errors provide an accurate depiction of the number
- D: Encourage the addition of non-nutrient medications in PN admixtu

Which of the following is a safe practice recommendation for TPNs from the Institute for Safe Medication Practices?

- A: Mismatch prescribing and pharmacy templates
- B: Eliminate transcription of PN orders
- C: Provide labels that fit on the TPN bags
- D: Ensure continuity of review by having the same pharmacist verify t

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-921-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF STANDARDIZED PROCEDURES FOR STERILE AND NON-STERILE COMPOUNDING COMPETENCY

Vivian Lin, PharmD*; Peter Mui, PharmD, MS, MBA

NorthShore University HealthSystem, 777 Park Avenue West, Highland Park, IL, 60035

vlin@northshore.org

Purpose:

The United States Pharmacopeia (USP) <797> details procedures and requirements for compounding sterile preparations, while the USP <795> details procedures and requirements for compounding non-sterile preparations in order to ensure pharmacies are providing compounded products that are safe for patients. These standards are enforced by the state board of pharmacies and other regulatory agencies. As such, those involved in the compounding process should be adequately trained, capable and qualified to perform various compounding duties. In addition, regulatory agencies such as The Joint Commission require documentation of employees training and competencies that are appropriate for the assigned duties at the time of hire and annually thereafter.

The purpose of this project is to implement standardized procedures in both sterile and non-sterile compounding for training and maintaining competency across the four-hospital health system. Currently, each hospital has different procedures when training new personnel and in maintaining annual competency. Establishing standardized procedures and examinations for training and annual competency would allow for consistency and assurance that personnel across the health system are capable of preparing compounded products in accordance to established rules and regulations across the health system.

Methods:

Current procedures for training and establishing annual competency at each hospital will be evaluated in order to create a standardized process for training new employees and evaluating annual competency. Existing examinations given to employees will also be analyzed in order to create a standardized exam in electronic format to allow for integration with electronic testing software. Updated training materials will be reviewed with technician supervisors and managers to ensure compliance at all hospital sites. This evaluation is a quality improvement project and is exempt from review by the Institutional Review Board.

Results/Conclusion:

A summary of results and conclusion will be presented at the 2015 Great Lakes Residency Conference.

Learning Objectives:

Review required components of U.S. Pharmacopeial Convention (USP) <797> and USP <757> that compounding personnel are expected to follow.

Discuss the importance and requirements for training and establishing competency, both for new employees and for establishing annual competency.

Self Assessment Questions:

Which of the following is a responsibility of the supervising compounding personnel?

- A: Ensure that water-containing non-sterile compounded sterile prod
- B: Ensure that open or partial containers are disposed and not store
- C: Ensure that labels on compounded sterile products contain only th
- D: Ensure that deficiencies in compounding, labeling, packaging, que

Media-fill tests should be:

- A: Performed semi-annually.
- B: Representative of the most challenging product made for a particu
- C: Monitored for 7 days.
- D: Required of all employees in the pharmacy regardless of their job

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-805-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF ADHD FOLLOW-UP CARE FOR PEDIATRIC PATIENTS

*Ashley B Lindstrom, PharmD, PGY1 Pharmacy Resident; Carl M Conway, RPh, BCPS, Clinical Pharmacist; Tina Zook, PharmD, Pharmacy Director
NorthShore University HealthSystem, 2650 Ridge Ave, Evanston, IL, 60201
ALindstrom@northshore.org

Purpose: Attention deficit hyperactivity disorder (ADHD) is the most common neurobehavioral disorder of childhood and can profoundly affect the academic achievement, well-being, and social interactions of children. Close follow-up when initiating or adjusting drug therapy is essential for successful treatment. Healthcare Effectiveness Data and Information Set (HEDIS) is a tool used by many of America's health plans and Centers for Medicare and Medicaid Services to measure performance on important dimensions of care and service. Historically, the Chicago region has performed poorly on the HEDIS measure for ADHD follow-up care. Currently no projects have been completed to determine if NorthShore University HealthSystem meets the criteria for this particular measure. This evaluation will gather baseline information on current practices.

Methods: In accordance with the HEDIS measure, this project looked at the percentage of children newly prescribed ADHD medication who have at least three follow-up care visits within a ten-month period, one of which is within thirty days of when the medication was initiated. Data from 380 randomized charts was collected from the electronic medical record. Each patient was prescribed an ADHD medication between October 25, 2013 and October 24, 2014. Children between the ages of six and twelve were included. Patients with narcolepsy, substance abuse and ADHD medication use in the previous 120 days were excluded. Descriptive statistics were used to analyze the data. This project was exempt from the Institutional Review Board because of its scope as a quality improvement project.

Results: One hundred forty-three patients (37.6%) had an appointment within thirty days of medication start. One hundred eighty-nine patients (48.7%) had three appointments within ten months. Overall, 105 patients (27.6%) met both of these endpoints to adhere to the HEDIS measure.

Conclusions: Analysis is in process; therefore conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Recognize the clinical importance of follow-up care for patients starting ADHD medications

Discuss how compliance with HEDIS measures may have financial implications for accountable care associations

Self Assessment Questions:

When starting a medication for ADHD, children with poor follow up care may experience ____.

- A: Unnecessary side effects
- B: Poor medication compliance
- C: Continued ADHD symptoms
- D: All of the above

Providers who are part of _____ often need to comply with HEDIS measures in order to receive reimbursement.

- A: Preferred provider organizations
- B: Accountable care associations
- C: Private practices
- D: Medical homes

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-520-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF AN ANTIMICROBIAL CLINICAL DECISION SUPPORT SYSTEM (CDSS) WITHIN A VETERANS AFFAIRS MEDICAL CENTER

Colleen A. Linsenmayer, PharmD, BCPS*, Christopher M. Degenkolb, PharmD, BCPS, Tamra M. Pierce, PharmD, BCPS, Rachel A. Ranz, PharmD, BCPS

Veteran Affairs - Indianapolis VA Medical Center, 1481 West 10th St, Pharmacy Department (119), Indianapolis, IN, 46202
colleen.linsenmayer@va.gov

Purpose:

An effective antimicrobial stewardship program should incorporate multifaceted interventions to optimize patient care and reduce inappropriate antimicrobial therapy. Antimicrobial clinical decision support systems (CDSS) increase guideline adherence, reduce adverse events, and shorten length of stay. The goal of this project is to improve antimicrobial stewardship through the implementation of an antimicrobial CDSS into a Veterans Affairs Medical Centers (VAMC) computerized patient record system (CPRS). This project will attempt to describe the barriers to implementation of a CDSS and the skills necessary to navigate a process improvement project. This quality improvement project does not require IRB oversight or approval.

Methods:

An antimicrobial CDSS consists of menus that guide a provider in selecting appropriate antimicrobial therapy for a suspected diagnosis. An existing antimicrobial CDSS will be reviewed for guideline adherence and adjusted based on local susceptibility patterns. Once the review is complete, the customized CDSS menus will be imbedded within CPRS for testing. Upon conclusion of testing the antimicrobial CDSS will initially be implemented in the acute care setting with potential to expand to the outpatient clinics. Currently, the antibiotic CDSS menus are being reviewed by clinical pharmacists, an ID physician, and service chiefs. A needs assessment was completed prior to initiating the implementation process to identify factors that may affect prescriber acceptance of CDSS.

Preliminary Results:

The needs assessment revealed that providers recognized numerous benefits of a CDSS and agreed it would improve the quality of antimicrobial prescribing. The project successes to date include an engaged ID physician champion, enthusiasm from providers, and approval to test the antimicrobial CDSS from the Medical Executive Committee. Encountered roadblocks include limited available resources for the informatics department to upload the CDSS and the time needed to review extensive CDSS menus.

Conclusion:

Final conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review literature regarding the benefits of an antimicrobial CDSS in an institutional setting

Describe project successes to date as well as encountered barriers to implementation

Self Assessment Questions:

It has been demonstrated in literature that utilization of an antimicrobial CDSS resulted in:

- A: Increase in hospital length of stay
- B: Decreased mortality
- C: Improvement in appropriate antimicrobial use
- D: Increase in adverse events related to antibiotic therapy

Before implementation each individual antibiotic CDSS menu should be evaluated by:

- A: Pharmacy
- B: Pharmacy and nursing
- C: Pharmacy and infectious disease
- D: Pharmacy, infectious disease, and relevant department heads of service

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-521-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACY INTERVENTION ON ADHERENCE AND COST CONTAINMENT FOR A HIGH RISK MEDICAID PATIENT POPULATION

Karie A Morrical-Kline, PharmD, BCACP, Katee J Lira*, PharmD, Amanda J Place, PharmD, BCACP, Linda Grosser, RN, BSN, CPNP, CPHQ

St. Vincent Joshua Max Simon Primary Care Center, 8414 Naab Road Suite 150, Indianapolis, IN, 46260

katee.lira@stvincent.org

Purpose: Up to 50% of adults with chronic conditions are not taking medications as instructed. As a result, medication nonadherence creates a significant financial burden on the health care system and is estimated to be responsible for \$290 billion annually in avoidable health care costs. The National Report Card on Adherence identified that patients' personal connection with a pharmacist or pharmacy staff was the top factor associated with medication adherence. Pharmacists can play a key role in addressing medication nonadherence as they are uniquely positioned to educate patients and identify barriers to adherence. The objective of this study is to demonstrate that interventions made by pharmacists lead to increase in medication adherence and decrease in total cost of care.

Methods: This is a prospective, observational study from January 1, 2015 to December 31, 2015 enrolling up to 50 patients to receive medication management interventions by pharmacists at the St. Vincent Primary Care Center (PCC). The enrolled patients will complete informed consent and at least two medication management appointments with a pharmacist at the PCC during the study period. Patients have been identified based on predetermined high risk criteria, enrollment in MDwise St. Vincent Hoosier Healthy Indiana Plan and assignment to a primary care provider at the PCC. Patients who are non-English speaking patients, pregnant, incarcerated, greater than 64 or less than 18 years of age, or lose MDwise eligibility will be excluded. Primary outcomes include medication possession ratio, forecasted risk index, and total cost of care. Secondary outcomes include adherence with Healthcare Effectiveness Data and Information Set measures and disease specific outcomes.

Results: Results are pending and will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe how pharmacists can impact adherence and cost containment for high risk patients

Define terms commonly reported in claims data such as medication possession ratio and forecasted risk index

Self Assessment Questions:

Which of the following is a tool that pharmacist can use to evaluate a patient's health literacy?

- A: Medication Possession Ratio (MPR)
- B: Forecasted Risk Index (FRI)
- C: Newest Vital Sign (NVS)
- D: Healthcare Effectiveness Data and Information Set (HEDIS)

Medication Possession Ratio (MPR) is calculated by dividing:

- A: The days supplied of the medication by the number of days in the observation period
- B: The number of pills supplied by the days in the observation period
- C: The days supplied of the medication by the number of pills supplied
- D: The number of days by the number of fills in the observation period

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-522-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST-REVIEW OF MEDICATION LISTS FOR DELIRIUM PREVENTION

Daniel J Litzenberg, Pharm.D.*; Richard London, M.D.; Cathleen Hoffman, BSN, RN-BC; Andrew Ticcioni, Pharm.D., BCPS; Robert Mueller, Pharm.D., BCPS

Wheaton Franciscan – St. Joseph Campus, 5332 S 98th Street, Hales Corners, WI, 53130

daniel.litzenberg@wfhc.org

Purpose:

In long-term care settings, a large study (n=3,538) demonstrated that a pharmacist-led medication review produced a reduction in the incidence of hospital-acquired delirium. The purpose of this study is to explore the feasibility of and to develop a generalizable model for routine pharmacist-led delirium medication review in a community hospital setting.

Methods:

This non-blinded, pre-intervention and post-intervention study is in-progress within select general medicine units at a community teaching hospital with a time frame of January 1st to April 1st, 2015. The study population includes patients ≥70 years of age, identified by a daily, facility-specific report that contains prescribed high-risk medications for delirium. Exclusion criteria include patients not prescribed high-risk medications, coma, terminal condition, or rehabilitation. Pharmacists, who have completed and passed a competency exam, will perform a medication review and place their written interventions in the patient chart for prescriber review. Interventions include dose reduction, therapeutic substitution, and discontinuation. High-risk medications are derived from Beers Criteria for Delirium, History of Falls or Fractures, and Dementia & Cognitive Impairment. The primary endpoint is the number of interventions accepted by the prescriber. Secondary endpoints include total number of interventions, number of interventions continued at discharge, number of interventions per patient, time taken to complete the review, and effect of intervention on mental status.

Results:

In a preliminary data collection period from 1/2/2015 to 1/20/2015, no intervention outcome information was returned. Of 25 reviewed patient profiles that contained high-risk medications, 5 interventions were performed. Average time to complete the review was 11 minutes. No mental status data is available.

Conclusions:

Due to lack of preliminary intervention outcome data, we are unable to compare provider acceptance rate to other pharmacist-led intervention services at this time. Due to an average review time of 11 minutes, we have determined the service to be a reasonable addition to pharmacist workload.

Learning Objectives:

Identify medications that may increase risk of delirium in hospitalized elderly patients

Recognize the importance of delirium prevention and how pharmacists can be involved

Self Assessment Questions:

Which medication class may increase risk of delirium, falls, or dementia in elderly patients?

- A: Proton pump inhibitors
- B: Angiotensin-converting enzyme inhibitors
- C: Anticholinergics
- D: Beta-lactam antibiotics

Which intervention may pharmacists perform to prevent delirium in elderly patients?

- A: Develop auto-substitution protocols for high-risk medications
- B: Recommend minimal use of indwelling catheters
- C: Prevent daytime napping
- D: Prioritize early mobilization

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-806-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PRIVILEGING PHARMACISTS ON THE MICROBIOLOGIC TEST RESULTS ASSESSMENT PROCESS IN THE EMERGENCY DEPARTMENT

Steven M. Loborec, PharmD, BCPS*, Cynthia A. Carnes, PharmD, PhD
Jose A. Bazan, DO; Thomas M. Wickizer, MPH, PhD; Trisha A. Jordan, PharmD, MS

The Ohio State University Wexner Medical Center, 720 W 3rd Avenue, Apartment 247, Columbus, OH, 43212

steven.loborec@osumc.edu

Purpose: Pharmacists currently involved with the outpatient microbiologic test results review process operate with physician oversight of their clinical interventions, but this process has proved to be inefficient with the potential to cause delays in patient care. A method to improve the efficiency in this process is to privilege pharmacists to act independently within a defined scope of practice. The primary objective of this study is to reduce delays in time to patient notification of a change in therapy following availability of microbiologic test results after being discharged from the emergency department.

Methods: The study is a single-center, retrospective, randomized, chart review study comparing the standard microbiologic test results assessment process to the privileged pharmacist microbiologic test results assessment process. Patients discharged from the emergency department with subsequent positive microbiologic test results requiring intervention were included. After data abstraction and classification, a board certified infectious disease specialist physician reviews each case to assess the appropriateness of the interventions made by the privileged pharmacist. The primary outcome is time to patient notification and the secondary outcome is the number of incorrect or missed interventions.

Results: Pre-implementation results show that for a non-privileged pharmacist, the average time to initial review was 3.7 hours and the average time to patient notification was 23.9 hours. The physician oversight model of pharmacist intervention resulted in 27 of 29 appropriate interventions being made while only missing two.

Conclusion: Final data collection and analysis is ongoing. The results will be presented at the Great Lakes Pharmacy Residency Conference. We hypothesize that the new process will improve the efficiency for the microbiologic test results assessment process, with a reduction in time to patient notification of a change in therapy, and no difference in the clinical appropriateness of interventions made by the pharmacist with or without direct physician oversight.

Learning Objectives:

Discuss the benefits and challenges of implementing pharmacist credentialing and privileging
Identify opportunities for implementation of such a program at your institution

Self Assessment Questions:

What were the benefits of the pharmacist credentialing and privileging in this study?

- A: Improves efficiency
- B: Reduces the time to patient notification of a required change in the
- C: No difference in accuracy of interventions
- D: All of the above

What can a privileged pharmacist at OSUWMC do?

- A: Order and adjust laboratory tests related to monitoring medication
- B: Monitor and adjust medications based on renal, hepatic, anti-thrombotic
- C: Start new medications independently
- D: A & B only

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-807-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZATION OF OFF-LABEL USAGE PATTERNS OF NOVOSEVEN AND PROFILNINE AT A LARGE ACADEMIC MEDICAL CENTER

Les Loudon*, PharmD Erik E. Abel, PharmD, BCPS Ellen A. Keating, PharmD, MS Erin M. Reichert, Pharm.D, BCPS

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 W 10th Avenue, Columbus, OH, 432101234

Les.Loudon@osumc.edu

Purpose:

Recombinant Factor VIIa (NovoSeven RT) and three factor prothrombin complex concentrate (Profilnine SD) are approved by the Food and Drug Administration (FDA) for the prevention and treatment of bleeding in patients with hemophilia or relevant clotting factor deficiencies. Increased usage has been demonstrated for off-label indications. Common off-label uses include reversal of severe bleeding related to liver disease, post or intra-operative bleeding, trauma, as well as for reversal of excessive anticoagulation. Optimal timing, dosage, and efficacy of these factor products for treatment in these diverse indications remain uncertain in the absence of published guidelines. The objective of this study is to characterize the off-label indications for use, dosing practices compared to The Ohio State University Wexner Medical Center (OSUWMC) specific guidelines, and cost implications for NovoSeven and Profilnine. The results will be used to identify opportunities to guide clinical practice and documentation for off-label factor product use.

Methods:

A retrospective review was conducted of all patients who were administered at least one dose of Profilnine and/or NovoSeven for off-label use at OSUWMC between July 1, 2013 and June 30, 2014. Patients ≤ 18 years or ≥ 89 years of age, height < 60 inches, pregnant females and prisoners were excluded. Data collected included: age, gender, body weights (actual, adjusted, and ideal), body mass index, off label indication for using ICD-9-CM diagnosis codes, Profilnine dose administered, NovoSeven dose administered, department, inpatient mortality, Profilnine plus NovoSeven administration, severity of illness subclass, and diagnosis-related group length of stay. Analysis will be conducted using descriptive statistics for all variables. Continuous variables will be expressed using the mean, standard deviation, median and other appropriate measures of variance. Categorical variables will be expressed using frequencies and percentages.

Results:

Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify common off-label uses and recommended dosing strategies for factor products NovoSeven and Profilnine.

Recognize the risks that are involved with administration of factor products.

Self Assessment Questions:

Which of the following would be recommended as an off-label dose of NovoSeven for the management of a severely obese patient experiencing post-operative bleeding from open-heart surgery?

- A: 40 mcg/kg Actual Body Weight
- B: 40 mcg/kg Ideal Body Weight
- C: 40 mcg/kg Adjusted Body Weight
- D: 40 mcg/kg Lean Body Weight

Which of the following are possible adverse effects associated with Profilnine administration?

- A: Thrombosis
- B: Thrombosis, infectious disease transmission
- C: Thrombosis, infusion-related reactions
- D: Thrombosis, infection disease transmission, infusion-related reactions

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-523-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

GENERATION OF A TOTAL PARENTERAL NUTRITION FORMULA FILE FROM THE ELECTRONIC HEALTH RECORD TO IMPROVE PATIENT SAFETY AND PHARMACY WORKFLOW

Kristopher R. Lozanovski, PharmD* and Susan Moreland-Wilkins, RPh
NorthShore University HealthSystem, 2650 Ridge Road, Evanston, IL 60201
klozanovski@northshore.org

Purpose:

The Institute for Safe Medication Practices (ISMP) defines total parenteral nutrition (TPN) as a high risk medication that bears a heightened risk for causing significant patient harm. In an effort to improve TPN safety, automated compounding devices have been utilized to reduce errors and contamination during the compounding process. Automated compounding devices often utilize proprietary software to calculate, provide alerts, and create formula files of a TPN to be compounded. The required process surrounding TPN formula entry into the proprietary software is redundant and prone to transcription errors. The purpose of this project is to eliminate this manual transcription process by implementing components within the electronic health record (EHR) that will provide similar alerts and formula file generation functionality as the automated compounding device proprietary software.

Methods:

The rate and type of errors caused by manual transcription into the automated compounder proprietary software were analyzed to determine the potential impact this project will have on overall error prevention. Within the proprietary software, alert limits, composition checking, generated product labels, and formula files were analyzed in an effort to duplicate this functionality within the EHR. A workstation, that contains the proprietary software and interfaces directly with the automated compounder, was reconfigured to allow access to the EHR generated formula files. Original functionality of the workstation was retained for network downtimes and patients not serviced through the EHR. Approved alert limits, composition checking, product labels, and formula file creation functionality were tested and transitioned to the EHR.

Results/Conclusion:

Results of the error analysis showed an 8% error rate with an average of 1.46 errors intercepted by pharmacists per day when utilizing the current manual transcription process. It is expected that the implementation of this project will eliminate those errors. Final results and conclusions will be presented at the Great Lakes Residency Conference in April 2015.

Learning Objectives:

Recognize the common types of errors associated with manual transcription processes

Outline the process for implementing components within the electronic health record to duplicate automated compounding device proprietary software functionality

Self Assessment Questions:

Which of the following is not a common type of error associated with a manual transcription process?

- A: Wrong patient information
- B: Component omitted
- C: Wrong label printed
- D: Wrong infusion rate

Which of the following must happen within the electronic health record to allow automated TPN compounding to occur?

- A: Electrolyte limit checking
- B: TPN additive limit checking
- C: Calcium/phosphate compatibility checking
- D: Generation and transfer of formula file

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-922-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF AN INTERDISCIPLINARY TEAM-LED CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) GROUP CLASS FOR VETERAN PATIENTS

Amanda E. Ludwig, Pharm.D*; Megan K. Heim, Pharm.D., BCACP;
Beth R. Dunlap, RN

Veteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Madison, WI, 537052286

amanda.ludwig2@va.gov

Purpose: The growing prevalence of chronic obstructive pulmonary disease (COPD) has significant clinical and economic impact in the United States. In 2010, the economic burden of COPD was estimated to be \$49.9 billion in direct and indirect costs. Additionally, the burden of the disease on health care services is substantial. Of hospitalized COPD patients, 13-14% have a hospital readmission with 41-49% of these readmissions occurring within 60 days. Patient recognition of COPD exacerbation symptoms and early initiation of therapy has been shown to hasten exacerbation recovery and decrease risk of hospitalization. The purpose of this study is to assess the impact of an interdisciplinary team-led COPD group class on COPD hospital admissions and emergency department visits at the William S. Middleton Memorial Veterans Hospital. Furthermore, this study will aim to identify the impact of education on COPD medication adherence and timely use of medications for treatment of COPD exacerbations.

Methods: A retrospective chart review will be completed for all patients that attended the COPD group class from November 2013 through July 2014. Data to be collected will include age, sex, baseline pulmonary function test results, medical conditions, hospital admissions and emergency department (ED) visits within 6 months before and after class attendance, antibiotic use for COPD exacerbations, types and adherence to COPD medications, and patient satisfaction of the class.

Results/Conclusions: This study is currently in progress. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the clinical and economic impact of chronic obstructive pulmonary disease (COPD) in the United States

Identify the potential benefits of patient recognition of COPD exacerbation symptoms and early initiation of therapy

Self Assessment Questions:

What is the estimated hospital readmission rate of COPD patients in the United States?

- A: 0-2%
- B: 13-14%
- C: 37-39%
- D: 79-89%

2. What is a potential benefit of patient recognition of COPD exacerbation symptoms and early initiation of therapy?

- A: Decreased need for long-term controller COPD medications
- B: Improvement in pulmonary function tests
- C: Increased risk of hospitalization
- D: Decreased risk of hospitalization

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-524-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF INSULIN DRIP ORDERS ON BLOOD GLUCOSE TARGETS AND TRANSITION TO SUBCUTANEOUS INSULIN

*Jeffrey D. Luke, PharmD, PGY1 Resident; Tera M. Hornbeck, MSN, RN, CNS; Katherine Pickerill, PharmD, Clinical Pharmacy Coordinator
Franciscan St. Elizabeth Health, 1701 South Creasy Lane, Lafayette, IN, 47905
jeffrey.luke@franciscanalliance.org

Purpose: Insulin infusions are a critical component in the treatment of hyperglycemic crises like diabetic ketoacidosis (DKA) as well as stress hyperglycemia in critical care patients. While our institution offers intravenous insulin order sets, including one for DKA, physicians may order an insulin infusion with any titration per their discretion. An analysis of 2013 institution data showed that the DKA insulin order set was only used in 28% of patients admitted with DKA. About 30% of patients experienced at least one episode of hypoglycemia. Less than 50% of patients received recommended subcutaneous insulin one to two hours prior to drip discontinuation which may have contributed to rebound hyperglycemia in 61% of patients. This project will evaluate whether using an updated, standardized insulin infusion order set will achieve blood glucose targets and recommended transition to subcutaneous insulin.

Methods: Literature review was conducted to identify best practices for intravenous insulin titration and transition to subcutaneous insulin. Using this information a new insulin titration protocol was implemented at our institution. The updated insulin order set was approved by the appropriate institutional bodies. Decision support tools, including published insulin titration parameters and electronic documentation of administration guidelines, were developed to facilitate use. Education was provided for pharmacists and necessary nursing staff. Outcome measures will be assessed on adult patients admitted to critical care units and managed on an insulin infusion. Primary outcomes are time to goal range, occurrence of hypoglycemia, and recommended overlap of subcutaneous insulin. A secondary outcome is to assess nursing and physician feedback on the new protocol.

Results: Data collection is ongoing. Additional collection and analysis will be conducted prior to the conclusion of the study.

Conclusions: Preliminary analysis will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

State recommended blood glucose ranges in the treatment of DKA and for critically ill patients.

Identify the recommended transition from intravenous to subcutaneous insulin when treating DKA.

Self Assessment Questions:

What is the recommended blood glucose range for the majority of critically ill patients (non-DKA)?

- A 80-110 mg/dL
- B: 110-140 mg/dL
- C: 140-180 mg/dL
- D: 180-200 mg/dL

Which of the following is recommended by the ADA when transitioning a patient to subcutaneous insulin from an intravenous insulin drip after resolution of DKA?

- A Subcutaneous insulin should be administered one to two hours prior
- B Subcutaneous insulin should be administered two to four hours prior
- C Subcutaneous insulin should be administered one to two hours after
- D Subcutaneous insulin should be administered two to four hours after

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-525-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE ANALYSIS OF CARVEDILOL VS. METOPROLOL SUCCINATE IN REDUCING CONGESTIVE HEART FAILURE EXACERBATIONS REQUIRING HOSPITALIZATIONS AT THE HUNTINGTON VETERANS AFFAIRS MEDICAL CENTER

Katherine R. Mabry, Pharm. D.* , Marcus D. Patrick, Pharm. D., BCPS
Veteran Affairs - Huntington Medical Center, 1540 Spring Valley Drive, Huntington, WV, 25704
katherine.mabry@va.gov

Purpose: Current guidelines recommend the use of beta blockers in those diagnosed with heart failure and a reduced ejection fraction of $\leq 40\%$. These agents have been shown to delay progression of cardiac dysfunction and improve mortality. The current formulary at the Huntington Veterans Affairs Medical Center (HVAMC) prefers the prescribing of either metoprolol succinate or carvedilol in this patient population. Few clinical trials have compared the two to determine the benefits of choosing one agent over the other.

Methods: A retrospective chart review was performed in a subset of patients with CHF and an ejection fraction $< 40\%$ to determine the rate of CHF exacerbations in patients on carvedilol or metoprolol succinate at the Huntington VAMC. The number of hospitalizations related to CHF exacerbations was determined. Furthermore, ability to titrate other CHF medications to target dose as well as all-cause mortality, cardiovascular mortality, and time to first hospitalization after initiation of beta blocker were identified and analyzed.

Results: Data is currently being collected and analyzed. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Indicate which beta blockers have mortality benefit in patient's with reduced ejection fraction.

Identify the benefit of other medication classes in congestive heart failure.

Self Assessment Questions:

Which beta blocker has mortality benefit in patient's with reduced ejection fraction?

- A Carvedilol
- B: Atenolol
- C: Metoprolol tartrate
- D: Propranolol

Which class of medication has been shown to have mortality benefit in patient's with reduced ejection fraction?

- A Calcium channel blockers
- B Loop diuretics
- C Thiazide diuretics
- D ACE inhibitors

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-526-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF ANTIHYPERTENSIVE USE IN THE EMERGENCY DEPARTMENT FOR HYPERTENSIVE URGENCY AND EMERGENCY

: Adam MacLasco, PharmD, BCPS, PGY2 Emergency Medicine Resident; * Renee Petzel Gimbar, PharmD, Emergency Medicine/Medical Toxicology Clinical Pharmacist, Director PGY2 Emergency Medicine Pharmacy Residency

University of Illinois at Chicago, 833 South Wood St, Suite 164 PHARM 886, Chicago, IL, 60612

maclasa@uic.edu

Background: Hypertensive crises are characterized by severe elevations in blood pressure, typically defined as greater than 180/120 mmHg, complicated by evidence of impending or progressive end organ dysfunction. These elevations require immediate management and reduction to prevent or limit damage, though not necessarily to baseline. Epidemiologic data indicate the prevalence of hypertension in adults is approximately twenty percent, but data on hypertensive crises are lacking for the general population and emergency departments (EDs). A single center evaluation of an urban, Italian ED found hypertensive crises represented more than one fourth of medical urgencies seen at that institution. Current recommendations guiding therapy are primarily based on expert opinion and experience of the clinician as few head-to-head randomized controlled trials have been conducted. Information regarding comparative efficacy would allow more efficient management of hypertensive crises in the ED through correlation of appropriate medications with antecedent causes. **Methods:** A single center, retrospective chart review will be conducted for approximately 200 patients who presented to the ED from July 1, 2012 to July 31, 2014 with hypertensive urgency and emergency. Patients were identified through use of ICD-9 codes. Inclusion criteria included all patients greater than 18 years old with hypertensive crises treated acutely with at least one antihypertensive in the ED. Exclusion criteria included acute ischemic stroke, acute aortic aneurysm, or were pregnant. The primary outcome is to compare efficacy of medications utilized in achieving a decrease of twenty percent from baseline of a patients mean arterial blood pressure (MAP) within one hour. Secondary outcomes include the total time required to achieve a decrease of twenty percent from baseline of a patients MAP and characterization of medications utilized for management. Descriptive statistics will characterize the data. **Results:** Results pending collection of data and analysis.

Learning Objectives:

Define hypertensive crisis.

Discuss the benefits of knowing the comparative efficacy of antihypertensives for the management of hypertensive crises.

Self Assessment Questions:

Hypertensive crisis is defined as which of the following?

- A Elevations in blood pressure, typically defined as greater than 180
- B: Any elevation in blood pressure above baseline complicated by ev
- C: Elevations in blood pressure, typically defined as greater than 180
- D: Elevations in blood pressure, typically defined as greater than 210

Which of the following are potential benefits ascribed to the comparative efficacy of antihypertensives for the management of hypertensive crises

- A Greater throughput in the ED
- B Better correlation of appropriate medications with appropriate ante
- C Decreased mortality for patients with hypertensive crises
- D Answers A and B only

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-527-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE ANALYSIS OF ACUTE KIDNEY INJURY: TREATMENT WITH VANCOMYCIN PLUS EITHER STANDARD OR EXTENDED INFUSION PIPERACILLIN/TAZOBACTAM IN THE INTENSIVE CARE UNIT

Dan Magistrelli, Pharm.D.*; Anna Stewart, Pharm.D., BCPS; Scott Bergman Pharm.D., BCPS(AQ-ID); Stacy Schmittling, Pharm.D. BCPS St. John's Hospital, 800 East Carpenter Street, Springfield, IL, 62769 daniel.magistrelli@hshs.org

Purpose: The primary objective of this study is to determine what difference exists in the incidence of acute kidney injury (AKI) with vancomycin when combined with either a standard or extended infusion of piperacillin/tazobactam.

Methods: This is a single center, retrospective chart review comparing the incidence of AKI in two groups of patients admitted to the intensive care unit (ICU): Those receiving vancomycin plus piperacillin/tazobactam by either 4 hour extended-infusion (EI) or 30 minute standard-infusion (SI). AKI is being defined as either an increase in serum creatinine of 0.5 mg/dL or a 50% increase in serum creatinine from baseline. Baseline is being defined as the lowest serum creatinine measured within 48 hours of hospital admission. AKI will be further classified using the R.I.F.L.E criteria. Other data being analyzed include: ICU length of stay, incidence of thrombocytopenia, neutropenia, Clostridium difficile associated diarrhea, and the cumulative dose and duration of piperacillin/tazobactam and vancomycin. Exclusion criteria include patients <18 years old, pregnant, treated with vancomycin & piperacillin/tazobactam for less than 48 hours, receiving hemodialysis or peritoneal dialysis on admission, and those admitted with a diagnosis of AKI or serum creatinine ≥ 2.5 mg/dL. A Chi Squared test is being used to assess all categorical data, including the primary outcome. Student's t-test is being used to assess continuous data. A sample size of 400 patients was calculated to detect a difference of 12.5% between the EI and SI groups with 80% power and a two sided alpha of 0.05.

Results and conclusion: Data collection is currently ongoing. Final results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the literature surrounding use of extended-infusion piperacillin/tazobactam plus vancomycin and the incidence of acute kidney injury

Identify factors potentially placing patients at increased risk of developing acute kidney injury while receiving concomitant piperacillin/tazobactam and vancomycin

Self Assessment Questions:

Administering piperacillin/tazobactam as an extended infusion has been shown to optimize which pharmacodynamic parameter?

- A Area under the curve / minimum inhibitory concentration (AUC / M
- B: Maximum concentration (Cmax)
- C: Time above the minimum inhibitory concentration (T > MIC)
- D: Area under the curve (AUC)

Which of the following are potential barriers to implementing a hospital-wide protocol for utilizing extended-infusion piperacillin/tazobactam compared to standard infusion?

- A Paucity of data supporting improved outcomes in non-critically ill p
- B Compatibility issues
- C Occupying IV lines for prolonged periods of time
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-528-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPACT OF AN EMPIRIC URINARY TRACT INFECTION TREATMENT GUIDELINE ON CLINICAL OUTCOMES IN THE INPATIENT SETTING

Allie Mahalik, PharmD., Nicole Costa, PharmD., Kayla Collins, PharmD., BCPS, Katherine Allen, PharmD., BCPS

Presence St. Joseph Medical Center, 333 N Madison St, Joliet, IL, 60435
allie.mahalik@presencehealth.org

Purpose: There is emerging resistance to antibiotics among urinary tract pathogens. IDSA guidelines advise not using fluoroquinolones (FQNs) if resistance is greater than 10%. As shown by our institutions antibiogram, FQN resistance is a growing concern. Upon retrospective analysis, approximately 45% of patients were started on a FQN as empiric treatment of a urinary tract infection (UTI). Subsequently, of the patients started on FQNs with reported susceptibilities, 52% were resistant to FQNs. Creation of a treatment guideline may aid prescribers in selecting appropriate empiric therapy which may lead to a decreased duration of therapy (DOT) and improved susceptibility to initial antibiotics. The objective of the study is to assess if implementing a guideline results in more appropriate prescriber empiric antimicrobial choices.

Methods: This study is being conducted at Presence Saint Joseph Medical Center (PSJMC) and includes adult inpatients with a diagnosis of a UTI or pyelonephritis. Pregnant patients or patients with concomitant infections requiring antibiotics will be excluded. Patients will be identified using a data surveillance system to obtain all urine cultures within the specified time periods of analysis. A retrospective analysis of prescribing patterns for empiric treatment for UTIs was conducted from July 2014 through August 2014. Based upon the initial analysis and current IDSA guidelines, an empiric treatment guideline for UTIs was created. Education regarding the guideline was provided to the two hospitalist physician groups at PSJMC. Following implementation, an analysis will be performed from January 15, 2015 to March 15, 2015 that will be identical to the retrospective analysis. The primary outcome of this study will be to assess the percent of patients started on appropriate empiric antibiotics. DOT will be evaluated as a secondary outcome. Results: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe current barriers to the management of urinary tract infections as it relates to emerging resistance concerns
Recognize the clinical benefit of creating and implementing an empiric UTI treatment guideline

Self Assessment Questions:

Which of the following should be considered when choosing an antibiotic?

- A Cost
- B: Prescriber preference
- C: Resistance patterns
- D: A&C

A 27 year old female has a UTI, no healthcare exposure, a penicillin allergy and normal renal function. Which of the following is the best oral option to treat this patient?

- A Levofloxacin
- B Sulfamethoxazole-trimethoprim
- C Nitrofurantoin
- D Cephalexin

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-529-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PHARMACY DRIVEN POST-DISCHARGE FOLLOW-UP PHONE CALL: A TRANSITIONS OF CARE INITIATIVE

Alyssa Mahlenkamp, Pharm.D., Kelly Epplen Pharm.D. BCACP, FASH
St. Elizabeth Healthcare, 85 North Grand Ave, Ft. Thomas, KY, 41075
Alyssa.mahlenkamp@stelizabeth.com

This study was granted exempt status the Institutional Review Board at St. Elizabeth Healthcare. The electronic medical record system is being utilized to identify all patients discharged within 72 hours from the medicine service team. Patients with plans to follow up with the Family Practice Center are being targeted for a post-discharge phone call. Prior to the phone call, patients charts are being reviewed for pertinent medical information. Pharmacists and students completing their advanced pharmacy practice experiences are conducting the standardized phone call to patients. Data to be collected includes: discrepancies in medication discharge summaries, pharmacy interventions related to CMS and TJC outpatient core measures, pharmacy interventions related to chronic disease state management, readmissions and number of patients who completed their follow-up appointment. Results will be reviewed to quantify discrepancies and the number of pharmacy interventions.

Learning Objectives:

Review the pharmacists role in transitions of care and reducing hospital readmission rates
Discuss the process for implementing a transitions of care initiative in a community setting

Self Assessment Questions:

Which of the following disease states are impacted by the penalty for readmissions that began in October, 2012?

- A Pneumonia
- B: Heart Failure
- C: Acute Myocardial Infarction
- D: All of the above

Which of the following elements has been proven to reduce hospitalizations by "Project RED"?

- A Telephone reinforcement
- B Assessing patient understanding
- C Discharge summary provided to PCP
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-808-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASCORBIC ACID FOR PREVENTION OF POST-CORONARY ARTERY BYPASS GRAFTING ATRIAL FIBRILLATION: A RETROSPECTIVE ANALYSIS

*Heather Malcom, Pharm.D.; Jennifer Arnoldi, Pharm.D. BCPS; Mary Eilers, Pharm.D.; Brandi Strader, Pharm.D. BCPS; Ian Wilson, Pharm.D. St. John's Hospital, 800 E. Carpenter Street, Springfield, IL, 62769
Heather.Malcom@hshs.org

Purpose: New onset atrial fibrillation (AF) is common within three days of coronary artery bypass grafting (CABG). Consequences of AF include prolonged hospital stay and increased 30-day and 6-month mortality. Beta-blockers (BB) are proven to reduce but do not eliminate the risk of post-CABG AF; however, the addition of ascorbic acid to a BB may provide further reduction in the incidence of AF by reducing oxidative stress. Current practice at HSHS St. Johns is to start oral ascorbic acid after CABG. The objective of this study is to evaluate the impact of adding ascorbic acid to carvedilol to prevent post-CABG AF. **Methods:** A retrospective review of ascorbic acid for prevention of post-CABG AF was conducted with approval by the local Institutional Review Board. Patients age 18 years or older who underwent a CABG at HSHS St. Johns Hospital in Springfield, IL between January 2012 to February 2015 will be identified using diagnostic codes. Patient groups will include carvedilol monotherapy and carvedilol plus ascorbic acid combination therapy. Ascorbic acid use will be defined as 1 gram orally twice daily continued for up to 5 days. Exclusion criteria are: undergoing more than one procedure at time of CABG, history of AF or heart failure (preserved or reduced ejection fraction (EF)), and a less than 3 day post operative hospital stay. Data collection for study patients will include: patient demographics, study medication(s) dose and duration, study drug compliance, surgical date, surgeon, discharge date, cardiac medications, magnesium and potassium levels as well as replacement, average daily heart rate and blood pressure, EF, reports of AF (progress notes and electrocardiograms), and any adverse events. The primary efficacy endpoint is the incidence of new-onset AF, which will be analyzed using a Chi-square test. **Results/Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of preventing post-coronary artery bypass grafting atrial fibrillation.

Identify pharmacological therapy options shown to reduce post-coronary artery bypass grafting atrial fibrillation.

Self Assessment Questions:

Which of the following is NOT a potential consequence of post-coronary artery bypass grafting atrial fibrillation?

- A: Increased mortality
- B: Stroke
- C: Shortened hospital stay
- D: Increased hospital cost

Which of the following is NOT a pharmacological therapy shown to reduce the incidence of post-coronary artery bypass grafting atrial fibrillation?

- A: ACE Inhibitors
- B: Sotalol
- C: Beta-blockers
- D: Magnesium

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-530-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

APPLICATION AND VALIDATION OF READMISSION RISK ASSESSMENT TOOLS FOR UTILIZATION AT AN URBAN, SAFETY-NET HOSPITAL

Kendra M. Malone, PharmD*; Zach Weber, PharmD, BCPS, BCACP, CDE; Jasmine D. Gonzalvo, PharmD, BCPS, BC-ADM, CDE; Todd A. Walroth, PharmD, BCPS; Elayne Ansara, PharmD, BCPS, BCPP; Lauren Pence, PharmD, BCACP; Jessica Triboletti, PharmD, BCACP Eskenazi Health, 720 Eskenazi Ave., Indianapolis, IN, 46202
kendra.malone@eskenazihealth.edu

Purpose: Readmission risk assessment tools predict characteristics that put patients at high risk for hospital readmission. The primary objective of this study was to determine which readmission risk assessment tool most accurately predicts 30-day hospital readmissions. Validated tools included in this study were the LACE index, HOSPITAL score, and Risk of Readmission Score (RRS). The tool that most closely predicts actual readmission in this patient population will be utilized to identify specific needs of patients at highest risk allowing for targeted care to prevent further readmissions.

Methods: Electronic health record data was collected on patients discharged from Eskenazi Health, an urban, safety-net health system, from June 1, 2013 to July 31, 2014. Data collected included demographic information, readmission status, time to readmission, chronic comorbidities, and data needed for the readmission risk assessment tools. Data from a random sample of patients readmitted within 30 days of discharge and an equal number not readmitted within 30 days was collected and analyzed.

Results: Baseline demographics of the readmitted group (n=35) include a median age of 55 (IQR, 32.5-60) years and 55.9% female. Baseline demographics of patients not readmitted (n=40) include a median age of 48.5 (IQR, 34.75-58.75) years and 67.5% female. Using the LACE Index, 25.7% versus 10% (p=0.026) of patients were at high risk of readmission in the readmitted group versus those not readmitted, respectively. Using the HOSPITAL Score, 14.3% versus 0% (p=0.063) of patients were at high risk of readmission in the readmitted group versus those not readmitted, respectively. Using the RRS, 10% versus 0% (p=0.002) of patients were at high risk of readmission in the readmitted group versus those not readmitted, respectively.

Conclusion: The preliminary results suggest the tools are able to place up to 25.7% of patients readmitted into a high-risk category for 30-day hospital readmission.

Learning Objectives:

Describe the criteria for penalty by Centers for Medicare and Medicaid Services per the Hospital Readmission Reduction Program
Identify methods for assessing patients risk of readmission at Eskenazi Health.

Self Assessment Questions:

Which patients are eligible for reduced reimbursement from CMS if readmitted within 30 days?

- A: Aged 55 years or older
- B: Admitted for pneumonia
- C: Admitted for diabetes mellitus
- D: Receiving private insurance benefits

Which criteria are assessed in all readmission risk assessment tools included in this study?

- A: Insurance and marital status
- B: Length of stay and type of admission
- C: Discharge sodium and hemoglobin concentrations
- D: Number of ED visits and Charlson Comorbidity Index

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-809-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF URINARY TRACT INFECTION MANAGEMENT IN A LONG-TERM CARE UNIT AT A VETERANS AFFAIRS HOSPITAL

Eric T. Marsh, PharmD*; Jamie S. Winner, PharmD, BCPS-AQID; Kasey L. Gussert, PharmD, BCPS; Christopher Gries, MBA, MLS (ASCP)CM
Veteran Affairs - Clement J. Zablocki Medical Center, 5000 West National Avenue, Department of Pharmacy, Milwaukee, WI, 532950001
eric.marsh@va.gov

Purpose: Urinary tract infections (UTIs) are among the most common reasons for antibiotic use in long-term care (LTC) facilities. Recent literature has increasingly identified over-treatment of UTIs as a source of unnecessary antibiotic use. Preventing overuse of antibiotics in LTC facilities is of particular concern, as LTC facility residents can be vectors for the development and spread of resistant organisms. The primary objective of this study was to assess the current state of diagnosis and treatment of UTIs in the LTC unit at a Veterans Affairs (VA) hospital. **Methods:** This study was conducted as a quality improvement study. The study consisted of a retrospective chart review of urinalyses (UAs) performed on the LTC unit at a VA hospital between January 1, 2013 and December 31, 2014. A urinalysis was included in the study only if it was drawn due to suspected urinary tract infection. The charts of patients who produced eligible UA specimens were reviewed, and data regarding the signs and symptoms that led to the urinalysis were analyzed. If a patient received antibiotic therapy as a result of the urinalysis, further review of the medical record was conducted. Further review included analysis of antibiotic therapy used, culture results, time to review after culture result, and action taken regarding culture results. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review proper interpretation of urinalysis results.

Identify instances when it would be appropriate to screen for asymptomatic bacteriuria.

Self Assessment Questions:

The term "pyuria" refers to the presence of what type of cell in the urine?

- A: Red blood cell
- B: Bacterial cell
- C: Epithelial cell
- D: White blood cell

Screening for asymptomatic bacteriuria is recommended in which of the following populations?

- A: Men undergoing transurethral resection of the prostate
- B: Catheterized patients while the catheter remains in situ
- C: Persons with spinal cord injury
- D: Elderly, institutionalized subjects

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-531-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

STANDARD VERSUS LOW DOSE ALTEPLASE INFUSION FOR TREATMENT OF ACUTE PULMONARY EMBOLISM

Lukas Martin, PharmD*; Jessica Winter, PharmD, BCPS; Madeline Foertsch, PharmD, BCPS; Kristen Hillebrand, PharmD, BCPS; Sheila Takieddine, PharmD, BCPS; Nicole Harger, PharmD, BCPS
UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 452192316
lukas.martin@uchealth.com

Purpose: Pulmonary embolism (PE) is a life-threatening event, with presentations ranging from asymptomatic to massive embolism causing death. Treatment includes thrombolysis with alteplase in high risk and submassive (intermediate risk) PE, however, with risk of major bleeding. Ultrasound-accelerated catheter-directed thrombolysis (CDT) utilizes lower alteplase doses to reduce major bleeding, but a lack of clinical data exists to support routine use. Newer data suggests patients with lower body weights may benefit from lower alteplase doses resulting in reduced bleeding rates and similar outcomes. Thrombolysis in submassive PE may be considered with conflicting benefit to risk ratios in patients presenting with right ventricular (RV) dysfunction. Evidence demonstrates lower alteplase doses can also be used with decreased rates of bleeding in this population. The primary objective of this study was to measure rates of major bleeding between patients with PE receiving 50 mg alteplase or less compared to standard 100 mg doses. **Methods:** This multi-center, retrospective cohort study included adult patients who received either systemic or CDT alteplase for any PE subtype at University of Cincinnati Medical Center and West Chester Hospital from August 2005 to April 2015. Patients were excluded if they were pregnant or incarcerated at the time of admission. Secondary endpoints included comparisons of symptomatic resolution defined as having three of four criteria (resolution of hypotension, tachycardia, tachypnea and/or improvement of oxygen status) or resolution of right ventricular dysfunction up to 24 and 48 hours after alteplase infusion, respectively. Other endpoints included morbidity and mortality between the two dosing strategies stratified by massive and submassive subtype. A multivariate analysis was also performed to assess predictors of major bleeding to determine future patient populations that may benefit from lower alteplase dosing. **Results/Conclusion:** Results will be analyzed and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Classify the three subtypes of acute pulmonary embolism as defined by the 2011 American Heart Association guidelines in respect to symptomatic presentation and clinical imaging

Identify appropriate pulmonary embolism subtypes that warrant use of thrombolytic therapy

Self Assessment Questions:

Which pulmonary embolism subtype may be complicated by the presence of right ventricular dysfunction?

- A: Massive
- B: Submassive, intermediate risk
- C: Submassive, low risk
- D: Both A and B

Per the 2011 American Heart Association guidelines, first line thrombolytic therapy for treatment of massive pulmonary embolism in patients with contraindications is:

- A: Catheter directed therapy
- B: Systemic thrombolysis
- C: Ultrasound-accelerated catheter-directed thrombolysis
- D: Embolectomy

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-532-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PROCALCITONIN UTILIZATION IN SEPSIS WITH A TREATMENT ALGORITHM

Herman E. Martinez, Pharm.D.*, Andrea R. Chbeir, Pharm.D., BCPS
Blessing Hospital, 1101 Vermont St., Quincy, IL, 62301
Herman.Martinez@blessinghealthsystem.org

Evidence exists to support serum procalcitonin (PCT) as a useful biomarker to assist clinicians in discontinuing antibiotics in sepsis without clear evidence of infection. This study was designed to assess the use of PCT at a community hospital with a goal towards improving antimicrobial therapy following implementation of a pharmacist-driven treatment algorithm. Patients were identified based on an ICD-9 code matching a primary diagnosis of sepsis, severe sepsis, or septic shock with at least one PCT laboratory result during their hospital stay. Baseline characteristics including age, gender, admitting floor, diagnosis, and initial PCT ordering physician were collected. Analysis consisted of recording antibiotic days of therapy, length of hospital stay, 30-day hospital readmissions, positive culture results, presence of *Clostridium difficile* infection, and death during hospital stay. PCT use for initiation of antibiotics was defined as a PCT result prior to initial antibiotic therapy or as part of the preliminary sepsis evaluation. PCT use for discontinuation of antibiotics was defined as cessation of antibiotics within 24 hours of final PCT result. After evaluation of PCT usage, a protocol was implemented allowing pharmacists to order PCT levels and make recommendations based on a previously established treatment algorithm. Prior to algorithm implementation, average antibiotic days of therapy were 6.9 days while average length of hospital stay was 7.2 days. PCT was involved in initiation of antibiotics in 82.4% of all patients. Conversely, PCT was associated with discontinuation of antibiotics in 7.9% of all patients. Results are being compared after algorithm implementation. Results from this study suggest that PCT is often underutilized in the early discontinuation of antibiotics in sepsis. Implementation of a PCT-guided algorithm with corresponding education was performed with the goal of decreasing antimicrobial exposure. Analysis of results will evaluate effectiveness on early cessation of antibiotics in sepsis following an intervention.

Learning Objectives:

Describe the value of procalcitonin as a biomarker for bacterial infection in sepsis.

Recognize the utility of a treatment algorithm to guide duration of antibiotics in sepsis.

Self Assessment Questions:

Elevated serum procalcitonin levels may be used to predict which type of infection?

- A: Parasitic
- B: Viral
- C: Fungal
- D: Bacterial

Studies using a procalcitonin-guided treatment algorithm have shown which benefit?

- A: Decreased hospital mortality
- B: Decreased duration of antimicrobial therapy
- C: Decreased length of hospital stay
- D: Decreased antimicrobial resistance rates

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-951-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF AN EVIDENCE-BASED, PHARMACY-MANAGED WARFARIN DOSING PROTOCOL

Megan Maslowski, PharmD*; Benjamin Jung, PharmD, MS, MPA; Scott Ashby, PharmD, MHA
Ministry Health - St. Joseph's Hospital - WI, 1007 East Grant Street, Apt 62, Marshfield, WI, 54449
megan.maslowski@ministryhealth.org

Purpose: The Joint Commission National Patient Safety Goal 03.05.01 aims to reduce the likelihood of patient harm associated with the use of anticoagulation therapy. Studies have shown that pharmacist-driven anticoagulation management can reduce the risk of experiencing major bleeding, thromboembolism, or fatal events while receiving warfarin therapy by 39 percent compared to usual care. The purpose of this project is to implement an evidence-based, pharmacy-managed warfarin dosing protocol at a tertiary care facility. Measures of success include decreased time to achieve therapeutic international normalized ratio (INR), increased time within the goal INR range, and enhanced patient safety.

Methods: This quality improvement project has been exempt from review by the Institutional Review Board. A retrospective chart review was conducted to collect baseline patient data including INR, warfarin dose, warfarin indication, goal INR range, percentage of time outside the goal INR range, percentage of time within the goal INR range, bleeding occurrences, and concurrent interacting medications. Patients were separated into those who were taking warfarin prior to admission and those who were newly initiated on warfarin during their hospitalization. A protocol and nomogram were developed and implemented as a guide for pharmacists to make dosing and monitoring recommendations. Inclusion criteria for the pilot included all inpatients receiving warfarin on a hospitalist service. Excluded from this project were orthopedic patients, patients presenting with a warfarin-induced bleed (excluded until warfarin reinitiated by provider), and patients younger than 19 years of age. Primary outcomes included percentage of time outside the goal INR range, percentage of time within the goal INR range, and number of bleeding occurrences. Secondary outcomes included length of stay and discharge INR.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss how The Joint Commission addresses the importance of anticoagulation safety and management

Identify barriers to implementing a pharmacist-managed warfarin management service

Self Assessment Questions:

The Joint Commission National Patient Safety Goal 03.05.01 aims to:

- A: Reduce the number of hospitals with physician-managed warfarin
- B: Reduce the likelihood of patient harm associated with the use of a
- C: Increase the number of hospitalized patients with an INR within goal
- D: Reduce the number of interacting medications started on patients

Which of the following is a barrier identified with implementation of a pharmacy-managed warfarin dosing protocol?

- A: Lack of evidence showing improved safety and efficacy when warf
- B: Physicians do not want to transition the service over to pharmacist
- C: Resistance to change and increased workload for pharmacy staff
- D: Competing with services provided by outpatient anticoagulation cli

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-810-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF HYPOGLYCEMIA WITH THE UTILIZATION OF LONG ACTING INSULINS IN NON-DIABETIC INTENSIVE CARE UNIT PATIENTS

Jordan Masse*, Pharm.D., Chris Giuliano, Pharm.D., Renee Alexander, Pharm.D., BCPS

St. John Hospital and Medical Center, 22101 Moross Road, Detroit, MI, 48236

jmasse7@gmail.com

Purpose

Based on current guidelines, hyperglycemia in critically ill patients may warrant insulin therapy when blood glucose levels (BGL) reach a threshold of greater than 180 mg/dL. Available research examining normalization of elevated glucose primarily involves the use of continuous insulin infusions which is an effective means of achieving and maintaining euglycemia. An alternate therapy to continuous insulin infusions would be the utilization of subcutaneous (SQ) insulin. There is paucity in data assessing the utilization of SQ insulin in intensive care unit (ICU) patients. The purpose of this study is to assess the number of hypoglycemia events in non-diabetic ICU patients utilizing long acting insulin.

Methods

This is a single center, retrospective analysis of glycemic control in non-diabetic surgical ICU patients. The primary outcome will be to compare the number of hypoglycemic events in patients receiving sliding scale insulin (SSI) with long acting SQ insulin to those receiving SSI alone. Adult patients admitted to the surgical ICU for a minimum of 24 hours and have two consecutive BGL above 180 mg/dL will be included. Patients will be excluded if they have a history of diabetes, concomitant use of insulin NPH, R, or 70/30, receiving oral anti-diabetic agents, and death within 2 days of SICU admission. Groups will be matched based on the type of surgery. Secondary outcomes will compare the proportion of hypoglycemic, euglycemic, and hyperglycemic events between the two groups; to evaluate the doses of long acting insulin associated with the greatest occurrence of hypoglycemia; and to evaluate the number of hypoglycemic events of patients transferred to the floor on long acting insulin.

Results

Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the risks of developing hypoglycemia in critically ill patients.
Identify the risks of using long acting subcutaneous insulin in critically ill patients.

Self Assessment Questions:

1. Based on current guidelines, hyperglycemia in the ICU may warrant insulin therapy when blood glucose values reach above:

- A: 140 mg/dL
- B: 160 mg/dL
- C: 180 mg/dL
- D: 200 mg/dL

Which of the following are associated with an increased risk of hypoglycemia:

- A: Discontinuation of nutrition without adjustment in insulin
- B: Discontinuation of steroids without adjustment in insulin
- C: Vasopressor therapy
- D: A, B and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-811-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CLINICAL AND MICROBIOLOGICAL OUTCOMES IN PATIENTS WITH CANDIDA GLABRATA CANDIDEMIA STRATIFIED ACCORDING TO ECHINOCANDIN MIC

Christina M. Matthews, PharmD*; Jack Brown, MS, PharmD, BCPS; David Hutchinson, PharmD, BCPS; Joan-Miguel Balada-Llasat, PharmD, PhD; Jessica Johnston, MS; Nicole Theodoropoulos, MD; Karr A. Bauer, PharmD, BCPS

The Ohio State University Wexner Medical Center, 410 West Tenth Avenue, Department of Pharmacy, 368 Doan Hall, Columbus, OH, 43210
Christina.Matthews@osumc.edu

Purpose: Infections caused by *Candida glabrata* (*C. glabrata*) are a significant concern due to the associated high mortality rate and the rapid development of resistance to azole antifungal agents. Echinocandins, including anidulafungin, micafungin, and caspofungin, are increasingly used as empiric and definitive therapy, but resistance is emerging with widespread use. Resistance to echinocandin therapy is associated with amino acid substitutions in FKS1 and FKS2, which encode the echinocandin target enzyme. *Candida* spp. isolates with FKS mutations may not have increased echinocandin minimum inhibitory concentrations (MICs greater than or equal to 2mcg/mL). Clinical Laboratory Standards Institute lowered echinocandin breakpoints for *Candida* spp. to susceptibility at less than or equal to 0.12mcg/mL for anidulafungin and caspofungin and less than or equal to 0.06mcg/mL for micafungin to ensure maximal detection of FKS mutant strains.

The primary objective is to determine if a clinical mortality breakpoint exists for echinocandins in patients treated with echinocandins for *C. glabrata* candidemia. Secondary objectives include determining if a similar breakpoint exists for other clinical outcomes, including hospital length of stay (LOS), infection-related LOS, and duration of candidemia. Cost data will also be evaluated.

Methods: A retrospective cohort study will be performed on all hospitalized patients who received caspofungin for a blood culture positive with *C. glabrata* admitted from 1 January 2009 through 30 September 2014 at The Ohio State University Wexner Medical Center. Demographic and clinical outcomes data will be collected. Data obtained will include age, sex, hospital service, Charlson comorbidity index, duration of hospitalization prior to culture collection, intensive care unit (ICU) admission, location at time of culture collection, APACHE II score, microbiological data, source of candidemia, time to source removal, antifungal administered other than caspofungin, treatment duration, Infectious Disease consult, and discharge disposition.

Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the current literature describing *Candida glabrata* (*C. glabrata*) resistance mechanisms.

Describe the risk factors for the development of *C. glabrata* candidemia at an academic medical center.

Self Assessment Questions:

1. Please which of the following is TRUE:

- A: *C. glabrata* is the most common fungal species isolated from positive blood cultures
- B: Resistance to echinocandin therapy is associated with amino acid substitutions in FKS1 and FKS2
- C: Azole therapy is appropriate empiric therapy for *C. glabrata* blood stream infections
- D: The mechanism of action for echinocandins is ergosterol binding

Which of the following is considered a risk factor for the development of *C. glabrata* bloodstream infection?

- A: Receipt of tube feeds
- B: Recent history of echinocandin exposure
- C: Receipt of a 5-day course of steroids for a COPD exacerbation
- D: Presence of a foley catheter

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-533-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A RETROSPECTIVE CHART REVIEW OF COUNSELING FEMALE VETERANS OF CHILDBEARING AGE ABOUT THE RISK OF BIRTH DEFECTS PRIOR TO THE INITIATION OF POTENTIALLY TERATOGENIC PSYCHIATRIC MEDICATIONS

Tatiana Mauda, PharmD*; Archana Jhavar, PharmD, BCPP; Sindhu Abraham, PharmD, BCPS, Tania John, PharmD, BCACP; Nicholas Super, PharmD

Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Avenue, Chicago, IL, 60612

Tatiana.Mauda@va.gov

Purpose:

According to National Vital Statistics Reports, in 2006, birth defects accounted for the leading cause of infant mortality in the United States. Most cases are due to unknown causes; however, some medications are recognized as having an increased risk of causing birth defects. In the United States, approximately 11.7 million females of childbearing age are prescribed potentially teratogenic medications yearly. Of these, less than 20% receive adequate counseling regarding possible birth defects associated with such medications. Approximately 500,000 pregnancies in United States occur in women with mental illness. It is projected that by 2020, female veterans will equal approximately 10% of the veteran population in the United States. One-third of female veterans returning from combat were under the age of 30 requiring mental health medications. The primary purpose of this study is to review the documentation of counseling on teratogenic psychiatric medications initiated in women of childbearing age during the first visit the medication is prescribed. Furthermore, the following secondary outcomes will be evaluated during this study: documentation of contraception use, pregnancy testing, and proper management/counseling of teratogenic psychiatric medications when a pregnancy is confirmed.

Methods:

This study is a retrospective, electronic chart review of documentation of counseling female veterans of childbearing age about the risks of potentially teratogenic psychiatric medication-induced birth defects at the initial visit, and verification of contraception use prior to prescribing such medications between 01/01/04 - 08/08/14. These medications include benzodiazepines, selective serotonin reuptake inhibitors (SSRIs)/serotonin norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), mirtazapine, bupropion, lamotrigine, carbamazepine, valproic acid, lithium, methadone, buprenorphine and naloxone, methylphenidate/amphetamine products, and antipsychotics. Five hundred patient charts will be reviewed for such data during the time period between 01/01/04 - 08/08/14.

Results/Conclusion:

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance of documenting counseling within the patient chart prior to the initiation of potentially teratogenic psychiatric medication in female veterans of childbearing age

Classify psychotropic medications according to the Food and Drug Administration (FDA) pregnancy category

Self Assessment Questions:

What is the importance of documenting counseling patients prior to initiating potentially teratogenic psychiatric medications in female veterans of childbearing age?

- A Allow female veteran patients of childbearing age to become aware
- B Prevent potential birth defects that might be caused by the use of
- C A and B
- D None of the above

Which of the following medications is/are classified as pregnancy category B according to the FDA?

- A Clozapine
- B Valproic acid
- C Lurasidone
- D A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-923-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF OUTCOMES IN ADULT PATIENTS WITH NON-ICU HEALTHCARE-ASSOCIATED PNEUMONIA RECEIVING CEFTRIAXONE VERSUS PIPERACILLIN/TAZOBACTAM PLUS VANCOMYCIN

Brian M. Maynard*, Pharm.D.; Joseph A. Levato, Pharm.D.; Rolla Sweis, Pharm.D., M.A., BCPS

Advocate Christ Medical Center, 4440 W 95th Street, Oak Lawn, IL, 60459

brimaynard@gmail.com

Purpose:

The purpose of this retrospective cohort study is to compare clinical outcomes in general medicine patients with healthcare-associated pneumonia (HCAP) who were treated with vancomycin and piperacillin/tazobactam versus those treated with ceftriaxone alone. A 2014 editorial in the New England Journal of Medicine and an original prospective study based in Japan in 2013 aimed to reevaluate the criteria for HCAP set forth by the American Thoracic Society in 2005. If a sub-set of HCAP patients can be identified that only need ceftriaxone, this will lead to reduced empiric extended-spectrum antibiotic use without negatively impacting mortality, readmission, and length of stay.

Methods:

This study was submitted to the Institutional Review Board for approval. A single-center retrospective cohort study will be performed to evaluate clinical outcomes in patients who met the 2005 American Thoracic Society and the Infectious Diseases Society of America Guidelines definition of HCAP. Data will be collected from a two year period of patients ≥ 18 years of age diagnosed with HCAP within two days of admission to a general medicine unit who received either ceftriaxone or piperacillin/tazobactam plus vancomycin. After randomization, fifty patient charts will be included in each treatment arm. Patient demographics will be recorded, including but not limited to the specific criteria that classified the diagnosis as healthcare associated. Patients who were pregnant, had a concomitant infectious disease, or a documented penicillin or vancomycin allergy will be excluded from the analysis. The primary endpoint will be all-cause 90 day mortality and secondary endpoints will be all-cause 90 day readmission and length of hospitalization.

Results:

This research is currently in the data collection phase.

Conclusions:

This research is currently in the data collection phase. Results of this study, along with conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define healthcare-associated pneumonia according to the American Thoracic Society and the Infectious Diseases Society of America Guidelines

Select empiric antimicrobial therapy for pneumonia based on patient specific criteria

Self Assessment Questions:

Which of the following patient-specific criteria is not included in the definition of healthcare-associated pneumonia according to the guidelines?

- A Hospitalized for 2 or more days in the preceding 90 days
- B Resided in a nursing home or extended care facility
- C Received chronic dialysis within the last 30 days
- D These are all criteria for healthcare-associated pneumonia

Which of the following regimens would be appropriate for empiric therapy in a patient with suspected healthcare-associated pneumonia?

- A Tigecycline
- B Piperacillin/tazobactam, vancomycin, plus gentamicin
- C Cefepime plus gentamicin
- D vancomycin plus ertapenem

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-534-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF NIACIN ON PHOSPHATE CONTROL IN ADVANCED-STAGE CHRONIC KIDNEY DISEASE PATIENTS WITHIN THE VA POPULATION

Nicholas J. Burge, Pharm.D, BCPS, Kaitlin M. McArdle*, Pharm.D., Sue Kim, Pharm.D., BCPS, Justin M. Schmidt, Pharm.D., BCPS, BC-ADM, Katie Suda, Pharm.D., M.S.

Veteran Affairs - Edward Hines, Jr. Hospital, P.O. Box 630, Morris, IL, 60450

kaitlin.mcardle@va.gov

Purpose: Hyperphosphatemia is highly prevalent in chronic kidney disease (CKD). If left untreated, it can lead to secondary hyperparathyroidism, tissue calcification, and higher cardiovascular mortality. Current options for lowering phosphate levels have many limitations. Adequate dialysis and dietary restriction are typically insufficient to maintain serum phosphorus levels. The main pharmacological treatment option is phosphate binders, which are associated with gastrointestinal side effects and a large pill burden. A novel approach for treating hyperphosphatemia in CKD is the use of niacin, which has been shown to decrease serum phosphorus by inhibiting a gastrointestinal co-transporter. Niacin is typically administered once or twice daily without regards to meals, which offers a more convenient dosing regimen. The objective of this study is to compare phosphorus control in patients with advanced stages of CKD who received or did not receive niacin.

Methods: This study is a retrospective chart review of patients at the Edward Hines, Jr. VA Hospital with a diagnosis of CKD stage 4 or 5 between January 1, 2011 to December 31, 2014. Patients were excluded if they had been using niacin in the treatment group for less than 6 months, had a dietary consultation, experienced initiation or discontinuation of dialysis, or were admitted to the hospital within the 6 month time frame of data collection. The primary endpoint was median phosphorus control between eligible patients receiving or not receiving niacin. Sub-group analyses looked at differences in patient outcomes in: those with concurrent aspirin use, those who had received a consult from the renal dietician prior to data collection, and those who were adherent with niacin therapy. The total pill burden from phosphate binders was also compared between the two treatment groups.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the current treatment options for hyperphosphatemia in CKD.

Discuss the advantages and disadvantages of using niacin in the treatment of hyperphosphatemia as either monotherapy or as an additive agent to reduce the use of phosphate binders.

Self Assessment Questions:

Which of the following current treatment options for hyperphosphatemia is associated with GI side effects, high pill burden, and high cost?

- A: Calcium containing phosphate binders
- B: Dietary protein restriction
- C: Non-calcium containing phosphate binders
- D: Niacin

Which of the following is a potential benefit of niacin?

- A: Administration without regards to meals
- B: Similar dosing schedule to phosphate binders
- C: Cardiovascular benefit with lipid control
- D: Improved glycemic control

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-535-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST DISCHARGE COUNSELING AND FOLLOW-UP PHONE CALLS ON READMISSIONS AND EMERGENCY ROOM VISITS AT AN ACADEMIC MEDICAL CENTER

Alyssa McCann, PharmD*, Patricia Morris, PharmD, BCPS; Alicia Pence, PharmD, CACP, BCACP; Megan Lyons, PharmD, CACP, BCACP; and Justin Campbell, PharmD

UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 45219-2316

alyssa.wilson@uchealth.com

Purpose: Transitions of care is a top priority at institutions across the United States given an aging population, increasing healthcare costs, and numerous healthcare providers that are often involved in a patient's care. In October 2014, the University of Cincinnati Medical Center (UCMC) implemented a pilot program to improve the discharge process and education for patients admitted to a general medicine ward. The purpose of this study is to evaluate the impact this pilot program had on 30 day hospital readmission rates and emergency room visits.

Methods: This study is a retrospective, single-center, cohort study involving two groups of subjects at UCMC. Prior to study initiation, study protocol was approved by University of Cincinnati's Investigational Review Board. Pilot program patients were admitted to a general medicine unit during October 2014. These patients received counseling on all discharge medications and a follow-up telephone call two to five days after discharge. If desired, patients could enroll in the facility's outpatient pharmacy discharge concierge service that provided prescription delivery to bedside. The second group of patients were historical patients admitted in October 2013 and did not receive medication counseling or follow-up telephone calls. The thirty day hospital readmissions and emergency room visits were compared between study groups. The institution's Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores were evaluated in order to detect improvements in patient satisfaction. Any resources utilized for implementation of the pilot program were recorded and will be used in the future development of a business plan proposal for a full time position.

Results & Conclusion: Results and conclusions are pending.

Learning Objectives:

Define and review a pharmacist's role and critical points for transitions of care

Discuss the impact a pharmacist can have on reducing 30 day hospital readmission rates and emergency room visits

Self Assessment Questions:

Which of the following is a goal established by the Agency of Healthcare Research and Quality (AHRQ)?

- A: Patients should be able to pronounce each medication correctly
- B: Patients should know the name of each of their healthcare providers
- C: Patients should know what medications to take
- D: Patients should be guaranteed transportation if needed

What example of transitions of care was evaluated in this research study?

- A: Patients being admitted to the hospital from home
- B: Patients being discharged from the hospital to home
- C: Patients being discharged from the hospital to a skilled nursing facility
- D: Patients being seen in a primary care clinic for the first time

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-812-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

SATISFACTION AND MEDICATION ADHERENCE CHANGES ASSOCIATED WITH IMPLEMENTATION OF A MEDICATION SYNCHRONIZATION PROGRAM

Brooke R. McComb, PharmD*, Richard W. Dettloff, PharmD, BCPS, Jacqueline A. Morse, PharmD, BCPS, and Susan A. DeVuyst-Miller, PharmD

Meijer Pharmacy, Ferris State University, & Pfizer, 0-550 Baldwin Ave, Jenison, MI, 49428

Brooke.McComb@meijer.com

This study aims to assess changes in (1) patient and pharmacy staff satisfaction and (2) medication adherence associated with implementation of a medication synchronization program. The participating community pharmacies will utilize a computer program to provide an opportunity for patients to synchronize medication refills through an appointment-based model. All patients who fill prescriptions at these Midwest grocery store-based chain pharmacies will be eligible to enroll in the synchronization. Patients will be followed for 6 months from enrollment. Pharmacy staff will be trained on how to enroll patients in the medication synchronization program and conduct the appointment-based model. At each appointment, pharmacy staff will address any prescription changes and offer a pharmacist consultation. Patients will be asked to complete an anonymous customer satisfaction survey before and six months after enrolling in medication synchronization. The pharmacy staff (pharmacists, interns, and technicians) will also be asked to complete a satisfaction survey six months after enrolling patients in medication synchronization. In the absence of a validated survey instrument, a satisfaction survey specific to the service implemented was developed. Changes in medication adherence and persistence from six months before to six months after enrollment will be measured based on pharmacy claims by using prescription refill records to calculate proportion of days covered. Statistical analysis will utilize paired t-test to compare medication adherence rates six months before and six months after synchronization. IRB approval was obtained from the participating academic institution. We anticipate that there will be an increase in patient and pharmacist satisfaction and an improvement in medication adherence and persistence associated with the implementation of a medication synchronization program.

Learning Objectives:

Recognize the potential benefits afforded to patients and pharmacy staff through implementation of a medication synchronization program. Identify the methodology used to measure change in medication adherence patterns.

Self Assessment Questions:

Which of the following is a potential benefit of a medication synchronization program?

- A It creates more work for the pharmacy.
- B: It strengthens patient and pharmacist relationships.
- C: It increases the frequency of visits to the pharmacy
- D: It prevents patients from learning about the importance of their medication

Over which period of time was the change in medication adherence assessed in this study?

- A 3 months total
- B 6 months total
- C 9 months total
- D 12 months total

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-813-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

QTC PROLONGATION IN THE TREATMENT OF ICU-INDUCED DELIRIUM: AN INVESTIGATION OF MEDICATION-RELATED RISK FACTORS

*Anli L. McCoy, PharmD; Daniel S. Eiferman, MD; Mike M. Boyd, PharmD, BCPS; Gary S. Phillips, MAS; Claire V. Murphy, PharmD, BCPS

The Ohio State University Wexner Medical Center, 3648 Lacey Woods Park, Hilliard, OH, 43026

anli.mccoy@osumc.edu

Purpose: Torsade de Pointes (TdP) is a ventricular tachycardia associated with prolongation of the corrected QT interval (QTc), which can develop into life-threatening ventricular fibrillation. Critically ill patients may be at higher risk for developing prolonged QTc, given a greater likelihood of acquiring risk factors, including medications with QTc prolonging potential, renal/hepatic insufficiency, and electrolyte abnormalities. Use of antipsychotics, which is the most common non-cardiac QTc prolonging medication class, is increasing in the ICU due to improved recognition and management of delirium. Previous studies have found that administration of multiple QTc prolonging medications is associated with higher mortality rates and longer ICU lengths of stay. Limited data is available to guide identification of patients at risk for QTc prolongation in the ICU, or the frequency of ECG monitoring required. Accurate identification of high risk patients may allow for more targeted ECG monitoring and cautious medication therapy adjustments. This study aims to identify medication-related risk factors for QTc prolongation among ICU patients receiving treatment for ICU delirium.

Methods: A single-center, retrospective cohort study will be conducted. Adult patients who are actively being treated for ICU delirium while admitted to the medical or surgical ICU between January 1st, 2013 and January 1st, 2014 are eligible for evaluation. ICU delirium treatment includes at least one of the following agents: haloperidol, risperidone, quetiapine, olanzapine. Additional inclusion criteria are availability of baseline, pre-treatment ECG with QTc measurement, and at least one follow-up ECG during ICU delirium treatment. QTc prolongation was defined as QTc \geq 500 milliseconds (ms) or more than a 20% increase from baseline. QTc data will also be evaluated according to the following FDA recommended categories: >450 ms, >480 ms, >500 ms, and increase from baseline by 30 ms and 60 ms.

Results: Data collection and evaluation are currently being conducted. Preliminary results will be presented

Learning Objectives:

Describe risk factors that may predispose patients in the intensive care unit to QTc prolongation

Explain the relationship between ICU delirium and QTc prolongation, and why patients with ICU delirium may be at an increased risk for developing torsade de pointes

Self Assessment Questions:

Which of the following is a risk factor for QTc prolongation in a critically ill patient?

- A Prolonged use of vasopressors
- B: Hyperthyroidism
- C: Hyperkalemia
- D: Use of QTc prolonging medications

Why are critically ill patients with ICU delirium at higher risk for developing QTc prolongation and torsade de pointes?

- A Medications used for the treatment of delirium are known QTc prolonging
- B Patients with ICU delirium are generally older in age
- C Agitation associated with ICU delirium may lead to difficulty in obtaining ECGs
- D ICU delirium may cause increased stress and agitation in addition to QTc prolongation

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-536-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PHARMACIST IN THE PATIENT-CENTERED MEDICAL HOME (PCMH): A FOUR-WEEK PILOT PROJECT

Courtney R. McDonald*, PharmD, Maggie L. Mangino, PharmD, BCACP, CDE, Leslie K. Kenney, BS Pharm, BCPS
Norton Healthcare, Norton Healthcare Pharmacy Services, N-47,315
East Broadway, Suite 50, Louisville, KY, 40202
courtney.mcdonald@nortonhealthcare.org

Purpose: The Patient-Centered Medical Home (PCMH) is a care model in which the primary care provider organizes the services of multiple healthcare providers, including pharmacists, to improve patient care. The PCMH provides pharmacists the ability to apply their extensive training to collaborate with patients, families, and other healthcare providers to perform medication therapy management (MTM) services to ensure appropriate, effective, safe, and cost-effective therapeutic regimens. The purpose of this pilot project is to assess the impact of a pharmacist in the PCMH.

Methods: This pilot project is a prospective, interventional study that will take place in the first quarter of 2015 at Norton Healthcare primary care practice sites. Eligible patients will include those currently taking five or more medications and those who have been diagnosed with at least one of the following chronic medical conditions: chronic obstructive pulmonary disease (COPD), asthma, heart failure, diabetes mellitus, hyperlipidemia, or hypertension. Patients who opt to participate will meet with the pharmacist who will perform a comprehensive medication review (CMR) and identify any medication-related issues based on the following categories: appropriateness, effectiveness, and safety of the medication and adherence to the medication. The primary objective is to evaluate the impact a pharmacist can have in the PCMH by performing a CMR. The number and type of each intervention made to the provider and the number of recommendations accepted by the provider will be evaluated. The secondary objectives will evaluate provider and patient satisfaction of pharmacist involvement in the PCMH, which will be assessed via a three and five question survey, respectively.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the PCMH model within a healthcare system

Discuss the benefits of pharmacist involvement in the patient-centered medical home

Self Assessment Questions:

The patient-centered medical home is a patient-care model in which:

- A: Continuous, comprehensive, and collaborative care is provided to
- B: Providers meet in patients' homes to discuss their healthcare
- C: Only chronic disease state management will benefit
- D: Long-term care facilities currently use to provide healthcare to resi

Which of the following is most likely a benefit from the inclusion of pharmacists in a patient-centered medical home?

- A: Decline in patient wait-times to see the provider
- B: Better patient outcomes and improved medication safety
- C: Enhanced reimbursement rates for providers
- D: Reduction in education provided by the provider

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-814-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ADJUNCTIVE KETAMINE USE IN MANAGING SEVERE ALCOHOL WITHDRAWAL OR DELIRIUM TREMENS IN THE MEDICAL INTENSIVE CARDIAC CARE UNIT (MICCU)

Marc R. McDowell B.S., Pharm.D.; Pharmacy Resident* Poorvi Shah Pharm.D., BCPS; Medical intensive cardiac care unit Clinical Pharmacist Rolla T. Sweis Pharm.D., M.A., BCPS; Director of Pharmacy Theodore Toerne MD, FAAEM; Emergency medicine physician T
Advocate Christ Medical Center, 4440 West 95th Street, Oak Lawn, IL, 60453
marc.mcdowell@advocatehealth.com

Purpose:

Benzodiazepines are considered first-line agents in the management of alcohol withdrawal syndrome (AWS). Severe alcohol withdrawal can be refractory to benzodiazepines and may require adjunctive therapies. Sedative agents such as propofol and phenobarbital are potential options, however both possess respiratory depressant properties. These agents also lack activity on the N-methyl D-Aspartate (NMDA) receptor which contributes to the excitatory symptoms in AWS. Ketamine is an NMDA antagonist sedative agent that has minimal risk of respiratory depression and may have a potential role in refractory AWS. The aim of this study is to evaluate the adjunctive use of ketamine for AWS.

Methods:

An Institutional Review Board (IRB) application has been submitted and approved. Patients will be included if greater than 18 years of age, admitted to the Medical Intensive Cardiac Care Unit (MICCU), diagnosed with severe alcohol withdrawal symptoms, and received ketamine adjunctively when high doses of lorazepam infusions were not adequately controlling symptoms. Severe alcohol withdrawal is defined by a Clinical Institute Withdrawal Assessment (CIWA) score of greater than 20. Patients will be excluded if the MICCU severe alcohol withdrawal protocol was not utilized. The current MICCU severe alcohol withdrawal protocol includes a stepwise approach utilizing benzodiazepines and phenobarbital. Ketamine is currently not included on the alcohol withdrawal protocol and its use is determined on an individual basis. A retrospective analysis will be performed on these patients. Data collection will include the following variables: amounts of lorazepam, phenobarbital, and ketamine; time to symptom control; duration of all continuous infusions related to alcohol withdrawal management; need for mechanical ventilation; ICU length of stay; and adverse effects of ketamine.

Results:

Research is currently in the data collection phase. Results will be presented at the Great Lakes Conference.

Conclusions:

Conclusions of this study will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss medical management of severe alcohol withdrawal in the critically ill population.

Describe the potential role in therapy for ketamine as an adjunctive agent in severe alcohol withdrawal.

Self Assessment Questions:

What adverse effect is often associated with use of ketamine?

- A: Hypertension
- B: Decreased intracranial pressure
- C: Urinary retention
- D: Acute kidney injury

Which receptor does ketamine exert its effect in the treatment of severe alcohol withdrawal?

- A: Alpha 2 receptor
- B: Beta 1 receptor
- C: GABA receptor
- D: NMDA receptor

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-537-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OUTCOMES FOLLOWING THE USE OF NEBULIZED HEPARIN FOR INHALATION INJURY (HIHI STUDY)

Allyson M. McIntire, PharmD, BCPS*; Todd A. Walroth, PharmD, BCPS
Jessica A. Whitten, PharmD, BCPS; Andrew C. Fritschle-Hilliard,
PharmD, BCPS; David R. Foster, PharmD, FCCP; Serena A. Harris,
PharmD, BCPS

Eskenazi Health, 720 Eskenazi Avenue, Indianapolis, IN, 46202
allyson.mcintire@eskenazihealth.edu

Purpose: Inhalation injury (IHI) causes significant morbidity and mortality in burn victims due to inflammation and clot formation resulting in respiratory compromise and airway occlusion. Nebulized heparin promotes improvements in lung function and decreased mortality in IHI by reducing the inflammatory response and fibrin cast formation. However, uncertainty remains regarding the optimal dose, as studies have evaluated administration of 5,000 to 25,000 units. Our objective is to determine if nebulized heparin 10,000 units improves lung function and decreases mechanical ventilation duration, mortality, and hospitalization length while minimizing systemic adverse events in IHI.

Methods: This retrospective, case-control study evaluated efficacy and safety outcomes of nebulized heparin in IHI between June 1, 2014 and February 28, 2015. Control patients were case-matched to historical IHI patients prior to addition of nebulized heparin to the IHI protocol. Mechanically ventilated patients ≥ 18 years of age admitted ≤ 48 hours with confirmed IHI received nebulized heparin 10,000 units every 4 hours for 7 days (or until extubation if sooner) alternating with albuterol and N-acetylcysteine or sodium bicarbonate. Exclusion criteria included < 24 hours of mechanical ventilation, death ≤ 72 hours after admission, terminal wean, heparin allergy, history of HIT, pulmonary hemorrhage in the past 3 months, clinically important bleeding disorder, pregnancy, breastfeeding, or incarceration. The primary outcome was duration of mechanical ventilation. Secondary outcomes included lung injury score, number of ventilator-free days during the first 28 days, 28-day mortality, hospitalization length, VAP incidence, bronchoscopy incidence, and reported clinically significant bleeding events requiring therapy disruption. Subgroup analyses included patients with nebulized heparin initiated ≤ 24 versus 48 hours after injury, % total body surface area (TBSA) involvement, recent 3 month smoking status, and patients with COPD, asthma, or sleep apnea.

Results: Data collection ongoing.

Conclusions: This study will help determine whether nebulized heparin 10,000 units improves outcomes in patients with IHI.

Learning Objectives:

Describe the pathophysiology of inhalation injury (IHI)
Discuss the role of nebulized heparin in patients suffering from IHI

Self Assessment Questions:

In addition to % total body surface area (TBSA) involvement and age, which of the following is the biggest contributor to morbidity and mortality in burn victims?

- A Location of the burn
- B: Gender
- C: Inhalation injury (IHI)
- D: Comorbidities

Heparin is thought to improve patient outcomes by preventing:

- A Neutrophil migration
- B Surface erosion
- C Cilia destruction
- D Fibrin cast formation

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-538-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CORRELATION OF PHARMACOKINETIC/PHARMACODYNAMIC PREDICTIONS WITH CLINICAL AND MICROBIOLOGICAL OUTCOMES IN PATIENTS WITH PSEUDOMONAS AERUGINOSA PNEUMONIA USING EXACT MINIMUM INHIBITORY CONCENTRATIONS

Lauren N. McKinley, PharmD*; Anthony T. Gerlach PharmD, BCPS, FCCM, FCCP; Jessica E.W. Johnston, MS; Jose A. Bazan, DO; Karri A Bauer, PharmD, BCPS (AQ-ID)

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 West tenth Ave, Columbus, OH, 43210

Lauren.McKinley@osumc.edu

Background/Purpose: Pseudomonas aeruginosa pneumonia constitutes a tremendous burden on hospitals in the United States in terms of morbidity, mortality, and healthcare costs. Antimicrobial therapy for P. aeruginosa infections is limited because of the organisms multiple resistance mechanisms, often resulting in higher minimum inhibitory concentrations (MICs). Optimization of antimicrobial therapy through the application of pharmacokinetic (PK)/pharmacodynamic (PD) principles has the potential to significantly improve clinical and microbiological outcomes. However, few studies have used real-world application of PK/PD modeling and the use of targeted indices with exact MICs at the individual patient level. The purpose of this study is to evaluate the correlation of PK/PD predictions using exact MICs with clinical and microbiological outcomes in patients with P. aeruginosa pneumonia.

Methods: This is a retrospective study of all hospitalized adult patients who received cefepime or piperacillin/tazobactam for a positive respiratory culture with P. aeruginosa admitted from 1 January 2013 through 30 September 2014 at OSUWMC. The primary outcome is the correlation between predicted PK/PD modeling and clinical cure in patients with P. aeruginosa pneumonia. Secondary outcomes include hospital length of stay (LOS), infection-related LOS, intensive care unit (ICU) LOS, duration of mechanical ventilation, time to resolution of clinical signs and symptoms, microbiological outcomes (rate of documented or presumed organism eradication and recurrence), 30-day all-cause mortality, and infection-related mortality.

Patient demographics and baseline clinical characteristics will be compared via Student's t-test, Wilcoxon rank-sum test, Chi-square test, or Fisher's exact test as appropriate. Variables associated with the outcome of interest on univariate analyses with a p-value < 0.20 will be considered in the multivariable model. Logistic regression will be used to identify independent factors for the primary outcome of clinical cure.

Results/Conclusions: Data collection is currently underway.

Learning Objectives:

Review current literature on PK/PD outcomes in the treatment of Pseudomonas aeruginosa pneumonia.
Discuss the correlation of PK/PD predictions using exact MICs with clinical and microbiological outcomes.

Self Assessment Questions:

Which of the following statements is correct?

- A There is no concern for rising minimum inhibitory concentrations (I
- B: Pseudomonas aeruginosa has multiple resistance mechanisms, o
- C: Pseudomonas aeruginosa pneumonia has no effect on morbidity &
- D: Successful treatment of Pseudomonas aeruginosa has no correlat

Extended infusion β -lactam regimens _____ PK/PD profiles and patient outcomes.

- A negatively impact
- B do not effect
- C improve
- D worsen

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-815-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY OF IMMEDIATE RELEASE NIFEDIPINE AT AN ACADEMIC MEDICAL CENTER

Laura Means, PharmD, PGY2 Critical Care Pharmacy Resident,* Scott Benken, PharmD, BCPS, Clinical Pharmacist, Clinical Assistant Professor; Eljim Tesoro, PharmD, BCPS, Clinical Pharmacist, Clinical Associate Professor

University of Illinois at Chicago, 833 S Wood Street, Suite B16, Chicago, IL, 60612

lmeans2@uic.edu

Background: Immediate release (IR) nifedipine is a short-acting dihydropyridine calcium channel blocker previously utilized commonly for the treatment of hypertensive crisis. The utilization of nifedipine IR has decreased due to reports of adverse reactions such as hypotension, myocardial infarction, arrhythmia, and stroke. These adverse reactions are thought to occur because of an uncontrolled precipitous blood pressure decrease from peripheral vasodilation. These adverse reactions may be dose dependent and additionally may be linked to increased mortality with usage.

Methods: This is a retrospective evaluation of the safety and efficacy of nifedipine IR at the University of Illinois Hospital and Health Sciences System. This evaluation will explore targeted adverse events that have occurred when nifedipine IR has been utilized outside of the approved institutional indications (for obstetric and pediatric patients). Patients 18 years of age or older discharged from the hospital between January 2009 and December 2014 who received nifedipine IR were included. Data collected includes: baseline demographics, medical team during the receipt of nifedipine IR, blood pressure and mean arterial pressure at various time points, development of a new arrhythmia, requirement of a cardiology consultation, need for rescue therapies (vasopressors or a fluid bolus) after the dose, and incidence of stroke. For comparison, patients will be divided into those that have past medical conditions that may be associated with adverse effects if utilized (stroke, arrhythmia, coronary artery disease, and myocardial infarction) and those that do not. The primary endpoint of the study is a safety comparison between these two groups, comparing the incidence of arrhythmia, stroke, and myocardial infarction after receipt of nifedipine IR.

Results/conclusions: Endpoints remain under investigation as data collection and analysis are currently being completed.

Learning Objectives:

Define the mechanism of action of nifedipine

Discuss the potential adverse events associated with the utilization of nifedipine IR

Self Assessment Questions:

Nifedipine is a:

- A Alpha-2 agonist
- B: Beta blocker
- C: Calcium channel blocker
- D: Diuretic

What are the potential adverse events associated with nifedipine IR?

- A Arrhythmia
- B Myocardial infarction
- C Stroke
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-539-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTIBIOTIC DE-ESCALATION IN THE INTENSIVE CARE UNIT: A RETROSPECTIVE/PROSPECTIVE COMPARISON OF THE EFFECTS OF MULTIDISCIPLINARY ROUNDS

Alexander T. Meier*, PharmD; Amy M. Weir, PharmD, BCPS

Baptist Health Lexington, 1740 Nicholasville Rd, Lexington, KY, 40503

alexander.meier@bhsi.com

Purpose:

Antibiotic overuse is a problem that leads to antimicrobial resistance, superinfections, and worse outcomes. The objective of this study is to evaluate antibiotic de-escalation before and after the implementation of multidisciplinary rounds involving a pharmacist, which were instituted in the spring of 2012. Retrospective data from December 2011 through March 2012 will be compared to data from December 2014 through March 2015 to determine if the change in practice has resulted in a reduction in antimicrobial use.

Methods:

Patients admitted to a medical ICU from December 2011 through March 2012 with a diagnosis code of sepsis or systemic inflammatory response syndrome (SIRS) will be identified. Patient information including baseline demographics, comorbidity data, antibiotic use, hospital length of stay, and ICU length of stay will be obtained from medical records. Additional data including lab results, cultures, antibiotic administration times, vital signs, ventilator status, and vasopressor use will be collected at admission and at 72 hours. Prospective data will be acquired for admissions from December 2014 through March 2015 utilizing the same methods used for the retrospective data. Antibiotic de-escalation, defined as any narrowing or discontinuation of antimicrobial therapy in response to objective data (culture results, vitals, labs, etc) by 72 hours from admission, will be compared between the two groups to evaluate a change in de-escalation rates.

Results/Conclusion:

Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the importance of antimicrobial stewardship and antibiotic de-escalation

Discuss the role of pharmacists in critical care units during multidisciplinary rounds at Baptist Health Lexington

Self Assessment Questions:

Based on the information presented, which of the following is associated with appropriate antimicrobial de-escalation?

- A Increased length of stay
- B: Decreased mortality rates
- C: Increased antibiotic resistance
- D: Increased rates of recurrence

Baptist Health Lexington pharmacists implemented antibiotic de-escalation through which method?

- A Formulary restrictions
- B Protocols
- C Multi-disciplinary rounds
- D Chart notes

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-540-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF PHARMACY SERVICES AT AN AMBULATORY SURGERY CENTER

Jonathan J. Meli, PharmD*, Jennifer S. Elliott, PharmD, BCPS, Carolyn C. Brackett, PharmD, BCPS, Jay M. Mirtallo, MS, RPh, BCNSP, FASHP, FASPEN, Tamara L. McMath, MPH, Christy Collins, MA
Riverside Methodist Hospital, 3535 Olentangy River Rd., Columbus, OH, 43214
Jonathan.Meli@ohiohealth.com

Purpose: An emerging strategy for improving surgical operational efficiency has been the use of ambulatory surgery centers (ASCs) by shifting low-acuity procedures from the hospital setting to an ASC equipped to handle these same-day surgical cases. Although literature demonstrates the effectiveness of pharmacy oversight within various surgical areas, there is a lack of published data describing effective management of the medication-use process at ASCs. This study aims to describe the implementation and evaluation of pharmacy services at a hospital-affiliated ASC in Columbus, OH.

Method: A retrospective chart review and comparison of surgery patients who were admitted during a period of one-month prior to the opening of the hospital affiliated ASC (retrospective) and one month following the opening of the ASC (prospective) at OhioHealth Riverside Methodist Hospital. The primary outcome is comparison of the patient medication charge capture for surgical procedures conducted prior to versus following the opening of the ASC during the study timeframe, using surgery-specific historical controls. Secondary outcomes include evaluation of the medication charge capture process by performing a random quality audit of Automated Dispensing Cabinet (ADC) quick charges to determine if medications charged were actually documented as given. Additional secondary outcomes will include a comparison of the use of patient-specific, single use vials used in the ASC with multi-use vials used retrospectively by means of a random sample of each of the selected surgical categories.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe a best practice design for the implementation of pharmacy services at an ambulatory surgery center

Indicate whether this best practice design significantly impacted medication charge capture for procedures conducted at the ambulatory surgery center versus case matched historical controls

Self Assessment Questions:

Automated dispensing cabinets offer the following advantages to medication distribution within the surgical suite, EXCEPT:

- A Proper control of items prone to loss or diversion
- B Less immediate access to items for healthcare providers
- C Comprehensive documentation of all transactions
- D Accurate and timely medication charging to patient accounts

According to The Joint Commission Sentinel Event Alert, what percentage of harmful outbreaks have been reported since 2001 due to the misuse of vials?

- A 11
- B 25
- C 49
- D 54

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-816-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OUTCOMES OF FEMORAL PERCUTANEOUS CORONARY INTERVENTION IN PATIENTS TREATED WITH THREE DIFFERENT ANTICOAGULATION REGIMENS

Stephen A. Melton, PharmD*, Marantha R. Short, PharmD, BCPS (AQ Cardiology); Kevin L. Poe, PharmD, BCPS; Heejung Woo; Shawn King, PharmD

St. Joseph's Hospital - KY, One Saint Joseph Drive, Apt 2, Lexington, KY, 40504

stephenmelton@sjhlex.org

Purpose

Anticoagulation during percutaneous coronary intervention (PCI) is currently a highly debated topic. Prior studies demonstrate similar efficacy, but a decrease in major bleeding events when using bivalirudin compared to a combination of heparin and a glycoprotein IIb/IIIa inhibitor. A recent trial, HEAT-PPCI, showed an increase in ischemic events with bivalirudin use and no safety benefit over heparin alone. The primary objective of this study is to evaluate the safety of anticoagulation regimens used in femoral PCI at our facility by looking at the incidence of major bleeding events.

Methods

This study, declared exempt from review by the Western Institutional Review Board, is a retrospective cohort of patients who have underwent PCI procedure over the fiscal year from July 1st, 2013 to June 30th, 2014. Patients who received either bivalirudin alone, the combination of heparin and eptifibatide, or heparin alone for femoral PCI will be analyzed. Patients will be excluded if they are under eighteen years of age, received thrombolytics prior to procedure, or have incomplete medical records that limit data collection. Data collected will consist of: age, gender, and other demographic data, significant cardiovascular medical history, antiplatelets or anticoagulants taken prior to admission, medications administered prior to procedure, details of the procedure, hospital and ICU length of stay, baseline and lowest recorded hematocrit and hemoglobin, platelet count, bleeding location, and number of transfusions received if applicable. Major bleeding events will be defined by the Thrombolysis in Myocardial Infarction (TIMI) bleeding criteria. Total loss in hemoglobin or hematocrit will be defined as the difference between baseline and lowest recorded values. Appropriate statistical tests will be utilized to analyze the data. This study will be conducted at a 433 bed community hospital in Lexington, Kentucky.

Results and Conclusions

Data collection is currently underway. Final results will be presented at the conference.

Learning Objectives:

Discuss the rationale behind anticoagulation regimens commonly used during percutaneous coronary intervention.

Review the mechanisms of action of heparin, eptifibatide, and bivalirudin

Self Assessment Questions:

Which of the following reasons best describes why heparin is commonly combined with eptifibatide during PCI?

- A The pharmacokinetic parameters of heparin are very predictable.
- B Heparin requires combination with eptifibatide to be activated.
- C Heparin has been shown to activate platelets.
- D The combination is actually contraindicated.

Which of the following describes the mechanism of action of bivalirudin?

- A Direct Factor Xa Inhibitor
- B Direct Thrombin Inhibitor
- C Glycoprotein IIb/IIIa Inhibitor
- D Vitamin K Antagonist

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-817-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACY STUDENT IMPACT ASSESSMENT

Lee A Meredith*, PharmD; Chad Smith, PharmD, MBA, BCPS
Aurora St. Luke's Medical Center, 1260 Prairie Creek
Boulevard, #202, Oconomowoc, WI, 53066
lee.meredith@aurora.org

Purpose: The goal of this project was to quantify the impact that Advanced Practice Pharmacy Experience (APPE) students have on acute care units at Aurora St. Luke's Medical Center (ASLMC).
Methods: ASLMC integrates APPE pharmacy students into the pharmacy practice model on 4 acute care units: general medicine, general surgery, orthopedics and heart failure (HF). Each unit serves as the APPE rotation site for one student during each of the school's eight rotation blocks. Student time and preceptor time were used as surrogate measures to objectively assess students' impact on the pharmacy department. Standardized forms were created for both students and preceptors to record their daily time spent performing various patient care and academic activities. Data was collected from students and preceptors from each unit during a 5 day time study period, occurring on the fourth week of a six week rotation. Additionally, preceptors recorded any additional time spent during the 6 week rotation on orientation, evaluation and education. **Results/Conclusions:** During the 5 day time study, an average 20% of preceptor and student time (37 of 188 total preceptor hours; average 1.85 hours per student per day) was dedicated to direct instruction or discussion. Remaining time (155 preceptor hours, 146 student hours) was independently spent on patient care activities. Additional preceptor hours recorded during the 6 week, block-long time study include: 22 hours on orientation (medicine=7, surgery=10, orthopedics=1, HF=4), 49 hours on evaluation (medicine=20.5, surgery=15, orthopedics=6.5, HF=7), and 7.75 hours on topic discussion (medicine=2.75, surgery=3, orthopedics=0, HF=1). Additional results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the pharmacy student-pharmacist preceptor relationship at Aurora St. Luke's Medical Center, in terms of time, in the acute care setting.

Identify one or more activities that preceptors perform during each Advanced Pharmacy Practice Experience (APPE) rotation which could be standardized as a means to maximize efficiency.

Self Assessment Questions:

Assuming a 10 hour work day, how many hours do preceptors at Aurora St. Luke's Medical Center spend with APPE students in direct instruction or discussion?

- A 1
- B: 2
- C: 4
- D: 6

During the course of a year (8 APPE rotation blocks), how many collective hours will the preceptors for these units spend providing orientation?

- A 66
- B 94
- C 176
- D 246

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-818-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY AND SAFETY OF BELATACEPT CONVERSION FOR MAINTENANCE IMMUNOSUPPRESSION IN RENAL TRANSPLANT RECIPIENTS

Elizabeth A Messana*, PharmD, Nicole R Alvey, PharmD, BCPS, Jennifer Geyston, PharmD, BCPS, Monika Gil PharmD, BCPS, Marissa M Brokhof, PharmD, BCPS

Rush University Medical Center, 1653 W Congress Parkway, Atrium
SB0036, Chicago, IL, 60612

elizabeth_messana@rush.edu

Purpose: The most commonly utilized immunosuppressive regimen for renal transplant recipients consists of a calcineurin inhibitor (CNI) and an antimetabolite, with or without corticosteroids. Despite its effectiveness in preventing allograft rejection, the adverse effects associated with this regimen can negatively impact patient and graft survival. Belatacept is a selective T-cell co-stimulation blocker that gained FDA-approval in 2011 for maintenance immunosuppression in renal transplant recipients. Belatacept binds to CD80 and CD86 on antigen presenting cells inhibiting the CD28-mediated co-stimulation of T lymphocytes and is administered as an outpatient infusion. Belatacept has been associated with improved renal graft function after transplant and is considered a favorable alternative for patients that experience CNI toxicity or decreased renal function. In addition, it is administered as a monthly infusion and may be a good alternative for patients with compliance issues. The purpose of this study is to assess efficacy and safety of belatacept conversion in renal transplant recipients. An analysis of patient characteristics will be used to generate a guideline to assist clinicians in determining which patients may benefit from belatacept conversion.

Methods: This study is conducted as a single-center, retrospective 4:1 cohort. Baseline data prior to conversion will be compared to data collected at incremental points up to six months post-conversion. The primary endpoints will include change in renal function from baseline to six months post-conversion and rates of biopsy-proven rejection. Secondary endpoints will include rates of patient and graft survival at six months post-conversion, incidence of diabetes mellitus, hypertension, infection, proteinuria, leukopenia, and anemia. Patient characteristics that will be assessed include age, sex, race, cause of end-stage renal disease, comorbid conditions, transplant type, donor-recipient match, and baseline immunosuppression.

Conclusion: Data collection and analysis are in process. We hypothesize superior renal function and improvement in cardiovascular/metabolic side effects in patients converted to belatacept.

Learning Objectives:

Describe the mechanism of action of belatacept when used for immunosuppression

List potential characteristics of patients that may benefit from conversion to belatacept

Self Assessment Questions:

Which of the following is an adverse effect of belatacept?

- A Proteinuria
- B: Leukocytosis
- C: Polycythemia
- D: Thrombocytopenia

Compared to calcineurin inhibitors, studies have shown that belatacept has been associated with which of the following?

- A Worse cardiovascular outcomes
- B Earlier and more severe episodes of acute rejection
- C Lower rates of post-transplant lymphoproliferative disease
- D Lower rates of infection

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-541-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING SAFETY AND EFFICACY OF A CHEMOTHERAPY DESENSITIZATION PROTOCOL

Jennifer Miao PharmD*, PharmD; Reginald King, PharmD; Randall Knoebel, PharmD, BCOP; Gini Fleming, MD
University of Chicago Medical Center, 5841 S. Maryland Avenue, MC001
Room TE026, Chicago, IL 60637
jennifer.miao@uchospitals.edu

Background: Platinum agents are first-line therapies for many types of cancer including ovarian and colon cancer. However treatment with these agents can be limited by the development of hypersensitivity reactions (HSR), presenting a therapeutic challenge in patients with good disease response. The reported incidence of hypersensitivity reactions ranges from 9%-27% for carboplatin, 10%-19% for oxaliplatin, and 5%-20% for cisplatin. Studies show that all of these agents require repeated exposures before the onset of a HSR, with the reactions typically occurring after the 7th cycle. Rapid desensitization may be utilized to induce temporary tolerance to drug antigens, allowing patients to continue receiving optimal chemotherapy despite previous HSR. The University of Chicago Medicine conducts desensitizations for carboplatin, oxaliplatin, and cisplatin. In February 2013, our chemotherapy desensitization protocol was formalized to optimize compliance with the desensitization order set already being used. The primary objective of this study is to assess the impact of a formal protocol on the utilization of chemotherapy desensitization.

Methods: This retrospective chart review will include all adult patients receiving chemotherapy desensitization for carboplatin, oxaliplatin, or cisplatin from January 2009 to December 2014 at the University of Chicago Medical Center. Utilizing electronic medical records, data related to the utilization of appropriate premedications, safety monitoring, and management of HSR will be collected. The primary endpoint is compliance with our desensitization order set before and after formal protocol implementation. The secondary endpoint is the rate of successful desensitization as determined by receipt of full-dose chemotherapy.

Results: to be presented

Conclusion: to be presented

Learning Objectives:

Identify risk factors for hypersensitivity to platinum agents.

Outline the process of chemotherapy desensitization

Self Assessment Questions:

When are hypersensitivity reactions most likely to occur in patients receiving platinum agents?

- A During the 1st cycle of chemotherapy
- B: After the 3rd cycle of chemotherapy
- C: After the 7th cycle of chemotherapy
- D: At any point in therapy

Which of the following is true about chemotherapy desensitization?

- A Induces temporary tolerance of drug antigens
- B Infusions are titrated in a stepwise manner until the total dose is reached
- C Patients should receive proper education on how to administer the medication
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-819-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

SEVERE SEPSIS AND SEPTIC SHOCK: FACTORS IMPACTING OUTCOMES

Sarah M. Michienzi*, PharmD, Tana E. Hannawa, PharmD, Dustin B. Gladden, PharmD, Becky L. Alsup, PharmD, Kelly A. DeJager, PharmD
Candidate
St. Joseph Mercy Oakland, 44405 Woodward Ave, Pontiac, MI, 48341
sarahmichienzi@gmail.com

Purpose: For developed countries, studies indicate that in-hospital sepsis mortality has declined to approximately 20%. This mortality decrease is attributed in part to the implementation of the Surviving Sepsis Campaign (SSC) Guidelines. The application of the SSC guidelines for early resuscitation bundles accompanied by early administration of broad-spectrum antibiotics are reported to decrease mortality. Along with these key interventions, there are many additional factors that have been recently reported to affect sepsis mortality in the critical care literature. Examples of factors that influence mortality include: age, body mass index (BMI), comorbidities, resuscitation fluid selection, timing of hydrocortisone administration, selection and timing of antimicrobials and vasopressors, culture timing and results, diet/nutrition type, glucose control, use of mechanical ventilation, and code status. The aim of this study is to determine independent risk factors for mortality in patients with severe sepsis and septic shock at a community teaching hospital. **Methods:** This retrospective, single-center IRB-approved study included consecutive patients with an ICD-9 code of severe sepsis or septic shock admitted during 2014. Reasons for exclusion were: age less than 18 years, pregnancy, hospital stay less than 24 hours, or comfort care orders or death less than 6 hours after diagnosis. Subjects were divided into two groups, those who received antibiotics within three hours and those that received antibiotics in greater than three hours. The primary outcome was to identify independent risk factors associated with mortality for severe sepsis and septic shock. To take confounding variables into account, a multivariate regression analysis will be performed. The secondary outcome evaluated was length of stay. Data points including baseline characteristics and risk factors for mortality, described above, were collected. **Results:** Data collection and analysis are currently ongoing. Final results will be presented at the 2015 Great Lakes Residency Conference. **Conclusions:** Conclusions will be presented at the 2015 Great Lakes Residency Conference.

Learning Objectives:

Outline the elements included in the three and six-hour care bundles recommended by the SSC Guidelines

Describe risk factors that are reported to influence mortality in severe sepsis and septic shock

Self Assessment Questions:

According to the SSC Guidelines, which of the following should be completed within 3 hours?

- A Administer broad-spectrum antibiotics
- B: Apply vasopressors to maintain mean arterial pressure (MAP) > 65 mmHg
- C: Re-measure lactate level if initial lactate was elevated
- D: Measure central venous pressure (CVP) if persistent hypotension

Which of the following factors has been demonstrated by recent literature to increase mortality for severe sepsis and septic shock?

- A Delays in antimicrobial therapy
- B Early administration of hydrocortisone
- C Obesity
- D Administration of balanced fluids (such as lactated ringers)

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-542-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A COMPARISON OF CYCLOPHOSPHAMIDE, BORTEZOMIB, AND DEXAMETHASONE (CYBORD) VERSUS LENALIDOMIDE, BORTEZOMIB, AND DEXAMETHASONE (RVD) IN NEWLY DIAGNOSED MULTIPLE MYELOMA PATIENTS

Erika E. Milas, PharmD*; Patrick J. Kiel, PharmD, BCPS, BCOP
Indiana University Health, 1701 N. Senate Blvd., Indianapolis, IN, 46202
emilas@iuhealth.org

Background:

The treatment of multiple myeloma has changed dramatically over the past several decades. Treatment regimens now include novel therapies such as the immunomodulatory agents, thalidomide and lenalidomide, and proteasome inhibitors, namely bortezomib. Although these agents were first studied in refractory and relapsed disease, they showed promising results; consequently, it is now standard practice to use these agents as part of induction chemotherapy. Patients who respond to induction chemotherapy may proceed to high dose melphalan with autologous hematopoietic cell transplant, which may confer a progressive free and overall survival benefit.

Cyclophosphamide, bortezomib, and dexamethasone (CyBorD) and lenalidomide, bortezomib, and dexamethasone (RVD) comprise two of the newer regimens being used for induction therapy in multiple myeloma. CyBorD and RVD have shown promising results in recent clinical trials, but have limited head to head data in induction therapy.

Purpose:

The purpose of this study is to compare overall response rates with first line CyBorD to RVD in newly diagnosed myeloma. Secondary endpoints include progressive free and overall survival, and incidence of febrile neutropenia, thrombocytopenia, peripheral neuropathy, venous thromboembolism, and shingles.

Methods:

Patients 18 years and older with a new diagnosis of multiple myeloma who received induction therapy with either cyclophosphamide, bortezomib, and dexamethasone (CyBorD) or lenalidomide, bortezomib, and dexamethasone (RVD) from January 2009 to January 2014 will be included for analysis by retrospective study design. Retrospective data will be identified via search of medical records during the specified study period. Retrospective data to be collected will include: gender, age at diagnosis, myeloma stage and type, date of induction, induction regimen and number of cycles, M-protein at diagnosis and end of induction, urine M-protein per 24 hours at diagnosis and end of induction, and time until relapse and death.

Results:

Results and conclusions to be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe toxicities patients commonly experience with bortezomib therapy

Recognize toxicities associated with lenalidomide therapy

Self Assessment Questions:

Patient case: a 70 year old, 71kg male has a new diagnosis of IgG multiple myeloma. His oncologist began treatment with CyBorD (cyclophosphamide, bortezomib, and dexamethasone); the patient has now c

- A Peripheral neuropathy; cyclophosphamide
- B Shingles reactivation; bortezomib
- C Peripheral neuropathy; bortezomib
- D Shingles reactivation; cyclophosphamide

Patient case: a 59 year old, 50kg female has a new diagnosis of IgG multiple myeloma. Her past medical history is significant for migraines and depression. Her blood pressure today is 110/76mmHg. Her

- A Hypertension
- B Obesity
- C Hyperlipidemia
- D Use of lenalidomide

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-543-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST MANAGEMENT OF DYSLIPIDEMIA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

*Sarah A. Milkovich, Pharm.D., Lori Rose, Pharm.D., BCPS, Nathan T. Stuckey, Pharm.D., BCPS, Courtney Pearson, M.D., Carl V. Tyler, M.D. Benjamin Nutter

Cleveland Clinic - Fairview Hospital, 18101 Lorain Rd., Cleveland, OH, 44111

milkovs@ccf.org

Diabetes is a chronic disease affecting approximately 25.8 million Americans. According to the 2013 ACC/AHA Update on the Treatment of Blood Cholesterol in Adults, statin therapy is preferred to reduce the risk of atherosclerotic cardiovascular disease (ASCVD) in diabetic patients. Previous studies involving pharmacist management of dyslipidemia in diabetic patients utilized the previous NCEP ATP-III guidelines. The goal of this project is to evaluate the change in the number of type 2 diabetic patients with appropriate statin therapy after pharmacist management of dyslipidemia according to the 2013 ACC/AHA Treatment Guidelines. This is a pilot program of a pharmacy service in a family medicine clinic. Diabetic patients are enrolled in the program if they are age 21 years and older and referred to the program by a physician. Patients are excluded if contraindications to statin therapy are documented. The initial standardized pharmacy appointment includes a comprehensive medication review, baseline lipid panel, treatment goals, drug therapy initiation or modification, and education. After the initial pharmacy appointment, the pharmacist contacts patients via telephone within two weeks if therapy is initiated or medication changes occurred, and if necessary at six weeks and ten weeks. Patients return for a follow up pharmacy visit after 12 weeks to assess changes in lipid panel, risk factors, medication adherence, and adverse effects. Patients receiving pharmacist intervention are compared to a control group of diabetic patients receiving usual care by a physician, and differences will be assessed. To date, 73 patients have been referred to the dyslipidemia clinic and 25 initial office visits have occurred. Nineteen of the 25 patients initiated statin therapy and 12 patients have reported experiencing no adverse effects from the medication. Five patients reported muscle pain, constipation, or diarrhea. Follow up appointments are scheduled to evaluate changes from baseline and research is currently in progress.

Learning Objectives:

Review previous studies that evaluate pharmacist management of dyslipidemia

Explain the pharmacy medication therapy management (MTM) protocol for management of diabetic patients with dyslipidemia at the Center for Family Medicine using the 2013 ACC/AHA Update on the Treatment of Blood Cholesterol in Adults

Self Assessment Questions:

A 45 year old male with type 2 diabetes mellitus had a stent placed in his right coronary artery after an NSTEMI. He has an estimated 10-year ASCVD risk of 6.5%. What dyslipidemia therapy should be

- A Low-intensity statin therapy
- B Moderate-intensity statin therapy
- C High-intensity statin therapy
- D Fenofibrate

Which of the following is a limitation of the 2013 ACC/AHA Update on the Treatment of Blood Cholesterol in Adults?

- A Cholesterol goals are not targeted
- B The Pooled Cohort Risk Equation may overestimate 10-year ASC'
- C Simplifies patient care
- D Emphasizes the prevention of both heart disease and stroke

Q1 Answer: C Q2 Answer: B

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Activity Type: Knowledge-based Contact Hours: 0.5

EPTIFIBATIDE WASTE REDUCTION AND COST CONTAINMENT INITIATIVE

Samuel J Miller, PharmD.*; Chad Smith, PharmD., MBA, BCPS; Sarah Zukkoor, PharmD., BCPS AQ-Cardiology
Aurora Health Care, 2900 W. Oklahoma Ave, Milwaukee, WI, 53215
samuel.miller@aurora.org

Purpose: Eptifibatide is a medication indicated for treatment of acute coronary syndrome and patients undergoing percutaneous coronary intervention. The dosing is weight-based and infusion times can be variable in length leading to different volume requirements. This leads to a large amount of waste, and the potential for cost savings with waste minimization.

Methods: A retrospective chart review was conducted to determine the amount of waste with eptifibatide use at Aurora St. Lukes Medical Center (ASLMC). After chart review, it was found that for patients receiving greater than one 100 mL bottle incurred an average of 51% of the bottle wasted. Those patients receiving one 100 mL bottle incurred an average of 30% waste. Based on this review, the estimated waste for the 309 patients receiving eptifibatide from August 2013-July 2014 at ASLMC was \$51,727 and a waste-reduction strategy was determined using these waste estimations. The strategy involved batching eptifibatide into 50 mL syringes from the 100 mL bottle to be used in Alaris syringe pumps. The primary outcomes are the total cost of eptifibatide incurred annually and the individual cost per patient compared to the year prior to project implementation.

Results/Conclusions: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize how waste can occur with the use of eptifibatide.
Identify a strategy to decrease waste with eptifibatide use.

Self Assessment Questions:

How is eptifibatide dosed for treatment of patients undergoing percutaneous coronary intervention?

- A: 2 mcg/kg/min infusion for all patients
- B: 2 mcg/kg/min infusion for patients with CrCl >50 mL/min (1 mcg/kg/min)
- C: Two 180 mcg/kg bolus doses 10 minutes apart followed by 2 mcg/kg/min
- D: One 180 mcg/kg bolus followed by 2 mcg/kg/min for all patients

How can waste occur during treatment with eptifibatide?

- A: Unknown duration of infusion
- B: Shortened infusions at doses lower than recommended on package
- C: Change to an alternative therapy after eptifibatide therapy has started
- D: A & C

Q1 Answer: C Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF EXTENDED INFUSION CEFEPIME VERSUS INTERMITTENT INFUSION CEFEPIME

Angela M. Miller, PharmD.*; Maria Guido, PharmD, BCPS; Siyun Liao, PharmD, PhD, BCPS
UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 45219
Angela.Miller@uchealth.com

Purpose:

The pharmacodynamic parameter that best correlates with in vivo efficacy of cefepime is the duration of time that free drug concentration is above the minimum inhibitory concentration (MIC). Based on the challenges of treating multi-drug resistant Gram-negative infections, IDSA recommends extending the infusion time of beta-lactam antibiotics as an option to optimize dosing. Several Monte-Carlo simulations have demonstrated higher probability of target attainment when administering cefepime by extended infusion versus intermittent infusion.

Previous studies suggest a correlation between extended infusion cefepime and improvement in mortality. Mortality may be confounded by several variables and minimal data exists with regard to disease associated clinical response. Additionally, adverse effects related to cefepime that may be dose-related have not been evaluated.

The purpose of this study is to compare clinical and microbiological response rates of confirmed Gram-negative pneumonia and bacteremia between extended infusion and intermittent infusion cefepime. This study also aims to correlate clinical response rates with MIC of isolated pathogens. Completing this study may provide further evidence that extended infusion cefepime is associated with higher rates of clinical response than intermittent infusion, and whether neurotoxicity is of concern due to increased cefepime exposure.

Methods:

This single center, retrospective study will be conducted at the University of Cincinnati Medical Center. A comparative analysis will be completed for subjects who received cefepime extended-versus intermittent-infusion. Subgroup analyses will be completed for subjects with renal dysfunction, subjects whose first dose was administered over 30 minutes in the extended infusion group, and those who are critically ill. Neurotoxicity including encephalopathy, decreased alertness and orientation, myoclonus, seizures, nonconvulsive status epilepticus or any combination will be evaluated by electronic medical record review.

Results/Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe Monte-Carlo simulations supporting the use of extended infusion beta lactam antibiotics to achieve higher target attainment
Review the evidence describing trends towards lower mortality when using extended infusion versus intermittent infusion beta lactam antibiotics

Self Assessment Questions:

Monte Carlo simulations use computer technology to:

- A: Allow integration of PK and PD targets and microbiology surveillance
- B: Evaluate two point PK modeling in a single patient
- C: Estimate the probability of target attainment with dosing strategies
- D: Evaluate PK data from a group of infected individuals to extrapolate

The trials presented for extended infusion piperacillin-tazobactam against gram-negative infections showed:

- A: Significantly higher mortality rates in the intermittent infusion group
- B: Trends towards lower mortality rates in the extended infusion group
- C: Trends towards higher clinical cure in the extended infusion group
- D: Significantly higher clinical cure rates in the extended infusion group

Q1 Answer: A Q2 Answer: B

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Activity Type: Knowledge-based Contact Hours: 0.5

A GAP ANALYSIS OF AMBULATORY CARE PHARMACY SERVICES WITHIN A LARGE HEALTH SYSTEM

Gordana Milosevic, PharmD*; Nicholas Ladell, PharmD, BCPS; Prati Wojtal, MS, RPh, FASHP

Aurora West Allis Medical Center, 8901 West Lincoln Avenue, West Allis, WI, 53227

Gordana.Milosevic@aurora.org

Purpose: The ASHP/ASHP Foundation Ambulatory Care Conference and Summit developed consensus recommendations in March 2014. The consensus recommendations provide direction in the areas of defining ambulatory care pharmacy practice, patient care delivery and integration, sustainable business models, and outcome evaluation. The goal of the consensus recommendations is to provide long-term vision for pharmacy practice models in the ambulatory care setting. The purpose of this project is to perform a gap analysis and subsequently create recommendations for ambulatory care pharmacy services at Aurora Health Care (AHC), a large integrated health system.

Methods: A literature review of ambulatory care practices was performed. An evaluation of the proceedings, briefings, and other documents from the 2014 Ambulatory Care Conference and Summit was completed. In an effort to catalog current services provided, an assessment of current ambulatory care services at AHC was performed including community pharmacy, specialty pharmacy, clinic, and transitions of care. Due to the nature of the recommendations, explicit survey questions were developed based on the consensus recommendations. The survey was sent to pharmacists participating in current AHC ambulatory care services or those directly overseeing such services. A gap analysis was then performed comparing the current state of AHC ambulatory care services to the consensus recommendations. Based on the gaps identified, recommendations were developed and presented to stakeholders. Recommendations will then be utilized to develop future strategic goals and improvements in the ambulatory care pharmacy services at AHC to assure that pharmacists are members of the teams that are responsible for patient outcomes.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define ambulatory care pharmacy practice

List two domain-specific subgroups for the Summit recommendations.

Self Assessment Questions:

What organization provides the basis of the Summit recommendations definition of ambulatory care pharmacy practice?

- A: Board of Pharmacy Specialties (BPS)
- B: American Society of Health-System Pharmacists (ASHP) Foundation
- C: American Pharmacists Association
- D: American College of Clinical Pharmacy

Which of the following is/are domain(s) included in the Summit recommendations?

- A: Outcome evaluation
- B: Patient care delivery and integration
- C: Interprofessional care coordination
- D: A and B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-821-L04-P

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EVALUATING PATIENT PERCEPTION OF A MEDICATION THERAPY MANAGEMENT SERVICE AT AN ACADEMIC MEDICAL CENTER

Christopher K Min*, PharmD; Jiz Thomas, PharmD, BCACP

University of Chicago Medical Center, 5500 South Shore Dr., Apt. 1603, Chicago, IL, 60637

christopher.min@uchospitals.edu

Medication mismanagement continues to be a public health concern, which pharmacists are able to address in Medication Therapy Management (MTM) clinics. Measuring patient satisfaction of pharmacist-provided services can demonstrate the pharmacists' value. The purpose of this study is to evaluate patient perception of a pharmacist-provided MTM service at the University of Chicago Medicine (UCM). Secondary objectives include the number and types of interventions made, disease-specific clinical outcomes, number of medications listed before and after the encounter, patient demographics, number of emergency department visits six months prior to and six months after the MTM visit, the referring physicians' medical year, and the number of specialists whom the patient had seen in the past year. Patients, with internal medicine primary care providers, will be referred to the MTM clinic by physicians at UCM based on need and patient acceptance. After the appointment with the pharmacist, patients will be given a Likert-scaled, seven-question survey to be completed and returned to the pharmacist. Analysis of the patient survey responses will include collecting completed patient surveys and calculating an average score for each question to assess overall perception of the services. Further analysis will include chart reviews of pharmacist notes, which are written after the patient visit. A standardized form will be used to help gather and analyze the interventions that were recommended in the notes. Other secondary outcomes will be assessed through chart review of patient profiles. Preliminary results indicate that patients at UCM find MTM services to be beneficial to their care. This could indicate that patients perceive pharmacists as integral components to their health. Opportunities to identify pharmacoeconomic outcomes as well as continuation and expansion of these services at UCM will be identified through the results of this project.

Learning Objectives:

Review existing literature supporting the impact of pharmacist-led Medication Therapy Management (MTM) clinics.

Recognize the types of interventions that pharmacists can make during an MTM encounter with a patient.

Self Assessment Questions:

Which of the following landmark studies demonstrated the positive impact that community pharmacists had on chronic disease state management through MTM services?

- A: Ashville Project
- B: Fairview Studies
- C: The Minnesota Experience
- D: Houston MTM Trials

Which of the following is a documented intervention category that a pharmacist can make in an MTM clinic at UCM?

- A: Communication
- B: Compliance
- C: Obtaining vitals
- D: Performing physical

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-822-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF A CHAIN-DRIVEN PHARMACIST INTERVENTION ON MEDICATION ADHERENCE

Paul A. Miron, Pharm.D. *; Lisa M. Meny, Pharm.D.; Amy R. Ellis, RPh.
Spartan Stores Pharmacy, Ferris State University, 850 76th St, Mail Code
GR764102, Grand Rapids, MI, 49518

Paul.Miron@spartannash.com

Purpose: The objective of this study is to measure the results of a super market chain-pharmacy wide program aimed at improving adherence to insulin glargine by encouraging a shift in dosage form from vials to pens. Patient adherence to medication therapy is essential to effective treatment and long-term health outcomes. Determining an effective mechanism would allow for rapid, streamlined implementation of future interventions.

Methods: Prior to initiation, this study was submitted to the Institutional Review Board at Ferris State University, and subsequently approved. In July 2013, a regional supermarket pharmacy chain implemented a program to educate patients on the advantages and availability of insulin glargine dispensed in pens versus in vials. Patient adherence to insulin glargine dispensed in vials during the year before the intervention, as measured by Proportion of Days Covered (PDC) will be determined by retrospective analysis of dispensing records from pharmacies in which the program was implemented. PDC for all insulin glargine prescriptions will then be recalculated for those same patients, regardless of whether they adopted pens. These PDC values will then be compared to the pre-intervention PDC. Data collected will comprise of: prescription number, patient age, patient pay amount, date sold, product dispensed, days supply, quantity dispensed, and directions for use. All data will be encrypted, and stored in a password-protected computer. Appropriate statistics and tests will be utilized and a P-value of 0.05 will determine statistical significance.

Results: Data analysis and subsequent conclusions are pending, and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of improving medication adherence in a patient population within a pharmacy chain.

Describe the method used by the Centers for Medicare and Medicaid Services (CMS) to measure medication adherence.

Self Assessment Questions:

Which of the following is a potential result for a pharmacy chain of improved patient medication adherence?

- A: Increased patient turnover
- B: Poor patient health outcomes
- C: Decline in CMS Star Rating measures
- D: Increased prescription count

Select the measure below that is used by CMS to measure medication adherence.

- A: Medication Possession Ratio (MPR)
- B: Proportion of Days Covered (PDC)
- C: Medication-total (MED_TOT)
- D: Continuous multiple-refill-interval measure of medication availability

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-823-L04-P

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DETERMINING CURRENT PATIENT MEDICATION LIST UTILIZATION

*Anne M. Misher, PharmD, Jill S. Borchert, PharmD, BCPS, FCCP, Mary Ann Kliethermes, BS, PharmD, Spencer E. Harpe, PharmD, PhD, MPH, Jennifer J. DSouza, PharmD, CDE, BC-ADM, Lea E. Dela Pena, PharmD, BCPS

Midwestern University, 2733 Buckingham Dr, Apt 203, Lisle, IL, 60532
amishe@midwestern.edu

Purpose: Accurate medication lists can help improve patient safety by reducing medication errors; however, limited literature describes what information a medication list should contain. The aims of the study will be to determine how patients, health care providers and clinical pharmacists are utilizing medication lists generated from the electronic medical record (EMR), collect information to optimize the contents of medication lists and collect patient and provider insight for improving medication lists.

Methods: A health care provider survey, patient survey and patient focus group will be conducted within a medical clinic. Additionally, a survey will be conducted within a college of pharmacy. Adult patients will be included if they are English speaking, prescribed at least 6 medications and have an appointment with a clinical pharmacist. All health care providers within the medical clinic and clinical pharmacists within the college of pharmacy will be included. All surveys will assess information gained from medications list utilization, desired medication list contents, preferred ordering of medications on the medication list and participant demographics. The focus group will be conducted according to the Duke Guidelines on How to Conduct a Focus Group. Data collected through the survey portions of the study will be assessed using descriptive statistics and comparisons between responses will be compared by means of Wilcoxon rank sum and Chi square. Responses from the focus group will be transcribed and organized into categories and assessed for similarities and differences among participants.

Results: Data collection has begun and is anticipated to end in March 2015. Results to date indicate pharmacists are using medication lists to know which medications patients are taking (100% of survey responders, n=23) and how patients are taking medications (75% of survey responders, n=23). Pharmacists prefer medications listed either alphabetically or by medical condition.

Conclusions: Conclusions are pending further results.

Learning Objectives:

Identify barriers to medication list utilization for both patients and providers

Describe the need for research on understanding patient utilization of their medication list

Self Assessment Questions:

Which of the following is a barrier for provider utilization of medication lists?

- A: Abundance of time to prepare and update an accurate medication list
- B: Fear of the patient utilizing the medication list for self-management
- C: Concern for providing the patient with too much medical information
- D: Lack of confidence in the patient's ability to utilize a medication list

Which of the following statements is correct?

- A: Studies do not show a correlation between medication errors and medication list utilization
- B: Few studies have assessed which information fields and format patients prefer
- C: Literature suggests medication lists are not beneficial for patients
- D: There is an abundance of literature assessing how patients and providers utilize medication lists

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-924-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

DIFFERENCES IN THE APPLICATION OF PHARMACY BENEFITS MANAGEMENT CRITERIA FOR USE FOR NON-FORMULARY MEDICATIONS AMONG TWO VA MEDICAL CENTERS

Leigh A. Moffett*, Pharm D, Chris Kniefelkamp, Pharm D, Bill Malloy, MS, PharmD, BCPS

Veteran Affairs - Richard L. Roudebush Medical Center, 1481 W 10th Street, Dept of Pharmacy, Indianapolis, IN, 46202

leigh.moffett@va.gov

Purpose: To evaluate the differences in the application of Pharmacy Benefits Management (PBM) criteria for use for non-formulary drug evaluations in VA facilities. The data collected will provide insights into how pharmacists evaluate non-formulary medication requests, whether or not criteria for use are available. Data obtained may also further aid VA PBM in the design and implementation of criteria for use, along with drug restriction and formulary management.

Methods: Data collection and analysis from two de-identified VA medical centers will be completed via chart review in the respective Decentralized Hospital Computer Program (DHCP) and Computerized Patient Record System (CPRS) patient medical record applications. Data collected include non-formulary denial rates between the two facilities, most commonly denied medications within each facility, specifically total number of denials for each medication, specific rationale for denial, recommendation of alternative option(s) following non-formulary medication denial, and cost of the requested item versus formulary item.

Preliminary results:

Analysis of facility A data revealed the top ten denied non-formulary agents were pregabalin, varenicline, duloxetine, celecoxib, rosuvastatin, memantine, rivaroxaban, diclofenac gel, esomeprazole, and pantoprazole. Additional information gathered identified that following a non-formulary consult denial, 55% of providers used the alternate agent recommended by a pharmacist.

Conclusions Reached:

Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Outline the formulary approval process.

Identify the most commonly denied medications between the two facilities

Self Assessment Questions:

Which of the following was identified as the most common reason a formulary request was not approved between the two facilities?

- A: Cost of requested agent
- B: Formulary agent not utilized or maximized
- C: Inappropriate non-formulary agent requested
- D: Insufficient information provided from prescriber

Which of the following medications was most commonly denied in facility A?

- A: Pregabalin
- B: Varenicline
- C: Sitagliptin
- D: Duloxetine

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-824-L04-P

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IMPLEMENTATION OF A PHARMACIST-LED TEACHING SERVICE FOR HEART FAILURE PATIENTS

Sarah Moldenhauer, PharmD* Craig Grzendzielewski, PharmD, BCPS; Erin Seider, PharmD, BCPS

Aurora St. Luke's Medical Center, 2900 West Oklahoma Ave, Milwaukee, WI, 53215

sarah.moldenhauer@aurora.org

Purpose: Heart Failure (HF) is associated with high morbidity, mortality and increasing rates of hospital readmissions and expenditures. In an attempt to improve hospital outcomes and reduce readmissions, a pharmacist-led teaching service for HF was developed. CMS reduces reimbursement for HF patients readmitted within 30 days. The Joint Commission and American Heart Association (AHA) have established core measures to ensure evidence-based care for HF patients. AHA is asking hospitals if patients were provided 60 minutes of education before discharge. According to AHA this should include medication education. Within Aurora, nurses provide HF education focused on blood pressure, activity, diet, and weight-monitoring. A focus on medications is needed. Pharmacists are well-positioned to counsel on medications and promote adherence; however, no formal process for targeting patients and providing medication education exists. The objective of this project is to design and implement a standardized process for pharmacist-provided medication education to inpatient HF patients across an integrated health-system.

Methods: A survey was sent to Aurora Health Care's quality coordinator and directors to evaluate practices for achieving HF measures and to determine the best way to target patients. Because of the large number of HF patients, the most acute, decompensated patients were targeted. Within the electronic medical record (EMR) patients with an EF \leq 40% and a BNP of $>$ 500 were automatically flagged for education. A documentation space was created within the EMR to communicate to other disciplines that education was completed along with time spent on education. The process will be implemented in February 2015, and a four-week snapshot will be conducted in March to examine pharmacist time commitment and adherence to the process.

Results/Conclusions: Results will be used to determine feasibility of expanding pharmacist-provided education to other disease states. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List two components that should be considered in the design of a standardized process for pharmacist-provided disease state education.

List two key medication education points that should be provided to patients with acute, decompensated heart failure before leaving the hospital.

Self Assessment Questions:

Which of the following areas should be addressed in the design of a standardized process for inpatient pharmacist-provided disease state education?

- A: Current practices for achievement of CMS/Joit Commission quality
- B: A method to target which patients within a disease state would most benefit
- C: Identification of commonly prescribed medications for a disease state
- D: All of the above

Which of the following may be useful in the assessment of a newly implemented process for medication education provided by pharmacists?

- A: Pharmacist adherence to documentation procedures
- B: Pharmacist time commitment
- C: Direct feedback from pharmacists
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-825-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY AND SAFETY OF A VANCOMYCIN DOSING PROTOCOL DEVELOPED FOR MORBIDLY OBESE PATIENTS

Lea E. Mollon, PharmD*, Zhe Han, PharmD, Natasha Pettit, PharmD, Jennifer Pisano, D.

University of Chicago Medical Center, 5841 S. Maryland Ave, Rm. TE026 MC0010, Chicago, IL, 60637

lea.mollon@uchospitals.edu

The optimal vancomycin dosing strategy is not well-defined in morbidly obese patients. Prior to June 2013, morbidly obese patients received a loading dose (LD) of 25-30mg/kg (max 2500mg) followed by a maintenance dose (MD) of 15-20mg/kg (max 2000mg) every 12 hours (normal renal function). These recommendations were revised in June 2013 following an internal review which revealed frequent supratherapeutic trough concentrations. The revised protocol recommends: LD of 25-30mg/kg (max 3000mg) followed by a MD of 10-12.5mg/kg (max 2000mg) every 12 hours (normal renal function). This study evaluates if the revised protocol improves initial therapeutic trough attainment in morbidly obese patients. It is a single-center, retrospective observational cohort review between June 1, 2012 - May 31, 2013 (pre-revision) and June 1, 2012 - July 31, 2014 (post-revision). Adult inpatients aged 18 years and older with morbid obesity (BMI ≥ 40 kg/m²) are included with a sample size of ≥ 100 patients per cohort. The primary endpoint is the proportion of vancomycin courses with initial therapeutic trough concentrations. Secondary endpoints include time to therapeutic trough attainment, proportion of therapeutic vancomycin courses, all-cause in-hospital mortality, hospital length of stay, and the incidence of vancomycin-induced nephrotoxicity. Patient demographics, laboratory data, medication administration records, length of stay, and mortality data will be retrieved from patient medical records. Additionally, pharmacist documentation of vancomycin management will be reviewed to determine compliance with vancomycin dosing based on each protocol. Descriptive statistics will be utilized to compare patient baseline demographics. Categorical variables will be analyzed using Chi Square or Fisher Exact Test and continuous variables will be analyzed using analysis of variance (ANOVA) or the Mann-Whitney U test; level of significance for all tests will be p value < 0.05 .

Learning Objectives:

Review alterations in vancomycin pharmacokinetics in morbidly obese patients.

Describe the rationale for developing a vancomycin dosing protocol for morbidly obese patients.

Self Assessment Questions:

Which one of the following statements is true in describing vancomycin pharmacokinetics in morbidly obese patients?

- A: Increased vancomycin volume of distribution
- B: Decreased protein binding of vancomycin
- C: Decreased vancomycin clearance
- D: Increased free vancomycin serum concentrations

In morbidly obese patients, the vancomycin dosing protocol recommended by the 2009 consensus statement resulted in:

- A: A higher incidence of subtherapeutic vancomycin serum concentrations
- B: A lower incidence of vancomycin-associated nephrotoxicity
- C: A higher incidence of supratherapeutic vancomycin serum concentrations
- D: A higher incidence of loading doses administered

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-546-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PHARMACY DEPARTMENT-BASED MEDICATION HISTORY PROGRAM IN THE BORGESS MEDICAL CENTER EMERGENCY AND TRAUMA CENTER

Christin M. Molnar*, Pharm.D.; Kimberly A. Melgarejo, Pharm.D., MHA
Borgess Medical Center, 1521 Gull Road, Kalamazoo, MI, 49004
christin.molnar@borgess.com

Purpose: Accurate medication reconciliation is necessary in the hospital setting, with impact on many factors. This process is an essential component of safe patient care, and is a National Patient Safety Goal. At Borgess Medical Center (BMC), mid-level practitioners and nursing staff gather medication histories. This process is frequently performed incorrectly, leading to medication errors. The objective of this business-model project is to successfully implement a pharmacy department-based medication history program in the BMC emergency and trauma center (ETC), and measure its success with defined metrics. Methods: The pharmacy resident began work on a business-model project in December 2014. This included development of a medication history-training program for pharmacy technicians and pharmacists, as well as working with leadership to add a pharmacist in the ETC to supervise the technician and expand other pharmacy services. After consulting with ETC and hospitalist staff, a plan to modify the inpatient admission workflow was developed to incorporate technicians who will complete medication histories. As patients are identified as inpatient admissions, the technician will complete the medication history with the patient, using a worksheet designed by the pharmacy resident. The technician will then verify the patient-reported medication list with an outpatient pharmacy, nursing home, or other source (as appropriate). Before updating the electronic medical record (EMR), the work of the technician will be reviewed by the pharmacist, to identify and resolve any potential discrepancies. Once the EMR is updated, the pharmacist will document the total number of medications, omissions, duplications, and other errors identified, using a spreadsheet. Metrics to be measured include number of medication histories performed daily, number of potential medication errors identified and resolved, patient satisfaction, impact on hospitalist staff time, and reduction of ETC wait time. Results: This project is in progress. Results and conclusions will be presented at the 2015 GLPRC.

Learning Objectives:

Describe the potential impact of a pharmacy department-based medication history program.

Discuss methods for overcoming challenges faced when implementing a new pharmacy service.

Self Assessment Questions:

Which of the following was the initial, primary goal of implementation of a pharmacy department-based medication history program?

- A: Expansion of pharmacy services
- B: Improvement of patient safety
- C: Increase in the knowledge and skills of pharmacy technicians
- D: Decrease in the time patients spend waiting in the emergency department

Which of the following is a potential challenge that may arise when implementing a new pharmacy service?

- A: Sufficient resources
- B: Increased support from interdisciplinary teams
- C: Balancing the requests of other departments with the capabilities of the pharmacy department
- D: Well-defined, simple tools for measuring metrics

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-925-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL IMPACT OF LEVALBUTEROL VERSUS RACEMIC ALBUTEROL ON CARDIOVASCULAR VITAL SIGNS IN PATIENTS WITH ASTHMA OR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

John J. Mondin II, PharmD*; Patrick D. Ratliff, PharmD, BCPS; Lauren G. Cottingham, PharmD; Kevin L. Poe, PharmD, BCPS
St. Joseph's Hospital - KY, 1 Saint Joseph Drive, Lexington, KY, 40504
JohnMondin@sjhlex.org

Purpose:

Levalbuterol, a short-acting beta-2 agonist, is approved by the FDA for treatment of asthma-related symptoms, but has been used for off-label treatment of chronic obstructive pulmonary disease (COPD). The objective of this study is to assess the incidence of cardiovascular adverse effects during hospitalization, specifically an increase in systolic blood pressure or the incidence of tachycardia, in patients being treated with this agent when compared to racemic albuterol for asthma or COPD.

Methods:

This study will also be used to assess safety of a formulary substitution policy of racemic albuterol for levalbuterol enacted by Saint Joseph Hospital, KentuckyOne Health in Lexington, Kentucky in March 2014. The electronic medical record system was used to generate a list of patients with an ICD9 code specific for the treatment of asthma or COPD on telemetry units who were hospitalized between December 2013 and July 2014. The following data were collected: patient demographics, agent used for treatment, adjunctive use of an anticholinergic agent, outpatient medications, indication, vital signs, length of stay, and discharge status. Average elevation in systolic blood pressure and rate of tachycardia will be calculated for patients receiving each medication. Tachycardia will be defined as a heart rate more than 100 beats per minute or increase greater than 15 beats per minute over baseline within 3 hours after administration. An elevation in systolic blood pressure will be defined as an increase of 10 mmHg or 10% from baseline observed within 3 hours after administration of a dose. Statistics will be evaluated using Chi-squared or student's T-test as appropriate. Data collection is still in progress, and results will be complete by presentation at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the place in therapy of short-acting beta2 agonists - specifically levalbuterol

Explain differences in chemical and pharmacological properties of enantiomers in some medications comprised of racemic mixtures

Self Assessment Questions:

Which of the following is likely a pharmacologic property of S-albuterol when compared to R-albuterol (levalbuterol)?

- A Synergistic effect with R-albuterol
- B: Increased rate of proinflammatory response/properties
- C: Decreased rate of tachycardia
- D: None of the above

Which of the following is currently an FDA-approved indication for levalbuterol?

- A Asthma
- B Emphysema
- C Pulmonary arterial hypertension
- D Bradycardia

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-547-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

FOSFOMYCIN FOR THE TREATMENT OF URINARY TRACT INFECTIONS CAUSED BY GRAM-NEGATIVE ORGANISMS

LeAnne N. Moore*, Pharm.D.; Federico Perez, M.D.; Sharanie V. Sims, Pharm.D., BCPS (AQ ID)

Veteran Affairs - Louis Stokes Cleveland Medical Center, 10701 East Boulevard, Cleveland, OH, 44106

leanne.nf.moore@gmail.com

Purpose: Urinary tract infections (UTIs) remain one of the most common nosocomial infections. Extended spectrum beta-lactamase (ESBL) producing organisms such as *Escherichia coli*, *Klebsiella pneumoniae*, and *Proteus mirabilis* have become a primary concern. The emergence of these multidrug resistant (MDR) organisms as the causative pathogens for such infections, has led to the resurgence of older antibiotics, such as fosfomycin. Fosfomycin has a wide spectrum of activity including Gram-positive and Gram-negative organisms and has retained activity against MDR organisms. However, there is limited in vitro and clinical data evaluating the use of fosfomycin for the treatment of these organisms in the United States. At the Cleveland VA Medical Center, fosfomycin is commonly prescribed for patients with MDR UTIs, however, susceptibility testing is not routinely conducted. The primary objective of this study is to determine the clinical response of patients treated with fosfomycin for a UTI caused by Gram-negative organism(s). Secondary objectives include microbiological response, fosfomycin susceptibilities, duration of therapy, rates of recurrence or reinfection, and all-cause mortality. Clinical response will be defined as positive, negative or uncertain. Whereas, microbiological response will be defined as positive, presumed or negative.

Methods: A retrospective chart review was conducted from January 2005 - August 2014. Patients were included if they had a positive urine culture with a Gram-negative organism and received ≥ 1 dose of fosfomycin. Patients were excluded if they had a concomitant bacteremia or were treated with combination antibiotic therapy. Additionally, fosfomycin susceptibility was determined using an E-test. Descriptive univariate statistics will be utilized as the data is nominal in nature. Frequencies and percentages will be presented where appropriate. Results to be determined.

Learning Objectives:

Recognize the emergence of multi-drug resistant pathogens

Describe the role of fosfomycin in the treatment of urinary tract infection:

Self Assessment Questions:

Which of the following statements are incorrect concerning multi-drug resistant pathogens?

- A There are multiple mechanisms of resistance including the production of beta-lactamase
- B: Multi-drug resistance is defined as resistance to at least one agent
- C: Drug-resistant pathogens have increased over time
- D: There is a surplus of treatment options for drug-resistant pathogen

Which of the following statements are correct regarding fosfomycin?

- A In the United States it is available in both oral and IV formulations
- B FDA labeled indications for fosfomycin include intrabdominal infection
- C Fosfomycin has a wide spectrum of activity including Gram-negative organisms
- D Fosfomycin lacks activity against pathogens that produce extended-spectrum beta-lactamase

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-548-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF ACCEPTANCE RATES OF PHARMACIST INTERVENTIONS AND ADHERENCE TO A PAIN, AGITATION, AND DELIRIUM PROTOCOL IN MECHANICALLY VENTILATED PATIENTS IN A RURAL COMMUNITY HOSPITAL.

Kate Morizio, Pharm.D.*, Allison Williams, Pharm.D., BCPS, Ashleigh Mouser, Pharm.D., BCPS, Joan Haltom, Pharm.D.

Ephraim McDowell Regional Medical Center, 134-1 Tyler Ave, Harrodsburg, KY, 40330

Kmorizio@emrmmc.com

Purpose: Effective pain management within the hospital has gained significant attention over the last 20 years focusing on more effective pain control in patients within the ICU. Despite national directives focusing on higher quality pain management, there still remains suboptimal control within the hospital setting. As demonstrated by the Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium (PAD) in Adult Patients in the ICU, analgesia for initial sedation (analgesia-first) is a key component to overall pain management in mechanically ventilated patients. As such, analgesia-first for sedation has been shown to improve clinical outcomes in mechanically ventilated patients. This study will serve to assess adherence rates to evidence-based PAD protocol orders and acceptance rates of pharmacist-driven interventions for mechanically ventilated patients to assure adequate analgesic therapy. Screening of patients in the ICU and adequacy of pain control will be accomplished by assessment of the Critical Care Pain Observation Tool.

Methods: Adult patients on mechanical ventilators will be screened and assessed based on the EMRMC approved PAD protocol with regards to analgesia only. If prescribed analgesia does not comply with the PAD protocol, the clinical pharmacist will make a recommendation for changes to the prescribed analgesia regimen as warranted during staffing days (M-F, 7am - 5pm). Types of interventions recommended and acceptance rates will be documented and the principle investigator will obtain these documents at the end of each day. Data will be collected and confidence intervals will be calculated to assess frequency of adherence to the analgesia portion of the PAD protocol and overall acceptance rates of pharmacist interventions. Confidence intervals will be used to further evaluate acceptance rates of individual intervention types.

Results: Data collection and analysis is currently underway and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the types of analgesia-first recommendations according to the Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patient in the ICU.

Explain the types of interventions used and how adherence to the EMRMC PAD protocol was affected by pharmacist-driven interventions.

Self Assessment Questions:

Per Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the ICU, which of the following is true regarding patients unable to self-report pain?

- A: Pain should be assessed in patients > 2x/shift using NRS scores.
- B: Pain should be assessed in patients 3x/shift using NRS scores.
- C: Pain should be assessed in patients \geq 4x/shift & prn using BPS.
- D: Pain should be assessed in patients < 5x/shift & prn using NRS, B

According to Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the ICU, which of the following is true regarding management, assessment, and prevention

- A: Vital signs are a reliable source for pain assessment and can be used.
- B: Treat pain first, then sedate.
- C: For neuropathic pain, non-opioid analgesics alone are adequate for
- D: Adjunctive agents (i.e. acetaminophen, ketorolac, ibuprofen) used

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-549-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST EVALUATION OF ANTIRETROVIRAL MEDICATION DISCREPANCIES DURING HOSPITALIZATION

Courtney Morse*, PharmD, Katelyn Lappin, PharmD, BCPS and Gaity Rizvi, PharmD

Mercy Hospital, 2525 S. Michigan Avenue, Chicago, IL, 60616

courtney.morse@mercy-chicago.org

Purpose: Treatment with antiretroviral therapy (ART) decreases morbidity and mortality in human immunodeficiency virus (HIV)-infected patients. Strict adherence to ART is essential in preventing progressive immunosuppression. Previous studies demonstrated that HIV-infected patients are at an increased risk of ART discrepancies during hospitalization. The purpose of this study is to determine if pharmacist intervention can impact the number of ART discrepancies during hospitalization.

Methods: The primary outcome was to identify the number of discrepancies in ART prescribing to HIV-infected hospitalized patients. Patients were identified over a 5 month period for chart review by an automatic email alert set to detect ordered formulary antiretroviral medications, and by daily pharmacist review of non-formulary medications. ART medication review by a clinical pharmacist occurred within 24 hours of patient identification if the following inclusion criteria were met: anticipated hospital admission > 24 hours, > 18 years, diagnosis of HIV/acquired immune deficiency syndrome (AIDS), and prescription for ART prior to admission. Additionally, inpatient ART medication orders and opportunistic infection (OI) prophylaxis orders were assessed for appropriateness and compared with outpatient medication prescriptions. ART and OI discrepancies were classified according to type, severity, and frequency. After pharmacist ART and OI review, if appropriate, intervention occurred in the form of pharmacist recommendation to the primary care team.

Preliminary results: Thirty patients have been identified for study inclusion as of January 31st, 2015. Seventeen ART discrepancies have been identified: 11 (65%) administration, 3 (17.5%) incorrect dose, and 3 (17.5%) incomplete regimen. Additionally, 3 OI prophylaxis discrepancies have been identified: due to missing medication. Physician acceptance rate of pharmacist intervention(s) to-date is 95%.

Conclusions: Early data suggests clinical pharmacist review of ART and OI prophylaxis

Learning Objectives:

Describe the risks associated with antiretroviral therapy (ART) discrepancies during hospitalization

Identify common types of ART-related medication discrepancies seen during hospitalization

Self Assessment Questions:

Which of the following is the preferred agent for PCP prophylaxis?

- A: Dapsone
- B: Atovaquone
- C: Sulfamethoxazole-trimethoprim
- D: Pyrimethamine + leucovorin

MAC prophylaxis should be started when CD4 count is less than which of the following?

- A: < 50
- B: < 100
- C: < 150
- D: < 200

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-926-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

DISCHARGE OPIOID PRESCRIPTION HABITS AFTER IMPLEMENTING A PATIENT-CUSTOMIZED OPIOID TOLERANCE PROGRAM

Hesham Mourad*, PharmD, BCPS, CAHIMS, Jill Payne, MSN RN CENP, Mary Sitterding, PhD, RN, CNS, Robert D. Warhurst, PharmD, Mark Baumgart, RPh, PharmD, Lisa Starost, PharmD
Indiana University Health, 1515 N Senate Ave, Indianapolis, IN, 46202
hmourad@iuhealth.org

Purpose:

Opioids are an important tool in pain management. Using opioids is challenging because of the fine balance between their therapeutic and adverse effects. 207 million opioid prescriptions were written for pain management in 2013. The increased use of opioids in the past two decades has resulted in an epidemic of prescription opioid addiction, overdose, and deaths. In 2009, poisoning became one of the leading causes of death in the United States, with more people dying from opioid prescription overdoses than from all other drugs combined. According to the CDC, death rates from opioid prescription overdoses quadrupled during 1999 - 2010. The purpose of this study is to review the current discharge opioid prescription habits in a community and an academic teaching hospital and then evaluate if implementing an in-patient-customized opioid tolerance program will affect those habits.

Methods:

Retrospective, observational, two-center, Institutional review board approved study comparing patients (males or non-pregnant females over the age of 18 years) in the customized opioid tolerance pilot group with a similar population admitted to the same units from November 2014 till January 2015. The primary outcome is evaluation if there is a change in the average daily opioid dose prescribed at discharge, calculated in morphine equivalents, between the two groups. The secondary outcome includes looking at the change in the inpatient average daily opioid dose, calculated in morphine equivalents, between these two groups. Variables between the groups will be compared using the appropriate parametric or non-parametric tests.

Results/Conclusions:

Data collection and analysis are in progress and will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify the fine balance between therapeutic effects and their adverse effects of opioid prescriptions.

Describe risks associated with opioid prescriptions.

Self Assessment Questions:

More people die from _____ than from all other drugs combined, including heroin and cocaine

- A: Overdoses of opioids prescription
- B: Overdoses of beta blockers prescription
- C: Overdoses of statins prescription
- D: Overdoses of calcium channel blockers prescription

One of the reasons for the increase in the number of patients suffering from substance use disorders:

- A: Decreased number of surgeries performed
- B: Over prescription of pain medications
- C: Low stress level
- D: Good family support

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-826-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF ATRIAL FIBRILLATION IN PATIENTS RECEIVING NOREPINEPHRINE IN THE INTENSIVE CARE UNIT

Joseph H Mousa, PharmD; Bryan D Lizza, PharmD; Jessica M Cottreau PharmD
Northwestern Memorial Hospital, 251 East Huron
jmousa@nm.org

Purpose: Patients admitted to the intensive care unit (ICU) are at increased risk for cardiac arrhythmias due to multiple factors, including the use of vasoactive agents. Cardiac arrhythmias, particularly atrial fibrillation (AF), can lead to prolonged ICU and hospital stay, and increased mortality. In critically ill adults, AF is noted to occur in approximately 11% of patients receiving norepinephrine. To our knowledge, no study has attempted to identify risk factors associated with the development of AF in patients receiving norepinephrine for the management of shock. The purpose of this case control study is to identify the risk factors associated with the development of AF in patients receiving norepinephrine for shock.

Methods: Patients will be included in the study if they received norepinephrine at a rate of rate of 0.5 mcg/min or higher for two consecutive hours. Patients with a history of cardiothoracic surgery within ≤ 3 months will be excluded. Baseline demographics include age, gender, etiology of shock, severity of illness, echocardiography, serum electrolyte levels, history of cardiac disease, and history of stroke or transient ischemic attack. Patients that develop AF while receiving norepinephrine will be matched up to a ratio of 1:4 according to age and shock etiology to those who did not develop AF while receiving norepinephrine.

Results/Conclusions: Results to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the impact of arrhythmia development in ICU patients on length of hospitalization and mortality.

Identify risk factors associated with the development of atrial fibrillation in ICU patients receiving norepinephrine for the management of shock.

Self Assessment Questions:

The development of cardiac arrhythmias in ICU patients impacts

- A: Length of ICU and hospital stay
- B: Mortality outcomes
- C: Healthcare costs
- D: All of the above

The most common type of arrhythmia associated with norepinephrine use is

- A: Ventricular fibrillation
- B: Atrial flutter
- C: Atrial fibrillation
- D: Premature ventricular contractions

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-550-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

LEAN APPROACH TO IMPROVE EFFICIENCY IN ORDERING AND DISTRIBUTING OF CLOTTING FACTOR CONCENTRATES

Meghan M. Murphy*, PharmD; Heidi Smith, PharmD; David Eberle, PharmD; Kristin Hanson, MS, RPh; Aina Lasky, PharmD; Nathan Smith, PharmD; Erin Turk, PharmD

Froedtert Hospital, 9200 W Wisconsin Ave, Milwaukee, WI, 53226

Meghan.murphy@froedtert.com

Purpose: Clotting factor concentrates (CFC), or blood factor products, represent a large aggregate cost to Froedtert Hospital and the organization. It is suspected that a portion of this cost can be attributed to waste and inefficiencies in the CFC distribution process. A common approach to identify sources of inefficiencies is to apply lean methodology to the current process to determine when and where non-value added steps occur. The aim of this project is to analyze, optimize, and streamline the CFC use process by utilizing lean methodology with the goal of facilitating accurate ordering of CFCs and increase the efficiency in the distribution process to ultimately reduce costs attributed to waste.

Methods: This project will be conducted in three phases from December 2014 to August 2015. Phase I will involve collection of baseline data including duration of time spent in various points along the CFC distribution process and total aggregate cost of real and potential CFC waste. In Phase II, lean methodology will be applied to current workflow and sources of inefficiencies will be identified and eliminated if feasible. A new workflow will be designed and implemented at this time. Phase III will collect data following implementation of a lean workflow to determine changes in efficiency and/or cost attributed to waste.

Results/Conclusions: Data collection and analysis is ongoing. Baseline results and preliminary conclusions will be presented at the Great Lakes Pharmacy Resident Conference in April 2015.

Learning Objectives:

Identify sources of inefficiencies in each step of the medication use process

List three lean methods that can be used to evaluate a current process

Self Assessment Questions:

Potential waste in the medication use process can include:

- A: Compounding sterile products in large batches
- B: Technician-technician verification ("tech-check-tech")
- C: On-site and accessible storage of frequently used medications
- D: High inventory turnover

A spaghetti diagram may assist in evaluating a process by:

- A: Displaying how all steps in a process line up to produce a product
- B: Visualizing the physical flow of traffic or movement of people and
- C: Depicting the flow of information needed to trigger a process into a
- D: Showing where activities add value and where they do not

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-827-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF ACUTE KIDNEY INJURY DURING TREATMENT WITH EXTENDED-INFUSION PIPERACILLIN-TAZOBACTAM OR CEFEPIME IN COMBINATION WITH VANCOMYCIN IN INTENSIVE CARE UNIT PATIENTS

*Sandra L. Naegele, PharmD, BCPS; Joseph A. Levato, PharmD; Rolla T. Sweis, PharmD, M.A., BCPS

Advocate Christ Medical Center, 4440 W 95th Street, Oak Lawn, IL, 60453

sandra.naegele2@advocatehealth.com

Purpose: Compare acute kidney injury (AKI) occurrence among patients treated with vancomycin in combination with extended-infusion piperacillin-tazobactam (EIP) or cefepime to evaluate if one treatment modality predisposes patients to a greater risk of nephrotoxicity.

Methods: This study has been approved by an Institutional Review Board. A retrospective analysis will be conducted comparing patients admitted to the hospital who received extended-infusion piperacillin-tazobactam plus vancomycin versus cefepime plus vancomycin. Adult patients hospitalized in an intensive care unit setting on combination therapy for at least 48 hours with two or more serum creatinine (SCr) measurements will be included. Patients will be excluded if they are pregnant, less than 18 years of age or if they are on any form of dialysis including continuous renal replacement therapy. The primary safety objective is AKI, defined as an increase in serum creatinine of at least 0.5 mg/dL or a 50% increase in serum creatinine from baseline at any time during antibiotic therapy. Safety outcomes will be compared between the two treatment groups and contributing factors for developing AKI will be assessed.

Results: This research is currently in the data collection phase. Results of this study will be presented at the Great Lakes Pharmacy Resident Conference.

Conclusions: This research is currently in the data collection phase.

Results of this study, along with conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define acute kidney injury (AKI)

Recognize adverse effects of drug-induced AKI on the healthcare system

Self Assessment Questions:

Which of the following statements is true?

- A: AKI is defined as an increase in serum creatinine of at least 0.5mg
- B: AKI is defined as a 30% increase in serum creatinine from baseline
- C: AKI is defined as an increase in serum creatinine of at least 1.5mg
- D: AKI is defined as an increase in serum creatinine of at least 0.5mg

All of the statements are true, except which of the following?

- A: Drug-induced AKI complicates a patient's hospital course
- B: Drug-induced AKI has been associated with increased mortality
- C: Drug-induced AKI may lead to decreased lengths of stay in the hospital
- D: Drug-induced AKI is associated with higher hospital costs

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-927-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF DEXMEDETOMIDINE EFFECTS ON DURATION OF MECHANICAL VENTILATION AND INTENSIVE CARE UNIT LENGTH OF STAY COMPARED TO MIDAZOLAM AND PROPOFOL

Travis L. Nash, PharmD* Samuel H. Wornall, PharmD, BCPS Catherine L. Shely PharmD, BCPS Abigail S. Hay, PharmD, BCPS

St. Claire Regional Medical Center, 222 Medical Circle, Morehead, KY, 40351

travis.nash@st-claire.org

PURPOSE: Studies have shown that prolonged mechanical ventilation is associated with complications such as, pneumonia, cardiovascular compromise, barotrauma, and neurological complications. This study will evaluate the duration of mechanical ventilation in patients sedated with dexmedetomidine. The data collected will be compared to a historical cohort of mechanically ventilated patients sedated with either propofol or midazolam to determine if there are significant differences in duration of mechanical ventilation, intensive care unit (ICU) length of stay, and incidence of pneumonia and delirium.

METHODS: Prior to commencement, this study was submitted to the Institutional Review Board for approval. A list of patients in the ICU who received dexmedetomidine, propofol, and midazolam for sedation in mechanical ventilation during the study period was generated from the hospital's information system. Patient demographic data, duration of mechanical ventilation, duration of ICU stay, incidence of delirium, and incidence of pneumonia were compared between the patients managed with dexmedetomidine and the historical cohort managed with propofol or midazolam infusions. The collected data was used to determine if dexmedetomidine reduces duration of mechanical ventilation, length of stay in the ICU, occurrence of pneumonia, or incidence of ICU associated delirium when compared to midazolam and propofol.

RESULTS/CONCLUSIONS: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Explain dexmedetomidine's role in mechanical ventilation

Discuss dexmedetomidine's potential impact on ICU length of stay, ventilator associated pneumonia, and ICU associated delirium

Self Assessment Questions:

Which of the following patient populations has dexmedetomidine shown the potential to reduce morbidity and mortality?

- A: Patients requiring deep sedation on the Richmond Agitation-Sedation Scale
- B: Critically ill patients at high risk for delirium
- C: Patients at high risk for hypotension
- D: Obese patients

Research has shown some evidence for dexmedetomidine with all of the following except one. Which of the following has not been associated with dexmedetomidine as of yet?

- A: Reduced incidence of coma
- B: Reduced duration of ICU stay
- C: Reduced incidence of delirium
- D: Reduced duration of mechanical ventilation

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-551-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYZING THE CLINICAL OUTCOMES OF A RAPID MASS CONVERSION FROM ROSUVASTATIN TO ATORVASTATIN IN A VA MEDICAL CENTER OUTPATIENT SETTING (PART 1)

Chad A Naville*, PharmD, MS, PGY1 Non-Traditional Pharmacy Resident; Christina White, PharmD, MBA, BCPS, Assistant Chief, Mark Triboletti, PharmD, BCPS, Procurement Supervisor

Veteran Affairs - Indianapolis VA Medical Center, 1481 W 10th Street (119), Indianapolis, IN, 46202

chad.naville@va.gov

Purpose: Automated, rapid medication conversion is a new procedure at the Indianapolis VA Medical Center. These conversions automatically change the medications for a list of patients from one drug to another. These conversions are typically initiated due to formulary changes at the local VAMC. Macros are small programs that reside within a larger program that are capable of automating repetitive tasks and allow for logic to be built in for decision making. Macros are able to reduce the amount of time spent converting prescriptions, increase patient safety by providing consistent results while still utilizing clinical decision support systems in addition to clinically sound complex logic, and save costs due to rapid medication changeover. A macro was developed with the approval of the Pharmacy and Therapeutics Committee for the conversion of patients from rosuvastatin to the formulary alternative atorvastatin.

Methods: The macro was developed in Attachmate Reflections using Microsoft Visual Basic code to automate the conversion of outpatient prescriptions from rosuvastatin to atorvastatin. The macro was designed with logic to adjust all medications according to pre-specified criteria. A list of 2,167 patients with active prescriptions for rosuvastatin was retrieved using the VISN 11 Data Warehouse. Exclusion criteria were applied to the list of patients to arrive at the final list of 1,520 conversion ready patients, as discussed in Part 2.

Conclusion: Macros save time, increase patient safety, and save money by its ability to rapidly convert prescriptions from one medication to another. Building logic and decisions into the macro allow it to work semi-autonomously on a patient list while allowing the user to exercise clinical judgment during the conversion. A data dashboard is a valid option for longitudinal monitoring of the clinical effects of these mass conversions on large patient populations as discussed in part 2.

Learning Objectives:

Outline the process of creating a Vista macro in order to rapidly convert a set list of prescriptions from rosuvastatin to atorvastatin.

Identify steps required to develop the clinical logic for macro development, including unforeseen events/decisions.

Self Assessment Questions:

What is the method used in this process to retrieve a list of patients for conversion?

- A: Thorough patient chart review
- B: Mail the patient survey requesting feedback on medication being received
- C: Retrieve a list of patients from the VISN 11 Data Warehouse of patient information
- D: Document each dispensing of medication as it occurs that will be converted

Which of the following items must be accounted and adjusted for when developing macro logic?

- A: Day supply of prescription
- B: Day the prescription is being converted
- C: Number of refills remaining
- D: All of the above.

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-828-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

KETAMINE AND PROPOFOL FOR PEDIATRIC PROCEDURAL SEDATION IN THE EMERGENCY DEPARTMENT

Theresa Nerone, Pharm.D.*, Kara Sink, RPh, Matthew Campbell, Pharm.D., BCPS, Stephanie Bass, Pharm.D., BCPS
Cleveland Clinic, 9500 Euclid Ave, Cleveland, OH, 44195
neronet@ccf.org

Purpose: Children often require diagnostic or therapeutic procedures in the emergency department that require some level of sedation or analgesia. Procedural sedation is the use of pharmacologic agents to effectively minimize discomfort, pain, and anxiety while controlling movement in order to safely and effectively complete a procedure or diagnostic exam. Patients undergoing procedural sedation should not require intubation and are ideally ready for discharge shortly after completion of the procedure. Ketamine and propofol are commonly used agents for procedural sedation in the pediatric population. Studies have compared the impact of these agents on time to sedation resolution. To our knowledge, there have been no studies comparing ketamine or propofol alone on the time to sedation resolution in the emergency department for pediatric procedural sedation. The primary objective is to compare the impact of ketamine and propofol on time to sedation resolution in pediatric patients undergoing procedural sedation in the emergency department. The secondary objective is to assess the rate of adverse events associated with administration of ketamine and propofol during procedural sedation in the emergency department.

Methods: This study was approved by the Institutional Review Board. The hospital's electronic medical record system will be utilized to identify pediatric patients who received ketamine or propofol in the emergency department for procedural sedation. Patients will be excluded from the study if they are greater than 18 years old or were given any sedative for intubation and have not undergone procedural sedation. The following data will be collected: age, weight, gender, location, diagnosis, procedure type, level of consciousness, sedative given (number of doses, initial dose, cumulative dose), opioids given, length of procedure, adverse reactions, and time to sedation resolution.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the benefits of pediatric procedural sedation in the emergency department.

Identify the pharmacokinetic and pharmacodynamic differences between ketamine and propofol in the context of procedural sedation.

Self Assessment Questions:

A benefit of pediatric procedural sedation in the emergency department is

- A: Patients must be intubated.
- B: Providers can safely complete a procedure or diagnostic exam by
- C: Patients usually have to be admitted to the hospital for monitoring.
- D: Children are not appropriate candidates for procedural sedation.

Which of the following statements is FALSE

- A: Ketamine causes non-progressive, dissociative sedation.
- B: Ketamine has been associated with emergence phenomena.
- C: Propofol is an ultra-short-acting, highly lipophilic hypnotic agent.
- D: Propofol has analgesic properties.

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-552-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF PHARMACY RESIDENT WORKLOAD DISTRIBUTION IN A MULTI-SITE RESIDENCY PROGRAM

Kytara B. Neustadter, PharmD* and Hina Patel, PharmD, BCPS
NorthShore University HealthSystem, 9600 Gross Point Rd, Skokie, IL, 60076
KNeustadter@northshore.org

Purpose:

The role a pharmacy resident plays in health care organizations requires them to assume positions of responsibility and make meaningful contributions. The benefit of having a large health system with a multi-site residency program is the availability of many pharmacists, residents and students to assist in patient care. It is important to ensure the distribution of work enables each subgroup to perform tasks at the top of their license. The purpose of this investigation is to assess the utilization of residents when compared to pharmacists and students, and determine if a change in workload distribution between the groups needs to occur.

Methods:

A taskforce of pharmacy managers and core preceptors representing each hospital site was created to identify measurements to assess the workload distribution amongst pharmacists, residents, and students. Baseline retrospective data of workload metric parameters was compiled and analyzed from October 1, 2013 to September 30, 2014 to review number of orders verified, interventions identified, patients educated, notes written, and medication reconciliations completed. Based on analysis of retrospective data, changes to workload distribution will be made and data will be re-measured post implementation of changes to determine the effect of the modifications. This evaluation was exempt from the Institutional Review Board as data collected will be utilized as quality improvement within the health system.

Results/Conclusion:

Preliminary results for this investigation revealed a need to reorganize the workload distribution of pharmacy residents due to variability of work during different times of year, inter-site population variations, and inconsistent expectations of rotation duties. Changes are anticipated to start with the current group of residents with full implementation planned to occur with the following residency class. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the workload distribution of PGY1 pharmacy practice residents in a large, multi-site residency program

Identify areas for improvement in the utilization of PGY1 pharmacy practice residents using measurements derived from patient care workload metrics

Self Assessment Questions:

What is a benefit of having a large health system with a multi-site pharmacy residency program?

- A: Decreased availability of pharmacists to assist in patient care
- B: Decreased availability of pharmacists, residents, and students to assist in patient care
- C: Increased availability of pharmacists, residents, and students to assist in patient care
- D: Both A and C

Which of the following are workload metrics that can be used to measure resident impact on patient care?

- A: Patients educated
- B: Hours worked
- C: Medication reconciliations completed
- D: Both A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-829-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF TREATMENT DOSE ENOXAPARIN FOLLOWING IMPLEMENTATION OF ANTI-XA MONITORING

Garrett P. New*, PharmD, Jacqueline K. Clouse, PharmD, BCPS, Ronald J. Jones, PharmD
Lutheran Health Network, 7952 W. Jefferson Blvd., Fort Wayne, IN, 46804
gnew@lhn.net

Purpose: Randomized clinical trials evaluating enoxaparin for the treatment of venous thromboembolism and acute coronary syndromes have excluded special populations, such as those with severe renal impairment, who are underweight, and the morbidly obese. Due to the concern for over anticoagulation in these groups, anti-factor Xa (anti-Xa) monitoring has been recommended. However, there is limited data available on how to adjust the dose based on these concentrations. The purpose of this study is to evaluate anti-Xa monitoring and derive safe and effective dosing guidelines for these populations.

Methods: This prospective, single-center study was submitted to the Institutional Review Board, and exemption status was obtained. Patients will be included if they are at least 18 years of age; receive treatment dose enoxaparin; and meet one or more of the following: CrCl less than 30 mL/min, weight less than 50 kg; weight greater than 150 kg (or BMI greater than 40 kg/m²). Exclusion criteria will include non-enoxaparin anticoagulation that may interfere with anti-Xa concentrations, dialysis, CrCl less than 10 mL/min, severe liver failure, pregnancy, or outpatient treatment. Anti-Xa levels will be drawn 3-5 hours following the fourth dose (steady-state). For anti-Xa levels not within the defined therapeutic range (0.6 to 1 IU/mL), the dose will be adjusted, and repeat anti-Xa levels will be obtained. Primary outcome measures will include frequency of anti-Xa levels within the therapeutic range, frequency of dose adjustments, and time to therapeutic level. Secondary outcome measures will include frequency of major bleeding/thrombotic events, length of stay in the hospital, and frequency of heparin-induced thrombocytopenia and be compared to a pre-protocol analysis via Chi square and student t-test as appropriate. Using this data, a dosing protocol for these special populations will be derived.

Results/Conclusions: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Recognize the importance of anti-Xa monitoring and identify specific patient populations receiving treatment dose enoxaparin of whom anti-Xa monitoring is recommended

Describe potential strategies in enoxaparin treatment dose adjustment for anti-Xa levels outside of therapeutic range

Self Assessment Questions:

Which of the following patient populations receiving treatment dose enoxaparin are recommended for anti-Xa monitoring?

- A: Severe renal impairment
- B: Morbidly obese
- C: All healthy individuals
- D: A & b

Which of the following anti-Xa reference ranges best approximates therapeutic anti-Xa level for twice-daily enoxaparin treatment dosing?

- A: 0.1 - 0.5 IU/mL
- B: 0.6 - 1 IU/mL
- C: 1 - 2 IU/mL
- D: 2 - 2.5 IU/mL

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-553-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ORAL ANTICOAGULANTS AS AN INDEPENDENT RISK FACTOR FOR HOSPITAL READMISSION

Mary Jane Newell, PharmD*; Jennifer Austin, PharmD, BCPS; Ishaq Lat, PharmD, BCPS; Michael Howell, MD, MPH
University of Chicago Medical Center, 5841 S Maryland Ave, Chicago, IL, 60637
mary.newell@uchospitals.edu

Oral anticoagulants are high-risk medications that are associated with adverse events that can lead to hospital admissions and readmissions. Patient readmissions are expensive, place the patients at an increased risk of hospital complications, and may be preventable. Identifying potentially modifiable risk factors for readmission may lead to focused interventions that prevent unplanned readmissions.

The primary objective of this study is to determine if exposure to oral anticoagulants is an independent risk factor for unplanned hospital readmission within 30 days. Secondary objectives are to evaluate time to readmission and emergency department visit within 30 days.

A retrospective cohort analysis will be conducted. All patients 18 years or older, admitted to the University of Chicago Medical Center with inpatient status are eligible for inclusion. Patients who were discharged to hospice, transferred from an outside hospital, had a cardiac arrest during index admission, or admitted for observation will be excluded. Data collected will include patient demographics, severity of illness, medical service for admission, length of stay, comorbid disease states, number of comorbid disease states, number of concurrent medications, number of doses of oral anticoagulants per day, number of ED visits in past year, ICU stay during index admission, payor type, and place to discharge. Oral anticoagulants include warfarin, dabigatran, rivaroxaban and apixaban. Traditional and propensity-matched multivariable logistic regression will be used to control for confounders.

Baseline characteristics of the study population will be evaluated using Chi Square or Fischer exact test for nominal data and Student t test for continuous data. A forward, multivariate logistic regression analysis will be used to determine a relationship between the independent variables and outcomes. Independent variables found to be statistically significant will be entered into the regression analysis and presented as odds ratios with 95% confidence intervals.

Learning Objectives:

Recognize the benefit of identifying oral anticoagulants as an independent risk factor for hospital readmission.

Identify the importance of assessing covariates and variables thought to increase the risk of hospital readmission.

Self Assessment Questions:

Identifying modifiable risk factors for readmission can lead to which of the following?

- A: Focused interventions to decrease readmissions
- B: Decreased hospital costs and improve reimbursement
- C: Decreased risk of hospital-acquired infections and complications
- D: All of the above

Which of the following would not be seen as a benefit of assessing variables thought to place patients at an increased risk for hospital readmission?

- A: Propose areas for future research
- B: Identification of target areas for interventions
- C: May introduce some bias in the results
- D: Allows for the evaluation of potential confounders

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-928-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND IMPACT OF A PHARMACY DISCHARGE SERVICE

Thu Nguyen, Pharm.D.*; Kristine Swank, Pharm.D., BCPS; Kyle Wilson Pharm.D.

St. Vincent Health, 12020 Parkview Lane, Fishers, IN, 46038

thu.nguyen@stvincent.org

Purpose: Studies have shown that adverse events occur in approximately one in five adult medical patients within three weeks of hospital discharge. Pharmacists have the training and expertise to play a crucial role in the discharge process to ensure continuity of care from hospital to home. Due to limited funding, the pharmacy department must incorporate this process into pharmacists' current workflow to accommodate this additional service. The objective of this study is to implement a new pharmacy discharge service as well as to determine the impact of the pharmacists' role in the discharge process on the number of interventions on medication reconciliation, patient satisfaction, and readmission rates.

Method: This pilot project is a 12-week study starting from December 01, 2014 to February 28, 2015. The first 4 weeks consisted of the retrospective chart review of the pre-intervention phase and the subsequent 4 weeks included the prospective data collection of the pharmacy intervention. Patients were then followed post-discharge for 4 weeks to determine the 30-day readmission rate. Patients admitted to St. Vincent Anderson Regional Hospital, who were 18 years or older and discharged to home were enrolled for study. In addition, they had to have at least 10 medications prior to admission or were initiated on an anticoagulant medicine in the hospital. The designated pharmacist completed medication reconciliation and medication discharge counseling for patients who met the study criteria. Patients who received discharge counseling were asked to fill out an anonymous satisfaction survey. Data collected include patient demographics, number and types of interventions during medication reconciliation, intervention acceptance rate by a physician, length of discharge counseling, and patient satisfaction score.

Results/Conclusions: Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role of a pharmacist during the discharge process

Review the perceived impact of a pharmacy discharge service

Self Assessment Questions:

What is one of the roles of a pharmacist during discharge?

- A: Provide education on home medications
- B: Compare home medication list to discharge medication list
- C: Fill the new prescriptions
- D: Ensure discharge medications follow hospital formulary

What is a perceived impact of a pharmacy discharge service?

- A: Increase the number of patients being discharged daily
- B: Decrease patient satisfaction
- C: Replace nursing discharge responsibilities
- D: Improve medication and adherence education

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-830-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ADULT DIABETIC KETOACIDOSIS: MANAGEMENT IN THE EMERGENCY DEPARTMENT - IS THERE ROOM FOR IMPROVEMENT?

Ethan S. Nilssen, Pharm.D.*; Leslie A. Propst, Pharm.D., BCPS; Kara L. Birrer, Pharm.D., BCPS

Union Hospital, 1606 N. 7th Street, Terre Haute, IN, 47804

enilssen@uhhg.org

Purpose

The purpose of this study was to compare the management of diabetic ketoacidosis (DKA) in the emergency department (ED) at a community hospital with current American Diabetic Association (ADA) guidelines.

Methods

A retrospective chart review of all patients admitted to Union Hospital ED with a diagnosis of DKA. Inclusion criteria: age ≥ 18y, DKA diagnosis; exclusion criteria: age < 18y, pregnant, or prisoner. Data collected included labs, vital signs, imaging, insulin, fluid and potassium administration. The primary endpoint was adherence to the 2009 ADA DKA guidelines: insulin rate of 0.14 units/kg/hr, goal plasma blood glucose (BG) decline of 50-75 mg/dL/hr, and initial fluid resuscitation of 15-20 mL/kg/hr. Secondary endpoints included: adverse effects, ED length of stay (LOS), maintenance fluid selection, and median BG and serum potassium decline.

Results

155 patients were screened; 65 patients evaluated. 29/65 (45%) patients were male; mean age was 36.17y. 56/65 (86%) patients treated for DKA were Type I diabetics. 51/65 (78%) patients received an insulin infusion. Overall, 2/65 (3%) patients met all primary endpoint criteria. The median insulin rate was 0.14 [IQR: 0.1-0.21] units/kg/hr; 20/51 (39%) insulin infusion rates fell between 0.08-0.16 units/kg/hr. 19/127 (15%) follow-up BG measurements met the goal plasma BG decline (median decline was -78 [IQR: -43 to -134] mg/dL/hr). The initial fluid resuscitation rate was 16.3 [IQR: 13.5-19.5] mL/kg/hr; 30/65 (46%) patients fell within the goal rate. 9/65 (14%) patients had an adverse effect from ED management. Mean ED LOS was 3h:22min:59min. Of the 61 patients with maintenance fluid ordered, 2/61 (4%) had the correct fluid based on corrected serum sodium. Median serum potassium decline was -0.9 [IQR: -0.5 to -1.6] mEq.

Conclusion

ED management of DKA was not consistent with ADA guidelines. Most patients had BG values that fell too rapidly, higher than recommended insulin infusion rates, and inadequate volume resuscitation. These results demonstrate a need for improved ED DKA management protocols.

Learning Objectives:

Review the goals of initial DKA management including blood glucose decline, insulin administration rates, and initial fluid resuscitation.

Identify appropriate maintenance fluids based on corrected serum sodium, potassium, and blood glucose values.

Self Assessment Questions:

1. What is the correct initial insulin infusion rate for patients being treated for DKA without first receiving a bolus dose?

- A: 0.1 units/kg/hr
- B: 0.05 units/kg/hr
- C: 0.14 units/kg/hr
- D: 0.2 units/kg/hr

Which is the correct maintenance fluid choice for patients with normal corrected serum sodium levels?

- A: 0.45% Sodium Chloride
- B: 0.9% Sodium Chloride
- C: 0.225% Sodium Chloride
- D: 3% Sodium Chloride

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-554-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY OF PHARMACOLOGIC VENOUS THROMBOEMBOLISM PROPHYLAXIS AFTER HEMORRHAGIC BRAIN INJURY

Kimberly P. Niver, PharmD*; Laura E. Aykroyd, PharmD, BCPS; Emily M. Hutchison, PharmD, BCPS

Indiana University Health, 1701 N. Senate Blvd, Room AG401, Indianapolis, IN, 46202

kniver@iuhealth.org

Background:

Hospitalized patients have several known risk factors for the development of venous thromboembolism (VTE). The concern for hematoma expansion, however, has historically prevented early pharmacologic VTE prophylaxis in the hemorrhagic brain injury population. While published guidelines from many large organizations include recommendations for pharmacologic VTE prophylaxis for some of these patient populations, the guidance is currently very broad and non-specific. In the absence of more specific recommendations and using published literature, Indiana University Health (IUH) developed algorithms for initiation of pharmacologic VTE prophylaxis in hemorrhagic stroke and traumatic brain injury patients.

Purpose:

The purpose of this study is to evaluate the safety of early pharmacologic VTE prophylaxis in adult patients admitted for hemorrhagic brain injury at IUH Methodist Hospital. The primary endpoint is bleeding complications, defined as development of new intracranial bleed or expansion of initial bleed, as detected by computed tomography (CT) or other imaging.

Methods:

This study is a retrospective chart review of adult patients admitted to IUH Methodist Hospital between June 2013 and June 2014 who received pharmacologic VTE prophylaxis within seven days of admission for hemorrhagic brain injury. Patients included had one or more of the following diagnoses: subarachnoid, intracerebral, extradural, subdural, or intracranial hemorrhage; skull fracture; and other unspecified intracranial injury. Patient data collected for study endpoints includes time to pharmacologic VTE prophylaxis initiation, contraindications to pharmacologic prophylaxis, time of initial stable head CT, presence of VTE, expansion of initial bleed, and ICU and total length of stay. Additional information evaluated includes gender, age, weight, estimated creatinine clearance, traumatic or non-traumatic injury, type of bleed, volume of blood on initial CT, pharmacologic agent used, Glasgow Coma Score on admission, and Injury Severity Score.

Results:

Results and conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize characteristics of traumatic brain injury patients that put them at increased risk for venous thromboembolism.

Identify patients with hemorrhagic brain injury who are appropriate candidates for pharmacologic venous thromboembolism prophylaxis.

Self Assessment Questions:

Which of the following factors contribute to the increased venous thromboembolism risk in traumatic brain injury patients? I. Reduction in fibrinolysis II. Prolonged immobility III. Tissue factor release

- A I and II
- B I, II, and IV
- C II, III, and IV
- D I, II, and III

In which of the following patients can pharmacologic venous thromboembolism (VTE) prophylaxis reasonably be considered at this time?

- A 46-year-old woman who presented with a non-traumatic intracranial hemorrhage
- B 75-year-old man with a stable head CT, INR 1.1, and PLT 40,000/ μ L
- C 63-year-old man who presented with a traumatic subarachnoid hemorrhage
- D 52-year-old woman with hematoma expansion on most recent CT, INR 1.5

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-555-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF HIGH DOSE VERSUS STANDARD DOSE OSELTAMIVIR IN CRITICALLY ILL PATIENTS

Zachary R. Noel, PharmD*; Melissa Thompson Bastin, PharmD, BCPS; Alexander H. Flannery, PharmD, BCPS

University of Kentucky HealthCare, 421 Redding Road, Unit 58, Lexington, KY, 40517

zrnoel2@uky.edu

Purpose: Since 2009, influenza (H1N1) has resulted in significant morbidity and mortality. Neuraminidase inhibitors, such as oseltamivir, are the mainstay for treating and preventing viral replication. Standard dosing of oseltamivir is 75mg twice daily for 5 days (adjusted for renal function); however, the WHO made recommendations in 2009 that administering 150mg twice daily for 10 days in critically ill patients may be appropriate. In spite of a lack of evidence supporting the efficacy of high dose oseltamivir, such dosing has been widely used in the critically ill population. In light of influenza pandemic proportions in recent years, supply shortages, and expense, the purpose of this study is to determine whether high dose oseltamivir is associated with improved outcomes in critically ill patients as compared to standard dosing.

Methods: Retrospective chart review of PCR positive influenza patients admitted to the intensive care unit at an academic medical center from January 1, 2007 to March 31, 2014. 106 patients met inclusion criteria. Exclusion criteria include patients who were admitted to the ICU for reasons other than influenza or influenza complications and patients treated at an outside hospital for greater than 48 hours. High dose oseltamivir was classified as 150mg twice daily, adjusted for renal function and/or renal replacement therapy. Baseline severity of illness is being determined by APACHE II score and observed outcomes include ICU length of stay, mechanical ventilator days, P:F ratios, and survival from the ICU. Oseltamivir duration of therapy and its effect on outcomes is being collected as a secondary outcome.

Results/Conclusion: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Outline current recommendations surrounding high dose oseltamivir and implications it may have on practice.

Review current literature on the safety and efficacy of high dose oseltamivir in humans.

Self Assessment Questions:

For severe or progressive clinical illness, the World Health Organization (WHO) stated it is reasonable to use oseltamivir at what dose in adults with influenza?

- A 75mg twice daily
- B 120mg twice daily
- C 150mg twice daily
- D 225mg twice daily

Which of the following statements most accurately reflects current recommendations and evidence supporting the safety and efficacy of high dose oseltamivir?

- A Randomized controlled trials have proven high dose oseltamivir to be superior to standard dose.
- B Although studies have shown a potential decrease in time to PCR positivity, high dose oseltamivir is not recommended.
- C High dose oseltamivir is associated with substantially more adverse effects than standard dose.
- D All critically ill patients should receive high dose oseltamivir.

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-556-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF ANTIMICROBIAL SELECTION AND DURATION IN ADULT INPATIENTS

Rebecca C Nolen*, Pharm.D.; Margaret M Cook, Pharm.D., BCPS, Dan Persells, Pharm.D.

Aurora St. Luke's Medical Center, 2900 W.
Oklahoma, Milwaukee, WI, 53215
rebecca.nolen@aurora.org

Purpose: Antimicrobial stewardship programs have a critical role in interdisciplinary decisions promoting optimal antimicrobial therapy. Proper selection, both empiric and definitive, along with appropriate duration of therapy optimizes patient outcomes, limits toxicity and super-infections, and minimizes risk of resistance by reducing antibiotic consumption. To achieve this goal, a process was designed and implemented to promote evidence-based, definitive antimicrobial selection and duration of therapy for inpatient management of non-critical adults.

Methods: This was a prospective, single-center, quasi-experimental study at a 680-bed, tertiary care medical center. Adult patients on cefepime, ceftriaxone, piperacillin/tazobactam or IV vancomycin for 48 hours or longer between January and March 2015 were included in the analysis. Patients were excluded if they were immunocompromised (e.g. HIV, active cancer, RA, SLE, organ transplant), less than 18 years of age, or pregnant. Treatment of osteomyelitis and CNS infections were also excluded. Electronic health record (EHR) alerts were created to trigger pharmacists to evaluate antimicrobial selection on day 3 of therapy. Cultures and susceptibilities as well as acuity of infection were reviewed for each patient to determine if optimization of their antimicrobial regimen was appropriate via switching from parenteral to enteral route, de-escalation, or discontinuation of antibiotics. A flag also alerted pharmacists at day 7 to trigger evaluation of duration of treatment with the prescribing physician. Results of interventions were documented in the pharmacists' EHR notes and compiled for further review with the Antimicrobial Stewardship Program team. The primary outcome was antimicrobial consumption with secondary outcomes of pharmacist time participating in interventions and results of the interventions.

Preliminary Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe a pharmacist-driven process which improves culture-directed, definitive therapy and optimal antimicrobial duration in adult inpatients

List three barriers to implementing an Antimicrobial Stewardship Program using EHR alerts to pharmacists

Self Assessment Questions:

Which of the following serves as an appropriate metric for antimicrobial consumption within pharmacist-driven Antimicrobial Stewardship Program?

- A: Patient satisfaction
- B: Improvement of physician antimicrobial prescribing
- C: Antibiotic consumption measured in days of therapy (DOT)
- D: Improvement in pharmacist-physician collaboration

Which of the following is a barrier to implementing a pharmacist-driven Antimicrobial Stewardship Program?

- A: EHR functionality
- B: Pharmacist time and integration into workflow
- C: Long-term support and sustainability
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-557-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TOTAL ANTIBIOTIC DAYS OF THERAPY 90 DAYS PRIOR TO CLOSTRIDIUM DIFFICILE DIAGNOSIS IN HOSPITALIZED PATIENTS

Sarah Normand*, PharmD, Lee Hruby, PharmD, Joanna Colgan, PharmD, BCPS, Noelle Wimer, PharmD, Kent Gierhart, RPh, MBA, Catherine Lea, RPh, BCACP, Ross Dierkhising, MS
Mayo Clinic Health System-Eau Claire, 1221 Whipple St, Eau Claire, WI, 54703
normand.sarah@mayo.edu

Purpose: Healthcare-associated Clostridium difficile infections (HA-CDI) are associated with high morbidity and mortality in hospitalized patients. The use of antibiotics is a strong risk factor for developing HA-CDI. Although nearly all antibiotics have been reported to contribute to the development of HA-CDI, broad-spectrum antibiotics are the most frequently associated. Longer exposure to antibiotics as well as exposure to multiple antibiotics may increase the risk for HA-CDI; however, even single dose perioperative prophylactic antibiotics have been associated with HA-CDI. The purpose of this study was to determine if the total days of antibiotic therapy in the 90 days prior to diagnosis of HA-CDI is associated with developing HA-CDI.

Methods: A retrospective, matched, case-control study was performed for patients who developed HA-CDI while hospitalized. The control group consisted of hospitalized patients who did not develop CDI and were matched to case patients by gender, relative age, hospital unit, length of hospital stay, and time period in which they were hospitalized. An index date, defined as the length of hospital stay before a case patient developed HA-CDI, was used to match control patients to case patients; control patients could theoretically become case patients if they developed HA-CDI after the index date.

Primary analysis consisted of conditional logistic regression modeling to estimate the association between days of antibiotic therapy and developing HA-CDI. Secondary analysis estimated the association of HA-CDI with the number of antibiotics and specific antibiotic use. Other potential risk factors for HA-CDI were included as covariates in the models. Odds ratios with 95% confidence intervals were estimated from the models to describe the level of association with HA-CDI.

Results: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify risk factors for the development of healthcare-associated Clostridium difficile infection in hospitalized patients.

Describe strategies that can be used to decrease the incidence of healthcare-associated Clostridium difficile infections.

Self Assessment Questions:

Which patient is at lowest risk of developing HA-CDI?

- A: 59 year old male with multiple myeloma admitted for weakness
- B: 82 year old female receiving levofloxacin and clindamycin for susp
- C: 50 year old male with history of GERD treated with sucralfate adm
- D: 30 year old female admitted for bowel resection due to severe Cro

Which of the following is the most appropriate strategy to minimize the risk of developing and spreading HA-CDI?

- A: Give prophylactic metronidazole to patients at high risk of develop
- B: Use alcohol-based hand sanitizer upon entering and leaving CDI p
- C: Administer probiotics to hospitalized patients receiving antibiotic t
- D: Deescalate antibiotic therapy once culture results are available

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-558-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INTRAVENOUS ACETAMINOPHEN IN CESAREAN SECTION PATIENTS: EFFECTS ON PAIN MANAGEMENT

Kristen C.J. Nowdomski, Pharm.D.*

Palos Community Hospital, 12251 South 80th Avenue, Palos Heights, IL, 60463

KNowdomski@paloscomm.org

Purpose: The objectives of this study are to determine if the use of opioid narcotics and their complications are reduced and if effective pain management is achieved with the use of intravenous acetaminophen in postoperative cesarean section patients. The use of intravenous acetaminophen for pain management is commonly used post cesarean section in this community hospital. Currently, it is unknown if intravenous acetaminophen provides adequate pain relief with reduced adverse effects or requirement of breakthrough pain medication.

Methods: A retrospective chart review from January 1, 2012 to December 31, 2014 was conducted to gather and analyze the use of intravenous acetaminophen and opioid narcotics, total doses of pain medications used within the first 24 hours, adverse effects of pain medications, medications used to manage adverse effects, cost, pain scores, and total acetaminophen intake within the first 24 hours. Additional information gathered included age, weight and type of anesthesia used. Patients were included in the study if greater than or equal to 18 years old, had a cesarean section completed between January 1, 2012 to December 31, 2014, and managed postoperatively in the hospital. Patients that were excluded include if intravenous acetaminophen was used for fever reduction.

Results and Conclusions: Data collection and analysis is currently undergoing. The results and conclusions of this research project will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the mechanism by which acetaminophen contributes to the multimodal pain management after cesarean section

Discuss the impact on opioid use and pain control post cesarean section when intravenous acetaminophen is added to the pain management regimen

Self Assessment Questions:

What is the mechanism of acetaminophen that provides pain relief?

- A: Inhibition of prostaglandin synthesis
- B: Up-regulation of cyclooxygenase-2
- C: Opioid receptor antagonist
- D: De-regulating substance P

Utilization of intravenous acetaminophen for post cesarean section showed differences in?

- A: Total opioids used
- B: Cost of pain management
- C: Pain scores
- D: Decrease in opioid complications

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-559-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTIEPILEPTICS IN THE TREATMENT OF STATUS EPILEPTICUS IN THE EMERGENCY DEPARTMENT

Jaclyn M. O'Connor*, PharmD, BCPS, Suprat Wilson, PharmD, BCPS, Phillip Levy, MD

Detroit Receiving Hospital, 4201 St. Antoine Blvd, Detroit, MI, 48201

jaclyn.m.oconnor@gmail.com

Purpose: The purpose of this study is to compare clinical outcomes of patients receiving phenytoin, levetiracetam, or valproic acid for the treatment of status epilepticus in the emergency department. Results of this study will provide direction in the optimal antiepileptic to use minimizing adverse effects, time to discharge, and time to seizure resolution.

Methods: This is a retrospective, cohort study of patients with a diagnosis of status epilepticus within the Detroit Medical Center from January 2008 to July 2014. Patients were identified using ICD-9 billing codes and admission diagnoses of seizure or status epilepticus. Eligible patients were those that received phenytoin, levetiracetam, or valproic acid while in the emergency department. Patients were excluded if they remained in status epilepticus when transferred out of the emergency department, required continuous infusions of antiepileptics to control seizure activity, or if seizure was attributed to new diagnosis of traumatic brain injury or tumor. Data collected includes patient demographics, pertinent laboratory data, total dose of antiepileptics received, vital signs after antiepileptic administration, adverse events, time to seizure cessation, length of stay, and disposition at discharge. Continuous data and nominal data will be compared using Student's t-tests and Pearson's chi-square, respectively, using SPSS version 21. P-values < 0.05 will be considered statistically significant.

Results: A total of 18,134 orders for antiepileptics were generated during the IRB-approved study period based on ICD-9 codes including seizure or status epilepticus. Phenytoin orders totaled 7,201 (39.7%), levetiracetam orders totaled 9,052 (49.9%), and valproate orders totaled 1,881 (10.4%). Preliminary screening eliminated 1,106 patients who were less than 18 years of age, and an additional 2,609 who experienced seizure outside of the emergency department.

Conclusions: Final results and analysis are expected to be completed by April 2015.

Learning Objectives:

Explain the pathophysiology of status epilepticus and define the mechanisms by which phenytoin, levetiracetam, and valproic acid work to promote seizure cessation.

Discuss the temporal relationship between antiepileptic administration, adverse events, and clinical outcomes in status epilepticus patients managed in the emergency department.

Self Assessment Questions:

What is the mechanism by which levetiracetam prevents seizure activity during status epilepticus?

- A: Enhances sodium efflux from neurons of the motor cortex
- B: Prevents hypersynchronization of epileptiform burst firing and propagation
- C: Increases concentrations of gamma-aminobutyric acid (GABA) in the synaptic cleft
- D: Reduces polysynaptic response and blocks post-tetanic potentiation

Which of the following is the most common adverse effect consideration with intravenous phenytoin administration?

- A: Altered mental status
- B: Hepatic failure
- C: Cardiac instability
- D: Unsteady gait

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-560-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CORRELATIONS BETWEEN PIPERACILLIN-TAZOBACTAM MINIMUM INHIBITORY CONCENTRATION AND CLINICAL OUTCOMES

J Nicholas O'Donnell, PharmD, BCPS*; Nathaniel J. Rhodes, PharmD, BCPS; John Z. Day; Rebecca S. Jett; Marc H Scheetz, PharmD, MSc, BCPS (AQ-ID)

Midwestern University / Northwestern Memorial Hospital, 251 E Huron St, Chicago, IL, 60611

jodonne1@nmh.org

Purpose

Susceptibility cut-points aim to identify a range of minimum inhibitory concentrations (MICs) wherein usual dosing adequately treats most infections. However, controversy exists over whether standard doses of piperacillin-tazobactam (TZP) will lead to optimal outcomes at current MIC susceptibility cut-points. Recent data suggest that even prolonged infusion or high-dose strategies may be insufficient for some if MICs are close to 16 mg/L. Our study will assess clinical outcomes of patients with Gram-negative bacilli (GNB) bloodstream infections (BSI) treated with TZP.

Methods

We will complete a retrospective, observational, cohort study designed to evaluate subjects with GNB BSI treated empirically with TZP. Patients will be included if they have at least one positive blood culture for GNB, were started on TZP therapy within the 48 hours before or after the positive culture was drawn, and received at least 24 hours of therapy. Patients will be excluded if they received less than 24 hours of therapy or had a polymicrobial bloodstream infection. Patients will only be included once during the study period. Subjects will be stratified based on TZP MIC. The primary outcome will be the incidence of in-hospital mortality stratified by TZP MIC. From this stratification, we will identify a contemporary pathogen MIC cut-point for TZP associated with improved outcomes. Secondly, we will look at time to in-hospital mortality and length of stay for survivors. Planned subgroup comparisons will be made based on extended spectrum beta-lactamase status, TZP dosing strategy employed, severity of illness scores at the time of infection, source of bloodstream infection, time to active therapy, and Gram-negative species.

Results and Conclusion will be presented at Great Lakes Residency Conference 2015

Learning Objectives:

Describe Pharmacokinetic/pharmacodynamic parameter most closely associated with the efficacy of piperacillin-tazobactam

Identify FDA/CLSI defined breakpoint minimum inhibitory concentration for susceptible organisms

Self Assessment Questions:

Which pharmacokinetic/pharmacodynamic parameter is most closely associated with the efficacy of piperacillin-tazobactam?

- A: Percent of time the concentration exceeds the minimum inhibitory
- B: The ratio of C_{max} to minimum inhibitory concentration (C_{max}:MIC)
- C: The ratio of the area under the exposure curve to the minimum in
- D: The ratio of the C_{min} to the minimum inhibitory concentration (C_m

What is the current FDA/CLSI defined breakpoint minimum inhibitory concentration for piperacillin-tazobactam?

- A: Less than or equal to 4
- B: Less than or equal to 8
- C: Less than or equal to 16
- D: Less than or equal to 32

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-561-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF -LACTAM ALLERGY GUIDELINES AT A LARGE ACADEMIC MEDICAL CENTER

Tristan O'Driscoll, PharmD, MPH, BCPS*; Amy Hanson, PharmD, BCPS; Sheila Wang, PharmD, BCPS, AQ-ID

Midwestern University / Rush University Medical Center, 555 31st Street, Downers Grove, IL, 605151235

todris@midwestern.edu

Purpose: -lactam allergies are the most commonly reported antibiotic allergies. Switching to another class of antibiotics due to a reported allergy may adversely affect patient care leading to less effective therapies, more adverse effects, increased costs, and higher resistance rates. To optimize antibiotic selection in patients with reported -lactam allergies and avoid negative consequences of antibiotic switching, a clinical practice guideline has been developed for use at our institution. These guidelines incorporate education on recent literature surrounding lactam allergies, tools such as penicillin skin tests, rapid inductions of drug tolerance, graded challenges, a cross-reactivity table, and a decision tree in order to aid practitioners in the safe treatment of patients with reported -lactam allergies. To better understand the potential impact of these guidelines, a review of previous patients with reported -lactam allergies at our institution was undertaken.

Methods: This is a single-center, retrospective cohort study evaluating the incidence, prevalence, and antimicrobial use of all outpatients and inpatients who reported a -lactam allergy during an admission to Rush University Medical Center from January 1, 2011 through December 31, 2014. Data analysis using descriptive and inferential statistics will be performed using SPSS.

Results: From 2011 through 2014, 19% to 26% of our admissions reported a -lactam allergy. However, only 7% to 8% of patients reported a possible Type I IgE-mediated reaction. Data is being collected on the use of clindamycin, vancomycin, levofloxacin, and aztreonam in reported -lactam allergic patients in order to correlate to a risk of Clostridium difficile, methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), and increased drug costs.

Conclusions: -lactam allergy guidelines have the potential to positively affect the outcomes of a large proportion of patients at our institution; the full impact of which will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Classify the risk of cross-reactivity between -lactams based on their structure

Report on the tools available for the treatment of patients with -lactam allergies

Self Assessment Questions:

Which of the following agents has an identical R1 side chain to aztreonam?

- A: Cefazolin
- B: Ceftazidime
- C: Piperacillin
- D: Ertapenem

Which of the following procedures creates a temporary state in a patient allowing for safe administration of an antigenic drug?

- A: Graded challenge
- B: Penicillin skin test
- C: Rapid induction of drug tolerance (desensitization)
- D: Test doses

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-562-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

NEGATING NEPHROTOXIC INJURY BY JUST IN TIME ACTION (NINJA) IN THE CRITICALLY-ILL PEDIATRIC PATIENT

Sara L. Ogrin, PharmD*; Jason P. Thomas, MD Candidate; Julia M. Steinke, MD; Emily K. D'Anna, PharmD; Christie J. Van Dyke, PharmD, BCPS

Spectrum Health, 100 Michigan Street NE, Grand Rapids, MI, 49503
sara.ogrin@spectrumhealth.org

PURPOSE: Acute kidney injury (AKI) in critically-ill children has a reported incidence ranging from 1%-82%. The purpose of this study is to improve safety and avoid harm from AKI in hospitalized critically-ill children receiving nephrotoxic medications. The primary objective is to identify children admitted to the pediatric intensive care unit at risk for developing AKI due to exposure to nephrotoxic medications. Secondary objectives include reducing the rate, severity, and duration of AKI through serum creatinine monitoring and drug therapy recommendations. **METHODS:** This initiative was approved as a quality improvement project by the Spectrum Health Institutional Review Board. To determine prevalence of AKI, baseline data was collected from July 1, 2014 to September 30, 2014. The NINJA initiative began on October 1, 2014. On weekdays, pharmacists reviewed Quality Compass Pathfinder to screen for patients 21 years or younger who received > 3 days of an intravenous aminoglycoside and/or > 3 nephrotoxic medications (from a list of twenty-five) for inclusion. Exclusion applied to patients admitted to the neonatal intensive care unit or patients with a kidney transplant and/or chronic kidney disease. Daily serum creatinine monitoring and/or drug therapy interventions were recommended by pharmacists within 24 hours once a patient met inclusion.

RESULTS: To date, 18 critically-ill pediatric patients have been identified as at risk for developing AKI due to exposure to nephrotoxic medications per NINJA criteria. Seven patients received > 3 days of an intravenous aminoglycoside and 11 patients received > 3 nephrotoxic medications. No patients developed AKI after starting the NINJA initiative versus 33% of patients during baseline data collection.

CONCLUSION: Identifying critically-ill pediatric patients at risk for developing AKI due to nephrotoxic medications and monitoring daily serum creatinine may reduce the rate of AKI. The effect on the extent of AKI severity and duration are yet to be determined.

Learning Objectives:

Identify common causes of acute kidney injury in hospitalized children
Recognize medications commonly attributing to acute kidney injury

Self Assessment Questions:

What is an increasingly common cause of acute kidney injury in hospitalized children?

- A Dehydration
- B: Nephrotoxic Medication Exposure
- C: Sepsis
- D: Primary Renal Disease

Which of the following medications may contribute to an increased risk for developing acute kidney injury in the critically-ill pediatric patient?

- A Azithromycin
- B Ampicillin
- C Cefazolin
- D Piperacillin-Tazobactam

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-929-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

CATHETER DIRECTED THROMBOLYSIS THERAPY TREATMENT OF PULMONARY EMBOLISM: AN OBSERVATIONAL ANALYSIS OF THE EKOS DELIVERY SYSTEM

Vishal Ooka, PharmD*; Amber Cummins, PharmD, BCPS; Kena Lanham, PharmD, BCPS; Kannan Natarajan, MD.

St. Vincent Health, 2001 W. 86th St., Indianapolis, IN, 46260
vooka001@stvincent.org

Purpose: Recently, the ULTIMA and SEATTLE II trials have shown positive outcomes when utilizing catheter directed thrombolysis (CDT) for patients presenting with submassive and massive pulmonary embolism (PE). Despite strict inclusion and exclusion criteria used in these controlled studies, results have been extrapolated to the majority of patients who present with PE requiring thrombolysis. Based on PE subtype (massive vs. submassive) and variable prescriber preference at our institution, the total amount and duration of thrombolysis may differ when CDT is utilized for PE. Thus, the purpose of this study is to evaluate the use of a catheter directed thrombolysis delivery system (EKOS: EndoWave Infusion Catheter System) in a general hospital setting for the treatment of submassive or massive PE and to make general comparisons to the ULTIMA and SEATTLE II trials.

Methods: A retrospective observational analysis of patients diagnosed with PE who received thrombolysis via EKOS from January 1, 2012 to December 31, 2014 will be included in this study. The primary objectives include observing the difference in mean pulmonary artery systolic pressure and oxygen saturation from baseline to device removal. Secondary objectives include observing changes in oxygen requirements before and after the procedure as well as observing the incidence of bleeding within 72 hours of the start of procedure, recurrent PE within 30 days, placement of an inferior vena cava placement, death within 30 days of procedure, ICU length of stay, and hospital length of stay. Additionally, patients meeting inclusion/exclusion criteria for the ULTIMA or SEATTLE II trial will be compared to patients who did not in a subgroup analysis.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the complications of pulmonary embolism.
Discuss the role of catheter directed thrombolysis treatment.

Self Assessment Questions:

Which of the following is a complication of massive pulmonary embolism if left untreated?

- A Right-sided heart failure
- B: Abdominal aortic aneurysm
- C: Heart block
- D: Hypertension

Thrombolytics act by:

- A Inhibiting platelet activation
- B Binding to fibrin and converting plasminogen to plasmin
- C Inhibit the conversion of fibrinogen
- D Binding to thrombin

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-563-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF POST-PROCEDURAL BRIDGING PRACTICES AT / VETERANS AFFAIRS ANTICOAGULATION CLINIC

Steven T. Orlando*, PharmD, Carla Staresinic, PharmD, BCACP, Megal Heim, PharmD, BCACP, Amanda Margolis PharmD, MS, BCACP
Veteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Madison, WI, 53705
Steven.Orlando@va.gov

Purpose: Low-molecular-weight heparin (LMWH), such as enoxaparin, is commonly used to bridge patients with high thromboembolic risk who require temporary interruption of warfarin for invasive procedures. LMWH is often continued until the international normalized ratio (INR) reaches therapeutic range. The practice at the William S. Middleton Memorial Veterans Hospital has been to resume the established warfarin maintenance dose following the procedure. Often patients will require several boost doses of warfarin to achieve a therapeutic INR and facilitate discontinuation of the LMWH. There is interest in determining the optimal warfarin dosing regimen to resume following procedures. A recent study showed that resuming warfarin with loading doses leads to faster achievement of therapeutic INR. The purpose of this evaluation is to determine the post-procedural bridging practices in a Veteran Affairs (VA) anticoagulation clinic, specifically the frequency and extent of "boost" dosing post-procedurally and the time to reach therapeutic INR.

Methods: This is a single-center retrospective analysis of patients on an established warfarin maintenance dose who received peri-procedural bridging for an invasive outpatient procedure. A query of the VA pharmacy database identified all patients prescribed enoxaparin from September 2013 - September 2014. One hundred eligible patients were randomly selected for review. The primary outcome was time to therapeutic INR. Secondary outcomes included magnitude of warfarin loading dose relative to maintenance dose and major bleeding and thromboembolic events within the first 30 days post procedure. Additional data collected included age, sex, weight, indication for warfarin, type of procedure, concurrent antiplatelets, enoxaparin and warfarin dosing, estimated creatinine clearance, INR day of procedure, and INR goal for procedure and therapy.

Results and Conclusions: pending

Learning Objectives:

List advantages and disadvantages of post-procedure warfarin loading dosing.

Describe results from past studies of warfarin loading doses in the peri-procedural setting.

Self Assessment Questions:

What is a potential advantage of post-procedure warfarin loading dosing

- A: Longer duration of LMWH use
- B: Shorter time to reach therapeutic INR
- C: Decreased bleeding risk
- D: Increased clotting risk

A 2011 study by Schultz and Bungard demonstrated that warfarin loading dosing after warfarin doses were withheld for a minimum of 4 consecutive days:

- A: Decreased time to reach therapeutic INR by about 15 days
- B: Decreased time to reach therapeutic INR by about 5 days
- C: Had no change on time to therapeutic INR
- D: Increased time to reach therapeutic INR by about 3 days

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-564-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF AN INSTITUTIONAL INSULIN INFUSION PROTOCOL AND TREATMENT GUIDELINES FOR HYPERGLYCEMIC CRISES

Zhen M. Ou, PharmD*; Jodi H. Fugate, PharmD, BCPS
Advocate Illinois Masonic Medical Center, 836 W. Wellington Ave., Chicago, IL, 60657
Zhen.OU@advocatehealth.com

Purpose:

Diabetic ketoacidosis (DKA) and hyperglycemic hyperosmolar state (HHS) are acute diabetic emergencies that are associated with serious complications if not promptly treated. Treatment of DKA and HHS requires the correction of dehydration, hyperglycemia, and electrolyte disturbances. Studies have shown that implementation of institutional guidelines for the management of hyperglycemic crises have improved clinical outcomes, including decreased time to anion gap closure and decreased length of stay. At AIMMC, DKA and HHS treatment guidelines were updated to include a nurse-driven insulin infusion protocol and computerized order set. The purpose of this project is to evaluate treatment outcomes and compliance to the DKA and HHS treatment guidelines before and after the revised guidelines were implemented.

Methods:

This study was exempt from IRB approval on the basis of its quality improvement design and is a retrospective cohort study. Pre-implementation data collected from July 2013 through June 2014 will be compared to post-implementation data collected from January 2015 through April 2015. The study population includes all patients >18yo with diagnosis of a hyperglycemic crises and weighing >40kg. Patients with diagnosis of a hyperglycemic crises not initiated on an insulin infusion were excluded. The primary endpoint is time to attainment of goal blood glucose of 200-250 mg/dL. Secondary endpoints evaluating efficacy, safety, and compliance include: time to anion gap closure for DKA, time to normalized osmolality for HHS, number of hypoglycemic episodes, appropriateness of the initial insulin infusion rate and subsequent rate changes, incidence of hypokalemia, assessment of IV fluid management and conversion from intravenous (IV) to subcutaneous (SubQ) insulin administration.

Results/Conclusions:

Data Collection and analysis are in progress. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify treatment goals for DKA and HHS.

List improved outcomes associated with the implementation of institutional DKA and HHS guidelines, as supported by literature.

Self Assessment Questions:

Which of the following must be corrected to appropriately manage DKA and HHS?

- A: Dehydration
- B: Hyperglycemia
- C: Electrolyte disturbances
- D: All of the above

Based on current literature, which of the following treatment outcomes have been associated with implementation of an institutional DKA and HHS guideline?

- A: Decreased time to anion gap closure
- B: Increased ICU length of stay
- C: Increased hospital length of stay
- D: Increased time to ketone clearance

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-565-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF WORKFLOW ENHANCEMENTS IN EMERGENCY DEPARTMENTS AT AN INTEGRATED HEALTH SYSTEM

*Vysakh V. Padiyara, PharmD and Adam R. Linstedt, PharmD, BCPS
NorthShore University HealthSystem, NorthShore University
HealthSystem, 2650 Ridge Ave., Evanston, IL, 60201
vpadiyara@northshore.org

Purpose:

The use of electronic medical records (EMR) to order, dispense, and monitor administration of medications used in emergency departments (ED) have allowed for observations of delays in administration of time-sensitive medications. The purpose of this project is to implement enhancements to the workflow of EDs at hospitals of an integrated health system, to allow for improved communication about and prompt administration of time-sensitive medications.

Methods:

This project is exempt from review by the Institutional Review Board because it is a quality improvement process. Enhancements to the current ED workflow and target medications were identified through meetings with the head and associate head of emergency medicine for all hospitals within the health system. Target medications were deemed time-sensitive from a clinical perspective and included prothrombin complex concentrate (PCC), antibiotics, antiepileptic medications and tissue plasminogen activator. Orders for these medications were defaulted to "STAT" priority when physicians entered the order, to ensure timely verification and dispensing from the pharmacy. Custom stickers were created for time-sensitive medications, instructing pharmacy technicians to communicate with the ED nurse when said medications were delivered from the pharmacy. Orders for PCC for an indication that could not be clinically managed at the ordering site were routed by the verifying pharmacist to another hospital within the health system and prepared for administration at the receiving site. The pharmacist utilized a custom note template to communicate this via the EMR as well as via phone communication. Finally, a new EMR function implemented in the ED allows nurses and physicians to check the status of a medication order after the order is placed to better coordinate timely administration of the target medication.

Results/Conclusion:

The progress, barriers, results and conclusions of the implementation of these enhancements will be presented at the Great Lakes Residency Conference in April 2015.

Learning Objectives:

Outline the process for implementing multiple enhancements to an existing workflow.

Recognize benefits and challenges associated with implementing multiple ED workflow improvements concurrently.

Self Assessment Questions:

Which of these medications is considered time-sensitive from a clinical perspective?

- A: Bisacodyl
- B: Tissue plasminogen activator
- C: Acetaminophen
- D: Simvastatin

What is challenging about implementing multiple workflow enhancements concurrently?

- A: Coordinating approval process for multiple enhancements, rolling out
- B: Overwhelming enthusiasm from staff
- C: Decrease in time from order to administration of time-sensitive medications
- D: Improvements in communication between pharmacy and ED staff

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-831-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE IMPACT OF HOSPITAL-BASED CLINICAL PHARMACY SERVICES IN AMBULATORY COPD PATIENTS

Valerie A. Palmer, PharmD*; Nada Farhat, PharmD Candidate 2015; Nancy C. MacDonald, PharmD, BCPS; James S. Kalus, PharmD, BCPS (AQ CV), FASHP; Krishna Thavarajah, MD, MS; Bruno DiGiovine, MD, MPH; Amber Lanae Smith, PharmD, MS, BCPS

Henry Ford Health System, 324 Hendrie St Apt 19, Detroit, MI, 48202
vpalmer1@hfhs.org

Purpose: Limited literature exists assessing pharmaceutical involvement in Chronic Obstructive Pulmonary Disease (COPD) care. This study was the first to evaluate an ambulatory care model integrating a pharmacy service bundle to improve COPD management and outcomes. The purpose was to validate the impact of a pharmacist in the ambulatory management of COPD through targeting medication optimization, patient adherence, patient education, and core measure elements for patients with COPD within a new collaborative practice model in the hospital-based ambulatory care setting. A standardized bundle service was performed by the pharmacist and consisted of: medication therapy management, evaluation of patient access to medications, patient education, and assessment of quality measures. This study aimed to advance a pharmacist's role as an ambulatory healthcare provider improving patient outcomes, knowledge of disease state, quality of life, and satisfaction.

Methods: The Henry Ford Hospital (HFH) Institutional Review Board approved this retrospective cohort analysis. We identified patients with COPD seen in the HFH Pulmonary Outpatient Clinic in Detroit, Michigan (Patients 18 years of age or older with a diagnosis of COPD (spirometry confirmed) were included. We excluded pregnant women, patients enrolled in hospice or palliative care, and patients with lung cancer. The specific aims were: (1) to identify the impact of a pharmacist-provided clinical service bundle on the management of COPD in an ambulatory setting and (2) to establish that compliance with the clinical service bundle improves predetermined clinical and humanistic outcomes. The primary outcome was compliance with the pharmacy service bundle; compliance was defined as satisfactory completion and documentation of the four metrics of the bundle. Secondary outcomes included clinical worsening, healthcare utilization, and patient and provider satisfaction. **Results/Conclusion:** Data collection and analysis are ongoing. The results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the implications of poorly managed COPD

Identify services a hospital-based ambulatory care pharmacist may perform to optimize outpatient therapy management for patients with COPD

Self Assessment Questions:

Poor management of COPD may lead to:

- A: Decreased COPD-related emergency department visits
- B: Decreased COPD-related re-admission rates
- C: Decreased health care costs
- D: Increased health care utilization

A 67 year old female follows up at the pulmonary hospital-based ambulatory care clinic after a recent admission to the hospital for a COPD exacerbation. After the provider meets with the patient, he r

- A: Patient education, medication adherence assessment, disease dia
- B: Medication reconciliation, medication optimization, evaluation and
- C: Inhaler device technique review, prescription administration, medic
- D: Smoking status assessment, medication history, patient educatio

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-566-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PATIENT HEALTH LITERACY ON PHARMACIST'S WORKLOAD IN AN AMBULATORY CARE SETTING

Renee E. Papageorgiou, PharmD*; Jill Borchert, PharmD, BCPS, FCCP
Mary Ann Kliethermes, PharmD

Midwestern University, 555 31st Street, Downers Grove, IL, 60515
rpapag@midwestern.edu

PURPOSE: There are currently no formal studies regarding the relationship of health literacy level and required patient visit times. The objective of this study is to use the Short Assessment of Health Literacy (SAHL) assessment to measure health literacy and its impact on pharmacist workload. The primary objective is to discover whether level of health literacy affects a pharmacist's workload provided during one clinic visit. The secondary objective is to determine if there is a difference in time spent completing various pharmacist tasks during and after a clinic visit between health literacy groups.

METHODS: All patients scheduled for an appointment with a clinical pharmacist at the study site on a data collection day will be eligible to participate in the study. English speaking patients, age 18 and older, that are able to fill out the demographic questionnaire and respond to the SAHL assessment, will be asked to participate. All study subjects will complete a demographics questionnaire about the patients age, ethnicity, education level, estimated income, and healthcare coverage, followed by the administration of the 18-item SAHL assessment. After the questionnaire and assessment are completed, the patient visit will begin. The research assistant will remain in the room and will observe the visit, and record how many minutes are spent on various tasks completed during the visit including, but not limited to: comprehensive medication review, identify drug-related problems, identify non-adherence, patient interview, plan development, drug therapy recommendation, and patient education. The total clinic visit time will be recorded, as well as any time spent completing tasks related to the patient following the clinic visit (writing patient note, ordering refills, ordering labs, etcetera).

RESULTS: No preliminary results are available at this time.

Learning Objectives:

Define health literacy

Identify outcomes of inadequate health literacy

Self Assessment Questions:

Health literacy is:

- A The ability to read health related information
- B: The degree an individual obtains, processes and understands bas
- C: The ability to understand health terms
- D: None of the above

Inadequate health literacy can result in:

- A Poor understanding of health information
- B Poor health outcomes and increased healthcare costs
- C Misunderstanding prescription instructions
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-832-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF DEXMEDETOMIDINE IN BRAIN INJURED PATIENTS

Alison M. Paplaskas Pharm.D.*, Maria Pusnik Pharm.D., BCPS, Linda Park Pharm.D., BCPS, Dennis Parker Jr. Pharm.D.

Detroit Receiving Hospital, 4201 St. Antoine Blvd, Detroit, MI, 48201
apapask@dmc.org

Purpose: Dexmedetomidine is a highly selective alpha2-adrenoreceptor agonist that produces sedation and asserts an analgesic-sparing effect. Dexmedetomidine is approved for use for peri-procedural sedation and sedation of mechanically ventilated patients in the intensive care setting. The reported advantages of dexmedetomidine in critically ill patients include the lack of respiratory depression, reduced rates of delirium, and a reduction in ventilator days when compared to benzodiazepine based sedation regimens.

Hypotension in the early resuscitation phase for patients with severe head injury has been associated with an increase in mortality up to 50% and has also been linked to adverse clinical outcomes including decreased functional status and decreased rate of discharge to home. The primary adverse effects of dexmedetomidine include hypotension and bradycardia. Use of dexmedetomidine beyond 24 hours has been associated with tolerance and tachyphylaxis and a dose-related increase in adverse reactions. The primary objective of this study is to evaluate the incidence of cardiovascular adverse effects of dexmedetomidine in brain injured patients. The secondary objective is to evaluate the opioid-sparing effects of dexmedetomidine when used for sedation in the brain injured patient.

Methods: A retrospective analysis will be performed on patients admitted to Detroit Receiving Hospital who are prescribed dexmedetomidine from 2007 through October 2014. Data collection will include patient demographics, past medical history, and admission diagnosis. The characteristics of dexmedetomidine therapy will be documented including bolus dose (if given), initial infusion rate, maximum infusion rate for the initial 48 hours of therapy, and total length of therapy. The incidence of cardiovascular adverse effects including hypotension and bradycardia, and required interventions will be recorded. Opioid therapy (in fentanyl equivalents) and non-dexmedetomidine sedative use will be recorded for 24 hours prior to and after initiation of dexmedetomidine.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the negative impact of hypotension on clinical outcomes in patients with brain injuries.

Discuss the role of dexmedetomidine use in patients with brain injuries.

Self Assessment Questions:

Which of the following was dexmedetomidine use associated with in the MENDS trial?

- A Hypotension
- B: Delirium
- C: Coma
- D: Bradycardia

Hypotension in brain injured patients has been linked to:

- A Increased mortality
- B Decreased functional status
- C Decreased rate of discharge to home
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-567-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF LIPOSOMAL BUPIVACAINE AND TRADITIONAL PAIN MANAGEMENT ON POST-OPERATIVE OPIOID USE IN A COMMUNITY HOSPITAL SETTING

Brittany Parmentier, PharmD*; Sarah Saft, PharmD, BCPS; Shannon Smallwood, PharmD, BCPS

Community Health Network / Butler University, 1500 N. Ritter Ave., Indianapolis, IN, 46219

bparmentier@ecommunity.com

Purpose: Postoperative pain is a common occurrence after surgery and can have an impact on a patient's recovery. Liposomal bupivacaine is indicated for administration into the surgical site to produce postsurgical analgesia. Locally administered bupivacaine HCl provides an analgesic effect for 8-12 hours, but liposomal bupivacaine is expected to provide a longer analgesic effect up to 72 hours. Theoretically, this would lead to decreased doses of other analgesic medications. The literature support for this agent in larger, randomized controlled trials comparing liposomal bupivacaine to an active control is still minimal. The objective of this study is to determine use of post-operative opioids in abdominal, colorectal, and genitourinary surgery patients receiving liposomal bupivacaine compared to a traditional pain management strategy. The primary outcome is the difference in total post-operative opioids administered in morphine equivalents at 72 hours after surgery. **Methods:** Inpatients from three network hospitals with orders for liposomal bupivacaine between December 1, 2013 and August 31, 2014 were identified by Epic Clarity report. A total of 100 abdominal, colorectal, and genitourinary surgery patients were included for a retrospective, observational chart review study. Subjects were then matched to a historical control based on surgery type and surgeon from December 1, 2012 to August 31, 2013 prior to liposomal bupivacaine approval for formulary. Collected data for outcomes includes: patient demographics, type of surgery, surgeon, anesthesiologist, opioid use in post-anesthesia care unit (PACU) and at 24, 48, and 72 hours post-op (converted to morphine equivalents), pain scores in PACU and at 24, 48 and 72 hours post-op, length of stay from end of surgery until discharge, pharmacy costs of post-surgical related medications, time to first use of opioid rescue medication, and adverse events. **Results/Conclusion:** To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify potential advantages to using a long-acting local anesthetic to treat surgical pain.

State characteristics of liposomal bupivacaine that make it advantageous for post-operative analgesia.

Self Assessment Questions:

Which of the following is a potential advantage to using a long-acting local anesthetic during surgery?

- A: Decreased doses of opioid medications
- B: Less frequent monitoring of pain scores
- C: No adverse effects to monitor
- D: Shorter time in surgery

Which of the following is true?

- A: Liposomal bupivacaine is FDA approved only for pain related to heart surgery
- B: Liposomal bupivacaine is expected to provide an analgesic effect for up to 72 hours
- C: Liposomal bupivacaine is intended for multiple-dose administration
- D: The dose of liposomal bupivacaine is always 266 mg

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-568-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A NATIONAL CALCIUM GLUCONATE SHORTAGE IN ICU PATIENTS RECEIVING PARENTERAL NUTRITION

Jasmine U. Patel, PharmD*, Lina Y. Qasem, Patrick Larabell, BA, BS, William Arthur, RPh, Peter Whittaker, PhD, Steven Tennenberg, MD, Bryan Dotson, PharmD, BCPS

Harper University Hospital, 3990 John R, Detroit, MI, 482012018

jpate13@dmc.org

Purpose: Hypocalcemia is linked to increased mortality in ICU patients. It is unknown if this association is causal, and studies suggest that calcium administration during critical illness may worsen outcomes. We sought to assess the impact of a national calcium gluconate shortage or calcium administration, ionized calcium (iCa) levels, and clinical outcomes in ICU patients receiving parenteral nutrition (PN). **Methods:** A retrospective study was conducted in adults who received PN in the ICU for ≥ 48 hours at Detroit Medical Center hospitals. Patients were categorized into two groups: pre-shortage (PS, Jan 2012 to Jan 2013, n = 135) and during-shortage (DS, Feb 2013 to March 2014, n = 133). **Results:** The amount of parenteral calcium administered in grams of calcium gluconate equivalents, which included calcium in PN and supplementation outside of PN, was considerably higher in the PS group (1.63 \pm 0.71 vs 0.17 \pm 0.37 g/day, p < 0.00001). IV calcium supplementation was higher in the DS group (0.06 \pm 0.15 vs 0.15 \pm 0.36 g/day, p = 0.006). Mean iCa while on PN was lower in the DS group (1.18 \pm 0.1 vs 1.12 \pm 0.08 mmol/L, p < 0.0001). Mild (iCa < 1.13 mmol/L) and moderate (iCa < 1 mmol/L) hypocalcemia were more prevalent in the DS group (57% vs 79%, p < 0.0001, and 12% vs 25%, p = 0.013, respectively). The occurrence of severe hypocalcemia (iCa < 0.9 mmol/L) was similar in both groups (7% vs 8%, p = 0.713). No significant differences were detected between groups for organ dysfunction, length of ICU stay, or mortality. **Conclusions:** As a consequence of a national calcium gluconate shortage, ICU patients receiving PN had a substantial decrease in calcium exposure. This was associated with lower iCa levels and an increased prevalence of hypocalcemia. Clinical outcomes were unaffected.

Learning Objectives:

Discuss causes of drug shortages and how they may adversely affect patient care.

Explain why the routine administration of parenteral calcium during critical illness is an area of controversy.

Self Assessment Questions:

Which of the following is a common cause of drug shortages?

- A: Available supplies that exceed demands
- B: Manufacturing problems
- C: Excess of raw materials
- D: Financial incentives to produce a product

When would a provider recommend administering parenteral calcium in an ICU patient?

- A: Patient with an iCa of 0.85 mmol/L, who is in shock.
- B: Patient experiencing shortness of breath.
- C: Patient experiencing hypercalcemia.
- D: Patient with acute kidney injury.

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-569-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RISK FACTOR EVALUATION FOR PIPERACILLIN/TAZOBACTAM RESISTANCE IN CRITICALLY ILL PATIENTS WITH HEALTHCARE ASSOCIATED PNEUMONIA (HCAP)

Twisha S. Patel, PharmD, BCPS*, Cesar Alaniz, PharmD, Danielle Fan, Jerod L. Nagel, PharmD, BCPS (AQ-ID)

University of Michigan Health System, 1500 E. Medical Center Dr., Ann Arbor, MI, 48103

twishap@med.umich.edu

Purpose: Piperacillin/tazobactam is often employed as first-line therapy in critically ill patients with HCAP due to its broad spectrum of activity. However, piperacillin/tazobactam resistance can be common in this population. Thus, there is interest in identifying patients who are at highest risk for harboring these resistant pathogens. The objective of this study is to identify risk factors for piperacillin/tazobactam-resistant gram-negative bacteria in critically ill patients with healthcare associated pneumonia (HCAP).

Methods: This is a single-center, retrospective, case-case-control study conducted at a university-affiliated tertiary medical center. Adult patients (≥18 years old) admitted to the intensive care unit with HCAP will be divided into three groups: those with piperacillin/tazobactam-resistant gram-negative infections, those with piperacillin/tazobactam-sensitive gram-negative infections, and those without a positive culture. Patients will be excluded if they have cystic fibrosis, documented bacterial colonization, or if they were transferred from an outside hospital with incomplete records. Information will be obtained from the patients' medical record and will be maintained confidentially. Data collected for each patient will include demographic, clinical and microbiological information. The primary outcome of this study is to identify risk factors for piperacillin/tazobactam resistance using logistic regression. Secondary outcomes include creation and analysis of a dual-axis antibiogram based on observed resistance patterns. Additionally, clinical outcomes will be evaluated including 30-day all-cause hospital mortality, total hospital length of stay, and length of intensive care unit stay.

Results: In progress.

Conclusions: In progress.

Learning Objectives:

Define healthcare associated pneumonia as described by the Infectious Diseases Society of America and the American Thoracic Society.

Identify risk factors for multidrug-resistant organisms causing healthcare associated pneumonia.

Self Assessment Questions:

1. According to the IDSA guidelines, which of the following patients is at risk for healthcare associated pneumonia?

- A: A 90 year-old female who lives at home.
- B: A 45 year-old male with several comorbidities including asthma, diabetes, and chronic kidney disease.
- C: A 65 year-old female who resides in a nursing home.
- D: A 21 year-old soccer player.

Which of the following statements is true regarding studies evaluating risk factors for healthcare associated pneumonia caused by multidrug-resistant organisms?

- A: All proposed scoring tools have been prospectively validated.
- B: The definition of a multidrug-resistant organism is variable among studies.
- C: The same risk factors have been consistently identified in all of the studies.
- D: The studies conclude that risk stratification is not an appropriate approach.

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-573-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF AN ELECTRONIC REPORT TO PROVIDE PREDICTED FLUID AND CALORIE DATA FOR USE IN NEONATES.

Dipale Patel, PharmD, MBA,* Karen Kelly, PharmD

NorthShore University HealthSystem, 9600 Gross Point Road, Skokie, IL, 60076

dpatel2@northshore.org

Purpose: Infants in the neonatal intensive care unit are often critically ill and it is vital to calculate the daily fluid and caloric needs for adequate hydration and nutrition. Monitoring the total amount of fluids and calories that a neonate receives from medications, free fluids, enteral formula feeds and parenteral nutrition is required for proper medical management. Currently, the information used to monitor fluid and calorie intake is located in multiple locations within the electronic medical record. The purpose of this project is to provide practitioners a clinical decision support tool that will provide predicted fluid and calorie information in a single dynamic report format.

Methods: A taskforce of pharmacists, dietitians, nurses, physicians, and health information technologists was gathered to discuss implementation of this report to provide real time calculation of predicted fluids and calories at the point of order entry. Enteral feedings, intravenous fluids and drips and total parenteral nutrition (TPN) specific to the neonatal population were identified to be included in the clinical decision support report. The primary endpoint is the number of days to reach goal calorie amount in patients with enteral feeds while receiving TPN. A retrospective review of the data pre- and post-implementation of the report will be performed.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain why fluid and caloric goals are closely monitored in the neonatal population

Describe the impact on workflow from implementation of the report

Self Assessment Questions:

Identify which of the following should be accounted for when assessing the total fluids and caloric needs for the neonate

- A: Enteral Feeds
- B: Fluids
- C: Parenteral Nutrition
- D: All of the above

2. Choose the most appropriate statement that describes the report

- A: This report calculates the total fluids volume the patient should receive
- B: The report provides predicted fluid and calorie information
- C: The report displays information solely about the current TPN order
- D: The report compares the nutritional status of multiple patients simultaneously

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-834-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF MODIFIED AAP GUIDELINES IMPLEMENTATION ON OSTEOPENIA OF PREMATURITY MARKERS

Kuntal Patel, Pharm.D.*, Victoria Geraldo, MD, Heather Vaule, MS, RD, CNSC, Pavel Prusakov, Pharm.D., BCPS

Sinai Health System, 1500 S. Fairfield Avenue, Chicago, IL, 60677

kuntal.patel@sinai.org

Purpose: Osteopenia of prematurity (OP) is common and serious complication among prematurely born infants. The severity of osteopenia is influenced by many factors including, but not limited to, gestational age, birth weight, feeding practices, such as prolonged use of parenteral nutrition, and the concurrent use of specific medications, such as loop diuretics, glucocorticoids, or methylxanthines. The intake of calcium, phosphorus and vitamin D is of special concern in premature neonates and goals for intake are unique among these patients. This is because approximately 80% of bone accretion occurs during the last trimester and replicating in utero conditions is extremely challenging. Suboptimal supplementation and monitoring can lead to decreased bone development and subsequent fractures. In April 2014, Mount Sinai (MSH) Neonatal ICU implemented a service entitled "bone rounds" (BR) which identifies premature infants at high-risk for developing OP and ensures optimal supplementation of key vitamins and minerals based on guidelines published by the American Academy of Pediatrics (AAP) in 2013. Information as to compliance to AAP recommendations and subsequent outcomes in relation to the BRs is wanting and needs to be evaluated in this inner city urban population.

Methods: A retrospective chart review of premature neonates will be conducted from April 2013 to September 2014. Patients meeting the following criteria will be included in the analysis: gestational age < 27 weeks, birth weight < 1500g, TPN > 21 days, use of loop diuretics or corticosteroids for > 7 days, history of alkaline phosphatase > 1000 U/L, chronically low phosphate (< 4 mg/dL), and inability to tolerate oral nutrition.

Objective: The primary objective is to compare the incidence of radiographically confirmed osteopenia between patients prior to and following the implementation of BR.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize factors the put prematurely born infants at high-risk for developing osteopenia

Describe the relationship between prematurity, concomitant disease states, medication and TPN use on the severity of osteopenia of prematurity

Self Assessment Questions:

Which of the following factors contributes to bone mass reduction in neonates?

- A: Premature birth
- B: Prolonged dependence on total parenteral nutrition
- C: Corticosteroid use for an extended duration
- D: All of the above

Which of following laboratory markers is most important in monitoring for osteopenia?

- A: Total bilirubin
- B: Alkaline phosphatase
- C: Alanine aminotransferase
- D: Aspartate aminotransferase

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-570-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A STRATEGY TO DISCONTINUE EMPIRIC VANCOMYCIN FOR HEALTH-CARE ASSOCIATED PNEUMONIA

Puja C Patel, PharmD*; Hee Jung Kang, PharmD, BCPS

Swedish Covenant Hospital, 5145 North California Avenue, Chicago, IL, 60625

pupatel@schosp.org

Purpose: Infectious Diseases Society of America (IDSA) guidelines recommend the use of sputum cultures as a tool for de-escalation in patients with health-care associated pneumonia (HCAP). However, no clear guidance is available on de-escalation strategies in patients without sputum cultures. The objective of this study was to develop and implement a strategy for early discontinuation of vancomycin in patients with suspected HCAP when sputum cultures are or are not available.

Methods: A retrospective chart review from July 2013 to July 2014 identified 50 patients initiated on empiric vancomycin for suspected HCAP. These medical records were reviewed to determine if sputum cultures were obtained, the timing of the cultures in relation to antibiotic initiation, and whether antibiotics were de-escalated based on sputum culture results.

Results: Of the 50 patients screened, 30 (60%) patients did not have any sputum cultures and the remaining 20 (40%) patients had sputum cultures which were obtained 12 or more hours after antibiotic initiation. Of these 20 patients, antibiotics were de-escalated in only five (25%) patients based on sputum culture results.

Conclusions: A lack of sputum cultures in 60% of patients and the low rate of de-escalation in those with sputum cultures identified potential areas for improvement. The current emergency department pneumonia order set and ventilator order set will be updated to include sputum cultures. By obtaining appropriately timed sputum cultures, clinical pharmacists could review culture results on the third day of vancomycin therapy and recommend de-escalation accordingly. A protocol is being developed to guide pharmacists with antibiotic selection consistent with IDSA guidelines. In patients unable to produce sputum, nasal and throat surveillance cultures will be utilized as an alternative method to guide vancomycin discontinuation. In-services will be provided to emergency room and pharmacy staff on the new de-escalation protocol and order set changes

Learning Objectives:

Discuss Infectious Diseases Society of America guideline recommendations for de-escalation of empiric antibiotic regimens

Review the risk factors for multi-drug resistant pathogens in health-care associated pneumonia

Self Assessment Questions:

What are Infectious Diseases Society of America guideline recommendations when clinical improvement is seen at 48-72 hours and lower respiratory tract cultures are negative?

- A: Continue empiric antibiotics for 7-8 days
- B: Consider stopping antibiotics
- C: De-escalate therapy to a more narrow agent
- D: No recommendations are provided

Which of the following is not considered a risk factor for health-care associated pneumonia?

- A: Home wound care
- B: Family member with a multi-drug resistant pathogen
- C: Hospitalization for 2 or more days in the preceding 120 days
- D: Chronic dialysis within 30 days

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-571-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A COMMUNITY PHARMACIST PROVIDED MEDICATION ADHERENCE COUNSELING SERVICE ON PATIENT FOLLOW-UP WITH PHYSICIAN AND SUBSEQUENT MEDICATION REFILLS

*Payal D. Patel, Pharm D; Chandni Patel, Pharm D; Jeffrey Hamper, Pharm D; Caitlin Malone, Pharm D; Beatrice Drambarean Pharm D, BCPS, BCACP

Jewel-Osco Pharmacies / University of Illinois at Chicago, 3030 Cullerton, Franklin Park, IL, 60131

payal.d.patel@albertsons.com

Purpose: Medication non-adherence creates a significant cost to the healthcare system. Clinical studies have shown that non-adherence is responsible for 33-69% of all medication related hospitalizations. These hospitalizations can cost as much as \$100 billion per year. Studies conducted in inpatient settings have shown that care transition pharmacists providing intensive adherence related discharge counseling can have a significant impact on decreasing the number of hospital readmissions. Studies assessing the impact on community pharmacist provided adherence support on similar outcomes are lacking. The purpose of this study is to evaluate the impact of a community pharmacist driven medication adherence program on patient adherence and physician follow-up.

Methods: Eligible patients will be identified by pharmacists based on hospital designation on the prescription hard copy. Patients who meet all of the following criteria will be included: discharged from a hospital within 7 days of presenting to the pharmacy, have a discharge prescription for a chronic medication intended for greater than 30 days of use, and provide consent. Eligible subjects will be placed into either a control group or intervention group. Subjects in the intervention group will receive a telephone call from a pharmacist at 7 and 21 days post identification. These calls will assess the patients understanding of new medications, adherence to chronic discharge medications, and the patients follow-up with the referred physician after discharge. At 30-37 days post identification, the medication profile for all patients will be reviewed for chronic discharge medications designated as picked-up. Adherence specific data collected from patient profiles will be compared between patients who received intensive counseling and control patients who did not. This will determine if this service resulted in a difference in medication adherence rates.

Results/Conclusions: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the five dimensions of adherence as defined by the World Health Organization and interventions that can be made within these areas to improve adherence.

Review the statistical trends involving medication adherence related hospital admissions in the US.

Self Assessment Questions:

Which of the following is a pharmacist provided intervention that can be made within the therapy-related dimension of adherence?

- A Refer a patient to a social support group that will provide medication
- B Recommend an agent that is dosed once daily instead of three times
- C Educate healthcare providers about changes in treatment guidelines
- D Encourage a patient to utilize a pillbox to help them form and maintain

What percentage of medication related hospitalizations are attributed to medication non-adherence?

- A 33-69%
- B 73-89%
- C 8-15%
- D 13-25%

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-833-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PROMOTING A CULTURE OF SAFETY THROUGH FOCUSED EDUCATIONAL SESSIONS TO IMPROVE MEDICATION ERROR REPORTING.

Parth V Patel, Pharm.D.*; Tahmeena Siddiqui, Pharm.D.; Christopher Dykstra, Pharm.D., MBA; Rahim Mohammadali, Pharm.D. BCPS; Lijian Cai, Pharm.D.; Cara Burditt, Pharm.D.

Wheaton Franciscan – St. Joseph Campus, 5000 W. Chambers St., Milwaukee, WI, 53210

Parth.Patel@wfhc.org

Purpose: Medication errors cost hospitals about \$21 billion across the United States. One significant component in managing medication risks is through establishing a culture of safety. Improving the culture of safety is an ongoing process with one of the key elements being increased medication safety incident reporting. One way to promote this is by educating clinicians on medication reporting. The goal of this study is to promote an improved culture of safety and increase medication error reporting.

Methods: This study will be conducted on the general medicine floor of a community, teaching hospital. An initial questionnaire will be given to clinicians before each focused educational session to assess awareness on medication error reporting. The clinicians will include medical and pharmacy residents, pharmacists and nurses. Educational sessions will be delivered via in-services in January 2015. The medication error data from Quarter 4 of 2014 will be compared to the data from Quarter 1 of 2015 to assess significant improvements in error reporting are present. Medication error reports will be qualitatively-assessed based on patient demographics, severity level, narrative description and where in the medication process the error occurred in.

Results: In Quarter 4 of 2014, there were 251 incidences that were reported. Pre-questionnaire results showed 41% of the respondents rarely or never reported an error, 45% rarely or never reported an error with no potential to harm the patient, and 19% rarely reported an error that could harm the patient. Full results are to be presented.

Conclusion: Due to educational component being presented in the month of January, we were unable to compare the data from the pre vs. post questionnaire. However, preliminary results suggest that educating clinicians will increase incident reporting and help us as an organization to be one step closer in improving our culture of safety.

Learning Objectives:

Identify methods to improve culture of safety

Describe the importance of reporting medication errors, adverse drug events and adverse drug reactions

Self Assessment Questions:

Which one of the key elements of culture of safety is associated with this project?

- A Critically evaluate your reporting system
- B Increase medication safety incident reporting
- C Develop a system for follow-up of reports
- D Analyze incident report data

According to Institute of Medicine report what is the main purpose of reporting?

- A To obtain timely medical advice
- B Providing a record of events
- C Improving the management of individual patients
- D Provide information that leads to new knowledge

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-930-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY AND TOLERABILITY OF TESTOSTERONE 1.62% GEL IN MALE VETERANS WITH HYPOGONADISM CONVERTED FROM A TESTOSTERONE PATCH

Atit Patel, PharmD*; Brett Geiger, PharmD; Milica Jovic, PharmD, BCACP; Laurie Noschese, PharmD, BCPS; Nisha Mehta, PharmD; James Sluis, PharmD, BCACP; Lonyel Williams, PharmD

Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Ave, Chicago, IL, 60612

atit.patel@va.gov

Background/Purpose: Hypogonadism currently affects 13% of the United States population and is defined as low levels of total serum testosterone or sperm production with the presence of associated signs and symptoms, such as erectile dysfunction, memory, and energy impairment. Testosterone replacement therapy (TRT) is the mainstay of treatment and has shown to be effective in improving symptoms of hypogonadism as well as increasing testosterone levels to mid-normal range. TRT comes in several formulations including, but not limited to, a transdermal patch and gel. In 2012, the Department of Veterans Affairs designated the 1.62% testosterone gel pump as the preferred topical testosterone therapy option. Patients who were on the patch were converted to the gel formulation using a dosing conversion chart. The chart was developed based solely on the pharmacokinetic properties of each formulation as there is no literature comparing the direct conversion of testosterone patch to the gel formulation. As a result, the goal of this study is to evaluate whether the conversion doses used were efficacious and tolerable. **Methods:** This is a retrospective, electronic chart review of male patients aged 18 years and older who were converted from the testosterone patch to the testosterone 1.62% gel pump in 2012. The primary endpoint is the percent of patients who were maintained on the converted dose of the 1.62% gel pump for at least 6 months after the conversion from the testosterone patch. Data for an individual patient will be collected from 09/1/2010 to 08/31/2014. **Results and Conclusion:** Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List signs and symptoms of hypogonadism.

Identify the advantages of the testosterone gel formulation.

Self Assessment Questions:

Which of the following is a sign(s) or symptom(s) of hypogonadism?

- A: High testosterone levels
- B: Erectile dysfunction
- C: Improved energy
- D: Both A and B

What is an advantage of the testosterone gel formulation over the patch formulation?

- A: High risk of skin irritation
- B: Conceals the application
- C: Weekly versus daily administration
- D: Both A and B

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-835-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CONCOMITANT PROTON PUMP INHIBITOR AND MYCOPHENOLATE MOFETIL USE IN RENAL TRANSPLANT RECIPIENTS

Kajal Patel, PharmD*; Julie Barnes, PharmD; Seth Bauer, PharmD, BCPS; Michael Spinner, PharmD

Cleveland Clinic, 1127 Euclid Ave, Apt 1416, Cleveland, OH, 44115

patelk9@ccf.org

Background: Adequate mycophenolic acid (MPA) levels, the active moiety of the immunosuppressant mycophenolate mofetil (MMF), are associated with decreased acute rejection risk early post-transplantation. Transplant recipients commonly require acid-suppressing agents due to MMF-associated gastrointestinal effects and long-term steroid therapy. While pharmacokinetic data show reduced MPA levels in patients taking MMF-proton pump inhibitor (PPI) concomitantly, two retrospective studies found no significant acute rejection risk difference in patients taking MMF-PPI versus MMF-ranitidine. The Cleveland Clinic renal transplant immunosuppression protocol utilizes lower MMF doses compared to the two studies. Our study aims to evaluate outcomes in renal transplant patients receiving MMF-PPI co-therapy versus MMF without a PPI.

Objectives: The primary objective was to compare one-year incidence of biopsy-proven acute rejection/treated suspected rejection. Secondary objectives included: three-month incidence of rejection, time to rejection, rejection type and stage, patient survival, graft survival, graft function, and Clostridium difficile colitis incidence.

Methodology: A retrospective cohort study was conducted in adult patients who received a renal transplant at Cleveland Clinic between January 1, 2009 and June 30, 2013. Inclusion criteria were patients who received per-protocol induction and maintenance immunosuppression. Follow-up was 12 months post-transplant or up to patient death (within 12 months). Subjects were excluded if they underwent multi-organ transplantation or experienced death or acute rejection during index hospital admission. Subjects were divided into two groups based upon acid-suppressing therapy prescribed at discharge. Demographics, donor and recipient characteristics, and post-transplant outcomes were collected from electronic medical records and the renal transplant database. Between-group comparisons will be made using inferential statistics.

Results and Conclusions: Of the 728 recipients screened, 522 were eligible for inclusion. The number of subjects discharged on a PPI post-transplant was 183 (35%) compared to 339 (65%) discharged on a histamine-2 receptor antagonist. Remaining results will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the pharmacokinetic consequences of MMF-PPI co-therapy

Discuss clinical studies evaluating the risk of renal rejection with MMF-PPI co-therapy post-transplantation

Self Assessment Questions:

Which of the following has been shown to decrease the levels of mycophenolic acid?

- A: famotidine
- B: phenytoin
- C: fluconazole
- D: pantoprazole

Which of the following statements is correct?

- A: Mycophenolic acid (MPA) levels do not correlate with risk of acute
- B: All acid suppressing therapies have been shown to have a similar
- C: Mycophenolate mofetil commonly causes gastrointestinal side effects
- D: Mycophenolic acid is a prodrug of mycophenolate mofetil

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-572-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ACCURACY OF WARFARIN DOSE PREDICTION IN PATIENTS WITH SICKLE CELL DISEASE

Maika I. Patino*, PharmD, Edith A. Nutescu, PharmD, MS, FCCP, Supatat Chumnumwat, PharmD, Yee Ming Lee, PharmD, BCPS, and Julio D. Duarte, PharmD, PhD

University of Illinois at Chicago, 833 South Wood Street 164 PHARM, MC 886, Chicago, IL, 60612

maikap@uic.edu

Purpose: The pharmacy-directed Personalized Medicine Program at the University of Illinois Hospital and Health Sciences System (UI Health) has provided personalized warfarin dosing integrating clinical and pharmacogenetic information for over two years. This program has resulted in improved clinical and health utilization outcomes in patients newly-initiated on warfarin when compared to historical controls. We have observed anecdotally that it is considerably more difficult to provide accurate warfarin dose estimates for our sickle cell disease compared to our general population. The goal of this study is to determine if our widely-accepted warfarin dose prediction algorithms differ in accuracy between sickle cell disease patients and our general population treated with warfarin.

Methods: Sickle cell disease (SCD) patients enrolled in our ongoing warfarin pharmacogenetics study will be compared to age-, race-, and goal INR range-matched controls. Patients must have at least one follow up appointment at our outpatient Antithrombosis Clinic and will be followed until the end of their treatment or three months, whichever is sooner. The primary outcome of this study is the difference in time to first therapeutic INR between SCD patients and controls. Secondary outcomes include differences in time within therapeutic range and the difference in predicted therapeutic warfarin dose versus their actual stable dose. Demographic information and potential confounding variables such as concurrent disease states, medications, vitamin K intake, and patient adherence will also be collected for all patients. Student's t-test will be used to compare continuous variables and chi-squared test will be used to compare categorical variables between sickle cell disease patients and controls. Linear regression will also be used to compare cases and controls while controlling for the covariates listed above.

Preliminary Results: Data collection is ongoing. Results will be presented at the Great Lakes Residency Conference.

Conclusions: Conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

List common clinical and pharmacogenetic factors that play a role in determining a patient's stable warfarin dose.

List postulated mechanisms that contribute to the increased risk of thromboembolic events in sickle cell disease patients.

Self Assessment Questions:

Which of the following is a clinical or pharmacogenetic factor that can lead to a lower stable warfarin dose?

- A: A high dietary intake of vitamin K
- B: Severe chronic kidney disease
- C: A CYP2C9 *1/*1 genotype
- D: A CYP4F2 AA genotype

Which of the following is a postulated mechanism that may contribute to the increased risk of thromboembolic events in sickle cell disease patients?

- A: Less phosphatidylserine groups observed on erythrocyte surfaces
- B: Lower tissue factor expression
- C: Less adhesion molecules on reticulocytes and the vascular endothelium
- D: Decreased nitric oxide bioavailability

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-574-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PHARMACIST-LED TRANSITION OF CARE DIABETIC CONSULTATION AND COUNSELING SERVICE

*Elisha J Paul, PharmD, Kay Palmer, RPh

Aspirus Wausau Hospital, 333 Pineridge Blvd, Wausau, WI, 54401

Elisha.Paul@aspirus.org

Purpose: Diabetes Mellitus is a complicated disease to manage and when left uncontrolled can lead to serious sequelae. It is important to recognize when a patient is uncontrolled and modify their home regimen to help reduce the risk of complications. Diabetic patients have high readmission rates for many reasons. Some investigators have found that poor health literacy, failure of the health system in providing discharge support, and inadequate discharge counseling have increased the risk of readmission. These risk factors suggest that disease state education and medication education prior to discharge may improve health literacy and patient outcomes. A transition of care service is also warranted to provide support to patients recently discharged. The objective of this study is to determine if a pharmacist-led discharge consultation and counseling service will improve readmission rates and provide better hyperglycemia control.

Methods: A pharmacist-led transition of care service will be developed for a period of two months to support our institutions Hospitalist service. Patients meeting any of the following criteria: hemoglobin A1c greater than 8%, greater than eight prescription medications, or any patient with the diagnosis of both diabetes and heart failure will be included. Pharmacists would recommend therapeutic recommendations for a patient to be discharged on. A pharmacist would also provide discharge education, contact the patient 48-72 hours after discharge, and offer a face-to-face interview within two weeks post discharge. The counseling session would consist of disease state education and provide instruction regarding their medications. Primary end points will be 30 day readmission rates and the reassessment of hemoglobin A1c three months post discharge. Secondary end points will be the number of medication changes made at discharge and the time spent reviewing each patient.

Results/Conclusions: Research is ongoing and preliminary results will be presented at the 2014 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify risk factors for readmission in diabetic patients

Recognize the ways to measure the success of a pharmacist-led discharge transition of care service

Self Assessment Questions:

What are the risk factors pharmacists can intervene on to reduce readmission in diabetic patients?

- A: Poor health literacy, failure of the health system in providing discharge support
- B: Poor health literacy, unsupportive family, insurance
- C: Failure of the health system in providing discharge support, unsupportive family
- D: Inadequate discharge counseling, insurance, unsupportive family

What are the most effective ways to assess the clinical relevance of a pharmacist-led discharge transition of care service?

- A: Document if interventions were made, perception of helpfulness from patient
- B: Document the types of interventions made, perception of helpfulness from patient
- C: Document the types of interventions made, assess readmission rates
- D: Document if interventions were made, HCAHPS scores, time spent with patient

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-836-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF AN ELECTRONIC ASSESSMENT AND RE-ENFORCEMENT TOOL ON DRUG DOSING COMPLIANCE WITH AN ICU SEDATION PROTOCOL

Katelyn A. Payter, PharmD*, Michael A. Peters, RPh, BCPS, Tom Smoot, PharmD, BCPS

Henry Ford Health System, 2799 West Grand Boulevard, Detroit, MI, 4820
kpayter1@hfhs.org

Purpose: Standardize protocols in intensive care units (ICU) improve outcomes. The Henry Ford Health System utilizes a continuous sedation nurse driven protocol to target lighter levels of sedation. Lighter levels have been found to reduce the duration of sedation and poor outcomes. The protocol uses the Motor Activity Assessment Scale (MASS) to facilitate dosage adjustments. The goal is to maintain a MAAS score of 3 (clam cooperative state). Despite previous educational services, staff adherence to the protocol has been suboptimal, with a compliance rate in the medical intensive care unit (MICU) of only 20 %. This study will evaluate the change in sedation protocol compliance after the implementation of an electronic assessment and reinforcement tool.

Methods: This is a prospective quasi experimental study conducted in the two MICU pods at Henry Ford Hospital. Inclusion criteria: all patients admitted to the MICU with active continuous sedation orders. Exclusion criteria: patients <18 years of age, admitted to a general practice unit or another non MICU and lack of continuous sedation protocol orders. The control group consists of patients managed by the staff without the electronic tool. The intervention consists of implementation of the electronic tool daily during morning rounds by the clinical pharmacist. The pharmacist inputs the patient specific data related to continuous sedation into the tool to determine if the nurse was compliant with the protocol. Non-compliance will be defined as failure to comply with all steps set forth by the approved facility protocol. Assessment includes: time to assessment of MAAS score, vital sign documentation, VAS score, drug dosing and sedation vacation. Direct feedback is presented during morning rounds.

Results/Conclusions: Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the importance of continuous sedation protocol in an intensive care unit (ICU).

Discuss the benefit of targeting light levels of sedation in an ICU patient population.

Self Assessment Questions:

Current guidelines recommend sedation protocols include which of the following?

- A Daily sedation vacation
- B: Lighter sedation target
- C: Minimize the use of sedatives as clinically indicated
- D: All of the above

Current practice guidelines recommend maintaining a lighter level of sedation. What is the role of lighter sedation in an ICU patient population?

- A Shorter sedation vacation and longer hospital length of stay.
- B Decreased need for mechanical ventilation and increased incidence
- C Decreased duration of mechanical ventilation and hospital length of stay
- D Increased need for sedation and decreased long term cognitive dysfunction

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-837-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE USE OF PROCALCITONIN AS A MARKER FOR CLINICAL INFECTION IN A RURAL COMMUNITY HOSPITAL

Bethany P Pearson*, PharmD

Ephraim McDowell Regional Medical Center, 217 South Third Street, Danville, KY, 40422

bpearson@emrhc.com

Purpose: Multiple studies have shown a strong correlation between mortality and the time to initiation of antimicrobial therapy. The literature reports the quicker we can start therapy in these patients, the better the outcome. Several acute bio-markers have been assessed for their utility in helping to identify systemic infection early. One such marker is procalcitonin. Procalcitonin is a precursor to calcitonin, a hormone found naturally in the body. Production of procalcitonin increases within 3-6 hours of the infectious process commencing suggesting that procalcitonin may be a viable marker for early infection. Research conducted at larger institutions has provided conflicting evidence to the utility of this laboratory test. The purpose of this study is to evaluate the utility of procalcitonin levels in our facility as a marker for clinical infection.

Methods: A report was processed utilizing laboratory reports that identified patients who had a procalcitonin lab test performed within the timeframe of January 2014 - June 2014. A sample of 200 patients > 18 years of age identified to have had cultures and procalcitonin levels evaluated upon admission were randomly selected. From this sample, 100 patients were randomly selected to participate in the initial analysis. A retrospective chart review was performed and patients were organized into blocks based on their procalcitonin lab levels as follows: ≤ 0.5 ng/mL; > 0.5 ng/mL ≤ 2 ng/mL; and > 2 ng/mL. A regression analysis will be performed on this data to determine the probability of infection between procalcitonin levels and to identify a range that may have a higher predictive value within our patient population. Data collected by retrospective chart review from the remaining 100 patients will be used to determine the correlation between the identified procalcitonin level indicative of infection and positive cultures.

Results and conclusions will be reported at Great Lakes Residency Conference.

Learning Objectives:

Define procalcitonin

Explain how the procalcitonin test is used in health care

Self Assessment Questions:

Which of the following is the most accurate definition of procalcitonin?

- A An acute biomarker that is a precursor to calcitonin
- B: An acute biomarker that is a product of anaerobic metabolism
- C: A chronic biomarker that is a precursor to calcitonin
- D: A chronic biomarker that is a product of anaerobic metabolism

Which of the following statements accurately identifies the rationale behind the use of procalcitonin as a marker for systemic infection?

- A Production of procalcitonin increases within 48 hours of the infection
- B Production of procalcitonin increases within 3-6 hours of the infection
- C Production of procalcitonin increases within 3-6 hours of anaerobic infection
- D Production of procalcitonin increases within 48 hours of anaerobic infection

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-575-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A COMBINED VALUE-BASED DESIGN AND MEDICATION THERAPY MANAGEMENT PROGRAM ON ADHERENCE IN DIABETIC PATIENTS

Alex K. Peaslee*, PharmD; Marleen K. Wickizer, PharmD, AE-C; Julie A. Olson, DNP, MS, RN, CQIA, CBE; Robert Topp, PhD, RN

Navitus Health Solutions, 2601 W Beltline Hwy, Ste 600, Madison, WI, 53713

Alex.Peaslee@Navitus.com

Purpose: Value-based design (VBD) waives prescription copayments to reduce member costs for refilling medications and medication therapy management (MTM) reinforces members knowledge regarding medications, addressing two known barriers to adherence. This study quantifies the impact of a program combining VBD with an external, unaffiliated retail pharmacist-mediated MTM program on key adherence metrics among diabetic members of a large commercial employer group.

Methods: A retrospective pre/post longitudinal analysis of claims was performed for 77 members voluntarily enrolled in the program between 6/1/2013 and 12/1/2013, as well as for 77 non-participating members, matched by key baseline metrics. Oral diabetic medication adherence and cost-related outcomes for all pharmacy claims were evaluated within-subject, comparing the initial six months of intervention to a six month period immediately preceding enrollment, and between-subject, comparing intervention and control groups.

Results/Conclusions: Proportion of Days Covered increased 2.7% (0.929 to 0.954) by intervention, indicating a non-significant trend towards improvement (95% CI -0.029, 0.081), compared to a 1.2% decrease (0.928 to 0.917) in the control arm (95% CI -0.066, 0.045). Gaps in Therapy improved by intervention, decreasing 29% (9.69 to 6.86, 95% CI -11.03, 5.37), compared to a 29% increase (9.78 to 12.60) in the control group (95% CI -5.39, 11.02). As expected, pharmacy claims costs paid by the plan per member per six month period significantly increased by 55% (\$1991.23 to \$3092.74, 95% CI \$22.28, \$2,180.73), compared to a non-significant 17% increase (\$1402.21 to \$1645.68) in the control arm (95% CI -\$835.76, \$1,322.69). While statistically significant improvements to adherence were not observed among this highly adherent population, improvement trends demonstrated that the program may influence behavior in commercial employer groups. Additional benefit may be realized by targeting members with lower baseline adherence metrics, examining potential cost savings associated with medical outcomes, and optimizing the external MTM program.

Learning Objectives:

Identify common barriers to adequate medication adherence.

Describe how a Pharmacy Benefit Manager can positively influence medication adherence.

Self Assessment Questions:

Which of the following barriers to medication adherence are addressed by Value-based Insurance Design?

- A: Value of therapy
- B: Poor provider communication
- C: Adverse effect management
- D: Financial

What is the primary advantage of measuring adherence using a PBM claims database?

- A: Availability of detailed prescriber instructions
- B: Includes medications filled at various pharmacy chains and health
- C: Includes over-the-counter medications
- D: Includes medications purchased out-of-pocket

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-838-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF THE HEMODYNAMIC EFFECTS OF FENTANYL, REMIFENTANIL, AND HYDROMORPHONE FOR MECHANICALLY-VENTILATED PATIENTS IN THE INTENSIVE CARE UNIT

Lauren H. Peck, PharmD*; Angela M. Harding, PharmD; Amy L. Durell, PharmD, BCPS; Tamara L. McMath, MPH; Christy L. Collins, MA

Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH, 43214

Lauren.Peck@ohiohealth.com

Purpose: Fentanyl, remifentanyl, and hydromorphone are opioids used at our institution for analgesia-based sedation in critically-ill mechanically-ventilated patients. The 2002 pain, agitation, and delirium (PAD) guidelines recommend fentanyl and hydromorphone as the drugs of choice in critically ill patients with hemodynamic instability. Remifentanyl, a fentanyl derivative, may also have limited effects on hemodynamics. This study will compare the outcomes of continuous infusions of each of agent on the mean arterial pressure and heart rate over 6 hours. Additionally, this study will report whether goal sedation and pain scores were achieved and maintained as well as the frequency of vasopressor initiation within the 6 hours post infusion.

Methods: This study is a retrospective chart review of patients 18 years of age or older admitted to a critical care unit at our institution between August 2013 and July 2014. For inclusion, patients must have received at least 24 hours of a continuous infusion of fentanyl, remifentanyl, or hydromorphone while on mechanical ventilation. Exclusion criteria include patients with requirements for vasopressor therapy at the time of opioid infusion initiation, severe neurologic depression (head trauma, anoxic brain injury, cerebral vascular accident), an anaphylactic reaction to opioids, history of drug abuse (alcohol, benzodiazepines, and/or opioids), and pregnancy or lactation. Data for collection include cumulative doses of opioids and concomitant sedatives, changes from baseline mean arterial pressure, changes from baseline heart rate, sedation scores, and pain scores within the 6 hours following infusion initiation. Additional data include demographic information and primary admitting diagnosis.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the hemodynamic effects of continuous infusions of fentanyl, remifentanyl, and hydromorphone for analgesia-based sedation in mechanically-ventilated patients in the intensive care unit.

Report whether the desired sedation score was achieved and maintained within the six hours following opioid infusion initiation.

Self Assessment Questions:

Which of the following opioid agents has the potential to cause the most hypotension in a critically ill patient?

- A: Morphine
- B: Fentanyl
- C: Remifentanyl
- D: Hydromorphone

Which of the following descriptions reflects the most appropriate level of sedation in critically ill patients?

- A: Patient seems alert but very agitated
- B: Patient awakens to verbal stimulations and makes eye contact
- C: Patient makes small movements in response only to physical stim
- D: Patient does not respond to verbal or physical stimulation

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-576-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF VETERAN AND PHARMACIST PERSPECTIVES ON THE IMPACT OF DISCHARGE MEDICATION COUNSELING: PART 1 OF 2

Emily D. Peedin, PharmD*, Audrey M. Andres, PharmD, William X. Malloy, M.S., PharmD, BCPS, Christopher M. Degenkolb, PharmD, BCPS

Veteran Affairs - Indianapolis VA Medical Center, 1481 West 10th Street, Indianapolis, IN, 46202

Emily.Peedin2@va.gov

Purpose: At the Indianapolis VA Medical Center, all patients receive medication counseling by a pharmacist prior to discharge. However, pharmacists differ in the method, content, and documentation of this counseling. There is also a lack of knowledge of the veterans' thoughts about the helpfulness of this education. The primary objective of this project is to evaluate the impact of discharge medication counseling from the veterans' perspective and to compare patient education and documentation practices between weekday and weekend discharges.

Methods: This quality improvement initiative was exempt from IRB approval. Veterans perspectives regarding the impact of discharge medication counseling were assessed by a voice of the customer questionnaire. This questionnaire evaluated the helpfulness and effectiveness of education currently provided and allowed veterans to voice suggestions for improvement. This questionnaire also assessed the patients level of understanding and retention of information after discharge education through use of the teach-back method. Additionally a retrospective chart review of pharmacy discharge notes was performed in order to compare the documentation of patient education.

Results: The voice of the customer questionnaire demonstrated that veterans perceived the discharge medication counseling to be "very helpful" across both weekday and weekend discharges. The majority of veterans could recall the indication and directions for use for their medications but not potential side effects. The degree of detail in patient education chart documentation varied across pharmacists. The majority of notes failed to include the specific indication, side effects, and drug interactions. The majority of weekend discharge notes included directions for use whereas the majority of weekday discharge notes did not.

Conclusions: Despite the discrepancies in chart documentation, overall pharmacists medication discharge counseling was very helpful and effective across both weekday and weekend discharges. Pharmacist chart documentation of patient education could be improved through editing the note template and standardizing documentation practices.

Learning Objectives:

Discuss the effectiveness of current discharge medication counseling practices based on the veterans perspectives and teach-back results
Describe the differences in patient education documentation between weekend and weekday discharges

Self Assessment Questions:

How helpful do the majority of veterans find the current discharge medication counseling?

- A Not helpful
- B: Somewhat helpful
- C: Helpful
- D: Very helpful

Which component of discharge counseling were veterans LEAST likely to remember?

- A Indication
- B Directions for use
- C Side effects
- D Drug interactions

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-839-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARING STANDARDIZED, PHARMACIST AND PHARMACY STUDENT CONDUCTED MEDICATION RECONCILIATION VERSUS OTHER HEALTHCARE PROVIDERS IN THE EMERGENCY DEPARTMENT

Alyssa Penick*, Pharm.D.; Nicole Harger, Pharm.D, BCPS; Madeline Foertsch, Pharm.D, BCPS; Jessica Winter, Pharm.D, BCPS

UC Health - University Hospital (Cincinnati), 234 Goodman St, ML 0740, Cincinnati, OH, 45219

alyssa.penick@uchealth.com

Purpose

The emergency department serves as a crucial transition point in patient care, making it essential to identify patients medications quickly and accurately through comprehensive medication reconciliation. Although arguably pharmacists possess the skills and training most appropriate for conducting medication reconciliation, resource limitations may restrict the pharmacists ability to conduct medication reconciliation for all patients. The purpose of this study is to compare the number and types of discrepancies identified during medication reconciliation when completed by pharmacists and pharmacy students versus other healthcare providers in the emergency department.

Methods

This study is a single center study with prospective identification of patients and all data reviewed retrospectively. Approximately 104 patients who had a medication reconciliation conducted at the University of Cincinnati Medical Center Emergency Department were included to detect a 17% difference in the primary outcome with 80% power and alpha of 0.05. Rates of 30-day readmission, 30-day emergency department visits, and hospital length of stay were compared between pharmacists or pharmacy students who have been previously educated on a standardized medication reconciliation process to other healthcare providers in the emergency department. The secondary aim described the number and type of discrepancies identified, defined as variances in the patients medication list in their electronic medical record compared to their actual medication regimen. These discrepancies were compared when identified by a pharmacist or pharmacy student after a non-pharmacy healthcare provider completed the original medication reconciliation. Univariate and multivariate regression analyses were conducted to determine patient characteristics associated with patients at a higher risk for medication discrepancies. A subgroup analysis of primary and secondary outcomes were conducted between pharmacy students and pharmacists to evaluate potential disparities between groups.

Results will be analyzed and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the medication reconciliation process and relevance to medication safety

Describe challenges in implementing a pharmacy-driven medication reconciliation process in the emergency department

Self Assessment Questions:

What percentage of medication errors can be attributed to inadequate medication reconciliation?

- A 12%
- B: 28%
- C: 46%
- D: 64%

Which of the following is a barrier to pharmacy-driven medication reconciliation in the emergency department?

- A Lack of interest in implementation
- B Physician-driven medication reconciliation processes in place
- C Resource limitations
- D Nurse-driven medication reconciliation processes in place

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-840-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECT OF PROTON PUMP INHIBITOR (PPI) USE ON THE INCIDENCE OF HOSPITAL-ONSET, ANTIMICROBIAL-ASSOCIATED CLOSTRIDIUM DIFFICILE INFECTION (CDI) AT A LARGE, ACADEMIC MEDICAL CENTER

Zachary L. Pentoney*, PharmD, Bryan D. Lizza, PharmD, BCPS, Viktorija O. Barr, PharmD, BCPS
Northwestern Memorial Hospital, 251 E Huron St, Feinberg Pavilion, LC-700, Chicago, IL, 60611-2908
zpentone@nm.org

Purpose: Clostridium difficile infection (CDI) is a major public health concern, both in the community and health care settings. Over the last decade, the incidence of CDI has doubled. The rising incidence of CDI is likely multi-factorial, but the increasing utilization of proton pump inhibitors (PPIs) in the hospital setting has garnered much attention. Numerous studies have examined the potential link between PPIs and CDI, but the results are conflicting and the issue remains controversial. The purpose of this study is to determine the effect of PPI use on the incidence and severity of hospital-onset, antimicrobial-associated CDI at a large, academic medical center. **Methods:** This investigation will be a retrospective, case-control study of patients admitted between January 1, 2014 and December 31, 2014. Case patients will be at least 18 years old with a positive Clostridium difficile toxin polymerase chain reaction (PCR) assay occurring more than 48 hours after admission and exposed to at least one day of antimicrobial therapy. Control patients will be at least 18 years old without a positive Clostridium difficile toxin PCR assay and exposed to at least one day of antimicrobial therapy. Case patients will be matched to control patients by age and hospital location at the time of positive PCR in a one to four ratio. The primary end point will be exposure to a PPI for at least one dose. Secondary endpoints will include severity of CDI, total PPI exposure, total antimicrobial exposure, exposure to antimicrobial class, use of other acid suppressive agents, and the presence of valid indications for PPI therapy based on current guidelines. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify modifiable and non-modifiable risk factors associated with Clostridium difficile infection (CDI).
Explain the proposed mechanism by which proton pump inhibitors (PPIs) increase the risk of CDI.

Self Assessment Questions:

Which of the following is a non-modifiable risk factor for the development of CDI?

- A: Advanced age (especially older than 65)
- B: Antimicrobial exposure
- C: Acid suppressive therapy exposure
- D: Chemotherapy exposure

What is the proposed mechanism by which PPIs increase the risk of CDI?

- A: PPIs decrease gastric pH, thereby allowing bacterial spores to pass
- B: PPIs increase gastric pH, thereby allowing bacterial spores to pass
- C: PPIs decrease gastric pH, thereby facilitating dissolution of the toxin
- D: PPIs increase gastric pH, thereby triggering an intracellular signal

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-577-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

STANDARDIZED APPROACH TO PROPHYLACTIC MANAGEMENT OF EPIDERMAL GROWTH FACTOR RECEPTOR INHIBITOR INDUCED SKIN RASH

Micah S. Pepper*, PharmD; Megan V. Brafford PharmD, BCOP;
Baptist Health Lexington, 1740 Nicholasville RD, Lexington, KY, 40503
micah.pepper@bhsi.com

Purpose: Epidermal growth factor receptor inhibitors (EGFRI) have become effective agents for a variety of cancers. However, the rash associated with the usage of EGFRI can be debilitating, limiting the patients treatment and quality of life. Prophylactic management of the EGFRI associated rash has been a novel option for preventing treatment modification and discontinuation. This study will focus on determining if prophylactic management of EGFR induced skin rash is a more effective option in decreasing skin toxicities when compared to current reactionary based practices during the 6-week skin treatment period at Baptist Health Lexington.

Methods: This is a retrospective examination of preemptive EGFRI rash treatment in patients treated at Baptist Health Lexington ranging from August 1, 2012 to May 31, 2015. The eligible patients electronic medical records (EMR) will be divided between those prior to standardized prophylactic management (August 1, 2012 to July 31, 2014) and those after a standardized procedure for prophylactic management (September 1, 2014 to May 31st, 2015). Comparisons will be made between the patients rash severity, EGFRI dosage modifications, rash treatment medications, and other pertinent information relating to the severity of the patients rash. Data, such as rash treatment medications, rash severity, and EGFRI dosage modifications, will be extracted from documents available in each patients electronic medical record (EMR) and compared between the two time ranges. Descriptive statistics and statistical analyses will be performed for comparative evaluation.

Results/Conclusions: Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Express the importance of decreasing rash incidence and severity in EGFRI treated patients.
Discuss the efficacy of prophylactic rash treatment in the management and mitigation EGFRI induced rash.

Self Assessment Questions:

What is the incidence of rash without prophylactic rash management for patients treated with an EGFRI, as reported in literature and reflected in my study?

- A: 21-40%
- B: 41-60%
- C: 61-80%
- D: 81-99%

Which of the following medications is an integral component in both EGFRI rash treatment and prophylaxis?

- A: Tetracycline antibiotics
- B: Intravenous steroids
- C: Benzoyl peroxide
- D: Calcineurin inhibitors

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-578-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) INPATIENT PHARMACY CONSULTS ON TRANSITIONS OF CARE

Erika Perpich*, PharmD, Nancy C. MacDonald, PharmD, BCPS, James S Kalus, PharmD, BCPS, FASHP

Henry Ford Health System, 2799 W. Grand Blvd, Detroit, MI, 48202
eperpic1@hfhs.org

Purpose: The role of inpatient pharmacists within transitions of care (TOC) is evolving rapidly. In 2012, the American College of Clinical Pharmacy recommended roles and responsibilities of pharmacists in ensuring optimal outcomes during care transitions. However, there is limited data demonstrating inpatient pharmacists role in TOC. In January 2013, Henry Ford Hospital (HFH) implemented inpatient pharmacy TOC consults for patients with acute COPD exacerbations. This study evaluated the impact of the inpatient COPD pharmacy consult on TOC. **Methods:** This retrospective, cohort study, examined patients with a final discharge diagnosis of an acute COPD exacerbation between December 1, 2013 and November 1, 2014. Patients were enrolled in either the intervention arm or control arm based upon whether or not they received an inpatient COPD pharmacy consult. The primary composite endpoint consisted of three measurable outcomes: 1 whether or not the patients home medication list was updated after the initial admission medication reconciliation was performed, 2. whether or not the patient met criteria to receive a vaccination during the admission and 3. the comparison of the rate-of-fill at HFH Discharge Pharmacy. Additional data was collected on specific process measures of the inpatient COPD pharmacy consult. The categorical data was analyzed by chi-square test and Fishers exact test, while the continuous data was analyzed by students t-test and Mann-Whitney U-test. Results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Discuss the developing roles and responsibilities of pharmacists within transitions of care.

Describe the components of an inpatient COPD pharmacy consult at Henry Ford Hospital.

Self Assessment Questions:

In the literature, pharmacists have demonstrated value in improving care transitions by providing which of the following services?

- A: Medication reconciliation at admission
- B: Vaccination history at admission
- C: Discharge medication teaching
- D: Both A and C

All of the following are components of a COPD inpatient pharmacy consult EXCEPT:

- A: Medication history
- B: Follow-up phone call after discharge
- C: Assessment of flu and pneumococcal vaccinations
- D: Patient education

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-841-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSOCIATION BETWEEN CHLORIDE CONTENT OF INTRAVENOUS FLUIDS AND ACUTE KIDNEY INJURY DURING FLUID RESUSCITATION OF CRITICALLY ILL ADULTS WITH SEPSIS

Megan, N, Perry; PGY2 Critical Care Resident, PharmD; Bruce, A, Doepker; Speciality Practice Pharmacist, PharmD, BCPS; Kari, L, Mount; Speciality Practice Pharmacist, PharmD, BCPS; Lindsay, J, Ryder; Speciality Practice Pharmacist, PharmD, BCPS; Claire, V
The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 West 10th Avenue, Columbus, OH, 432101240
Megan.Perry@osumc.edu

Adequate fluid resuscitation is an essential component in the management of patients with sepsis. According to the most recent International Guidelines for the Management of Severe Sepsis and Septic Shock, crystalloids are the preferred initial resuscitation fluids, but the guidelines do not suggest which crystalloid product is preferred. In recent years, shortages of 0.9% sodium chloride and concerns about adverse effects associated with administration of fluids with a supraphysiologic chloride content have led to increased interest in the use of more balanced fluids, such as Lactated Ringers and Plasma-Lyte A. Our objective is to compare high-chloride to low-chloride fluid resuscitation and the development of acute kidney injury (AKI) in patients with severe sepsis or septic shock.

A single-center, retrospective, cohort study will compare the incidence of AKI in septic patients receiving high-chloride (0.9% sodium chloride) or low-chloride (Lactated Ringers and Plasma-LyteA) fluids for resuscitation. Adult patients with sepsis admitted to The Ohio State University Wexner Medical Center medical intensive care unit from August 2013 to August 2014 will be eligible for inclusion. Exclusion criteria include age less than 18 years, incarceration, acute decompensated liver failure, end stage renal disease on renal replacement therapy (RRT) at baseline, RRT for medication intoxication reversals, or discharged, died, or transitioned to comfort care prior to post-resuscitation hospital day 3. The primary outcome will be the incidence of AKI, according to the RIFLE criteria. Secondary outcomes include individual components of the RIFLE criteria, mortality, ICU and hospital length of stay, incidence of RRT, and the development of hyperchloremic acidosis. Categorical data will be analyzed using chi-square or Fishers exact test. Continuous data will be analyzed using the student t-test for parametric data and Wilcoxon rank-sum test for non-parametric data.

Data collection and analysis are ongoing. Results and conclusions will be presented.

Learning Objectives:

Describe similarities and differences in various intravenous crystalloid products.

Discuss concerns related to administration of 0.9% sodium chloride for fluid resuscitation.

Self Assessment Questions:

Which of the following intravenous fluid products has the highest chloride content?

- A: 0.9% sodium chloride
- B: 0.45% sodium chloride
- C: Plasma-Lyte A®
- D: Lactated Ringers

Administration of supraphysiologic amounts of chloride may cause which of the following acid-base disturbances?

- A: Metabolic Acidosis
- B: Respiratory Alkalosis
- C: Metabolic Acidosis
- D: Respiratory Alkalosis

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-579-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF INTRAVENOUS ACETAMINOPHEN IN CARDIOTHORACIC SURGERY PATIENTS

Rosemary Persaud, PharmD*; Seth Bauer, PharmD, BCPS; Marc Gillinov, MD; Chiedozie Udeh, MD; Matthew Wanek, PharmD, BCPS
Cleveland Clinic, 9500 Euclid Ave, JN1-200, Cleveland, OH, 44195
persaur@ccf.org

Background: Intravenous (IV) acetaminophen (APAP) is approved for use in the United States for the management of pain. Compared to other analgesic agents, several potential advantages of IV APAP exist due to differences in side effect profiles. Although a reduction in opioid consumption with use of IV APAP has been suggested in prior studies, data supporting consistent improvements in patient pain scores, opioid-related adverse drug events, or ICU length of stay is currently lacking. Furthermore, the cost of IV APAP is approximately 1000 times that of its oral formulation, leading to higher medication costs. Considering the lack of consistent evidence for benefit in cardiothoracic surgery patients and higher cost associated with the IV formulation, the clinical benefit of IV APAP in this population is unclear.

Objective: To assess the impact of IV APAP use in post-cardiothoracic surgery adults on intensive care unit (ICU) length of stay, post-operative opioid requirements, incidence of opioid-related adverse drug events, and time to extubation.

Methodology: A retrospective cohort study with a matched historical control was conducted. Data was extracted from the STS Adult Cardiac Surgery Database. Study group inclusion criteria included adult patients who received at least one dose of IV APAP post-operatively in CVICU from October 2011 to December 2014. Excluded patients included heart and lung transplant, ventricular assist device, and extracorporeal membrane oxygenation patients. The study group was matched to control patients admitted to CVICU post-operatively between October 2008 and September 2011 based on age, gender, American Society of Anesthesiologists Physical Status Score, and surgery type. The primary endpoint was ICU length of stay. Additional endpoints included opioid requirements within the first 24 and 48 hours post-surgery, incidence of opioid related adverse effects, time to extubation, and reintubation rates.

Results and conclusions: To be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the pharmacokinetic differences between the intravenous, oral, and rectal formulations of acetaminophen

Review the results of clinical studies evaluating the impact of intravenous acetaminophen on patient outcomes

Self Assessment Questions:

Intravenous acetaminophen has a ____ Cmax and ____ Tmax compared to its oral formulation.

- A: lower, shorter
- B: lower, longer
- C: higher, shorter
- D: higher, longer

Which of the following statements is correct?

- A: IV acetaminophen has proven to have a faster onset of analgesia
- B: There is a lack of consistent benefit on opioid related adverse drug
- C: IV acetaminophen has consistently shown benefit on patient outcomes
- D: There is an increased concern for decreased gastrointestinal motility

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-580-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PIPERACILLIN/TAZOBACTAM MONOTHERAPY COMPARED TO VANCOMYCIN AND PIPERACILLIN/TAZOBACTAM COMBINATION THERAPY FOR TREATMENT OF COMPLICATED INTRA-ABDOMINAL INFECTIONS

Sarah Petite Pharm.D.*; Seth Bauer, Pharm.D., BCPS; Christine Ahrens, Pharm.D., BCPS; Jessica Bollinger, Pharm.D., BCPS; Lisa Glick, Pharm.D., BCPS

Cleveland Clinic, 9500 Euclid Ave, Cleveland, OH, 44195
petites@ccf.org

Background: Intra-abdominal infections are associated with significant mortality in intensive care unit (ICU) patients. The Infectious Diseases Society of America (IDSA) recommends empiric antimicrobial therapy for complicated intra-abdominal infections (cIAIs) that targets facultative and aerobic gram-negative bacilli and anaerobic organisms. However, the IDSA guidelines recommend that additional empiric methicillin-resistant *Staphylococcus aureus* (MRSA) and *Enterococcus* coverage be used in select patient groups. While the recommended antibiotics for intra-abdominal infections may cover *Enterococcus* species, such as piperacillin/tazobactam, there is relative resistance to this agent and it does not cover cIAIs caused by MRSA. Vancomycin may be added as dual therapy with piperacillin/tazobactam to more broadly cover *Enterococcus* and MRSA cIAIs. Therefore, it is unknown if monotherapy with a beta-lactam is sufficient for cIAIs or if an additional agent is required, such as vancomycin, for initial treatment. This study aims to determine if there is a clinical benefit from combination therapy with vancomycin and piperacillin/tazobactam.

Objective: To determine the clinical benefit of the addition of vancomycin to piperacillin/tazobactam compared to piperacillin/tazobactam monotherapy for treatment of cIAIs in surgical intensive care unit (SICU) patients.

Methodology: This study is an IRB-approved non-interventional retrospective chart review. Adult patients admitted to the SICU with documented secondary peritonitis receiving at least 72 hours of piperacillin/tazobactam with or without vancomycin will be included. Patients will be excluded if they have pancreatitis, primary peritonitis, neutropenia, or if they are immunocompromised. Data describing baseline characteristics, antimicrobial therapy, and clinical cure and failure will be collected. The primary endpoint will be clinical cure rate at day 28, in patients treated with vancomycin and piperacillin/tazobactam versus piperacillin/tazobactam monotherapy. Secondary endpoints include comparing clinical cure rate at day 7, hospital and ICU length of stay and mortality rates between groups.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify the risk factors for complicated intra-abdominal infections caused by *Enterococcus*

Describe the Infectious Diseases Society of America's recommended empiric antimicrobial therapy for complicated intra-abdominal infections

Self Assessment Questions:

Which of the following is not a risk factor for a complicated intra-abdominal infection caused by *Enterococcus*?

- A: Prior vancomycin exposure
- B: Postoperative infection
- C: Immunosuppression
- D: Valvular heart disease

The Infectious Diseases Society of America recommends empiric antimicrobial therapy for complicated intra-abdominal infections that covers which organisms?

- A: *Pseudomonas aeruginosa*
- B: Facultative and aerobic gram-negative bacilli and anaerobic organisms
- C: Extended-spectrum beta lactamase producing gram negative organisms
- D: Atypical organisms

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-581-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INSULIN DELIVERY STRATEGIES FOR BRONSON HEALTH GROUP

*Sara M. Pfeiffer, Pharm. D; Shaun W. Phillips, Pharm. D, MBA; James M. Curtis, Pharm. D

Bronson Battle Creek, 300 North Ave, Battle Creek, MI, 49017

pfeiffes@bronsonhg.org

Purpose: Nearly 25% of inpatient days are attributed to patients with diabetes, and the majority of these patients are managed with insulin during their hospitalization. The invention of the insulin pen in the 1980s resulted in a transition toward inpatient pen usage with the assumption that it would provide more accurate dosing, easy administration, and a valuable teaching opportunity for diabetic patients. More recently, The Institute for Safe Medication Practices has published numerous safety alerts in regards to institutional insulin pen use focused on the misuse of insulin pens and subsequent transmission of infections. Other institutions may use floor-stock insulin; however, The Joint Commission has provided recent guidance against using multiuse vials, including insulin, on multiple patients. Based on these high-profile organizational statements, it is obvious that current insulin delivery methods utilized are prone to serious safety events. The purpose of this study is to evaluate Bronson Healthcare Groups different methods of insulin administration to determine a safe, cost-effective, nursing preferred insulin delivery strategy.

Methods: Retrospective data will be collected in the form of medication safety event forms, insulin purchasing records, hospital wide insulin usage reports, and a nursing survey. Insulin use data will be collected from August 2013 to August of 2014 from Bronson Methodist Hospital and Bronson Battle Creek Hospital. The nursing survey will be distributed to inpatient Bronson facilities from January 22 to February 5 2015. Aggregate data will be collected and analyzed via Microsoft Excel.

Results/ Conclusions: Data collection is ongoing and final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify strengths and weaknesses of insulin administration methods including traditional vial and syringe and insulin pen administration.

Describe metrics useful in helping standardize insulin delivery across a multi-hospital health system.

Self Assessment Questions:

While many differences exist, both insulin pens and vial/syringe administration need to be:

- A Held for 5 seconds in the skin to make sure full dose is administer
- B: Routinely checked for proper storage
- C: Used carefully when administered to multiple patients
- D: Accurately drawn up for each dose

What metric is useful when analyzing the costs of insulin delivery in a health system?

- A Number of nursing needle sticks
- B Number of insulin-related errors
- C Amount of wasted insulin product
- D Percent of nurses preferring insulin pen administration

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-582-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A USP <800> GAP ANALYSIS ACROSS AN INTEGRATED HEALTH CARE SYSTEM

Huan Phan, PharmD*; Ashley Feldt, PharmD, MBA; Stacy Wucherer, RPh; Nicholas Ladell, PharmD, BCPS

Aurora West Allis Medical Center, 3013 W Lincoln

Ave, Milwaukee, WI, 53215

huan.phan@aurora.org

Purpose: United States Pharmacopeia (USP) has published a draft version of General Chapter <800> Hazardous Drugs Handling in Healthcare Settings. The goal of this new chapter is to limit preventable hazardous drug (HD) exposure to patients, personnel, and the environment through the use of containment systems and safe work practices. The chapter provides standards for facility layout, storage, personal protective equipment, compounding, transport, cleaning, and environmental control. Aurora Health Care, which includes 15 hospital and 22 cancer clinics, handles a high volume of HDs. This necessitates early system wide assessment and practice reforms. The purpose of this project is to identify and address USP <800> compliance gaps within pharmacies across an integrated health care system.

Methods: In November, a gap analysis based on USP <800> was developed and disseminated to Aurora Health Care inpatient pharmacies and cancer clinics. Information such as compounding and handling practice, personal protective equipment, compounding hood type, storage, and pharmacy layout were collected. This baseline data as well as advice from expert USP consultants were used to create short-, medium- and long-term action plans for system compliance. Resource toolkits will be created to assist pharmacy directors in successful implementation.

Learning Objectives:

Describe the purpose of USP <800> and the importance of compliance

List 3 requirements in USP <800>

Self Assessment Questions:

The purpose of USP <800> is to:

- A Regulate pharmacies but not other departments
- B: Promote patient, worker, and environmental safety
- C: Provide standards for all entities that prepare, transport, or administer
- D: B and C

The following is/are true regarding USP <800> standards:

- A Both HD compounding hoods and rooms must vent to the outside
- B Two pairs of chemotherapy gloves must be worn when compound
- C Hazardous drug compounding rooms must have positive pressure
- D A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-709-L03-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACOKINETICS AND PHARMACODYNAMICS OF EXTENDED-INFUSION CEFEPIME IN CONTINUOUS RENAL REPLACEMENT THERAPY

Carolyn D. Philpott, PharmD*; Christopher Droegge, PharmD; Molly Droegge, PharmD, BCPS; Neil Ernst, PharmD; Shaun P. Keegan, PharmD, BCPS; Kristen E. Hillebrand, PharmD, BCPS; Jessica Winter, PharmD, BCPS; Madeline Foertsch, PharmD, BCPS; Nicole Harger, PhD
UC Health - University Hospital (Cincinnati), 6927 Lynnfield Ct, Apt 105, Cincinnati, OH, 45243
carolyn.dosen@uchealth.com

Purpose: Cefepime is a broad-spectrum, fourth-generation, cephalosporin used to treat nosocomial Gram-negative infections in critically ill patients. Extended infusion (EI) administration is utilized to maximize the time free serum concentrations are above the minimum inhibitory concentration (MIC) to achieve pharmacodynamic efficacy. Recent studies demonstrate EI cefepime is associated with decreased mortality when compared to conventional infusion in patients with normal renal function. EI cefepime has not been evaluated in continuous renal replacement (CRRT) modalities. The goal of this study is to describe the pharmacokinetics and pharmacodynamics of EI cefepime in critically ill patients receiving continuous venovenous hemofiltration (CVVH) or hemodialysis (CVVHD).

Methods: This prospective, multicenter, clinical pharmacokinetic and pharmacodynamic study will include ten critically ill patients admitted to the medical, surgical, cardiovascular, or neuroscience intensive care units (ICU) at the University of Cincinnati Medical Center or mixed medical-surgical ICU at West Chester Hospital. Adult patients receiving cefepime 2 grams every eight hours with a four-hour infusion while on CVVH or CVVHD will be included. Patients admitted for burn injuries or cystic fibrosis or those with a urine output exceeding 400 milliliters in a 24-hour period will be excluded. Coordinated serum, effluent, and urine cefepime concentrations will be collected at one, two, three, four, and eight hours during EI cefepime administration. Assays will be collected at first dose and one steady state dose (i.e., fourth through sixth doses). WinNonlin software will be used for pharmacokinetic modeling. Population pharmacodynamic modeling via Monte Carlo simulations will be performed for probability of target attainment (i.e., $T > MIC$) based on susceptible dose dependent (SDD) MIC breakpoints. Cumulative fraction of response (CFR) will be determined from documented organism MIC.

Results/Conclusions: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe cefepime pharmacokinetics and pharmacodynamics.
Discuss pharmacokinetics and pharmacodynamics of cefepime in continuous renal replacement therapy.

Self Assessment Questions:

Which of the following is the primary pharmacodynamic target for cefepime?

- A: Half-life ($t_{1/2}$)
- B: Area under the serum concentration-time curve (AUC)
- C: Time above the minimum inhibitory concentration ($T > MIC$)
- D: Concentration above the MIC

Which of the following statements is true about extended-infusion cefepime?

- A: It has been shown to decrease mortality compared to conventional
- B: It lowers the probability of pharmacodynamic target attainment.
- C: It has been well studied in patients receiving continuous renal replacement
- D: It has a higher rate of toxicity than conventional infusion cefepime.

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-583-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A RETAIL PHARMACY REFILL REMINDER PROGRAM IN AN HIV-INFECTED POPULATION

Kevin S. Phung*, PharmD; Julie Hahn, RPh, AAHIVP; Lisa Fletcher, PharmD, BCPS; Melody Berg, PharmD, BCPS AQ-ID, AAHIVP; Eric Farmer, PharmD, BCPS, AAHIVP
Indiana University Health, 5370 N Broadway St, Indianapolis, IN, 46220
kphung@iuhealth.org

Purpose: Antiretroviral therapy (ART) can lead to reductions in viral loads and lower risk of immune deficiency in patients with human immunodeficiency virus (HIV). Many studies have demonstrated the close association between adherence to ART and plasma HIV RNA level, CD4 cell counts and mortality in HIV-infected patients. Adherence levels of $\geq 95\%$ are associated with virologic suppression; however, studies show that 40% to 60% of patients with HIV are $< 90\%$ adherent. Major contributing factors to non-adherence include, but are not limited to provider, environmental and patient-specific barriers. To reduce pharmacy-related barriers, the Indiana University Health (IUH) LifeCare Program developed a refill reminder service in collaboration with the IUH Methodist Retail Pharmacy. This study aims to evaluate the impact of a retail pharmacy refill reminder program on adherence rates to ART treatment, viral load suppression and mean CD4 count among an HIV-infected population.

Methods: This was a single-center, retrospective, pre- and post-intervention comparative study that included LifeCare patients who are infected with HIV, prescribed ART agents for at least twelve months and enrolled in the retail pharmacy refill reminder program from November 2013 to November 2014. Using patients refill data from the retail pharmacy operating system, the Proportions of Days Covered (PDC) will be derived and serve as a surrogate marker for ART adherence. The calculation for PDC, is as follows: $PDC = (\text{Total Days Supply} / \text{Total Number of Days Evaluated}) \times 100$. The study will compare the mean PDC between pre- and post-intervention as well as the proportion of population with undetectable HIV-1 viral load and mean CD4 count. Data analysis will be conducted with Student's t-test for continuous variables and Chi-square test for nominal values.

Results/Conclusions: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the barriers to medication adherence in an HIV-infected population.

Describe the potential benefits of a refill reminder program to medication adherence in an HIV-infected population

Self Assessment Questions:

Which of the following examples are pharmacy-related contributing factors to antiretroviral therapy adherence for an HIV-infected population?

- A: Poor health literacy
- B: Pill burden
- C: Unmanaged side effects
- D: All of the above

KP is a 35 year-old man with Tuberculosis (TB) and HIV coinfection. He was started on anti-TB medications two months ago and is now being started on an ART regimen consisting of lamivudine (3TC), zidovudine (ZDV) and efavirenz (EFV).

- A: More likely to have a higher adherence rate to his treatment therapy
- B: Less pill burden through refill synchronization
- C: Higher possibility of virologic suppression
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-842-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

RESPONSE RATES AND OUTCOMES IN C-MYC POSITIVE DIFFUSE LARGE B-CELL LYMPHOMA (DLBCL) PATIENTS TREATED WITH HYPER-CVAD

Maria Piddoubny, PharmD*; Patrick J. Kiel, PharmD, BCPS, BCOP
Indiana University Health, Methodist Hospital, 1701 North Senate
Avenue, Indianapolis, IN, 46202
mpiddoubny@iuhealth.org

Background:

Non-Hodgkin lymphoma (NHL) is the fifth most common cancer worldwide, encompassing over 60 subtypes. Diffuse large B-cell lymphoma (DLBCL) is an aggressive subtypes accounting for one third of all new diagnoses. In 2002 rituximab was added to CHOP therapy (R-CHOP), and became the standard of care in DLBCL. Despite significant improvements seen in complete response rates, event-free survival, and overall survival in DLBCL treated with R-CHOP, a subset of patients with c-myc oncogene overexpression have experienced poorer outcomes comparatively. Discovered in the 1980s, c-myc is a regulator which has distinguished itself as one of the more prominent oncogenes in the genesis and prognosis of lymphomas. C -myc positive DLBCL shares similarities with Burkitts Lymphoma (BL), as genetic biomarkers present in both are associated with poor prognosis. CHOP is not adequate therapy for BL; it requires a higher intensity chemotherapy regimen such as Hyper-CVAD.

Objectives:

The primary objective of this study was to determine the objective response rate (ORR) of c-myc positive DLBCL patients treated with Hyper-CVAD compared to alternative treatments, such as R-CHOP. Secondary objectives included safety and tolerability of Hyper-CVAD therapy in c-myc positive DLBCL patients.

Methods:

This study was a retrospective chart review of c-myc positive DLBCL patients 18 years and older treated at Indiana University Health, Simon Cancer Center between January 1, 2010 and August 16, 2014. The ORR of patients treated with Hyper-CVAD was compared to the ORR of patients treated with alternative regimens (CHOP, R-CHOP, or R-Hyper-CVAD) in a one to two ratio based on: age, sex, stage at diagnosis, LDH, and renal function. Additionally, patient tolerability, hospitalizations, and Common Terminology Criteria for Adverse Events (CTCAE v 4.03) grade 3/4 peripheral neuropathy and febrile neutropenia were reported.

Conclusions Reached:

Results and conclusions will be presented in full at the Great Lakes

Learning Objectives:

Identify oncogenes associated with overexpression and poorer prognosis in DLBCL.

Explain the differences between CHOP and Hyper-CVAD regimens.

Self Assessment Questions:

Which of the following oncogenes are associated with overexpression in DLBCL, leading to poorer prognosis?

- A Bcl-1, bcl-2, bcl-3
- B: C-myc, BCL-5, BCL-10
- C: C-myc, BCL-2, BCL-6
- D: C-myc, BCL-6, BCL-10

RD is an active 55 year old male who has recently been diagnosed with c-myc positive DLBCL after presenting with a painless swelling in his left axilla. His oncologist would like to begin RD on Hyper-

- A Hyper-CVAD contains newer chemotherapeutic drugs than R-CHOP
- B Hyper-CVAD contains stronger chemotherapeutic drugs than R-CHOP
- C Hyper-CVAD contains many of the same chemotherapeutic drugs
- D Hyper-CVAD contains many of the same chemotherapeutic drugs

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-584-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A MEDICATION MANAGEMENT PROGRAM FOR RHEUMATOLOGY PATIENTS AT AN ACADEMIC MEDICAL CENTER

Elizabeth Pieper, PharmD*; Robert Leinss RPh, MBA; Jessica Michaud, PharmD, BCPS; Erika Smith, PharmD, BCPS
Froedtert Hospital, 9200 W Wisconsin Avenue, Milwaukee, WI, 53226
elizabeth.pieper@froedtert.com

Purpose

Biologic disease-modifying anti-rheumatic drugs (bDMARDs) and target specific DMARDs (tsDMARDs) are often necessary to control rheumatologic disorders. However, these medications have significant risks and initiation may be overwhelming for patients. Patient-related barriers include coming to terms with disease progression, fear of needles and self-injection, and medication cost. Risks associated with bDMARDs or tsDMARDs include infection, hematologic disorders, cancers, immunologic conditions, neurologic conditions, heart failure, and injection site reactions. Prior to project implementation, patients were seen by a pharmacist for medication and administration education at Froedtert & the Medical College of Wisconsin and subsequent medication management was primarily conducted by rheumatologists at clinic visits. Development of a pharmacist-driven medication management service may assist patients with overcoming the aforementioned barriers, navigating financial and administration issues, and improving adherence.

Methods

A prospective, single-center project for patients with rheumatologic conditions is being conducted at Froedtert Hospital to evaluate the impact of telephone monitoring after the initiation of an anti-tumor necrosis factor (anti-TNF), non-TNF, or tsDMARD agent. Adult patients included in the analysis will have a newly prescribed bDMARD or tsDMARD by a Froedtert Hospital rheumatologist from August 15th through November 14th, 2014. The primary outcome is drug survival six months after the new start of a study specific medication. Secondary outcomes include adherence, number of pharmacist interventions to ensure proper use and tolerability, and a measurement of the medications efficacy using the health assessment questionnaire (HAQ-DI). Pharmacist telephone calls occur at 1 month, 2 and/or 3 months, and 6 months after the first dose of the medication and consist of an evaluation of patient reported adherence, side effects, and, for most patients, efficacy using the HAQ-DI.

Preliminary Results and Conclusion

Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe labs, side effects, and counseling points reviewed during a phone follow-up for a patient using an anti-TNF, non-TNF or target specific DMARD

Discuss whether pharmacist-driven medication monitoring, in addition to standard of care, improves health outcomes for patients starting a new DMARD

Self Assessment Questions:

How long generally take to see the highest degree of symptom improvement following the initiation of an anti-TNF DMARD?

- A 1 week
- B: 1 month
- C: 3 months
- D: 12 months

Which of following is a potential side effect of tofacitinib (Xeljanz) monitored in a phone follow-up?

- A Infection
- B Heart failure
- C Injection site reaction
- D Kidney failure

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-585-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY AND EFFICACY OF FOSCARNET FOR THE MANAGEMENT OF GANCICLOVIR-RESISTANT OR REFRACTORY CYTOMEGALOVIRUS INFECTIONS: A SINGLE CENTER STUDY

*Brett Pierce PharmD, Chad Richardson PharmD, Joslyn Brown PharmD, Katie Cunningham PharmD, Carly D'Agostino PharmD, Colleen O'Brien PharmD, Christine Tseng PharmD, Michael G. Ison MD MS
Northwestern Memorial Hospital, 600 N McClurg Ct., Apt 2709A, Chicago, IL 60611
bpierce@nm.org

Background: Infection with cytomegalovirus (CMV) is an important cause of morbidity and mortality following solid organ transplantation (SOT). Resistance can rarely develop via mutations in UL97 or UL54. Many agents have been used to treat ganciclovir (GCV)-resistant CMV infections. There are limited published studies assessing the safety and efficacy of foscarnet for the management of GCV-resistant or refractory CMV infection.

Methods: After IRB approval, we retrospectively reviewed the electronic charts of all SOT recipients (R) transplanted between 1/1/06 and 12/31/14 who received at least one dose of foscarnet. Treatment outcomes, tolerability, and safety of foscarnet was evaluated. Most SOTR had genetic resistance testing performed at ViraCor-IBT Laboratories, Lees Summit, MO. Significant renal dysfunction (SRD) was defined as >25% decline in eGFR during active treatment with foscarnet.

Results: 31 patients received foscarnet. Ten (32.3%) SOTR died during treatment with foscarnet; 16/21 (76.2%) surviving SOTRs had documented resistance, and all 21 surviving SOTRs cleared infection. Three (14.3%) patients developed SRD; 2/3 had renal biopsy results consistent with foscarnet-induced toxicity.

Conclusions: GCV-resistant CMV infection is associated with high mortality (32.3%). Of those SOTRs treated with foscarnet and survived, SRD was rare, even with extended use. Use of multi-disciplinary teams, including Pharmacists, expert nursing staff and TID physicians likely contributes to the excellent outcomes.

Learning Objectives:

Recall CMV mutations that may confer ganciclovir resistance.
Recognize toxicities associated with foscarnet use.

Self Assessment Questions:

Which of the following viral mutations can confer resistance to ganciclovir?

- A: UI29
- B: P53
- C: UI54
- D: Pde5

Which of the following is a significant toxicity most commonly associated with foscarnet use?

- A: Vision Loss
- B: Hyperphosphatemia
- C: Hearing Impairment
- D: Renal Insufficiency

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-586-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF VASOPRESSOR SELECTION IN PATIENTS WITH SEPTIC SHOCK

Tania Pini*, PharmD, Jill Starykiewicz, PharmD, Sarah Wieczorkiewicz, PharmD, BCPS, Amish Doshi, PharmD, Ina Zamfirova, BA
Advocate Lutheran General Hospital, 1775 Dempster St, Park Ridge, IL 60068
tania.pini@advocatehealth.com

PURPOSE: Prompt initiation of vasopressors in patients with septic shock and persistent hypotension despite adequate fluid resuscitation is essential. The Surviving Sepsis guidelines recommend norepinephrine as the first-line agent due to its more effective reversal of hypotension in patients with septic shock. Phenylephrine is only indicated for those patients with septic shock who experience serious arrhythmias with norepinephrine, have low cardiac output with persistently low blood pressures, and for salvage therapy. The aim of this project was to review vasopressor selection in septic shock patients based on the Surviving Sepsis guideline recommendations.

METHODS: This was a retrospective chart review of subjects presenting to the emergency department (ED) that have a suspected infection, ≥ 2 SIRS criteria, and an admitting diagnosis of sepsis between January 2013 and October 2014. Subjects could have survived or expired to be included. The primary objective was to determine the selected vasopressor for patients who are presenting to the ED with diagnosis of septic shock. The secondary objectives included in-hospital mortality, ICU length of stay, appropriateness of vasopressor selection based on subject's history, and appropriate vasopressor initiation and continuation after transfer from the ED.

RESULTS: A total of 157 subjects were reviewed who presented with septic shock requiring vasopressor support. The vasopressors used in this assessment included norepinephrine, phenylephrine, epinephrine, dopamine, and vasopressin. Data analysis is in progress. Results will review the impact of vasopressor selection on mortality and related adverse reactions experienced by these subjects.

CONCLUSIONS: Final conclusions will be presented.

Learning Objectives:

Describe the current Surviving Sepsis Campaign vasopressor recommendations for patients in septic shock and refractory to initial fluid resuscitation.

Identify the most appropriate vasopressor selection for patients presenting with septic shock based on their past medical history

Self Assessment Questions:

Which of the following is a goal when initiating vasopressors in septic shock patients with persistent hypotension refractory to initial fluid resuscitation?

- A: Initiate within 3 hours of presentation
- B: Initiate phenylephrine as first-line agent in patients without cardiac
- C: Maintain mean arterial pressure (MAP) ≥ 65 mmHg
- D: Repeat fluid resuscitation of 30 ml/kg of crystalloid

Select one of the following vasopressors that would be an appropriate initial agent for a patient who presents with atrial fibrillation with RVR:

- A: Dopamine
- B: Norepinephrine
- C: Phenylephrine
- D: Vasopressin

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-843-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF A PHARMACY DEPARTMENT OPERATED MEDICATION HISTORY SERVICE

*Kyle J. Piscitello, Pharm.D., Andrew J. Ticcioni, Pharm.D., BCPS, Christopher Dykstra, Pharm.D., MBA, Tahmeena Siddiqui, Pharm.D., Jordan Williams, Pharm.D., BCPS, Lisa Bosman, RN/BSN

Wheaton Franciscan – St. Joseph Campus, 5000 West Chambers Street, Milwaukee, WI, 53210

Kyle.Piscitello@wfhc.org

Purpose: The American Society of Health System Pharmacists believes that an effective medication reconciliation program reduces the number of preventable medication errors and adverse drug events. Case studies confirmed that trained Advanced Pharmacy Practice Experience students, pharmacy interns, and pharmacy technicians can effectively participate in these programs by gathering patients' home medication lists for clinical pharmacists to reconcile. In addition to developing and implementing the medication history service, this study seeks to determine the average number of discrepancies identified on nursing gathered home medication lists, to categorize the discrepancies identified, and to determine average time required to gather an accurate home medication list.

Methods: This is a prospective quality improvement study involving patients admitted to the general medicine unit. Excluded patients are those admitted to observation units, with home medication lists gathered by emergency department pharmacy staff, the terminally ill, and those being admitted for preplanned procedures. Trained pharmacy interns and students will identify patients that meet inclusion criteria from printed reports. Patient data will be collected via interview, from hospital medical records, and community pharmacies. The pertinent data includes the home medication list, drug allergy record, and prescription filling record. The pharmacy-gathered home medication list will be compared to nursing admission medication reconciliation to identify all discrepancies between the two lists. The amount of time required to complete this task will be recorded as well. The study's principal investigator will analyze all data. Analysis includes determining the average number of discrepancies identified per patient, including both medication and allergy discrepancies, the approximate financial savings accrued from preventing these errors, and the staffing requirements to provide this service on a daily basis.

Results/Conclusion: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the elements that comprise a "Best Possible Medication History."

Recognize discrepancies commonly included on medication histories and the impact they can have on the health system and patient care.

Self Assessment Questions:

Which of the following best describes an important component of collecting the "Best Possible Medication History?"

- A: Relying solely on prescription refill records from community pharmacy
- B: Taking two hours to call multiple local community pharmacies, far
- C: Utilizing a standardized medication history collection form to collect
- D: Recording the prescribed instructions and not including a patient's

The following is included on a nurse's home medication list: "Carvedilol 3 mg cap - One tablet qday" How many discrepancies can you identify for this medication?

- A: 2
- B: 4
- C: 5
- D: 6

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-844-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

VA PHARMACISTS INCREASE PATIENTS ACCESS TO CARE THROUGH COLLABORATION WITH PRIMARY CARE PROVIDERS IN PATIENT ALIGNED CARE TEAMS (PACT)

Ellina S. Pisetsky, PharmD*; Andrew J. Wilcox, PharmD; Janelle L. Vittetoe, PharmD; Hilary R. Friedman, PharmD

Veteran Affairs - William S. Middleton Memorial Hospital, 2500 Overlook Terrace, Madison, WI, 53705

Ellina.Pisetsky2@va.gov

Purpose

The purpose of this practice advancement project was to increase patients access to primary care, assist primary care providers (PCPs) in management of their patients with chronic disease states, and to ensure appropriate clinical pharmacy resources are available to patients and PCPs at the William S. Middleton Memorial Veterans Hospital.

Methods

Methods involved were multifaceted. First, a strong educational campaign was conducted to ensure PCPs knew what pharmacy resources were available for chronic disease state management. At the same time, a program called the "PharmD Point of Contact (POC)" was instituted. This program assigned a second year pharmacy resident to each of the PCPs to act in the role of a true Patient Aligned Care Team (PACT) pharmacist. Additionally, a new medication intake clinic was created and a proactive panel management program was instituted. With the support of PCPs, a proposal was written requesting more clinical pharmacy resources be allocated to primary care, and 4.0 new clinical pharmacist FTE was approved.

Results

The educational campaign was launched in September 2014. Analysis from October through December 2014 revealed pharmacy clinic utilization rates increased by an average of 13.79% (11.24% growth in face to face clinics and 20.15% growth in telephone clinics). In addition, the PharmD POC program was highly utilized, with one PharmD POC receiving 84 different contacts from five different PCPs since program initiation, averaging about 2 contacts per day. Results from the impact of the new medication intake clinic, proactive panel management service, and allocation of the 4.0 new PACT clinical pharmacist FTE will be presented at the Great Lakes Pharmacy Conference.

Conclusion

Clinical pharmacy practice expansion into primary care has increased pharmacy clinic utilization rates and has opened PCP appointment slots resulting in increased access to care for Veterans. Further conclusions will be presented at the Great Lakes Pharmacy Conference.

Learning Objectives:

State what the acronym "PACT" stands for.

Identify two ways in which pharmacists can help increase patients access to primary care.

Self Assessment Questions:

What does the acronym "PACT" stand for?

- A: Pharmacy Ambulatory Care Tracker
- B: Patient Aligned Care Team
- C: Parent And Child Together
- D: Patient Art Coalition Time

What are 2 ways in which pharmacists can help increase patients access to primary care?

- A: PharmD POC program and cancelling appointments when PCPs are
- B: Education on pharmacy chronic disease state services and more
- C: Creating a Medication Intake Clinic and education on pharmacy
- D: Proactive panel management and tracking no-show rates

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-587-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING ORAL CHEMOTHERAPY EDUCATION, DOCUMENTATION, AND FOLLOW-UP

Laura Poggi*, PharmD, PGY2 Pharmacy Resident in Oncology; Jennifer Godden, PharmD, BCOP, Outpatient Oncology Pharmacy Clinical Coordinator; Scott Becker, Senior Analyst, Beacon IT
Aurora Health Care, 2900 W Oklahoma Ave., Milwaukee, WI, 53215
laura.poggi@aurora.org

Purpose: The objective of this project is to develop a standardized process to improve the workflow for oral chemotherapy education, follow up, and documentation.

Methods: Prior to this project there was not a consistent standard for oral chemotherapy education, follow-up, or documentation throughout our system. Oral chemotherapy electronic medical record (EMR) flowsheets were created to document initial and follow-up education. The EMR flowsheets include elements to be discussed with patients to ensure safety and compliance with oral chemotherapy as well as meet Quality Oncology Practice Initiative (QOPI) standards. The elements in the EMR flowsheets also ensure Utilization Review Accreditation Commission (URAC) requirements are met for Auroras Specialty Pharmacy. A workflow was created and initiated for education and follow up assessment in November 2014 at 24 oncology clinics. All caregivers were to document the oral chemotherapy initial education and follow-up assessments in the EMR flowsheets, which allows documentation to be easily seen across disciplines and are reportable to audit compliance with QOPI and URAC measures. Compliance with documentation in the EMR flowsheets, and pharmacists time and interventions were collected after initiation of the workflow. Based on assessment of this data, a revised workflow was developed. A pilot of the new workflow will be performed at one clinic to optimize the process for all disciplines. During this new pilot, it will be determined how a pharmacist can be utilized to improve the management of oral chemotherapy agents.

Results/Conclusion: To be presented at the 2015 GLPRC.

Learning Objectives:

Describe two Quality Oncology Practice Initiative (QOPI) measures that relate to oral chemotherapy.

List two barriers to implementing a new oral chemotherapy workflow process in a large, integrated system.

Self Assessment Questions:

Which of the following describes a QOPI measure(s) that relates to oral chemotherapy?

- A The start date of the oral chemotherapy is documented
- B Safe handling education is provided to the patient prior to starting
- C Medication adherence is assessed following the start of oral chem
- D All of the above

What is a barrier(s) to implementing a new oral chemotherapy workflow process in a large, integrated system?

- A Variation in staffing across clinics
- B Pharmacists refusing to participate in the new workflow
- C EMR flowsheets not able to be seen across disciplines
- D a and c

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-931-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PILOT TELEPHARMACY SERVICE ON OUTPATIENT PHARMACIST SATISFACTION, WORKFLOW, AND REVENUE

Abigail D. Polley, PharmD, Kristin L. Peterson, RPh, Jamie L. Statz-Paynter, RPh, Joseph A. Zorek, PharmD
UW-Madison School of Pharmacy Community Pharmacy Residency Program, 777 Highland Ave., Madison, WI, 53705
apolley@wisc.edu

Statement of Purpose:

The primary aim of this pilot study is to evaluate outpatient pharmacist satisfaction with the incorporation of a telepharmacy service. Secondary aims include assessing the impact of this service on pharmacy workflow and revenue generation.

Statement of Methods:

In this pilot telepharmacy service, pharmacy technicians of an outpatient pharmacy housed within an integrated healthcare system (i.e., with medical clinics and a hospital within walking distance) will deliver medications to ambulatory surgery patients at bedside prior to discharge, and outpatient pharmacists will perform remote consultations via video technology. Pharmacists will complete a satisfaction survey before and after implementation of the service, and participate in recorded semi-structured interviews following service implementation. Descriptive statistics will be used to characterize pharmacists and satisfaction scores. Wilcoxon Signed-Rank tests will be used to evaluate changes in satisfaction scores following service implementation, and qualitative content analysis will be employed to identify and characterize emergent themes from interview transcripts to inform workflow implications. Additional revenue captured by the pharmacy secondary to this pilot service will be reported.

Summary of Results:

To be determined.

Conclusions:

To be determined.

Learning Objectives:

Define telepharmacy

List benefits of utilizing telepharmacy

Self Assessment Questions:

What is telepharmacy?

- A The use of medical information exchanged from one site to another
- B A method used in pharmacy practice in which a pharmacist utilizes
- C Communication over a distance by cable, telegraph, telephone, or
- D A system for transmitting visual images and sound that are reproduced

What is a benefit of utilizing telepharmacy?

- A Pharmacists can talk to each other when there is down time in the
- B Pharmacists are not on-site to supervise dispensing of medication
- C Pharmacists can provide patient care when the pharmacist and patient
- D There are no benefits to telepharmacy

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-845-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL OUTCOMES AND COST ANALYSIS OF HEALTH-SYSTEM WIDE CONVERSION FROM PORACTANT ALFA TO CALFACTANT IN THE NEONATAL INTENSIVE CARE UNIT

*Michelle Poole, PharmD; Laurel Brown, PharmD, BCPS; Betsy Walters Burkey, PharmD, BCPS; Benjamin Nutter

Cleveland Clinic - Fairview Hospital, 18101 Lorain Ave, Cleveland, OH, 44111

poolem3@ccf.org

Purpose

Respiratory distress syndrome (RDS) is a common reason for admission into the neonatal intensive care unit (NICU). Typically RDS affects neonates below 35 weeks of gestational age due to their immature lung development, and a mainstay of treatment includes surfactant replacement. Our institution recently changed the formulary surfactant product from poractant alfa to calfactant. Currently there are no head-to-head, prospective trials comparing poractant alfa to calfactant, but from a large comparative effectiveness study it was seen that poractant alfa and calfactant had similar efficacy when prevention of air leak syndromes, bronchopulmonary dysplasia and death were considered. Unfortunately redosing rates were not analyzed. This study compares redosing rates, clinical outcomes and cost for both products.

Methods

This retrospective study examines data from the electronic medical record of three NICUs within the Cleveland Clinic Health System. Data was collected from September 1, 2013 through March 1, 2014 for patients receiving poractant alfa, and from September 1, 2014 through March 1, 2015 for those receiving calfactant. The primary endpoint is redosing rate of calfactant versus poractant alfa during NICU admission. Secondary endpoints include total ventilator days, oxygen requirements at 28 days or discharge, drug acquisition costs to the health-system, complications (pulmonary hemorrhage or pneumothorax) within 24 hours of surfactant administration, and mortality.

Results

For the primary endpoint, preliminary results indicate similar redosing rates for the second dose of calfactant and poractant alfa, but there appears to be a trend that neonates weighing less than 1000 grams often require more than two doses of calfactant. This trend differs from what was observed in the poractant alfa group. Data collection is ongoing and secondary endpoints will be evaluated after data collection is complete.

Conclusions

Research is currently in progress and further results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the most common etiology of respiratory distress syndrome.
Review the differences between surfactant products.

Self Assessment Questions:

What is the most common reason an infant will develop respiratory distress syndrome?

- A: Mother administered betamethasone prior to delivery
- B: Low gestational age
- C: Congenital heart disease
- D: Greater than 40 weeks gestation at birth

How are poractant alfa and calfactant different?

- A: Multiple doses can be administered
- B: Route of administration
- C: FDA indicated for treatment of RDS
- D: Cost per vial

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-588-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHANGE IN PATIENT CLINICAL ASSESSMENTS AFTER COMPLETING A COMMUNITY PHARMACIST-LED DIABETES EDUCATION PROGRAM

Kevin M. Popa* Pharm D; Caitlin K. Malone Pharm D; Jeffrey G. Hamper Pharm D; Susan R. Winkler Pharm D, BCPS, FCCP

InstitutionSite

Jewel-Osco Pharmacies/Midwestern University Chicago College of Pharmacy, 3030 Cullerton st., Franklin Park, IL, 601312205

kevin.popa@albertsons.com

Purpose: The primary objective is to determine the change in body mass index (BMI), blood pressure, and hemoglobin A1c from baseline for subjects who have completed a six month pharmacist-led diabetes education program. Secondary aims are to identify changes in patient behaviors and gather patient demographics.

Methods: This is a multi-center, retrospective, descriptive study that was approved by the Midwestern University Institutional Review Board. The six month pharmacist-led diabetes education program is offered at a chain grocery store pharmacy in 12 states in a standardized format. The program consists of an initial group class and four individual consultations designed to obtain patient assessments and provide diabetes self-management education using American Diabetes Association recommendations. Eligible patients will be identified by a report generated for those who have completed the program. Included patients are age 18 or older, have enrolled March 1, 2013 or later, and have attended all program visits. Patients are excluded if they did not complete the program by August 1, 2014. Data collected will include clinical assessments, patient behaviors, and patient demographics. Clinical assessments include BMI, blood pressure, and hemoglobin A1c to help tailor the educational component of the program and change in patient behavior to impact and clinical assessments. Patient behaviors include smoking status, physical activity, glucose monitoring frequency, medication adherence, and health maintenance (dental, eye, foot exams). Data from final visit will be compared to initial visit data to determine change in clinical assessments and patient behaviors using a paired t-test and will be analyzed by SPSS Statistics Version 22. Data collection will be performed by the primary researcher using a central database. A sample size of 384 patients will be needed for a 95% confidence interval and to reach power.

Results/Conclusion: Research is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the American Diabetes Association (ADA) recommendations for the treatment of diabetes.

Discuss the American Diabetes Association (ADA) recommendations for the self-management of diabetes.

Self Assessment Questions:

What is the recommended hemoglobin A1c target for most non-pregnant adults with diabetes according to the American Diabetes Association (ADA)?

- A: 6%
- B: 6.5%
- C: 7%
- D: 7.5%

Which of the following is listed as part of diabetes self-management education and support in the American Diabetes Association (ADA) guidelines?

- A: Psychosocial care
- B: Fluid restrictions
- C: Acupuncture
- D: Sodium-restricted diets

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-589-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RAPID ESTIMATE OF ADULT LITERATURE IN MEDICINE-REVISED (REALM-R) USE AS A HEALTH LITERACY SCREENING TOOL FOR CLINICAL INTERVENTION

*Edward Portillo, PharmD; Berook Addisu, PharmD, BCPS; Susanne Barnett, PharmD, BCPS

Veteran Affairs - William S. Middleton Hospital, 2302 University Avenue, Madison, WI, 53726

Edward.Portillo@va.gov

Purpose:

Many studies have demonstrated that low health literacy is associated with poorer health outcomes including hospital readmissions. A post-discharge Hospital to Home Clinic is being implemented for patients at risk for low health literacy at the William S. Middleton Memorial Veterans Hospital in Madison, WI. Participants are enrolled in the service based on their score determined by a low health literacy screening tool called the Rapid Estimate of Adult Literature in Medicine-Revised (REALM-R). The REALM-R is an 11-item evaluation used to identify patients at risk for low health literacy and can be administered and scored in less than 2 minutes.

The purpose of this project is to assess the effectiveness of the REALM-R tool in identifying patients at increased risk for hospital readmissions or emergency department/urgent care visits.

Methods:

This study is a single-center, prospective, observational research project. Patients hospitalized from December 1, 2014 to February 15, 2015 were administered the REALM-R word recognition test as a component of the medication history interview. Patients were differentiated based on risk for low health literacy as determined by the REALM-R. Group A consisted of patients at risk for low health literacy (REALM-R score less than or equal to 6), and Group B included patients not at risk for low health literacy (REALM-R score greater than 6).

Assessment of 30-day hospital readmission rates and emergency department/urgent care visits were made for all patients post-discharge. Composite results were then compared across Group A and Group B. As a secondary analysis, hospital readmission risk for patients in Group A was also compared to that for existing high risk patient populations currently receiving transitions of care services within the institution.

Learning Objectives:

Identify the impact poor health literacy has on patient outcomes and health care expenditures

Describe the challenges in reliably determining patient health literacy level

Self Assessment Questions:

The REALM-R tool largely measures

- A Reading ability or print literacy
- B: Language comprehension for non-English speakers
- C: Critical thinking skills
- D: Medication adherence

How many minutes does it take to administer the REALM-R tool?

- A 2 minutes or less
- B 12 minutes or less
- C 25 minutes or less
- D 45 minutes or less

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-846-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS WITH ENOXAPARIN IN OBESE PATIENTS

Rebecca L. Posegay, Pharm.D.*; Alfred M. Pheley, PhD.; Gay G. Alcenius, Pharm.D.

Allegiance Health, 205 NE Ave, Jackson, MI, 49201

rebecca.posegay@allegiancehealth.org

Purpose: VTE is one of the leading preventable causes of hospital-related deaths in the United States. Risk assessment models are used to determine VTE risk and the need for prophylaxis (e.g. enoxaparin). In addition to being a County and nation-wide problem, obesity is a risk factor for VTE. The obese population has been underrepresented in prophylactic enoxaparin dosing studies, making it difficult to determine optimal dosing strategies. Due to possible altered drug distribution and pharmacokinetics in obese patients, use of standard prophylactic enoxaparin doses may be inadequate. Recent studies have investigated anti-Xa levels as surrogate markers for enoxaparin activity, but have not necessarily studied VTE incidence. A difference in VTE incidence may exist between obese and non-obese patients receiving standard prophylactic doses of enoxaparin. The primary objective of this study is to determine if obese patients treated with standard VTE prophylactic doses of enoxaparin had a higher incidence of VTE than non-obese patients.

Methods: This retrospective cohort study includes patients from Allegiance Health, a community hospital, that received VTE prophylaxis with enoxaparin at doses of 40mg daily, 30mg twice daily, and 30mg daily. Patients will be classified based on body mass index (BMI) as obese (BMI $\geq 30\text{kg/m}^2$) or non-obese (BMI $< 30\text{kg/m}^2$). Exclusion criteria include contraindications to enoxaparin, active bleeding, therapeutic anticoagulation indications, pregnancy, and bleeding or clotting disorders. Data, based on patients who received prophylactic enoxaparin from August 1st, 2013 to September 30th 2014, were collected from the electronic health record and used to analyze the primary outcome, incidence of VTE within 90 days of enoxaparin use.

Results/Conclusions: Data collection and analysis are ongoing. Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize risk factors for developing VTE

Discuss enoxaparin dosing strategies for VTE prophylaxis in obese patients

Self Assessment Questions:

Which of the following is a risk factor for developing VTE?

- A History of VTE
- B: Obesity
- C: Ambulation
- D: Both A and B are risk factors

For VTE prophylaxis in obese patients, the clinical literature most strongly supports which of the following enoxaparin dosing strategies?

- A The same dose given to non-obese patients
- B A dose based on total body weight
- C A dose based on body surface area
- D There is no consensus regarding dosing in obese patients

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-590-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

REDUCING MEDICATION WASTE THROUGH CHANGES IN UNIT-DOSE STRIP-PACKAGING PROCEDURES

Adam J Post*, PharmD, PGY-1 Pharmacy Resident, Jeff T Thiel, PharmD, MS, Director, Pharmacy Services
NorthShore University HealthSystem, 2650 Ridge Avenue, Evanston, IL, 60026
apost@northshore.org

Purpose:

The purposes of this project were to determine a specific target for reducing medication waste, measure the amount of waste produced in that area, and to formulate and implement an intervention with the goal of reducing the amount of medication waste produced and expenses associated with said waste.

Methods:

Several meetings took place and suggestions were solicited from pharmacy staff to determine the source of medication waste on which to focus. Based on these discussions it was decided to focus on waste produced by outdating of oral medications that have been repackaged into unit-dose packets by strip-packaging. Previously, data had never been collected within the health system for the amount of waste that occurs in this process. Data was collected over a 6-week period and totaled based on the number of different medications and the quantities and cost of each medication. High-cost medications were identified as well as similar medications not recorded that were also high-cost. These medications would be the target of intervention, as this could potentially result in significant cost reduction. The process change to be implemented is to avoid repackaging these medications and instead package an individual dose from the original container when it is needed.

Results:
During the data collection period 176 different medication products were recorded as discarded, of which 173 were included in further analysis. The total number of medication units discarded was 4,918 with a value of \$17,665. Extrapolated to 1 year, this is equal to 42,740 units with a value of \$153,520. It was found that 13 medications accounted for 81% of the value discarded in the data collection period. These medications were identified as high-cost.

Conclusions:

Unit-dose strip-packaged medications were confirmed as a significant source of medication waste and a potential target for reducing medication waste and medication expense.

Learning Objectives:

Identify potential limitations of the data collection process used

Identify the timeframe from the date of implementation of the intervention to when a reduced amount of waste should be expected based on the beyond-use-date of pre-packaged medications

Self Assessment Questions:

Which of the following is a potential limitation of the data collection process used in this project?

- A: Incomplete recording of medications discarded
- B: No medications were discarded
- C: No standardized form was utilized
- D: Data was only collected over 2 weeks

Based on the beyond-use-date used for pre-packaged medications, what would be the expected timeframe from the date of implementation of the intervention to when a reduced amount of waste should be expected?

- A: Immediately
- B: 3 months
- C: 12 months
- D: > 2 years

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-847-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE EVALUATION OF THE USE OF VANCOMYCIN IN PATIENTS WITH FEBRILE NEUTROPENIA (REVVU-VANCO)

Zachary S. Post, Pharm.D.*, Sharanie V. Sims, Pharm.D., BCPS (AQ-ID), Usha Stiefel, MD, Candice M. Wenzell, Pharm.D., BCOP
Veteran Affairs - Louis Stokes Cleveland Medical Center, 10701 East Boulevard, Cleveland, OH, 44107
zachary.post@va.gov

Purpose: To assess the prescribing of vancomycin for empiric antimicrobial coverage in patients with febrile neutropenia (FN) at the Louis Stokes Cleveland VA Medical Center (LSCDVAMC) and accordance with the 2010 Infectious Diseases Society of America (IDSA) Clinical Practice Guidelines for the Use of Antimicrobial Agents in Neutropenic Patients with Cancer.

Methods: Vancomycin accordance will be determined by indication for initiation and de-escalation. Secondary objectives include identification of the indication for vancomycin initiation, frequency of de-escalation from vancomycin in accordance with the IDSA guidelines, assessment of initial vancomycin dose and frequency in accordance with 2014 LSCDVAMC Antimicrobial Guidelines, identification of duration of vancomycin therapy, monitoring by Pharmacy Consult Service, hospital length of stay, ICU admissions and length of stay, along with nephrotoxicity. This study is a retrospective chart review. Patients will be identified by utilizing a pharmacy generated list of patients between June 1, 2011 and October 31, 2014. Inclusion criteria are as follows: have a diagnosis of FN upon admission or during hospital stay with receipt of vancomycin as a component of FN treatment during the same admission. Exclusion criteria are as follows: transferred from outside facility or receipt of IV antibiotics within 30 days prior to FN episode (unless antibiotic course was for prior FN episode). Descriptive statistics will be utilized to summarize data collected. Other measures include cancer type, administered chemotherapy, oral antibacterial prophylaxis, colony stimulating factors, and external radiotherapy within the past 30 days, other antibiotic agents included in initial regimen for FN, documented pneumonia infection and concurrent treatment during FN, and all-cause mortality.

Results: Data collection is ongoing. Final results and conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the significance of febrile neutropenia (FN) in oncology patients

Describe the implication of appropriate antimicrobial agent selection in patients with FN, particularly with vancomycin

Self Assessment Questions:

Which of the following statements concerning FN is correct?

- A: Vancomycin should be included in the antimicrobial treatment of a
- B: Documented skin or soft-tissue infection is not an appropriate indi
- C: Unnecessary vancomycin use is not thought to be associated with
- D: Microbiologically documented infections occur in a minority of all c

Which of the following situations describes an appropriate indication for initiation of empiric coverage with vancomycin in FN?

- A: Patient has severe mucositis after receiving antimicrobial prophylax
- B: Positive blood culture for Gram-negative bacteria retrieved from p
- C: Patient is hemodynamically unstable; heart rate 122bpm, systolic l
- D: Patient also has suspected community-acquired pneumonia upon

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-591-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

UTILIZATION OF PHARMACY STUDENTS IN THE DELIVERY OF PATIENT CARE WITHIN A COMMUNITY HEALTH SYSTEM

Anne J. Poundstone, PharmD* and Amber B. Clouse, PharmD, BCPS
NorthShore University HealthSystem, 1930 Ridge Ave, Apartment B-109, Evanston, IL, 60201
apoundstone@northshore.org

Purpose:

It is well documented that pharmacy students are capable of providing meaningful clinical services within the hospital setting. The Joint Commission recommends completion of medication reconciliation and medication teaching for hospitalized patients, and pharmacy students can play an important role in the delivery these services without increasing labor costs to the institution.

The purpose of this project is to determine how pharmacy students across a multi-site, community health system are participating to deliver patient care. By reviewing student, pharmacy resident, and pharmacist participation in medication reconciliation, medication counseling, and disease state teaching, the goal is to gain insight into the current role of pharmacy students compared to pharmacy residents and pharmacists. This information will be used to help determine if there are opportunities for improvements in workload distribution while ensuring that each group of pharmacy providers are performing tasks at the top of their license.

Methods:

A taskforce of selected pharmacists and pharmacy managers was assembled to determine the parameters to be measured and to assist in decision making. A baseline metrics analysis assessing the number of notes written and the documented number of patients counseled by pharmacy students, pharmacy residents, and pharmacists in the electronic health record between October 1, 2013 and September 30, 2014 was completed. This baseline data, along with pharmacy residents and pharmacists schedules, will be used by the taskforce to restructure the distribution of students across the health system and standardize required rotation activities. This evaluation is a quality improvement project and is therefore exempt from review by the Institutional Review Board.

Results/Conclusion:

A summary of results and conclusion will be presented at the 2015 Great Lakes Residency Conference.

Learning Objectives:

Discuss the role of pharmacy students in performing medication reconciliation, medication counseling, and disease state teaching. Identify opportunities for improvement in pharmacy student workload distribution at a multi-site, community health system.

Self Assessment Questions:

Which of the following patient care activities are pharmacy students capable of providing?

- A: Obtaining medication histories
- B: Medication counseling
- C: Order verification
- D: Both A & B

By utilizing pharmacy students to provide clinical services such as medication reconciliation and medication counseling, hospitals can:

- A: Increase the number of patients reached by pharmacy personnel.
- B: Provide more patient care by increasing labor costs.
- C: Provide more patient care without increasing labor costs.
- D: Both A & C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-848-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF PHENYTOIN COMPARED TO LEVETIRACETAM FOR EARLY SEIZURE PROPHYLAXIS FOLLOWING TRAUMATIC BRAIN INJURY (TBI) AND INTRACRANIAL HEMORRHAGE (ICH) IN THE INTENSIVE CARE UNIT (ICU)

Ashley M. Powell*, PharmD; Stacy A. Otremba, PharmD; Mark H. Pangrazzi, PharmD

Sinai-Grace Hospital/Detroit Medical Center, 6071 West Outer Drive, Detroit, MI, 48235

apowell3@dmc.org

Purpose:

Post-traumatic seizures (PTS) are a known complication of TBI/ICH with an estimated incidence of 4-25%. PTS complications include impaired oxygen delivery, elevated intracranial pressure, and hypertension. Current guidelines recommend phenytoin for early seizure prophylaxis following TBI/ICH. Several recent studies show similar efficacy between phenytoin and levetiracetam. The favorable pharmacokinetic/pharmacodynamic profile of levetiracetam makes it an attractive alternative for clinicians. Due to conflicting literature and population heterogeneity, questions remain as to which medication is preferred.

Methods:

The primary aim of this retrospective analysis is to determine the incidence of early PTS in patients treated with anti-epileptics in the ICU from January 1, 2014 to December 1, 2014 at two Detroit Medical Center hospitals. Patients will be identified through medication reports based on ordered drugs and chart review using the health system's electronic medical record. Patients with CT-confirmed TBI, ICH, or subarachnoid hemorrhage (SAH) and placed on PTS prophylaxis will be included. Patients will be excluded if age <18 years, history of brain injury or seizure disorder, pre-hospital use of antiepileptics, or withdrawal of care within 48 hours of admission. Patients will be analyzed for demographics, dose/duration of antiepileptic, serum phenytoin and levetiracetam levels, seizure occurrence, time to seizure while on drug therapy, and documented adverse events. Additional secondary endpoints will include ICU and hospital length of stay, ventilator days, and in-hospital mortality. All data will be analyzed using appropriate statistical tests with the statistical software SPSS version 18.0 or later. All p values <0.05 are considered statistically significant. This study is pending final approval by the Institutional Review Board.

Results/Conclusions:

Data is currently under review and results will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the pathophysiology of secondary brain injury and the recommendations for preventing posttraumatic seizures in patients with traumatic brain injury

Discuss the outcomes of patients with acute brain injury who received either phenytoin or levetiracetam for early seizure prophylaxis

Self Assessment Questions:

The current Brain and Trauma Foundation guidelines for management of patients with severe TBI recommend which of the following:

- A: Antiepileptics should be administered for 7 days post brain injury
- B: Patients with traumatic brain injury of any severity should receive s
- C: Phenytoin should be used to prevent early posttraumatic seizures
- D: Both A and C are correct

Suggested benefits to the use of levetiracetam over phenytoin for early seizure prophylaxis include(s):

- A: Non-linear kinetic profile
- B: Minimal protein binding
- C: Higher rates of fever
- D: All of the above

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-592-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHYSICIAN-PERCEIVED VALUE OF PHARMACISTS PROVIDING ADVANCED PATIENT CARE MANAGEMENT

Mindy J Prasad, PharmD*, Laurie Wesolowicz, PharmD, Alexandra Tungol-Lin, PharmD

University of Michigan Health System, 4151 Lake Forest Ct, Ann Arbor, MI, 48108

mprasad@bcbsm.com

Recognized provider status of pharmacists is the focus of several major pharmacy organizations. Increasing pharmacist involvement in advanced patient care, along with added quality measures for health plans may provide avenues for provider payment to pharmacists for non dispensing services by managed care organizations. Establishing appropriate structures for pharmacist roles in patient care is necessary. Physician input regarding pharmacist role identification may speed acceptance and identify unmet areas of need. The objective of this study is to determine physicians perceptions and attitudes of pharmacists providing advanced patient care management. A questionnaire survey was developed and reviewed by a medical director (physician), subject matter expert on pharmacist ambulatory care services, and leadership of a large insurers physician incentive program for clarity and brevity. Physician participants of a large insurers provider network received the survey via mail. Participation was voluntary with no incentives offered to respondents. Data collection occurred over three months. The survey employed a 5 point Likert scale, multiple choice, and free response questions. Physician demographics and a baseline assessment of physician understanding of pharmacist roles and functions was gathered. Physicians rated pharmacist value in specific roles and functions such as independent one-on-one clinical appointments with patients and supporting pharmacy-related HEDIS or CMS STARS measures. Total population of the provider network is >30,000 physicians. Assuming a 20% response rate, with margin of error set at 5% and 95% confidence level, the number of surveys mailed was 3,770. Descriptive analyses (means, standard deviations, frequency distributions) were used for all variables. A total of 3,770 surveys were sent November 2014. As of January 2015, 286 (7.5%) surveys were received. Survey responses will be collected through February 2015. The results of this study will be used to further develop value-based healthcare partnerships involving pharmacist-delivered advanced patient care management.

Learning Objectives:

Recognize demographic variable likely to influence perception of pharmacist provided advanced patient care management.

Arrange chronic disease states in order of physician perceived pharmacists' value in management

Self Assessment Questions:

Identify the demographic variable associated with a higher physician-perceived value rating of pharmacist-provided one-on-one clinical appointments.

- A: Male gender
- B: Length of practice ≥ 21 years
- C: Participation in a physician incentive program
- D: Practice in the inpatient setting only

Arrange the following chronic disease states that pharmacists can help manage in rank order, as identified by physicians (1 = lowest value to 7 = highest value).

- A: Diabetes > Heart failure > COPD > Hypertension > Anticoagulation
- B: Heart failure > Diabetes > COPD > Hypertension > Anticoagulation
- C: Anticoagulation > Diabetes > Heart failure > COPD > Hypertension
- D: Anticoagulation > Diabetes > Heart failure > Hypertension > Dyslipid

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-849-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF 3-FACTOR PCC VERSUS 4-FACTOR PCC FOR WARFARIN REVERSAL

Natalie I. Prater, PharmD, BCPS*; Molly Mason, PharmD, BCPS; Timothy J. Ellender, MD

Indiana University Health, 1701 N. Senate Blvd, Indianapolis, IN, 46202
nprater@iuhealth.org

Background:

Anticoagulation reversal has become a prominent topic in health care with the emergence of novel oral anticoagulants. In light of these agents, warfarin, a vitamin K antagonist (VKA), is still one of the most commonly used agents for anticoagulation. The 2012 CHEST guidelines recommend rapid reversal of anticoagulation for patients with VKA-associated bleeding using a four-factor prothrombin complex concentrate (PCC) with the addition of vitamin K. KCentra was the first four-factor PCC available in the United States in April 2014. Prior to the release of KCentra, Profilnine, a three-factor PCC, was an alternative product used for VKA reversal. To date, clinical outcomes have not been compared between the factor products.

Purpose:

The purpose of this study is to retrospectively compare clinical reversal of anticoagulation between KCentra and Profilnine (with and without the use of vitamin K) as well as patient outcomes.

Methods:

Patients were included in this study if they were age 18 or older and received Kcentra or Profilnine for emergent reversal of warfarin. Patient data was analyzed by retrospective study design. Data was identified via a search of pharmacy and medical records spanning the periods of January 2013 through September 2014. Patient data collected included age, gender, height, weight, date of admission, admission diagnosis, indication for warfarin, home regimen of warfarin, use of anti-platelet medications, use of other medications that increase bleeding risk, lab values (PT, INR, hemoglobin, hematocrit, and platelets), factor product, dose of factor product, use of additional/adjunct blood products, use of antifibrinolytic agents, time to INR < 1.5, results of imaging studies, patient length of stay, and patient outcome.

Results:

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Explain how to appropriately dose and administer KCentra for the emergent reversal of warfarin.

Describe the pharmacologic differences between the factor products and how they affect warfarin reversal.

Self Assessment Questions:

Which of the following parameters is needed to dose KCentra?

- A: Hemoglobin
- B: INr
- C: Time between last dose of warfarin and presentation
- D: Anatomic location of bleeding

Patient Case: A 64 year old, 110 kg male presented to the emergency department after a fall and is now complaining of the worst headache of his life. His past medical history is significant for H

- A: Kcentra® 5000 units IVPB x1 over 30 minutes, repeat dose if INR
- B: Kcentra® 6500 units IVPB x1 over 30 minutes
- C: Kcentra® is not indicated in this patient. Recommend using Profil
- D: None of the factor products are indicated for this patient. Recomm

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-593-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT AND OPTIMIZATION OF MEDICATION PRACTICES IN AURORA HEALTH CARE OPERATING ROOMS

Ellen N Prichard PharmD MBA*, Allan Loeb PharmD MS, Julie Kindsfater PharmD BCPS

Aurora St. Luke's Medical Center, 2900 W Oklahoma Ave., Milwaukee, WI, 53215
ellen.prichard@aurora.org

Purpose: The Joint Commission (TJC) puts a strong emphasis on the labeling and preparation of medications in procedural areas within the medication management chapter of the Comprehensive Accreditation Manual for Hospitals (CAMH). Pharmacy caregivers rarely access or observe operating room medication practices. This can lead to suboptimal medication practices which have the potential to put patients and caregivers at risk. This project examines O.R. medication practices at 13 Aurora Health Care hospitals and compares them with recommended best practices and regulatory standards.

Methods: A literature search was conducted to identify medication safety best practices and regulatory standards applicable to the O.R. A site assessment tool was created based on information found in the literature review. The assessment tool consists of three surveys, one each for the site pharmacy director, site O.R. representative and for use during a tour of the O.R medication areas. Additionally, reported medication events in procedural areas from July 2013 to June 2014 were reviewed to identify related (or associated) medication practice issues. After analysis of findings from site assessments and review of medication events a toolkit was developed to optimize medication practices in the O.R. Education will be provided to site pharmacy directors on how to best utilize the toolkit and implement recommendations.

Results and conclusions: Analysis of findings is still in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe rationale for ensuring appropriate storage, preparation, and labeling in the operating room.

Identify unsafe medication practices in the perioperative setting.

Self Assessment Questions:

Which of the following statements is correct?

- A The Joint Commission is the only organization that provides guidance
- B: In the absence of an operating room pharmacy, perioperative medication
- C: Medication practices not in accordance with standards and recommendations
- D: Nurse responsibilities in the perioperative setting are similar to the

Which of the following is considered an unsafe medication practice?

- A Medication syringes are labeled on and off of the sterile field but not
- B All elastomeric pumps are prepared in the operating room.
- C Spill kits and waste containers for hazardous medications are stored
- D A and B

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-932-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

STANDARDIZATION OF EDUCATION FOR BMT PATIENTS

Rachel A. Pritchett, PharmD*; Jill K. Leslie, PharmD, BCPS, BCOP
Franciscan St. Francis Health, 8111 S. Emerson Ave., Indianapolis, IN, 46237

Rachel.Pritchett@franciscanalliance.org

Purpose

The primary objective is to improve the current bone marrow transplant (BMT) education program through survey analysis and redesign of the materials and process. The secondary objective is to compare the redesigned education program to the old program. The second half of the study will occur post-implementation to allow enough new patients to undergo the redesigned program. Another survey will then be administered to the new patients and results will be compared to the previous survey.

Methods

This survey-based study takes place at the Indiana Bone and Marrow Transplant clinic and inpatient BMT unit at St. Francis Hospital in Indianapolis, Indiana. One survey will be administered to BMT healthcare providers and another will be sent to all patients who completed transplantation at St. Francis Hospital in the past two years. The surveys contain similar questions regarding the sources of information about the illness and opportunities for improvement within the current education program. They include two free response questions in which participants may provide specific suggestions or voice concerns with the current program. Data will be collected from the survey responses through SurveyMonkey for emailed surveys and through manual data collection for surveys sent by post. Based on the results of the survey and background research, new education materials will be developed and implemented. The creation of individualized medication counseling sheets is a primary focus of this redesign. Additional opportunities include the following: updating the educational booklet, providing a journal for patients, and ensuring all patients receive a detailed, personalized discharge medication sheet.

Preliminary Results

Data collection is in progress. Preliminary results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the educational, physical, and logistical challenges of Bone Marrow Transplantation (BMT) patients

Identify various methods to improve education for BMT patients

Self Assessment Questions:

Which of the following has NOT been identified in previous studies as an area of improvement for BMT centers?

- A More information about quality of life after transplant
- B: Mentorship program with a previous BMT patient
- C: Availability of internet websites for further education
- D: More print or audiovisual educational materials

Which of the following aspects of education did most of the surveyed healthcare providers suggest improving?

- A Underlying cancer and need for transplant
- B Chemotherapy agents and supportive therapy
- C Realistic treatment outcomes
- D Quality of life after transplantation

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-850-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF VANCOMYCIN INITIAL DOSING ON SEPSIS RESOLUTION IN PATIENTS WITH METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS BACTEREMIA

Jessica Probst-Wesolek, PharmD*; George Delgado Jr., PharmD; Christopher Giuliano, PharmD; Susan Szpunar, PhD; Kelly McNorton, PharmD, BCPS

St. John Hospital and Medical Center, 939 Vernier Rd., Grosse Pointe Woods, MI, 482361578

Jessica.Probst@stjohn.org

Purpose:

For complicated methicillin resistant *Staphylococcus aureus* (MRSA) infections, vancomycin loading doses of 25 to 30 milligrams per kilogram (mg/kg) of actual body weight are recommended for critically ill patients to avoid delays in reaching therapeutic concentrations, despite a paucity of evidence to support clinical benefit. The purpose of this study is to determine if initial vancomycin doses affect time to systemic inflammatory response syndrome (SIRS) resolution in patients with sepsis due to MRSA bacteremia.

Methods:

This retrospective, single-center study will include patients with MRSA bacteremia that meet the following criteria: vancomycin MRSA minimum inhibitory concentration ≤ 2 , ≥ 2 SIRS criteria, and receipt of vancomycin for at least 72 hours. Initial vancomycin dose will be stratified into three groups (<15 mg/kg, 15 to 24.9 mg/kg, and ≥ 25 mg/kg). Exclusion criteria include pregnancy, immunosuppression, receipt of vancomycin within 42 days prior to admission, weight greater than 100 kg, and subsequent admissions for the same patient within 90 days. The primary outcome is time to SIRS resolution between the <15 mg/kg group and the ≥ 25 mg/kg group. Resolution is defined as having less than two SIRS criteria for 24 hours. Secondary outcomes include resolution of SIRS in all three groups, time to initial vancomycin dose, percentage of initial vancomycin levels within the therapeutic range, bacteremia clearance, time to bacteremia clearance, length of hospital stay, and inpatient mortality.

Results:

Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the epidemiology of MRSA and its impact on patient outcomes. Review the current recommendations and rationale for "loading" vancomycin.

Self Assessment Questions:

MRSA bacteremia is associated with which of the following outcomes?

- A Decreased length of stay
- B Increased healthcare costs
- C Decreased mortality compared with MSSA
- D Low rates of sepsis

Current vancomycin consensus guidelines recommend which of the following doses as an initial dose for complicated infections:

- A 1 gram
- B 10-15 mg/kg
- C 20-25 mg/kg
- D 25-30 mg/kg

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-594-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

BEDSIDE DELIVERY OF DISCHARGE PRESCRIPTIONS WITHIN AN INTEGRATED HEALTH CARE SYSTEM

Ashley D. Purohit, PharmD, MBA*; Chad Smith, PharmD, MBA, BCPS; Prati Wojtal, MS, RPh, FASHP; Dan Persells, PharmD

Aurora Health Care, 2900 W Oklahoma Avenue, Milwaukee, WI, 53215

ashley.purohit@aurora.org

Purpose: Medication non-adherence and unfilled discharge prescriptions contribute to an increase in the patients risk for readmission to the hospital setting. In an effort to help reduce this risk for our patients, a best practice was developed to encourage patients to fill their prescriptions before leaving the hospital. A bedside discharge prescription delivery service was established at a 580-bed tertiary care center to ensure patients leave the hospital with the correct medications.

Methods: To establish this service across the entire hospital, opportunities to optimize the current discharge prescription bedside delivery process were identified, communication tools embedded within our electronic health record were developed and leveraged, physical and human resources were obtained, training materials for all caregivers impacted were created and disseminated, and an expansion plan for the service was developed.

Summary: A six-step discharge prescription bedside delivery service was optimized by better utilizing our electronic health record to improve communication between all caregivers, adjusting the order of the six-steps to align with pharmacist workflows, and ensuring the integrity of the patients medication list remained intact at the time of leaving the facility with medications-in-hand. Training materials were created for the program and over 150 pharmacists were trained to provide this service. Once the process was optimized and caregivers were trained, an expansion and follow-up plan was developed to successfully implement the service in each acute care nursing unit.

Conclusions: Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain how increased prescription capture can improve patient outcomes.

Identify two steps that are crucial to the success of implementation of a new service.

Self Assessment Questions:

Which of the following is/are associated with increased discharge prescription capture?

- A Reduced readmissions
- B Increased patient complaints
- C Disgruntled caregivers
- D None of the above

Which of the following are important steps in the implementation of a new service?

- A Open communication to and from front line caregivers
- B Communication to hospital administrators
- C Development of training resources
- D All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-851-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST PARTICIPATION ON THE RATE OF COMPLETION AND REIMBURSEMENT FOR MEDICARE ANNUAL WELLNESS VISITS

Hanna P Raber, PharmD*, Kierstan M Hanson, PharmD, BCPS, Ed P Sheridan, PharmD, BCPS, Ed N Battjes, PharmD, CDE

St. Joseph Regional Medical Center - IN, 820 Summer Way, Apt. 1B, Granger, IN, 46530

hanna.raber@sjrmc.com

Purpose: In 2011, Medicare began covering the Annual Wellness Visit (AWV) for all eligible beneficiaries. Patients are deemed eligible if they are no longer within their first 12 months of Medicare Part B coverage and have not received an Annual Wellness Visit or Initial Preventive Physical Examination (IPPE) within the past 12 months. The goal of the AWV is to educate patients about disease prevention and to assist in the development of a personalized preventative health plan. Many health care professionals, including pharmacists, are able to complete and bill Medicare for these visits. The purpose of this study is to evaluate the utility of pharmacist participation in Annual Wellness Visits, both in number of visits, total reimbursement, and the interventions made during visits.

Methods: Medicare beneficiaries of the Family Medicine Center and the Family Medicine Faculty Physician Center were identified (n= 1019). Resident and faculty physicians were informed of the AWVs and encouraged to refer eligible patients based on clinical judgment. In addition, eligible patients were identified through review of the weekly clinic schedule by the pharmacist. Four 60-minute appointment slots will be available per week for pharmacist conducted AWVs. The number of visits, reimbursement rate, and interventions made will be documented.

Results: To date a total of 11 patients have completed an Annual Wellness Visit with the primary study investigator. An average of 4.7 interventions per patient visit were completed by the pharmacist. Possible interventions are grouped into vaccines (influenza, tetanus/Tdap, Zostavax, pneumonia, hepatitis B), screening recommendation (colorectal, mammogram, AAA, bone density, lipids, diabetes, glaucoma), referrals (weight loss, cognitive impairment, depression, tobacco cessation, dental), and medication management. The estimated revenue for completed visits is \$1,650.

Conclusion: To be presented at the 2015 Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe the purpose of Medicare Annual Wellness Visits and which patients are considered eligible for these visits.

List the main components of a Medicare Annual Wellness Visit.

Self Assessment Questions:

1. Which of the following statements most accurately describes the purpose of the Medicare Annual Wellness Visit?

- A: An annual visit to replace a traditional annual physical for Medicare
- B: An annual visit to do a complete medication review for Medicare p
- C: An annual visit to discuss patient health concerns with Medicare p
- D: An annual visit to discuss preventative services with Medicare pati

Which of the following is included in a Medicare Annual Wellness Visit?

- A: Visual acuity screen
- B: Cognitive function assessment
- C: Bone density screening
- D: Deep tendon reflex exam

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-595-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE SAFETY AND EFFICACY OF VALGANCICLOVIR TWICE WEEKLY DOSING IN KIDNEY TRANSPLANT PATIENTS WITH IMPAIRED RENAL FUNCTION

Rachel Ralph*, PharmD, Bing Ho, MD, Michael Ison, MD, Michael Postelnick, BS Pharm, BCPS AQ ID, Chad Richardson, PharmD

Northwestern Memorial Hospital, 400 N McClurg Ct, Apt 1608, Chicago, IL, 60611

rralph@nmh.org

Purpose: Cytomegalovirus (CMV) is associated with significant morbidity and mortality in transplant recipients. Ganciclovir and its prodrug, valganciclovir, are antiviral agents used in the prevention of CMV in the post-transplant period. Renal excretion is the primary route of elimination for valganciclovir and it is necessary to dose reduce in patients with impaired renal function. While there are currently no dose recommendations for valganciclovir in patients with creatinine clearance (CrCl) <10mL/min or on hemodialysis (HD), practitioners oftentimes extrapolate and use the dosing recommendations for patients with CrCl 10-24mL/min. The purpose of this study is to evaluate the safety and efficacy of valganciclovir in patients with reduced CrCl in the post-transplant period.

Methods: This retrospective, case-control chart review will aim to evaluate the safety and efficacy of twice weekly valganciclovir dosing in post-renal transplant patients with impaired renal function at Northwestern Memorial Hospital (NMH). Renal transplant recipients will be matched based on CMV IgG donor/recipient status, time period within a year of transplant, and time from transplant within 3 months. Inclusion criteria will consist of kidney transplant recipients at NMH who received alemtuzumab induction. Exclusion criteria will include receipt of organs other than a kidney, basiliximab induction, human immunodeficiency virus (HIV), receipt of rituximab for desensitization, and donor negative/recipient negative CMV IgG serostatus. Safety parameters will include neutropenia and severe neutropenia defined as absolute neutrophil count (ANC) <1500 and <500 respectively. Efficacy parameters will include CMV viremia as detected by standard laboratory tests at NMH and need for treatment.

Results/Conclusions: Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the differences in dosing recommendations for renal impairment between ganciclovir and valganciclovir.

Identify side effect concerns for valganciclovir over-exposure.

Self Assessment Questions:

Which of the following are side effects of valganciclovir?

- A: Neutropenia
- B: Eosinophilia
- C: Thrombocytopenia
- D: A & C only

What is the lowest creatinine clearance (CrCl) for which valganciclovir has dosing recommendations?

- A: CrCl 75 mL/min
- B: CrCl 50 mL/min
- C: CrCl 30 mL/min
- D: CrCl 10 mL/min

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-596-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING PAIN MANAGEMENT IN ONCOLOGY PATIENTS

Heena Rathod, PharmD; Sol Yoder, PharmD, BCOP; Erin Lydon, PharmD, BCPS; Dan Persells, PharmD
Aurora Health Care, 2800 West Oklahoma Ave, Milwaukee, WI, 53215
heena.rathod@aurora.org

Purpose:

Pain control has been identified as a focus of patient satisfaction and is an important aspect of patient care. In the past at our institution, improvement in patient satisfaction scores was seen with a pain management pilot; however sub-optimal patient identification and workflow changes prevented its continuation. A re-implementation of this pilot was conducted to incorporate aspects such as identification of patients through electronic methods and integration of the process into the pharmacists daily activities. First objective of this project was to design and develop a workflow for the pain management pilot on the 48-bed inpatient oncology unit. Second objective was to implement and assess the impact of this pilot.

Methods:

Patient inclusion criteria consisted of a pain score of 8 or greater for at least 3 times in the past 24 hours and use of as needed pain medications for at least 4 times in the past 24 hours; or patients with an active patient controlled analgesia (PCA) or a continuous opioid infusion. Patients with a history of opioid abuse and/or with a pain management consult were excluded. Electronic methods were explored and optimized to help identify patients. Pharmacists were provided education on pain management and the workflow process. The pain management pilot was implemented on half of the oncology unit and continues to be optimized to allow expansion of the service to the entire oncology unit. Patient satisfaction scores, change in pain scores, average number of patients assessed per day, pharmacists time requirement, proposed number of interventions and accepted number of interventions will be collected to assess the impact of this pilot.

Results/Conclusion: To be presented at 2015 GLPRC.

Learning Objectives:

Explain the importance of patient satisfaction with pain control.

Describe the type of recommendations provided to improve pain control and medication-related side effects.

Self Assessment Questions:

Which of the following explains why patient satisfaction with pain control is important?

- A: Determines health care reimbursement
- B: Decreases pharmacist involvement in patient care
- C: Increases adverse drug reactions
- D: Determines number of medications prescribed

Which of the following describes a type of recommendation provided to maximize pain control and minimize medication-related side effects?

- A: Discontinue bowel regimen on patients receiving opioids
- B: Increase the dose of long-acting opioid medication
- C: Avoid as needed pain medications at all time
- D: Discontinue all prior to admission pain medications upon admission

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-597-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A RETROSPECTIVE REVIEW OF SHORT-TERM PARENTERAL NUTRITION- PATIENT CHARACTERISTICS AND OUTCOMES

Brittany J Ray, PharmD*, Michelle R Meyer, PharmD, BCPS, BCNSP, Jennifer Hartwell, MD
Grant Medical Center, 111 S Grant Ave, Columbus, OH, 43215
brittany.ray@ohiohealth.com

Purpose: Parenteral nutrition (PN) is contraindicated for treatment that is anticipated to be less than five days in patients without severe malnutrition. However, many times this guideline is not followed and patients receive PN inappropriately, increasing their risk of complication: such as catheter-related bloodstream infections and hyperglycemia. The goal of this study will be to identify characteristics of patients that have received inappropriate PN therapy for ≤ 4 days compared to patients who have received PN therapy for ≥ 7 days with the hope of increasing ability to estimate duration of treatment and assist in deciding which patients to initiate on PN.

Methods: The electronic medical record will be reviewed for all adult patients ≥ 18 years of age who were admitted to an OhioHealth facility for any reason, and received PN from July 1, 2013 through June 30, 2014. The following data will be collected: age, gender, weight, height, body mass index, APACHE II score, Charlson Comorbidity score, albumin, pre-albumin, hospital site, date of admission, length of stay, days on ventilator, days of peripheral line insertion, days of central line insertion, clinical indication for PN, day of stay that PN was initiated, duration of PN, need for PN resolved, central venous access solely for PN, enteral access contraindicated, enteral access attempted prior to PN, surgical procedures performed, hyperglycemia, hypertriglyceridemia, catheter-related bloodstream infections, discharged on PN, death on PN. Patients will then be split into the following groups: those who received PN for ≤ 4 days (group 1), those who received PN for 5-6 days (group 2), and those who received PN for ≥ 7 days (group 3). The groups will be evaluated to identify differences and/or commonalities between them. Results: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the risks and complications associated with parenteral nutrition use

Identify patients who would be appropriate for parenteral nutrition therapy

Self Assessment Questions:

Which of the following is an associated complication of parenteral nutrition therapy?

- A: Hypotension
- B: Hyperglycemia
- C: Urinary retention
- D: Sedation

Which of the following would be an inappropriate indication for parenteral nutrition?

- A: Complete bowel obstruction
- B: Inability to obtain enteral access
- C: Gastrointestinal bleed
- D: Inability to achieve caloric needs with enteral nutrition

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-852-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMAL PAIN MANAGEMENT THROUGH PROVIDER EDUCATION AND PAIN THERAPY STEWARDSHIP

Masooma Razvi, PharmD*, Ramy Elshaboury, PharmD, BCPS, Luke Palmer, PharmD, BCPS, Jeffrey Yochum, PharmD, BCPS, Fatema Yusufali, PharmD, Cara Burditt, PharmD

Wheaton Franciscan – St. Joseph Campus, 5000 W. Chambers St., Department of Pharmacy, Milwaukee, WI, 53210

masooma.razvi@wfhc.org

Purpose: Of all opioid-related adverse drug events recorded in The Joint Commissions Sentinel Event database between 2004 and 2011, 47% were incorrect doses, 29% were inappropriate patient monitoring, and 11% were due to excessive dosing, drug interactions and adverse drug reactions (ADRs). The objectives of this study are to update the institutional pain therapy resources to be consistent with evidence-based literature, educate providers, and initiate a pharmacy-driven pain stewardship service.

Methods: A medical records review of adult patients admitted to a general medicine floor, with at least 1 opioid analgesic order, between January 1st, 2015 and March 31st, 2015 is in progress to identify duplication of opioid orders, excessive dosing in opioid-naïve patients, and inappropriate directions for use. Patient data on the following parameters will also be gathered: age, sex, agent, dose, appropriateness of therapy and route, total daily dose in morphine equivalents, intolerable ADRs, concomitant multimodal agents, drug-drug interactions, and dose adjustments for organ function and age. The present institutional pain resource will be updated and approved by the Pharmacy and Therapeutics Committee. Pharmacists, hospitalists, and medical and pharmacy residents will be invited to educational seminars. A questionnaire will be administered, prior to and following these interventions, to assess provider satisfaction, comfort and understanding of opioid analgesics use and institutional pain management. The above parameters will be revisited to assess the impact on prescribing and pain management practices. These 2 interventions may serve as tools to enhance safety and efficacy of opioids. Gathered data will be utilized to establish the value for a pharmacy-based pain stewardship service and reduce opioid-related inconsistencies at our institution.

Results: Will be presented at the conference.

Conclusions: Will be presented at the conference.

Learning Objectives:

Discuss the pharmacology, equianalgesic dosing conversions, pharmacokinetic parameters, adverse effects and corrective measures for safe and effective opioid use.

Select an opioid regimen and monitoring parameters based on patient specific factors.

Self Assessment Questions:

Which opioid analgesic may be safe to use in patients with chronic kidney disease?

- A Morphine
- B: Hydrocodone
- C: Fentanyl
- D: Codeine

Which of the following opioid is relatively equianalgesic in potency to morphine 60 mg PO?

- A Oxycodone 20 mg PO
- B Hydromorphone 2 mg PO
- C Oxymorphone 5 mg PO
- D Hydrocodone 20 mg PO

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-853-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMAL CORTICOSTEROID DOSE FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) EXACERBATIONS AMONG HOSPITALIZED PATIENTS

David W Reeb, PharmD, Eric T Johnson, PharmD, BCPS; Larry J David, PharmD; Andrew J Borgert, PhD

Gundersen Lutheran Medical Center, 2103 7th St S, La Crosse, WI, 54601
DWReeb@gundersenhealth.org

Purpose: Corticosteroids, used for COPD exacerbations, have shown to shorten recovery time and reduce the risk of early relapse. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guideline recommends prednisone 40 mg daily, but studies have excluded patients admitted to the intensive care unit (ICU). The objective of this study is to evaluate 30 day readmission rates when given high dose steroid compared to lower dose steroid for treatment of COPD exacerbations. The goal of this study is to provide guidance in standardizing steroid dosing for COPD exacerbations in hospitalized patients.

Methods: This retrospective cohort study will be submitted to the Institutional Review Board for approval. The electronic medical record will be used to identify patients admitted with an acute COPD exacerbation. Patient identifiers will be removed prior to being placed in two groups, ICU and non ICU. Once placed in a group, patients given high dose steroid will be compared to those given lower dose steroid. High dose steroid will be defined as greater than prednisone 40 mg daily in non ICU patients and greater than methylprednisolone 180 mg daily in ICU patients. Lower dose steroid will be defined as less than or equal to prednisone 40 mg daily in non-ICU patients and less than or equal to methylprednisolone 180 mg daily in ICU patients. The primary outcome will be 30-day readmission rate. A total of 644 charts will be reviewed with an expected 15 percent readmission rate. The lower dose will be non-inferior to high dose if the readmission rates are within a 10 percent difference. Secondary outcomes being compared in each group will be length of ICU and hospital stay, blood glucose trends while hospitalized, and insulin requirements while hospitalized.

Results: Results are in process

Conclusion: Conclusions are pending

Learning Objectives:

Identify the optimal corticosteroid treatment regimen recommended by The GOLD guideline for an acute COPD exacerbation

Recognize common adverse effects associated with short term use of corticosteroids

Self Assessment Questions:

According to The GOLD guideline, which of the following is considered the optimal corticosteroid treatment regimen for an acute COPD exacerbation?

- A Methylprednisolone 60 mg IV every 6 hours
- B: Prednisone 60 mg PO daily
- C: Methylprednisolone 80 mg IV three time daily
- D: Prednisone 40 mg PO daily

Which of the following common adverse effect is associated with short term use of corticosteroids?

- A Diuresis
- B Hyperkalemia
- C Impaired fasting glucose
- D Weight loss

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-598-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF MUPIROCIN NASAL DECOLONIZATION ON TOTAL JOINT REPLACEMENT SURGICAL SITE INFECTIONS

****William Reesor, PharmD, PGY1 Pharmacy Practice Resident**;** Scott Smith, RPh, Clinical Pharmacy Specialist; David Newman, RPh, Clinical Pharmacy Specialist; Crystal Owens, PharmD, BCPS Pharmacy Resident Director

Veteran Affairs - Louisville Medical Center, 800 Zorn Avenue, Louisville, KY, 40206

william.reesor@va.gov

Purpose

Staphylococcus aureus (*S. aureus*) is the most common pathogen implicated in surgical site infections (SSI). While numerous contributors may predispose a patient to *S. aureus* SSI, colonization represents an independent and significant risk factor. Mupirocin is a topical antibiotic with activity against staphylococcal species. Pre-surgical mupirocin decolonization of MRSA carriers has reduced the incidence of *S. aureus* SSI in numerous settings. The objective of this project was to assess the impact of a mupirocin decolonization protocol on the development of methicillin resistant *Staphylococcus aureus* (MRSA) SSIs following joint replacement surgery.

Methods

This single-center, retrospective analysis assessed the incidence of surgical site infections following total joint replacement between two Veteran cohorts. The pre-protocol cohort included any Veteran undergoing arthroplasty between January 2013 and initiation of the mupirocin protocol in February 2014. The post-protocol cohort included all Veteran patients following initiation of the protocol until September 30, 2014. For the protocol, all patients were screened for MRSA colonization within two weeks of surgery. MRSA carriers received a five-day course of intranasal mupirocin and re-screened to ensure decolonization. Exclusion criteria included arthroplasties for infected joints, perioperative antibiotic use outside surgical prophylaxis guidelines, documented mupirocin allergy, or death within three months of surgery. The primary outcome was the rate of MRSA SSI; secondary outcomes included methicillin sensitive *S. aureus* (MSSA), total *S. aureus*, and total SSI rates by any bacteria. The percent success rate of decolonization of all MRSA carriers was also evaluated.

Results (Preliminary)

One-hundred and thirty two patients were included. Of the pre-protocol cohort, one MRSA and MSSA SSI each occurred (1.4%) and ten total SSIs (15%) developed. No staphylococcal infections developed in the post-protocol cohort. Three total SSIs (5%) developed. All MRSA carriers were successfully decolonized and none developed SSI.

Conclusion

To be presented at Great Lakes Residency Conference

Learning Objectives:

Identify criteria that must be met to diagnose and characterize a surgical site infection

Review current recommendations regarding the use of pre-operative mupirocin to improve surgical site infection outcomes

Self Assessment Questions:

Surgical site infections

- A 1. Are considered a relatively rare and minor complication of surgery
- B 2. Are often caused by gram negative enteric bacteria
- C 3. Are sub-classified as either superficial or deep depending on the
- D 4. By definition occur within 90 days of a procedure

According to ASHP clinical practice guidelines

- A 1. Mupirocin decolonization is recommended before all surgeries
- B 2. Mupirocin decolonization should be done only in combination with
- C 3. Optimal timing and duration of mupirocin decolonization is not set
- D 4. Mupirocin resistance has made it increasingly difficult to control

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-599-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF A BEST PRACTICE ALERT ON SEPSIS DIAGNOSIS AND TREATMENT IN A COMMUNITY HOSPITAL

Karl R Renius, PharmD*, Denise M Pratt, PharmD

Sparrow Health System, 1215 East Michigan Avenue, Lansing, MI, 48912

karl.renius@sparrow.org

Purpose: Sepsis is a deleterious host response to infection that causes significant morbidity and mortality which are lessened when treatment is expedited. To improve sepsis care, clinical decision support systems (CDSSs) which monitor patient records in electronic health records (EHRs) for systemic inflammatory response syndrome (SIRS) criteria in real-time have been designed and tested. CDSSs can alert providers when SIRS criteria develop through text notification via an EHR. Effects of these CDSSs on treatment, diagnosis, and outcomes in hospitalized patients after their implementation have been investigated in single institutions with variable results. The purpose of this study is to investigate the effects of an EHR which alerted providers when patients had two of four SIRS criteria on sepsis treatment at Sparrow Hospital.

Methods: Patients diagnosed with sepsis or septicemia with at least two of four SIRS criteria prior to and post-implementation of the CDSS will be included in this retrospective study. The two groups will primarily be compared to assess differences in the number of patients with lactate orders within three hours of CDSS detection of two SIRS criteria. Time to antibiotic and lactate orders, time to administration of antibiotics, sepsis mortality index, and the positive predictive value for the algorithm will also be examined.

Conclusion: This study is still under investigation; results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define the diagnostic criteria for systemic inflammatory response syndrome, sepsis, severe sepsis, and septic shock

Recognize the challenges in identifying true sepsis using an electronic health record

Self Assessment Questions:

Which of the following are diagnostic criteria for determining sepsis?

- A Heart rate greater than 100 beats per minute
- B Urine output less than 1 mL/kg/hr
- C Normal white blood cell count with greater than 10% bands
- D Both A and C

Which of the following statistical measures of the diagnostic ability of clinical decision support systems for sepsis is most likely to result in alert fatigue?

- A High sensitivity
- B High negative predictive value
- C Low positive predictive value
- D High specificity

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-600-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYZING THE CLINICAL OUTCOMES OF A RAPID MASS CONVERSION FROM ROSUVASTATIN TO ATORVASTATIN IN A VA MEDICAL CENTER OUTPATIENT SETTING (PART 2)

Leroy E Rhea III*, PharmD, PGY1 Non-Traditional Pharmacy Resident; Christina White, PharmD, MBA, BCPS, Assistant Chief, Mark Triboletti, PharmD, BCPS, Procurement Supervisor

Veteran Affairs - Richard L. Roudebush Medical Center, 1481 West 10th Street, Indianapolis, IN, 46202

leroy.rhea@va.gov

Purpose: Following the development of a rapid mass conversion tool and the clinical data dashboard as referenced in part 1, clinical evaluation of this conversion was performed. The purpose of this evaluation was for process improvement in the setting of cost savings-driven mass formulary conversions. In order to properly measure the safety and efficacy of this mass conversion, both primary and secondary endpoints were selected and added to the clinical data dashboard. Primary endpoints included LFT and lipid parameters for efficacy, while secondary endpoints focused on cardiovascular events for safety.

Methods: A retrospective review of computerized records at the Indianapolis VAMC was conducted, specifically utilizing VISN 11 Clinica Data Warehouse Report Builder 3.0 as discussed in part 1. Dates of data extraction included pre-conversion dates from 6/1/12-5/31/13 and post-conversion dates from 9/1/13-8/30/14. This data extraction involved 1,520 patients converted from rosuvastatin to atorvastatin, and identifying patient information was removed. Primary endpoints selected were; LDL, AST, ALT, Alkaline Phosphatase, and CPK. Secondary endpoints selected were the cardiovascular events of myocardial infarction, stroke, and stent placement. The data was analyzed using SAS 9.0 paired t-tests for primary endpoints and chi-square for secondary endpoints.

Conclusions: Statistical analysis of this data pull concluded there was no overall statistical significance between pre- and post-conversion patient groups for the lab values chosen. Cardiovascular events evaluation concluded that the incidence of events was also not statistically significant during the pre- and post-conversion time frame selected. In conclusion, a rapid conversion from rosuvastatin to atorvastatin was safe and effective during the evaluated time frame. Furthermore, it can be postulated that ensuing cost savings-driven formulary conversions could also utilize this rapid mass-conversion method, as well as outcomes evaluation utilizing electronic data extractions to create a clinical data dashboard.

Learning Objectives:

Outline the process of evaluating a clinical data dashboard to determine safety and efficacy of a rapid mass formulary conversion.

Discuss significance of clinical outcomes evaluation in the setting of a rapid mass conversion of formulary alternatives.

Self Assessment Questions:

1. How many months were equally evaluated pre- and post-conversion for rosuvastatin and atorvastatin?

- A: 6
- B: 9
- C: 12
- D: 15

Which was NOT a selected cardiovascular event for evaluation?

- A: Myocardial Infarction
- B: Stroke
- C: Stent Placement
- D: Arrhythmia

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-854-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL AND PHARMACOKINETIC EVALUATION OF THE ACETAMINOPHEN ABSORPTION TEST IN CRITICALLY ILL PATIENTS

Abigail G. Rhoades*, Pharm.D., Molly E. Droege, Pharm.D., BCPS, Neil E. Ernst, Pharm.D., Kristen Hillebrand, Pharm.D., BCPS, Shaun Keegan, Pharm.D., BCPS, Megan Welch, Pharm.D., BCPS, Christophe Droege, Pharm.D.

UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 45219-2316

Abby.Rhoades@UCHealth.com

Purpose: Decreased medication and nutrient oral absorption often manifest in critically ill patients. Malabsorption is associated with compromised immune function and increased morbidity. A relative paucity exists for tests intended to clinically evaluate absorption. Anecdotal reports of acetaminophen absorption have been purported as a marker for absorptive capacity. In healthy subjects, oral acetaminophen rapidly reaches measurable serum concentrations, has minimal adverse events, and is readily available. The purpose of this study is to evaluate serum acetaminophen concentrations following an acetaminophen absorption test (AAT) in critically ill patients. The hypothesis is patients will have absorption as demonstrated by detectable serum acetaminophen concentrations.

Methods: This is a single-center, retrospective, chart review of critically ill patients admitted to the University of Cincinnati Medical Center from November 2012 through 2014 with detectable (i.e., ≥ 10 mg/L) or undetectable (i.e., < 10 mg/L) serum acetaminophen concentrations following AAT. The specific aims of the study are to evaluate and describe: 1) acetaminophen concentrations in critically ill patients; 2) risk factors for undetectable concentrations; 3) two-point kinetics in patients with two detectable concentrations; and 4) nutritional parameters between patients with detectable and undetectable concentrations. Patients will be included who are ≥ 18 years and received AAT with a corresponding serum concentration within 120 minutes. Exclusion criteria include receipt of serum acetaminophen concentration for other diagnoses, acetaminophen use within 12 hours of the test, weight > 150 kg, or prisoners and pregnant patients. Dichotomous and continuous data will be analyzed using the appropriate statistical tests. A multivariate logistic regression will be performed for decreased absorption risk factor determination.

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe altered absorption in critically ill patients

Discuss acetaminophen absorption as a marker of gastrointestinal function

Self Assessment Questions:

The greatest concern regarding impaired absorption in critically ill patients is:

- A: The suboptimal effect of medications
- B: Malabsorption of macronutrients and micronutrients
- C: Inappropriate use of feeding tubes
- D: Requiring costly IV therapies longer than necessary

Why is acetaminophen proposed as an optimal marker for absorption?

- A: Acetaminophen has a favorable side effect profile despite high risk
- B: Acetaminophen is absorbed primarily in the stomach
- C: Acetaminophen reaches measurable serum concentrations at rect
- D: Acetaminophen has reliable uptake via active transport

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-601-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DESIGN AND IMPLEMENTATION OF A TREATMENT ALGORITHM FOR UNCOMPLICATED SKIN AND SOFT TISSUE INFECTIONS IN OUTPATIENT CLINICS

Krista Rice, Pharm.D.*, Lynne Fehrenbacher, Pharm.D., BCPS (AQ-ID), Margaret Cook, Pharm.D., BCPS

Aurora St. Luke's Medical Center, 2900 W. Oklahoma Ave., Milwaukee, WI, 53215

krista.lavender@aurora.org

Purpose: The Aurora Health Care Antimicrobial Stewardship Program is a system-wide initiative with intentions that include optimizing antibiotic use while reducing unintended consequences from antimicrobial therapy. The initial focus of the Antimicrobial Stewardship Program has been inpatient-based with a goal of expanding its initiatives to include outpatient treatment sites. Uncomplicated skin and soft tissue infections (SSTIs) are some of the most common indications for outpatient antibiotic prescribing, thus making them a reasonable focus for the first Antimicrobial Stewardship Program initiative in outpatient clinics. The objective of this project was to develop and implement a treatment algorithm in outpatient clinics to promote rational and effective antibiotic use for uncomplicated SSTIs and then to assess adherence to the algorithm through evaluation of post-intervention prescribing patterns.

Methods: A treatment algorithm was developed based on current Infectious Diseases Society of America guidelines in collaboration with internal expert opinion from the Aurora Health Care Antimicrobial Stewardship Program committee. A retrospective chart review from January through June of 2014 was done to establish general baseline prescribing patterns, including therapy selection and average duration of therapy. Through prescriber education and engagement, the treatment algorithm was implemented at three outpatient sites (two family practice clinics and one urgent care). Concurrent chart review is in process to assess adherence to the algorithm as well as identify any opportunities for optimization of prescribing. In order to sustain engagement and promote adherence, scheduled project updates are being provided to prescribers to offer feedback and targeted re-education while also providing an opportunity to identify areas to improve the process and algorithm through prescriber input that is received.

Results/Conclusions: Data collection is in progress. Results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Recall two implementation strategies that aid in launching a new antimicrobial stewardship initiative.

Describe the challenges that may arise when implementing an antimicrobial stewardship initiative in an outpatient setting.

Self Assessment Questions:

When launching a new antimicrobial stewardship initiative, which of the following can aid prescribers in choosing guideline-based antimicrobial therapy?

- A: A treatment algorithm
- B: Prescriber education and feedback
- C: A treatment documentation template
- D: A and B

Which of the following is TRUE when initiating an antimicrobial stewardship initiative in an outpatient setting?

- A: Prescribing habits are easy to change
- B: It may be challenging to effectively provide feedback and education
- C: All outpatient sites are familiar with the goals of antimicrobial stewardship
- D: Sustainability takes little effort or planning

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-602-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE IMPACT OF TRANSITIONS-OF-CARE CLINIC REFERRAL ON THE COMPOSITE OF 30-DAY READMISSION AND EMERGENCY DEPARTMENT VISITATION.

Angela M. Righi, Pharm.D.*; John M. Moorman, Pharm.D., BCPS; Lawrence A. Frazee, Pharm.D., BCPS; Kimberly McBennett, M.D, PhD, FACP

Akron General Medical Center, 1 Akron General Avenue, Akron, OH, 44304
angela.righi@akrongeneral.org

Purpose: Care transitions from inpatient to ambulatory care are a high-risk time for medication errors and subsequent readmission. Successful transitions of care (TOC) are important in light of the Centers for Medicare and Medicaid Services denial to reimburse should readmission occur within 30 days. Studies implementing TOC interventions show positive impacts on readmission rates, emergency department (ED) visitation, and hospital costs. Akron General Medical Center (AGMC) established a multidisciplinary TOC clinic, including a pharmacist, in February 2014. The primary objective of this study is to compare the rate of the composite outcome of unplanned 30-day readmission and ED visitation between patients referred to a TOC clinic to historical controls. Predictors of the composite outcome among patients referred to TOC clinic will also be assessed.

Methods: This retrospective, single-center, cohort study is approved by the AGMC Institutional Research Review Board. Patients aged at least 18 years, discharged from AGMC after being seen by general medicine service within 30 days of TOC clinic referral, TOC clinic visit between February 5, 2014 and February 5, 2015, and continuing care at Internal Medicine Center of Akron were included. These patients are matched to historical controls via population percentages based on age, gender, length of stay, discharge season, and Charlson comorbidity index. The control population is comprised of patients seen by general medicine 1 service from January 1, 2008 to February 4, 2014. Patient information is accessed via AGMC electronic medical records and admission data. The composite outcome of ED visitation and/or unplanned readmission within 30 days of discharge will be assessed in the overall population and two subgroups: (1) patients who attended TOC clinic and (2) patients who were not directly readmitted from TOC clinic.

Results/ Conclusions: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the different interventions institutions have put into place to improve the safety and quality of transitions-of-care and decrease admissions within 30 days.

Define the four components of the LACE (L= Length of Stay, A=Acuity or admission, C: Charlson Index (modified), E= Number) score, a validated tool used to quantify a patient's risk of death or unplanned readmission within 30 days of discharge.

Self Assessment Questions:

What unique transitions-of-care intervention does Akron General Medical Center currently utilize?

- A: Care transitions bundle
- B: Multidisciplinary transitions-of-care clinic
- C: Social work-led care transitions program
- D: Discharge medication reconciliation

Which of the following is included in the LACE score?

- A: Discharge season
- B: Age
- C: Length of stay
- D: Discharge disposition

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-855-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE COMPARISON OF HYPERGLYCEMIA REQUIRING TREATMENT AFTER LUNG TRANSPLANT

Margaret M Riley, PharmD*, Michael J Latran,
Indiana University Health, 1701 Senate Boulevard, Indianapolis, IN, 46202
mriley7@iuhealth.org

Purpose:

Hyperglycemia requiring treatment, often referred to as new onset diabetes after transplant (NODAT), occurs in 35-40% of lung transplant recipients. NODAT is associated with adverse cardiovascular effects, infection, and reduced graft and patient survival. Our institution changed induction therapy from basiliximab to alemtuzumab for lung transplantation in combination with reduced maintenance immunosuppression (MI). The objective of this study is to compare the incidence of hyperglycemia requiring treatment at discharge, 6 months, and 12 months following lung transplantation to evaluate if alemtuzumab in combination with reduced dose MI decreased the incidence of hyperglycemia requiring treatment.

Methods:

Patients undergoing lung transplantation will be identified through the electronic medical record system. Patients will be placed into two groups based on induction therapy (alemtuzumab versus basiliximab). First time lung transplant recipients greater than 18 years of age will be included, excluding patients with a prior diagnosis of diabetes or who died within 30 days of transplantation. Data will be collected to determine if the recent immunosuppression regimen change was associated with a reduction in hyperglycemia requiring treatment at baseline, 6 months, and 12 months. Demographics to be collected include: gender, age, race, height, weight, BMI, reason for transplantation, CMV status, and family history of diabetes. Additional data to that will be collected includes steroid doses and serum tacrolimus concentrations at 6 and 12 months, specific diabetic medications utilized, rejection episodes requiring pulse dose steroids, and A1C values at baseline, 6 months, and 12 months. This study has been submitted to the Institutional Review Board and had been approved.

Results:

Results to be presented at Great Lakes Pharmacy Residency Conference

Conclusions:

Conclusions to be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe the aspects of post-transplant care which can lead to hyperglycemia requiring treatment.
Explain alemtuzumab's mechanism of action for use in induction therapy

Self Assessment Questions:

Which of the following interventions has the potential to prevent hyperglycemia requiring treatment in lung-transplant patients?

- A: Increasing the daily dose of prednisone
- B: Decreasing the daily units of insulin
- C: Increasing the goal serum level of basiliximab
- D: Decreasing the goal serum level of tacrolimus

Which of the following is an accurate description of alemtuzumab?

- A: A chimeric antiCD25 monoclonal antibody which binds to IL2 receptor
- B: A humanized antiCD52 monoclonal antibody which causes profound
- C: A chimeric antiCD25 monoclonal antibody which leads to profound
- D: A humanized antiCD52 monoclonal antibody which causes IL2 receptor

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-603-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED PILOT EVALUATION OF INTRAVENOUS ACETAMINOPHEN IN ADULT PATIENTS PRESENTING WITH INTRACRANIAL HEMORRHAGE IN THE NEURO-INTENSIVE CARE UNIT

Jennifer L. Rinehart, PharmD*, Jennifer L. Besse, MSN, APN, ACNP-BC, CNRN; Dina L. Porro, PharmD

Presence St. Joseph Medical Center, 333 N. Madison Street, Joliet, IL, 60564

jennifer.rinehart@presencehealth.org

PURPOSE: The standard of care for pain in patients with intracranial hemorrhage (ICH) at our institution is intravenous (IV) hydromorphone. Concerns with hydromorphone use in this population include insufficient pain relief, nausea and vomiting, and altered mental status. A small study at our institution demonstrated that nurses and physicians prefer IV acetaminophen due to improved pain scores and more accurate neuro-assessments. This study will determine if the use of IV acetaminophen in patients with ICH reduces pain and leads to a decrease in opioid use and subsequent nausea and vomiting.

METHODS: Approval by the Institutional Review Board was obtained prior to study implementation. From June 1 to September 30, 2014, patients with ICH were included in a retrospective chart analysis to determine prescribing patterns for pain control. Patients admitted to the neuro-intensive care unit with ICH from January 5 to March 31, 2015 were screened for participation in the prospective trial. After informed consent was obtained, patients were randomized to receive either acetaminophen 1000 mg or 0.9% NS (placebo) IV every six hours for 72 hours. Patients in both treatment and placebo group had an order for hydromorphone 0.5-1 mg IV every two hours as needed for rescue analgesia if satisfactory pain relief was not achieved. Liver function tests were taken at baseline and at 72 hours. The primary outcome was the amount of opioid use in each group. The secondary outcomes were reduction in pain and occurrence of nausea and vomiting. This data will be used to assist in the decision of whether scheduled IV acetaminophen should be used as the standard of care for pain in patients with ICH.

RESULTS: Retrospective results demonstrated that there is currently no pain management standard of care for patients with ICH. Prospective results will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the pharmacokinetic differences between oral, rectal, and intravenous acetaminophen
Discuss the benefits of using intravenous acetaminophen in patients with intracranial hemorrhage

Self Assessment Questions:

Which of the following statements is true about acetaminophen?

- A: Acetaminophen relies on protein-mediated transport to reach its site
- B: The T_{max} of oral acetaminophen in an acute stroke patient is the
- C: 1 gram of oral acetaminophen produces the same CNS concentration
- D: 1 gram of IV acetaminophen produces a CNS AUC >100% times that

Which of the following statements is true regarding a patient suffering from an ICH?

- A: An acute change during a neuro-assessment is transient and requires
- B: Pain from ICH is caused from the initial insult, the hematoma itself
- C: Ketorolac is a safe and effective alternative to opioid analgesics to
- D: The primary concern about episodes of nausea and vomiting in this

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-604-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF POINT OF CARE SCREENING FOR CHLAMYDIA AND GONORRHEA ON ANTIMICROBIAL STEWARDSHIP IN THE EMERGENCY DEPARTMENT

Kaitlyn R. Rivard*, PharmD, Kasey L. Bucher, PharmD, BCPS, Heather M. Draper, PharmD, BCPS, G. Robert DeYoung, PharmD, BCPS, Nnaemeka E. Ekwuatu, MD, MPH, David W. Whalen, MD, MPH, FACEP, Lisa E. Dumkow, PharmD, BCPS

Mercy Health Saint Mary's, 200 Jefferson St SE, Grand Rapids, MI, 49503
kaitlyn.rivard@mercyhealth.com

PURPOSE:

Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) are the two most common bacterial sexually transmitted infections. Traditional screening methods for CT and NG (CT/NG) may require a three to five day turnaround time for results, therefore the Centers for Diseases Control and Prevention recommend that high-risk patients who present for testing be treated empirically. This delay in results impacts the time to notification and treatment for test-positive patients who do not receive empiric therapy. Meanwhile, excessive antimicrobial use in test-negative patients may contribute to increased rates of resistance in other clinical isolates. The first point-of-care (POC) test for the detection of CT/NG was approved in December 2012. This test has results available within 90 minutes. The primary purpose of this investigation is to determine if the implementation of POC testing will improve CT/NG treatment by decreasing antimicrobial exposure in test-negative patients while increasing treatment rate in test-positive patients.

METHODS:

This is a quasi-experimental study evaluating patients who received traditional versus POC CT/NG screening in the Emergency Department. Data was collected retrospectively using electronic medical records. Study outcomes include: percent of patients who receive appropriate treatment during their index visit, time to patient notification of positive result, time to appropriate treatment, and healthcare resource utilization amongst patients who receive POC screening versus traditional screening for CT/NG. Demographic and survey data will be presented as descriptive statistics. Outcomes measured on a nominal scale will be assessed using a Chi-square test. Outcomes measured on a continuous scale will be assessed using a Student's t-test or Mann Whitney U test as appropriate.

RESULTS: Data collection and analysis are currently in progress.

CONCLUSIONS: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the patient population most at risk for chlamydia and gonorrhea infections.

Discuss the different treatment options for chlamydia and gonorrhea infections.

Self Assessment Questions:

Which of the following patient populations is at highest risk of CT/NG infection?

- A 15-24 years old
- B 25-39 years old
- C 40-64 years old
- D > 65 years old

Which of the following is the first-line treatment for Neisseria gonorrhoeae?

- A Azithromycin 2 g PO, once
- B Ceftriaxone 250 mg IM, once + Azithromycin 1 g PO, once
- C Cefixime 400 mg PO, once + Azithromycin 1 g PO, once
- D Ceftriaxone 250 mg IM, once + Doxycycline 100 mg PO, twice daily

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-605-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSING VANCOMYCIN ASSOCIATED NEPHROTOXICITY POST IMPLEMENTATION OF A RESISTANT GRAM-POSITIVE ANTIMICROBIAL CYCLING PILOT PROGRAM

*Karrine D. Roberts, Pharm.D.; Ryan P. Mynatt, Pharm.D., BCPS AQ-ID; Keith S. Kaye M.D., M.P.H.; Michael J. Rybak, Pharm.D., M.P.H.; Kyle Murray, Pharm.D.; Stacy Otremba, Pharm.D.; Mark Pangrazzi, Pharm.D.; Jason M. Pogue, Pharm.D., BCPS AQ-ID

Detroit Receiving Hospital, 4201 Saint Antoine Street, Detroit, MI, 48201
kroberts5@dmc.org

In response to several cases of acute kidney injury (AKI) thought to be associated with vancomycin use, a resistant Gram-positive antimicrobial cycling pilot program was implemented at Sinai Grace Hospital (SGH). This program involves monthly cycling of vancomycin with alternative antimicrobials active against resistant Gram-positive organisms, chosen based on the indication, in order to assess the individual impact of vancomycin on the incidence of AKI. The primary objective of this study is to assess the incidence of AKI in patients who received vancomycin or alternative antimicrobials after the implementation of this pilot. Secondary objectives include the impact of antibiotic selection (vancomycin vs. alternatives) on length of stay variables, in-hospital mortality, total duration of antimicrobial treatment, and incidence of other adverse events.

This is a retrospective cohort study of patients admitted to the ICU at SGH who received antimicrobials with activity against resistant Gram-positive organisms after implementation of the pilot program. Patients will be identified based on their admission to the ICU and receipt of a target resistant Gram-positive antimicrobial during the months of November 2014 through April 2015 using the software program TheraDoc™. There will be two cohorts of patients, matched on four variables related to risk for acute kidney injury. The first group will be patients who received vancomycin and the comparator group will be those who received an alternative antimicrobial. Patients included are those ≥ 18 years of age, admitted to the ICU, and received a target antimicrobial for > 24 hours. Exclusion criteria include those taking oral vancomycin, having a diagnosis of meningitis, death or discharged within 48 hours of admission to the ICU, or already having AKI or severe chronic kidney disease.

Preliminary results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the history and proposed pathogenesis of vancomycin-associated nephrotoxicity

List known risk factors associated with vancomycin-associated nephrotoxicity

Self Assessment Questions:

Which of the following statements regarding vancomycin-associated nephrotoxicity (VAN) is false?

- A VAN was originally thought to be due to the impurities in the origin
- B Pathogenesis of VAN is thought to partly be due to oxidative stress
- C This toxicity is considered to be irreversible and permanent
- D More aggressive dosing strategies that target higher vancomycin troughs

The following are risk factors associated with vancomycin-associated nephrotoxicity

- A Concomitant nephrotoxic agents
- B Longer duration of therapy (> 7 days)
- C Vancomycin doses greater than 4 grams per day
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-606-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLOPIDOGREL RELOADING IN ACUTE CORONARY SYNDROME IN A VA EMERGENCY DEPARTMENT (CRAVED STUDY)

*Ross R Robison, PharmD, Amanda L Miller, PharmD, BCPS, Jonathan Goldberg, MD, Steve Adoryan, RPh, BCPS

Veteran Affairs - Louis Stokes Cleveland Medical Center, Pharmacy Service 119 (W), 10701 East Blvd, Cleveland, OH, 44106

Ross.Robison@va.gov

Statement of Purpose: The purpose of this study is to compare the rate of clopidogrel loading dose administration in the Emergency Department (ED) between veterans presenting with Unstable Angina (UA)/Non-ST Elevated MI (NSTEMI) who are taking chronic clopidogrel vs those who are not. There is recent evidence to suggest clopidogrel reloading may be beneficial for patients who present with UA/NSTEMI and undergo percutaneous coronary intervention (PCI).

Secondary objectives include: (I) compare the rate of clopidogrel loading dose administration by age group (<75 vs >75), (II) determine if other factors are associated with ED clopidogrel loading dose administration (race, previous MI, smoking, TIMI risk >3, race, etc), (III) assess incidence of MACE, major bleed, GI bleed within 30 days of presentation, (IV) assess location and timing of clopidogrel loading doses and (V) assess rates of aspirin, beta-blocker and parenteral anticoagulation administration in the ED.

Statement of Methods: Veterans > 18 years of age who presented to the Louis Stokes VA Medical Center ED, had a subsequent hospital admission and discharge diagnosis of unstable angina or NSTEMI will be eligible for chart review. Patients will be divided into two groups: chronic clopidogrel (>10 days of therapy) or no chronic clopidogrel upon presentation. Patients will be excluded if: they receive clopidogrel outside the VA, have a discharge diagnosis of stable angina or STEMI, or are taking prasugrel, ticagrelor or anticoagulants at home. A chi-square test will be used to compare the rate of clopidogrel administration between those taking chronic clopidogrel vs those who are not. A sample size of 126 will be able to detect a moderately small effect size of 0.25 with a power of 0.80 and an α of 0.05.

Summary of preliminary results: To be determined

Conclusions: To be determined

Learning Objectives:

Review current recommendations for antiplatelets in acute coronary syndrome (ACS) management in unstable angina and non-ST-elevated myocardial infarction (UA/NSTEMI)

Identify clinical setting in which clopidogrel re-load may confer additional benefit upon review of current literature

Self Assessment Questions:

Based on the 2012 ACCF/AHA Guidelines, which of the following is the most appropriate antiplatelet regimen for a patient presenting with a UA or NSTEMI?

- A Aspirin 325mg
- B Aspirin 325mg + Clopidogrel 600mg
- C Clopidogrel 600mg
- D Aspirin 325mg + Clopidogrel 300mg

Which of the following is a population who may potentially benefit from a clopidogrel "re-load" based on ARMYDA-4 RELOAD, ARMYDA-8 RELOAD-ACS, and the retrospective study by Mahmoudi, et al?

- A Which of the following is a population who may potentially benefit
- B Patients who present with stable angina (SA) and are currently pre
- C Patients who present with UA or NSTEMI and are currently prescr
- D Any patient who presents with an MI

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-607-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST REVIEW OF MEDICATION RECONCILIATION PERFORMED BY NURSING STAFF UPON ADMITTANCE TO HOSPITAL

Amy C. Rogers, PharmD*, Lisa M. Hart, PharmD, BCPS, CGP, LDE, FASCP, Carl E. Gordon, PharmD, BCPS, Susan C. Case, PharmD, Michael R. Smithson, PharmD, BCPS

Sullivan University College of Pharmacy / Frankfort Regional Medical Center, 299 King's Daughters Dr, Frankfort, KY, 40601

arogers@sullivan.edu

Purpose: The purpose of this study is to review initial medication reconciliations on admitted patients. Currently, nursing personnel perform medication reconciliations after a patient is admitted to the hospital. Patient and medication safety is of upmost concern at Frankfort Regional Medical Center. This project is designed to demonstrate the importance of pharmacy involvement in medication reconciliation.

Methods: Prior to commencement, this study was submitted as an exempt application and approved by the Sullivan University College of Pharmacy Institutional Review Board. This study is a prospective, single center, observational cohort study conducted at Frankfort Regional Medical Center located in Frankfort, Kentucky. It was limited to only patients admitted to this facility for surgical or medical inpatient purposes. Subjects were not recruited outside of being admitted to the hospital. The following patient areas of the hospital were excluded: OB NICU, Hospice care. Data collection included: drug name, drug formulation, route, strength, dosing regimen, duplication of therapy, administration of incorrect drug regimen, and any adverse event resulting from the medication error. Pharmacy reviewed admission medication reconciliation for accuracy and, if discrepancies were found, the patients pharmacy was called to verify prescriptions. In addition to calling the pharmacy, patients were asked to verify what medication they take and the directions they follow. Discrepancies were addressed with the physician before any changes were made to the patients active medications

Summary of (preliminary) results to support conclusion:

Observations at this time of the study include:

Most common drug with one or more discrepancies: Levothyroxine

Most common discrepancy: incorrect strength

Total admissions: 70

Total errors: 43 (only 2 errors reached the patient; all without any adverse events)

Conclusion reached: To be presented

Learning Objectives:

Discuss the importance of pharmacy involvement in hospital medication reconciliation

Identify the problem areas with transitions of care and medication reconciliation

Self Assessment Questions:

Which of the following is the most common medication reconciliation error at FRMC?

- A form
- B strength
- C route
- D drug

Which of the following areas is the most problematic for medication reconciliation?

- A Transitions of care
- B Outpatient surgery
- C Inpatient surgery
- D Emergency Department

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-856-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A STUDENT PHARMACIST DRIVEN MEDICATION DELIVERY SERVICE AT HOSPITAL DISCHARGE

Jacalyn Rogers, PharmD, CHM, BCPS*; Chet Kaczor PharmD, MBA; Shannon Yarosz, PharmD; Jay M. Mirtallo, MS, RPh, BCNSP, FASHP; Justin Cole, PharmD, BCPS; Vinita Pai, PharmD, MS; Charline Catt, RN, MS; Jenna Merandi, PharmD, MS
Nationwide Children's Hospital, 131 Turner Dr, Chardon, OH, 44024
jacalyn.rogers@nationwidechildrens.org

Background:

An After-Visit-Summary (AVS) is a discharge summary with a current list of the patient's medications and instructions for home administration. An audit previously conducted on 21 AVSs identified over 41 medication errors. The most common errors identified were PRN with no indication, followed by no dose, and no frequency. Medication reconciliation continues to be a challenge and improving accuracy in this area could decrease potential adverse drug events.

Purpose:

The primary objective of this quality improvement project is to evaluate whether a student driven discharge medication reconciliation and delivery service reduces the proportion of medication errors on AVSs. The secondary objective is whether the student driven discharge medication reconciliation and delivery service improves patient access to medications as measured by the proportion of patients leaving the hospital with their medications.

Methods:

This quality improvement project has been designed to utilize pharmacy students to improve the discharge process for patients from the General Pediatrics service at NCH. Students were educated at the beginning of every month on essential information to participate in this program. A student driven prescription delivery service was offered to patients being discharged from the General Pediatrics service, which included discharge medication reconciliation. The students then reviewed the patient's profiles and AVS. Students were informed when the nurses wanted the student to deliver the medications. Students delivered the medication and completed medication reconciliation before the patient was discharged. If an error was discovered on the AVS, the student contacted the prescriber to reconcile the discrepancy.

Results/Conclusion: The quality improvement project is in the data collection phase. Final results with conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall the most common medication errors identified on the After Visit Summaries

Discuss how pharmacy student involvement during the discharge process can be beneficial for patients and health-systems

Self Assessment Questions:

Which of the following errors were identified on the After Visit Summaries?

- A PRN with no indication
- B: No dose
- C: No frequency
- D: All of the above

Why should pharmacy students be involved in medication reconciliation at discharge?

- A Increased errors for patients
- B Improved educational value for students
- C Reduced quality of education
- D There is no reason to involve students

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-933-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF HIV POST-EXPOSURE PROPHYLAXIS PROGRAM FOR VICTIMS OF SEXUAL ASSAULT

Ryan J Rogoszewski, PharmD*; Sarah Kemink, PharmD, AAHIV; Angela Green, PharmD, BCPS; Adam Gwizdala, PharmD; Caleb Bryant PharmD
Mercy Hospital, 1500 E. Sherman Blvd., Muskegon, MI, 49444
Ryan.Rogoszewski@mercyhealth.com

Purpose/Background: There are more than 1.2 million people in the United States living with HIV infection. Almost 1 in 7 people are unaware that they are infected. The government has worked closely with local health departments and community-based organizations to improve treatment, prevention, and increase HIV awareness. However, there are still approximately 50,000 new HIV infections diagnosed per year in the United States. Sexual assault cases are more likely to be associated with trauma, which increases the risk of HIV transmission. HIV post-exposure prophylaxis is currently recommended by CDC and New York State guidelines for most sexual assault victims. Mercy Health Muskegon utilizes specialized sexual assault nurse examiners (SANE) to care for victims of sexual assault. However, currently HIV prophylaxis is not offered. The purpose of this project is to establish an HIV post-exposure prophylaxis program for victims of sexual assault at Mercy Health Muskegon

Methods: This project is a retrospective, survey-based quality review evaluating the development and implementation of a new program. This project will also assess the beliefs and attitudes of SANE nurses towards HIV medications. Sexual assault victims 18 years and older who present to the emergency department will be eligible and offered a 7-day starter pack of HIV post-exposure prophylaxis medications. Outcomes that will be measured are: number of prophylaxis starter packs offered, number of prophylaxis starter packs accepted/rejected, number of patients completing prophylaxis, number of follow up appointments attended at the HIV Clinic, number of patients lost during the follow up process, and beliefs and attitudes of SANE nurses towards HIV medications.

Results: To be presented

Conclusion: To be presented

Learning Objectives:

Recognize appropriate regimens for HIV post-exposure prophylaxis according to current guidelines

Identify the necessary steps and barriers to development of an HIV post exposure prophylaxis program.

Self Assessment Questions:

What is the recommended treatment regimen for HIV post-exposure prophylaxis (according to the New York State Guidelines)?

- A Raltegravir 400mg twice daily and emtricitabine 200mg/tenofovir 300mg daily x 28 days
- B: Dolutegravir 50mg/emtricitabine 200mg/zidovudine 300mg daily x 28 days
- C: Efavirenz 600mg/emtricitabine 200mg/tenofovir 300mg daily x 3 months
- D: Darunavir 800mg/ritonavir 100mg daily and abacavir 600mg/lamivudine 300mg daily x 28 days

Which of the following are barriers to development of an HIV post-exposure prophylaxis program for sexual assault victims?

- A Ensuring proper medication adherence and patient follow-up
- B Healthcare provider unfamiliarity with HIV prophylaxis
- C Cost of medications
- D All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-608-L02-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF APPROPRIATE USE OF STRESS ULCER PROPHYLAXIS IN ACUTE MEDICALLY ILL PATIENTS

Jiwon Roh*, Pharm.D., Hana Alawy, Pharm.D. Candidate 2015, Cheryl Szabo, Pharm.D., BCPS, Angela Milad, B.S.Pharm, Sheila Wilhelm, Pharm.D., BCPS

Harper University Hospital, 3990 John R, Detroit, MI, 482012018
jroh@dmc.org

Purpose: Studies have shown that gastrointestinal bleeding in non-critically ill patients is as low as 0.3-0.4%. Despite little or no evidence to support it, stress ulcer prophylaxis (SUP) is commonly used in hospitalized general medicine patients, and subsequently many patients are discharged with unnecessary acid suppressive therapy. Inappropriate use of SUP can put patients at risk of complications such as *Clostridium difficile* infection, and pneumonia. It can also increase economic burden to hospitals and patients. A recently conducted cohort study examined risk factors for nosocomial gastrointestinal bleeding in non-critically ill patients and developed a new scoring system to identify patients most likely to benefit from acid suppression. Based on this scoring system, Harper University Hospital revised guidelines for SUP among non-critically ill patients. This study aims to assess the impact of these revised guidelines on SUP prescribing practices. **Methods:** This is a retrospective cohort study at a single tertiary care hospital. Data was collected using electronic medical record for two months before and after revising the guidelines. Inclusion criteria included all inpatients \geq age 18 years who received a sucralfate, histamine-2 receptor antagonist or proton pump inhibitor during inpatient admissions. The study excluded inpatients admitted to or transferred from an intensive care unit and patients who admitted with active or suspected acute GI bleeding. The study also excluded patients who have history of GERD, peptic ulcer disease, or erosive esophagitis, and patients who take acid suppressive therapy at home. The primary endpoint is the proportion of patients meeting the criteria for SUP indication. Secondary endpoints are the proportion of patients that received discharge orders for SUP and adverse reactions to SUP medications. Data will be analyzed using chi-squared analysis or Fishers exact test for parametric data. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the risk factors used to calculate the risk of upper GI bleeding in non-critically ill general medicine patients
Describe potential adverse effects of acid suppression therapy

Self Assessment Questions:

Which is not a risk factor that is calculated for risk score for stress ulcer prophylaxis?

- A liver disease
- B acute renal failure
- C female
- D age > 60 years

Which of following adverse event is not associated with inappropriate use of acid-suppression therapy?

- A *clostridium difficile* infection
- B pneumonia
- C osteoporosis
- D dementia

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-609-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFYING BARRIERS TO VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS IN GYNECOLOGICAL CANCER PATIENTS FOLLOWING SURGERY

Megan M. Root, PharmD*, Teresa M. Meier, PharmD, BCOP; Tamara L. McMath, MPH; Christy L. Collins, MA

Riverside Methodist Hospital, 6218 Inishmore Lane, Dublin, OH, 43017
megan.root@ohiohealth.com

Purpose: Gynecologic oncology patients undergoing surgery are considered a high-risk population for developing a venous thromboembolism (VTE), with the highest demonstrated risk in abdominal or pelvic surgery patients. Following surgery, VTE prophylaxis with low-molecular weight heparin (LMWH) is recommended by evidence-based guidelines. Treatment barriers exist that prevent compliance with this recommended prophylaxis plan. A prospective study observing barriers to complying with the recommended VTE prophylaxis may be beneficial in identifying opportunities to increase adherence to evidenced-based guidelines.

Methods: This is a prospective, single center survey study of adult patients that have been diagnosed with gynecological tumors and have undergone debulking surgery. Exclusion criteria includes those non-English speaking, LMWH deemed inappropriate by physician, or concurrent use of anticoagulants. At the time of a four-week follow-up visit, each participating patient will be given a consent form and survey. The survey will assess compliance with the VTE prophylaxis regimen and identify different barriers to compliance. The evaluating clinician will assess each patient for a clinical diagnosis of VTE at the visit, as well as inquire about a diagnosis of VTE since the time of her debulking surgery. The primary objective is to describe the patient-reported treatment barriers that prevent compliance with the current evidence-based guidelines for prophylactic LMWH use following surgery in gynecological cancer patients. Secondary outcomes include determining the occurrence of clinical VTE in gynecological cancer patients following surgery. The rate of VTE will be reported for those that took the recommended LMWH as compared to those who did not, as well as in those who took aspirin rather than the prescribed LMWH.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the recommendations for VTE prophylaxis in gynecological cancer patients following debulking surgery.

Describe the patient-reported treatment barriers that prevent compliance with the current evidence-based guidelines for prophylactic low-molecular weight heparin use following debulking surgery in gynecological cancer patients.

Self Assessment Questions:

The American College of Chest Physicians (CHEST) Evidence-Based Clinical Practice Guidelines recommend that high-VTE risk patients undergoing abdominal or pelvic surgery for cancer should receive prophylaxis.

- A No prophylaxis recommended
- B 3 to 5 days
- C Limited duration (1 week)
- D Extended duration (4 weeks)

Which of the following statements is correct regarding treatment barriers for LMWH?

- A Cost was a barrier for both filling the prescription and daily compliance
- B Over 50% of patients forgot to fill the prescription.
- C Experiencing adverse effects was not a barrier.
- D No treatment barriers were reported.

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-610-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PHARMACIST-DRIVEN WEIGHT MANAGEMENT PROGRAM

Alaina D. Rotelli, PharmD*, Billy-Clyde Childress, PharmD, BCACP, FASCP, Stacy L. Rowe, PharmD, MBA

Sullivan University College of Pharmacy / Center for Health & Wellness, 2100 Gardiner Lane, Louisville, KY, 40204

alaina.rotelli@gmail.com

Purpose: Over one-third of adults in the United States are obese. Participation in a well-designed treatment program has been shown to be efficacious in helping achieve weight loss goals and improve disease control. As healthcare professionals, pharmacists play a role in disease state management, not limited to medication therapy. The purpose of this study is to determine the continued impact of a pharmacist-driven, interdisciplinary health and wellness program for improving physical activity and dietary choices of participants which will continue to lead to significant weight reduction and decreased waist circumference.

Methods: This is the second year of an ongoing, single-centered, prospective interventional cohort study. Participants in the study were required to be at least 18 years of age and have a body mass index (BMI) of 25 kg/m² or greater. Participants were excluded if they: were greater than 65 years of age, reported limited mobility, had a history of gastric surgery, or had used chronic steroids or weight loss medications within three months prior to enrollment in the program. The participants are enrolled in a health and wellness weight management program, which was twelve weeks in length, with four weeks utilized for individual meetings, and eight weeks of one-hour workshops. Education-based behavioral interventions regarding food choices and physical activity were implemented and health metrics for each participant were measured at baseline and at follow-up intervals throughout the program. The primary endpoints were total weight reduction from baseline and a decrease in waist circumference. Secondary outcomes were improvements in blood pressure, total cholesterol, LDL cholesterol, HDL cholesterol, hemoglobin A1c and overall quality of life.

Results and Conclusion: Previous years data suggests this program has significant impact. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe how reductions in weight lead to improved disease control and overall health.

Discuss the potential benefits of a pharmacist-driven weight management program.

Self Assessment Questions:

Which of the following modifiable risk factors is associated with increased morbidity and mortality?

- A: Eating a well-balanced diet
- B: BMI < 25 kg/m²
- C: Waist Circumference
- D: Family history of obesity

Pharmacists can provide which of the following benefits to a weight-management program?

- A: Education on disease state management
- B: Eliminate the need for nutritionists
- C: Provide information about weight-loss medications
- D: Both A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-611-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DAPTOMYCIN DOSING GUIDELINE: IMPLEMENTATION AND EVALUATION OF AN UPDATED INSTITUTIONAL GUIDELINE USING ADJUSTED BODY WEIGHT IN OBESE PATIENTS.

Megan Ruffner*, PharmD; Theresa Koski, PharmD; Andrew Caputo, PharmD, BCPS; Ashley Gallagher, PharmD; Kelly Haines, PharmD; Darrell Spurlock, Jr., PhD, RN, NEA-BC; Theresa Strong, RPh

Mt. Carmel Medical Center, 793 W. State St., Columbus, OH, 43222

megan.ruffner@mchs.com

Purpose: Daptomycin dosing has traditionally been based on total body weight (TBW) in all patients per manufacturer recommendations. With TBW dosing it has been shown that daptomycin maximum concentration and area under the curve are significantly higher in obese patients than normal weight patients. Studies have also shown that as body weight increases, a patient has a higher propensity for developing elevated creatine phosphokinase (CPK) levels. The purpose of this project was to implement an updated daptomycin dosing guideline based on adjusted body weight rather than TBW for obese patients. Evaluation of the guideline was done by monitoring infectious outcomes, CPK elevations, and institutional drug costs pre and post implementation.

Methods: The study was approved by the Institutional Review Board as an evidence based practice project. The electronic medical record system was used to identify patients for retrospective chart review. Patients were included in the study if they received inpatient or outpatient treatment with daptomycin for at least 72 hours, had a body mass index greater than 30 kg/m², were at least 18 years old at the time of treatment, and had a culture positive for an isolate with known susceptibility to daptomycin. Patients were excluded if there was documentation of pre-existing rhabdomyolysis. Clinical success was determined by resolution of infectious signs and symptoms as defined by white blood cell count, temperature, and/or a negative repeat culture. Safety outcomes included presence of CPK levels greater than 500 units per liter (if levels were drawn), CPK changes from baseline (if levels were drawn), and discontinuation of therapy due to myalgia. Pharmacoeconomic outcomes were also examined. All outcomes were assessed using statistical process control methods.

Results: Data collection and analysis are currently underway.

Conclusion: Final results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify fundamental reasons supporting the use of adjusted body weight to dose daptomycin in obese patients.

Select a daptomycin dose for an obese patient based upon adjusted body weight.

Self Assessment Questions:

Which of the following support the use of using an adjusted body weight to dose daptomycin in obese patients?

- A: Daptomycin AUC and C_{max} were significantly increased in obese
- B: No correlation has been found between increased body mass index
- C: Studies looking at daptomycin dosing based on adjusted body weight
- D: Both A and C

A 108 kg male is 68 inches tall. His body mass index is 36.2 kg/m². A physician orders daptomycin 6 mg/kg. Assuming a guideline was in place stating that daptomycin should be dosed on adjusted body weight

- A: 650 mg
- B: 350 mg
- C: 500 mg
- D: 400 mg

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-612-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND ASSESSMENT OF AN AMBULATORY PRESCRIBING GUIDANCE TOOL TO IMPROVE PATIENT SAFETY IN THE GERIATRIC POPULATION.

Daniel J Ruhland*, PharmD; Jessica Bellone, PharmD, BCACP; Erin Wilkes, PharmD, BCPS; Anne Zechlinski, PharmD, BCPS
Froedtert Hospital, 9200 W. Wisconsin Ave., Milwaukee, WI, 53226
Daniel.Ruhland@froedtert.com

Purpose: Certain medications have been identified as potentially inappropriate for use in older adults because the risk of adverse drug events outweighs the benefits. Guidelines such as the Beers criteria have been formulated to assist prescribers in avoiding these high-risk medications in elderly patients

Some of the most successful documented interventions to decrease the prescribing of inappropriate medications in older adults have been computer decision support alerts in the order entry process. Currently at Froedtert and the Medical College of Wisconsin, there are opportunities to optimize the order entry process in the electronic medical record of the ambulatory clinics with the development of decision support tools. The purpose of this study is to assess the prescribing rate of glyburide, a potentially inappropriate medication in older adults, in the ambulatory care clinics pre- and post- implementation of an alternative medication alert.

Methods: A best practice advisory was developed to recommend glimepiride as an alternative to glyburide due to less risk of prolonged hypoglycemia. The primary outcome of the study will be the number of glyburide prescriptions ordered for patients over age 65 during a three month period pre- and post- implementation of the alternative medication alert. Patients will be included if they are over the age of 65 and have been prescribed glyburide in a Froedtert ambulatory clinic during the study period. Secondary outcomes will include the number of times the alert fires, number of times the alert is overridden, and number of times the suggested medication was accepted. Data will be analyzed for all patients over the age of 65 who have had an office visit encounter or medication refill request during the study period to determine the rate of glyburide prescribing.

Results/Conclusions: Data collection and outcomes evaluation are currently being completed..

Learning Objectives:

Describe interventions which have been used to successfully decrease the prescription of inappropriate medications.
Identify potential implications of optimizing clinical decision support tools in the ambulatory practice setting.

Self Assessment Questions:

According to the Beers criteria, glyburide is inappropriate for use in older adults because of its increased risk of:

- A: Renal failure
- B: Prolonged hypoglycemia
- C: QT prolongation
- D: Liver failure

Which of the following are important considerations when developing clinical decision support tools?

- A: Avoidance of alert fatigue
- B: Ensuring recommendations are clear to the end user
- C: Ensuring a hard stop is created
- D: A and B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-934-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

REDESIGN OF ENTERPRISE-WIDE PHARMACY SERVICES TO ADVANCE PATIENT CARE ACROSS THE CONTINUUM (PART II: OUTPATIENT)

Jordan Rush, PharmD, MS Candidate*; Maria Luz A. Ajami, PharmD, MS Candidate; Dave Hager, PharmD, BCPS; Joe Cesarz, PharmD, MS; Michelle Thoma, PharmD, BCACP; Kate Hartkopf, PharmD, BCACP; Philip Trapskin, PharmD, BCPS; Steve Rough, MS, RPh, FASHP
University of Wisconsin Hospital and Clinics, 600 Highland Ave, Madison, WI, 53792
jrush@uwhealth.org

Purpose: Outpatient pharmacy services at the University of Wisconsin Hospital and Clinics include 14 retail pharmacy locations and expanding presence in primary care and specialty clinics. Service development has not been coordinated to align and integrate services across the care continuum. The growing emphasis on accountable healthcare has created opportunities to advance pharmacy services, reduce cost, improve quality, avoid readmissions, and enhance the patient experience. The primary objective for this project was to optimize value-based practice activities across care settings through designing, piloting, and evaluating an idealized pharmacy practice model.

Methods:

In summer 2014, the Redesign of Enterprise-wide Pharmacy Services Continuum of Care Committee (REPS-CCC) was developed to oversee the project. This committee was co-chaired by the project investigators and comprised of pharmacists and patient advocates. Project investigators created a repository of idealized pharmacy practice statements from best practices identified in the literature and provided by pharmacy experts. In fall 2014, the REPS-CCC reviewed and approved the idealized statements. Thereafter, a gap analysis was performed to assign a value to each statement and compare each to current practice. The REPS-CCC prioritized idealized statements based on the calculated value, perceived value, and identified gaps. Prioritized statements were used by the REPS-CCC to create an idealized practice model spanning across all care settings. In winter 2015, pilots of the idealized practice model will be implemented in the inpatient and outpatient settings, led separately by each project investigator. Results of the outpatient pilots will be analyzed to determine the feasibility of a system-wide rollout. Outcomes to be evaluated include patient experience, patient outcomes, staff satisfaction, and productivity metrics

Results:

Expected results include idealized pharmacy practice statements, a value-based gap analysis of current practice to the idealized statements recommendations for a redesigned value-based practice model, and a strategic plan to implement the model enterprise-wide.

Learning Objectives:

Describe the process of creating an idealized pharmacy practice model
Define the value equation and apply it to gap analysis prioritization

Self Assessment Questions:

When designing an idealized pharmacy practice model

- A: You should ensure the idealized model is feasible with all current practice
- B: You should create the ideal state and work backwards
- C: You should keep current limitations in place when designing
- D: You should keep everything the same as the current state

The value equation can be defined as

- A: [Quality + Service] / Cost
- B: Input / Output
- C: Revenue / Costs
- D: Sales - Variable costs

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-857-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PARALYTIC AGENTS DURING THERAPEUTIC HYPOTHERMIA AFTER CARDIAC ARREST: A RETROSPECTIVE REVIEW OF USE AND OUTCOMES AT AN ACADEMIC MEDICAL CENTER

Leah A. Sabato, Pharm.D.; Christopher A. Droege, Pharm.D.; Neil E. Ernst, Pharm.D.; Kristen E. Hillebrand, Pharm.D., BCPS; Eric W. Mueller, Pharm.D., FCCM; Shaun P. Keegan, Pharm.D., BCPS
UC Health - University Hospital (Cincinnati), 410 White Ash Court, Fairborn, OH, 45324
leah.sabato@uchealth.com

Background: Cardiac arrest is a major cause of morbidity and resulting neurological injury is the cause of death in up to 68% of patients. Post-ischemic damage increases as body temperature increases, thus therapeutic hypothermia (TH) has become the standard of care in selected patients who remain unresponsive after return of spontaneous circulation. In order to achieve the target temperature, shivering must be adequately treated.

Paralytic agents are among the options to treat shivering during TH. Their action prohibits the signal propagation that results in shivering. The landmark trials that established the benefit of TH used paralytic agents throughout the cooling period. However, neuromuscular blockade has significant risks including loss of neurological examination, prolonged weakness and/or myopathy, extended time on the ventilator, infections, and pressure ulcerations. Current guidelines suggest that use of neuromuscular blockade be minimized or avoided altogether, although limited evidence exists regarding their use.

Purpose: The aim of this study is to explore the use and outcomes associated with neuromuscular blockade in patients undergoing TH after cardiac arrest at an academic medical center. The effects of neuromuscular blockade administration on temperature maintenance and clinical outcomes will be assessed. We will also describe the institutions use of neuromuscular blockade during TH.

Methods: This study is a retrospective review of adult patients undergoing TH after cardiac arrest between December 1, 2012 and December 1, 2014. Data collected includes patient demographics, use of paralytics, sedatives, anti-shivering agents, and vasopressors, disposition from hospital, hospital length of stay, ventilator time, and temperature measurement. Statistical analysis will be performed by using chi-squared and t-tests as appropriate.

Results and Conclusions: Data collection is ongoing.

Learning Objectives:

Describe the pathophysiology and benefits of therapeutic hypothermia after cardiac arrest

Discuss the use of paralytics to treat shivering during therapeutic hypothermia after cardiac arrest

Self Assessment Questions:

In which of the following cardiac rhythms is the use of therapeutic hypothermia most well established in the literature?

- A: pulseless electrical activity
- B: asystole
- C: ventricular fibrillation
- D: supraventricular tachycardia

Which of the following paralytic agents is preferred for patients with hepatic or renal dysfunction due to elimination through the Hofmann Reaction?

- A: Rocuronium
- B: Vecuronium
- C: Cisatracurium
- D: Pancuronium

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-613-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARING INSULIN GLARGINE VERSUS INSULIN DETEMIR IN AN INPATIENT DIABETIC POPULATION: ACHIEVEMENT OF THERAPEUTIC GLYCEMIC RANGE

Kelly N. Saha* PharmD, Meghna Vallabh, PharmD, BCPS, Greg Mateyoke, PharmD, Chelsea G Owen, PharmD, MPH, BCPS
St. Joseph Hospital East, 150 N. Eagle Creek Drive, Lexington, KY, 40509
kellysaha@sjhlex.org

PURPOSE

In randomized controlled trials, patients with diabetes mellitus required higher doses of insulin detemir than insulin glargine to obtain the same glycemic control. However, this may differ in daily clinical practice. The purpose of this study is to determine if there is a difference in glycemic control when using insulin glargine versus insulin detemir in our hospitalized patients. Several secondary outcomes will also be evaluated including, mean daily blood glucose, mean daily basal insulin dose, mean amplitude of glycemic excursions, and use of bolus mealtime insulins.

METHODS

This is an observational, retrospective, multi-center study. Patients will be included if they were admitted to Saint Joseph East or Saint Joseph Hospital in Lexington, KY with a diagnosis of diabetes mellitus, and received at least 2 doses of either insulin glargine or insulin detemir. Patients will be excluded if they have a diagnosis of diabetic ketoacidosis, received both insulin glargine and insulin detemir, or are <18 years of age. Data will be collected from hospital admissions ranging from July 2012 to December 2014. Patient information that will be collected will be age, gender, location, glycosylated hemoglobin A1C (if on record), body mass index, total number of doses received, length of stay, blood glucose readings >70mg/dL, blood glucose readings <180mg/dL, oral diabetic agents, steroid usage. Continuous data will be evaluated utilizing the Student's t-test where appropriate, assuming parametric data. Categorical data will be evaluated utilizing the chi-squared test (x2) and Fisher's exact test where appropriate. An a priori alpha of 0.05 will be set for significance. These methods have been determined to meet federal exemption criteria by the Western Institutional Review Board.

Learning Objectives:

Recognize the clinical importance of adequate glycemic control for inpatients with diabetes.

Discuss the pharmacokinetic differences between insulin glargine and insulin detemir, as they may relate to dosing strategies.

Self Assessment Questions:

Which of the following is true regarding glycemic control in inpatient diabetics?

- A: The American Diabetes Association (ADA) recommends a blood glucose target of 180mg/dL
- B: Hypoglycemia and hyperglycemia have been shown to impact patient outcomes
- C: In critically ill patients, the goal target blood glucose is <110mg/dL
- D: Only hyperglycemia has been shown to have negative outcomes for patient outcomes

Which of the following statements is true?

- A: Insulin detemir appears to have more dose independent duration of action
- B: Both long acting insulin analogs have no pronounced peak
- C: Insulin detemir can be dosed once daily or twice daily
- D: Insulin glargine appears to have a shorter duration of action than insulin detemir

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-614-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PERI-OPERATIVE ANTIMICROBIAL PRESCRIBING IN PATIENTS WITH BETA-LACTAM ALLERGIES UNDERGOING CARDIAC SURGERY OR AN ELECTROPHYSIOLOGY PROCEDURE

Priya Sahadeo*, PharmD, Mike Boyd, PharmD, BCPS, Karri Bauer, PharmD, BCPS, Erik Abel, PharmD, BCPS, Erica Reed, PharmD, BCPS
The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 West 10th Avenue, Columbus, OH, 43210
Priya.Sahadeo@osumc.edu

Purpose:

Perioperative antibiotics are administered to patients undergoing surgical procedures in order to reduce the likelihood of developing a surgical site infection, with the beta-lactam cefazolin being an antibiotic of choice for many surgical procedures. Allergies to beta-lactams are reported in approximately 10% of the population, which potentially limits the use of cefazolin in this setting. However, only 10% of patients reported as beta-lactam allergic will develop a true allergic response when administered a beta-lactam. Documentation of an antibiotic allergy can lead to prescribing of antibiotics that are considered second-line therapy, have a broader spectrum of activity, potential side effects, and higher cost. Completeness and accuracy of beta-lactam allergy documentation and its influence on antibiotic prescribing at our institution is unknown. The objective of this study is to characterize beta lactam allergies of patients receiving aztreonam perioperatively for cardiac surgery or an electrophysiology procedure, their influence on perioperative antimicrobial prescribing, and the potential cost savings associated with administering cefazolin vs. aztreonam to patients lacking a true beta-lactam allergy.

Methods:

A retrospective review will be conducted evaluating patients undergoing an electrophysiology procedure or cardiac surgery between May 1, 2014 and August 31, 2014. The sample size was determined by actual patient volume. Patients < 18 years or > 89 years of age, pregnant patients and prisoners will be excluded. Data collected will include: age, gender, actual body weight, patient care service, length of stay, operative procedure, beta-lactam allergies as documented in the medical record including the allergy description and severity, profession of the allergy scribe, previous beta-lactams administered, aztreonam doses, and profession of the aztreonam ordering user. A descriptive analysis will be conducted.

Results:

Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review perioperative antibiotic options for patients undergoing cardiac surgery or electrophysiology procedures.

Identify which adverse drug reactions are classified as intolerances versus true allergies.

Self Assessment Questions:

Which of the following antibiotics is recommended in place of cefazolin in patients with a true beta-lactam allergy undergoing cardiac surgery?

- A Ciprofloxacin
- B: Ceftriaxone
- C: Aztreonam
- D: Gentamicin

Which of the following reactions is considered an intolerance and therefore not a true allergy?

- A Swelling
- B Pruritus
- C Shortness of breath
- D Metallic taste

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-615-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DESIGN AND IMPLEMENTATION OF A SUSTAINABLE PHARMACIST FOLLOW UP PROCESS FOR PATIENTS AFTER DISCHARGE.

*Dalia R. Saleh, PharmD; Chad Smith, PharmD, MBA, BCPS
Aurora Health Care, 1460 South Six Points Xing, Apt. #408, West Allis, WI, 53214-4977
dalia.saleh@aurora.org

Purpose

A standard process for pharmacists to follow up with discharged patients has not been developed in our organization. This project aims to explore the many operational obstacles involved in performing this task. The primary objective of this project is to design and implement a sustainable pharmacist follow up process for patients after discharge.

Methods

A hypothesized workflow was outlined and tested at various stages, exploring feasibility and efficiency. Various factors of the process were tested and measured by means of a pilot. The three key stages of the process were patient identification, telephone communication, and documentation. The methods of patient identification that were compared include pharmacist flagging, electronic health record reporting, and paper nursing reports. The methods of documentation that were explored involved an electronic chart encounter and internal pharmacist documentation. A cardiac post-stent patient population was used for this project.

Results & Conclusion

The most efficient method of patient identification was determined to be dependent on the target population. The most effective method of documentation was found to be through an electronic telephone encounter on the patients chart. The results and various lessons from this project are to be summarized into a toolkit. This toolkit can be used in the future by operational leaders interested in the implementation of a pharmacist phone call program aimed at post-discharge follow up.

Learning Objectives:

Identify the three key stages of a phone call follow up process.

Recognize the key benefits and limitations of the different strategies for patient identification and phone call documentation.

Self Assessment Questions:

Which of the following depicts the correct order for the stages of a pharmacist phone call process?

- A Documentation, telephone communication, patient identification.
- B: Telephone communication, patient education, documentation.
- C: Telephone communication, documentation, patient identification.
- D: Patient identification, telephone communication, documentation.

Which of the following is an advantage of pharmacist flagging as a method of patient identification?

- A It adds an additional task to the pharmacist workflow.
- B It takes into account changes in the patient's health care plans.
- C It provides an easy method of retrieval of the patient list.
- D It captures patients whose profiles have not been reviewed by a pharmacist.

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-935-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF ANTIFUNGAL PROPHYLAXIS IN LUNG TRANSPLANT RECIPIENTS

Lisa C. Samanas*, PharmD; Linda J. Stuckey, PharmD, BCPS
University of Michigan Health System, 1320 Brookfield Drive, Ann Arbor, MI, 48103
albrechl@med.umich.edu

Purpose: Lung transplant recipients have a high risk of developing invasive Aspergillus infections compared to other solid organ transplant recipients. Invasive Aspergillus infections are associated with increased morbidity and mortality in lung transplant recipients. Currently, no consensus exists on the optimal aspergillus prophylaxis regimen in this population. The objective of this study is to determine the incidence of invasive Aspergillus infection and colonization between two prophylactic regimens in lung transplant recipients at this institution.

Methods: This study was submitted to the institutional review board and received approval. Patients who received a lung transplant between August 2006 and December 2013 will be included in this study. Patients who died prior to discharge, were less than 17 years old at time of transplant, were colonized with Aspergillus prior to lung transplantation or received transplanted lungs that were colonized with Aspergillus were excluded from this study. The following data was collected: indication for lung transplant, transplant date, noted non-compliance with inhaled amphotericin B liposomal post-discharge and reasons for non-compliance. Bronchoalveolar lavage culture data at three weeks, six weeks, three months, six months and twelve months post-transplant will also be collected and analyzed. All data will be recorded without patient identifiers and maintained confidentially. Outcomes will be assessed using repeated measures logistic regression and chi-squared tests.

Results: Data collection in progress.

Conclusion: N/A

Learning Objectives:

Describe the current state of anti-fungal prophylaxis at the University of Michigan.

Discuss the incidence of Aspergillus infection at the University of Michigan.

Self Assessment Questions:

Which is a risk factor for invasive Aspergillus infection?

- A Single lung transplant
- B Double lung transplant
- C EBV infection
- D Hypergammaglobulinemia

Which medications are currently used for antifungal prophylaxis in lung transplant recipients at the University of Michigan?

- A Voriconazole
- B Itraconazole
- C Amphotericin B liposomal for inhalation
- D B & c

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-616-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFICATION OF MISSED OPPORTUNITIES IN THE UTILIZATION OF PROCALCITONIN LEVELS AS A GUIDE FOR ANTIMICROBIAL THERAPY IN RESPIRATORY TRACT INFECTIONS

Ahoo Sammak*, PharmD, Michael Mikrut, PharmD
CPS/Mercy Hospital and Medical Center, 2525 S Michigan Ave, Chicago, IL, 60616
ahoo.sammak@mercy-chicago.org

Purpose: There is little guidance in the literature to direct the use of procalcitonin in the treatment of respiratory tract infections. The primary objective of this study is to evaluate the appropriate use of procalcitonin levels at a community teaching hospital based on the ProHOSP trial.

Methods: A retrospective cohort study of 100 patients was conducted at a community teaching hospital to examine the use of PCT levels in patients with documented community-acquired pneumonia (CAP), chronic obstructive pulmonary disease (COPD), and lower respiratory tract infection (LRTI). The PCT algorithm reported in the ProHOSP trial was utilized. A PCT ≥ 0.25 mcg/L was considered positive and a PCT ≤ 0.1 mcg/L was considered negative for an acute bacterial infection. A PCT between 0.1 mcg/L and 0.25 mcg/L was considered positive if the patient had at least one Systemic Inflammatory Response Syndrome (SIRS) criterion. The primary outcome was to assess the appropriate use of PCT levels in continuation or discontinuation of antimicrobials based on the treatment algorithm. The secondary outcomes included adverse events associated with excess antimicrobial use, excess antimicrobial cost, excess length of stay, and readmission within 30 days for CAP, COPD, or LRTI.

Results: 67% of the PCT levels obtained before antimicrobial initiation were used appropriately based on the ProHOSP treatment algorithm. The readmission rate within 30 days was 3%. The average length of hospital stay was 7.8 and 8.6 days for the inappropriate and appropriate PCT groups, respectively. The total cost of excess PCT levels was \$1680. The total cost of antibiotics post PCT levels was \$1436.

Conclusion: This study determined that appropriate use of PCT levels may greatly impact antibiotic use, hospitalization, and cost. Appropriate use of PCT levels could considerably decrease the cost of antibiotics and subsequent unnecessary PCT levels.

Learning Objectives:

Review procalcitonin and its utility in treating respiratory tract infections

Discuss the ProHOSP trial and associated treatment algorithm as it relates to the appropriate

Self Assessment Questions:

Which of the following will increase the PCT level?

- A Lung cancer
- B Chronic Kidney Disease
- C Bacterial pneumonia
- D HIV

Which of the following is an indication of antimicrobial therapy for respiratory tract infection based on the ProHOSP algorithm?

- A Pct < 0.1
- B PCT = 0.12 and WBC 10,000
- C Pct = 0.5
- D PCT = 0.20 and HR 85

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-617-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

REHOSPITALIZATION RATES FOLLOWING STENT PLACEMENT IN PATIENTS RECEIVING CLOPIDOGREL, PRASUGREL, OR TICAGRELOR

Sarah M. Schepers, PharmD*; Kris Howard, PharmD, BCPS; Jamie L. Drees, PharmD, BCPS, Jesse R. Christman, PharmD
Parkview Health System, 11109 Parkview Plaza Drive, Fort Wayne, IN, 46825
sarah.schepers@parkview.com

Purpose: The current standard of care in the treatment of patients with acute coronary syndromes (ACS) after stent placement includes dual antiplatelet therapy (DAPT). This regimen consists of aspirin in combination with a P2Y₁₂ inhibitor, including clopidogrel, prasugrel, or ticagrelor. There is evidence suggesting potential benefits of prasugrel and ticagrelor over clopidogrel including decreased cardiovascular mortality, myocardial infarction, and stroke based on the PLATO and TRITON-TIMI studies. Prasugrel and ticagrelor have shown potential benefits with faster onsets of action and less inter-patient variability in antiplatelet response. However, it is not clear which agent provides superior results based on a lack of head-to-head clinical trials with all three agents or studies comparing prasugrel versus ticagrelor. The purpose of this study is to examine rehospitalization rates for ACS and bleeding in patients receiving clopidogrel, prasugrel, or ticagrelor after ACS with stent placement to evaluate efficacy and safety parameters associated with DAPT.

Methods: The Institutional Review Board at Parkview Health approved this retrospective chart review of patients who were admitted with ACS (STEMI, NSTEMI, and UA) and underwent PCI with stent placement during the index admission between 7/1/2013 and 7/1/2014. Patients were age 18 years or older and received at least one dose of clopidogrel, prasugrel, or ticagrelor during the index admission. Patients were excluded if no P2Y₁₂ inhibitor was prescribed at discharge or if they died during the index admission. The primary endpoint is 30-day readmission rates for ACS, including STEMI, NSTEMI, UA, or cardiac-related chest pain. Secondary endpoints include 90-day readmission rates for ACS and 30- and 90-day readmission rates for bleeding as the reason for admission or bleeding coincidentally noted on admission.

Results/Conclusion: Data collection is currently underway. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the current treatment guidelines for patients receiving dual antiplatelet therapy after ACS and stent placement
Discuss potential advantages and disadvantages of the three currently available P2Y₁₂ inhibitors: clopidogrel, prasugrel, and ticagrelor.

Self Assessment Questions:

Which of the following is the correct loading dose of P2Y₁₂ inhibitor to support primary PCI as recommended by the 2013 ACCF/AHA STEMI guidelines?

- A Ticagrelor 90 mg
- B Clopidogrel 600 mg
- C Prasugrel 10 mg
- D Clopidogrel 300 mg

What are potential advantages of prasugrel and ticagrelor when compared with clopidogrel?

- A Faster onset of action
- B Less inter-patient variability in patient response
- C Increased risk of drug interactions
- D Both A and B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-618-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTI-XA MONITORING OF CONTINUOUS INFUSION UNFRACTIONATED HEPARIN IN CHILDREN

Lisa A. Scherkenbach, Steven Pipe, Regine L. Caruthers, Elizabeth J. Beckman
University of Michigan Health System, Victor Vaughn House, 1111 E. Catherine St., Ann Arbor, MI, 48109-2054
lscherke@med.umich.edu

Purpose

Unfractionated heparin (UFH) is the cornerstone of short term anticoagulation in critically ill children. With its unpredictable pharmacokinetic profile, close laboratory monitoring is imperative. Activated partial thromboplastin time (PTT) has been the most common method of monitoring UFH. When compared to PTT, adult data suggests that anti-Xa monitoring results in faster time to goal, longer time spent within goal, and a reduced need for dosing adjustments and monitoring tests. This study will describe the use of anti-Xa monitoring in children at our institution, and provide insight as to whether anti-Xa monitoring is beneficial in pediatric patients.

Methods

This is a retrospective chart review designed to describe the use of anti-Xa monitoring of UFH in children. We will compare patients who were monitored using PTT values alone (PTT group) with patients who were monitored using a combination of PTT and anti-Xa values (anti-Xa group). The electronic medical record will identify patients less than 18 years of age on pediatric inpatient services, who received continuous infusion UFH, and had PTT or PTT and anti-Xa values drawn during UFH therapy. We will exclude patients receiving heparin during extracorporeal membrane oxygenation. The remaining patients will be categorized into the PTT and anti-Xa groups. We will describe the efficacy of each monitoring strategy by characterizing the ability to maintain goal PTT or anti-Xa. Safety will be described in terms of the number of lab values drawn and infusion rate changes made during therapy, as well as by the incidence of major bleeding.

Results and Conclusion

Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Outline advantages and disadvantages of monitoring unfractionated heparin infusions by anti-Xa levels in children.

Discuss the data regarding the safety and efficacy of anti-Xa monitoring of unfractionated heparin infusions in children.

Self Assessment Questions:

1. Which of the following is an advantage of monitoring anti-Xa levels in children on unfractionated heparin infusions?

- A Measures the global effect of factors II, V, VIII, IX, X, XI, XII, and f
- B Availability of published nomograms to guide dose adjustments
- C Less variability compared to PTT monitoring
- D Need to recalibrate assay for different reagents

2. Which of the following has been shown regarding the safety and efficacy of anti-Xa monitoring in children on unfractionated heparin infusions?

- A Fewer monitoring tests and dose adjustments compared to PTT
- B Poor correlation between PTT and anti-Xa levels drawn concurrently
- C Equal clot resolution rates compared to PTT monitoring
- D Goal anti-Xa 0.35-0.7 units/mL is safe and effective in all ages of children

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-619-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF DECITABINE THERAPY ADMINISTERED EVERY EIGHT HOURS FOR PATIENTS WITH ACUTE MYELOID LEUKEMIA

Zachary W Schlei*, PharmD; Laura S Geswein, PharmD, BCPS; Lisa M Digrazia, PharmD, BCPS, BCOP

Rush University Medical Center, 575 West Madison Street, Chicago, IL, 60661

Zachary_Schlei@rush.edu

Acute myeloid leukemia (AML) is a hematopoietic malignancy that is rapidly fatal if left untreated. Because older age is associated with poor outcomes and high morbidity in patients receiving standard induction chemotherapy, low-intensity therapy is an attractive option. Decitabine 15mg/m² administered intravenously (IV) every eight hours for 72 hours and decitabine 20mg/m² administered IV daily for five or ten days represent low-intensity treatment options used in practice. To date there are no published studies investigating decitabine 15 mg/m² every eight hours for 72 hours administered until disease progression or intolerance in AML patients. The purpose of this study is to evaluate outcomes with this regimen used in patients with newly diagnosed or relapsed/refractory AML at Rush University Medical Center.

This study is a single center, retrospective chart review investigating two cohorts of patients. Cohort one includes patients 18 years of age and older newly diagnosed with AML between January 1, 2008 and January 1, 2014 selected to receive decitabine 15 mg/m² administered every eight hours for 72 hours. Exclusion criteria for cohort one is prior treatment of AML (except for hydroxyurea), acute promyelocytic leukemia, central nervous system (CNS) leukemia, other active malignancy, and prior treatment with hypomethylating agents. Cohort two includes patients 18 years of age and older diagnosed with relapsed/refractory AML between January 1, 2008 and January 1, 2014 selected to receive decitabine 15 mg/m² administered every eight hours for 72 hours. Exclusion criteria for cohort two are acute promyelocytic leukemia, CNS leukemia, other active malignancy, and prior treatment with hypomethylating agents.

Data collection is ongoing. Overall survival estimates will be determined by Kaplan Meier survival analysis. A multivariate cox proportional hazards model will be utilized to evaluate the independent effect of demographic and clinical variables on outcomes.

The authors conclusions are pending data collection and analysis of results.

Learning Objectives:

Discuss the role of decitabine therapy for patients with acute myeloid leukemia

Select an appropriate dose and frequency of decitabine for patients with acute myeloid leukemia

Self Assessment Questions:

What is the role decitabine therapy in acute myeloid leukemia patients?

- A: Therapeutic option for patients unfit for standard induction chemot
- B: Therapeutic option for standard induction chemotherapy
- C: Therapeutic option for relapsed/refractory acute myeloid leukemia
- D: A & c

Which of the following is not an appropriate dose and frequency of decitabine used in acute myeloid leukemia patients?

- A: Decitabine 15 mg/m² Q8 hours for 72 hours
- B: Decitabine 20 mg/m² daily for 5 days
- C: Decitabine 15 mg/m² Q8 hours for 5 days
- D: Decitabine 20 mg/m² daily for 10 days

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-620-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF ANTIRETROVIRAL THERAPY IN THE INTENSIVE CARE UNIT AMONG UNCONTROLLED OR TREATMENT-NAVE HIV-INFECTED PATIENTS

Breanna R. Schmidt*, PharmD; Daniel B. Truelove, PharmD, BCPS (AC ID), BCACP, AAHIVP; Mark R. Cox, PharmD, BCPS; Forest W. Arnold, DO, MSc, FIDSA; Lynn C. Wardlow, PharmD, MBA, BCPS

University of Louisville Healthcare, 530 S Jackson St, Louisville, KY, 40203
breansch@ulh.org

Background: With the introduction of antiretroviral therapy (ART), the overall morbidity and mortality of HIV/AIDS patients admitted to the intensive care unit (ICU) have significantly declined. Patients admitted with an AIDS-defining diagnosis are suggested to have the poorest prognosis and, theoretically, will receive the greatest benefit from ART. Prescribing ART in the ICU is a subjective decision as limited data is available to guide its use in critically ill HIV-infected patients and clinical outcomes have not been validated. Due to this controversy, a study has been conducted to evaluate the clinical outcomes of patients initiated or continued on ART in the ICU.

Methods: This study is a retrospective case control study of uncontrolled and treatment naive HIV-infected patients initiated or continued on ART versus those untreated with ART in the ICU at an academic medical center. Patients were included if they were diagnosed with HIV and aged 18 years or older admitted to the ICU between September 2004 and August 2014. Patients who died within 24 hours of ICU admission or were included in the study within the previous six months were excluded. Case and control patients were matched by initiation or continuation on ART during ICU admission. The primary efficacy outcome was inpatient mortality while the primary safety outcome was the development of immune reconstitution inflammatory syndrome (IRIS), as determined by ICD-9 coding. The secondary outcomes included the following: ICU mortality, 6 month mortality, ICU length of stay (LOS), hospital LOS, and a subgroup analysis evaluating mortality within 30 days post-discharge of ART initiation or continuation in the ICU versus wards.

Results: To be presented at Great Lakes Pharmacy Resident Conference (GLPRC).

Conclusions: To be presented at GLPRC.

Learning Objectives:

Review current treatment guidelines for the initiation of antiretroviral therapy in HIV-infected patients

List barriers to the initiation of antiretroviral therapy in critically ill HIV-infected patients

Self Assessment Questions:

According to current treatment guidelines, the following individual(s) should be initiated on ART

- A: Cd4 <200
- B: Pregnant female
- C: Opportunistic infections
- D: All of the above

Barriers to the initiation of ART in critically ill HIV-infected patients include

- A: Threat of immune reconstitution inflammatory syndrome (IRIS)
- B: Drug interactions
- C: Altered pharmacokinetics
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-706-L02-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF METRICS TO ASSESS THE IMPACT OF PHARMACISTS IN CLINICS

Lauren Schmidt*, Pharm.D., Christopher Klink, Pharm.D., BCPS, Arlene Iglar, RPh, MS, FASHP, Neha Sharpe, Pharm.D.

Aurora St. Luke's Medical Center, 2900 W. Oklahoma Ave., Milwaukee, WI, 53215

lauren.schmidt@aurora.org

Purpose: Pharmacists provide services in a variety of ambulatory settings within Aurora Health Care. Utilization of measures to capture the effects of their services is inconsistent. The purpose of this project is to develop standard metrics to measure pharmacist impact in ambulatory clinics.

Methods:

Representative pharmacists in a variety of Aurora clinic settings were surveyed to assess current clinic practice on metric collection. Literature review and meetings with system stakeholders guided development of targeted measures that would be valuable across the health system. Electronic documentation strategies were developed to facilitate increased automation of metric reporting and tabulation. Clinic pharmacists at 3 sites were educated on workflow processes for utilizing the metrics. The 3 sites are employing the metrics as a 3 month pilot during which regular feedback and evaluation is guiding adjustment and optimization.

Preliminary Results: Quality, financial, and patient experience measures were identified as metric targets aligning with the values and strategic plan of Aurora Health Care. Interventions per pharmacist full time equivalent are being assessed as a measurement of quality of care. Correlation of interventions with estimated cost avoidance will provide a measurement of financial effect. Patient satisfaction surveys are being collected as a measure of the patient experience.

Results/Conclusions: Data collection is in progress; preliminary results suggest metrics successfully capture pharmacist impact on patient care in ambulatory clinics. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify a national initiative for the advancement of pharmacists ambulatory services.

Recognize barriers to standard, automated metric implementation.

Self Assessment Questions:

Which of the following organization-initiative pairs most closely relates to the Ambulatory Care Summit Consensus Recommendations released in 2014?

- A: American Pharmacists Association – Provider Status Initiative
- B: American Society of Health-System Pharmacists – Pharmacy Practice Initiative
- C: American College of Clinical Pharmacy – Public Policy Initiative
- D: The Joint Commission – Measure Development Initiative

Which of the following are barriers to standardized metric implementation?

- A: Time constraints
- B: Varied services across sites
- C: Manual data collection
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-858-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPING A DRUG-DRUG INTERACTION TOOLKIT AND EXPLORING ITS USEFULNESS IN COMMUNITY PHARMACIES.

Bryant Schobert, Pharm.D.*, Michelle A. Chui PhD, Pharm.D., Marvin R. Moore, Pharm.D.

UW-Madison School of Pharmacy Community Pharmacy Residency Program, 520 E Reed St. Apt. #7, Manitowoc, WI, 54220

bschobert@wisc.edu

Purpose: To evaluate a toolkit to help community pharmacists improve their Electronic Quality Improvement Platform for Plans and Pharmacies (EQUIPP) drug-drug interaction (DDI) score.

Methods: The toolkit is designed to identify current DDIs and prevent future DDIs by standardizing a process to run reports, analyze the types of DDIs that are identified, and recommend safe alternatives to patients and their physicians. The toolkit will be evaluated in three ways. First, the toolkit will be pilot tested in one pharmacy from September 2014 to January 2015. Second, the types of DDIs, the individual (pharmacist or technician) who identified the DDI, and the recommendations and changes to potentially harmful medications will be recorded during the pilot. Third, EQUIPP DDI scores will be recorded to calculate longitudinal change. A survey was administered to 1400 Wisconsin pharmacists to determine their opinions on the usefulness of the toolkit in their practice settings. The survey will be analyzed descriptively and will note trends within types of pharmacists and pharmacies.

Preliminary Results: During the pilot test, all medications that count towards the EQUIPP DDI score were reviewed. These data showed the majority of DDIs involved an antibiotic medication. This led to a revision in workflow where technicians focused on finding interactions involving antibiotics. Preliminary survey results are showing community pharmacists have interest in implementing the toolkit with a mean score of 8.28 on a ten point Likert scale. Pharmacists seem most interested in a therapeutics alternative chart (9.13) and a method to find interactions affecting their scores (8.25). Pharmacists think that a toolkit with these features would improve their EQUIPP scores (8.78). The survey final results, along with pilot results, will be presented at the Great Lakes Resident Conference.

Conclusion: Conclusions will be presented at the Great Lakes Resident Conference.

Learning Objectives:

Describe the current system used to share pharmacy Medicare Star Ratings and what pharmacies can do to improve their scores.

Identify what aspects of a toolkit would be most valuable to community pharmacists when trying to improve their drug-drug interaction scores.

Self Assessment Questions:

Which of the following is a Medicare Star Rating category affecting pharmacies?

- A: Adherence to injectable medications
- B: Adherence to Renin-Angiotension system inhibitors.
- C: Percentage of patients taking a PPI for longer than 12 weeks.
- D: Adherence to warfarin

Which of these would strategies could be implemented to lower a pharmacy's drug-drug interaction score?

- A: Be more vigilant to current DUR drug interaction prompts.
- B: Call doctors to tell them not to prescribe azithromycin anymore
- C: Tell patients that the medication they are picking up may be interacting
- D: Find patients on medications with chronic interactions by using NCPDP

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-936-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF PHARMACIST TRAINING BEFORE INITIATING AN EXTENDED INR INTERVAL PROTOCOL IN AN ANTICOAGULATION CLINIC

Rebecca R. Schoen, PharmD*; Amanda Margolis, PharmD, MS, BCACP; Andrea L. Porter, PharmD; Cheryl Ray, PharmD, CACP; Carla E. Staresinic, PharmD, BCACP

Verteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Madison, WI, 53705

rebecca.schoen2@va.gov

Purpose:

Currently, the Madison VA Anticoagulation Clinic, a pharmacist-managed clinic, will extend International Normalized Ratio (INR) follow-up for stable warfarin patients to no more than five to six weeks. Recent literature incorporated into the 2012 ACCP Guidelines suggested that INR testing frequency up to twelve weeks can be safe and other countries have accepted extended durations between INR testing. An ongoing study examining the feasibility, acceptance, and safety of an extended INR interval protocol up to twelve weeks in a veteran population at an individual clinic will begin recruiting subjects soon. The primary objective of this project was to prepare the anticoagulation clinic pharmacist staff for this new protocol and assess the effectiveness of the pharmacist training.

Methods:

A two-hour training session was developed to explain enrollment criteria informed consent, scheduling follow-ups, and procedures for unexpected and/or adverse events of the extended INR interval protocol. The material was presented using a didactic presentation, discussion, and performing simulated informed consent. Attendees were the anticoagulation staff clinical pharmacists. Following the training, the pharmacists completed a multiple-choice assessment of case-based questions that could be encountered during the study. After reviewing the answers, the pharmacists completed a survey describing their current confidence and comfort level with the protocol using a scale of 0 "cannot do at all" to 10- "highly certain I can do"

Results/Conclusions:

This study is currently in progress. At this time, 9 of the 14 pharmacists have been trained. Of the pharmacists that completed the assessment and survey, the average score was 93% on the pharmacist knowledge assessment and ranged from 75%-100%. The median certainty score from the pharmacist survey was 9, indicating high self-reported certainty of the pharmacists to use the extended INR interval protocol. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe evidence presented to pharmacists supporting a 12 week follow-up between international normalized ratio (INR) assessments
Discuss benefits of interactive teaching methods when preparing staff for a new protocol

Self Assessment Questions:

Current sources supporting extended durations of extended INRs in stable patients include:

- A Randomized controlled trials and American College of Chest Phys
- B: Randomized controlled trials and warfarin package insert
- C: American College of Chest Physicians Guidelines and warfarin pa
- D: British hematology guidelines and Physician Desk Reference

Why was time at the provider training spent rehearsing informed consent?

- A To increase the duration of the provider training session
- B To improve test scores on the self-assessment
- C To increase self-efficacy of the providers
- D To facilitate the pharmacists meeting one other

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-859-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PROPHYLACTIC AND THERAPEUTIC ENOXAPARIN DOSING IN OBESE PATIENTS USING ANTI-XA MONITORING

Kelsey E. Schultz, PharmD*; Karishma S. Deodhar, PharmD, BCPS; Monica L. Miller, PharmD, MS; Christie M. Mock, PharmD, BCPS; Katherine L. Skillman, PharmD, BCPS; Curtis A. Wright, M.D.

Eskenazi Health, 720 Eskenazi Avenue, Indianapolis, IN, 46202

kelsey.schultz@eskenazihealth.edu

Purpose: Low molecular weight heparins are commonly used for venous thromboembolism (VTE) prevention and treatment; however, data is limited regarding safety and efficacy in obese patients. Previous studies evaluating enoxaparin for VTE prophylaxis suggested a fixed-dose regimen may be inadequate in obese patients, while a weight-based regimen may be more effective. Other studies concluded that target anti Xa levels, in patients treated with therapeutic enoxaparin, are achieved at doses lower than 1 mg/kg using actual body weight. Data supporting these recommendations are limited, leaving it unclear how to optimally dose enoxaparin in the obese population. This study's primary objective was to evaluate prophylactic and therapeutic enoxaparin dosing in obese medical and surgical patients using anti-Xa monitoring to determine optimal enoxaparin dosing regimens. Secondary objectives included evaluation of the safety and efficacy of enoxaparin in obese patients.

Methods: A retrospective chart review of 174 patients from January 2011-November 2014 was performed. Major inclusion criteria included a BMI > 35 kg/m² and anti-Xa level drawn 3-5 hours after steady state enoxaparin administration. Major exclusion criteria were CrCl < 30 mL/min and baseline coagulopathy. The primary endpoint was dose required to achieve target peak anti-Xa levels based on prophylactic or treatment goals. Secondary endpoints included: incidence of VTE, major and non-major clinically significant bleeding rates, and side effects including heparin-induced thrombocytopenia and injection-site reactions. Descriptive statistics were utilized to analyze data.

Results: Data collection is currently in progress.

Conclusion: We anticipate our results will reveal an optimal prophylactic and therapeutic enoxaparin dosing regimen in the obese population. Thereafter, this data will be used to design a prospective study. Additionally, the data will help elucidate the incidence of thromboembolism, rate of major and non-major clinically significant bleeding, and inform recommendations for future implementation of an institution wide protocol for enoxaparin dosing in the obese population.

Learning Objectives:

Discuss the appropriate timing and interpretation of anti-Xa levels.
Describe prophylactic or therapeutic enoxaparin dosing strategies studied in the obese population.

Self Assessment Questions:

CR is a 56 yo WF admitted to your hospital for a symptomatic left lower leg DVT. CR is 55", 155 kg, with a BMI of 56.7 kg/m². The medical team starts her on enoxaparin 150 mg subcutaneously q 12 hour

- A Recommend drawing anti-Xa level 1 hour after at least the third er
- B: Recommend drawing anti-Xa level 3-5 hours after at least the third
- C: Recommend drawing anti-Xa level 3-5 hours after at least the fifth
- D: Recommend drawing anti-Xa level 3-5 hours after at least the third

Which of the following prophylactic enoxaparin dosing regimens have been successfully used in studies of the obese population?

- A 60 mg subcutaneously q 12 hours
- B 0.5 mg/kg subcutaneously q 12 hours
- C 0.5 mg/kg subcutaneously daily
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-860-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF MEDICATION USE AND COST UTILIZATION IN OLDER VETERANS WITH COGNITIVE IMPAIRMENT

Laura A Schultz*, PharmD; Kristin K Phillips, PharmD, CGP; Megan E Mills, PharmD, CGP; Christine T Cigolle, MD, MPH
Veteran Affairs - Ann Arbor Healthcare System, 2215 Fuller Road, (119), Ann Arbor, MI, 48105
Laura.Schultz2@va.gov

Purpose: Two clinical geriatric demonstration projects were previously initiated at the VA Ann Arbor Healthcare System: Bridging the Gap: Care Management Targeting Veterans with Cognitive Impairment at Times of Transition (Phase I) and Bridging the Gap: Care Management Targeting Veterans with Medical Complexity and Cognitive Impairment (GeripACT). This study aimed to evaluate potentially inappropriate medication use in older adults with cognitive impairment and the cost utilization of their overall medication use based on patients identified from Phase I and GeripACT demonstration projects.

Primary objectives included assessing prevalence of potentially inappropriate medications, specifically those with anticholinergic or psychoactive properties and nonsteroidal anti-inflammatory drugs, along with overall number of medications used. Additionally, documentation of a risk-benefit conversation regarding the use of atypical antipsychotics in the elderly with dementia was evaluated. The cost utilization analysis examined the cumulative cost of a medication regimen.

Methods: A retrospective chart review of two populations was used to assess the impact of evaluation in a geriatrics demonstration project on the primary objectives. Population 1 included veterans 65 years and older, with a diagnosis of cognitive impairment, and evaluated in Phase or GeripACT between May 2010 and May 2014. The second comparative group, population 2, included veterans 65 years and older, with a diagnosis of cognitive impairment, and never evaluated in Phase I or GeripACT. Patients residing in a nursing home at the time of initial consult, those with a major psychiatric illness history, or active substance abuse were excluded. An analysis of the primary objectives 6 months pre and post the initial visit was conducted for population 1 with an additional 6 months post initial visit comparison for population 1 versus population 2. Descriptive data will be analyzed for statistical significance in relation to the study objectives.

Results/ Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize medications that may be considered potentially inappropriate in the elderly.

Identify the factors that should be considered in the prescribing of antipsychotics in the elderly.

Self Assessment Questions:

Which of the following has the least potential for inappropriate prescribing in the elderly?

- A: Clonazepam
- B: Warfarin
- C: Fluoxetine
- D: Ibuprofen

Which of the following is a factor to be weighed when considering an antipsychotic in older adults?

- A: Dementia
- B: Exercise regimen
- C: History of osteoporosis
- D: CHA2DS2-VASc Score

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-937-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFICATION OF RISK FACTORS ASSOCIATED WITH URINARY TRACT INFECTIONS CAUSED BY EXTENDED-SPECTRUM BETA-LACTAMASE PRODUCING ORGANISMS

Natalie R. Schwarber, PharmD*, Nikki S. Land, RPh, Brian N. Peters, PharmD, MS
Riverview Health, 395 Westfield Road, Noblesville, IN, 46060
nschwarber@riverview.org

Purpose: Extended-spectrum-beta-lactamase (ESBL) producing *Escherichia coli* and *Klebsiella* species are increasing in frequency as causes of urinary tract infections (UTI). The Infectious Diseases Society of America (IDSA) has published guidelines on UTI treatment, however there are currently no published guidelines available addressing appropriate empiric therapies for ESBL pathogens. Evaluation of existing literature reveals a multitude of potential risk factors for development of ESBL UTI. The objective of this study is to identify risk factors associated with the development of ESBL UTI. Based on the identified risk factors, a risk-stratification tool will be created to improve empiric antimicrobial therapy and patient outcomes.

Methods: This study has received IRB approval. A retrospective case-control chart review will be conducted reviewing patient charts from June 1, 2012 to May 31, 2014. Cases will include patients admitted to the hospital with diagnosis of UTI and urine culture positive for ESBL *Escherichia coli* or *Klebsiella* species. Patients with non-ESBL UTI will serve as the control group. Patients will be matched 1:1 for age, gender, and hospital ward. Patient information to be collected and assessed for risk factors includes presence of urinary catheter, dialysis, antibiotic exposure within six months of hospitalization, prior hospitalization within six months of current admission, urinary tract obstruction/malformation, disposition prior to admission, immunosuppression, albumin and prealbumin levels, concomitant anticholinergic medications, recent surgery, feeding tubes, prior history of UTI, prior history of ESBL infections, dementia, neutropenia, and external wounds/ulcers. Secondary objective data will include empiric antibiotic therapy, length of stay, mortality, and readmissions within thirty days of discharge. Multivariate analysis will be used to determine significant risk factors.

Learning Objectives:

Describe the extended-spectrum beta-lactamase mechanism of resistance.

Identify risk factors that may be associated with ESBL UTI.

Self Assessment Questions:

Which of the following antimicrobials is considered a drug of choice for treating ESBL producing organisms?

- A: Ceftriaxone
- B: Meropenem
- C: Piperacillin / tazobactam
- D: Vancomycin

Which of the following statements is correct?

- A: Patients with sepsis need empiric antibiotics started within twenty-
- B: The mechanism of resistance for an ESBL is a change in the peni
- C: A common organism responsible for urinary tract infections is Esc
- D: ESBL organisms display resistance to all beta-lactams.

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-621-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CLINICAL AND ECONOMIC OUTCOMES FOLLOWING A DAPTOMYCIN DOSE-OPTIMIZATION PROTOCOL

Benjamin Scott, PharmD*; Joseph Mueller, MBA; Kevin Poe, PharmD, BCPS; Patrick Ratliff, PharmD, BCPS; William Judd, PharmD, BCPS
St. Joseph's Hospital - KY, 1 Saint Joseph Drive, Lexington, KY, 40504
benjaminscott@sjhlex.org

Purpose:

The purpose of this study was to evaluate clinical outcomes in patients who received daptomycin before and after implementing a weight-based dose optimization and consolidation policy. Cost savings were determined after consolidating daptomycin dose preparation and eliminating waste from partially used vials. Clinical outcomes were evaluated by examining all-cause mortality, hospital length of stay, ICU length of stay, and hospital readmission in 30 days as primary and secondary objectives. Patients with Staphylococcus aureus and Enterococcus species infections were evaluated separately.

Methods:

A retrospective chart review was performed on adult patients who received daptomycin for treatment of proven or suspected Staphylococcus aureus or Enterococcus infections. The study was approved by the institutions Investigational Review Board. Two groups in the study included an all-treated efficacy (ATE) group and a microbiologically evaluable (ME) group. The ATE group consisted of all patients who received daptomycin, and the ME group contained patients with documented gram positive pathogens previously mentioned. Both groups were evaluated before and after policy implementation. Daptomycin dosing in this study was based on an institutional policy. The policy used FDA approved dosing regimens, dose rounding protocols, standardized drug administration times, and procedures for handling excess volume of daptomycin while compounding. Data collected for this study included patient demographics, patient comorbidities, severity of disease, daptomycin dose and cost data, culture and isolate identification, as well as hospitalization length of stay and cost of stay data.

Results and Conclusions:

Data collection is currently underway. Results and conclusions will be presented at the conference.

Learning Objectives:

Review FDA approved dosing for the treatment of various infections caused by Methicillin Resistant Staphylococcus aureus and Enterococcus species
Discuss the pharmacodynamic characteristics of daptomycin

Self Assessment Questions:

Assuming normal renal function, which of the following is correct in regards to FDA recommendations for the use of daptomycin in the treatment of MRSA?

- A For complicated SSTI's, the recommended dose is daptomycin 6 mg/kg
- B: In MRSA bacteremia, higher daptomycin doses such as 10 mg/kg
- C: For MRSA osteomyelitis with a daptomycin MIC of 4 mcg/mL, the
- D: In MRSA endocarditis, daptomycin 6 mg/kg/dose IV daily is appropriate

Which of the following accurately describes the pharmacodynamic characteristics of daptomycin?

- A Daptomycin displays bacteriostatic activity in a time-dependent fashion
- B Daptomycin displays bacteriostatic activity in a concentration-dependent fashion
- C Daptomycin displays bactericidal activity in a concentration-dependent fashion
- D Daptomycin displays bactericidal activity in a time-dependent fashion

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-622-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IDENTIFYING OPERATIONAL BARRIERS TO INITIATION OF APPROPRIATE ANTIMICROBIAL THERAPY FOLLOWING A POSITIVE BLOOD CULTURE

Christie L. Scott, PharmD*, Alice H. Beane, PharmD, BCPS, Ashley M. Wilde, PharmD

Norton Healthcare, 315 East Broadway, Louisville, KY, 40202

christie.scott@nortonhealthcare.org

Purpose:

Early appropriate antibiotic initiation is vital to improving survival in patients with newly positive blood culture results. However, operational barriers can lead to delays in antibiotic administration in these patients. Some operational barriers include delayed physician notification and prescribing, pharmacist verification and dispensing and nursing administration. Identifying breakdowns in the operational process between initial gram stain result and administration of antibiotics will highlight opportunities for optimization.

Methods:

This study is a descriptive, retrospective chart review evaluating the time required for operational steps starting from positive blood culture gram stain result through antibiotic prescribing and administration. Positive blood culture results between August 1, 2014 and October 31, 2014 will be used to identify 50 patients for evaluation. Patients will be excluded if the positive blood culture was result of a contamination, if they were discharged from the hospital prior to positive gram stain result, if the positive gram stain result is from an outside hospital or if the patient was receiving appropriate antibiotics prior to gram stain result. The primary endpoint is to determine the time required for each step in the operational process when responding to a gram stain result from notification of the positive gram stain through antibiotic administration in patients not on appropriate antimicrobial therapy. Secondary outcomes include in-hospital mortality, hospital length of stay, discharge disposition and percentage of patients on effective antibiotics prior to gram stain results.

Results/Conclusion:

Data collection is currently in progress. Results and conclusion will be presented at 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of early antibiotic administration in blood stream infections
Describe operational barriers that result in delayed antibiotic administration

Self Assessment Questions:

Delayed and inadequate antimicrobial therapy in bloodstream infections can result in the following except:

- A Increased hospital mortality
- B: Greater number of organ system complications
- C: Increased length of stay
- D: Decreased hospital costs

Operational barriers that result in delays in time to antibiotic administration include the following except:

- A Tubes not available to send up first dose
- B Nurses not calling physicians with gram stain result
- C Microbiology laboratory operating 24 hours a day, 7 days a week
- D Administration times adjusted by pharmacy

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-861-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CYSTIC FIBROSIS TOBRAMYCIN-RELATED INTRA- AND INTERPATIENT VARIABILITY: THE CF ON TRIAL STUDY

Stephanie M. Seaman*, Pharm.D.; Christopher A. Droege, Pharm.D.; Eric W. Mueller, Pharm.D., FCCP, FCCM; Neil E. Ernst, Pharm.D.; Jessica B. Winter, Pharm.D., BCPS; Madeline J. Foertsch, Pharm.D., BCPS; Bradley E. McCrory, Pharm.D., BCPS; Gary L. McPhail, UC Health - University Hospital (Cincinnati), 234 Goodman Street, Cincinnati, OH, 45219-2316
Stephanie.Seaman@UCHealth.com

Purpose: Pulmonary consequences in cystic fibrosis (CF) have become a major source of morbidity and mortality. Thick mucus secretions, mucus plugging, and airway inflammation lead to chronic pulmonary infections and pulmonary fibrosis. Patients with CF are committed to lifelong antibiotic exposure and a clinical interplay between chronic inflammation secondary to recurrent infection, development and colonization of multidrug resistant organisms, and routine exposure to potentially toxic therapies. Tobramycin serves a central role in exacerbation treatment. Patients with CF display wide variability in pharmacokinetic parameters making it difficult to optimize therapy. The primary objectives of this study include describing the accuracy of a 10 mg/kg intravenous (IV) tobramycin dosing strategy as well as to characterize pharmacokinetic variability within and between patients. Secondary objectives will aim to identify variables that contribute to this variability and risk for acute kidney injury (AKI), defined as an increase in serum creatinine from baseline by greater than or equal to 50% or an absolute increase from baseline by 0.3 mg/dL.

Methods: This retrospective chart review of adult patients with CF treated at UCMC will include data collected for patients admitted between January 2007 to September 2014. One-compartment model pharmacokinetic equations will be used to determine variables utilized in tobramycin monitoring and adjustment. The proportion of patients reaching a goal serum peak of 20 to 30 mg/L with the initial dose will be recorded as well as those requiring dosage changes. Univariate and multivariate regression analyses will be performed to determine variables that may contribute to the necessity for higher tobramycin doses to obtain goal serum concentrations and that increase risk for AK development.

Results and Conclusions: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the epidemiology and pathophysiology of cystic fibrosis (CF)
Describe CF-related complications and treatment strategies

Self Assessment Questions:

Which is a physiologic consequence of a mutation in the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) Receptor?

- A Increased movement of sodium into epithelial cells leading to water
- B Decreased retention of chloride inside the epithelial cell leading to water
- C Increased retention of chloride inside the epithelial cell leading to water
- D Increased retention of chloride inside the epithelial cell leading to dehydration

Which of the following is a focus of current antibiotic treatment practices for CF patients?

- A Chronic suppressive therapy with IV antibiotics to prevent bacteria
- B Restricting all antibiotic therapy to acute exacerbations due to inpatient
- C Delaying therapy initiation during acute exacerbations until culture
- D Early aggressive treatment for pseudomonas eradication

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-623-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECTS OF LIPOSOMAL BUPIVACAINE ON PAIN AND FUNCTIONAL OUTCOMES IN PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY (TKA)

Amy Secord, PharmD*; Jennifer Phillips, PharmD, BCPS; Amish Doshi, PharmD
Advocate Lutheran General Hospital, 1775 Dempster Street, Park Ridge, IL, 60049
amy.secord@advocatehealth.com

Purpose: Liposomal bupivacaine is an extended release formulation of bupivacaine approved for use as a single-dose infiltration into the surgical site to produce post-surgical analgesia. Two previously published studies evaluating the effects of liposomal bupivacaine on opioid use and pain scores when used as part of a multimodal analgesia cocktail in patients undergoing total knee arthroplasty procedures reported conflicting results. There is currently one published study evaluating the impact of this drug on physical therapy outcomes, but it did not assess this drug as part of a multimodal analgesia cocktail. Based on the long-acting pain relieving effects of this drug, it is hypothesized that use of this drug combined with an alternative, adductor canal nerve block may improve patients functional status and allow them to reach physical therapy goals faster than historical control patients who received a multimodal cocktail containing traditional bupivacaine with femoral nerve blockade. The purpose of this study is to assess the effect of peri-articular liposomal bupivacaine with adductor canal blockade on postoperative opioid requirements, pain scores, and functional outcomes in patients undergoing primary unilateral TKA. **Methods:** A retrospective chart review will be conducted comparing two groups of patients: (1) those who underwent unilateral TKA at ALGH from September 2014 to February 2015 and (2) a group of historical controls comprised of patients who underwent unilateral TKA procedure at ALGH prior to September 2014. For both groups of patients, data will be collected regarding demographics, pain scores, narcotic utilization (calculated morphine equivalents), length of stay, achievement of physical therapy goals prior to discharge, and medication related adverse events. The groups (historical control vs. liposomal bupivacaine) will be compared using unpaired t-test for continuous data and chi-squared, or Fishers exact for nominal data. **Results/conclusions:** Final results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify potential advantages and disadvantages to using liposomal bupivacaine as part of a multimodal perioperative analgesic regimen.
Recall proposed advantages of utilizing adductor canal peripheral nerve blockade in patients undergoing total knee arthroplasty procedures with respect to the potential impact on functional outcomes.

Self Assessment Questions:

What is the main benefit of using the liposomal formulation of bupivacaine in multimodal perioperative analgesia regimens?

- A Increased ease of administration
- B Reduced incidence of bupivacaine injection site reactions
- C Decreased medication cost
- D Extended duration of analgesia

Which of the following is a potential advantage of utilizing adductor canal peripheral nerve blockade as perineural analgesia in patients having total knee arthroplasty procedures?

- A Improved blockade of both motor and sensory function
- B Preservation of quadriceps motor function
- C Elimination of postoperative fall risk
- D Improved analgesia through use of continuous infusion bupivacaine

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-624-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PATIENT UNDERSTANDING AFTER A RIVAROXABAN EDUCATIONAL VIDEO

Jordan N.P. Sedlacek, PharmD*, Christopher A. Giuliano, PharmD, Susan Szpunar, PhD, Kaitlin R Baisden, Kyle R Rising, Melissa Lipari, PharmD, BCACP

St. John Hospital and Medical Center, 22101 Moross, Detroit, MI, 48236
jordan.sedlacek@stjohn.org

Purpose: The purpose of this study is to assess the effect of a newly developed rivaroxaban educational video by evaluating patient knowledge.

Methods: We are conducting a quasi-experimental educational study of adult patients (≥ 18 years old) receiving rivaroxaban. The primary objective of this study is to determine knowledge gained immediately after administration of a rivaroxaban education video. The secondary objective of this study is determining the seven day recall of information delivered. Prior to the start of the study, three rivaroxaban educational videos (for different indications) and two questionnaires (for once and twice daily dosing) were developed and validated. Validation occurred by three expert pharmacists within the cardiology field. Pilot testing of the questionnaires in the general population occurred prior to conductor of the study. Patients will be identified for study inclusion via Senti7 pharmacy system and enrolled after obtaining informed consent. All patients that have been on rivaroxaban previously and patients newly started rivaroxaban will be included. Patients will be excluded if they were unwilling or unable to complete study procedures. Once consent is obtained, a pre-test will be administered to the patient. The patients will then watch the educational video. This will be followed by an identical post-test to evaluate immediate recall along with a video satisfaction questionnaire. The same post-test will be administered by phone seven days later to evaluate long term recall. Descriptive statistics will be used to characterize the study population. The primary and secondary outcomes will be analyzed by paired t-test. A subgroup analysis of the primary outcome will be performed on patients newly started on rivaroxaban versus those having any previous history with rivaroxaban. Reliability of questionnaire results will be described using Cronbach Alpha.

Results: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the potential benefits of a rivaroxaban educational video.
Review the effectiveness of a rivaroxaban educational video.

Self Assessment Questions:

Benefits of an educational video include which of the following?

- A: Increasing the amount of time a health professional needs to teach
- B: Increasing health professionals' satisfaction.
- C: Increasing patients' knowledge.
- D: Decreasing readmissions.

Which of the following statements is true?

- A: Patients' knowledge of warfarin increased after viewing a warfarin
- B: More nursing time was associated with video counseling during a
- C: Phosphorus levels increased after dialysis patients watched a pho
- D: Patients typically do not enjoy watching medication videos.

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-862-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF WEIGHT BASED CHEMOTHERAPY DOSING AND TREATMENT RELATED TOXICITIES IN ADULT FEMALES WITH BREAST CANCER RECEIVING CYCLOPHOSPHAMIDE AND DOXORUBICIN

Nicholas Selle, PharmD*, Nicole McMullen, PharmD, BCOP; James Reissig, PharmD, BCPS

Akron General Medical Center, 1 Akron General Avenue, Akron, OH, 44307
Nicholas.Selle@akrongeneral.org

Purpose: In April 2012, the American Society of Clinical Oncology published guidelines recommending obese patients receive chemotherapy dosed on actual body weight (ABW). This guideline was based on literature that suggested neither short nor long term toxicity is increased among obese patients receiving ABW chemotherapy dosing. The purpose of this study is to compare chemotherapy toxicity profiles in obese patients who receive ABW dosing with non-obese patients receiving the same chemotherapy. This study will also describe the chemotherapy dosing patterns at Akron General Medical Center (AGMC) before and after the release of this guideline.

Methods: A retrospective chart review of adult patients that received cyclophosphamide and doxorubicin (AC) at the outpatient infusion center at AGMC was conducted. Eligible subjects had a diagnosis of breast cancer, were adult females ≥ 18 years of age, received at least one cycle of AC, and had been treated at AGMC's outpatient infusion center between 8/1/2010 and 11/30/2014. Subjects were excluded if they were pregnant, had received previous chemotherapy for breast cancer, or received a granulocyte colony stimulating factor with the first cycle of AC. The primary outcome is the incidence of stage IV neutropenia in obese patients who received ABW dosing as compared to non-obese patients. Secondary outcomes include the percentage of obese patients who received ABW dosing as compared to adjusted body weight (AdjBW) dosing prior to and after the release of the ASCO guideline, the relative dose intensity of obese patients as compared to non-obese patients, and the incidence of stage IV neutropenia in obese patients who received ABW dosing as compared to obese patients who receive AdjBW dosing. Grade 4 neutropenia will be defined as an absolute neutrophil count <500 .

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Review the American Society of Clinical Oncology's current recommendation for chemotherapy dosing of obese patients.
Describe the rationale behind using actual body weight chemotherapy dosing in obese patients.

Self Assessment Questions:

The American Society of Clinical Oncology currently recommends that dosing of obese patients' chemotherapy be based on:

- A: BSA calculated from actual body weight
- B: BSA calculated from actual body weight but capped at 2.0
- C: BSA calculated from adjusted body weight
- D: BSA calculated from adjusted body weight but capped at 2.0

Literature has shown that compared to normal weight patients, obese patients receiving actual body weight chemotherapy dosing experience:

- A: Higher rates of adverse drug reactions
- B: Improved life expectancy
- C: Lower rates of adverse drug reactions
- D: Similar rates of adverse drug reactions

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-625-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF USING SERUM OSMOLALITY WITH OR WITHOUT SERUM BICARBONATE TO HELP IDENTIFY TOXIC ALCOHOL EXPOSURES

Clarissa M. Sema, PharmD, PGY1 Pharmacy Practice Resident;* Frank P. Paloucek, PharmD, DABAT, FASHP, Clinical Associate Professor
University of Illinois at Chicago, 833 South Wood Street, Chicago, IL, 6061
sema@uic.edu

Purpose: Toxic alcohols are frequently implicated in suicidal, unintentional, and homicidal poisonings. Toxic alcohol ingestion is a differential diagnosis of metabolic acidosis with an elevated anion gap. A potential early surrogate marker of toxic alcohol poisoning is an elevated osmol gap. However, osmol gap elevation is neither sensitive nor specific for toxic alcohol poisonings. Using absolute serum osmolality and serum bicarbonate as diagnostic tools for toxic alcohol exposures has not been analyzed. The objective of this study is to determine whether serum osmolality values ≥ 350 mg/dL with or without serum bicarbonate levels ≤ 10 mEq/L can predict toxic alcohol ingestions (blood concentrations ≥ 20 mg/dL). **Methods:** This is a retrospective, multi-center, cohort study looking at toxic alcohol exposures from three poison control centers in the United States from January 2010 to December 2013. The primary outcome of this study is to analyze the positive and negative predictive values for predicting toxic alcohol ingestion. The secondary outcome will include the impact of co-ingestion of ethanol on measured serum osmolality to predict toxic alcohol ingestion. Data to be collected include: toxic alcohol ingested, co-ingestion of ethanol, serum osmolality, serum ethanol level, serum bicarbonate, toxic alcohol serum blood concentration, time of ingestion, time of levels, final diagnosis and treatment. Demographic variables to be collected include: age, gender, ethnicity, and poison control center. All data will be recorded without patient identifiers and maintained confidentially. Cases of toxic alcohol ingestions identified using the Toxicall electronic medical record system with a recorded toxic alcohol concentration, serum bicarbonate, and measured serum osmolality will be analyzed. Continuous variables will be analyzed using Student's t-test and Wilcoxon rank sum, as appropriate. Demographic variables will be analyzed using descriptive statistics. **Results/conclusion:** To be presented at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the limitations of osmol gap elevation to identify toxic alcohol exposures
Identify potential early surrogate markers to identify toxic alcohol exposures

Self Assessment Questions:

Osmol gap elevation can be seen in which of the following situations?

- A Toxic alcohol exposure
- B: Diabetic ketoacidosis
- C: Metabolic acidosis
- D: All of the above

Which of the following is the best potential early surrogate marker to identify toxic alcohol exposures?

- A Elevated serum osmolality
- B Respiratory alkalosis
- C Non-gap metabolic acidosis
- D Elevated serum pH

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-626-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INTRAVENOUS IMMUNOGLOBULIN GRAMS AVERTED WITH IMPLEMENTATION OF AN INPATIENT IVIG RESTRICTED USE AND DOSING GUIDELINE.

Joshua M Senn*, PharmD; Rachel L Swope, PharmD, BCPS; Amanda I Castle, PharmD, BCPS
Norton Healthcare, 315 East Broadway, Louisville, KY, 40202
joshua.senn@nortonhealthcare.org

Purpose:

Intravenous immunoglobulin (IVIG) is a concentrated solution of gamma globulins from pooled plasma donors that has immuno-regulatory and anti-inflammatory properties. IVIG is currently utilized in numerous disease states for both FDA approved and non-approved indications. Concerns regarding utilization of IVIG for off label uses include limited evidence of therapeutic benefit, potential adverse effects, limited supply and low reimbursement costs for inpatient administration. Implementation of an IVIG restricted use and dosing guideline may be able to optimize Norton Healthcare's inpatient utilization of IVIG in terms of safety, efficacy, conservation, and cost. The purpose of this study is to evaluate the potential IVIG grams averted with implementation of an IVIG restricted use and dosing guideline.

Methods:

This is an IRB approved retrospective study of adult patients who received IVIG as an inpatient at one of the four adult Norton Healthcare facilities. All IVIG courses of therapy in a one year time period are being assessed for compliance with a proposed evidence-based IVIG restricted use and dosing guideline for both indication and indication-specific dosing. IVIG courses are excluded from analysis if the indication for use is not designated by the prescriber within the patient's medical record. The primary endpoint is a composite of potential IVIG grams averted for noncompliance with the IVIG restricted guideline with regard to both indication and dosing. The secondary endpoints include potential IVIG grams averted for noncompliant indication, potential IVIG grams averted for noncompliant dosing, and potential annual cost savings with guideline implementation. A safety secondary endpoint will assess compliance with the IVIG restriction guideline dosing scheme (ie appropriate dose, frequency, and duration).

Results and Conclusions:

Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the rationale for optimizing IVIG use in the inpatient setting.

List criteria for consideration in developing an IVIG indication restriction guideline for the inpatient setting.

Self Assessment Questions:

Factors that support the optimization of IVIG use in the inpatient setting include all of the following except:

- A Limited supply
- B: Off-label use without supporting evidence of therapeutic benefit
- C: Low drug cost
- D: Adverse drug events

Which of the following criteria would be most appropriate to support the use of IVIG for a specific indication when developing an inpatient IVIG restriction guideline?

- A Physician preference
- B IVIG used as third line therapy
- C Case reports of potential therapeutic benefit
- D High level of evidence of therapeutic benefit for acute treatment

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-627-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING PHARMACISTS ROLE IN HEPATITIS C TREATMENT

Kushal Y. Shah*, PharmD; Sue Kim, PharmD, BCPS; Ursula C. Patel, PharmD, BCPS AQ-ID; Andrea M. Mendyk, PharmD, BCPS
Veteran Affairs - Edward Hines, Jr. Hospital, 5000 South 5th Ave, Pharmacy Service 119, Hines, IL, 60141
Kushal.Shah2@va.gov

Background: In 2013, according to an HCV registry, 208,147 (92%) veterans receiving Veteran Health Administration (VHA) care screened positive for HCV antibodies and 174,302 (84%) of those were identified with HCV viremia. Direct-acting antiviral agents (DAAs) have shown significant improvement in cure rates, adherence, tolerability, as well as shorter duration of treatment which has made new treatment more appealing. As new drugs for the treatment of Hepatitis C are making their way into clinical practice, high costs of these novel treatments continue to pose a huge economic burden on the healthcare system.
Purpose: The primary purpose of this project is to survey providers (pharmacists, physicians, nurses) across VA facilities in the nation to characterize pharmacists role in managing Hepatitis C patients.
Methods: Two surveys were designed to evaluate pharmacists involvement and duties in a Hepatitis C clinic. Surveys for providers and pharmacists consisting of 11 questions and 13 questions, respectively, were developed. Both surveys were compiled on SurveyMonkey using skip logic. Surveys will be open for 7 weeks from December 4, 2014 until January 23, 2015. A pharmacists survey link was emailed to the Clinical Pharmacists and Hepatitis C Pharmacists groups. A providers survey link was emailed to the Hepatitis C Clinicians and Coordinators groups. In order to reach out to all providers, a request was made to the Hepatitis C pharmacists to forward the providers survey link to providers who are either working with them or associated with GI/Liver (Hepatitis C) clinics. A reminder to complete the survey was sent at the beginning of the sixth week. Data from survey evaluations will be analyzed and presented at the Great Lakes Pharmacy Resident Conference.
Results and Conclusion: Data is currently being collected, and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the services pharmacists can provide in a Hepatitis C clinic
Identify potential economic benefits having pharmacist(s) in a Hepatitis C clinic

Self Assessment Questions:

Clinical responsibilities of pharmacists in Hepatitis C clinic include

- A Direct patient care
- B: Administrative tasks
- C: Diagnosis of Hepatitis C
- D: A and B

Pharmacists can make a significant economic impact in a Hepatitis C clinic by

- A Monitoring patient outcomes data
- B Addressing adverse drug events
- C Selecting appropriate drug regimens
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-863-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PHARMACIST-MANAGED GOUT CLINIC ON SERUM URIC ACID LEVELS AND PATIENT OUTCOMES IN A VETERAN POPULATION

Margi K. Shah, Pharm.D.*, Vanita Panjwani, Pharm.D., Tracy A. Martinez, Pharm.D., BCACP, Jennifer L. Clemente, Pharm.D., BCACP
Veteran Affairs - John D Dingell Medical Center, 3748 Briarbrooke Lane, Oakland Township, MI, 48306
margi.shah@va.gov

Purpose: To determine the impact of a clinical pharmacist managed gout clinic on patient outcomes. The primary outcome is percentage of patients achieving goal uric acid, defined as less than 6%. The secondary outcome is number of patient-reported gout flares. Gout is the most common form of inflammatory arthritis in men and is associated with significant morbidity, emergency department visits, and healthcare costs. The management of gout is often suboptimal with frequently poor patient adherence and lack of understanding regarding their treatment. Limited literature exists regarding the role of a clinical pharmacist in managing gout.

Methods: This study, submitted to the institutional review board (IRB) for review, is a retrospective chart review of Veterans enrolled in the John D. Dingell Veteran Affairs Medical Center (JDDVAMC) pharmacist-managed gout clinic. Veterans seen in the pharmacist-managed gout clinic from January 2013-December 2014 were reviewed for inclusion into this study. The computerized patient record system (CPRS) was used to collect information on patients referred to the pharmacist-managed gout clinic. Patients must have been seen in the gout clinic at least twice to be included in the analyzed data. The following data was collected: baseline patient demographics, gout medications at baseline and throughout the study period, medication fill data, presence of risk factors for gout, uric acid levels at baseline and throughout the study period, number of encounters with the pharmacist-managed gout clinic, and reported adverse effects to gout medications. Provider documentation was reviewed to determine number of patient-reported gout flares and patient-reported medication adherence. Data will be analyzed using descriptive statistics.

Results/Conclusion: Data collection is ongoing. Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the mechanism of action of allopurinol and colchicine in the treatment of gout.

Explain the role of a pharmacist in optimizing gout treatment and identifying lifestyle modifications to achieve target uric acid and reduce frequency of gout flares.

Self Assessment Questions:

If a urate lowering therapy is initiated, concurrent daily colchicine must also be initiated for at least how long?

- A 0 months
- B: 3 months
- C: 6 months
- D: 12 months

JS reports 1 gout flare/year. His exam is negative for tophi and there is no history of nephrolithiasis. His estimated creatinine clearance is 75 mL/min and his current uric acid is 7.6 mg/dL, all o

- A Start allopurinol 100mg daily
- B Start allopurinol 100mg daily + colchicine 0.6mg daily
- C Start colchicine 0.6mg as needed for gout flares
- D Start colchicine 0.6mg daily

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-628-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DETERMINING THE CLINICAL UTILITY OF INTRAVENOUS ACETAMINOPHEN IN A COMMUNITY BASED HOSPITAL SYSTEM

Nora H. Sharaya, PharmD, BCPS*; Shannon Smallwood, PharmD; David Cruse, PharmD

Community Health Network / Butler University, 1500 N. Ritter Ave, Indianapolis IN, Indianapolis, IN, 46219
nsharaya2@ecommunity.com

Purpose: Ofirmev (intravenous acetaminophen) is the first FDA-approved non-narcotic, non-NSAID analgesic available for intravenous (IV) use. It was approved for the management of mild to moderate pain, management of moderate to severe pain with adjunctive opioid analgesics, and reduction of fever. The acquisition cost of IV acetaminophen is increasing without full knowledge of its clinical utility. This study aims to determine the clinical effectiveness of IV acetaminophen in surgical patients in a community-based hospital system.

Methods: This is a retrospective chart review comparing matched surgical patients with or without IV acetaminophen use. Institutional Review Board approval was received. Patients were included if they had an order for IV acetaminophen for an inpatient surgical procedure. Study patients were matched with surgical inpatients who did not receive IV acetaminophen. The primary endpoint of this study is to examine the total opioid use in morphine equivalents 24 hours after surgery in patients that used IV acetaminophen versus those that did not as part of their operative pain management regimen. Secondary endpoints include opioid use in the PACU, at 48 hours, and at 72 hours; median and range pain scores in the PACU, at 24 hours, at 48 hours, and at 72 hours; cost of stay; time from surgery to discharge; antiemetic use; time to first physical therapy and occupational therapy; length of post-anesthesia care unit stay; total acetaminophen exposure above 4 grams in 24 hours; and time to first oral medication. For orthopedic surgeries, time to first step and total amount of steps will be secondary endpoints.

Results: Data collection is currently underway. A total of 100 patients who received IV acetaminophen as part of their pain regimen are being matched to patients who did not based on surgery type.

Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the FDA-approved indications for intravenous acetaminophen.

Describe the benefits of utilizing a multimodal pain relief regimen in post operative patients.

Self Assessment Questions:

The benefits of a multimodal analgesia regimen include all of the following except:

- A: Improvement of post-operative pain relief
- B: Reduction of healthcare cost
- C: Decrease patient satisfaction
- D: Expedite mobilization and rehabilitation

Which of the following is not an FDA-approved indication for intravenous acetaminophen?

- A: Mild to moderate pain
- B: Management of moderate to severe pain with adjunctive opioid analgesics
- C: Reduction of fever
- D: Management of moderate pain as part of a multimodal regimen to

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-629-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

AN EVALUATION OF HAZARDOUS MEDICATION PRESCRIBING, USAGE AND ADMINISTRATION AT A REHABILITATION HOSPITAL

*Blake Shay, PharmD, Mark Crist, PharmD, BCPS, Ellen Keating, PharmD, MS, Ryan Forrey, PharmD, MS, FASHP, Amanda Hafford, PharmD, MS, Maureen Musto, RN, BNS, CRRN, ACNS-BC

The Ohio State University Wexner Medical Center, 368 Doan Hall, 410 W 10th Avenue, Columbus, OH, 43210

blake.shay@osumc.edu

Purpose:

Dodd Hall is a 60-bed inpatient rehabilitation hospital located on the medical campus of The Ohio State University Wexner Medical Center (OSUWMC). In July 2013, OSUWMC began a cancer rehabilitation service at Dodd Hall for patients whose rehabilitation diagnosis was secondary to a hematologic or oncologic diagnosis. Services provided include the administration of hazardous medication regimens during the rehabilitation process. The logistics of ordering, delivery, administration, and monitoring can create challenges to the medication use process in a setting where chemotherapy is not delivered on a routine basis.

Appropriate steps must be taken to ensure the necessary safety precautions and processes are in place. The ability to ensure all patients receive appropriate rehabilitation time during their chemotherapy treatment in this setting is also a factor that must be considered. The purpose of this project is to evaluate the current medication use process for hazardous medications and identify opportunities for improvement.

Methods:

A retrospective review will be conducted of all patients who received at least one dose of a hazardous medication at the Dodd Hall rehabilitation hospital from July 1, 2013 to June 30, 2014. The population size for this study was determined by patient volume rather than calculated statistical power. Patients less than 18 years or greater than 89 years of age, pregnant women and prisoners will be excluded from the data analysis. Data to be collected will include age, medication (including formulation), OSUWMC hazardous medication grouping, dosing regimen, patient home supply usage, prescriber credentials, verifying pharmacist, appropriate nursing administration based on hazard grouping, overall administration time and monitoring requirements, pharmacy and nursing travel time, special compounding requirements, rehabilitation time with infusion medications, number of doses administered and length of stay.

Results:

Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify barriers to the medication use cycle when administering chemotherapy and other hazardous medications in an inpatient rehabilitation hospital setting.

Define hazardous drugs and give examples of each classification.

Self Assessment Questions:

Which of the following is correct regarding hazardous medication groupings from The National Institute for Occupational Safety and Health (NIOSH)?

- A: 5 hazardous medication groups exist under current NIOSH recommendations
- B: 7 hazardous medication groups exist under current NIOSH recommendations
- C: 3 hazardous medication groups exist under current NIOSH recommendations
- D: 10 hazardous medication groups exist under current NIOSH recommendations

Which hazardous medication grouping from The National Institute for Occupational Safety and Health (NIOSH) contains antineoplastic medications?

- A: Group 1
- B: Group 2
- C: Group 3
- D: Group 4

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-864-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

TECHNICIAN BARCODE VERIFICATION AS AN ALTERNATIVE TO A PHARMACISTS VISUAL CHECK OF FIRST DOSES IN AN ACUTE CARE SETTING

*Annie Shelton, Pharm.D; Chris Sanders, Pharm.D; Mark Naumann, RPh; David Oxencis, Pharm.D; Julie Guenette, CPT; Philip Brummond M.S. Pharm.D

Froedtert Hospital, 9200 W. Wisconsin Ave., Milwaukee, WI, 53226
annie.shelton@froedtert.com

Purpose: Increasing financial pressures have forced hospitals and healthcare systems to do more with less. Areas of interest/potential gain include reallocation of resources, advancement of current skill mix, and integration of technology. It is known that manual processes inherently introduce human error to the verification process; ultimately affecting medication accuracy furthermore can be a rate-limiting step resulting in unnecessary wait times. Currently there is a lack of literature to support integration of technology into final dose verification. However, there are published studies supporting the positive impact that bedside barcode scanning has had with regard to medication administration accuracy rates. These studies have prompted an investigation into the use of this technology earlier in the medication dispensing process, particularly with regard to verification of first-doses.

Methods: This retrospective two phase non-inferiority study includes first dose medications except for compounded sterile products and custom preparations. During phase I a pharmacist's visual check will assess barcode scanner accuracy. Throughout phase II, barcode scanning will assess the accuracy of a pharmacist's visual check. A minimum of 3684 doses will be evaluated both pre and post intervention to provide 80% power to demonstrate non-inferiority of barcode scanning to a pharmacist's visual check. Time trial data will be collected during phase I to analyze process time associated with a pharmacist's visual check.

Results: Data collection and evaluation is ongoing and will be presented at the Great Lakes Pharmacy Resident Conference.

Conclusion: Results of this study will determine whether barcode scanning is as effective as a pharmacist's visual check with regard to first-dose final verification in an acute care setting. In addition, results will estimate a change in processing time associated with implementation of barcode verification when used as an alternative to a pharmacist's visual check of first doses.

Learning Objectives:

Describe a valid way to evaluate if barcode scanning technology is as efficacious as a pharmacist visual check.

Describe potential benefits of leveraging barcode scanning technology within central operations.

Self Assessment Questions:

Which of the following research methods would be advantageous to use to evaluate if technician barcode verification is as good as a pharmacist's visual check?

- A: Non-inferiority study
- B: Randomized controlled trial
- C: Case Report
- D: Direct observation

Which of the following is a potential benefit of leveraging skill mix and technology?

- A: De-escalation of current staff responsibilities limiting their practice
- B: Decreased efficiencies in central operations.
- C: Increase in error rates.
- D: Ability to reallocate pharmacists' time to new and innovative responses

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-710-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A SKIN AND SOFT TISSUE INFECTION PROTOCOL IN A COMMUNITY HOSPITAL

Krista L. Shepherd*, PharmD; Brian D. Host, PharmD, BCPS
Baptist Health Lexington, 1740 Nicholasville Rd, Lexington, KY, 40503
krista.shepherd@bhsi.com

Purpose:

A multidisciplinary antimicrobial stewardship committee was recently formed at our institution to improve patient clinical outcomes. The initial objective of this team has been to design and implement site-specific protocols for the treatment of common infectious disease states. In light of the recent release of the updated skin and soft tissue infection (SSTI) guidelines by the Infectious Diseases Society of America (IDSA), this is now an area of focus. This study will evaluate the current initiative of the antimicrobial stewardship committee in developing an SSTI protocol.

Methods:

This study was approved by the institution's investigational review board. The main objective is to evaluate antibiotic use and clinical outcomes before and after an SSTI protocol is applied to practice by the stewardship committee. The retrospective chart review consisted of patients admitted from January 2013 to December 2013 that had a primary discharge diagnosis of SSTI. Data collected from these patients combined with the newly published guidelines, was utilized to develop a protocol that will be applied and implemented by the antimicrobial stewardship committee in early 2015. Prospective, observational data will then be collected from patients treated with the new protocol. Data collected on the treatment of these patients will be reviewed and compared to that of treatment before implementation of this protocol.

Results/Conclusions:

Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the updated IDSA guidelines for SSTIs

Discuss the data behind the design of our site-specific SSTI protocol

Self Assessment Questions:

The guidelines suggest that purulent skin and soft tissue infections are caused by what organism?

- A: Streptococcus species
- B: Staphylococcus aureus
- C: Bacteroides fragilis
- D: Escherichia coli

The protocol developed at our institution recommends using which antibiotic(s) for empiric coverage of moderate skin and soft tissue infections?

- A: Linezolid
- B: Vancomycin and ceftriaxone
- C: Clindamycin
- D: Piperacillin-tazobactam

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-630-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RAISING AWARENESS OF IMMUNIZATION SERVICES AT TWO HOSPITAL-BASED OUTPATIENT PHARMACIES FOR SIX-VACCINE PREVENTABLE DISEASES AND IDENTIFICATION OF PATIENT SPECIFIC BARRIERS.

Pinal Sheth, PharmD, MBA*; Betty Fang, PharmD, BCACP; Ksenia Hankewych, PharmD; Seema Patel, PharmD; Tina Zook, PharmD
NorthShore University HealthSystem, 6141 W. Henderson
Street, Chicago, IL, 60634
psheth@northshore.org

Purpose: To identify patient specific barriers to immunization services, educate and train pharmacy staff members on eligibility criteria of six vaccine-preventable diseases, and raise awareness of immunization services to patients at two hospital-based outpatient pharmacies.

Methods: Pharmacy technicians and immunization-certified pharmacists will be re-educated about the following six vaccines: influenza, herpes zoster, pneumococcal, Tdap, hepatitis A, and hepatitis B. Staff education will also include a review of patient eligibility criteria for each vaccine. This will enable the pharmacy staff to actively identify and offer specific immunizations to eligible patients.

A seven-question Likert-scale survey will be completed by patients at one hospital-based outpatient pharmacy over the course of a one week immunization services promotional campaign. This will generate descriptive statistics and identify patient specific barriers to immunization services. Survey questions will assess patient awareness of available immunization services, as well as patient familiarity with their vaccine eligibility. The survey will further assess the likelihood of a patient receiving a necessary immunization at the outpatient pharmacies.

Beyond this campaign week, raising awareness of pharmacy immunization services will continue for two additional months. This will consist of a brochure included with each dispensed prescription and a display of vaccine-specific informational materials. Additionally, all patients visiting the outpatient pharmacies will be offered a vaccine eligibility questionnaire by a pharmacist or a pharmacy technician. Patients who meet eligibility criteria will be offered appropriate immunizations. The number of immunizations given during this one month time frame will be compared to the corresponding time frame one year ago to evaluate for a change in the number of vaccines administered post patient awareness and pharmacy staff education efforts.

Results and Conclusions: Data collection and analysis are ongoing. The results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review eligibility criteria and contraindications for the following immunizations: influenza, herpes zoster, pneumococcal, Tdap, hepatitis A, and hepatitis B.

Discuss patient-specific barriers to immunization services at hospital-based, outpatient pharmacies.

Self Assessment Questions:

If a healthy 29 year old pregnant patient, in her third trimester comes to the pharmacy, which of the following immunizations should be strongly recommended?

- A Herpes zoster and influenza
- B: Tdap and influenza
- C: Pneumococcal and Tdap
- D: Hepatitis B and intranasal influenza

Which of the following is a contraindication to receiving the herpes zoster vaccine?

- A Egg allergy
- B Younger than 60 years old
- C Gelatin allergy
- D None of the above

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-631-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF CONGESTIVE HEART FAILURE (CHF) 30-DAY READMISSION RATES FOLLOWING IMPLEMENTATION OF THE HOSPITAL IN HOME (HIH) PROGRAM AT THE CINCINNATI VA MEDICAL CENTER (CVAMC)

Dana M. Short*, PharmD; Bonnie Y. Yeung, PharmD, BCPS; Judy M. Harrer, RPh, PhD
Veteran Affairs - Cincinnati Medical Center, 3200 Vine
Street, Cincinnati, OH, 45220
dana.galloway@va.gov

Purpose: CHF is the leading cause of hospitalization in the U.S. and approximately 25% of patients are readmitted within 30 days. The current CHF readmission rate at the CVAMC is 21%, which is higher than the site goal of 18%, but has decreased from 24% in 2013. In February 2013, a HIH program was initiated at the CVAMC with a full-time pharmacist as part of the program team to provide critical hospital services to patients in the home for conditions such as CHF. The purpose of this study is to determine if the HIH program is contributing to the reduction in CHF readmission rates. Secondary endpoints include 30 day readmission rates specifically for CHF exacerbations, length of stay patient satisfaction, program costs and optimization of medication regimens by utilization of angiotensin converting enzyme inhibitors (ACE I) or angiotensin receptor blockers (ARB) and beta-blockers per national guidelines.

Methods: This is an internal retrospective chart review, quality-improvement case-control study. Patients admitted to the HIH program with a diagnosis of CHF from October 1, 2013 to September 30, 2014 will be identified using the electronic medical record system and compared to a usual care group. The usual care group will consist of patients admitted to the acute care setting for CHF during the same time period with a similar age and gender profile. Based on power analysis, approximately 320 usual care and 80 HIH patients must be unrolled to achieve 80% power to detect a 14% decrease in readmission rate. Data collected and analyzed will be de-identified and include: age, sex, weight, readmission or death within 30 days after discharge, length of stay, appropriate utilization of ACE/ARBs and beta-blockers, and HIH patient satisfaction & program costs.

Results and Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference in April 2014.

Learning Objectives:

Discuss various strategies that are being implementing in an effort to reduce admissions in patients with heart failure.

Describe the Hospital in Home program that was implemented at the CVAMC in February 2013 and discuss the impact of the program on patient outcomes.

Self Assessment Questions:

What is the estimated 30-day readmission rate after hospitalization for heart failure in the United States?

- A 10%
- B: 25%
- C: 40%
- D: 50%

Which of the following statements is correct regarding the Hospital in Home program at the CVAMC?

- A The Hospital in Home program delivers acute hospital services to
- B The Hospital in Home program provides respite care.
- C There is a pharmacist on the Hospital in Home program team.
- D A&c

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-632-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE APPROPRIATE USE OF STRESS ULCER PROPHYLAXIS IN CRITICALLY ILL PATIENTS ADMITTED TO THE INTENSIVE CARE UNIT

Sirine S. Shoukair, PharmD, PGY1*, Michael Rudoni, PharmD, BCPS
Toledo Hospital/Toledo Children's Hospital, 2142 N. Cove Blvd, Toledo, OH, 43606
sirine.shoukair@promedica.org

Purpose: Critically ill patients requiring admission to the intensive care unit (ICU) are at risk for developing gastrointestinal stress ulcers. The American Society of Health-System Pharmacists (ASHP) has published evidence-based guidelines identifying patients who may benefit from stress ulcer prophylaxis (SUP). Increasing medical costs, nosocomial pneumonia, and *Clostridium difficile* infections make assessing appropriateness of SUP therapy of great importance. This evaluation aims to examine appropriateness of SUP therapy, according to the risk factors listed in the ASHP guidelines, in patients admitted to the ICU. Continuation of therapy after resolution of risk factors or discharge from the ICU will also be evaluated.

Methods: This will be a retrospective chart review evaluating the appropriateness of SUP in the ICU. Electronic medical records will be reviewed to identify adult patients admitted to the ICU between the dates January 1, 2014 and April 30, 2014 who received acid suppressive therapy (i.e., proton pump inhibitors, histamine-2 receptor blockers, sucralfate, antacids). Patients with gastrointestinal bleeding, history of gastroesophageal reflux disease, esophagitis, gastritis, dyspepsia, or receiving acid suppressants as part of *Helicobacter pylori* treatment or prior to admission will be excluded. Data collection will include patient demographics, date of ICU admission and length of stay, risk factors for stress ulcers, and drug name, dose, and duration of therapy. Appropriateness of therapy will be determined according to the 1999 ASHP Stress Ulcer Prophylaxis Guidelines. Data will be analyzed using descriptive statistics. This project was approved by our Institutional Review Board as a practice improvement initiative. Results will be used to perform a protocol update that will aid healthcare professionals in identifying patients who warrant SUP and reassessing the need for continuation of therapy after resolution of risk factors and beyond discharge.

Results/Conclusion: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patient populations at risk for stress ulcers

Discuss the appropriateness of stress ulcer prophylaxis according to the ASHP guidelines

Self Assessment Questions:

Which of the following factors is/are very high risk for developing stress ulcers in the ICU?

- A: Partial hepatectomy
- B: Head injury
- C: Mechanical Ventilation > 48 hours
- D: Spinal cord injury

When would it be appropriate to discontinue acid-suppressive therapy for SUP?

- A: After discharge from ICU
- B: After discharge from hospital
- C: When patient able to receive enteral feeding
- D: Patient should be assessed routinely and discontinue therapy when

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-633-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF A DISCHARGE MEDICATION DELIVERY SERVICE AT A COMMUNITY TEACHING HOSPITAL

Rebecca L. Sicking, PharmD*, Margo N. Ashby, PharmD, BCPS
Baptist Health Madisonville, 900 Hospital Drive, Madisonville, KY, 42431
rebecca.sicking@bhsi.com

Purpose: Medication discrepancies such as omitted medications upon discharge and patient noncompliance are common upon transitions of care. Baptist Health Madisonville is evaluating the development of several new programs to involve pharmacy proactively at discharge to increase patient compliance and increase patient satisfaction. One program that has been shown to improve patient compliance, improve patient satisfaction scores, and reduce readmission rates is a discharge medication delivery service to the bedside. A goal of this facility is to implement a discharge medication delivery service for COPD and CHF patients. The most recent data states that approximately 25% of COPD and CHF patients experience readmissions. Through the addition of this program, Baptist Health Madisonville anticipates the reduction in the number of readmissions, increase in patient compliance, and increase in patient satisfaction for our patients.

Methods: The primary outcome for this study will be to determine if there is a reduction in the number of readmissions for the selected patient populations. Inclusion criteria will contain all patients discharged from the hospital with a diagnosis of COPD or CHF and who accept to have their prescriptions filled in-house. Exclusion criteria will include patients who refuse the service or were discharged to a skilled nursing facility. The pharmacy will offer to fill new medications that pertain to either the patients COPD or CHF diagnoses. Patient satisfaction and changes in hospital revenue will be assessed. Research to determine financial feasibility will also be reviewed. A plan will be developed to discuss the purpose and description of program, required resources, and financial implications for presentation to hospital administration.

Results: Data collection/ analysis ongoing.

Conclusions: Final results/conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Discuss barriers to developing a discharge medication delivery service at a community teaching hospital.

Describe the steps required to successfully implement a discharge medication delivery program

Self Assessment Questions:

Which of the following statements have been shown to be a barrier with implementing a discharge medication delivery service?

- A: Lack of patient knowledge of program
- B: Acceptance of other disciplines realizing benefit of program
- C: Payment incentives of Centers for Medicare and Medicaid Service
- D: Pharmacy resources for implementation and maintenance of program

Which of the following statements is an initial requirement for a successful implementation of a discharge medication delivery program?

- A: Lack of planning with both pharmacy and nursing staff
- B: Identification and support from key stakeholders
- C: Adequate and appropriate inventory
- D: Pharmacist and pharmacy technician transition of care training

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-865-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPLIANCE ASSESSMENT IN AVOIDANCE OF ANTIBIOTIC PRESCRIBING FOR ACUTE BRONCHITIS

Nataliya Sidelnikova, PharmD*; Min Song, PharmD, BCPS
NorthShore University HealthSystem, 2100 Pfingsten
Road, Glenview, IL, 60026
nsidelnikova@northshore.org

Purpose:

Acute bronchitis is a common respiratory illness that results in millions of office and emergency department visits per year. Although more than 90 percent of acute bronchitis infections are viral in origin, antibiotics continue to be prescribed. The American College of Chest Physicians (ACCP) recommends against antibiotic use for acute bronchitis treatment in adults unless other comorbidities exist. The ongoing development, collection, and application of quality measures affect payment and reimbursement. A tool utilized for quality assurance by a majority of health insurance plans in the United States is called Healthcare Effectiveness Data and Information Set (HEDIS). HEDIS was developed by the National Committee for Quality Assurance (NCQA), and one of the indicators of quality assurance focuses on the avoidance of antibiotic treatment in adults with acute bronchitis. In the NCQA 2014 Mid-Year Update, only 28% of organizations surveyed in the Chicagoland area were compliant with this specific measure. The objective of this evaluation was to assess compliance in the avoidance of antibiotic treatment for acute bronchitis by the primary care physician group within a community health system.

Methods:

This evaluation is exempt from IRB approval because it is a quality assurance evaluation. Patient encounters with a primary diagnosis of acute bronchitis were analyzed to determine whether antibiotics were inappropriately prescribed. This evaluation included healthy adults 18 to 64 years old, with a diagnosis of acute bronchitis, and treatment by the primary care physician group of a single community health system from October 1st, 2013 through September 30th, 2014. Patients with a diagnosis of HIV, malignant neoplasm, emphysema, chronic obstructive pulmonary disease, cystic fibrosis, or pharyngitis prior to or on the episode date were excluded.

Results/Conclusions:

Analysis of results is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the appropriate treatment options for an otherwise healthy patient with a diagnosis of acute bronchitis.
Discuss the significance of meeting quality measures to a healthcare organizations success.

Self Assessment Questions:

What is the appropriate treatment for an otherwise healthy patient being diagnosed with acute bronchitis?

- A Antibiotics
- B: Bronchodilators
- C: Steroids
- D: Antiviral medications

What is an outcome of measuring and meeting quality measures to a healthcare organizations success?

- A Improve population health
- B Reduce per capita costs of healthcare
- C Maximize reimbursement from third party entities
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-634-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL IMPLICATIONS OF APPROPRIATE DE-ESCALATION OF EMPIRIC ANTIMICROBIAL THERAPY BASED ON CULTURE RESULTS

Jaclyn Sievers, PharmD & Sherri Stoecklein, PharmD, BCPS
Captain James A. Lovell Federal Health Care Center, 3001 Green Bay
Road, North Chicago, IL, 60064
jaclyn.sievers@va.gov

Purpose: The practice of de-escalation is highly recommended in the Infectious Disease Society of America (IDSA) guidelines, however the actual incidence of this occurring is closer to half. This study aims to focus on urinary tract infections in a hospitalized general medicine veteran population. The primary objective of this study is to analyze the rates of treatment failure in patients who were appropriately de-escalated from empiric antimicrobial therapy. The secondary outcomes will assess length of stay, incidence of clostridium difficile and cost of antibiotics used.

Methods: This study is a retrospective, observational, case-control, chart reviewed study to assess the rate of treatment failure in two groups of veteran patients with urinary tract infections, who are hospitalized at Captain James A Lovell Federal Health Care Center. The study group consists of patients who were started on appropriate empiric antimicrobial therapy, based on clinical infection and IDSA recommendations, which were then successfully de-escalated before antibiotic discontinuation. The control group consists of patients who were started on appropriate empiric antimicrobial therapy, whose regimen was not de-escalated. Treatment failure is defined by the presence of persistent or recurrent infections. Appropriateness of empiric therapy will be determined by the in vitro sensitivity of the causative pathogen. De-escalation of therapy is considered successful when the antibiotic spectrum is narrowed in <72 hours after culture collection and is based on the spectrum ranking utilized in a previous study. The spectrum ranking labels carbapenems as the broadest spectrum agents, followed by fourth-generation cephalosporins, piperacillin/tazobactam, quinolones, antipseudomonal third-generation cephalosporins and then others.

Learning Objectives:

Review the practice of de-escalation of antimicrobial therapy
Identify strengths associated with the practice of de-escalation

Self Assessment Questions:

What is de-escalation of antimicrobial therapy?

- A Switching from a narrow spectrum antimicrobial agent to a more b
- B: Switching from a broad spectrum antimicrobial agent to a narrow s
- C: Starting therapy on a broad spectrum antimicrobial agent and conti
- D: Not initiating antimicrobial therapy

Which of the following is associated with the practice of de-escalation?

- A Increase in costs
- B Increase in rates of resistant pathogens
- C Increase rates of adverse outcomes/mortality rates
- D Decrease rates of resistant pathogens

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-635-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DESIGN AND IMPLEMENTATION OF MEDICATION VIDEO RESOURCES IN A HEALTH SYSTEM

Sara K. Sladky, PharmD, MBA*, Ashley Feldt, PharmD, MBA, Angie Weitendorf, PharmD, BCPS
Aurora Health Care, 2900 W Oklahoma Ave, Milwaukee, WI, 53215
sara.sladky@aurora.org

Purpose: Patient education is a vital component to improving patient adherence and reducing medication-related problems. Video education can be used to increase patient education in both the inpatient and outpatient settings, while also possibly saving pharmacists time. The purpose of this project is to evaluate and implement the use of medication education video resources for selected patients within an integrated health care system.

Methods: Videos were identified through various patient education companies and assessed using a quality assessment tool that was created based off of the APhA counseling rubric. A time study was conducted to evaluate the amount of time that could be saved through utilization of videos in comparison to standard pharmacy education. The methods of writing and creating medication videos through hospital departments were explored. A survey of pharmacists was conducted to determine which medications to target for patient education. Platforms for patients to view medications as an inpatient and outpatient were also identified and will be assessed based on cost, availability, and patient access.

Results/Conclusions: One warfarin video was identified from a video company that met the quality assessment criteria; however, the other videos identified did not meet patient counseling criteria. Therefore, the decision was made to pursue creating medication videos through the creative services department within the hospital. The medications to target for patient education were identified through a survey of hospital directors and pharmacists, and the result of this survey was to create videos for the new oral anticoagulants (NOACs): rivaroxaban, dabigatran, and apixaban. Through a time study comparing video counseling to standard pharmacy education, it was identified that approximately three minutes could be saved per patient education for warfarin. Platforms for inpatient and outpatient viewing and use of these videos will be determined to help expand patient education.

Learning Objectives:

Recognize the importance and impact of implementing patient medication video education.

Describe methods of identifying and creating quality medication education videos.

Self Assessment Questions:

What impact can patient medication video education have on a health system?

- A Increased pharmacists' time spent on patient education
- B Increased amount of medication education available for patients
- C Decreased consistency of education
- D Increased difficulty of providing education for a variety of learning

Considerations prior to implementing video education should include which of the following?

- A Quality assessment of each video
- B Determining medications to target
- C Methods of limiting patient access to videos
- D A and B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-866-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON BETWEEN OUTPATIENT AND INPATIENT INSULIN UTILIZATION FOR NON-CRITICALLY ILL PATIENTS AT A COMMUNITY HOSPITAL

Giles W Slocum*, PharmD, Brandon Pierce, PharmD, BCPS, E. Thomas Carey, PharmD

SwedishAmerican Hospital, 1401 East State Street, Rockford, IA, 61104
gslocum@swedishamerican.org

Purpose: Patients with diabetes who are admitted to hospitals have an associated likelihood of increased insulin requirements. Modifications of medication regimens, stress of procedures and acute disease states, alterations in diet and infections are all situations that can result in increased insulin demand. Thus, patients who are on insulin to treat their diabetes on an outpatient basis will often struggle to maintain their blood glucose levels while hospitalized. The American Diabetes Association, American College of Endocrinology, and American Association of Clinical Endocrinologists support the use of a basal/bolus insulin regimen to manage blood glucose in non-critically ill inpatient patients. The purpose of this study is to assess the change in insulin requirement during hospitalization in non-critically ill diabetic patients who utilize insulin on an outpatient basis.

Methods: Patients were identified upon admission to SwedishAmerican Hospital through the pharmacy information system based on the inclusion of insulin on their home medication list. After thorough medication reconciliation was done on the patient admitted to a non-intensive care, adult medicine floor, pharmacists monitored the use of insulin during the patients inpatient stay. The average daily dosage of insulin was collected and compared to the patients daily outpatient use. Interventions were made by hospitalists by adjusting either the patients basal or bolus insulin. Data collected included: type of insulin used, new medications administered that are known to increase or decrease glycemic levels, dietary status, and active infections. Comparative data were collected and utilized to assess a quantitative difference between the patients inpatient and outpatient insulin requirements.

Results/Conclusion: To be presented at Great Lakes Residency Conference.

Learning Objectives:

Review medication classes that might be administered to hospitalized patients that can cause hyperglycemia.

Recognize the factors that hospitalized patients might experience that can cause hyperglycemia.

Self Assessment Questions:

Which medication can cause hyperglycemia?

- A Ibuprofen
- B Lisinopril
- C Prednisone
- D Cefazolin

Hyperglycemia in diabetes can be caused by:

- A Decreased stress
- B Use of too much insulin
- C Presence of an infection
- D Work with physical therapy

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-636-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INTERVENTIONAL STUDY ENHANCING MEDICATION SAFETY IN A SENIOR EMERGENCY DEPARTMENT OF A COMMUNITY TEACHING HOSPITAL

Melanie Smallwood*, PharmD; Andrew Arter, PharmD; Rox Gatia II, PharmD, BCPS

St. Joseph Mercy Oakland, 44405 Woodward Ave., Pontiac, MI, 48341

Melanie.Smallwood@StJoesHealth.org

Purpose: Geriatric patients are often prescribed multiple medications that may increase adverse drug events. Many of these medications are included in the Beers list and studies, as well as accrediting agencies and insurers, have correlated the inappropriate prescribing of medications from the Beers list with an increase in falls and hospitalizations. Data is currently lacking in assessing Beers list medications as a contributing factor to falls in geriatric patients as they transition throughout various transitions of care. The purpose of this study is to determine the impact of a pharmacist-guided intervention on patients presenting to a community hospital emergency department (ED) with a fall.

Methods: This is a quasi-experimental study of elderly patients ≥ 65 years old presenting to the Senior ED after experiencing a fall secondary to a Beers list medication. Patients were identified by a computer-generated alert titled, "Senior ED Medication Review," which generates for any senior presenting with a fall, between October and December 2014. Two patient groups existed with a comparison between those receiving the standard of care and those undergoing the patient interview to evaluate if the fall was related to administration of medications included on the Beers list. Patients in the intervention group were followed at every transition of care to ensure the identified fall-causing medication was not continued. The primary outcome was a composite of a fall secondary to a Beers list medication on presentation to the ED, during the hospitalization, and readmission to ED within 30 days. Secondary outcomes included: individual components of the primary outcome, medications and medication class associated with the greatest number of falls, and the number of pharmacist interventions.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify modifiable and non-modifiable risk factors in geriatric patients that have been associated with increased fall risk.

List medications and medication classes included in the Beers list that are associated with fall-causing potential.

Self Assessment Questions:

Which of the following has been associated with an increased risk of falls in the elderly and is the most easily modifiable?

- A Medications
- B: Age
- C: Gender
- D: Health status

The following medication class is not included in the Beers list as having a fall-causing potential:

- A Benzodiazepines
- B Tricyclic anti-depressants
- C Anti-arrhythmics
- D Alpha agonists

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-938-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

TIMELINESS OF TARGETED ANTIFUNGAL THERAPY IN CANDIDEMIA AFTER IMPLEMENTATION OF PNA FISH TESTING

Keaton S. Smetana, PharmD*, Craig A. Martin, PharmD, BCPS, Donna Burgess, PharmD, David S. Burgess, PharmD, FCCP

University of Kentucky HealthCare, 800 Rose St, Rm H110, Lexington, KY, 40517-0298

keaton.smetana@uky.edu

Purpose: Candida infections are the fourth most common cause of nosocomial bloodstream infection in the United States. Guidelines suggest that laboratories perform antifungal susceptibility testing against fluconazole for *C. glabrata* and other Candida species that have failed to respond to antifungal therapy or in which azole resistance is strongly suspected. In 2010, our institution implemented a rapid peptide nucleic acid fluorescence in situ hybridization (PNA FISH) assay to improve time to species identification in Candidemia. The purpose of this study is to evaluate the timeliness of targeted antifungal therapy after the implementation of the PNA FISH assay.

Methods: This is a single-center, retrospective, chart review of patients with Candida spp. isolated from a blood culture either before PNA FISH implementation (2008-2009) or after implementation (2011-2013). Our primary endpoint is to evaluate the time to targeted therapy before and after implementation of PNA FISH. Targeted therapy is defined as fluconazole for *C. albicans*, *C. parapsilosis*, and *C. tropicalis* and micafungin or amphotericin B for fluconazole resistant *C. glabrata* or *C. krusei*. Patients were excluded if they had a blood culture positive for *C. dubliniensis*, antifungal started prior to yeast positive blood culture reported, PNA FISH not performed (in 2011 to 2013), or if targeted therapy was never attained. The primary endpoint will be evaluated using two-way ANOVA, categorical data will be analyzed using the Chi-square or Fishers exact test, and Students t-test for continuous variables.

Results/Conclusion: Final results and conclusion are pending completion

Learning Objectives:

Discuss current Infectious Diseases Society of America (IDSA) practice guidelines on the treatment of invasive candidiasis

Identify the advantages of using a PNA FISH assay in the treatment of candidemia

Self Assessment Questions:

What is the recommended duration of therapy for candidemia without persistent fungemia or metastatic complications?

- A 2 weeks after documented clearance of Candida from bloodstream
- B: 2 weeks from start of antifungal therapy
- C: 1 week after documented clearance of Candida from bloodstream
- D: 1 weeks from start of antifungal therapy

How long does it take for species identification with PNA FISH assay?

- A 3 days
- B 90 minutes
- C 20 minutes
- D 1 day

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-637-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF CURRENT URINALYSIS REFLEX TO CULTURE CRITERIA AND ANTIBIOTIC ADMINISTRATION FOR GENITOURINARY INFECTIONS IN A COMMUNITY HOSPITAL SYSTEM

Josiah P. Smith PharmD*; Sandra Lemon, PharmD, BCPS; Brittany C. Mills, PharmD, BCPS; Giulia Vicari, PharmD, BCPS; Ryan T. Kinnavy, Pharmacy Student; Mitchell I. Streck, Pharmacy Student; Jarrett R. Amsden, PharmD, BCPS

Community Health Network, 1500 North Ritter Avenue, Indianapolis, IN, 46219

jpsmith1@ecomunity.com

Purpose: Present literature demonstrates that the simple presence of one positive urinalysis (U/A) parameter does not predict a positive urine culture. Following our healthcare networks current criteria to reflex to culture given the presence of a single positive U/A parameter (white blood cells {WBCs} >5 cell/hpf, leukocyte esterase, nitrite, yeast, or bacteria) is felt to lead to an excessive number of inappropriate cultures and increased antibiotic utilization. Analysis of the predictive value of individual U/A parameters, including epithelial cells, for positive urine cultures should allow us to identify which parameter(s) are most predictive of a positive urine culture or a UTI. Ultimately this study should allow our healthcare network to restructure our U/A reflex criteria. **Methods:** This study is a retrospective chart review study conducted at four network hospitals in Indianapolis, Indiana. Patients included will be 18-89 years of age admitted during the time period of 1/1/14 through 6/30/14 that presented with a UTI and/or UTI-like symptoms based on the current network criteria for U/A with reflex to culture criteria, will be included. Excluded patients are individuals who are pregnant, prisoners, those who are neutropenic (ANC≤500 cell/mm³) on the day the U/A and reflex to culture were obtained. Pertinent data points to be collected include are: quantitative range of WBCs and epithelial cells in the urinalysis; quantitative range of bacteria in the urinalysis; presence of leukocyte esterase, nitrites, and yeast; antibiotic selection; symptoms attributed to cystitis and pyelonephritis; functional and structural urinary abnormalities; and organism isolated. **Results:** Preliminary data of 118 U/A revealed 20 positive cultures (16.9%). These cultures were positive for the presence of WBCs (80%) bacteria (95%) leukocyte esterase (70%), nitrites (25%), and yeast (10%). WBCs of 10-25 (35%) and marked bacteria (40%) were the most common quantitative ranges. Final data to be presented at GLPRC 2015

Learning Objectives:

Identify the most common urinalysis parameters associated with a positive urine culture

Report the percentage of false positive urinalysis reflexed to culture

Self Assessment Questions:

Which of the following urinalysis parameters is most often associated with a positive urine culture?

- A: White Blood Cells (WBCs)
- B: Leukocyte Esterase
- C: Bacteria
- D: Nitrite

Which percentage below most closely represents the percentage of false positive U/As reflexed to culture in the Reflect Urine Culture Cancellation in the Emergency Department study by C.W. Jones et al

- A: 20%
- B: 40%
- C: 60%
- D: 80%

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-638-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RISK STRATIFICATION PROCESS FOR NEAR MISS MEDICATION ERROR REPORTING

Melissa Smith*, PharmD, Julia Schimmelpfennig, PharmD, MS, BCPS, CDE, Joshua Schmees, PharmD, Maggie Wong, PharmD, BCPS, Michael Randazzo, PharmD

St. Elizabeth's Hospital / Southern Illinois University Edwardsville School of Pharmacy, 211 South Third Street, Belleville, IL, 62220

melissa.smith2@hshs.org

Purpose: The purpose of this project is to develop a risk stratification scoring tool to identify near miss medication error event types with the highest risk associated.

Methods: In a twofold medication safety process the number of near misses reported and the implementation of a tool to assess the highest risk events in a community teaching hospital was developed in the fall of 2014. Investigational Review Board (IRB) documentation has been submitted. In the first phase, an entry within the patients electronic health record (EHR) was developed for pharmacists to report near miss medication errors in order to increase reporting. As cited in the literature, with the reporting of near miss medication events processes can be developed to prevent events from occurring to improve patient safety. In the second phase, a scoring tool to stratify the risk associated with medication error types has been developed. Risk stratification based on medication type, high-risk medication status, involvement of surgical care improvement process (SCIP) or core measures, and route of administration was created. Point values were assigned for each category in the scoring tool and higher point values assigned for events involving high-alert medications and risk for adverse outcome.

Results: The initial phase was implemented September 2014 and resulted in a 590% increase in near miss medication error reporting. Currently, risk stratification of near miss reporting has been undertaken based upon high-alert status and frequency of errors. In addition, the near miss event type and probable cause categories have been analyzed based on frequency.

Conclusion: Due to the increase in near miss medication error reporting, the risk stratification scoring tool will identify areas for improvement based on risk associated with the error type.

Learning Objectives:

Identify near miss medication errors.

Review high-alert medications.

Self Assessment Questions:

Which of the following is a near-miss medication error?

- A: A circumstance or event that has the capacity to cause an error
- B: An event occurred that did not cause harm to the patient
- C: An event occurred that did not reach the patient
- D: An event occurred that required monitoring to confirm it did not result

Which of the following choices contains only high-alert medications?

- A: hydralazine, insulin aspart, magnesium oxide, methylphenidate
- B: hydromorphone, magnesium sulfate, heparin, 3% NaCl solution
- C: insulin glargine, 0.45% NaCl, lisinopril, ketorolac
- D: labetalol, lactated ringers, albumin, fentanyl

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-939-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

PERFORMANCE OF A CLINICAL INSTITUTE WITHDRAWAL ASSESSMENT FOR ALCOHOL-REVISED (CIWA-AR) PROTOCOL

Sydney L Smith*, PharmD, Jeffrey M Ketz, PharmD, BCPS, Elias Khawam, MD, Vicente Velez, MD, FACP, FHM
Cleveland Clinic, 9500 Euclid Avenue, JN1-200, Cleveland, OH, 44195
smiths9@ccf.org

Purpose: The CIWA-Ar is a validated protocol in which a clinician can quickly assess the severity of alcohol withdrawal symptoms and provide an appropriate medication, typically a benzodiazepine, at a dose correlating with the CIWA-Ar score. Utilizing the CIWA-Ar for symptom-triggered therapy with short-acting benzodiazepines rather than scheduled long-acting benzodiazepines may help to avoid overmedication and shorten treatment duration, but may not always adequately control alcohol withdrawal symptoms. Few studies have been published evaluating the performance and appropriate use of CIWA-Ar protocols. Our goal is to describe the use of the CIWA-Ar protocol implemented at the Cleveland Clinic and evaluate its effectiveness in the management of alcohol withdrawal. The protocol is ordered for both potential and actual alcohol withdrawal. Patients managed for alcohol withdrawal with the CIWA-Ar protocol will be compared to those managed without the protocol.

Methods: Adult patients who received the CIWA-Ar protocol or who had an alcohol withdrawal diagnosis during the period of January 2013 to November 2014 were identified through the electronic medical record. Data collected for each patient included demographics, past medical history, reported alcohol consumption and date of last consumption, CIWA-Ar scores, benzodiazepine use, and any reported medication or withdrawal-related adverse events. Response of symptoms to protocol treatment, number of CIWA-Ar assessments and subjective alcohol consumption of each group will be compared. Appropriate and inappropriate benzodiazepine administration and use of the protocol will be determined. Student's t-test or Mann-Whitney U test will be used to compare total benzodiazepine use between groups. Descriptive statistics with measures of central tendency will be used for other endpoints. This study is IRB approved.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the benefits and risks associated with use of a symptom-triggered short-acting benzodiazepine protocol for alcohol withdrawal. Describe the use of a CIWA-Ar protocol in inpatients experiencing alcohol withdrawal.

Self Assessment Questions:

Which of the following describes a risk associated with the use of short-acting benzodiazepines for symptom-triggered therapy in alcohol withdrawal?

- A Alcohol withdrawal symptoms may not always be adequately controlled.
- B Duration of treatment may be shorter.
- C Overmedication may be avoided.
- D Significantly reduce seizures and delirium in alcohol withdrawal.

Which of the following is an example of a patient in which use of a CIWA-Ar protocol would be appropriate?

- A A patient who is intubated.
- B A patient who has a past history of alcoholism but has not consumed alcohol.
- C A patient who is unable to communicate or cannot answer questions.
- D A patient who is able to communicate and can answer questions.

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-639-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ADJUNCT METHADONE TO DECREASE THE DURATION OF MECHANICAL VENTILATION IN THE MEDICAL INTENSIVE CARE UNIT

*Thomas L. Smoot PharmD, Jeffrey Jennings MD, Michael Mendez MD, Michael Peters RPh, Zachary Smith PharmD, Lenar Yessayan MD
Henry Ford Health System, 2799 West Grand Blvd, Detroit, MI, 48202
tsmoot1@hfhs.org

Purpose: Evaluate the efficacy of using early enteral methadone to decrease the duration of mechanical ventilation in patients with high opioid requirements in the medical intensive care unit (MICU). **Methods:** This is a randomized, double blind, placebo-controlled trial designed to evaluate the effect of adding enteral methadone or placebo to continuous sedation within 72 hours of endotracheal intubation. Patients will be randomized to receive enteral methadone or placebo at a dose that is calculated by converting all opioids received in the previous 24 hours to oral morphine equivalents and then converted to methadone. The study medication is administered every eight hours in addition to titratable intravenous analgesics and sedatives according to the institution's continuous sedation protocol. The primary outcome is duration of mechanical ventilation. The study medication will be continued for seven days or until extubation, whichever occurs first. The patients are followed until transfer from the MICU, discharge or death. **Results:** Preliminary results will be presented and discussed at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the pharmacology and potential benefit of methadone in intensive care unit (ICU) patients with high opioid requirements. Describe the potential benefits of minimizing sedation in the ICU.

Self Assessment Questions:

Which of the following statements is true regarding the theoretical benefit of using methadone in the ICU population with high opioid requirements?

- A Methadone is a NMDA receptor antagonist, which increases its potency.
- B Heavier sedation is associated with improved outcomes, so the ac
- C Intermittent sedation is associated with improved outcomes, so tra
- D A & C

All of the following are benefits of minimizing sedation in the ICU except

- A Decreased duration of mechanical ventilation
- B Reduced incidence of delirium
- C Improved glycemic control
- D Decreased ICU length of stay

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-640-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND VALIDATION OF A VANCOMYCIN DOSING NOMOGRAM AT A TERTIARY CARE TEACHING HOSPITAL

Olga Sobocinska Pharm.D.*; Gail Itokazu Pharm.D.; David Schwartz MD; Katayoun Rezai MD; Ryan Szynek Pharm.D., BCPS
John H. Stroger Jr. Hospital, 1901 West Harrison Street
LL175, Chicago, IL 60612
osobocinska@cookcountyhhs.org

Purpose: The objective of the intervention is to determine if the implementation of a vancomycin dosing nomogram will increase the frequency of appropriate empiric vancomycin regimens. Secondary objectives are to assess the percentage of patients achieving initial target trough concentrations when dosed according to nomogram and to assess nomogram safety.

Methods: This quality improvement study was approved by the Institutional Review Board at our 464 bed tertiary care teaching hospital. Included in the study will be all adult patients on the medical/surgical services who receive intravenous vancomycin prior to nomogram implementation (October-November 2014) and post nomogram implementation (January-February 2015). Patients will be excluded from the study if vancomycin is administered for surgical prophylaxis. The intervention incorporates the development plus validation of the nomogram for the empiric dosing of vancomycin. Nomogram creation was done using standard pharmacokinetic equations. To pilot the effectiveness of the nomogram to predict target steady state trough concentrations the following data will be collected: nomogram adherence and initial steady state trough concentration. Safety of the nomogram will be evaluated by assessing the incidence of vancomycin-induced nephrotoxicity. The outcomes from the pre and post nomogram study periods will be compared. Based on the data, if necessary, modifications to the nomogram will be made.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List pharmacodynamic and pharmacokinetic properties of vancomycin
Describe dosing and monitoring strategies for vancomycin therapy

Self Assessment Questions:

Which of the following about vancomycin is correct?

- A Vancomycin exhibits concentration-dependent killing
- B: The AUC/MIC target for vancomycin is > 200
- C: The vancomycin susceptibility breakpoint for *S. aureus* is ≤ 4 mcg/
- D: Vancomycin is classified as a glycopeptide antibiotic

In which infection is the recommended vancomycin goal trough 15-20 mcg/mL?

- A Streptococcal pneumonia
- B Enterococcal urinary tract infection
- C Methicillin-resistant *Staphylococcus aureus* osteomyelitis
- D Streptococcal cellulitis

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-641-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE FINANCIAL IMPACT OF ELIMINATING WHITE BAGGING OF ENZYME REPLACEMENT THERAPY INFUSIONS WITHIN A PEDIATRIC INFUSION CLINIC

*Patrick J Sorgen, PharmD; Jeffrey Filotei, PharmD; Christopher Lowe, PharmD, BCPS; Michael McGregory, PharmD, MBA
Indiana University Health, 1030 West Michigan Street, Indianapolis, IN, 46202
psorgen@iuhealth.org

Enzyme replacement therapies are a class of specialty infusion products used to treat a subset of specific rare inherited enzyme deficiencies known as lysosomal storage diseases. Due to their relatively low utilization and high inventory cost, Riley Hospital for Children has historically circumvented direct purchasing of enzyme replacement therapy products and has utilized the controversial practice of white bagging. The primary objective of this study was to evaluate the net financial impact of eliminating white bagging of enzyme replacement therapies at the Riley Outpatient Center infusion clinic.

A retrospective analysis of annual enzyme replacement therapy product utilization was completed for the period of 2011-2014. Patient volumes for the identified products were used to calculate potential drug specific reimbursement for each year. Reimbursement was estimated using CMS Medicaid Fee Schedule September 2014. Wholesale acquisition costs were attained from RED Book and 340b prices were estimated. A sensitivity analysis was created to account for fluctuating 340b eligibility of this clinic population.

Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the practice of white bagging and how it differs from the traditional buy and bill model.

Discuss the advantages and disadvantages of eliminating white bagging of enzyme replacement therapies.

Self Assessment Questions:

Which of the following statements illustrates the difference between white bagging and the traditional buy and bill model?

- A White bagging allows infusion centers to decrease drug expense
- B: The practice of white bagging increases clinic drug expense
- C: In both models, the infusion center is able to bill for medication
- D: White bagging enables infusion centers to maximize reimbursement

Which of the following is a potential barrier to the elimination of white bagging of enzyme replacement therapies?

- A Increase of infusion related reimbursement
- B Decrease in infusion center drug expense
- C Increase in infusion center drug expense
- D Impact on infusion pharmacy workflow

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-867-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPACT OF A TREATMENT GUIDELINE ON THE MANAGEMENT OF DELIRIUM IN THE MEDICAL SURGICAL INTENSIVE CARE UNIT

Carolyn A. Spiegel, Pharm.D.*, Taylor J. Post, Pharm.D., BCPS
Presence St. Joseph Medical Center, 333. N. Madison St., Joliet, IL, 60431
carolyn.spiegel@presencehealth.org

Purpose:

Intensive care unit (ICU) delirium presents as an acute change in baseline mental status characterized by inattention or agitation, disorganized thinking, and sleep disturbances. It affects up to 50% of ICU patients. Guidelines from the Society of Critical Care Medicine (SCCM) recommend the early use of the Confusion Assessment Method for the ICU (CAM-ICU), a validated assessment tool. Along with non-pharmacologic therapy, the SCCM endorses use of atypical antipsychotics for patients who exhibit signs of delirium for greater than 24 hours or a harm to themselves or caregivers. The use of an institution specific guideline is supported to help reduce the frequency and severity of ICU delirium. Therefore, this study was developed to measure the effect that a pharmacy-driven ICU delirium treatment guideline would have on the length of ICU delirium.

Methods:

This single center, 19 bed medical/surgical ICU (MSICU) study includes a retrospective chart review with a prospective evaluation following the implementation of an ICU delirium treatment guideline at Presence St. Joseph Medical Center. The retrospective analysis sample includes MSICU patients 18-75 years of age admitted to the ICU for greater than 24 hours who tested CAM-ICU positive from 9/16/2014-11/27/2014 and the prospective sample includes those admitted to the MSICU from 1/5/2015-3/27/2015. Exclusion criteria included pregnancy, admission after drug overdose or suicide attempt, outpatient antipsychotic use, contraindications to antipsychotics or baseline neurologic abnormalities. The intervention was the implementation of an ICU delirium treatment guideline through education of ICU pharmacists and physician intensivists on its use. The primary outcome is the length of ICU delirium as measured by a positive CAM-ICU score. Secondary objectives include length of ICU stay, length of hospitalization, and duration of mechanical ventilation.

Results/Conclusion:

Data collection and analysis are currently in progress and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define risk factors for the development of delirium in the ICU.

Discuss current prevention and treatment modalities for ICU delirium recommended by the Society of Critical Care Medicines Pain, Agitation and Delirium (PAD) guidelines.

Self Assessment Questions:

ICU delirium is associated with which of the following outcomes EXCEPT?

- A Increased mortality
- B Increased length of stay
- C Increased time mechanically ventilated
- D Increased cognition

Which of the following pharmacologic agents are NOT recommended for the treatment of ICU delirium per the 2013 SCCM PAD guidelines?

- A Quetiapine
- B Olanzapine
- C Haloperidol
- D Risperidone

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-642-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RISK STRATIFICATION OF MULTI-DRUG RESISTANT ORGANISMS IN COMMUNITY-ACQUIRED VS. HEALTHCARE-ASSOCIATED PNEUMONIA.

*Kevin Sponsel, PharmD, Christian Cheatham, PharmD, Annie Stock, PharmD

Franciscan St. Francis Health, 8111 S Emerson Ave, Fishers, IN, 46237
kevin.sponsel@franciscanalliance.org

Purpose: Healthcare-associated pneumonia (HCAP) criteria were introduced in 2005 and were based upon epidemiology studies from academic medical centers in the U.S. These studies identified a much higher prevalence of hospital-acquired pathogens than common community-acquired pneumonia (CAP) pathogens. These criteria produce a high number of false positives however and expose a large proportion of patients to unnecessarily broad-spectrum antibiotics. These criteria were derived from a patient population that may not be representative of the true epidemiology of pneumonia across a diverse healthcare landscape. The aim of this study is to evaluate the risk factors for acquiring MDROs among patients coming from the community who were hospitalized with a diagnosis of pneumonia, CAP, or HCAP. Specifically, the objective is to develop a risk-scoring tool that can be used to accurately identify subjects at risk for pneumonia due to MDRO.

Methods: This is a single-center, retrospective cohort study of patients ≥ 18 years of age admitted to St. Francis Hospital from January 1st, 2009 to December 10th, 2014, with a documented diagnosis of pneumonia, CAP, and/or HCAP, and positive respiratory and/or blood cultures for bacterial pathogens. Exclusion criteria include: patients diagnosed with cystic fibrosis (CF), those who received only inhaled antimicrobials as monotherapy, or those with fungal or mycobacterial pneumonia/blood stream infections.

Potential MDRO risk factors will be evaluated by logistic regression analysis. Based upon these findings, a predictive scoring tool will be developed to identify the presence of MDRO. The predictive value of the scoring tool will be explored for correctly indicating the presence of MDRO via a receiver-operating characteristic (ROC) curve.

Results/Conclusion: Data collection is in progress. Final results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Identify risk factors for pneumonia due to multi-drug resistant organisms

Recognize patients presenting with pneumonia who should receive empiric, broad-spectrum antibiotics

Self Assessment Questions:

Current criteria for healthcare-associated pneumonia (HCAP) includes all of the following, except?

- A Antibiotic use within the previous 90 days
- B Hospitalization in an acute care hospital for ≥ 2 days in the last 90 days
- C Residence in a nursing home or long-term care facility in the last 30 days
- D Hospitalization in an acute care hospital within the last 6 months

Identify the most common pathogen isolated in healthcare-associated pneumonia (HCAP)?

- A Staphylococcus aureus
- B Pseudomonas aeruginosa
- C Streptococcus pneumoniae
- D Escherichia coli

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-643-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY OF THERAPEUTIC CONVERSIONS AT A VETERANS AFFAIRS HEALTH SYSTEM

Patrick M Spoutz*, PharmD, Katherine K Freeman, PharmD, and Allison C Brenner, PharmD

Veteran Affairs - Ann Arbor Healthcare System, 2215 Fuller Road, Ann Arbor, MI, 48105

patrick.spoutz@va.gov

Purpose: In a given class of medications, there are often several drug products of approximately equal safety and efficacy. Large health organizations such as the Veterans Health Administration may select one agent from a given class to place on a preferred formulary. Over time, the most cost effective agent may change due to a variety of factors. Eligible patients may then be converted to the preferred agent via a process known as therapeutic interchange. While the safety and equivalent efficacy of the replacement medication has been evaluated in advance, there is relatively little data describing the safety of the conversion process itself.

Methods: This study reviews safety markers from three conversion processes at the Veterans Affairs Ann Arbor Healthcare System (VAAHS), including a conversion from aspirin/extended-release dipyridamole to clopidogrel beginning in November 2012, from mometasone and formoterol individual inhalers to budesonide/formoterol, a combination inhaler, in August 2013, and from linagliptin to saxagliptin beginning in January 2014.

Patient-specific safety data was collected from the computerized patient record system (CPRS) via a combination of manual chart review of selected patients and automatic data retrieval from the data warehouse. The primary outcome is a composite of several safety metrics, including the presence of potential therapeutic duplication or gaps in therapy as noted by refill records, appropriateness of renal dosing, documented occurrence of adverse drug reactions, number of patients converting back to the previous medication within 90 days, and whether any drug interactions were managed appropriately. Secondary outcomes include measures of conversion costs and conversion processes. Cost measures are estimated to determine a minimum cost-savings threshold.

Preliminary Results: Preliminary data from the linagliptin to saxagliptin conversion suggest that the most common safety risk was potential duplicate therapy (13/30 patients), followed by gaps in therapy (5/30 patients).

Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Outline the process by which a Veteran Affairs Healthcare System conducts therapeutic conversions

Explain the safety risks endogenous to the therapeutic conversion process

Self Assessment Questions:

Per preliminary results, what is the most common type of safety risk associated with therapeutic conversions?

- A: Gaps in therapy without adequate supply of either agent
- B: Adverse reaction to the new agent
- C: Inappropriately dosed medication for patient's renal function
- D: Overlap in medication supplies with the potential for duplicate therapy

Which of the following is a potential downside when electing to use a "macro," or automated style conversion?

- A: Risk of undocumented, or poorly documented previous adverse reaction
- B: May not be used for medications that require patient education
- C: Requires more manual chart reviews than alternative options
- D: High chance of delayed fills of new prescriptions if patients had existing therapy

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-940-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

MANAGEMENT OF FUNGEMIA IN SURGICAL PATIENTS RECEIVING PARENTERAL NUTRITION

Pavithra Srinivas, Pharm.D., BCPS*, Suzanne Benjamin, RPh, BCNSP, Dusten T. Rose, Pharm.D., BCPS (AQ-ID), AAHVP, Thomas Z.

Hayward III, MD, MBA, Indiana University Health, 1701 N. Senate Blvd, Room AG401, Indianapolis, IN 46202 psrinivas@iuhealth.org

Indiana University Health, 1701 N. Senate Blvd, AG401, Indianapolis, IN, 46202

psrinivas@iuhealth.org

Purpose: Fungemia is a significant cause of morbidity and mortality in critically ill patients, with mortality rates up to 75%, and staggering hospital costs. SICU patients are at a higher risk of developing fungemia due to the following risk factors - surgery, presence of a central venous catheter (CVC), and parenteral nutrition (PN). Treatment paradigms for fungemia include removal of venous access devices, source control and selecting an optimal initial antifungal. IDSA guidelines for management of candidemia recommend fluconazole as the initial antifungal agent, with echinocandins being reserved for more severely ill or neutropenic patients. Primary literature varies in recommendations of a preferred empiric antifungal agent, and there is a lack of a consensus regarding treatment of fungemia in patients receiving PN. The objective of this study is to assess outcomes of the most common treatment paradigms utilized in the management of fungemia in surgical patients receiving PN.

Methods: This will be a retrospective study that evaluates outcomes in adults admitted to the SICU and Surgery units at IU Health - University Hospital from June 2008-July 2013, who received PN and developed fungemia. Exclusion criteria include <72h of PN, failure to initiate antifungal within 48h of fungemia identification, death within 48h of admission/antifungal initiation, concomitant bacterial infection, peripheral PN, initiation of Voriconazole, Posaconazole or Amphotericin-B, and history of solid organ transplant within the previous 6 months. Data collection will include age, gender, surgical procedure, type and duration of CVC, type and duration of PN, empiric antifungal agent, duration of antifungal, fungal species identification, 7-day mortality after end of antifungal therapy, persistence of fungemia 72h after removal of CVC, ICU and hospital lengths of stay, and discharge status. All patient data will be de-identified and maintained confidentially.

Results/Conclusions: Data collection and analysis will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review suggested mechanisms for increased risk of fungemia associated with parenteral nutrition use.

Describe the current treatment paradigms recommended for the management of invasive fungal infections.

Self Assessment Questions:

Which of the following is a suggested mechanism for the development of fungemia in patients receiving total parenteral nutrition? I. Mucosal atrophy due to lack of enteral nutrition resulting in micro

- A: I
- B: II and III
- C: I, II and III
- D: I, II, III and IV

61 year old patient who is post-op day 3 after an esophagectomy has been receiving 3-in-1 TPN x 3 days. Patient has now developed new onset fevers with leukocytosis, and blood cultures are positive for

- A: Remove CVC and stop TPN therapy
- B: Initiate antifungal therapy
- C: Remove CVC and hold TPN x 72 hours, then resume TPN without CVC
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-644-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE EFFICACY OF CLINICAL VIDEO TELEHEALTH (CVT) IN THE MANAGEMENT OF HYPERTENSION: A RETROSPECTIVE ANALYSIS

Eric S. Stack, PharmD, PGY-1 Pharmacy Practice Resident*; Jessica Sawyers, PharmD, Clinical Pharmacy Specialist; Mary E. Clonch, PharmD, BCACP, Clinical Pharmacy Specialist; Terrence B. Baugh, PharmD, BCPS, Clinical Pharmacy Specialist

Veteran Affairs - Battle Creek Medical Center, 5500 Armstrong Rd., Battle Creek, MI, 49037

Eric.Stack@va.gov

The prevalence of hypertension in Veterans Administration (VA) primary care patients is 52.3%. In addition, an estimated 36% of Veterans enrolled within the VA reside in rural areas, which creates multiple barriers to accessing healthcare. In order to increase access to healthcare for Veterans, the VA has implemented innovative clinical services, including clinical video telehealth (CVT), which allows Veterans to connect with remotely located healthcare providers. The primary objective of this study is to compare the efficacy of CVT services and traditional face-to-face appointments in the management of hypertension within the Battle Creek VA Pharmacy Primary Care Clinics.

This single-center, retrospective, chart review analysis has been approved by the Institutional Review Board. Data will be collected by utilizing the electronic medical record and electronic databases to identify patients that meet the eligibility criteria. The principal investigator will perform a chart review analysis of all patients that meet eligibility criteria for enrollment into the Pharmacy Primary Care Clinic for hypertension management. A retrospective chart review will be conducted covering the time period of January 1, 2012 to November 30, 2013. The chart review will determine the achievement of treatment goals related to the management of hypertension defined as meeting the patients assigned target blood pressure over the course of enrollment. In addition to blood pressure readings, measurements for secondary objectives will be collected and analyzed, including distance traveled to appointments, appointment adherence, number and length of appointments, documented episodes of orthostatic hypotension and other antihypertensive adverse drug reactions, and hemoglobin A1c values for those patients who are also being managed for Type II diabetes mellitus. Data collected from this search will be entered into a secure database by the principal investigator.

Data collection is currently in the initial stages, and results/conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the impact of hypertension (HTN) on the overall population of the United States (US), including the Veteran population
Identify the role of innovative clinical services, such as Clinical Video Telehealth (CVT), in increasing access to healthcare

Self Assessment Questions:

Overall, it is estimated that what percentage of the adult population in the United States has hypertension?

- A 10%
- B: 20%
- C: 33%
- D: 50%

Innovative clinical services, such as CVT, can increase patient access to care by which of the following?

- A Increase distance needed to travel for appointment(s)
- B Overcome an insufficient number of healthcare providers located in rural areas
- C Greater restrictions of access to both chronic and specialty care
- D Increase patient's amount of money spent on gasoline to travel to appointments

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-645-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING GLYCEMIC CONTROL OF VIETNAM WAR VETERANS EXPOSED TO AGENT ORANGE WITH TYPE TWO DIABETES MELLITUS: A RETROSPECTIVE REVIEW.

Kevin D. Stack, Pharm.D., * Elizabeth M. Ratti, Pharm.D., BCPS, Terrence B. Baugh, Pharm.D., BCPS

Veteran Affairs - Battle Creek Medical Center, 5500 Armstrong Road, Battle Creek, MI, 49037

Kevin.Stack@va.gov

Purpose:

As a result of the efforts put forth by the Institute of Medicine in the publication of 'Veterans and Agent Orange: Herbicide/Dioxin Exposure and Type 2 Diabetes' in 2000, the Department of Veterans Affairs has recognized the association between Agent Orange exposure and the development of diabetes. Pharmacy primary care providers have noticed a trend that Veterans exposed to Agent Orange often enroll in the pharmacist-managed primary care clinic with a higher hemoglobin A1C than other Veteran populations. The purpose of this study is to provide a better understanding of the glycemic control of the described population

Methods:

Prior to initiation, this study was approved by the Institutional Review Board. This single-center, retrospective chart review includes a study period from January 1, 2009 through June 30, 2014. Inclusion criteria includes recognition as a Vietnam War Veteran, having a clinical diagnosis of type two diabetes mellitus (T2DM), and being enrolled in the pharmacist-managed primary care clinic for greater than or equal to six months with an initial hemoglobin A1C greater than or equal to 9%. Exclusion criteria includes Veterans diagnosed with type one diabetes mellitus, diagnosed with T2DM status post-surgery or medical procedure, and/or prescribed medications known to increase blood glucose for more than 30 days within a 365 day period. Patients meeting the study criteria were assessed for the primary and secondary objectives via electronic medical records. The primary outcome is the average hemoglobin A1C reduction for Veterans diagnosed with T2DM who were exposed to Agent Orange during the Vietnam War in comparison to those Veterans not exposed. Hemoglobin A1C reduction was calculated by subtracting the most recent chronological hemoglobin A1C, or upon clinic discharge, from the hemoglobin A1C at the time of clinic enrollment.

Results/Conclusions:

Data collection pending, results/conclusions will be presented at the Great Lakes Resident Conference.

Learning Objectives:

Review the chemical components of Agent Orange.

Recall the available evidence regarding the association between Agent Orange exposure and the development of type two diabetes mellitus (T2DM).

Self Assessment Questions:

Of the various toxins included in Agent Orange, which of the following is considered to be the most toxic?

- A 2-methyl-4-chlorophenoxyacetic acid
- B: 2,4-dichlorophenoxyacetic acid
- C: 2,4,5-trichlorophenoxyacetic acid
- D: 2,3,7,8-tetrachlorodibenzo-p-dioxin

What government organization published 'Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam,' which was the original report regarding the exposure of Agent Orange, other herbicides

- A Food and Drug Administration
- B Institute of Medicine
- C Department of Defense
- D Centers for Disease Control and Prevention

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-646-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

MANAGEMENT OF UNFRACTIONATED HEPARIN INFUSIONS BY CLINICAL NOMOGRAM VS. CLINICALLY DIRECTED MODIFICATION BY PHARMACISTS.

Andrew T. Stacy*, PharmD; Herbert E. Pettit, PharmD, BCPS
Baptist Health Lexington, 1740 Nicholasville Rd., Lexington, KY, 40503
andrew.stacy@BHSI.com

Purpose:

Traditionally UFH management at our institution has followed a specific nomogram which the nursing staff utilizes. A recent pilot project implemented a nomogram managed by pharmacists who are permitted to use their clinical judgment to help facilitate early achievement of goal therapeutic level of anticoagulation. The purpose of this study is to evaluate differences in the management of continuous infusion of unfractionated heparin (UFH) at our institution between the two nomograms.

Methods:

The institutional review board has approved this study. This is a retrospective chart review of patients initiated on continuous infusion UFH at a 356 bed acute care facility. Patients will be excluded if they are less than 18 years of age, pregnant, or receive therapy for less than 24 hours. The primary objective of this study is to compare time to achievement of therapeutic anti-Xa on continuous UFH when initiated by the current nursing managed UFH nomogram versus that initiated by pharmacists. Data will be collected from October 2014 to January 2015 for the current nurse managed UFH nomogram while the pharmacist managed nomogram data will be collected from February to March 2015. The pharmacist managed group will utilize the same nomogram initially but pharmacists will be permitted to make patient specific modifications to the nomogram for patients who do not progress normally towards their therapeutic goal.

Results/Conclusions:

Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review current management of unfractionated heparin infusions at our institution.

Discuss how pharmacist management of unfractionated heparin infusions has impacted outcomes at ours and potentially other institutions.

Self Assessment Questions:

How are continuous infusions of UFH currently managed at Baptist Health Lexington?

- A: Physician managed utilizing anti-Xa assays
- B: Nursing managed nomogram utilizing aPTT assays
- C: Pharmacist managed nomogram utilizing aPTT assays
- D: Nursing managed nomogram utilizing anti-Xa assays

What sub set of patients on continuous infusions of unfractionated heparin are most commonly therapeutic at 24 hours at Baptist Health Lexington?

- A: Non-Intensive Care Unit patients
- B: VTE/PE nomogram patients
- C: Cardiac or Other nomogram patients
- D: Intensive Care Unit patients

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-647-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A BEDSIDE MEDICATION DELIVERY SERVICE: A PILOT STUDY FOR FUTURE EXPANSION UTILIZING TECHNICIANS AND TECHNOLOGY

Ryan C Stanke, PharmD*; Justin B Guthman, PharmD; Brian T Ruppel, PharmD, BCACP; Ashley R Lorenzen, PharmD, BCPS; Jon C Rootellis, CPhT; Linda J Hertel, RN, BSN

Ministry Health - St. Joseph's Hospital - WI, 611 Saint Joseph Avenue, Apt. 204, Marshfield, WI, 54449

ryan.stanke@ministryhealth.org

PURPOSE: Medication adherence starts with medication possession and recent literature suggests almost one-third of patients do not receive new prescriptions within nine months of being prescribed. Additionally, local research has demonstrated that pharmacy involvement at the time of discharge has improved 30-day all-cause readmission rates and medication-related patient satisfaction scores. The primary objective of this project is to improve the prescription fill rate at an outpatient pharmacy by implementing a bedside medication delivery service. Secondary objectives include evaluating financial impact, assessing discharge process efficiency, and gauging patient and nurse satisfaction.

METHODS: This quality improvement project has been exempt from review by the Institutional Review Board. Patients discharged from a medical/surgical unit of a tertiary care hospital were considered for inclusion. The initial phase of the project focused on obtaining current prescription fill rate from patients on the unit, observing current workflow and obtaining baseline financial information. A four-week pilot was completed utilizing outpatient pharmacy staff. An offer for bedside medication delivery to the patient was completed prior to discharge. Demographic, insurance, and payment information was collected for patients electing to use the service. Upon discharge, medications were filled by the outpatient pharmacy, delivered to the patients room, and a consultation was provided. Patient and staff satisfaction was assessed through surveys. Measures of success include improvement of prescription fill rate, maintained efficiency and satisfaction of the discharge process, and increased pharmacy revenue. Results will be assessed and a business case will be developed for permanent implementation.

PRELIMINARY RESULTS and CONCLUSIONS: After 12 days, 22 medications have been delivered to nine patients, resulting in a medication gross profit of over \$312. Patients have been satisfied with the service and discharge efficiency has been maintained thus far. Final results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of providing a bedside medication delivery service to the patient, an outpatient pharmacy, and nursing staff

Identify barriers associated with implementation of a bedside medication delivery service and methods to overcome barriers

Self Assessment Questions:

Which of the following is a benefit to the patient from utilization of a bedside medication service?

- A: Every patient will receive their medication(s) and is provided with education
- B: Every patient will be completely adherent to the medication regime
- C: The patient will not experience side effects
- D: The patient will not have to pay for their medications

Which barrier can be overcome by a simple phone call to the patients room before delivering their medication?

- A: Nurse is unaware patient is enrolled in service
- B: Patient is discharged when pharmacy is closed
- C: Payment collection process
- D: Capturing patient signature

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-868-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF ORAL ANTINEOPLASTIC REFILL CLINIC ON MEDICATION POSSESSION RATIO AND COST-SAVINGS

Alison L. Stauder, PharmD*, Brooke S. Crawford, PharmD, BCOP, Susan Bullington, PharmD, BCOP

Veteran Affairs - Richard L. Roudebush Medical Center, 1481 W. 10th Street, Pharmacy (119), Indianapolis, IN, 46202

alstauder5@gmail.com

Purpose:

Numerous studies have evaluated oral chemotherapy adherence patterns and identified correlations between oral chemotherapy non-adherence or over-adherence and poorer disease-related outcomes. However, measurement and assessment of adherence rates varies between studies due to complexities in oral antineoplastic regimens and differences in definition of adherence. Currently, no one method for adherence evaluation outshines the others. Each of these methods has inherent benefits and limitations, yet all have been included in studies evaluating adherence with oral chemotherapy. Calculation of the medication possession ratio (MPR) retrospectively for oral chemotherapy agents is a potential method of measuring adherence due to the assumption that medications are taken when in the patients possession.

The Richard L. Roudebush VA Medical Centers (RLR VAMC) current system relies on patients to initiate refills, rather than health care providers. Instances have occurred where a provider discontinues therapy, yet a patient still has a significant oral antineoplastic supply on hand. This results in antineoplastic waste, potential safety concerns, and a decreased MPR. Therefore, a pharmacy-run antineoplastic refill clinic was implemented to address these concerns. Currently no data exist for adherence rates regarding patients receiving oral antineoplastics at this institution. Assessment of adherence patterns for patients receiving oral antineoplastic therapy allows the opportunity for potentially improved patient disease outcomes and cost savings.

Methods:

This quality-improvement project is exempt from Institutional Review Board approval. Mean medication possession ratio (MPR) for select oral antineoplastic medications will be retrospectively compared pre and post implementation of an oral antineoplastic refill clinic using refill history data from September 2012 through August 2014 (pre-implementation) and September 2014 through March 2015 (post-implementation). Descriptive statistics will be used to evaluate MPR and estimated cost-savings/cost-avoidance.

Conclusions Reached:

Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the estimated financial cost to society of poor medication adherence.

Identify three barriers to implementation of an oral antineoplastic refill clinic.

Self Assessment Questions:

Which of the following best estimates the financial cost of poor medication adherence?

- A: \$10 million
- B: \$100 million
- C: \$100 billion
- D: \$10 billion

Which of the following is NOT a barrier to implementation of an oral antineoplastic refill clinic?

- A: Lack of standardized process for providers to notify pharmacy of a
- B: Mail delivery delays for antineoplastic prescriptions
- C: Reliance on patients answering phone calls
- D: Streamlined oral antineoplastic prescription processing

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-869-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

VANCOMYCIN MIC DIFFERENCES WITH ETEST VS. VITEK 2 AMONG METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS ISOLATES AT A TERTIARY CARE CENTER

Mitchell J. Stein, PharmD*, Justin K. Rak, PharmD; Rebecca S. Maynard, PharmD

Borgess Medical Center, 1975 E. Centre Ave., Portage, MI, 49002

mitchell.stein@borgess.com

Purpose: Data has shown that significant discrepancies may exist between vancomycin minimum inhibitory concentrations (MICs) among methicillin-resistant *Staphylococcus aureus* (MRSA) isolates obtained from different testing systems. The purpose of this study was to determine if a significant difference exists between MRSA vancomycin MICs reported via the Etest and the VITEK 2 automated system.

Methods: The study was a retrospective observational trial using electronic chart review for data collection. The study population included patients admitted to Borgess Medical Center from November 1, 2012 through October 31, 2014. Any patient admitted with a blood culture positive for MRSA or patients in critical care units with a respiratory culture positive for MRSA were considered for inclusion in the study. The MIC results from the VITEK 2 system and Etest were recorded. In addition, several other data points were collected, including: patient demographic information, in-hospital mortality, length of stay, duration of intubation, time to negative blood cultures, and any anti-MRSA antibiotic changes as a result of the reported vancomycin MIC. The primary outcome was to determine if a significant difference exists between vancomycin MICs obtained via Etest vs. VITEK 2 among MRSA isolates from blood and respiratory cultures.

Results: 119 patients were identified with a total of 331 blood and respiratory cultures positive for MRSA during the study period. 112 total patients were included in the study with a total 245 culture results. Among all isolates where both an Etest and VITEK result were available the mean Etest result was significantly higher than the mean VITEK result (2.09 mcg/mL vs. 0.93 mcg/mL, $p < 0.001$). The two tests were in agreement with one another for only 7.14% of culture results.

Conclusion: A significant discrepancy exists between the MRSA vancomycin MIC values reported via the Etest vs. the VITEK 2 system.

Learning Objectives:

Describe the difference observed in vancomycin Minimum Inhibitory Concentration (MICs) obtained via the Etest vs. the VITEK 2 system.

Explain how this difference could impact the selection of antibiotics for treating patients in a health care system.

Self Assessment Questions:

Which of the following is true regarding the results of the study?

- A: There was no difference regarding the mean vancomycin MIC value
- B: The Etest and VITEK 2 vancomycin MIC values were in agreement
- C: The mean VITEK 2 vancomycin MIC was significantly higher than
- D: The mean VITEK 2 vancomycin MIC was significantly lower than

Which of the following may be concluded based on the study results

- A: The use of vancomycin may not be a good option to treat MRSA
- B: The use of nafcillin should be considered once MRSA is identified
- C: The majority of patients with MRSA identified in blood or respiratory
- D: Vancomycin should be used more frequently for the treatment of

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-870-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INITIAL TREATMENT CHOICES FOR HYPERGLYCEMIA IN PATIENTS WITH NEWLY-DIAGNOSED TYPE 2 DIABETES MELLITUS AND HbA1c > 9%

Taylor D Steuber, PharmD*, Andrew N. Schmelz, PharmD, BCACP
Indiana University Health / Butler University, 230 S Alabama St., Apt.
493, Indianapolis, IN, 46204
tsteuber@iuhealth.org

Background:

Type 2 diabetes mellitus (T2DM) is a progressive disease which causes pancreatic beta-cell function to gradually decline and ultimately fail, requiring initiation of exogenous insulin therapy. Emerging evidence suggests that early intensive glycemic control reduces long-term vascular outcomes and may potentially prolong beta-cell function and life-span. For patients with newly diagnosed T2DM and glycated hemoglobin A1c (HbA1c) > 9%, the American Association of Clinical Endocrinology (AACE) recommends either non-insulin double or triple antidiabetic therapy without symptoms or initiation of insulin other agents with symptoms. An increasing body of evidence supporting early intensive glycemic control calls into question what the initial treatment strategy should be in this group of patients.

Purpose:

The purpose of this study is to evaluate the effect of initial treatment choices in newly-diagnosed type two diabetics with entry HbA1c > 9% on rapid achievement of glycemic control.

Methods:

Patients 18 years and older with newly-diagnosed T2DM between July 1 2012 to June 30, 2013, with initial HbA1c > 9% will be included for analysis. A retrospective chart review will provide the data for the analysis. Patients will be sorted into the insulin-based treatment group or the non-insulin treatment group. The primary endpoint will be achievement of HbA1c goal at three months or initial follow-up. Additional data points collected will be change from baseline HbA1c at three months or first follow-up, HbA1c goal met at one year, and the following baseline demographics: patient age, gender, height, weight, BMI, and smoking history. Also, safety data collected will include change from baseline weight at three months or first follow-up and one year and the incidence of hypoglycemia defined as an emergency room visit for hypoglycemia or low clinic blood glucose reading (<70mg/dL).

Results:

Results and conclusions to be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Outline initial treatment options for newly-diagnosed type 2 diabetics with entering HbA1c > 9% according to the AACE guidelines

Describe how to appropriately initiate insulin therapy in patients with entering HbA1c > 9% according to the AACE guidelines

Self Assessment Questions:

Which of the following therapeutic regimen(s) is/are appropriate for newly-diagnosed type 2 diabetic patients with entering HbA1c > 9% with or without symptoms? I. Insulin glargine; II. Metformin

- A I only
- B I, iii
- C I, iv, v
- D All of the above

Patient case: a 40 year old, 70 kg male is seen by his primary care physician for routine check-up. He complains of increased urination, thirst, and weight loss. Routine lab work reveals a HbA1c of

- A Insulin detemir 5 units SubQ BID, titrate every 2-3 days
- B Insulin detemir 10 units SubQ daily, titrate every 2-3 days
- C Insulin glargine 10 units SubQ daily, titrate every 2-3 days
- D Insulin glargine 14 units SubQ daily, titrate every 2-3 days

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-648-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF LOW-LEVEL VIREMIA ON THE TIME TO PROGRESSION TO VIROLOGIC FAILURE

Brooke N. Stevens, PharmD*, Lisa Fletcher, PharmD, BCPS, AAHIVP, Eric K. Farmer, PharmD, BCPS, AAHIVP, AAHIVP, Melody Berg, PharmD, BCPS-AQID, AAHIVP

Indiana University Health, 1701 North Senate Avenue, Room AG401, Indianapolis, IN, 46206

bstevens3@iuhealth.org

Purpose: Current guidelines for the treatment of HIV recommend targeting a HIV viral load below the level detected by commonly used assays. In addition, the guidelines classify virologic failure as a viral load greater than 200 copies per milliliter (cpm). The consequences for patients with a viral load between 20 and 200 cpm are not well understood. Previous studies have examined the relationship between low-level viremia (LLV) and the presence of resistance mutations and virologic failure. However, neither previous literature nor current guidelines have addressed how to optimally treat these patients. This study will add to the current literature by determining the significance of LLV and very-low-level viremia (VLLV) on clinical outcomes. The hypothesis of this study is patients with LLV will have a faster time to progression to virologic failure than patients with an undetectable viral load.

Methods: A retrospective cohort study was completed examining time to progression to virologic failure in patients treated at the Indiana University Health LifeCare Clinic during the period of October 1, 2004 to September 30, 2014. LLV was defined as a viral load between 48 and 200 cpm. VLLV was defined as a viral load between 20 and 47 cpm. A control group was randomly chosen by utilizing patients with undetectable viral load, defined as a viral load less than 48 cpm. A Kaplan-Meier analysis of event-free survival among patients with LLV compared with randomized patients in the control group will be performed. The primary outcome of this study is time to virologic failure in patients with LLV compared to patients with undetectable viremia. The secondary outcome of this study is risk factors causing an increased likelihood of virologic failure in patients with LLV and VLLV.

Results/Conclusion: Data collection is pending and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify potential risk factors for the development of low-level viremia (LLV) or very-low-level viremia (VLLV).

Discuss the importance of virologic suppression with regards to HIV management and disease progression.

Self Assessment Questions:

Which of the following are potential risk factors for the development of low-level-viremia (LLV) as determined by current literature?

- A NNRTI + 2 NRTI regimen
- B Non-adherence
- C Longer duration of suppression prior to LLV
- D None of the above

Which of the following are potential consequences of virologic failure?

- A Viral evolution and the development of ART drug-resistance
- B Increased risk of HIV transmission
- C Progression of HIV to AIDS or death
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-649-L02-P

Activity Type: Knowledge-based Contact Hours: 0.5

INVESTIGATING THE EFFECTS OF A MULTIMODAL APPROACH TO REDUCING CLOSTRIDIUM DIFFICILE INFECTION RATES IN AN ACUTE CARE SETTING: A MULTICENTER RETROSPECTIVE REVIEW.

Denver J. Stewart, Pharm.D.*, Deanna Ratermann, Pharm.D., Mary Busam, Pharm.D.

St. Elizabeth Healthcare, 1 Medical Village Drive, Edgewood, Ky, 41017
denver.stewart@stelizabeth.com

C.Purpose: The purpose of this study is to determine the effect of new interventions (prolonged contact precautions and a new collaborative care agreement allowing pharmacists to discontinue inappropriate PPI therapy) on overall PPI use and new nosocomial Clostridium difficile infection (CDI) rates in the acute care setting.

D.Methods: This study was granted exempt status by the St. Elizabeth Institutional Review Board. A retrospective pre- and post- interventional analysis was conducted within three hospitals through a comprehensive chart review using their electronic medical record system. The primary outcome is total number of administered PPI doses and new CDI rates measured before and after the interventions. All inpatients within two 5 month periods was included in this outcome and there were no exclusion criteria. The secondary outcome is total number of PPI's started in a critical care area and continued onto the general floor. Any patient in the medical intensive care unit (MICU), surgical intensive care unit (SICU), cardiac cath unit (CCU) or cardiac surgery recovery unit (CSR) over two one month periods were included in this outcome. For the secondary outcome, exclusion criteria included use of acid suppression therapy prior to admission, patients with a new diagnosis requiring prolonged acid suppression, physician request, mortality while in the ICU, or discharge from ICU to home. Risk factors predisposing a patient to CDI including renal insufficiency (GFR<60), hypoalbuminemia (<3.5 g/dL), age >65 years old, history of diabetes, and any antibiotic exposure during admission were collected. Additional information collected on all patients (if available) included demographics (age, sex, height, weight), date of admission and discharge from both the critical care unit and hospital, total # of days exposed to PPI. New CDI rate was also measured in the secondary outcome patient population.

E.Results/Conclusion: Data collection is currently ongoing.

Learning Objectives:

Discuss the potential adverse events related to PPI use

Review predisposing risk factors for Clostridium difficile infections

Self Assessment Questions:

Proton pump inhibitors have been most frequently associated with which of the following adverse events?

- A None, they are safe medications with no adverse event profile
- B: Increased risk of infections, including C. diff colitis and pneumonia
- C: A "moon face" and "buffalo hump"
- D: Hypocalcemia, depression, lethargy

Which of the following factors predisposes an individual for C. diff infection?

- A No factors have been identified in literature
- B Genetic abnormalities, obstructive sleep apnea, electrolyte imbalance
- C Age over 65, hypoalbuminemia (<3.5mg/dL), prior antibiotic exposure
- D Male gender, processed food consumption, geography, and smoking

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-650-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE IMPACT OF A POVERTY SIMULATION EXERCISE ON HEALTH CARE STUDENTS PERCEPTIONS OF THOSE IN POVERTY

*Amy N. Stiner, PharmD; Kimberly S. Plake, PhD, RPh

Purdue University, 575 Stadium Mall Dr, 552C, West Lafayette, IN, 47907
astiner@purdue.edu

STATEMENT OF PURPOSE

The purpose of this study is to evaluate health care students' perception about those in poverty and to evaluate the impact of a poverty simulation on students' perceptions of those in poverty. Future plans for continued implementation of the exercise will also be discussed.

STATEMENT OF METHODS USED

Students from a variety of health disciplines at Purdue University will be asked to participate in the Missouri Association for Community Action (MACA) poverty simulation. During the simulation, participants will role-play the lives of low-income families. Each "family" in the simulation will be responsible for providing food, shelter, and other basic necessities for its members. Students will complete a pre- and post-survey assessing their attitudes regarding those in poverty, as well as the impact of the simulation. The Attitude Toward Poverty (ATP) short form will be utilized to assess students' perceptions. Students also will be asked to participate in individual interviews to gather additional data about the simulation and ways to improve the activity for future students. Descriptive statistics will be performed and comparisons will be conducted using paired t-tests.

RESULTS TO SUPPORT CONCLUSION

To be presented at Great Lakes Pharmacy Resident Conference.

CONCLUSION REACHED

To be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the importance of exposing students in health care professions to the challenges that those in poverty experience.

Discuss the benefits of an interprofessional poverty simulation.

Self Assessment Questions:

Health care student exposure to the challenges those in poverty face are important because:

- A The number of families in poverty in the United States increases each year
- B: Poverty is a major social determinant of health
- C: Students are never exposed to poverty
- D: It is required by ACPE 2016 draft standards

Which of the following is a benefit of conducting an interprofessional poverty simulation?

- A Students will better understand the financial pressure those in poverty experience
- B Students will gain a clearer understanding of the barrier to health care
- C Students will have more compassion for their patients in poverty
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-871-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF POSITIVE CULTURE RESULTS IN PATIENTS TREATED WITH THERAPEUTIC HYPOTHERMIA POST OUT-OF-HOSPITAL CARDIAC ARREST

Steven Stoyanov, PharmD*; Jenna Schaffner, PharmD, BCPS; Jacob Zimmerman, PharmD; Jodi Dreiling, PharmD, BCPS
Akron General Medical Center, 1 Akron General Ave, Akron, OH, 44307
Steven.Stoyanov@akrongeneral.org

Purpose: Out-of-hospital cardiac arrest (OHCA) occurs in over 400,000 people per year in the United States with less than a 10% survival rate. It is the standard of care for patients to undergo therapeutic hypothermia in order to improve neurological function. However, these patients are at an increased risk of infection due to immune system suppression. There have been several studies showing that therapeutic hypothermia increases the rate of infection; nevertheless, there has been no effect on mortality. Limited data suggests that early antibiotic therapy may reduce mortality in patients treated with therapeutic hypothermia.

Methods: This is a retrospective, cohort study from July 2008 through November 2014 evaluating the incidence of positive culture results in OHCA patients receiving therapeutic hypothermia. Patients eligible for inclusion are those 18 years of age and older, and treated with therapeutic hypothermia following OHCA surviving more than 24 hours. Exclusion criteria includes patients receiving antibiotics prior to admission, hospital admission within 30 days for infection, and pregnancy. The primary endpoint studied will be incidence of positive cultures in patients undergoing therapeutic hypothermia post cardiac arrest. Secondary endpoints include analysis of antibiotic timing, antibiotic choice, length of stay, and mortality. Data collection will include demographic information, cultures, antibiotic use, length of stay, and mortality. All patient identifiers will be removed prior to data analysis to maintain confidentiality. A statistician will also aid in the analysis of data.

Results/Conclusion: Collection of information is currently in progress. Final results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Recognize the prevalence and mortality outcomes of out-of-hospital cardiac arrest in the United States.

Identify the relationship between positive cultures and therapeutic hypothermia post cardiac arrest.

Self Assessment Questions:

What is the overall survival rate for patients who suffer an out-of-hospital cardiac arrest?

- A <10%
- B: 10-15%
- C: 15-20%
- D: 20-30%

Why do patients receiving therapeutic hypothermia have an increased risk of infection?

- A Antimicrobial resistance
- B Immune system suppression
- C Poor medication compliance
- D Ventilator use

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-872-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF TACROLIMUS LEVELS IN AFRICAN AMERICAN KIDNEY TRANSPLANT RECIPIENTS

Cassie Stromayer PharmD*; Patricia West-Thielke, PharmD, BCPS; Maya Campara, PharmD, BCPS
University of Illinois at Chicago, 833 S. Wood Street, 164 PHARM, Chicago, IL, 60612
cstroma2@uic.edu

Purpose: Kidney transplantation increases survival, improves quality of life of patients on hemodialysis, and is the preferred treatment for end-stage renal disease. Long-term allograft survival is not equal across ethnic groups and is the lowest in African American kidney transplant recipients. At UI Health, African Americans receive tacrolimus for maintenance immunosuppression. Genetic differences in CYP3A5 and p-glycoprotein commonly result in increased tacrolimus dose requirements and can result in delayed therapeutic trough concentrations. The goal of this study is to evaluate tacrolimus trough concentrations in African American kidney transplant recipients to determine if there is an association between low tacrolimus trough concentrations and an increased incidence of allograft rejection.

Methods: This is a retrospective review of African American kidney transplant recipients that received tacrolimus for maintenance immunosuppression from January 1, 2010 to February 1, 2014. It was approved by the University of Illinois institutional Review Board. Mean tacrolimus trough concentrations will be separated into the 4 following groups for evaluation: < 5 ng/mL, 5 to 7 ng/mL, 8 to 10 ng/mL, and > 10 ng/mL. The primary objective is to compare the incidence of acute rejection with mean tacrolimus trough concentrations at 3 months post-transplant. Secondary objectives include the incidence of acute rejection at 6 and 12 months, allograft and patient survival at 12 months based on tacrolimus trough concentrations at 3 months post-transplant, and glomerular filtration rate (GFR) and incidence of rejection at 3, 6, and 12 months in patients within therapeutic range $\geq 75\%$ and < 75% of time during the first 3 months post-transplant. Tacrolimus trough concentrations, allograft rejection, allograft survival, and patient survival data will be collected at 2 and 4 weeks, and 3, 6, and 12 months post-transplant.

Results/Conclusions: Data collection and analysis is ongoing. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe why African American kidney transplant recipients are at an increased risk of allograft rejection.

Discuss the role of maintenance immunosuppression with tacrolimus in high risk kidney transplant recipients.

Self Assessment Questions:

Which of the following statements about tacrolimus is false?

- A Inhibits calcineurin induced activation of interleukin (IL)-2
- B: Metabolized by CYP3A4, CYP3A5, and p-glycoprotein
- C: Decreased risk of new-onset post-transplant diabetes
- D: Therapeutic drug monitoring is helpful in evaluating efficacy and toxicity

Which of the following statements about African American kidney transplant recipients compared to other ethnicities is false??

- A They have the lowest long-term allograft survival
- B They require increased doses of tacrolimus
- C They display an increased immune response
- D They have a low risk of rejection

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-651-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF OVER-ANTICOAGULATED WARFARIN PATIENTS IN THE VETERAN POPULATION (EVOVA-WAVE)

Amanda Sturges, PharmD; Holly Holladay, PharmD, BCPS; Crystal Owens, PharmD, BCPS

Veteran Affairs - Louisville Medical Center, 800 Zorn Ave., Louisville, Ky, 40206
amanda.sturges@va.gov

Purpose: Warfarin is frequently used in the prevention and treatment of thromboembolic disease. The narrow therapeutic index and significant inter-patient variability are two of the most concerning issues with warfarin therapy. Patients may present with a supratherapeutic International Normalized Ratio (INR) for a variety of reasons and are at an increased risk of minor and major bleeding. Current guidelines recommend holding warfarin doses for an INR less than five but do not provide specific parameters. Because limited research is available, this analysis will provide important data regarding the rate of decline of supratherapeutic INRs to therapeutic range while holding warfarin doses.

Methods: This single-center, prospective analysis occurred at the Robt. L. Taylor Veterans Affairs Medical Center from October 1, 2014 to February 28, 2015. Patients will be included if they meet all inclusion criteria: greater than 18 years of age, receiving warfarin, INR greater than three, inpatient status, and daily INRs. Exclusion criteria includes: oncology patient, receipt of vitamin K or Fresh Frozen Plasma, restart of warfarin prior to therapeutic INR, INR goal of 2.5-3.5, receiving concurrent heparin or argatroban therapy, or discharged prior to INR returning to goal. The primary endpoint is the number of warfarin doses held for a supratherapeutic INR to return to therapeutic range. The secondary endpoint is to identify the potential cause of the elevated INR: bolus or additional doses, gastroenteritis, concurrent antibiotic therapy, recent alcohol intake, acute illness, interacting medications, disease states such as chronic kidney disease, heart failure, or liver disease, or unknown.

Results: Data collection in progress.

Learning Objectives:

Identify causes of supratherapeutic International Normalized Ratio (INRS)

Discuss warfarin management in the setting of supratherapeutic International Normalized Ratio (INRS)

Self Assessment Questions:

Which of the following is a possible cause of a supratherapeutic INR?

- A Concurrent use of acetaminophen
- B Heart failure exacerbation
- C Increase in consumption of vitamin K containing foods
- D Hypothyroidism

According to 2012 CHEST guidelines, if a patient presents with a supratherapeutic INR <5 without bleeding, which of the following would be an appropriate treatment strategy?

- A Give 5mg of vitamin K orally
- B Give 2.5mg of vitamin K subcutaneously
- C Administer 5mg vitamin K orally with 1-2 units of FFP
- D Hold 1-2 doses of warfarin

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-652-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST ACCEPTANCE OF CLINICAL PRACTICE SERVICE REVIEW AT A COMMUNITY TEACHING HOSPITAL

Larren Suh, PharmD

Grant Medical Center, 111 S. Grant Ave, Pharmacy Department, Columbus, Oh, 43215
larren.suh@ohiohealth.com

Pharmacists have provided clinical services such as pharmacokinetic and anticoagulation medication therapy management for over forty years. The first in-office pharmacist service provision dates back to the 1960s. There are few papers that speak to pharmacist clinical service review to ensure quality and only one other that mentions acceptability. These studies are carried out in the ambulatory or medication refill clinics and review is limited to intervention or the provision of drug information. In 2014, the American College of Clinical Pharmacy (ACCP) published two papers that state the pharmacist approach to care should be standardized across the profession and subsequent guidelines. Specifically, ACCP mentions the nursing profession and its approach to patient care that has been refined over 25 years. The paper then goes on to mention that the medical professions, at their core functions, all contain three main elements of practice: Assessment, planning, and follow up.

The Joint Commission recently revised Medical Staff standards such that new practitioners who complete residency and wish to provide services undergo a period of focused professional practice evaluation for new privileges. At minimum, a random sampling of 5% of high volume instances are required to be reviewed. Regulatory agencies do not require pharmacists to complete practice evaluation at this time. This study will obtain opinion of pharmacist clinical service review at a community hospital via an electronic pre- and post-implementation survey. This study will assess whether peer review is perceived by clinical pharmacists as an appropriate way to monitor pharmacist clinical activities at a community teaching hospital.

Learning Objectives:

Recall The Joint Commission minimum requirement for review of high volume encounters

Indicate the three core elements of clinical practice

Self Assessment Questions:

What is The Joint Commission minimum requirement for review of high volume encounters?

- A 2%
- B 5%
- C 8%
- D 10%

What are the three core elements of clinical practice?

- A assessment, planning, and follow up
- B assessment, decision making, and follow up
- C introduction, planning, and decision making
- D data gathering, planning, and follow up

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-873-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

SAFETY AND EFFICACY OF U-500 INSULIN IN VETERAN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Sherry Hoang, Pharm.D., BCPS, Judy Sungvoo, Pharm.D.*, & Katie Suda, Pharm.D., M.S.

Veteran Affairs - Edward Hines, Jr. Hospital, 5000 S. 5th Ave., Hines, IL, 60141
jsungv2@gmail.com

Purpose: Patients with insulin resistance may require large doses of insulin to maintain glycemic control. U-500 insulin is a potential option for patients requiring more than 200 units of insulin daily since its use allows the ability to administer higher doses of insulin with less volume. However, because U-500 insulin is five times more concentrated than U-100 insulin, there is increased potential for adverse events. U-500 insulin is listed as one of ISMPs high-alert medications due to the potency of the medication. According to ISMP, there have been more reports of adverse events for U-500 insulin regarding dosing confusion. Although U-500 is more concentrated than U-100 insulin, there is no specific syringe made to be used with U-500 insulin. ISMP recommends using a tuberculin or allergy syringe marked in volume rather than units to avoid confusion. ISMP also recommends prescribing the U-500 insulin in both units and volume. Administration errors due to dosing confusion can lead to hypoglycemia. The purpose of this project is to assess the safety and efficacy of U-500 insulin in veteran patients.

Methods: A retrospective chart review will be performed on patients diagnosed with type 2 diabetes mellitus that were on U-500 insulin between January 1, 2009 and December 31, 2013. Patients on insulin pumps will be excluded from the chart review. Data to be collected include incidence of hypoglycemia, documented patient education on proper administration of U-500 insulin, type of insulin syringe ordered, change in hemoglobin A1c after initiation of U-500 insulin, change in total daily dose of insulin, use of other diabetic medications, and change in weight.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of using U-500 insulin

Review the risks associated with U-500 insulin use

Self Assessment Questions:

What is a potential benefit of using U-500 insulin compared to U-100 insulin?

- A Once daily dosing
- B: Less risk of hypoglycemia
- C: Convenient use of insulin pens
- D: Less injections may be required

According to ISMP, U-500 insulin is considered a high risk medication due to risk of which of the following?

- A Injection site reaction
- B Muscle weakness
- C Dosing confusion leading to hypoglycemia
- D Hypersensitivity reaction

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-941-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE EFFECTS OF BETA-BLOCKERS VERSUS OTHER RATE-CONTROLLING AGENTS ON RECURRENT ATRIAL FIBRILLATION

Denise A. Sutter, PharmD, BCPS*, Michael P. Dorsch, PharmD, MS, BCPS, Kristen T. Pogue, PharmD, BCPS, Sarah M. Hanigan, PharmD, BCPS, Barry E. Bleske, PharmD, FCCP

University of Michigan Health System, 125 W. Hoover Ave, Apt 4B, Ann Arbor, MI, 48103

sutterd@umich.edu

Purpose: Atrial fibrillation (AF) is a common cardiac arrhythmia. The current AHA/ACC/HRS guidelines recommend using either a beta blocker or a non-dihydropyridine calcium channel blocker for ventricular rate control, but they provide no recommendations for choosing one class of agents over another. Despite a large patient population on these pharmacological agents, very few head-to-head studies compare the effectiveness between drug classes. The largest study to date included sixty patients and investigated the difference between metoprolol, carvedilol, diltiazem, and verapamil on heart rate and arrhythmia-related symptoms. Investigators found diltiazem to be the most effective drug for reducing heart rate, and calcium channel blockers better for symptom control. Additional studies are needed to support or challenge these findings. The purpose of this study is use data from the Cardiovascular Health Study to evaluate the ability of beta blockers to reduce recurrent AF compared to other rate-controlling agents.

Methods: This retrospective cohort study has been approved by the University of Michigan Institutional Review Board for exemption. Data will be obtained from the Cardiovascular Health Study - a prospective, community-based, epidemiological, observational study designed to assess cardiovascular risk factors and outcomes in elderly persons. Patients with atrial fibrillation at baseline will be included in this study. The primary endpoint is time-to-event of recurrent atrial fibrillation. Secondary endpoints include incidence of other types of arrhythmias, difference in change from baseline blood pressure, heart rate, lipid panel, fasting blood glucose, oral-glucose tolerance test, and/or 2-hour insulin level, and incidence of rehospitalizations. Time-to-event analysis of primary endpoint and the incidence of other arrhythmias and rehospitalizations will be analyzed using either a repeated measures logistic regression or a Cox proportional hazard model. All other secondary endpoints will be analyzed using a repeated measures mixed model.

Learning Objectives:

Discuss the current atrial fibrillation guideline recommendations for rate-control therapy

Identify the different mechanisms by which beta blockers and calcium channel blockers reduce ventricular heart rate

Self Assessment Questions:

Regarding the current recommendations for rate control in atrial fibrillation, which of the following statements is true?

- A Beta blockers are preferred over non-dihydropyridine calcium channel blockers
- B: Non-dihydropyridine calcium channel blockers are preferred over beta blockers
- C: No distinction is made between beta blockers and dihydropyridine calcium channel blockers
- D: No distinction is made between beta blockers and non-dihydropyridine calcium channel blockers

Both beta blockers and non-dihydropyridine calcium channel blockers reduce heart rate by increasing the refractory period of the atrioventricular node. Additionally, beta blockers do which of the following?

- A Reduce spontaneous firing of ectopic pacemakers
- B Increase contractility of the myocardium
- C Inhibit the L-type calcium channel
- D Increase conduction velocity through the AV node

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-653-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE OBSERVATIONAL COMPARISON OF OUTCOMES AND COST IN THE TREATMENT OF SKIN AND SOFT TISSUE INFECTION USING DAPTOMYCIN VERSUS VANCOMYCIN

Travis J. Swihart, Pharm.D.*; Alfred M. Pheley, Ph.D.; Gay A. Alcenius, Pharm.D.

Alliance Health, 205 N. East Ave, Jackson, MI, 49201

travis.swihart@alliancehealth.org

Purpose: Balancing best medical practices and rising healthcare costs is a constant challenge for health systems. Growing prevalence of antimicrobial resistance such as methicillin-resistant *Staphylococcus aureus* (MRSA) complicates the clinical picture. The 2011 Infectious Disease Society of America (IDSA) treatment guidelines for MRSA skin and soft tissue infections (SSTI) rates daptomycin and vancomycin with identical recommendation grades for inpatient therapy. Appropriate antimicrobial choice may best be influenced by efficacy and cost. Daptomycin was approved by the FDA for treatment of complicated skin and skin structure infections in 2003, and was recognized for its rapid bactericidal activity against MRSA. Prior to the approval of newer antimicrobials, vancomycin was used more commonly for the treatment of MRSA infections. With this study, we evaluated if daptomycin's novel mechanism provides shorter antibiotic-related length of stay. The primary objectives of this study were to assess the antibiotic-related length of stay and cost for inpatients treated with daptomycin compared to vancomycin for SSTI.

Methods: This is a retrospective chart review conducted at Alliance Health comparing patients admitted for primary diagnosis of cellulitis who received daptomycin or vancomycin. Primary outcomes included antibiotic-related length of stay and cost of stay. Secondary outcomes included length of stay, discharge disposition, and 60 day readmission rate. Statistical analysis was based on the hypothesis that there is no difference between daptomycin and vancomycin on antibiotic-related length of stay. Study population included patients age 18 years or older that received daptomycin or vancomycin at any dose. Study excluded endocarditis, pneumonia, creatinine clearance < 30 mL/min, and pregnancy. Data was analyzed in a regression analysis comparing primary and secondary outcome data as well as sub population analysis

Results/Conclusions: Data collection and analysis are ongoing. Results and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall empirical antibiotic therapy for hospitalized patients with cSSTI that possesses an A-I strength of recommendation and quality of evidence according to the 2011 IDSA treatment guidelines for MRSA infections.

State current FDA approved indications and usage for daptomycin.

Self Assessment Questions:

According to the 2011 IDSA MRSA treatment guidelines, which of the following antibiotics possesses an A-I strength of recommendation and quality of evidence rating for empirical treatment of hospitali

- A linezolid 600 mg PO/IV twice daily
- B: daptomycin 4 mg/kg/dose IV once daily
- C: clindamycin 600 mg IV/PO three times a day
- D: Both A and B

Daptomycin is currently FDA approved for which of the following indications?

- A Complicated skin and skin structure infections (cSSSI)
- B Pneumonia
- C *Staphylococcus aureus* bloodstream infections (bacteremia), inclu
- D Both A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-654-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF COST AND SAFETY OUTCOMES FOLLOWING IMPLEMENTATION OF A 30-DAY SUPPLY LIMIT OF INSULIN FOR OUTPATIENTS

Amanda L. Szymanski* Pharm.D., PGY1 Non-Traditional Pharmacy Resident; Karen J. Arthur, Pharm.D., BCPS, Medication Safety Program Manager; Christina A. White, Pharm.D., MBA, BCPS Associate Chief of Pharmacy; William X. Malloy, MS, Pharm.D., BCPS Clinical Veteran Affairs - Richard L. Roudebush Medical Center, 1481 W. 10th Street, Indianapolis, IN, 46202

Amanda.Szymanski1@va.gov

Purpose: The purpose of this quality improvement project is to evaluate the cost and safety impact of implementing a 30-day supply limit of insulin.

Methods: A retrospective, chart review of computerized records from November 20, 2012 to July 20, 2013 at the Richard L. Roudebush VA Medical Center was conducted. To be included, patients must have been on insulin and had at least one visit with a Clinical Pharmacy Specialist for diabetes management before and after the 30-day supply limit implementation date (March 20, 2013). Data collected included percentage of insulin prescriptions with accurate directions after dose changes, percent of patients with documentation of running out of medication, incidence of hypoglycemia reported during visit, admission due to hypoglycemia or hyperglycemia with documentation of incorrect insulin dosing and cost of insulin per unique patient for fiscal year 2013. **Results/Conclusion:** Results and Conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the cost and safety implications of implementing a 30-day limit of insulin for outpatients

Identify factors that lead to a higher incidence of diabetes in the Veteran population

Self Assessment Questions:

The 30-day supply limit had the following impact on safety

- A Patients reported running out of medication
- B: Increased incidence of hypoglycemia
- C: Decreased admissions for hypoglycemia
- D: No significant change in patient safety measures

Why is there a higher incidence of diabetes in the veteran population

- A Large veteran population
- B Agent Orange
- C Increased access to health care
- D Lower average BMI

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-942-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF PHYSICIAN ASSISTANT DOCUMENTATION AND PRESCRIBING OF PERI-OPERATIVE ANTIMICROBIAL PROPHYLAXIS EXTENDING BEYOND TWENTY-FOUR HOURS

Caitlin Taffe, PharmD*, Robin Ye, PharmD, BCPS

NorthShore University HealthSystem, 2100 Pfingston Rd, Unit B, Glenview, IL, 60026

ctaffe@northshore.org

Purpose:

The Joint Commission implemented the Surgical Care Improvement Project (SCIP) with the goal to improve surgical care by significantly reducing surgical complications. Specific goals were set in order to assess patient outcomes and to help hospitals identify areas in which they could improve the health care delivery process.

The community health system being evaluated collects data following SCIP measures and uses the information gained to improve the health care delivery process at the institution. One of the core measurements of SCIP is documentation that antimicrobial prophylaxis is discontinued within 24 hours following surgery. The goal of this project is to evaluate this SCIP measurement and use data collected to implement strategies to improve documentation by surgical physician assistants (PAs). Improvement in documentation may decrease time spent on communication with pharmacists clarifying duration of antimicrobial orders for surgical patients. This improvement can leave more time for pharmacists and PAs to focus on patient care and potentially lead to a protocol allowing pharmacists to make order changes without having to contact the PA for authorization.

Methods:

Retrospective evaluation of charts meeting SCIP criteria was completed using hip and knee arthroplasty surgery notes written by surgical PAs during a three-month time span to determine baseline documentation. After determining baseline data, the electronic medical record system will be utilized to develop and implement a template for PAs to use as a progress note that contains questions on antimicrobial prophylaxis duration. Once the template is available, education will be provided to PAs to help them properly utilize the template and understand the importance of documentation. Once education is complete, retrospective evaluation of charts for three months post-implementation will be done.

Results/Conclusion:

Collection of information is currently in progress. Final results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Describe the purpose and goals of the Surgical Care Improvement Project (SCIP).

Discuss the importance of appropriate antimicrobial timing in the peri-operative period.

Self Assessment Questions:

What is the primary goal of the SCIP?

- A To reduce overall hospital costs
- B To reduce surgical complications
- C To improve patient satisfaction
- D To decrease readmission rates

Which of the following describes the motive for discontinuing antimicrobial prophylaxis within 24 hours of the surgery end-time?

- A To minimize possible risk of bacterial resistance
- B To initiate directed oral antimicrobial treatment
- C To decrease potential drug interactions with post-operative medicine
- D To reduce surgical costs for both the hospital and patient

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-874-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY AND SAFETY OF CDEA FOR PERIPHERAL STEM CELL MOBILIZATION IN MULTIPLE MYELOMA

Soniya Tambe, Pharm.D.*, Daniel Wojenski, Pharm.D., BCPS, BCOP, Steve Trifilio, Pharm.D., Karen Egan, RN, Maria Kordas, RN, Farhan Rafi, Jayesh Mehta, MD

Northwestern Memorial Hospital, 18 E. Elm Street #704, Chicago, IL, 60611
stambe@nm.org

Purpose: High-dose chemotherapy followed by autologous stem cell transplantation (ASCT) has demonstrated survival benefit in transplant-eligible patients with multiple myeloma (MM). This study aims to provide information regarding a novel stem cell mobilization regimen involving dose-intensive cyclophosphamide, dexamethasone, etoposide, and doxorubicin (CDEA) in patients with MM. The purpose of this study is two-fold: (1) to determine if CDEA is capable of mobilizing a sufficient number of autologous blood peripheral stem cells for transplantation, and (2) to understand the treatment-related toxicity associated with CDEA.

Methods: We performed a retrospective chart review of patients who had received CDEA between January 2011 and September 2014. Information regarding patient demographics, CDEA therapy, previous myeloma treatments, hospital admission, and survival data were obtained by manual chart review from the electronic medical record system and information regarding individual apheresis sessions and reported adverse events were collected manually from paper charts kept by the apheresis department.

Results: Research in progress.

Conclusions: Research in progress.

Learning Objectives:

Describe the place in therapy of autologous stem cell transplantation in the treatment of multiple myeloma and the need for effective mobilization regimens for peripheral blood stem cell mobilization.

Discuss what the CDEA regimen involves and review the observed risks and benefits of using this regimen for peripheral blood stem cell mobilization.

Self Assessment Questions:

What is the purpose of stem cell mobilization?

- A To rescue healthy cells from toxicity associated with high dose chemotherapy
- B To mobilize enough stem cells for autologous transplantation
- C To provide in vivo B and T cell depletion
- D A and C

What are the four components of the CDEA regimen?

- A Cisplatin, Doxorubicin, Etoposide, Dexamethasone
- B Cisplatin, Dexamethasone, Eribulin, Doxorubicin
- C Cyclophosphamide, Doxorubicin, Etoposide, Vinorelbine
- D Cyclophosphamide, Dexamethasone, Etoposide, Doxorubicin

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-655-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

THERAPEUTIC DRUG MONITORING AND DOSE ADJUSTMENT OF POSACONAZOLE EXTENDED RELEASE TABLET

*Laura Tang, PharmD; Bernard Marini, PharmD; Jerod Nagel, BCPS (AQID); David Frame, PharmD; Marisa Miceli, MD; Peggy Carver, PharmD, FCCP; Anthony Perissinotti, PharmD, BCOP

University of Michigan Health System, 1114 Maiden Lane Court, Apt 101, Ann Arbor, MI, 48105

lsamide@med.umich.edu

Background

Posaconazole (PCZ) prophylaxis is associated with improved overall survival in AML patients, but PCZ troughs < 700 ng/mL increase the risk for breakthrough invasive fungal infections (IFIs). Risk factors for subtherapeutic PCZ levels with the suspension formulation include poor oral intake, concomitant administration of a proton pump inhibitor (PPI), mucositis, and diarrhea. The PCZ delayed release tablet (PCZ-TAB) improves the bioavailability and achieves higher serum concentrations than PCZ suspension. However, there is limited data describing PCZ-TAB therapeutic drug monitoring (TDM), risk factors for supra/subtherapeutic PCZ serum concentrations, dose adjustment strategies, and cost.

Objective

The primary objective is to identify risk factors associated with sub/supratherapeutic serum concentrations with PCZ-TAB. Secondary objectives are to describe the impact of TDM on time to therapeutic concentrations, adverse effects, required dose adjustments, breakthrough IFIs and cost.

Methods

This single-center, retrospective study includes adult patients that received PCZ-TAB between February 1, 2014 to January 12, 2015 (n = 90). PCZ-TAB TDM was performed for patients with AML undergoing chemotherapy or hematopoietic stem cell transplant patients with graft versus host disease receiving steroids. Multivariate logistic regression analysis will be performed to identify risk factors for initial PCZ-TAB sub/supratherapeutic serum concentrations for any univariate factors with P-value <0.2. Chi-square or student t-test will be used to evaluate secondary objectives. Target PCZ levels were defined as 700 - 1250 ng/mL.

Results

This study remains under investigation, with data collection and evaluation currently being conducted.

Conclusion

The results of this study may allow us to identify risk factors associated with supra and subtherapeutic levels and establish alternative initial PCZ-TAB dosing recommendations that minimize the risk for toxicity or IFIs.

Learning Objectives:

Identify risk factors for sub/supratherapeutic posaconazole levels

Describe the utility of posaconazole in immunocompromised patients

Self Assessment Questions:

Which of the following are risk factors for subtherapeutic posaconazole levels?

- A Patient weight
- B: Diarrhea
- C: Proton Pump Inhibitor Use
- D: All of the above

The use of posaconazole was found to have a mortality benefit in which of the following disease states

- A Acute lymphocytic leukemia
- B Acute myeloblastic leukemia
- C Diffuse large B-cell lymphoma
- D Osteosarcoma

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-656-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

REVENUE IMPACT OF SWITCHING FROM CHARGE ON DISPENSE TO CHARGE ON ADMINISTRATION FOR NEBULIZED ALBUTEROL SOLUTION

Andrew J Teare*, Pharm.D.; Jeanne M Anderson, Pharm.D., BCPS; Mark P Herriman, Pharm.D.; Kaitlyn M Priniski, Pharm.D., BCPS

Memorial Hospital of South Bend, 615 N Michigan St, South Bend, IN, 46601

ateare@beaconhealthsystem.org

Purpose: To determine the accuracy of administration and effects on hospital revenue when converting from charge on dispense through automated dispensing cabinets (ADC) to charge on administration (COA) using barcode medication administration (BCMA) of nebulized albuterol solution.

Methods: Currently Respiratory Therapists (RTs) remove nebulized medications from the (ADC) shared with nursing staff, leading to long lines and extended wait times during peak medication administration times. As a result, RTs remove more nebulized solutions than necessary for a patient's therapy to avoid re-entry into the ADC. This can lead to decreased charges of nebulized solutions actually administered or potentially overcharging one patient for medications intended to be used for multiple patients. Converting to COA will remove the nebulized albuterol solutions from ADCs and place them in the respiratory department. Charge on administration for albuterol nebulized solutions was implemented on December 1, 2014, with data collection continuing through February 28th 2015. To control for seasonal and intrinsic hospital variables, charge/administration data will be compared to the same time period in the previous year when charge on dispense was used. Data will be collected through the electronic health record (EHR) analytic systems. Retrospective chart review may need to be conducted to check accuracy of charges.

Results/Conclusions: Initial review following a two week trial suggests an increase in accuracy of charging of nebulized albuterol solution (-7% to +3%), resulting in an increase in revenue of \$1000 due to missed charges. Final data collection and analysis are ongoing and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the benefits of charge on administration for patients.

Explain the differences between charge on administration and charge on dispense.

Self Assessment Questions:

What is one benefit to the patient of charge on administration?

- A Increased billing accuracy
- B: Increased cost of healthcare
- C: Increased charges to the patient
- D: Decreased documented administrations

Which of the following is true regarding charge on administration or charge on dispense?

- A Charge on dispense uses barcode medication administration
- B Charge on administration utilizes automated dispensing cabinets
- C Charge on dispense utilizes patient's unique barcode ID to document
- D Charge on administration requires scanning the patient's barcode

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-943-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFICACY AND SAFETY OF RIVAROXABAN VERSUS ASPIRIN FOR VENOUS THROMBOEMBOLISM PROPHYLAXIS IN TOTAL HIP AND KNEE ARTHROPLASTY

Michelle M Tharp, PharmD, Rob D Beckett, PharmD, BCPS, Heather Kountouris, PharmD, Michael Todt, PharmD, BCPS

Parkview Health System, 11109 Parkview Plaza Drive, Fort Wayne, IN, 46845

michelle.tharp@parkview.com

Purpose: Patients undergoing total knee (TKA) or hip arthroplasty (THA) are at increased risk for developing venous thromboembolism (VTE) post-surgery, with deep vein thromboses (DVTs) occurring in nearly 40% of these patients in the absence of VTE prophylaxis. Current guidelines are ambiguous and contradictory about which prophylactic agents are optimal. The 2011 American Academy of Orthopaedic Surgeon (AAOS) guidelines state they are not able to recommend for or against a specific agent for VTE prophylaxis due to unclear evidence. The 2012 American College of Chest Physicians (ACCP) guidelines suggest low-molecular weight heparin (LMWH) in preference to other strategies. However, use of LMWH is limited in real-world practice due to high cost for patients and inconvenient daily subcutaneous injections. Oral options listed in the ACCP guidelines include rivaroxaban, apixaban, dabigatran, dose-adjusted vitamin K antagonist, and aspirin, but there is a lack of clinical studies directly comparing VTE prophylaxis strategies. The objective of this study is to compare the efficacy and safety of two convenient oral options, rivaroxaban and aspirin, for VTE prophylaxis in total knee and hip arthroplasty. **Methods:** In this IRB-approved, retrospective cohort study, data will be collected from electronic medical records of a community-health system for TKA and THA patients discharged on rivaroxaban or aspirin for VTE prophylaxis between April 1, 2013 and April 1, 2015. The primary outcome will be a composite of 30-day all-cause mortality and 30-day readmission for VTE. Secondary outcomes will include 30- and 60-day readmissions for VTE, 30- and 60-day readmissions for bleeding, and 60-day all-cause mortality. Data on patient demographics, concomitant use of LMWH, and drug interactions with home medications will also be analyzed. **Results/Conclusions:** Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the differences between the AAOS and ACCP guidelines for VTE prophylaxis post-orthopedic surgery.

Review the agents that are supported by clinical evidence for VTE prophylaxis post-orthopedic surgery.

Self Assessment Questions:

The current AAOS and CHEST guidelines recommend which of the following durations for thromboprophylaxis following knee and hip arthroplasty?

- A: AAOS: Determined by patient and provider, CHEST: At least 10-14 days
- B: AAOS: 35 days, CHEST: Determined by patient and provider
- C: AAOS: Determined by patient and provider, CHEST: At least 35 days
- D: Both recommend anticoagulation for 35 days

Which of the following represents the recommendation for thromboprophylaxis in orthopedic surgery patients in the 2012 ACCP Guidelines?

- A: LMWH > aspirin > rivaroxaban
- B: LMWH > rivaroxaban = aspirin
- C: LMWH > rivaroxaban > aspirin
- D: LMWH = rivaroxaban = aspirin

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-657-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A CHANGED APPROACH TO THE USE OF OPIOID MEDICATIONS IN THE TREATMENT OF CHRONIC NON-CANCER PAIN IN OLDER ADULTS

Brenda E Thiel, PharmD*; Candice L Garwood, PharmD, FCCP, BCPS; Lisa Binns-Emerick, MSN, CNP

Harper University Hospital, 3990 John Rd, Detroit, MI, 48201

bthiel@dmc.org

Purpose: Opiate medications place older adults at high risk for adverse events and carry a high potential of abuse. Recently, the Drug Enforcement Agency announced more restrictive prescribing requirements for hydrocodone combination products to reduce accessibility. This creates opportunity to change pain management prescribing for seniors. The Rosa Parks Geriatric Clinic developed a new standardized assessment and management approach to narcotic use for chronic non-cancer pain. The study objective is to determine opioid utilization before and after practice change.

Methods: This study is a single center, retrospective review of opiate utilization in older adults before and after the implementation of hydrocodone-combination rescheduling by applying a standardized approach to chronic pain management. Patients are included in the study if they received greater than 12 weeks of an opiate (oxycodone, oxycodone/acetaminophen, oxycodone ER, codeine/acetaminophen, hydrocodone/acetaminophen, oxymorphone, oxymorphone ER, hydromorphone, morphine, fentanyl, and tramadol) for pain management. Patients who received opioids between September 2013 and September 2014 constitute the pre-intervention phase. Post-intervention phase patients are evaluated from December 2014 to March 2015. Patients with cancer pain or who receive pain management elsewhere are excluded. Baseline demographics, pain indication, type of pain medication, duration of therapy, and prescriber are collected. To evaluate contributing factors for continued opiate therapy, changes to pain medication, over-the-counter pain medications, function level, depression scale, pain scores, and physical therapy evaluations are collected. The standardized approach includes a consistent assessment, a pain management agreement, treatment recommendations including alternatives to opiate medications, as well as an opiate de-escalation process for appropriate patients. Additionally, this study measures the opinions of patients, and a knowledge assessment of providers related to the implementation of a new standardized approach to chronic non-cancer pain management. **Results:** Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Define the issues associated with opioid medication use in the older adult population.

Describe the significance of alternative pain management strategies to assist in older adult chronic non-cancer pain.

Self Assessment Questions:

What is considered a contributing factor to age related challenges of older adult pain management?

- A: Minimal comorbidities
- B: Decreased pain prevalence
- C: Pharmacokinetics
- D: Limited pathophysiology changes

Which adverse event is considered to be attributed to opioid medication use in older adults for chronic pain management?

- A: Fluid retention
- B: Fall risk
- C: GI bleed
- D: Hyponatremia

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-658-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF VENOUS THROMBOEMBOLISM RISK (VTE) ASSESSMENT TOOLS AND ADEQUACY OF PHARMACOLOGIC PROPHYLAXIS BETWEEN TWO COMPUTERIZED PROVIDER ORDER ENTRY (CPOE) SYSTEMS

Corrinne J. Thomas, PharmD, BCPS*; Chris Zimmerman, PharmD, BCPS; Marc J. Moote, MS, PA-C; Bruce W. Chaffee, PharmD, FASHP
University of Michigan Health System, 1111 E. Catherine Street, Ann Arbor, MI, 48109
corrinne@med.umich.edu

Purpose: Venous thromboembolism (VTE) has historically been one of the most common causes of preventable hospital death. Healthcare systems are required to report the rate of VTE occurrence in their facility and implement programs to minimize this risk. Computerized provider order entry (CPOE) is a critical tool for ensuring compliance with these measures. The objective of this study is to examine the relative effectiveness of VTE risk assessment and prophylaxis when clinicians use a newly implemented CPOE system versus that of the legacy system.

Methods: This institutional review board approved study is a two cohort, retrospective observational chart review. The primary outcome of the study was to evaluate the success rates of VTE risk assessment measures between the legacy CPOE system and the newly implemented system. Secondary outcomes were to examine assessment accuracy, appropriateness of therapy selection, and any negative patient outcomes. Patients included in the study were 18 years of age or older and had a hospital admission in December 2013 and December 2014. VTE risk assessment was performed through the collection and analysis of VTE risk scores. Appropriate pharmacologic prophylaxis selection was determined by VTE risk score and patients specific baseline demographics, past medical/surgical history, and home medications. When applicable, the reason for pharmacologic prophylaxis contraindication was evaluated. Negative patient outcomes included: development of a new VTE or bleeding during the hospital stay, 30 day hospital readmission, and in-hospital or 30 day mortality. A review of the patients chart was performed to determine any association in negative outcomes to VTE pharmacologic prophylaxis. Descriptive statistics were performed. A t-test and Chi-square test was used with an alpha of 0.05 and beta of 0.2 to determine significance.

Results & Conclusion: Data collection and analysis is currently in progress. Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the venous thromboembolism (VTE) core performance measures developed by The Joint Commission and the National Quality Forum.
Explain the rationale for specific components of a VTE risk assessment tool.

Self Assessment Questions:

Which of the follow is one of the venous thromboembolism (VTE) core measures:

- A VTE admission instructions
- B: Inpatient VTE prophylaxis
- C: Outpatient VTE prophylaxis
- D: Incidence of Idiopathic VTEs

Name one fundamental feature of a successful VTE risk assessment tool:

- A Providers are only prompted to assess VTE risk upon admission
- B Incorporates ICD-9 diagnostic codes to automatically calculate VT
- C Utilizes clinical decision support rules in pharmacologic prophylaxis
- D Contains a generic list of medication contraindication reasons

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-944-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

ADHERENCE COMPARISON OF INSULIN ASPART IN A GERIATRIC VETERAN POPULATION: PRE-FILLED PENS VERSUS VIALS

Ashley M. Thomas*, PharmD; Kayla J. Houghteling, PharmD, BCPS, CDE; Danielle R. Kato, PharmD
Veteran Affairs - Aleda E. Lutz Medical Center, 1500 Weiss St, Saginaw, MI, 48602
Ashley.Thomas@va.gov

Adherence comparison of insulin aspart in a geriatric veteran population pre-filled pens versus vials

Ashley M. Thomas*, PharmD; Kayla J. Houghteling, PharmD, BCPS, CDE; Danielle R. Kato, PharmD
Aleda E. Lutz Veterans Affairs Medical Center, 1500 Weiss Street, Saginaw, Michigan 48602
Ashley.Thomas@va.gov; 989-497-2500x11723

Purpose: The purpose of this study was to retrospectively evaluate the impact of different insulin delivery devices on adherence rates among geriatric veterans with diabetes.

Methods: This study was a single-center, retrospective chart review approved by the Ann Arbor Veterans Affairs Investigational Review Board. All Veterans 65 years or older with diabetes within the Aleda E. Lutz Veterans Affairs Medical Center being treated with insulin aspart with an active prescription history between August 1, 2012 and July 31, 2014 were included within the study. Those excluded were Veterans with diabetes using an insulin pump, using less than 20 units of insulin aspart per day, or obtaining their medication from outside the Veterans Affairs healthcare system. Veterans underwent comprehensive chart reviews to determine study eligibility using the Computerized Patient Record System (CPRS). Eligible Veterans were then divided into two administration groups: pre-filled insulin pens or vials. Adherence to the Veterans insulin aspart regimen was evaluated through review of prescription refill histories and progress notes. Veterans age, gender and hemoglobin A1C were also extracted from the chart. The primary outcome consisted of veteran adherence rates as determined through an adherence percentage calculation with secondary outcomes including the percentage of Veterans with diabetes at goal hemoglobin A1C and number of reported hypoglycemic events. The student t-test was utilized to analyze the primary outcome and significance was interpreted with a p-value <0.05, yielding a 95% confidence interval. For safety analysis, an odds ratio test was performed.

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss factors affecting patient adherence to an insulin aspart regimen
Identify factors that would benefit from using an insulin pen over a vial

Self Assessment Questions:

Which of the following factors could increase insulin adherence?

- A Ease of administration
- B: Multiple injections per day
- C: Timing of mealtime injections
- D: High doses of insulin per dose

Which of the following patients would benefit from use of an insulin pen?

- A A patient with an essential tremor of the hands
- B A patient comfortable with drawing up syringes
- C A patient lacking the comprehension of syringe markings
- D Answers A and C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-659-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF A PHARMACIST-DRIVEN PROTOCOL TO TRANSITION WARFARIN PATIENTS TO A TARGET SPECIFIC ORAL ANTICOAGULANT

Kristen B Thomas*, PharmD; Wendy A Loder, PharmD; William N Ifeachor, PharmD, MBA, BCPS; Tiffany L Boelke, PharmD, BCACP
Veteran Affairs - Indianapolis VA Medical Center, 5110 Lakeshore Ct, Apt 1426, Indianapolis, IN, 46250
kthoma25@mix.wvu.edu

Purpose:

The time in therapeutic range (TTR) is a method of measuring the effectiveness of warfarin therapy. A TTR less than 70% has been associated with less effective therapy. Transitioning eligible patients to a target specific oral anticoagulant (TSOAC) may increase the number of patients who are therapeutically anticoagulated. The objective of this project is to develop a scope of practice that allows pharmacists at the Richard L. Roudebush anticoagulation clinic the ability to transition appropriate warfarin patients to a TSOAC (dabigatran, rivaroxaban, or apixaban) per protocol and ultimately increase TTR.

Methods:

This project will be implemented over two years. The first year is a quality improvement study exempt from Institutional Review Board approval; the second year will focus on the outcomes of patients who are transitioned from warfarin to a TSOAC. Year one will focus on the development and implementation of the scope of practice that will allow pharmacists to transition warfarin patients to a TSOAC at this institution. Chart review of 100 patients (50 in outpatient clinic, 50 in phone clinic) with non-therapeutic INR in a thirty-day period was performed to assess how many patients qualified for a TSOAC. A Voice of the Customer was also distributed to Primary Care physicians to assess their interest in involving pharmacists with anticoagulation management.

Results:

Preliminary results reveal opportunities to transition eligible warfarin patients to a TSOAC. Of the 100 patients identified, 40% of outpatient clinic and 34% of phone clinic patients qualified for a TSOAC. Results of the Voice of the Customer revealed 100% of physicians (n=15) believe clinical pharmacists should be able to transition a warfarin patient to a TSOAC if the patient is a better candidate for the TSOAC.

Conclusion:

Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Outline the process of expanding an existing scope of practice for pharmacists at an anticoagulation clinic.

Identify three limitations to expanding the scope of practice of anticoagulation pharmacists to include Target-Specific Oral Anticoagulants (TSOAC) agents.

Self Assessment Questions:

Which of the following patients would qualify for a TSOAC according to the protocol?

- A: 65 yo male with prosthetic heart valve taking warfarin for atrial fibrillation
- B: 60 yo male with PE with 6-month TTR of 56% despite compliance
- C: 87 yo male with non-valvular atrial fibrillation with a CrCl of 24 mL/min
- D: 75 yo female with DVT taking phenytoin for tonic-clonic seizures

Which of the following was not recognized as a limitation to expanding the scope of practice?

- A: Time limitations for pharmacists due to high volume of appointments
- B: Potential lack of comfort with TSOACs from physicians
- C: TSOACs are non-formulary at this institution
- D: Difficulty obtaining approval for a scope of practice within specific

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-875-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

UTILIZATION OF MONTE CARLO SIMULATIONS TO DETERMINE APPROPRIATE -LACTAM DOSING IN ADULT CYSTIC FIBROSIS PATIENTS BASED ON LOCAL ANTIBIOGRAM

Robert Z Thompson, PharmD*, Donna R Burgess, RPh, Craig A Martin, PharmD, BCPS, David S Burgess, PharmD, BCPS, FCCP
University of Kentucky HealthCare, 2529 Sun Seeker Court, Lexington, KY, 40503
rztthom2@uky.edu

Purpose

The purpose of this study is to predict the likelihood of -lactam antibiotics reaching a goal of 90 percent time above the minimum inhibitory concentration (%T>MIC) for each dosing interval in adult patients with cystic fibrosis (CF) based on local susceptibilities to *Pseudomonas aeruginosa*.

Methods used

Monte Carlo simulation was used to analyze the likelihood that various -lactam regimens achieved a threshold %T>MIC in at least 90% of exposures. Regimens included intravenous bolus, prolonged infusion (over 3 hours) and continuous infusion regimens of aztreonam, cefepime, ceftazidime, meropenem and piperacillin-tazobactam. Pharmacokinetic data for aztreonam, cefepime, ceftazidime, meropenem and piperacillin-tazobactam were obtained from previously published studies in CF patients. Bacterial cultures from CF patients were obtained from our institutional laboratory for the specified time period of January 1st, 2013 to December 31st, 2013. Minimum inhibitory concentrations for *Pseudomonas aeruginosa* for aztreonam, cefepime, ceftazidime, meropenem and piperacillin-tazobactam were measured by E-test. Monte Carlo simulation for 10,000 patients, accomplished via Crystal Ball (Oracle, Redwood Shores, CA) software, was conducted to calculate %T>MIC for each antibiotic regimen.

Results

Pseudomonas aeruginosa MIC data from 43 patients with CF were obtained for the specified timeline. Based on the resistance patterns none of the tested regimens reached the threshold %T>MIC in over 90% of the simulations. Meropenem 2 grams every 8 hours infused over 3 hours provided the highest probability of target attainment at 82.84%. Aztreonam provided the lowest probability of target attainment in all three regimens tested. Overall, prolonged infusion (over 3 hours) of all -lactam antibiotic regimens attained the highest probabilities of target attainment against *P. aeruginosa* in patients with CF.

Conclusions

In order to obtain optimal pharmacokinetic and pharmacodynamic properties in cystic fibrosis patients infected with *P. aeruginosa*, a higher dose and dosing regimens that include prolonged or continuous infusion may be necessary.

Learning Objectives:

Describe difficulties in reaching goal percentage of time above the minimum inhibitory concentration (%T>MIC) in cystic fibrosis patients with *Pseudomonas aeruginosa*.

Define optimal dosing strategies for aztreonam, cefepime, ceftazidime, meropenem and piperacillin-tazobactam in cystic fibrosis patients with *Pseudomonas aeruginosa*.

Self Assessment Questions:

Which of the following physiologic characteristics of cystic fibrosis patients alter pharmacokinetic and pharmacodynamic properties of -lactam antibiotics?

- A: Increased protein binding
- B: Increased total body clearance
- C: Decreased volume of distribution
- D: Increased hepatic clearance

Which of the following -lactam dosing strategies provides the optimal pharmacodynamic and pharmacokinetic parameters in patients with cystic fibrosis?

- A: Continuous infusion
- B: Intermittent bolus
- C: Extended infusion over 3 hours
- D: Extended infusion over 4 hours

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-660-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A CLINICAL DECISION SUPPORT TOOL FOR VENOUS THROMBOEMBOLISM PROPHYLAXIS

Kyle D. Thorner*, Pharm.D., PGY1 Pharmacy Practice Resident
Joel C. Reddish, Pharm.D., BCPS, Assistant Director of Pharmacy
Swedish Covenant Hospital, 5145 N California Ave, Inpatient Pharmacy, Chicago, IL, 60625
kthorner@schosp.org

Purpose: Without venous thromboembolism (VTE) prophylaxis, the incidence of hospital-acquired VTE is reported to be as high as 20% in general medical patients. The purpose of this study is to characterize the prophylactic practices at Swedish Covenant Hospital (SCH) pre- and post-implementation of a clinical decision support (CDS) tool. It is hypothesized that the development of this tool will lead to increased prescribing of appropriate VTE prophylactic regimens, a decrease in the incidence of VTE, and a decrease in adverse effects, such as bleeding, that are associated with inappropriate anticoagulation.

Methods: The first phase of this study required creation and implementation of a CDS tool for initiation of VTE prophylaxis. The CDS tool utilizes a modified Padua risk assessment model which assigns points based on specific VTE risk factors. A VTE risk score of four or greater labels a patient as high risk for VTE. Secondly, a retrospective review of patient medical records from January 1, 2014 to January 31, 2014 was conducted in order to capture VTE prophylactic practices at SCH prior to the use of the CDS tool. Lastly, following implementation of the CDS tool on November 7th, 2014 at SCH, another retrospective review of patient medical records will occur in order to compare the pre- and post-implementation time periods. The primary endpoint to be assessed is the incidence of physicians prescribing VTE prophylaxis. Secondary endpoints that will be measured include: the specific regimens utilized, the incidence of VTE, and the incidence of bleeding.

Results/Conclusion: Finalization of the CDS tool implementation and physician education occurred in mid-December. Post-implementation data will be collected for the month of January. The results and analysis of this data will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the Padua risk assessment model and how it can be utilized to measure venous thromboembolism risk.

Select the most appropriate venous thromboembolism prophylaxis regimen based on a patient's calculated risk for venous thromboembolism.

Self Assessment Questions:

Which of the following characteristics contributes the most to a patient's risk for venous thromboembolism based on the Padua risk assessment model?

- A: Obesity
- B: Active Cancer
- C: Acute Infection
- D: Recent surgery/trauma

Which of the following venous thromboembolism prophylaxis regimens is most appropriate for a patient with a Padua risk score of 5 and renal insufficiency (CrCl <30 ml/min)?

- A: Sequential compression devices (SCDs)
- B: Enoxaparin 40 mg Sub-Q daily
- C: Enoxaparin 30 mg Sub-Q q12h
- D: UFH 5000 units Sub-Q q12h

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-945-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF RISK FACTORS ASSOCIATED WITH 30 DAY READMISSION

Taylor M. Thurston*, Pharm.D.; Joshua N. Raub, Pharm.D., BCPS;
Raymond Yost, Pharm.D., BCPS; Joanne MacDonald, Pharm.D.;
Kenneth Risko, R.Ph., MBA; Candice Garwood, Pharm.D., FCCP, BCP
Detroit Receiving Hospital, 4201 St. Antoine Blvd., Detroit, MI, 482012153
tthursto@dmc.org

Purpose: Hospital readmissions are common, costly, and often preventable. An increased interest in 30-day hospital readmission has occurred due to various reasons, one of which is the Centers for Medicare and Medicaid Services (CMS) using readmission rates as a publicly reported outcome metric and financially penalizing hospitals with certain criteria met readmissions. The objective of this study is to determine the risk factors that are most associated with 30-day all-cause hospital readmission and use this data to develop an index to calculate the probability of 30-day hospital readmission.

Methods: This study is a retrospective cohort of adult patients, ages 18 and above, admitted to Detroit Receiving Hospital, Harper University Hospital, Sinai-Grace Hospital, and Huron Valley Sinai Hospital during the months of March 2013 and September 2013. Patients were excluded if they were discharged to a nursing home, long-term care facility, or hospice, left against medical advice, pregnant, or died during hospital admission. Information including baseline demographics, length of hospital stay, discharge diagnosis via International Classification of Disease (ICD)-9 coding, antibiotic use during admission, intensive care unit (ICU) admission, and medications at discharge will be obtained and analyzed. The primary outcome is to determine which risk factors are associated with 30-day all-cause hospital readmission and the secondary outcome is to derive a clinically useful index to calculate 30-day all-cause hospital readmission risk.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the need for determining a patient's 30-day hospital readmission risk.

Discuss previously described 30-day hospital readmission risk assessment tools.

Self Assessment Questions:

Which of the following are concerns in regards to 30-day hospital readmission?

- A: CMS reimbursement
- B: Financial penalties
- C: Patient care
- D: All of the above

Which of the following factors is not utilized in the LACE index?

- A: Length of stay
- B: Acute admission
- C: Number of hospital visits in previous 12 months
- D: Charlson comorbidity index score

Q1 Answer: D Q2 Answer: C

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Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF A PHARMACIST DRIVEN DISCHARGE EVALUATION SERVICE FOR INPATIENTS WITH VENOUS THROMBOEMBOLISM

Tyler O. Tomasek, PharmD*; Weslie Donia, PharmD Candidate; Christopher Tuttle, PharmD, BCPS; Abbi L. Smith, PharmD, BCPS; Daniel A. Lewis, PharmD, BCPS

Cleveland Clinic - South Pointe Hospital, 13003 Larchmere Blvd, Apt 4, Shaker Heights, OH, 44120

tomaset@ccf.org

Purpose: Venous thromboembolism (VTE) is a disease consisting of deep vein thrombosis (DVT) and pulmonary embolism (PE). The historic standard of care for acute treatment has been inpatient therapy with continuous intravenous heparin. The advent of long-acting injectable and novel oral anticoagulants opened the possibility for patients to be treated on an outpatient basis due to the lack of required monitoring and ease of self-administration. Numerous studies have since validated this approach and shown safety and efficacy for outpatient treatment of select patients with DVT. More recent evidence has demonstrated similar results for outpatient therapy in certain patients with asymptomatic PE. The South Pointe Hospital pharmacy has developed an anticoagulation discharge evaluation service to assist with the outpatient transition of VTE patients who are eligible for home therapy. The purpose of this study is to evaluate the impact of this service on the overall length of stay (LOS) in this population. Readmission rates for bleeding and recurrent VTE, as well as service acceptance, will also be evaluated.

Objectives: Primary objectives are to determine if a difference exists in the LOS between pre-and-post service initiation cohorts. Secondary objectives are to evaluate rates of thirty day readmissions, accepted recommendations, utilization of bedside medication delivery service, pharmacist provided patient education, and scheduled post-discharge appointments.

Methodology: This study was reviewed by the institutional review board. A retrospective, observational chart review will be conducted of patients aged 18 years and older diagnosed with VTE at South Pointe Hospital between July 2013 and March 2015. Patients will be excluded for: creatinine clearance less than 30 mL per minute (calculated using Cockcroft-Gault method), evidence of thirty day bleeding history, therapeutic anticoagulation upon admission, suspicion of non-adherence, or history of heparin induced thrombocytopenia.

Results and Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the evidence for treating patients with deep vein thrombosis on an outpatient basis.

Identify patient populations diagnosed with pulmonary embolism who may be treated safely and effectively on an outpatient basis.

Self Assessment Questions:

The 9th edition of the American College of Chest Physician guidelines on treatment for venous thromboembolism provide what recommendation for outpatient treatment for patients with deep vein thrombosis

- A 1b
- B: 1c
- C: 2a
- D: 2b

The Pulmonary Embolism Severity Index (PESI) Score is designed to predict which of the following:

- A 30 day risk of bleeding
- B 30 day risk of mortality
- C 30 day risk of readmission
- D 1 year risk of mortality

Q1 Answer: A Q2 Answer: B

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Activity Type: Knowledge-based Contact Hours: 0.5

THE GENERAL ATTITUDES OF KEY STAKEHOLDERS TOWARD PHARMACOGENETICS AND GENOTYPE-DRIVEN MEDICATION THERAPY MANAGEMENT IN A COMMUNITY PHARMACY

Whitney B. Tooley, Pharm.D.*, PGY1 Community Pharmacy Resident; Lynn M. Fletcher, Pharm.D., BC-ADM; Brian R. Overholser, Pharm.D., FCCP; Steven R. Abel, Pharm.D., FASHP; David R. Foster, Pharm.D., FCCP

Fagen Pharmacy / Purdue University, 1001 N Sturdy Rd, Ste 201, Valparaiso, IN, 46383

whitney.tooley@fagenpharmacy.com

Purpose: The purpose of this study is to establish a survey that collects information regarding the knowledge and attitudes that key stakeholders have toward the use of pharmacogenetics and genetic testing to help guide medication therapy management. The study results will be used to highlight the apparent obstacles and hypothesize how to overcome them in order to successfully implement a pharmacist-guided, genotype-driven medication therapy management program within a community pharmacy. **Methods:** Approximately 200 adult subjects will be anonymously surveyed. The targeted group will be comprised of a variety of key stakeholders, including patients, pharmacists, prescribers, and Fagen Pharmacy executive personnel, consisting of the pharmacy owner, Director of Pharmacy, and the Human Resources agent. All potential participants are patients, pharmacists, and executive officers of Fagen Pharmacy or prescribers of the HealthLinc Community Clinic, which houses and works closely with Fagen Pharmacy #39. The voluntary survey will address the subjects demographics, general knowledge of pharmacogenetics, safety and efficacy, potential benefits and limitations, willingness to participate, and cost. Ultimately, the survey responses will be analyzed with descriptive statistics. This project is currently awaiting Institutional Review Board (IRB) approval. **Preliminary Results:** This research is currently in progress, and preliminary results will be presented at the 2015 Great Lakes Pharmacy Resident Conference. **Conclusion:** Data from this study will be used to identify obstacles that must be overcome before pharmacogenetic testing and genotype-guided medication therapy management is successfully implemented within a community pharmacy. (Word Count: 237/300)

Learning Objectives:

Discuss the prevalence of genetically-altered medications.

Describe the attitudes toward the use of pharmacogenetic testing in community pharmacy and medication therapy management.

Self Assessment Questions:

A study from 2012 reports that _____ of patients fill prescriptions for drugs affected by genetic variations.

- A 10%
- B: 15%
- C: 20%
- D: 25%

2. Which of the following ideas contributes to the lack of pharmacogenetic testing utilized within the healthcare system?

- A Most healthcare providers feel as though they have adequate training
- B Lack of insurance coverage
- C Most healthcare providers do not believe that genetic variations influence drug response
- D Most patients believe that no predispositions exist regarding pharmacogenetics

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-663-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PHARMACIST-RUN PROTOCOL FOR MANAGING ANTIBIOTICS IN PATIENTS WITH DOCUMENTED PENICILLIN ALLERGIES

Nicholas P. Torney, PharmD*; Michael D. Tiberg, PharmD, BCPS (AQ-ID); Cynthia Nichols, PhD

Munson Medical Center, 1105 6th st., Traverse City, MI, 49621
ntorney@mhc.net

Purpose: Penicillin allergies are frequently encountered and often lead to the use of alternative antibiotics in the hospital setting. The objective of this study is to analyze the utility of a pharmacist-run protocol that is designed to recommend the safest, most effective antibiotic(s) in patients with a penicillin allergy without the use of a penicillin skin test.

Methods: In this randomized control trial, currently hospitalized patients with a penicillin allergy were identified using a report that searched the electronic medical record allergy field for the terms "penicillin," "penicillins," and "penicillin and derivatives." Patients were included if they had an active infectious process that was being treated with an alternative antibiotic (i.e. fluoroquinolone, vancomycin, aminoglycoside), and the primary investigator (PI) identified that an intervention could be made to modify antibiotics. Patients were excluded for the following reasons: pregnant, less than 18 years old, type-1 IgE-mediated allergic reaction within 5 years, unable to provide an allergy history or informed consent. Patients were randomized into two groups: control and intervention, with a goal of 30 patients in each group (total n=60) to meet a power of 85%. In both groups, the PI performed an allergy assessment, while only making a recommendation to the provider in the intervention group (based on the allergy reported, infectious process, and patient factors). An additional control group (n=30) without penicillin allergies was matched to the penicillin allergy groups by age, gender, and infection type. The primary endpoints are modification of antibiotics to a penicillin or cephalosporin and tolerability of this regimen. The secondary endpoints are cost of antibiotics per day of hospitalization and length of stay.

Results/Conclusions: Results and conclusions will be presented at the Great lakes Pharmacy Residency Conference.

Learning Objectives:

Identify penicillin allergic patients that can safely receive a -lactam antibiotic without utilizing a penicillin skin test.

Explain the role of a pharmacist in allergy documentation and how this can be applied to antimicrobial stewardship.

Self Assessment Questions:

JB (78 yo female) has a stated allergy to penicillin VK which caused a rash 40 years ago. She is currently hospitalized for community acquired pneumonia (no recent antibiotic use, hospitalizations, o

- A Ampicillin/sulbactam 3gm every 6 hours.
- B: Ceftriaxone 1gm daily + Azithromycin 500mg daily.
- C: Levofloxacin 750mg daily.
- D: Meropenem 500mg every 6 hours.

You are rounding with an internal medicine service and notice that a patient with a documented penicillin allergy is currently tolerating cephalexin 500mg four times daily. What should be your next s

- A Remove the penicillin allergy from the allergy field.
- B Do nothing and move on to your next task.
- C Notify the provider to immediately stop the cephalexin because the
- D Add a comment in the allergy field stating the patient has tolerated

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-664-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

MAAS VS. RASS: COMPARING THE ACHIEVEMENT OF TARGET SEDATION SCORES IN ICU PATIENTS

Ayumi O. Tran PharmD*, Aaron Hoffman PharmD, BCPS

Advocate Illinois Masonic Medical Center, 836 W. Wellington Ave., Chicago, IL, 60657

ayumi.tran@advocatehealth.com

Purpose: In the intensive care unit (ICU), sedation is often implemented as part of patient care in order to decrease the patients awareness of events, discomfort, and agitation. Agitation is believed to occur in at least 71% of ICU patients and is one of the major reasons for initiating and maintaining sedation. The clinical practice guidelines for the management of pain, agitation, and delirium published by the Society of Critical Care Medicine (SCCM) recommend maintaining light levels of sedation, which have been associated with improved clinical outcomes such as decreased duration of mechanical ventilation and ICU length of stay. The SCCM guidelines recommend using the Richmond Agitation Sedation Scale (RASS) or the Sedation-Agitation Scale to monitor depth of sedation and brain function, due to their validated accuracy and reliability for evaluating quality and depth of sedation. AIMMC transitioned from using MAAS to RASS in August 2014. The purpose of this project was to assess whether this transition improved sedation management in patients by measuring the percent achievement of target sedation scores. **Methods:** This was a retrospective cohort study that included medical and surgical ICU patients on sedation. The primary outcome was the percent achievement of target sedation scores among patients using MAAS compared to RASS and the percent of sedation scores within goal at least 25, 50, and 75 percent of the time. Secondary outcomes included average MAAS or RASS score, percent of sedation scores above or below goal, average dose of sedation medications, mortality, and ICU length of stay. IRB approval was not needed since this was a quality improvement project. **Results/Conclusions:** Results/conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the difference between MAAS and RASS.

Identify a desired RASS goal in maintaining light sedation levels in a patient.

Self Assessment Questions:

Which of the following is an advantage of using the RASS instead of MAAS?

- A RASS allows for more accurate assessment of motor activity
- B: RASS allows for more accurate assessment of psychometric prop
- C: RASS allows for more accurate assessment of the patient's mood
- D: RASS allows for more accurate assessment of delirium

Which of the following is the correct target range when utilizing the RASS to evaluate a patients level of sedation?

- A +1 to +3
- B 0 to +2
- C -1 to -3
- D 0 to -2

Q1 Answer: B Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5

ADJUNCTIVE VALPROIC ACID FOR THE TREATMENT OF ICU DELIRIUM IN INTENSIVE CARE PATIENTS: A RETROSPECTIVE STUDY

Hoai-Phuong T. Tran, PharmD*, James M. Curtis, PharmD, BCPS, Tara R. Holt, PharmD, BCPS, Tyler J. Monroe, PharmD
Bronson Methodist Hospital, 601 John Street, Box 56, Kalamazoo, MI, 49007
tranh@bronsonhg.org

Purpose: Management of acute intensive care unit (ICU) delirium in patients can prove challenging when patient response is suboptimal and concerning side effects are present with antipsychotics. Based on case reports, the addition of valproic acid may aid in symptom improvement and reduce patient requirement of concomitant antidelirium medications. The objective of this study is to evaluate the effectiveness of adjunctive valproic acid in the treatment of acute ICU delirium in critically ill patients by assessing changes in patient requirement for concomitant sedative, opiate, and antipsychotic medications as well as measuring patients Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and Richmond Agitation and Sedation Scale (RASS) scores. **Methods:** This study is a retrospective chart review of patients who were administered valproic acid for the treatment of ICU delirium while admitted to the medical intensive care unit or trauma burn unit between June 2012 and October 2014. Patients were included if they were mechanically ventilated and had received valproic acid for at least 48 hours. Patients were excluded if the indication for valproic acid was not delirium and if valproic acid was a home medication. The primary outcomes were changes in patient requirement for concomitant sedative, opiate, and antipsychotic medications; CAM-ICU scores; and RASS scores after initiation of adjunctive valproic acid therapy. Secondary outcomes included time to intravenous sedative discontinuation post-valproic acid initiation, time to extubation post-valproic acid initiation, number of ventilator days, incidence of clinician-defined treatment failure, incidence of valproic acid continuation at discharge, mean hospital length of stay, mean unit length of stay, and presence of adverse effects related to valproic acid. **Results/Conclusions:** Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the four criteria within the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU).

Explain the advantages and/or disadvantages of administering valproic acid for the management of ICU delirium.

Self Assessment Questions:

Which of the following combinations results in a positive CAM-ICU assessment?

- A: Acute onset of mental changes and inattention
- B: Altered level of consciousness and disorganized thinking
- C: Acute onset of mental changes, inattention and altered level of consciousness
- D: Inattention and disorganized thinking

Which pharmacological treatments are commonly used for management of agitation and/or ICU delirium?

- A: Antipsychotics
- B: Benzodiazepines
- C: Precedex
- D: All of the above

Q1 Answer: C Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZING MEDICATION USE EFFICIENCY AND APPROPRIATENESS THROUGH REVISION OF AN AUTOMATIC HOLD PROCEDURE IN PREPARATION FOR COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE)

Erica R Treadway, PharmD*; Brook S DesRivieres, PharmD, MS; Michelle L Brenner, PharmD, BCPS; Matthew J Thill, PharmD
Ministry Health - St. Joseph's Hospital - WI, 611 Saint Joseph Avenue, Marshfield, WI, 54449
Erica.Treadway@ministryhealth.org

PURPOSE: With increasing focus placed on affordable healthcare, efforts are being made to decrease medication costs during hospital stays. Pharmacists play a pivotal role in assessing medication therapies for accuracy, appropriateness, safety, and acute necessity. Some facilities incorporate an automatic hold procedure that allows pharmacists to hold home medications continued by physicians based on criteria that deem them not acutely necessary for hospitalization. This project focuses on the expansion of an automatic hold procedure to improve resource utilization upon implementation of computerized physician order entry. The primary objective is to decrease the percent of home medication orders received by pharmacists that are deemed not acutely necessary during the hospital stay. Secondary objectives include reduction in time required for pharmacist automatic hold interventions and for technicians to process unused multi-dose medications.

METHODS: This quality improvement initiative has been exempt from review by the Institutional Review Board. Patients admitted to adult hospitalist services with orders received from admission home medication reconciliation forms were included in this study. Orders collected during a 2-week pre-intervention period were reviewed for necessity and adherence to the current automatic hold procedure by physicians and pharmacists. Pharmacists documented automatic hold interventions in clinical surveillance software, which included medication held and associated time to complete. The number of multi-dose medications returned to pharmacy and technician time required to credit and restock medications was recorded as a function of rework done by pharmacy associates. Based on baseline data and assessment, a revised procedure will be implemented. Physician education will be completed to drive adherence. The post-intervention period will involve a second phase of recording percent of medication orders deemed not acutely necessary, time required for interventions, and time required for processing unused multi-dose medications.

RESULTS AND CONCLUSIONS: Results and conclusions will be

Learning Objectives:

Identify medications that are included in an automatic hold procedure and not acutely necessary for hospitalization.

Discuss potential benefits and barriers of the effective use of an automatic hold procedure.

Self Assessment Questions:

According to the automatic hold procedure at Ministry Saint Josephs Hospital, which of the following orders from a medication reconciliation are subject to the procedure and should be held upon admission?

- A: Atenolol 50mg tablet / 1 tablet by mouth once daily / last dose this morning
- B: Terbinafine 1% cream / Apply topically to affected area as needed
- C: Cranberry 450 mg tablet / 1 tablet by mouth once daily / last dose this morning
- D: Omeprazole 20 mg capsule / 1 capsule by mouth once daily / last dose this morning

Which of the following is a potential benefit of the effective use of an automatic hold procedure?

- A: Increased medication waste
- B: Increased number of medications held that are deemed not acutely necessary
- C: Increased number of pharmacist interventions
- D: Increased number of orders entered by physicians

Q1 Answer: C Q2 Answer: B

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Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT OF A DASHBOARD TO ASSESS QUALITY AND ACCURACY OF ORDER VERIFICATION

Long D. Trinh, Pharm.D.*; Erin M. Roach, Pharm.D., BCPS; Eric D. Vogan, MSPH; Simon W. Lam, Pharm.D., BCPS, FCCM; Garrett G. Eggers, Pharm.D., M.S.

Cleveland Clinic, 1127 Euclid #609, Cleveland, OH, 44115

trinh1@ccf.org

Statement of the purpose: Prospective order verification is a core component of a pharmacist's role in the detection and correction of medication errors. Productivity monitoring systems currently used do not consider the quality or accuracy of order verification on a team or individual level. The pharmacy department's metric for productivity related to order verification is based solely on order volume. The data provided by these monitoring systems may show what appear to be significant performance differences between two pharmacists or services, when in fact the quality of orders verified according to accepted standards defined by practice guidelines, hospital policies, and procedures are not captured. Benchmarking based solely on data without context may result in a misinterpretation of performance. The inability to capture this data makes it difficult to identify pharmacist performance-improvement opportunities compared with that of peers. The primary objective of the study is to develop a quality dashboard for order verification and measure the impact on performance of pharmacists following individualized feedback.

Statement of methods used: This study will be carried out in two phases. Phase one is to develop a quality dashboard to measure order verification performance. Phase two is to evaluate the implementation of the dashboard and its impact on the quality and accuracy of order verification. Pharmacists will be selected to participate in phase two of the study based on predefined inclusion criteria. During phase two, individualized performance feedback will be provided to the pharmacists on trends identified by the dashboard along with best practices and strategies to improve compliance.

Summary of (preliminary) results to support conclusion: Eight high volume orders were selected with recommendations defined by institution guidelines for renal-dosing, weight-based dosing and restricted medication documentation to build the quality dashboard: Unasyn, Cipro, Zosyn, Zovirax, Lovenox, Protonix, Keppra, Mycamine

Conclusions reached: Study in process.

Learning Objectives:

Discuss the role of benchmarking in healthcare

Describe the purpose of a quality performance metric to assess order verification

Self Assessment Questions:

Which of the following is a reason for using internal benchmarking systems

- A: To measure performance trends over time
- B: To identify industry best practice
- C: To measure the performance of a pharmacy department against a
- D: To compare U.S. hospitals' strategies to reduce healthcare costs

Which of the following is a quality metric to assess pharmacist order verification performance?

- A: Number of orders verified per hour
- B: Orders verified in compliance with accepted practice standards
- C: Number of calls received from nursing
- D: Average time spent verifying a medication order

Q1 Answer: A Q2 Answer: B

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EVALUATION OF ADMISSION MEDICATION HISTORIES IN A COMMUNITY HOSPITAL

Carolyn K. Truong, Pharm.D.*, Meghan E. Jordan, Pharm.D., BCPS, Susan L. Julia, Pharm.D., BCPS, CACP, Rachelle Simon, Pharm.D., BCPS, and Sergio Villicana, Pharm.D., BCPS.

Franciscan St. Margaret Health, 5454 Hohman Ave., Hammond, IN, 46320

Carolyn.Truong@franciscanalliance.org

Purpose:

Admission medication histories (AMH) are used by providers to accurately and completely assess a patient's medication therapy and make appropriate new treatment plans or adjust current treatment. Literature has shown medication histories collected by trained pharmacy staff improves accuracy and prevents medication errors. The 2013 National Patient Safety Goals released by The Joint Commission report: high-quality and accurate medication histories have shown to improve overall care to hospitalized patients and is included as an important aspect of hospital admissions. The purpose of this project is to identify areas that pharmacists can help improve patient care and safety.

Methods:

This study is IRB approved. Patients were included if they 18 years or older and admitted to an inpatient unit from the emergency department or directly from a physician's office. Patients AMH were first collected by nurses or pharmacists and entered into the electronic health record following current hospital policy. Patients were re-interviewed by the investigator to obtain medication histories, allergy histories, and preferred pharmacies and evaluated for accuracy. Any discrepancies found by the investigator were corrected and the prescribing physician was contacted if needed to adjust inpatient medication regimens. Incident severity scores were assigned to inaccurate or incomplete medication histories using the Institute for Safe Medication Practices and reported following hospital policy.

Results and Conclusion:

A total of 100 medication histories were re-collected. 47 of 50 AMH collected by pharmacists were considered complete, while 6 of 50 AMH collected by nurses were considered complete. 65% of category B errors and 100% of category C errors identified were not rated higher due to early intervention by the investigator. Based on these findings, a transition of care pharmacist role is being developed in order to assist in improving continuity of care and further enhance patient care and safety.

Learning Objectives:

Describe the advantages of having a pharmacist collect medication histories.

Identify ways a pharmacist can help prevent medication errors from admission to discharge.

Self Assessment Questions:

How can a pharmacist help improve continuity of care during a patient's admission?

- A: Improve accuracy of medication histories
- B: Work in conjunction with other healthcare providers to resolve disc
- C: Identify duplicate therapies
- D: All of the above

How can pharmacists help improve the accuracy of medication histories

- A: Recognize duplicate therapies
- B: Identify inappropriate dosing
- C: Identify mismatched formulations with frequencies (i.e. extended r
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-946-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE IMPACT OF A MOBILE APPLICATION ON PRESCRIBING ADHERENCE TO INSTITUTIONAL ANTIBIOTIC GUIDELINES FOR SEPSIS IN THE EMERGENCY DEPARTMENT

Jonathan Tse*, Pharm.D., Mark Deaton, Pharm.D.

Presence St. Joseph Medical Center, 333 N. Madison St., Joliet, IL, 60435

jonathan.tse@presencehealth.org

Purpose: At our institution, roughly 80 percent of sepsis patients enter through the emergency department (ED). Timely detection of sepsis and appropriate empiric antibiotic selection is vital for survival. Studies show that there is an increase in the use of mobile devices by clinicians for drug information and disease management. The creation of a mobile application may assist clinicians in prescribing appropriate initial empiric antibiotics for sepsis. The objective of this study is to determine if the use of a mobile application for clinicians will increase appropriate empiric antibiotic selection. **Methods:** This is a single centered pre and post-implementation observational study conducted at Presence Saint Joseph Medical Center. A retrospective analysis was conducted using a data surveillance system to identify patients with sepsis in the emergency department (ED) from May 1, 2014 to July 31, 2014. Patients with three or more systemic inflammatory response syndrome criteria and who are at least 18 years of age will be included. Those who are diagnosed with sepsis post inpatient admission, are less than 18 years of age, or who are pregnant will be excluded. Working in conjunction with ED pharmacists, empiric sepsis antimicrobial guidelines were created and converted into a mobile application. Prospective analysis will be conducted for a two month period following the sepsis mobile application implementation and education of the ED providers. The analysis will evaluate current treatment patterns and look for any predictive factors that may correlate to treatment outcomes. All patient data will be collected without patient identifiers and confidentiality will be maintained. The primary outcome will be adherence to institution specific guidelines regarding empiric sepsis antibiotic treatment. Secondary outcomes will include hospital length of stay and number of days on antibiotics. **Results/Conclusions:** Results will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify the impact of mobile technology in clinical practice

Discuss the initial management of sepsis and the interventions associated with decreased mortality

Self Assessment Questions:

According to a Health Information and Management Systems Society survey conducted in 2014, what percentage of participating physicians used mobile technology to provide patient care?

- A: 27%
- B: 62%
- C: 83%
- D: 74%

Which one of the following interventions has been shown to decrease mortality in the management of sepsis?

- A: Early administration of blood products
- B: Early administration of appropriate empiric antibiotic therapy
- C: Source control within 6 hours
- D: Targeting an upper glucose goal range of less than or equal to 110

Q1 Answer: C Q2 Answer: B

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ORAL VERSUS INTRAVENOUS ANTIBIOTICS FOR THE TREATMENT OF ACUTE BACTERIAL OSTEOMYELITIS IN THE VETERAN POPULATION

Caitlin A. Turnbull, PharmD*, Lisa R. Young, PharmD, BCPS - AQ ID, Sheryl L. Lowery, PharmD, BCPS

Veteran Affairs - Jesse Brown Medical Center, 820 S. Damen Avenue, Chicago, IL, 60612

Caitlin.Turnbull@va.gov

Background: Most clinicians treat acute osteomyelitis with a prolonged course of antibiotics; however the optimal route of administration has not been clearly defined. Based on pharmacokinetic data and expert opinion, intravenous antibiotics have been considered the standard of care. Although the use of oral antibiotics is not a novel idea, few well designed or adequately powered studies have evaluated clinical outcomes compared to intravenous therapy. Some studies suggest that oral may be as effective as intravenous therapy for chronic osteomyelitis in adults and acute osteomyelitis in children. In addition, some investigators have demonstrated reasonable oral absorption and bone penetration of certain antibiotics, supporting the potential efficacy of using the oral route of administration in adults with acute bacterial osteomyelitis.

Purpose: The purpose of this study is to determine if there is a difference in clinical outcomes in patients presenting to a Veterans Affairs hospital with acute bacterial osteomyelitis treated with oral versus intravenous antibiotics.

Methods: This is a retrospective, electronic chart review of patients diagnosed with acute osteomyelitis between October 1, 2008, and September 30, 2013, who received antibiotic therapy. The study analyzed treatment outcomes between two groups of included patients: 1) intravenous antibiotics for at least four weeks; or 2) oral antibiotics for at least four weeks. Exclusion criteria include: chronic osteomyelitis, non bacterial osteomyelitis, vertebral osteomyelitis, osteomyelitis in the setting of prosthetic devices, immunosuppression, and chronic suppressive antibiotic therapy. The primary endpoint of this study is treatment failure within one year of diagnosis. Secondary endpoints include incidence of post-treatment amputation, Clostridium difficile infection, and catheter-related infections. Treatment failure will also be analyzed in the following subgroups including: patients with diabetes mellitus and patients with peripheral vascular disease.

Results/Conclusion: Data collection and analysis are pending and will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the most common pathogens that cause bacterial osteomyelitis.

Name oral antibiotic agents that have been shown to penetrate bone tissue and may be appropriate for the treatment of osteomyelitis.

Self Assessment Questions:

Which of the following bacterial pathogens is most commonly implicated in osteomyelitis?

- A: Klebsiella pneumoniae
- B: Staphylococcus aureus
- C: Escherichia coli
- D: Clostridium difficile

When administered orally, which of the following antibiotic agents has been shown to achieve bone concentrations of at least 20% of serum concentrations?

- A: Fosfomycin
- B: Vancomycin
- C: Nitrofurantoin
- D: Ciprofloxacin

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-668-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INFLIXIMAB INITIAL DOSING IN PEDIATRIC PATIENTS

*Janelle Turner, PharmD; Danielle Alm, PharmD, BCPS; Shannon Rotolo, PharmD, BCPS; Reginald King, PharmD, BCOP; Edgardo Rivera, MD; Thomas Mangatu; Barbara Kirschner, MD
University of Illinois at Chicago, 5841 S Maryland, Chicago, IL, 60637
Janelle.Turner@uchospitals.edu

Inflammatory bowel disease (IBD) is a chronic, immune-mediated disorder, and in particular, pediatric patients tend to have more extensive disease and a higher rate of acute, severe exacerbations compared to adults. Infliximab, an anti-tumor necrosis factor-alpha agent, is a treatment option for pediatric patients with moderate to severe IBD unresponsive to first line agents with approved dosing of 5 mg/kg/dose with titration to 10 mg/kg/dose. However, in practice, some clinicians start the biologic at more aggressive initial dosing of 10 mg/kg/dose and then de-escalate therapy based off clinical response to 5 mg/kg/dose in addition to other immunomodulators, such as 6-mercaptopurine or methotrexate.

The aim of this study is to determine whether initiating infliximab 10 mg/kg/dose for IBD flares results in greater remission at 14 days in the pediatric population versus the more conservative initial 5 mg/kg/dose. To achieve this, charts of all pediatric patients at University of Chicago Comer Childrens Hospital who receive infliximab for an acute exacerbation will be reviewed retrospectively. Incidence of remission at 14 days, along with secondary endpoints, such as laboratory improvement and incidence of hepatotoxicity, will be evaluated.

Currently, the data for this study is still in process. However, results from this research are expected to help compare the clinical success of starting at a higher dose of infliximab with conventional dosing. Also, the results will help evaluate different patient considerations in dose determination. The hope is to see some sort of correlation between dosing scheme and remission, which could lead to further, future, prospective studies and/or guideline development of infliximab dosing for acute IBD flares in pediatrics for internal use. Additionally, data from this study will contribute to a topic where current literature is scarce, especially in this particular patient population being investigated.

Learning Objectives:

Explain the different approaches to initially dosing infliximab for acute inflammatory bowel disease (IBD) flares.

Identify pertinent baseline characteristics utilized to assess the severity of IBD for a patient.

Self Assessment Questions:

What are the two approaches to initially dosing infliximab for acute IBD flares?

- A: Infliximab 10 mg/kg/dose vs. infliximab 5 mg/kg/dose
- B: Titrating infliximab 10 mg/kg/dose--> 5 mg/kg/dose vs. stepping up
- C: Immunomodulators and infliximab 5 mg/kg/dose vs. infliximab 10 mg/kg/dose
- D: Starting with infliximab 5 mg/kg/dose and dosing based off levels

Which of the following baseline characteristics is NOT utilized to assess the severity of IBD for a patient?

- A: Number of liquid stools per day
- B: Harvey Bradshaw Index (HBI)
- C: Total dose of glucocorticoids at the time of infliximab infusion
- D: Patient race

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-670-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EMPIRIC VS PFT DIRECTED THERAPY FOR COPD PATIENTS: A QUALITY AND COST ANALYSIS

Lauren Turner, PharmD*; Amanda Place, PharmD BCACP, Karie Morrical-Kline, PharmD, BCACP
St. Vincent Health, 2001 W. 86th Street, Indianapolis, IN, 46260
lauren.turner3@stvincent.org

Purpose: Pulmonary function tests (PFTs) are used to help diagnose chronic obstructive pulmonary disease (COPD) and differentiate it from other pulmonary diseases. Additionally, PFTs help guide therapy for patients diagnosed with COPD, but are associated with increased costs of care. There are approximately six hundred patients at the St. Vincent Joshua Max Simon Primary Care Center (PCC) with a diagnosis of COPD. Of these, approximately one third do not have PFTs documented in the outpatient medical record. Patients at the PCC without PFTs may have a documented diagnosis of COPD based on symptoms alone. This practice varies from GOLD Guideline recommendations for diagnosis and management of COPD, which include evaluating PFTs, symptom scores, and exacerbation risk to determine treatment plans. Not having PFTs available for evaluation may result in inappropriate diagnosis and treatment. The purpose of this study was to compare the number of COPD exacerbations and overall healthcare costs in patients diagnosed with COPD who have PFTs available for evaluation versus patients without PFTs.

Methods: This was a retrospective chart review of PCC patients from January 2007-January 2014. Patients were included if they had a documented diagnosis of COPD in the electronic medical record within the specified time period. Data was collected on each patient for a two year period, specifically identifying exacerbations and medication prescriptions over time. An inpatient exacerbation was identified if a patient was admitted to St. Vincent with a discharge diagnosis of COPD. An outpatient exacerbation was identified in patients prescribed steroids and/or antibiotic therapy in the outpatient medical record and assigned a cost based on PCC billing data. At each exacerbation investigators re-evaluated the patients smoking status, PFT documentation, medications, and associated cost for each.

Results/Conclusion: Final results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Outline medications indicated for COPD by GOLD Guideline severity

Explain the role of PFTs in the classification of COPD per the GOLD Guidelines

Self Assessment Questions:

Which medication class would be recommended first line for a patient with classification B COPD?

- A: Inhaled corticosteroid
- B: Inhaled long-acting bronchodilator
- C: Phosphodiesterase 4 inhibitors
- D: Inhaled short-acting bronchodilator

What FEV1/FVC ratio is needed to confirm a diagnosis of COPD per the GOLD Guidelines?

- A: 0.50
- B: 0.80
- C: 0.70
- D: 0.30

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-669-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL USES AND LENGTH OF THERAPY OF DEXMEDETOMIDINE IN PEDIATRIC PATIENTS

Janeth Valadez, PharmD*

Children's Hospital of Wisconsin, 520 W. Riverwood Dr., Oak Creek, WI, 53154

jvaladez@chw.org

Purpose: Dexmedetomidine is a sedative that has been shown to be safe and effective when used short-term to provide comfort to patients and to facilitate tolerance of invasive therapies. The primary objective is to determine an appropriate length of therapy for dexmedetomidine based on its clinical use and the ordered dose/rate at a pediatric institution. Pharmacist interventions for dexmedetomidine monitoring were implemented in August 2014 in an effort to monitor length of therapy and to ensure proper indications for use. A secondary objective is to evaluate the safety and efficacy of prolonged infusions in comparison to the published literature.

Methods: An electronic medical record was used to identify pediatric patients with at least one administered continuous infusion of dexmedetomidine. Retrospective data of pediatric patients receiving dexmedetomidine were used to perform a drug use evaluation, evaluate the appropriateness of the length of therapy, and to assess safety and efficacy of dexmedetomidine use at a pediatric institution. A review of retrospective medication usage included May through October 2014. The following data were collected: patient age, patient weight, past medical history, ordered dose/rate, dose/rate changes, length of therapy, and adverse reactions. Provider and pharmacist documentation were utilized to determine rationale for dexmedetomidine use and treatment plan. All data were recorded without patient identifiers and will remain confidential. This study was submitted to the Institutional Review Board for approval.

Preliminary Results: A retrospective medication use evaluation (5/1/14-10/31/14) was completed to determine the average duration of use for dexmedetomidine. A total of 282 patients received dexmedetomidine between May and July for a mean duration of 4.09 days. Between August and October, 322 patients received dexmedetomidine for a mean duration of 4.51 days. The retrospective data will be further evaluated to determine why no changes occurred between August through October following implementation of pharmacist interventions.

Conclusions: To be presented.

Learning Objectives:

Describe the mechanism of action, pharmacokinetic properties, and adverse effect profile of dexmedetomidine.

Recognize the role of dexmedetomidine for sedation in the pediatric intensive care setting.

Self Assessment Questions:

What is the usual loading dose and maintenance infusion rate of dexmedetomidine?

- A: 1 mcg/kg over 10 minutes; 0.2-0.7 mcg/kg/hr
- B: 1 mcg/kg over 30 minutes; 0.2-0.7 mcg/kg/hr
- C: 1 mcg/kg over 10 minutes; 0.2-0.7 mcg/kg/min
- D: 0.5 mcg/kg over 10 minutes; 0.2-0.7 mcg/kg/min

A unique characteristic of dexmedetomidine is that it:

- A: is not analgesic
- B: provides sedation while preserving arousability
- C: provides sedation and analgesia
- D: causes respiratory depression

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-671-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

LIPOSOMAL BUPIVACAINE IN TOTAL KNEE ARTHROPLASTY (TKA): PATIENT CHARACTERISTICS ASSOCIATED WITH POSITIVE OUTCOMES

Cortney L Valela, B.S., Pharm.D.*

Palos Community Hospital, 12251 S. 80th Avenue, Palos Heights, IL, 60463

cvalela@paloscomm.org

Purpose

The purpose of this research is to identify patient populations that stand to receive the most benefit from the use of liposomal bupivacaine during TKA. Patient characteristics that will be assessed with respect to positive outcomes include patient age, gender, side of surgery (right versus left), body mass index, and opioid status at admission (naïve versus tolerant). Positive outcomes associated with this research are defined as a shorter hospital stay, decreased overall need for postoperative narcotics, longer time to first post-operative opioid use for pain control, fewer episodes of vomiting and use of antiemetic medication, and reduced hospital readmission within 30 days of surgery.

Methods

Data will be analyzed retrospectively from sequential TKA patient cases. Patients undergoing TKA without the use of liposomal bupivacaine will be the control group and those who received liposomal bupivacaine will be in the active treatment group. Patients will be excluded from the study if both knees were operated on within the same 30-day period. The primary endpoint is opioid use on postoperative day one.

Preliminary Results Summary

Patients who received liposomal bupivacaine were administered significantly less opioids on postoperative day one compared to control patients regardless of age or gender, and amongst patients who were overweight or obese at baseline.

Conclusions

Limitations of this study include the small sample size and the study design. The retrospective nature did not allow for control of variables including practice changes during the data collection period. The data from this trial appears to support the use of liposomal bupivacaine to decrease opioid use on postoperative day one following TKA surgery; however, taking these limitations into consideration, it is recommended that the utility of liposomal bupivacaine for this purpose be further studied in a larger, prospective clinical trial.

Learning Objectives:

Recognize the role of pain control following total knee arthroplasty and how this contributes to decreased hospital costs

Identify baseline patient characteristics which are associated with decreased opioid use on post-operative day one in patients undergoing total knee arthroplasty with liposomal bupivacaine

Self Assessment Questions:

Better pain control postoperatively helps contribute to decreased hospital costs by allowing the patient to _____

- A: decrease their oxygen demand
- B: increase their activity with physical therapy
- C: decrease the use of IV steroids
- D: decrease the use of IV antibiotics

Which of the following baseline patient characteristics was associated with a statistically significant decrease in opioid use in patients undergoing total knee arthroplasty with liposomal bupivacaine

- A: Age < 65 years
- B: Surgery on left knee
- C: Body Mass Index 18.5-24.9
- D: Opioid naïve preoperatively

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-878-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION AND EVALUATION OF AN OVERDOSE EDUCATION AND NALOXONE DISTRIBUTION PROGRAM IN A VA MEDICAL CENTER

*Anuja Vallabh, PharmD; Matthew T. Haas, PharmD, BCPP, BCPS; Janel M. Larew, PharmD, BCPS; Angela C. Paniagua, PharmD, BCPS, CGP

Veteran Affairs - Clement J. Zablocki Medical Center, 5000 West National Avenue, Milwaukee, WI, 53295

Anuja.Vallabh2@va.gov

Purpose: Over the last decade, the rate of prescription drug overdose-related deaths in the United States (US) has nearly quadrupled, with over seventy percent of drug overdose deaths in 2011 due to narcotics. A significant rise in opioid-related overdose deaths has also been seen in the U.S. veteran population. The objective of this project is to implement an overdose education and naloxone distribution (OEND) program in a VA healthcare system and evaluate its utilization.

Methods: The implementation of the opioid education and naloxone distribution program will involve the development of educational materials for patients, pharmacists, providers, and nursing staff. Healthcare professionals will be trained on the identification of an opioid overdose, appropriate rescue response, naloxone kit prescribing and distribution processes, and key components of patient education and training. A retrospective analysis of naloxone kit distribution and utilization will be conducted. The electronic medical record system will be utilized to identify patients that have been prescribed a naloxone kit from January 01, 2015 to March 31, 2015. The following information will be collected: prescriber area of practice, patient age and gender, reason for prescription, date of prescription, quantity of opioids prescribed in the last month, total number of naloxone kit prescriptions provided, reasons for repeat prescriptions, and outcomes after naloxone kit use. Qualitative statistics will be utilized to summarize data collected. All patient data will be kept confidential.

Results/Conclusions: Data collection and analysis are currently in progress. Final results and conclusions will be presented at the 2015 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the prevalence of opioid overdose related deaths in the U.S. and veteran populations.
Identify patients that may be at high risk for an opioid overdose.

Self Assessment Questions:

Which of the following accurately portrays recent patterns of opioid overdose related deaths?

- A Over the last decade, the rate of opioid overdose related deaths has increased
- B A decrease in opioid overdose related deaths has been seen in the U.S.
- C A significant rise in opioid overdose related deaths has been seen in the U.S.
- D Over the last decade, the rate of opioid overdose related deaths has decreased

Which of the following patients are at high risk for an opioid overdose?

- A Patients with a history of IV drug abuse
- B Patients having had a period of abstinence from opioids
- C Patients prescribed high doses of opioids
- D All the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-947-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EXTENDED INTERVAL ONCE-DAILY VERSUS TRADITIONAL THRICE-DAILY AMINOGLYCOSIDE DOSING REGIMENS FOR SYNERGY IN GRAM POSITIVE ENDOCARDITIS

Nicholas W. Van Hise, PharmD, BCPS; Pavithra Srinivas, PharmD, BCPS; Rachel Lewis, PharmD; David Smith, PharmD, BCPS-AQID

Indiana University Health, 10575 Northern Dancer Dr, Indianapolis, IN, 46234

nvanhise@iuhealth.org

Purpose: Endocarditis is an extremely common disease with the prevalence continuing to increase. Due to the rising hospital costs and increase emphasis on patient outcomes, the time to clearance of bacteremia in endocarditis management is an issue from clinical, safety and cost standpoints. Aminoglycosides have been shown to demonstrate synergistic effects when used in combination with cell-wall active agents. The purpose of this study is to determine whether once daily aminoglycosides versus thrice daily aminoglycosides are non-inferior to each other for synergy in endocarditis. The data will be used to further the knowledge about the effectiveness of once daily aminoglycoside in synergy for endocarditis.

Methods: This study is a retrospective chart review from downtown IU Health Hospitals from January 1st, 2010 to December 31st, 2013 that utilized electronic health records. Patients will be included in the study if they have confirmed right or left sided infective endocarditis. Pt will also be required to have a positive blood culture for Enterococcus spp., Staphylococcus spp., and Streptococcus spp. The primary outcome will be the time to clearance of bacteremia between the once-daily and thrice-daily dosing arms.

Results/Conclusion: Data collection is in progress. Final data analysis and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize evidence based criteria for using aminoglycosides in endocarditis

Review the aminoglycoside dosing in gram positive endocarditis

Self Assessment Questions:

What is the main dose limiting adverse effect regarding thrice daily dosing regimens?

- A Nephrotoxicity
- B Ototoxicity
- C Hallucinations
- D Seizures

What is the rationale for using aminoglycoside in combination with gram positive bacteria?

- A Anti-inflammatory properties
- B To decrease mortality
- C To cover bacterial co-infections that are not represented in the blood
- D Synergistic bactericidal activity to improve clearance of bacteremia

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-672-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF PREDICTORS OF HYPERAMMONEMIA IN CRITICALLY ILL PATIENTS RECEIVING CONTINUOUS INFUSION VALPROIC ACID

*Edward T. Van Matre PharmD; Alex H. Flannery PharmD, BCPS; Melissa L. Thompson Bastin PharmD, BCPS; Aaron M. Cook PharmD, BCPS

University of Kentucky HealthCare, 800 Rose Street, H110, Lexington, KY, 40536

edward.vanmatre@uky.edu

status epilepticus. A clinically challenging adverse effect of VPA is hyperammonemia (NH₃ >60mcg/dL). Patients with hyperammonemia can present with lethargy, altered consciousness, focal neurological symptoms, and worsening of seizures due to encephalopathy. Critically ill patients receiving VPA may have a higher incidence of hyperammonemia than reported in ambulatory populations due to hypermetabolic states and nutritional deficits. The primary purpose of this study is to evaluate risk factors predictive for the development of hyperammonemia in critically ill patients receiving continuous infusion valproic acid. Methods: This was an Institutional Review Board approved retrospective chart review of patients admitted to a critical care service at the University of Kentucky Chandler Medical Center from January 1, 2012 to June 30, 2014. Patients were included if they were critically ill, greater than 18 years old, and received a valproic acid continuous infusion. Patients included were evaluated based on general demographics, severity of illness (APACHE II), ICU days prior to valproic acid administration, liver function, Glasgow Coma Scale, inpatient nutritional status, and valproic acid bolus and continuous infusion dosing (mg/kg). A multivariate logistic regression model was additionally constructed to evaluate predictive factors of VPA-induced hyperammonemia. Disposition upon discharge was also evaluated between the two groups utilizing the modified Rankin Score. Results/Conclusions: Results to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the typical adverse effects of valproic acid continuous infusions in critically ill patients

Describe the role of targeted and generalized treatments of hyperammonemia secondary to valproic acid therapy

Self Assessment Questions:

Which of the following is(are) mechanisms for valproic acid induced hyperammonemia?

- A: Inhibition of carbamoylphosphate synthase-1 (CPS-1)
- B: Inhibition of gamma-butyrobetaine hydroxylase
- C: Increased renal clearance of carnitine in critical illness
- D: All of the above

What is (are) proposed levocarnitine dosing strategies for hyperammonemia secondary to valproic acid therapy?

- A: Levocarnitine 100 mg/kg IV x 1
- B: Rifaximin 550 PO twice daily
- C: Lactulose
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-673-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

COMPARISON OF ACUTE KIDNEY INJURY IN HOSPITALIZED PATIENTS TREATED WITH VANCOMYCIN MONOTHERAPY OR IN COMBINATION WITH PIPERACILLIN-TAZOBACTAM OR CEFEPIME

Sara Vander Ploeg*, PharmD; Viktorija Barr, PharmD, BCPS; Nick O'Donnell, PharmD

Northwestern Memorial Hospital, 251 E. Huron, LC 700, Chicago, IL, 60611
svander@nm.org

Purpose: Vancomycin is a medication known to cause drug-induced nephrotoxicity that can lead to acute kidney injury (AKI). The incidence of vancomycin associated AKI is increasing likely due to elevated minimum inhibitory concentrations (MIC) for Methicillin-resistant Staphylococcus aureus (MRSA) and the need for higher trough concentrations for adequate killing. Vancomycin is often combined with an anti-pseudomonal -lactam antibiotic, like piperacillin-tazobactam or cefepime, for empiric coverage of a suspected infection. The latter two medications have limited association with AKI, but both are eliminated via the kidneys and may have the propensity to cause nephrotoxicity. In hospitalized patients, these antibiotic-related factors and the use of other nephrotoxic agents (i.e. aminoglycosides, contrast dye, etc.) put patients at increased risk for developing AKI. The primary aim of this study is to do a side-by-side comparison of three commonly used antibiotic regimens to determine if the incidence of acute kidney injury associated with vancomycin plus piperacillin-tazobactam is greater than that of vancomycin plus cefepime or vancomycin alone. Methods: This is a retrospective, single-center, cohort study of patients admitted to Northwestern Memorial Hospital between January 1, 2014 and December 31, 2014. Patients >18 years old who were treated with vancomycin alone or in combination with piperacillin-tazobactam or cefepime for at least 48 hours will be included. Patients will be excluded if they have underlying renal dysfunction (serum creatinine >1.5 mg/dl, creatinine clearance < 30 ml/min or received renal replacement therapy) paralysis or received a dose of aminoglycoside antibiotics. The primary outcome is incidence of AKI. Secondary outcomes include days to AKI, presence of AKI at discharge and vancomycin troughs >15 mcg/dl. Results/Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe the factors that put hospitalized patients at risk for acute kidney injury

Identify the bacterial coverage for vancomycin, piperacillin-tazobactam and cefepime

Self Assessment Questions:

Which of the following, in addition to antibiotics, may contribute to acute kidney injury in hospitalized patients?

- A: Use of docosate/senna
- B: Undergoing a series of x-rays
- C: Use of contrast dye
- D: Immobilization for extended periods

Coverage of which of the following organisms is the reason for use of cefepime in empiric regimens?

- A: Bacteriodes sp.
- B: Pseudomonas aeruginosa
- C: Methicillin-resistant Staphylococcus aureus
- D: Enterococcus faecium

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-948-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INTRAVENOUS MILRINONE IN THE TREATMENT OF VASOSPASM FOLLOWING AN ANEURYSMAL SUBARACHNOID HEMORRHAGE

Rebecca G. VanDerwall, PharmD*, Laura E. Aykroyd, PharmD, BCPS
Indiana University Health, 1701 N. Senate Blvd, Indianapolis, IN, 46202
rvanderwall@iuhealth.org

Purpose:

Cerebral vasospasm is a damaging complication in patients with subarachnoid hemorrhage. Since the mechanism of vasospasm is not fully understood, little pharmacotherapy exists to prevent and treat this devastating complication. Currently the use of hyperdynamic therapy is the best available treatment option. Milrinone, a phosphodiesterase inhibitor, has been used due to its inotropic and vasodilatory effects. The purpose of this study is to determine if the addition of intravenous (IV) milrinone improves the mean cerebral blood flow velocity measured by transcranial Doppler in the treatment of vasospasm following an aneurysmal subarachnoid hemorrhage (aSAH). Additionally, the study will determine an average appropriate dose of IV milrinone for the treatment of vasospasm and evaluate functional outcomes following milrinone use.

Methods:

Patients who were 18 years of age and older, surgically treated or coiled within 72 hours of aSAH onset, had an aneurysm observed on angiogram, experienced symptomatic angiographic vasospasm, and received baseline transcranial Doppler measurements prior to intra-arterial (IA) vasodilator and/or IV milrinone were eligible for inclusion in the study. Patients were excluded if they had a traumatic or non-aneurysmal SAH or received less than 24 hours of milrinone therapy. Included patients who received IV milrinone were then matched to patients who received only IA vasodilators based on age, gender, and Fisher grade.

The following data were retrospectively collected and analyzed: mean cerebral blood flow velocities before and after IA or IV treatment, IA vasodilator use and dose, number of IA injections, duration of milrinone infusion, average 24-hour milrinone infusion rate, and 30-day modified Rankin scores.

Results/Conclusions:

Results and conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the mechanism by which milrinone may help treat cerebral vasospasm after an aSAH.

Select an appropriate pharmacotherapy regimen for the treatment of cerebral vasospasm in patients with an aSAH.

Self Assessment Questions:

What is the proposed mechanism of action of milrinone when treating cerebral vasospasm?

- A: Positive inotropic activity and direct vasoconstrictive activity
- B: Negative inotropic activity and direct vasodilatory activity
- C: Positive inotropic activity and direct vasodilatory activity
- D: Negative inotropic activity and direct vasoconstrictive activity

Which of the following medications may be administered intra-arterially in the treatment of cerebral vasospasm?

- A: Verapamil, Papaverine, Milrinone, Nicardipine
- B: Papaverine, Amlodipine, Nicardipine, Nimodipine
- C: Nicardipine, Verapamil, Diltiazem, Milrinone
- D: Milrinone, Theophylline, Papaverine, Amlodipine

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-674-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

INCIDENCE OF HYPOTENSION WITH CONTINUOUS INFUSION ATRACURIUM COMPARED TO CISATRACURIUM IN THE INTENSIVE CARE UNIT (ICU)

Luke A VanderWeide, PharmD*; Mahmoud Abdel-Rasoul, MS, MPH;
Anthony T Gerlach, PharmD, BCPS, FCCP, FCCM

The Ohio State University Wexner Medical Center, 396 Doan Hall, 410 W
10th Ave, Columbus, OH, 43210

luke.vanderweide@osumc.edu

Background

Cisatracurium is the cis-enantiomer of atracurium and is associated with less histamine release, but the clinical significance in ICU patients is unknown. The purpose of this study is to compare the incidence of hypotension with continuous infusion atracurium to continuous infusion cisatracurium in ICU patients.

Methods

In this retrospective cohort, ICU patients were included if they received either continuous infusion atracurium from January 1, 2014 to September 15, 2014 or cisatracurium between January 1, 2013 to September 15, 2013. Patients were excluded if they were < 18 years, > 89 years, or incarcerated.

The primary outcome was the incidence of hypotension (defined as a MAP < 60 mmHg). Secondary outcomes included incidence of blood pressure decrease of > or = 20% from baseline, time to first hypotensive episode, treatment for hypotension related to NMB use, hospital mortality, ICU and hospital length of stay, duration of mechanical ventilation, and paralytic duration. Statistical Analysis was performed by Fishers exact test for nominal data, t-test for parametric data and Mann-Whitney U-test for nonparametric data.

Results

In preliminary analysis, 127 patients were included (59 received atracurium and 68 cisatracurium) with similar demographics. Hypotension occurred in 66% of atracurium patients and 60% in cisatracurium patients (p=0.50), with 58% experiencing > or = 20% drop in blood pressure in atracurium group and 52% in cisatracurium group (p=0.59). There were no differences between groups for median ICU length of stay (10.5 days atracurium and 12.4 days cisatracurium, p=0.27), median hospital length of stay (13.8 days atracurium and 17.9 days cisatracurium, p=0.25), median infusion duration (33.7 hours atracurium and 23.9 hours cisatracurium p=0.31), or hospital mortality (64% atracurium and 55% cisatracurium, p=0.36).

Conclusions

The majority of patients treated with continuous paralytics developed hypotension and the rates of hypotension were similar between groups. Further studies are needed.

Learning Objectives:

Describe the mechanism by which atracurium may cause hypotension.

State the result of the primary outcome of this study.

Self Assessment Questions:

What is the proposed mechanism by which atracurium causes hypotension

- A: Direct alpha-1 receptor blockade
- B: Direct beta blockade
- C: Diuresis
- D: Histamine release

What was the primary outcome of this study?

- A: Cisatracurium was associated with higher rates of hypotension compared to atracurium
- B: Atracurium was associated with higher rates of hypotension compared to cisatracurium
- C: There was not a significant difference between the two groups.
- D: Cisatracurium had higher rates of hypotension compared to atracurium

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-879-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

DOSE-STRATIFIED INCIDENCE OF VANCOMYCIN-INDUCED NEPHROTOXICITY WITH AND WITHOUT CONCOMITANT PIPERACILLIN-TAZOBACTAM

Jocelyn R. VanOpdorp, PharmD*, Andy K. Kim, PharmD, Mark R. Cox, PharmD, BCPS, Jacob B. Rigdon, PharmD Candidate, Lynn C. Wardlow, PharmD, MBA
University of Louisville Healthcare, 530 South Jackson Street, Louisville, KY, 40202
joceva@ulh.org

Statement of Purpose:

Recently published articles indicate a trend of increased nephrotoxicity with vancomycin and piperacillin-tazobactam (PT) combination therapy. The objective of this study is to determine if there is a dose-related (mg/kg/day) increase in the incidence of vancomycin induced nephrotoxicity in adult hospitalized patients receiving vancomycin and PT compared to vancomycin alone.

Statement of Methods:

This single center retrospective analysis enrolled patients 18 years and older that received at least 72 hours of vancomycin or vancomycin and PT therapy. Patients with baseline or acute renal dysfunction or any history of renal replacement therapy were excluded. Data collection included demographics, serum creatinine (SCr), average daily dose of vancomycin and PT, and vancomycin trough concentrations. The primary outcome, defined as incidence of nephrotoxicity (increase in SCr of 0.5 mg/dL or 1.5 times baseline), was stratified by dose of vancomycin in 10 mg/kg/day increments based on actual body weight. Secondary outcomes included nephrotoxicity stratified by age, steady state vancomycin trough concentrations, length of therapy, and ICU admission. Students t-test and chi-squared test were used to analyze continuous and categorical data respectively.

Summary of Results:

Two hundred patients were evaluated, and the overall rates of nephrotoxicity for the vancomycin (n=100) and vancomycin plus PT (n=100) groups were 11% and 26%, respectively (p=0.006). When stratifying by vancomycin dose in 10 mg/kg/day increments, the rates of nephrotoxicity were similar between groups. Results from the complete data set will be presented at the Great Lakes Pharmacy Resident Conference.

Conclusions:

To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the impact of dose-stratification in mg/kg/day on the rate of nephrotoxicity in patients on vancomycin and combination vancomycin plus piperacillin-tazobactam therapy.

Identify patient-specific and therapy-specific variables that are associated with an increased risk of developing vancomycin-induced nephrotoxicity.

Self Assessment Questions:

Based on the results presented, what impact does dose-stratification have on the rate of nephrotoxicity in patients on vancomycin and vancomycin plus piperacillin-tazobactam therapy?

- A: Combination therapy with piperacillin-tazobactam does not increase nephrotoxicity
- B: Stratifying by vancomycin dose in mg/kg/day can accurately predict nephrotoxicity
- C: Patients will not develop nephrotoxicity at doses of vancomycin less than 10 mg/kg/day
- D: Patients receiving more than 40 mg/kg/day of vancomycin may be at increased risk of nephrotoxicity

In the literature, which of the following has been shown to be associated with an increased rate of nephrotoxicity?

- A: Vancomycin dose greater than 3 grams per day
- B: Vancomycin length of therapy greater than 4 days
- C: Vancomycin therapy in patients admitted to an intensive care unit
- D: Vancomycin therapy with trough level less than 15 mg/L

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-675-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CLINICAL IMPACT OF CONVERTING TO DISPOSABLE PEN AMONG INSULIN-TREATED PATIENTS WITH TYPE 2 DIABETES MELLITUS

Nicole L. Vaughn, PharmD*, Elizabeth Ciuchta, PharmD, Jenny Ung, PharmD, Rachel Chandra, PharmD, BCPS, David Jacobs, PharmD, BCPS

Veteran Affairs - Dayton Medical Center, 4100 W third st, Dayton, OH, 45428

nicole.vaughn2@va.gov

Background: Diabetes Mellitus (DM) requires chronic glycemic control in order to prevent microvascular complications and reduce the risk of cardiovascular disease. Insulin therapy is recommended in symptomatic patients who present with an hemoglobin A1c (HbA1c) greater than 9%, and patients on dual or triple hypoglycemic therapy who have not achieved their HbA1c goal. Converting patients on insulin therapy to prefilled pens from vial and syringe administration has demonstrated improved adherence and cost-effectiveness. Studies utilizing clinical endpoints as the primary outcome in patients who have converted to prefilled pens are lacking. **Purpose:** This study will evaluate changes in glycemic control after conversion from vial and syringe insulin to prefilled pens. **Methods:** This study has been approved by the Institutional Review Board. An electronic database will generate specified data between January 1, 2009 and December 31, 2012. Patients diagnosed with Type 2 DM who had an HbA1c greater than or equal to 8%, and had two prescriptions filled for insulin glargine and/or insulin aspart vials (GLA-V) will be included in the retrospective evaluation. Patients with prescriptions filled for insulin other than aspart of glargine during the study period will be excluded. Patients will be defined as switchers or continuers. Switchers will have filled at least one prescription for glargine and/or insulin aspart pre-filled pens (GLA-P). Continuers will have filled a third prescription for GLA-V, and must not have filled any GLA-P during the study period. Patients age at index date, gender, comorbidities, and medication fill history will be collected. HbA1c will be obtained at baseline, 3 months, 6 months, and 12 months after the index date. Clinical outcomes assessed will include a 1-year follow up of change in HbA1c from baseline and prevalence of hypoglycemia-related events. **Results/Conclusions:** Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Explain the complications that occur in patients with DM as a result of poor glycemic control

Discuss possible barriers to achieving glycemic control that prefilled pens could help overcome

Self Assessment Questions:

Converting patients on insulin therapy to prefilled pens from vial and syringe administration has demonstrated:

- A: Improved adherence
- B: Cost-effectiveness
- C: A and B
- D: None of the above

Initiation of insulin therapy at DM diagnosis is recommended for symptomatic patients with an HbA1c:

- A: > 9.0%
- B: > 8.5%
- C: > 8.0%
- D: > 7.0%

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-676-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST INVOLVEMENT IN BEDSIDE ROUNDING ON A GENERAL MEDICINE UNIT AT A LARGE ACADEMIC MEDICAL CENTER

Katelyn T. Vautrin, PharmD*, Rachael Prusi, PharmD, Kevin Bajer, PharmD, Michael Postelnick, RPh, BCPS

Northwestern Memorial Hospital, 535 N Michigan Avenue, Unit 2106, Chicago, IL, 60611

kvastrin@nm.org

Purpose: Among a multi-disciplinary healthcare team, pharmacists are or should be considered the "medication experts". Pharmacists are a pivotal resource in safe medication use and should utilize a proactive approach in the prevention of medication errors and adverse drug events. It is known that a common root cause of medication errors occurs at the time when decisions about therapy are made and thus, The Institute of Medicine report "To Err is Human" promotes a systems approach utilizing specialized components to mitigate such errors.^{1,2,3} The role of pharmacists among a rounding team should be viewed as a pivotal component in providing an overall safe and satisfactory experience for hospitalized patients. The objectives of this study were to evaluate the impact of having a pharmacist attend bedside rounds on health outcomes, patient satisfaction, and number of significant pharmacist interventions.

Methods: A retrospective cohort study design was used to compare outcomes between patients who received care from a multidisciplinary team with a pharmacist versus those who received care with limited pharmacist involvement. Patients admitted to one of two general medicine units were included. The first unit included a bedside rounding team with a pharmacist, while the second had only peripheral pharmacist involvement (rounding team without a pharmacist). The primary endpoints were improvement in HCAHPS scores pertinent to pharmacy outcomes and the difference in number of clinically significant pharmacist interventions. Secondary endpoints included average length of stay, 30-day all cause readmissions and ED visits. Pharmacist interventions were documented using an online clinical decision support tool.

Results/Conclusions: To be presented at Great Lakes Residency Conference.

Learning Objectives:

Recognize the role of the pharmacist among a multidisciplinary healthcare team.

Describe the benefits of having a pharmacist attend daily patient care rounds.

Self Assessment Questions:

Which of the following statements is correct regarding the role of the pharmacist among a healthcare team?

- A A pharmacist is a resource in safe and effective medication use.
- B: A pharmacist serves only in a dispensary manner.
- C: A pharmacist is the medication expert among a healthcare team.
- D: A and C

Regarding the COLLABORATE study, pharmacist involvement on an internal medicine floor has been shown to do which of the following?

- A Improve 60-day readmission rates versus standard of care patient
- B Improve 30-day readmission rates versus standard of care patient
- C Improve care via specified quality indicators for all disease states
- D B and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-880-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

QUANTITATIVE REVIEW OF AUTOMATED DISPENSING CABINET STOCKING ERRORS AND THE IMPACT OF STAFF EDUCATION AND NEW TECHNOLOGY ON ERROR RATES

Allison Vecchiet, PharmD*, Shelly Morvay, PharmD, Holly Worst, PharmD, Julie Zaucha, RPh, Jenna Merandi, PharmD, MS

Nationwide Children's Hospital, 700 Children's Drive, Columbus, OH, 4320
allie.vecchiet@nationwidechildrens.org

The potential for adverse drug events in the pediatric inpatient population is approximately three times as high as among hospitalized adults. This study analyzes the types of automated dispensing cabinet (ADC) stocking errors made by inpatient pharmacy staff in a pediatric hospital. Current ADC stocking practice involves scanning internally developed barcodes. The primary objective is reduction in the number of ADC stocking errors through staff education, implementation of manufacturer barcode scanning, and tracking of barcode scanning compliance at the point of restocking.

This quality improvement project was designed to analyze ADC stocking errors made by inpatient pharmacy technicians and transporters. Baseline data include ADC stocking errors reported to the voluntary event reporting system between September 1, 2013, and August 31, 2014. Analysis included frequency of errors reported, medication involved, patient unit where the error occurred, barcode scanning compliance at the point of ADC restocking and the severity of the event based on the Nationwide Children's Hospital Clinical Severity Scale. Interventions included optimization of the ADC stocking process, staff education on the revised process, and hospital-wide implementation of manufacturer barcode scanning. ADC stocking errors and barcode scanning compliance were measured following implementation of the interventions. A comparison of baseline and post-intervention data will be used to assess the effectiveness of the interventions.

Baseline data included twenty-nine ADC stocking errors. Of those, 48% were classified as wrong drug events. In August 2014, 70% of staff were compliant with the goal of 95% barcode scanning during ADC stocking. Compliance ranged from 3 - 100%. Education was implemented in November 2014. Only one staff member was noncompliant with barcode scanning in December 2014 with a rate of 89%.

Barcode scanning compliance improved following interventions. Implementation of manufacturer barcode scanning in place of scanning internally developed barcodes has the potential to further improve ADC stocking accuracy.

Learning Objectives:

Identify opportunities to reduce errors during the automated dispensing cabinet stocking process.

Select best practices for a safe, effective medication use system utilizing automated dispensing cabinets.

Self Assessment Questions:

What is the most effective strategy to reduce ADC stocking errors?

- A Reprimand repeat offenders
- B: Monitor staff barcode scanning compliance rates
- C: Implement manufacturer barcode scanning rather than internally d
- D: Establish policies and procedures

What is the more predominant type of ADC delivery error reported in the literature and present study?

- A Wrong drug
- B Wrong strength
- C Expired product
- D Wrong dosage form

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-949-L05-P

Activity Type: Knowledge-based Contact Hours: 0.5

EXTENDED INFUSION VERSUS TRADITIONAL INFUSION CEFEPIME IN CRITICALLY ILL PATIENTS FOR THE TREATMENT OF PSEUDOMONAL BACTEREMIA OR PNEUMONIA

Cory M. Vela PharmD*, Christopher A. Anderson PharmD, BCPS,
Dusten Rose PharmD, BCPS (AQ-ID), AAHIVP
Indiana University Health, 1815 N. Capitol Avenue, Indianapolis, IN, 46206
cvela@iuhealth.org

Purpose: *Pseudomonas aeruginosa* is the most common gram negative organism isolated from intensive care units (ICUs) in the United States. Nosocomial infections with *P. aeruginosa* have been strongly associated with morbidity and mortality rates approaching 60% and increased healthcare expenditures. A pharmacokinetic/pharmacodynamic analysis of 4-hour extended infusion (EI) cefepime 1 gram every 8 hours predicted greater than 90% probability of target attainment at the susceptibility breakpoint of 8mcg/mL, suggesting that improved clinical outcomes may be associated with extended versus intermittent infusion times.

Methods: This retrospective, case-control study matched patients in a 1:1 ratio of EI to traditional infusion (TI) cefepime based upon ICU service, source of positive *P. aeruginosa* infection, and Sequential Organ Failure Assessment score. Data from Indiana University Health was generated using the patient electronic medical records. This single center study compared ICU patients who received cefepime 1 gram every 6-8 hours over 30 minutes from January 1, 2013 to April 1, 2013 to those who received cefepime 1 gram every 6-8 hours over 4 hours from April 2, 2013 to July 31, 2014. The primary objective of this study was to determine the 28-day mortality rate of EI compared to TI cefepime for patients admitted to the ICU at Indiana University Health with a documented pseudomonal bacteremia or pneumonia that was sensitive based on Clinical Laboratory and Standards Institute (CLSI) (MIC \leq 8mcg/mL). Secondary objectives included: length of stay in ICU, days on mechanical ventilation, and overall cefepime consumption in grams between EI and TI regimens.

Results/Conclusions: To be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the pharmacokinetic/pharmacodynamics between extended and traditional infusion for time-dependent antibiotics.
Outline studies which demonstrate a benefit utilizing extended infusion cefepime.

Self Assessment Questions:

Which of the following pharmacokinetic parameters do we target to maintain above the MIC for prolonged periods of time when administering extended infusion time-dependent antibiotics?

- A: AUC
- B: C_{max}
- C: T_{max}
- D: Half-life

When dosing cephalosporins, for what percentage of the dosing interval do serum antibiotic concentrations need to exceed the MIC to exhibit maximal bactericidal activity?

- A: > 40%
- B: > 50%
- C: > 60%
- D: > 70%

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-677-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

REDUCING UNNECESSARY OUTPATIENT PARENTERAL ANTIMICROBIAL TREATMENT FOR EXTENDED-SPECTRUM BETA- LACTAMASE URINARY TRACT INFECTIONS: IS FOSFOMYCIN AS GOOD AS ERTAPENEM?

Michael P. Veve, PharmD*; Jamie L. Wagner, PharmD; Sanjeev Kumar, MHA; Jenny L. Grunwald, PA-C; Susan L. Davis, PharmD
Henry Ford Health System, 2799 West Grand Blvd, Pharmacy Admin
Dept, Detroit, MI, 48202
mveve1@hfhs.org

Background and Objective: Fosfomycin is an antibiotic that retains activity against extended spectrum beta-lactamase (ESBL)-producing bacteria and can reduce unnecessary exposure to broader spectrum antimicrobials, such as carbapenems. Fosfomycin may have a unique role in treating complicated outpatient urinary tract infections (UTIs) due to high urine concentrations, oral dosage form, and reduced treatment costs in comparison to select intravenous agents. We seek to compare treatment outcomes of fosfomycin (FFM) and ertapenem (ERT) for outpatient ESBL-UTIs.

Methods: An IRB approved, retrospective cohort will be performed on Henry Ford Health System outpatients with diagnosed ESBL-UTIs. Patients >18 years old, treated with FFM or ERT as an outpatient from January 2010 to January 2014, and who had a positive urine culture with a microbiologically proven ESBL-producing bacteria resistant to penicillins, monobactams, and oxyimino-cephalosporins will be included. Patients who meet inclusion criteria will be variable-ratio matched in a 1:1 fashion to pre-defined conditions. Treatment efficacy will be evaluated by a primary endpoint of 30-day UTI-related hospital readmission or revisit rates. A non-inferiority analysis will be performed for FFM and ERT. Secondary endpoints include time to readmission, UTI-retreatment within 30 days and retreatment antibiotic selection, 30-day microbiology follow-up results, and difference in treatment costs.

Categorical data will be compared using Chi square or Fishers exact test; continuous data will be compared using Students t or Mann-Whitney-U tests. A multivariate analysis will be performed with logistic regression. Any variable found to have an association with hospital readmission or revisit ($p < 0.2$) or that is deemed clinically relevant will be considered for a multivariable logistic regression model.

Results/Conclusions: To be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify the role of fosfomycin in the treatment of ESBL-UTIs
Describe the burden of illness of ESBL-UTIs

Self Assessment Questions:

Which characteristics of fosfomycin warrant its use in treating ESBL-UTIs?

- A: Significant urine penetration
- B: Reportedly low bacterial resistance rates
- C: Intravenous dosage form
- D: A and B

Inappropriate treatment of asymptomatic bacteriuria leads to increased antibiotic resistance and ESBL production. Which of the following criteria should NOT be considered in the diagnosis of cystitis?

- A: 10^3 uro-pathogens in adult, non-pregnant women
- B: Foul smelling urine
- C: Dysuria or urgency
- D: A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-678-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

**EXTRACORPOREAL MEMBRANE OXYGENATION:
STANDARDIZATION OF UNFRACTIONATED HEPARIN USE IN
ADULTS AND PEDIATRICS**

Christopher W Viesselmann, PharmD*; Anne E Rose, PharmD
University of Wisconsin Hospital and Clinics, 600 Highland
Avenue, Madison, WI, 53792
cviesselmann@uwhealth.org

Purpose: Extracorporeal membrane oxygenation (ECMO) enables maintenance of cardiopulmonary function in the setting of cardiac or respiratory failure. Guidelines for anticoagulation in ECMO have been published, but do not provide definitive recommendations for dosing and monitoring of unfractionated heparin (UFH), and no consensus exists in the literature. Within the University of Wisconsin Hospital and Clinics (UWHC), there is no preferred laboratory test or associated target range for monitoring UFH for ECMO. Documentation of UFH adjustments is poorly defined leading to confusion among providers and adverse events related to bleeding and thrombosis. The purpose of this project is to improve UFH management and documentation practices in adult and pediatric patients receiving ECMO and to reduce the incidence of bleeding and thrombosis in these patients. **Methods:** The study was approved by the UW Health Anticoagulation Committee and Institutional Review Board. A literature search for best practices and guidelines relating to ECMO and anticoagulation was conducted. An email survey on anticoagulation management in ECMO from peer centers was sent. A retrospective chart review of patients who received UFH for ECMO at UWHC was conducted to analyze bleeding and thrombotic outcomes. A multidisciplinary project team was created to review findings and facilitate safe and appropriate use of UFH in this population. **Results:** Seventeen of 76 ECMO centers responded to the survey, revealing variability in UFH monitoring tests and target ranges between centers. Chart review of 31 UWHC patients who received ECMO from 1/1/2013 to 8/13/2014 also revealed wide variability in monitoring tests and target ranges, a rate of bleeding events of 74%, and a rate of thrombotic events of 32%. The project team recommended creation of a clinical practice guideline for anticoagulation in ECMO, electronic decision support, and an electronic clinical monitoring tool. **Conclusions:** To be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain the benefits and drawbacks of the different laboratory tests to monitor UFH in ECMO.

Discuss the utility of supplemental laboratory testing for monitoring anticoagulation status in patients receiving UFH for ECMO.

Self Assessment Questions:

What laboratory monitoring test is an in vitro measure of in vivo heparin activity?

- A: Activated clotting time
- B: Antifactor Xa assay
- C: Thromboelastography
- D: Activated partial thromboplastin time

At what antithrombin III (AT III) level is it recommended to replace AT III in a patient receiving UFH for ECMO?

- A: 100%
- B: 50%
- C: 25%
- D: Unknown

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-679-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

**IMPLEMENTATION AND EVALUATION OF A PHARMACY
MEDICATION INTAKE CLINIC FOR NEW PATIENTS AT A VETERAN'S
AFFAIRS HOSPITAL**

Janelle L Vittetoe, PharmD*; Jennifer L Wood, PharmD, BCPS; Ellina S Pisetsky, PharmD; Arthur A Schuna, RPh, MS, BCACP, FASHP
Veteran Affairs - William S. Middleton Hospital, 2500 Overlook
Terrace, Madison, WI, 53705
janelle.vittetoe2@va.gov

Purpose:

The purpose of this new service implementation project was to help improve patients access to care, ease new patient transition into the VA healthcare system, and meet the needs of primary care providers (PCPs). Evaluation of the new Pharmacy Medication Intake Clinic includes the impact on improved access to care, cost avoidance, and PCP satisfaction.

Methods:

The new Pharmacy Medication Intake Clinic operates one-half day per week through 30 minute telephone visits. Patients enrolled were those establishing primary care within the Madison VA Patient Aligned Care Teams (PACT). Patients were contacted prior to their first PCP appointment in order to perform medication reconciliation with appropriate formulary conversions and provide education on VA pharmacy policies and procedures. Medication orders were then entered for signature by PCP and a templated note was documented within the medical record for PCP review. A retrospective chart review of patients contacted by the Pharmacy Medication Intake Clinic between December 15th, 2014 and March 31st, 2015 was completed for evaluation of this new pharmacy service. Data collected included the number of medications taken, number of formulary conversions made, number of consults and recommendations made to and accepted by PCPs, pharmacist encounter time spent, and PCP encounter time spent completing medication related tasks. Additionally, satisfaction surveys were given to PCPs directly involved with the clinic and a cost avoidance analysis was performed.

Results and Conclusions:

This study is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the activities completed and topics reviewed during each patient encounter in the new Patient Medication Intake Clinic

Define the term PACT and describe how the Madison VA utilizes a PACT Model within primary care

Self Assessment Questions:

At the Madison VA each Patient Aligned Care Team (PACT) is made up of the following personnel except?

- A: Nurse Case Manager
- B: Psychiatrist
- C: Pharmacist
- D: Primary Care Provider

Which is true regarding the Pharmacy Medication Intake Clinic?

- A: Medication reconciliation is completed after the first primary care encounter
- B: Appointments are conducted through face-to-face encounters
- C: Information regarding VA pharmacy policies and procedures are d
- D: PCPs are in charge of entering medication orders following reconc

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-881-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ACCURACY AND IMPACT OF A PENICILLIN ALLERGY LABEL ON HOSPITALIZED PATIENT OUTCOMES

Sara P. Vu, Pharm.D.*, Kwang Yoon, Pharm.D., BCPS,
Swedish Covenant Hospital, 5145 N. California Ave, Chicago, IL, 60625
svu@schosp.org

Purpose:

The objective of this study was first to assess the accuracy of penicillin allergy documentation and second to determine the length of hospital stay, number of admissions to the intensive care unit (ICU), and prevalence rates of methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* for patients with and without a documented penicillin allergy.

Methods:

Electronic medical records for 1,540 hospitalized adult patients who received an antibiotic between January 1, 2013 and March 31, 2013 were evaluated for penicillin allergy documentation. Patients admitted to same day surgery, obstetrics, or observation units were excluded. Using these charts (n=222), allergy documentation was reviewed and a retrospective case-control study was conducted. Case subjects (n=150) with a documented penicillin allergy were matched to control subjects (n=150) by age-group, sex, and ICD-9 discharge diagnosis. Statistical analysis was performed using the Fishers exact and t-test.

Results:

Of patients given an antibiotic, penicillin allergy was documented in 14.4% (n=222) of charts. When reviewed, an allergic reaction description was missing in 60.8% (n=135) and adverse drug reactions were incorrectly documented as drug allergies in 4.1% (n=9) of these charts. Therefore penicillin allergy documentation was accurate in 35.1% of charts. In the case-control study, case subjects had a longer hospital length of stay (7.32 days vs. 6.31 days; p<0.05), a trend towards a greater number of ICU admissions (26 vs. 15; p=0.09), and more MRSA positive cultures (35 vs. 17; p=0.006) when compared to control subjects. However there was no difference for *C. difficile* prevalence.

Conclusion:

Those with a penicillin allergy label had increased length of stay, a trend towards greater ICU admissions, and increased prevalence of MRSA. Study results will be presented to hospital staff and utilized to improve accuracy of allergy documentation. Furthermore, a guideline for allergy assessment and cephalosporin use in penicillin allergic patients is being created.

Learning Objectives:

Review the mechanism and risk of cross-reactivity between cephalosporins and penicillin

Discuss when it would be appropriate to use a cephalosporin to treat a patient with a documented penicillin allergy

Self Assessment Questions:

What is the Ig-E mediated allergic cross-reaction rate between penicillins and third-generation cephalosporins?

- A: > 10 %
- B: 3 – 4 %
- C: 1 – 2 %
- D: < 1 %

A 29 yo female patient with history of morbilliform rash from amoxicillin presents to the ED with complaints of persistent dysuria and urinary frequency after failing outpatient treatment with nitrofurantoin. Her urine cultures returned (+) *E. coli*, (R)

- A Nitrofurantoin PO
- B Cefpodoxime PO
- C Ciprofloxacin IV
- D Imipenem/cilastatin IV

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-882-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A NOVEL PHARMACIST LED GERIATRIC FALLS MEDICATION MANAGEMENT CLINIC

Erica L Wagner, PharmD*; Art A Schuna, RPH, MS, BCACP; Robert J Przybelski, MD, MS

Veteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Madison, WI, 53705

erica.wagner2@va.gov

Purpose: Falls are a major health problem in older adults and can lead to injury, hospitalization and increased health care costs. Approximately one third of adults aged 65 years or older experience a fall every year. Several meta-analyses have shown that multifactorial intervention programs are effective for reducing falls and in particular, medication review and reduction has been shown to have a significant impact in fall reduction. Therefore, a novel pharmacist led clinic was created to manage patients following their initial Falls clinic appointment with a geriatrician. The purpose of this study is to evaluate the fall risk reduction and therapeutic outcomes in patients enrolled in the Geriatric Falls Medication Management clinic.

Methods: This new pharmacist managed clinic operates day per week and provides follow-up care for patients initially seen in the VA Falls clinic who required more extensive medication modification, laboratory monitoring, and education to reduce their risk of future falls. Patients were seen within 6-8 weeks following their initial Falls clinic appointment and thereafter every 2-3 months as needed. Data collected included patient demographics, number of falls in past year and past three months, previous injury or hospitalization from a fall, number and type of laboratories monitored at each appointment and all interventions, referrals and recommendations made at each appointment. The primary outcome is fall reduction as measured by patient reported falls in the three months prior to and following the initial Geriatric Falls Medication Management clinic appointment. Secondary outcomes include interventions made at each appointment, including medication adjustments, and targeted specific vitamin levels achieved.

Results and Conclusions: To be presented

Learning Objectives:

Recognize medications that can increase patients risk of falls

Identify specific pharmacologic and non-pharmacologic interventions that pharmacists can implement to reduce the risk of falls in older adults

Self Assessment Questions:

A recent review of several meta-analyses of vitamin D supplementation in older adults, revealed that the number of older adults needed to treat with vitamin D to prevent one person from falling was ____

- A 10
- B: 15
- C: 20
- D: 60

According to one study, an intensive prescription review program reduced the risk of falls in older adults by what percentage?

- A 26
- B 32
- C 39
- D 48

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-680-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

FINANCIAL GAP ANALYSIS OF A MEDICATION ASSISTANCE PROGRAM

Dyson T. Wake, Pharm. D.*; Jeanne M. Anderson, Pharm.D., BCPS; Mark P. Herriman, Pharm.D., BCPS; Marka L. Lawson, CPhT; Kaitlyn M. Priniski, Pharm.D., BCPS

Memorial Hospital of South Bend, 615 N. Michigan St., South Bend, IN, 46601

dwake@beaconhealthsystem.org

Purpose: To estimate the revenue impact of a Medication Assistance Program (MAP) and identify a return on investment for hiring MAP staff. **Methods:** In this retrospective study, patients served by the MAP at Memorial Hospital of South Bend between 05/01/14 and 11/31/14 will be evaluated. A secondary analysis is performed on data from patients who the MAP was not able to assist due to time constraints. Data collected included the medication name, strength, and quantity, and the amount and source of financial assistance. Costs of medications are defined by the group purchasing organization (GPO) cost of the medication at the time of data analysis. Further costs of providing the program are derived from financial records of employee salary. Cost avoidance will be defined as expenses that could have reasonably been expected had the MAP not intervened; for example, the cost of a medication if it had been provided as a discharge supply. A survey was also distributed to providers of the studied patients to determine their awareness of financial constraints and likelihood of altering therapy had the MAP coordinator not intervened. The patient volume and derived mean financial benefit per patient is used to determine the potential financial benefit of program expansion.

Results and Conclusions: Preliminary data indicate an estimated cost avoidance of \$494,287.85 within the study period. Final results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Explain the function of medication and prescription assistance programs
Describe a potential organizational structure for a medication assistance program within a hospital.

Self Assessment Questions:

Which of these accurately describe a prescription assistance program?

- A: Presentations designed to improve patient health literacy.
- B: Service provided by clinics to improve patient access to providers.
- C: Medication counseling provided by hospitals to improve patient outcomes.
- D: Discount program provided by manufacturers to improve availability.

Which of these describe the organizational structure of the medication assistance program at the studied hospital?

- A: A part-time unlicensed associate
- B: A PRN nurse working on multiple floors
- C: A full-time pharmacy technician under the pharmacy department
- D: A contracted pharmacist working under the emergency department

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-883-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF THE RISK OF PNEUMONIA WITH CHRONIC BENZODIAZEPINE USE IN THOSE WITH COPD OR HEART FAILURE WITHIN A VETERANS AFFAIRS MEDICAL CENTER

Natalie A. Walker, PharmD*, Matthew T. Lane, PharmD, BCPS; Kelly W. Davis, PharmD, BCPS

Veteran Affairs - Lexington Medical Center, 1101 Veterans Drive, Lexington, KY, 40502

natalie.walker@va.gov

Purpose: Those with COPD and heart failure require more frequent medical care as disease progression compromises their ability to recover from comorbid illness. Benzodiazepines, which have shown mixed results when examined as a contributor to respiratory illness, are commonly prescribed within the Veteran population. It is important to determine whether chronic use is associated with an increased risk of developing pneumonia in those with COPD or heart failure. This will allow prescribers to modify therapy in high-risk patients, utilizing alternative medications and non-pharmacologic methods to improve health outcomes.

Methods: This study has received Institutional Review Board approval. A random sample of Veterans with a diagnosis of COPD or heart failure will be identified. Retrospective chart review of the computerized patient record system (CPRS) will be utilized to collect patient age, benzodiazepine agent if prescribed, dates of benzodiazepine use, date of pneumonia diagnosis, antibiotic treatment, level of care required, length of stay if hospitalized, and date of death. The primary outcome of this study will be the rate of diagnosed pneumonia in patients with COPD or heart failure during the study period, dividing patients into two groups based on presence or absence of chronic benzodiazepine use at the time of pneumonia diagnosis. The primary outcome will be compared using a chi-square test. Secondary outcomes will include evaluation of hospital admissions, hospital length of stay, whether antibiotics were prescribed and mortality based on the presence or absence of chronic benzodiazepine use.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review known risk factors for the development of pneumonia.
Identify potential reasons that benzodiazepines may contribute to the development of pneumonia.

Self Assessment Questions:

Which of the following is a risk factor for developing pneumonia?

- A: Age 40-60
- B: Heart disease
- C: Chronic Obstructive Pulmonary Disease
- D: b & c

Which of the following is a proposed mechanism for pneumonia development in the presence of benzodiazepines?

- A: Benzodiazepines decrease the effectiveness of the pneumococcal vaccine.
- B: Benzodiazepines inhibit the activity of macrophages.
- C: Benzodiazepines weaken respiratory epithelium.
- D: Benzodiazepines decrease the number of T cells available for an immune response.

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-681-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF A PHARMACY DRIVEN PROTOCOL TO REDUCE INAPPROPRIATE STRESS ULCER PROPHYLAXIS IN THE MEDICAL SURGICAL INTENSIVE CARE UNIT

Jessica Walles, Pharm.D.*, Annette Elens, RPh

Presence St. Joseph Medical Center, 333 Madison Street, Joliet, IL, 60435
jessica.walles@presencehealth.org

Overutilization of stress ulcer prophylaxis (SUP) is a growing issue in hospitals nationwide. The overuse of acid suppressant therapy (AST) has led to adverse effects including clostridium difficile associated diarrhea (CDAD), nosocomial pneumonia, and thrombocytopenia. The primary objective of this study is to identify and reduce inappropriate use of stress ulcer prophylaxis by implementing a pharmacy driven, guideline-based protocol.

Prior to study implementation, the protocol was approved by the Institutional Review Board. A two month retrospective observational study was conducted to identify patients who received inappropriate stress ulcer prophylaxis therapy. Patients 18 years and older admitted to the medical surgical intensive care unit (MSICU) were included in the study. Patients were excluded if they were on a histamine-2 receptor antagonist (H2RA) or proton pump inhibitor (PPI) for another indication not attributed to SUP. Patients were screened for either inappropriate AST or absence of SUP when clinically indicated, based on the 1999 ASHP Stress Ulcer Prophylaxis Guidelines. A two month prospective cohort study will then be conducted using a pharmacy driven protocol, which has been approved by the pharmacy and therapeutics committee. The guideline-based protocol allows for the initiation of SUP when a patient in the MSICU meets the pre-specified criteria in the guideline or discontinuation of SUP when a patient no longer meets those criteria. The primary outcome is percent reduction of inappropriate SUP therapy. The secondary outcome is overall drug cost savings.

Data collection is currently ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize appropriate indications for stress ulcer prophylaxis based on the ASHP Stress Ulcer Prophylaxis Guidelines
Identify strategies to reduce inappropriate use of stress ulcer prophylaxis

Self Assessment Questions:

Which of the following is an appropriate indication for stress ulcer prophylaxis?

- A: Mechanically ventilated for greater than 48 hours
- B: Age greater than 65 years-old
- C: Admitted to a general medicine floor
- D: Receiving low-dose oral corticosteroids

Which of the following can be used to reduce inappropriate stress ulcer prophylaxis?

- A: Change all pantoprazole to famotidine
- B: Add on acid-suppression therapy for all patients
- C: Discontinue pantoprazole in patients receiving enteral nutrition
- D: Implement a pharmacy-driven protocol

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-682-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

TRIMETHOPRIM/SULFAMETHOXAZOLE VERSUS MOXIFLOXACIN VERSUS LEVOFLOXACIN FOR THE TREATMENT OF STENOTROPHOMONAS MALTOPHILIA BLOODSTREAM INFECTIONS

Luke Watson, PharmD*; John Esterly, PharmD, BCPS AQ-ID; Milena McLaughlin, PharmD, MSc, BCPS, AAHIVP; Michael Postelnick, RPh BCPS AQ-ID

Northwestern Memorial Hospital, 251 E Huron St, Chicago, IL, 60611
lwatson@nmh.org

Purpose:

Stenotrophomonas maltophilia is an opportunistic Gram negative pathogen that commonly infects immunocompromised patients. S. maltophilia is widely known to be intrinsically resistant to multiple antibiotics including most -lactams and aminoglycosides. The first-line therapy for the treatment of S. maltophilia is trimethoprim/sulfamethoxazole (TMP/SMX) which is active against isolates in most settings; however, allergic reactions, intolerance, and resistance to TMP-SMX can limit its usage. Recent literature supports the use of fluoroquinolone for the treatment of Stenotrophomonas maltophilia bloodstream infections. The objective of this study is to assess the clinical outcomes of patients with S. maltophilia bloodstream infections that are treated with levofloxacin and moxifloxacin compared with TMP/SMX.

Methods:

This study is a retrospective, single-center, observational cohort study of patients with S. maltophilia bloodstream infections at Northwestern Memorial Hospital (NMH). Inclusion criteria are at least one positive blood culture for S. maltophilia, hospitalized from 01/01/2004-12/31/2014, ≥18 years-of-age, and treated with at least 48 hours of active therapy with levofloxacin, moxifloxacin, or TMP/SMX. Patients with receiving combination therapy that is active against S. maltophilia will be excluded from the study. Pertinent patient variables will be collected and evaluated including baseline demographics, co-morbidities, treatment regimen, time to first negative blood culture, discontinuation due to adverse drug events, and in-hospital mortality. The primary endpoint will be in-hospital mortality. Secondary outcomes will be time-to-death due to infection, time to first negative blood culture, length of stay post culture, and duration of antibiotic use. Univariate analyses will be performed on all data. Continuous variables will be evaluated with Student's t-test or Wilcoxon rank sum test and categorical variables will be evaluated with the Chi-square or Fisher's exact test as appropriate.

Results:

Data collection and analysis currently in progress.

Conclusions:

To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize risk factors for Stenotrophomonas maltophilia infections.
Identify antibiotic agents that are active against Stenotrophomonas maltophilia.

Self Assessment Questions:

Which of the following has been correlated as a risk factor for Stenotrophomonas maltophilia infections?

- A: History of multidrug-resistant infection
- B: Renal dysfunction
- C: Hepatic dysfunction
- D: Immunocompromised state

Which of the following agents has an established susceptibility breakpoint for S. maltophilia according to Clinical and Laboratory Standards Institute guidelines?

- A: Ceftriaxone
- B: Levofloxacin
- C: Doxycycline
- D: Moxifloxacin

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-683-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DESIGN AND IMPLEMENTATION OF THE ROLE OF THE PRIMARY CARE PHARMACIST IN ADVANCING CARE FOR HIGH RISK PATIENTS IN AN ACADEMIC MEDICAL CENTER

April J. Weaver*, PharmD, PGY-2 Ambulatory Care Pharmacy Practice Resident; Michelle M. Thoma, PharmD, BCACP, Ambulatory Clinics Manager

University of Wisconsin Hospital and Clinics, 600 N. Highland Ave. F6/133-1530, Madison, WI, 53792

aweaver@uwhealth.org

Purpose:

With the formation of Medicare Accountable Care Organizations (ACOs) there has been increased interest within many academic medical centers to improve performance measures by maximizing the expertise of pharmacists, nurses, and other healthcare professionals. At this institution, primary care pharmacists have impacted patient readmission rates and physician and patient satisfaction scores through initiation of an off-site telephone-based clinic but are not currently integrated directly into clinic workflows. The primary objective of this study is to expand the role for pharmacists within the primary care clinics by focusing on the advancement of care for the high risk, complicated patients within the medical center.

Methods:

Clinic workflows were evaluated at the pilot site to understand the roles of all on-site staff. Additionally, the current primary care organizational workflows were compared to those of an outside health system in which primary care pharmacists were already well integrated. A workgroup composed of nurses, medical assistants, a physician, and a clinic manager was established to discuss possible clinic roles for the pharmacist that would align with physician and nursing goals and maximize pharmacists' clinical education. Risk factors were also identified that should trigger patient referral to pharmacy. Based upon the workgroup discussions, a pilot was implemented to assess the feasibility and impact of the proposed activities. Process and outcome measures were agreed upon by the workgroup prior to the pilot and included "pharmacist time in clinic" as well as "number and type of recommendations accepted". Additionally, healthcare provider perspectives of pharmacist time in primary care clinic were evaluated through a post-implementation survey.

Results/Conclusions:

This study is still under investigation. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the benefits of including pharmacists in the healthcare of high risk, complicated patients.

List important topics to evaluate prior to piloting pharmacist services within a primary care clinic.

Self Assessment Questions:

Pharmacist involvement in the healthcare of high risk, complicated patients can provide which of the following benefits?

- A: Reduction in readmission rates
- B: Physician dissatisfaction
- C: Reduction in healthcare efficiency
- D: Increase in patient wait times

What was one of the topics discussed with the clinic workgroup prior to pilot implementation?

- A: Alignment with retail pharmacy initiatives
- B: Qualifications for participating physicians
- C: Future expansion of clinic pharmacy services
- D: Maximizing pharmacists' clinical education

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-884-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EFFECT OF A PHARMACIST CONDUCTED POST HOSPITAL DISCHARGE MEDICATION REVIEW ON THE 30 DAY READMISSION RATE TO THE HOSPITAL OR EMERGENCY DEPARTMENT

Emily Weisenbeck, PharmD*, Cathy Lea, RPh, BCACP, Michael O'Brien, RPh, MS, Ross Dierkhising, MS

Mayo Clinic Health System-Eau Claire, 1221 Whipple Street, Eau Claire, WI, 54703

weisenbeck.emily@mayo.edu

Purpose: Transitioning from one care setting to another puts patients at high risk for experiencing medication errors or adverse events. Patients with medication discrepancies are twice as likely to be readmitted to the hospital within 30 days of discharge. Many factors may contribute to medication errors or adverse events after discharge and many studies have researched this complex issue. No optimal approach has been identified to solve the problem. The primary aim of this study is to determine the effect of a pharmacist conducted post hospital discharge medication review in an internal medicine clinic on the 30 day readmission rate to the hospital or emergency department. Furthermore the study will determine the number and describe the types of drug therapy problems, recommendations and actions that were identified or made by the pharmacist.

Methods: A retrospective analysis will be conducted on patients who have met with a pharmacist in the internal medicine department for a post hospital discharge medication review. Patients that were 18 years or older and were deemed intermediate or high risk for readmission based on the current hospital's risk assessment tool were included in this study. Patients were excluded if they were not followed by the internal medicine department and were discharged to a skilled nursing facility or rehabilitation center. Pearson's chi-square test will be used to compare 30 day readmission rates between patients who did and did not meet with a pharmacist for a post hospital discharge medication review. Data will be collected to tabulate the number and types of drug therapy problems, recommendations and actions that pharmacists identified or made during the post hospital discharge medication reviews.

Results: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the implications of medication discrepancies at hospital discharge.

Describe the optimal strategy for improving transitions of care following a hospital discharge.

Self Assessment Questions:

Which of the following statements is true regarding medication discrepancies?

- A: Outpatient pharmacists have access to the necessary information
- B: Patients with medication discrepancies are twice as likely to be readmitted
- C: Medication discrepancies rarely occur
- D: Medication discrepancies do not increase the risk for adverse events

Which of the following methods is the best way to improve the transitions of care process following a hospital discharge?

- A: Pharmacist led phone visit with patient following a hospital discharge
- B: Face to face visit with a pharmacist following a hospital discharge
- C: Medication counseling by a hospital pharmacist prior to discharge
- D: Optimal strategy is still unclear

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-885-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF A NEWLY IMPLEMENTED PHARMACIST MANAGED VANCOMYCIN DOSING SERVICE IN A COMMUNITY TEACHING HOSPITAL

Cara Weisenberger PharmD*; Lauren A. Thomas, PharmD, BCPS; Daniel A. Lewis, PharmD, BCPS; Abbi L. Smith, PharmD, BCPS
Cleveland Clinic - South Pointe Hospital, 20000 Harvard Avenue, Warrensville Heights, OH, 44122
weisenc@ccf.org

Purpose: Vancomycin is regularly utilized as treatment for serious gram-positive bacterial infections. Vancomycin requires patient-specific dosing and monitoring of therapy to ensure efficacy, safety and to prevent the development of resistance. Vancomycin dosing guidelines from the Infectious Diseases Society of America in 2009 state empiric dosing should be based on actual body weight, and evidence supports monitoring vancomycin therapy by serum trough concentrations. Nationally, there is increasing vancomycin resistance in *Enterococcus* sp., from 60% to 80% of all *E. faecium* and from 2% to 6.9% of all *E. faecalis* infections reported from 2006 and 2007. Previous studies have shown pharmacist-managed vancomycin dosing and monitoring protocols based on patient-specific dosing improve optimization of vancomycin therapy. This study will evaluate the pharmacist-managed vancomycin dosing service at South Pointe Hospital.

Methods: Prior to commencement, this study was submitted to the Institutional Review Board for approval. Epic My Practice will be utilized to identify inpatients admitted to any unit who are 18 years or older and prescribed intravenous vancomycin for at least 48 hours. Patients will be excluded if they were on IV vancomycin therapy prior to admission, on dialysis or received surgical prophylaxis doses. The primary objective is to evaluate optimal dosing of IV vancomycin, based on actual body weight and calculated creatinine clearance, of patients dosed by pharmacy versus patients not dosed by pharmacy. Data collected includes: patient demographics, serum creatinine, BUN, vancomycin doses, administration times, trough data and concomitant nephrotoxic medications. Optimal initial dose is defined as ≥ 13.5 mg/kg, with an interval determined by calculated creatinine clearance. Target therapeutic range is determined by indication for vancomycin use, and is provided in institutional dosing guidelines. Data will be collected until vancomycin is discontinued or the patient is discharged.

Results and Conclusions: Results and conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss increasing resistance to vancomycin in various bacterial species.
Review IDSA vancomycin dosing and monitoring recommendations.

Self Assessment Questions:

What is the commonly accepted minimum inhibitory concentration (MIC) of *S. aureus* isolates that are considered to be vancomycin-resistant?

- A: > 8 mcg/mL
- B: > 16 mcg/mL
- C: > 32 mcg/mL
- D: > 64 mcg/mL

IDSA guidelines recommend that vancomycin trough concentrations should be maintained above:

- A: 5 mcg/mL
- B: 7.5 mcg/mL
- C: 10 mcg/mL
- D: 15 mcg/mL

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-684-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF HYPERCHLOREMIA SECONDARY TO HYPERTONIC SODIUM CHLORIDE ADMINISTRATION ON ACUTE KIDNEY INJURY

Patrick Welch, PharmD*; Christopher Droege, PharmD; Jessica Winter, PharmD, BCPS; Shaun P. Keegan, PharmD, BCPS; Neil Ernst, PharmD; Kiranpal Sangha; Eric W. Mueller, PharmD, FCCM, FCCP
UC Health - University Hospital (Cincinnati), 234 Goodman Dr, Cincinnati, OH, 45219
patrick.welch@uchealth.com

Purpose: Hypertonic sodium chloride (HTS, $> 0.9\%$) has multiple clinical indications, including the treatment of hyponatremia and management of elevated intracranial pressure secondary to traumatic brain injury or intracranial hemorrhage. Isotonic sodium chloride (0.9%) and subsequent hyperchloremia have been associated with acute kidney injury (AKI), prolonged length of hospital stay, and increased mortality. Hyperchloremia secondary to the administration of HTS may have similar effects, but the potential association has not been evaluated. The primary objective of this study is to compare the incidence of AKI among predefined peak serum chloride concentration tertiles (i.e., ≤ 110 mmol/L, 111-119 mmol/L, and ≥ 120 mmol/L) in critically ill patients receiving HTS therapy.

Methods: This investigator-initiated, retrospective chart review is evaluating adult patients admitted to University of Cincinnati Medical Center between January 2012 and March 2015 for a minimum of 48 hours. Patients receiving greater than 15 grams of intravenous chloride via HTS are included. Patients with pre-existing hyperchloremia (serum chloride > 110 mmol/L) or baseline renal insufficiency are excluded. A multivariate regression will be performed to identify factors which increase the risk of developing AKI, including time to onset of hyperchloremia, total grams of chloride received, and magnitude of change in serum chloride from baseline. Other potential factors including concurrent diagnoses, indication for HTS, age, sex, and concurrent nephrotoxic agents (e.g., aminoglycosides; contrast dyes diuretics) will also be evaluated. Rate of in-hospital mortality, length of hospital and intensive care unit stay, and incidence of acidemia (pH < 7.35) will also be compared among tertiles of peak serum chloride concentration.

Results and Conclusions: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss chloride physiology.
Describe the adverse effects which have been associated with supraphysiologic chloride-containing fluids.

Self Assessment Questions:

Which of the following statements is correct?

- A: Chloride is a primary intracellular anion.
- B: Twenty-five percent of chloride is reabsorbed in the proximal tubule.
- C: Chloride is a key contributor to strong ion difference.
- D: Hyperchloremia is a known cause of metabolic alkalosis.

Which of the following effects have been associated with the use of supra-physiologic chloride-containing fluids?

- A: Increased use of renal replacement therapy
- B: Heart failure
- C: Increased rate of nosocomial infections
- D: Hyperglycemia

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-686-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANTIMICROBIAL TREATMENT AND MORTALITY RISK FOR CARBAPENEM-RESISTANT KLEBSIELLA PNEUMONIAE PNEUMONIA

Sarah C. Welch, PharmD*, Elizabeth A. Neuner, PharmD, BCPS (AQ-ID); Simon W. Lam, PharmD, BCPS, FCCM; Seth R. Bauer, PharmD, BCPS, FCCM; Eric Cober, MD; David van Duin, MD, PhD; Stephanie N. Bass, PharmD, BCPS

Cleveland Clinic, 9500 Euclid Ave, JN1-422, Cleveland, OH, 44195
welchs@ccf.org

Background: Carbapenemase-producing *Klebsiella pneumoniae* (CRKP) bacteria are a group of emerging highly drug-resistant gram-negative bacilli causing infections with reported mortality rates of 47% to 66%. In vitro data have demonstrated that combination therapy with tigecycline and colistin produces synergistic effects on bacterial killing, and studies investigating CRKP bloodstream infections suggest better outcomes when two or more drugs with activity against the isolate are used. Tigecycline has been shown to have excellent in vitro activity; however, it may not achieve adequate concentrations in the epithelial lining cells of the lung. Similarly, the distribution of colistin into the pleural cavity and lung parenchyma is poor. Failure with colistin as monotherapy for the treatment of multi-drug resistant nosocomial pneumonia has been reported. Clinical outcomes in a real-world setting are needed to establish optimal therapeutic regimens.

Objective: To identify factors associated with mortality of carbapenem-resistant *Klebsiella pneumoniae* pneumonia

Methodology: A non-interventional, retrospective case-control study will be conducted to evaluate factors associated with mortality of CRKP pneumonia. The primary objective is to describe the influence of combination antimicrobial therapy on mortality at 30-days. Secondary objectives include empiric regimen, duration of definitive therapy, and time to appropriate antibiotics. Adult patients admitted to the hospital with a positive respiratory culture with carbapenem-resistant *Klebsiella pneumoniae* and evidence of pneumonia will be included. Data describing patient demographics, baseline characteristics, organism susceptibility and MIC, organism strain and genotype, daily antibiotic use, duration of therapy, and 30-day mortality will be collected. Nominal data will be analyzed using the Chi-Square or Fishers exact test and continuous data will be analyzed using the Students t-Test or the Mann-Whitney U-Test. A multivariate logistic regression will be used to assess for independent predictors of 30-day mortality.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review current literature evaluating antimicrobial therapy practices in patients infected with carbapenemase-producing *Klebsiella pneumoniae* (CRKP) bacteremia

Discuss pharmacokinetic distribution of agents used to treat CRKP in lung and illustrate why antimicrobial therapy strategies may differ for the treatment of pneumonia

Self Assessment Questions:

Which of the following statements is correct?

- A: Tigecycline achieves high concentrations in the epithelial lining flu
- B: Patients infected with carbapenem-resistant *Klebsiella* infections h
- C: Colistin achieves high concentrations in the lung parenchyma.
- D: Studies in patients with KPC bloodstream infections suggest imprc

What is the 2010 CLSI *Klebsiella* breakpoint for meropenem resistance?

- A: ≤ 0.25
- B: ≤ 0.5
- C: ≤ 1
- D: ≤ 2

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-685-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ACTUAL VERSUS ADJUSTED BODY WEIGHT AS THE IDEAL STANDARD FOR VANCOMYCIN DOSING IN OBESE PATIENTS WITHIN A SINGLE, TERTIARY HOSPITAL SETTING

Shawn C. Wellman*, PharmD, Derek Grimm, PharmD, BCPS, Derek Evans, PharmD

Cabell Huntington Hospital, 1340 Hal Greer Boulevard, Huntington, WV, 25701

shawn.wellman@chhi.org

Purpose: Current vancomycin dosing recommendations presented within Infectious Diseases Society of America are broad and do not extend to all populations or situations. Therefore, vancomycin-dosing strategies vary greatly among institutions. The objective of this study is to identify the optimal protocol for vancomycin dosing in comparison to published literature, as well as identifying risk factors that could affect the clearance of vancomycin.

Methods: This study is a retrospective, observational analysis of non-dialysis patients receiving vancomycin greater than 48 hours. Data will be collected using the electronic medical record system from July 2012 through July 2014 at Cabell Huntington Hospital. This analysis will utilize existing patient data and will include age, gender, weight, serum creatinine, concomitant antibiotic use, and the comorbidity diabetes mellitus. Patients who meet the appropriate study criteria for inclusion will be identified and placed into two categories for analysis. Group 1 will include those patients who were dosed according to the approved protocol at Cabell Huntington Hospital, and Group 2 will include patients who were dosed outside of this protocol (prior to commencement of said protocol). The primary end point will be to determine whether actual or adjusted body weight should be used in choosing an appropriate dosing regimen for obese patients in a single, tertiary hospital setting, while the secondary end point will be to identify whether diabetes mellitus may impact the dosing of vancomycin in relationship to nephrotoxicity.

Results: To be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Relate the pharmacokinetic properties of vancomycin with the various options for dosing of individuals in the obese population.

Outline current IDSA guidelines and various recent clinical studies on the dosing of vancomycin in the obese population.

Self Assessment Questions:

Which of the following is/are true regarding the pharmacokinetic properties of vancomycin?

- A: Exhibits hydrophilic properties that lead to large volumes of distrib
- B: Primarily renally excreted from the body
- C: Can be expressed as a 2- or 3-compartment model further attribut
- D: All of the above

Current IDSA Guidelines recommend the following dosing regimen for obese patients?

- A: 15 mg/kg based on Ideal Body Weight
- B: 15 mg/kg based on Adjusted Body Weight
- C: 15 mg/kg based on Actual Body Weight
- D: 20 mg/kg based on Adjusted Body Weight

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-687-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

ANALYSIS OF PHARMACOKINETIC OUTCOMES OF A VANCOMYCIN NOMOGRAM USING ADJUSTED BODY WEIGHT FOR DOSING

Daniel C Wellner, PharmD*; Katherine E Rotzenberg, PharmD, BCPS; Joshua R Rekoske, PharmD; Donna S Kieler, PharmD

St. Marys Hospital and Medical Center - WI, 700 South Park Street, Madison, WI, 53715

daniel_wellner@ssmhc.com

Purpose: Vancomycin is a common antibiotic used to treat serious Gram positive infections. Dosing nomograms for vancomycin rely on the drug's linear pharmacokinetics, correlation between creatinine clearance and drug clearance, and body weight to achieve target trough levels of 15-20 mcg/mL. Current Infectious Disease Society of America (IDSA) guidelines recommend using doses of 15-20 mg/kg based on a patient's actual body weight every 8-12 hours. The evidence from which the IDSA recommendations were drawn included relatively little data from obese patients. In June of 2014, St. Marys Hospital adopted a vancomycin dosing protocol that uses adjusted body weight when calculating doses for overweight and obese patients. The purpose of this study is to assess the efficacy of this new dosing protocol in achieving vancomycin trough levels of 15-20 mcg/mL. **Methods:** A retrospective, chart review for quality improvement purposes was performed for all patients who received vancomycin that were discharged between October and December of 2014. The hospital's electronic health record was used to identify adult inpatients who received an order of "vancomycin dose per pharmacy" during their admission. Patients were excluded from analysis for the following reasons: acute kidney injury, dialysis, vancomycin used for surgical prophylaxis, and discontinuation of vancomycin before a trough level was obtained. Data collected for each patient included height, actual body weight, adjusted body weight, serum creatinine, calculated creatinine clearance, first and second (if obtained) vancomycin trough levels, loading dose, maintenance dose, and any deviations from the dosing protocol. Descriptive statistics will be applied to determine efficacy of the dosing protocol at achieving vancomycin target trough levels of 15-20 mcg/mL. **Results/Conclusions:** Will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify IDSA guideline recommended pharmacokinetic parameters for monitoring the safety and adequacy of vancomycin therapy
Select an appropriate loading dose of vancomycin using adjusted body weight

Self Assessment Questions:

The IDSA recommended goal steady state trough level for vancomycin therapy for most patients is:

- A: 5-20 mcg/mL
- B: 10-15 mcg/mL
- C: 15-20 mcg/mL
- D: 20-25 mcg/mL

JR is a 65 year old male who presented to St. Marys Hospital with Gram positive blood cultures. He is 57 and weighs 150 kg (IBW = 66.1 kg, AdjBW = 99.7 kg). The attending physician would like you to start vancomycin for this patient with a loading dose

- A: 1500 mg
- B: 2000 mg
- C: 2500 mg
- D: 3000 mg

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-688-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

DETERMINANTS OF DRIVERS THAT AFFECT PHARMACIST WORKLOAD IN AMBULATORY CARE

Lindsey Westerhof, PharmD*; Jill Borchert, PharmD, BCPS, FCCP; Christine Schumacher, PharmD, BCPS, BC-ADM, CDE; Mary Ann Kliethermes, PharmD

Midwestern University, 555 31st St, Downers Grove, IL, 60515

lweste@midwestern.edu

Purpose: The primary objective of this study is to determine the factor(s) that drive pharmacist workload in ambulatory care practice settings. The secondary objectives are to determine the mean time spent per patient episode, to determine which activities comprise the majority of the pharmacist workload, and determine the proportion of workload activities occurring during visit versus post-visit. Secondary endpoints will also be evaluated for their impact on pharmacist workload.

Methods: This is a prospective, multicenter, observational study. Study subjects will be clinical pharmacists or pharmacy resident/student trainees at the ambulatory care sites conducting medication therapy management (MTM). During patient appointments, the pharmacist or trainee will be shadowed by a research assistant, who will measure workload by recording the amount of time spent performing specific clinical activities during and after the patient encounter. The research assistant will also collect patient specific data from the electronic medical record on age, sex, race, medication list (to calculate a Medication Regimen Complexity Index score), and problem list (to calculate a Charlson Comorbidity Index score). A regression analysis will be performed between all independent variables and workload, in minutes, in order to determine which factor(s) may be most predictive of influencing pharmacist workload. Understanding which factors are most likely to influence pharmacist workload will allow organizations to better understand staffing patterns needed for patient care. Estimating appropriate length appointment times is critical in delivering pharmacy services, in terms of both clinical and financial resources.

Results: Results will be presented.

Learning Objectives:

Define the role of the clinical pharmacist in the patient centered medical home

Discuss which patient factors may most drive pharmacist workload

Self Assessment Questions:

Which of the following is true regarding the role of clinical pharmacists in the patient centered medical home (PCMH)?

- A: Optimal staffing models have been created based on pharmacist volume
- B: Pharmacist provided services include preventing and resolving medication therapy problems
- C: Diagnose chronic diseases such as diabetes or heart failure
- D: Pharmacists hold a very traditional role within the PCMH

Which of the following is true regarding patient factors that may drive pharmacist workload in the PCMH?

- A: No specific patient factors have been shown to be correlated with pharmacist workload
- B: Patient factors that affect primary care physician workload are unrelated to pharmacist workload
- C: The impact of medication regimen complexity has been studied or quantified
- D: A high number of comorbidities is associated with an increased inpatient admission rate

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-886-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

CREATION OF A FIRST FILL PRESCRIPTION PROGRAM THROUGH IMPLEMENTATION OF A NEW PHARMACY MANAGEMENT SOFTWARE AT A COMMUNITY HOSPITAL PHARMACY.

Jessalynn K. White, PharmD*

Columbus Regional Hospital, 2400 E 17th Street, Columbus, IN, 47201
jwhite@crh.org

Purpose:

The purpose of this study is to evaluate the benefit of a new pharmacy management software by comparing pharmacoeconomic data, patient satisfaction, and quality data in a 225-bed acute care hospital. Columbus Regional Hospital's current software lacks point-of-sale system ability and only has the capability of filling prescriptions for hospital employees. New pharmacy management software is in the process of being implemented to allow new first fill prescriptions at time of discharge for patients to improve transition of care.

Methods:

In order to evaluate the benefit of a new pharmacy management system historical data prior to implementation of the new software will be compared to data post implementation. Data will be gathered immediately prior to the month of implementation, and post implementation. To improve data quality, the month of implementation will not be evaluated during the post implementation evaluation. Outcomes to be analyzed include, but are not limited to, HCAHPS scores, readmission rates, net cost, and percentage of patients using the new service for new first fill prescriptions.

Learning Objectives:

Identify Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) measures related to medication education.
Explain the benefits of first fill prescriptions at discharge from an acute care facility.

Self Assessment Questions:

Which of the following is an HCAHPS measure evaluated regarding medication education?

- A Medication cost
- B: Medication side effect profile
- C: Medication pathophysiology
- D: Physician follow-up appointment

Which of the following are potential benefits of receiving first fill prescriptions upon discharge from a hospital?

- A Increased adherence to new medication regimens
- B Decreased hospital readmissions
- C Increased patient education regarding new medications
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-887-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ADVANCING ANTIMICROBIAL STEWARDSHIP: EVALUATION OF ANTIBIOTIC THERAPY FOR MANAGEMENT OF UNCOMPLICATED CYSTITIS AND PYELONEPHRITIS IN THE EMERGENCY DEPARTMENT

Jessica M. Wilimczyk, PharmD*; Sara Trovinger, PharmD

Lutheran Health Network, 7950 W. Jefferson Blvd., Fort Wayne, IN, 46804
jwilimczyk@lhn.net

Purpose: Antimicrobial resistance is a growing epidemic that threatens patient care. The release of the Antibiotic Resistance Threats report revealed a need for continued antimicrobial stewardship efforts. The emergency department (ED) sits at the interface between outpatient and inpatient care and provides the ideal setting to expand stewardship. Patients often seek treatment for uncomplicated cystitis and pyelonephritis in the ED. Current Infectious Diseases Society of America guidelines recommend following local resistance patterns and guidelines to manage these disease states, but literature has shown this is not always adhered to. The objective of this study is to determine the current prescribing patterns of ED physicians and utilize the information to develop a guideline based protocol to reduce the use of fluoroquinolones and broad spectrum antibiotics for the treatment of uncomplicated cystitis and pyelonephritis.

Methods: The study received approval from the Institutional Review Board as exempt. A retrospective, open-label chart review is being conducted through the use of Lutheran Hospitals medical record system. Female patients ages 18-65, admitted, held in observation, or discharged from the ED with a diagnosis of uncomplicated cystitis or pyelonephritis will be eligible for inclusion and identified through ICD-9 codes. Exclusion criteria include pregnant women, structural or functional urologic abnormalities, placement of urinary tract instrumentation within the preceding 7 days, residence in a nursing facility, suppressive antibiotic therapy, or a secondary diagnosis of kidney stones. The following data will be collected without the use of patient identifiers: age, medical history, medications, complete blood count with differential, physical exam findings, renal and hepatic function tests, urinalysis results, culture and sensitivity reports, and antimicrobial therapy. Following data collection, a guideline based protocol will be developed and proposed to the pharmacy and therapeutics committee for approval.

Results and Conclusion: Data will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Review the rationale for the implementation of a guideline based protocol in the emergency department for the management of uncomplicated cystitis and pyelonephritis.

Identify treatment options for common bacterial organisms that cause uncomplicated cystitis and pyelonephritis in patients presenting to the emergency department.

Self Assessment Questions:

Which antibiotics are preferred by the Infectious Diseases Society of America for the treatment of uncomplicated cystitis and pyelonephritis?

- A Fluoroquinolones and nitrofurantoin
- B: Trimethoprim-sulfamethoxazole and amoxicillin/clavulanate
- C: Trimethoprim-sulfamethoxazole and nitrofurantoin
- D: Fluoroquinolones and amoxicillin/clavulanate

Which of the following describes why treatment with fluoroquinolones should be restricted to patients who are not able to take nitrofurantoin or trimethoprim-sulfamethoxazole?

- A Increased risk of side effects with fluoroquinolones
- B Increased risk for selection of drug-resistant organisms with fluoro
- C Increased risk of treatment failure with fluoroquinolones
- D Increased risk of patient compliance issues with fluoroquinolones

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-689-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

HIGH-DOSE OPIOID PRESCRIBING IN AN AMBULATORY CARE SETTING

*Germaine R Williams, PharmD, Megan Dorrell, PharmD, BCPS, Nick Sciacca, PharmD, BCACP

Community Health Network, 1500 N Ritter Ave, Indianapolis, IN, 46219
gwilliams@ecomunity.com

Statement of purpose: Indiana falls into the highest category for opioid use based on 2012 data from the Center for Disease Control. On December 15, 2013 in Indiana, new opioid prescribing rules went into effect to reduce misuse. In response, ambulatory care pharmacists at the Community Group Family Medicine Center (CGFMC) provided education to prescribers on the law and proper use of opioids in chronic pain management. The primary objective is to evaluate the change in prescribing high-dose opioids for pain by the CGFMC pre- and post-law. Methods: A retrospective chart review was conducted using Community Health Networks (CHNw) electronic medical record, EPIC. Patients 18 years or older who received at least one (1) prescription for an opioid product from the CGFMC between July 1, 2013 and June 30, 2014 were included in the study. Patients excluded were over 89 years of age, prisoners, pregnant, or exclusively prescribed tramadol or hydrocodone-acetaminophen combinations. Secondary study objectives will evaluate the change of the following pre- and post-law: number of patients co-administered benzodiazepines and/or muscle relaxants, number of emergency department or hospital encounters with opioid-induced adverse effect as an active problem, median opioid dose, and number of patients that discontinue CGFMC management of opioid therapy. Descriptive statistics will be used for all data. Preliminary Results: Data collection has been completed. Statistical analysis is currently ongoing for 135 included patients. The results and conclusion will be shared during the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the provisions of the new Indiana opioid prescribing law that was enacted in December 2013.

Identify prescribing habits that affect the risk for adverse outcomes related to opioid treatment.

Self Assessment Questions:

Which of the following is an aspect of the opioid prescribing law enacted in December 2013 in Indiana?

- A: Inclusion of patients with or without terminal conditions
- B: Assessment of patient's mental health status and risk for substance use
- C: Review of treatment plan if morphine equivalent dose is greater than 50 mg
- D: Treatment agreements for all patients prescribed opioid containing

Based on previous studies, which of the following prescribing habits may increase the risk of adverse outcomes related to pain management with opioids?

- A: Accounting for cross-tolerance when switching agents
- B: Prescribing within the context of a written treatment agreement
- C: Utilizing tramadol as the short acting agent for break-through pain
- D: Co-administering benzodiazepines and/or skeletal muscle relaxants

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-690-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATING THE IMPACT ON INR OF SULFAMETHOXAZOLE-TRIMETHOPRIM COADMINISTRATION WITH WARFARIN

Elyse C Wilson, PharmD*; Mallory L Accursi, PharmD, BCACP; Thomas Grubaugh, RPh, CACP

Veteran Affairs - Chalmers P. Wylie, 420 N James Rd, Columbus, OH, 43219

elyse.wilson@va.gov

Purpose:

Sulfamethoxazole-trimethoprim is a commonly prescribed antibiotic known to interact with warfarin. The primary objective of this study is to determine the change in INR when sulfamethoxazole-trimethoprim is taken concomitantly with warfarin. Secondary objectives will compare the outcomes of patients who had a preemptive warfarin dose reduction and those who did not. These will include determining the change in INR between groups, the incidence of bleeding and vitamin K administration in each of these populations, and determining the average dose reduction in those with preemptive adjustments.

Methods:

This study was approved by the Institutional Review Board and R&D Committee. This is a retrospective chart review of outpatients enrolled in a pharmacist-managed anticoagulation clinic. Patients will be eligible if they have been on warfarin for a minimum of three months and had two therapeutic INR readings over at least four weeks prior to initiating sulfamethoxazole-trimethoprim, as well as have a follow-up INR reading within seven days of antibiotic initiation. The following data will be collected: age, gender, race, warfarin dose and indication, antibiotic duration, INR values, bleeding events, and administration of vitamin K. The mean change in INR from baseline to follow-up will be calculated. For secondary outcomes, the change in INR will be compared between those who received preemptive dose reductions and those who did not, and the average dose reduction will be determined. The proportion of patients experiencing bleeding or requiring vitamin K administration will be compared between the two groups.

Results: Pending

Learning Objectives:

Review the mechanism of interaction and clinical implications of warfarin coadministration with sulfamethoxazole-trimethoprim

Discuss the rationale for evaluation and results of the impact of this interaction on INR

Self Assessment Questions:

What is the usual onset of interaction when initiating sulfamethoxazole-trimethoprim?

- A: 6-12 hours
- B: 2-5 days
- C: 7-10 days
- D: 14-21 days

Which of the following is a potential mechanism for the interaction between warfarin and sulfamethoxazole-trimethoprim?

- A: Inhibition of CYP2C9 hepatic enzyme
- B: Induction of CYP2C9 hepatic enzyme
- C: Altered gastric pH leading to increased warfarin absorption
- D: Chelation of warfarin

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-691-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF AN EARLY SEPSIS ALERT PROGRAM ON A MEDICAL-SURGICAL UNIT

Lindsay B. Wilson, PharmD*; Lauren Czosnowski, PharmD, BCPS; David Smith, PharmD, BCPS-AQID; Todd S. Biggerstaff, MD
Indiana University Health, 1701 N. Senate Blvd, Indianapolis, IN, 46202
lwilson18@iuhealth.org

Purpose: Sepsis is a rapidly progressing systemic inflammatory and infectious state that can result in organ failure and ultimately death if untreated; this condition affects millions of patients each year. Early detection of sepsis is vital to patient survival and outcomes in the critically ill. The purpose of this study is to investigate the outcomes of an early alert that has been implemented in one unit of Methodist Hospital in an attempt to identify sepsis early using SIRS criteria. This will determine the utility and significance of the early alert and assist with the decision to expand the number of units that will use the alert. The data collected will be used to adjust the parameters of the alert and improve the current alert parameters being used.

Methods: This study is a retrospective chart review from November 1st, 2012 to November 30th, 2014 that utilized electronic health records. Paper records from nursing documents were also used to determine the steps taken after the sepsis alert was triggered on each patient. This identified the interventions initiated and parameters triggering the alert. Patients were included in the study group if the early sepsis alert was triggered during their hospital stay in the time frame being studied.

Patients were included in the control group if SIRS criteria were met before initiation of the alert. Only patients admitted to the adult medical-surgical unit were included. The primary outcomes were comparison of in-hospital mortality and 28-day mortality between each group.

Results/Conclusion: Data collection is in progress. Final data analysis and conclusions will be presented at the 2015 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify evidence based criteria for defining Systemic Inflammatory Response Syndrome (SIRS).

Discuss the current treatment algorithm for sepsis, including early goal directed therapy.

Self Assessment Questions:

According to the Surviving Sepsis Campaign guidelines for sepsis management, which of the following criteria are included for identification of SIRS?

- A Urine output less than 0.5ml/kg/hr
- B: Heart rate greater than 90 beats per minute
- C: Mean arterial pressure less than 70mmHg
- D: Elevated C-reactive protein

Of the following, what is the goal time to antibiotic initiation according to the Surviving Sepsis treatment algorithm?

- A 0-60 minutes
- B 60-120 minutes
- C 120-180 minutes
- D 180-240 minutes

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-888-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF INTERMITTENT VERSUS EXTENDED-INFUSION PIPERACILLIN-TAZOBACTAM IN THE TREATMENT OF GRAM-NEGATIVE INFECTIONS IN A COMMUNITY HOSPITAL

Erin M. Winstead, PharmD*; Patrick D. Ratliff, PharmD, BCPS; Russ W Judd, PharmD, BCPS

St. Joseph's Hospital - KY, 1 St. Joseph Drive, Lexington, KY, 40504
erinwinstead@sjhlex.org

Purpose:

The pharmacodynamic parameter for penicillins that links exposure of free drug to minimum inhibitory concentration (MIC) that best predicts efficacy is the time above the MIC. For piperacillin-tazobactam, this is designated as 50% of $t > MIC$ for bactericidal killing. Given this pharmacodynamic property and literature from previous trials, our hospital implemented an Antimicrobial Dose Optimization Policy in which orders for intermittent-infusion piperacillin-tazobactam are converted to three hour extended-infusions. The purpose of this study is to analyze the incidence of mortality, length of stay, and cost of piperacillin-tazobactam intermittent and extended infusions before and after policy implementation.

Methods:

This study will take place in a 433 bed community hospital in Lexington, Kentucky. The control group will consist of patients with documented gram-negative infections who received intermittent infusions of piperacillin-tazobactam for at least 48 hours prior to policy implementation. The treatment group will consist of patients with documented gram-negative infections treated with the correct loading and extended-infusion maintenance doses of piperacillin-tazobactam. Electronic chart review will be performed to collect clinical data, such as that necessary for cultures and sensitivities, MIC data, and APACHE II score calculations. A clinical systems analysts will perform demographic and outcome data collection. Outcomes measured will include in-hospital mortality, length of stay (total and ICU), readmission rates, and cost. IRB approval will be obtained prior to initiation of this study. For statistical analysis, students t-test, mann whitney u, chi square, and fishers exact will be utilized as appropriate.

Preliminary results:

Data collection is currently being conducted. Results and conclusion to be determined.

Disclosure:

The speaker has no actual or potential conflict of interest in relation to this presentation.

Learning Objectives:

Discuss pharmacodynamic parameters associated with beta-lactam antibiotics

Define the specific pharmacodynamic parameter that best links exposure of free drug concentration to bactericidal killing for piperacillin-tazobactam

Self Assessment Questions:

What pharmacodynamic parameter best represents beta-lactam antibiotics?

- A Peak-dependent killing
- B: Time-dependent killing
- C: Concentration-dependent killing
- D: Dose-dependent killing

2) What specific pharmacodynamic parameter is required for piperacillin-tazobactam to achieve bactericidal killing?

- A $t > MIC$ 60%
- B $AUC > MIC$ 25
- C $t > MIC$ 50%
- D $C_{max} > MIC$ 10

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-692-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CURRENT PRACTICES IN PRESCRIBING ANTIRETROVIRAL THERAPY IN HIV-INFECTED FEMALE PATIENTS WITH RESISTANCE MUTATIONS: EXPERIENCE FROM AN ACADEMIC-BASED HIV CLINIC

*Maura M Wojak, PharmD; Paula Peyrani Di Cast, MD, AAHIVS; Mary F Bishop, RPh, AAVHIVP; Mark R Cox, PharmD, BCPS; Daniel B Truelove, PharmD, BCPS (AQ-ID), BCACP, AAHIVP

University of Louisville Healthcare, 530 S Jackson
St, Louisville, KY, 402020000
maurawoj@ulh.org

Statement of purpose

There are over 50,000 new cases of HIV diagnosed each year in the US. Women account for 1 out of every 4 of these cases. Current guideline recommendations for antiretroviral treatment are supported by clinical trials that on average enroll up to 80 percent men. Less information is available regarding the best treatment approach for those with resistance mutations. Underrepresentation of women in these trials is an important public health concern. This study aims to identify current prescribing methods related to HIV infected female patients with drug resistance mutations at an academic based HIV clinic. The primary endpoint for this study was to identify current prescribing methods related to HIV-infected female patients with drug resistant mutations at an academic-based HIV clinic. Secondary endpoints included correlation of resistance-mutations to prescribed antiretroviral regimens, and detecting the percentage of patients receiving three or more active agents.

Statement of methods used

A retrospective review was conducted on female patients at a single-center HIV clinic. Medical records from January 2003 to August 2014 were screened for genotypic test results indicating presence of resistance mutations. The following data points were collected and analyzed; date of HIV-diagnosis, ethnicity, antiretroviral medications, HIV RNA viral load reports, and genotypic test results. Data points were analyzed with descriptive statistics.

Statement of preliminary results to support conclusion

A total of 373 HIV-infected females were screened for the presence of one or more genotypic test results. Antiretroviral resistance-mutations were confirmed in 92 of the 373 patients. Stratification of different resistance mutations revealed that M184V and K103N were the two most prevalent in our patient population (57/92 and 37/92 respectively). Additional results will be presented at Great Lakes Pharmacy Resident Conference (GLPRC).

Conclusion reached

To be presented at GLPRC.

Learning Objectives:

Identify prescribing methods related to HIV-infected female patients with drug resistant mutations at an academic-based HIV clinic

Describe correlations between patient characteristics and prescribed lines of therapy

Self Assessment Questions:

Based on results from this study, the majority of patients with resistance mutations were prescribed _____ active antiretroviral agents for treatment.

- A One
- B Two
- C Three
- D Four

Which one of the following resistance mutations was observed most commonly in the study patients?

- A E291d
- B K173n
- C M184v
- D Y181c

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-707-L02-P

Activity Type: Knowledge-based Contact Hours: 0.5

DEVELOPMENT AND IMPLEMENTATION OF A CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) DISCHARGE COUNSELING PROGRAM AND ITS IMPACT ON 30-DAY ALL-CAUSE READMISSIONS RATES

Sara E. Wolf, Pharm.D.*; Jeffrey M. Ketz, Pharm.D., BCPS; Mandy C. Leonard, Pharm.D., BCPS

Cleveland Clinic, 13660 Fairhill Rd, Apt 303, Shaker Heights, OH, 44120
wolfs@ccf.org

Background: Chronic obstructive pulmonary disease (COPD) is a progressive and chronic disease affecting fifteen million Americans. The National Center for Health Statistics, in 2011, reported that chronic lower respiratory disease, primarily COPD, was the third leading cause of death in the United States. In 2015, the Centers for Medicare and Medicaid added acute COPD exacerbation to their Readmission Reduction Program, which is already in place for heart failure, acute myocardial infarction, and pneumonia. Currently, there is limited information and research on the impact medication education has on COPD readmission rates. In response to the CMS initiative, pharmacists will provide medication counseling in an effort to improve the care of COPD patients.

Objective: To implement COPD Patient Discharge Counseling Program at the Cleveland Clinic to reduce readmission rates.

Methodology: A quasi-experimental study with a historical control was conducted to evaluate the implementation of the COPD Patient Discharge Counseling Program. The study population included all inpatient adults (≥18 years) in non-intensive care units, who are admitted for an acute COPD exacerbation. The patients were identified through a shared COPD patient list in Epic and a COPD admission order set, which included a Pharmacy COPD Education consult. Over the four month study period, all patients fitting the inclusion criteria received medication education from a pharmacist and were compared to a historical control group. Data was collected regarding patient demographics, average length of stay, all-cause readmissions within 30 days, time to readmission, overall HCAHPS scores, and medication specific HCAHPS scores.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the rationale for implementing a COPD discharge counseling program

Review the results of the COPD counseling program and assess its impact on 30-day all-cause readmission rates

Self Assessment Questions:

What two new readmission measures were added to the CMS Hospital Readmission Reduction Program in FY 2015?

- A Hip/Knee Arthroplasty and COPD
- B COPD and Heart Failure
- C Asthma and Hip/Knee Arthroplasty
- D Diabetes and COPD

According to Medicare claims data, what is the 30-day all-cause readmission rate of acute COPD exacerbations?

- A 43%
- B 33%
- C 23%
- D 13%

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-889-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST-LED MEDICATION RECONCILIATION DURING PRIMARY CARE HOSPITAL DISCHARGE FOLLOW-UP VISITS: A RETROSPECTIVE REVIEW

Lauren Wolfe, Pharm.D.*; Cari Cristiani, Pharm.D., BCPS, BCACP;
Marcie Parker, Pharm.D., BCACP
Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH, 44195
wolfel@ccf.org

Purpose: Transitions of care occur when patients are relocated to residences including short and long-term hospitals, skilled nursing homes, specialty care, rehabilitation facilities and their own homes. Care transitions frequently lead to discrepancies in medication charts and place patients at an increased risk for readmission. With the implementation of the Hospital Readmissions Reduction Program set forth by the Affordable Care Act, the Centers for Medicare and Medicaid Services (CMS) will reduce payments to hospitals found to have excessive readmission rates. In the past 10 years Medicare readmission rates have shown that 1 in 5 patients are re-hospitalized within 30 days of discharge. The challenges hospitals are facing regarding decreased reimbursement for readmission necessitates examination of services that may assist in readmission reduction. The objective of this study is to evaluate the volume, type, and significance of pharmacist interventions provided during hospital follow-up medication reconciliation visits in the primary care clinics.

Methods: This study is a non-interventional, retrospective chart review. Patients for inclusion are at least 18 years of age, have a medication regimen consisting of at least 5 medications, and have a documented value based care pharmacist intervention with the primary focus being hospital discharge medication reconciliation. Data including baseline characteristics, reason for admission, length of hospitalization, medication reconciliation interventions, and readmission within 30 days of discharge will be collected utilizing electronic medical records. The primary endpoints include total volume of pharmacist interventions, type of pharmacist intervention, volume of significant interventions per patient, and mean number of interventions per patient encounter. The secondary endpoint is readmission within 30 days of discharge. Data will be evaluated using descriptive statistics.

Results and conclusions: Will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patient populations focused on by the Centers for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program
Describe the role of pharmacist-led medication reconciliation in the primary care setting

Self Assessment Questions:

All of the following are conditions focused on by the Centers for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program except:

- A acute myocardial infarction
- B diabetes mellitus
- C chronic obstructive pulmonary disease
- D elective total hip arthroplasty and total knee arthroplasty

Medication reconciliation is:

- A a comprehensive evaluation of a patient's medication regimen any
- B only necessary following transitions of care
- C the collection of a medication list
- D primarily studied in the outpatient setting

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-693-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ALEMTUZUMAB VERSUS RABBIT ANTITHYMOCYTE GLOBULIN FOR INDUCTION IMMUNOSUPPRESSION IN RENAL TRANSPLANTATION

Lana Wong*, Pharm.D.; Nicole Alvey, Pharm.D., BCPS; Marissa M Brokhof, Pharm.D., BCPS; Monika Gil, Pharm.D., BCPS; Jennifer Geyston, Pharm.D., BCPS
Rush University Medical Center, 1653 W. Congress Parkway, Chicago, IL, 60612
lana_wong@rush.edu

Purpose: The purpose of this study is to compare the efficacy and safety of alemtuzumab versus rabbit antithymocyte globulin (rATG) for induction immunosuppression in renal transplant recipients of low immunologic risk. Rabbit antithymocyte globulin has historically been the induction agent of choice at Rush University Medical Center (RUMC). In November 2012, RUMC began utilizing dosing based on ideal body weight (IBW) for rATG. As a cost-savings initiative, in June of 2013, our institution implemented the use of alemtuzumab as the preferred induction agent for patients considered to be at low immunologic risk.

Methods: This is a retrospective cohort study of renal transplant recipients at RUMC who underwent a living or deceased donor renal transplant with alemtuzumab or IBW dosing rATG induction immunosuppression between November 1, 2012 and September 1, 2014. Approximately 100 patients were identified from an electronic renal transplant database at RUMC and will be reviewed for study inclusion. Inclusion criteria include: age 16-70 years at the time of transplant, panel reactive antibody <30%, negative crossmatch (T and E cell; flow and cytotoxic), and no indication for plasmapheresis pre-or post-transplant.

Results/Conclusion: The primary outcome of this study is biopsy proven acute rejection (BPAR). Secondary outcomes include graft survival, patient survival, infectious complications, hematological complications, readmission rates, and length of stay following transplant. We hypothesize that the use of alemtuzumab for induction will provide similar clinical efficacy and safety outcomes compared to rATG in patients considered to be at low immunologic risk. Data collection and analysis are ongoing. Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the mechanism of action of alemtuzumab for induction immunosuppression in solid organ transplantation.

Identify potential complications associated with the use of alemtuzumab

Self Assessment Questions:

Which of the following receptors does alemtuzumab bind to?

- A Cd20
- B Cd25
- C Cd52
- D Cd28

Which of the following adverse reactions is associated with the use of alemtuzumab?

- A Hypomagnesemia
- B Impaired wound healing
- C Hypertension
- D Cytokine Release Syndrome

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-695-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF PHARMACIST-DRIVEN DISCHARGE MEDICATION RECONCILIATION ON REDUCING MEDICATION DISCREPANCIES AND DECREASING READMISSIONS IN FEDERALLY QUALIFIED HEALTH CENTER (FQHC) PATIENTS

Stephanie A. Wong, Pharm.D.*, Christopher A. Schriever, MS, Pharm.D., AAHIVE, E. Thomas Carey, Pharm.D.

SwedishAmerican Hospital, 1401 E State St, Rockford, IL, 61104

swong@swedishamerican.org

Purpose: Medication reconciliation is the process of comparing a patient's current medication list to what has been taken in order to avoid medication errors such as missing medications, duplications, dosing errors, and drug interactions. A pharmacist-based discharge medication reconciliation has been shown to identify several medication discrepancies and decrease 30-day hospital readmission. Identifying medication errors and/or preventing readmissions through discharge medication reconciliation has been studied in the general inpatient population and in specific patient populations, such as the elderly, patients with COPD, patients with acute coronary syndrome, heart failure. However, there are no studies on the efficacy of discharge medication reconciliation in federally qualified health center (FQHC) patients. FQHCs are organizations that provide health care to underserved patients, offer a sliding fee scale, and provide comprehensive clinical services. The objective of this study is to determine if pharmacist-led discharge medication reconciliation decreases medication discrepancies and hospital readmissions in FQHC patients.

Methods: The Institutional Review Board at SwedishAmerican Hospital approved this prospective study. Patients admitted to the Heart Hospital and were already established with the local FQHC were randomized into the intervention group or control group. Patients in the intervention group had a pharmacist involved in their discharge, while patients in the control group had the usual standard of care. Patients were excluded if they were not admitted to the Heart Hospital and if they were not already established with the local FQHC. Primary endpoints will be reduction in medication discrepancies and readmission rate. Secondary endpoints will include mean number of medication discrepancies per patient, types of medication discrepancies, risk factors for greater number of medication discrepancies, percentage of pharmacist recommendations accepted by hospitalists, and reason and cost of 30-day readmissions. **Results:** Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the importance of discharge medication reconciliation in the FQHC patient population.

Identify which classes of medications are more likely to be involved in medication discrepancies.

Self Assessment Questions:

Which of the following is an intervention a pharmacist can make at the time of discharge to prevent medication discrepancies?

- A Identify drug interactions
- B Address duplicate medications
- C Assess appropriateness of dosages
- D All of the above

Which class of medication is more likely to be involved in medication discrepancies?

- A Antithrombotic
- B Psychiatric
- C Antihypertensive
- D Respiratory

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-890-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE IMPACT OF MOBILE DEVICES ON REAL-TIME CLINICAL DECISION SUPPORT AND PHARMACIST INTERVENTIONS

*Maggie Wong, PharmD, BCPS, Joshua Schmees, PharmD

St. Elizabeth's Hospital, 211 South Third Street, Belleville, IL, 62220

maggie.wong@hshs.org

Purpose: Many institutions utilize asynchronous clinical decision support (CDS) surveillance software to identify patients with specific criteria who are then flagged for pharmacist review. However, without an active alerting mechanism, the flagged patients can remain in a queue in the CDS surveillance software and might not be reviewed until a later time. This can lead to unaddressed preventable medication errors that could result in patient harm. The purpose of this project is to implement mobile devices to allow for real-time alerts from the CDS surveillance software to decentralized pharmacists supporting inpatient units.

Methods: After working with the information technology (IT) department to ensure the security on the mobile devices, the devices were incorporated into the decentralized pharmacy model at HSHS St. Elizabeth's Hospital. In addition to the mobile rounding application for the electronic health record, the devices served as the delivery mechanism for real-time alerts of patients who are flagged in the CDS surveillance software. To prevent alert fatigue, only alerts linked to preventable medication errors were selected and activated for the mobile devices. The primary outcome is to measure the impact of implementing mobile devices on the number of pharmacist interventions compared to the number of surveillance alerts generated. Mobile device impact will be evaluated by analyzing specific alerts and their changes pre- and post-implementation. The secondary outcome will be to evaluate if real-time pharmacist interventions impact medication errors.

Results/Conclusions: Data collection and analysis is currently in process. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify solutions to barriers around implementing mobile solutions in a health care institution.

Discuss the benefits of providing real-time clinical surveillance alerts.

Self Assessment Questions:

What are some things to consider when implementing mobile solutions in a health care institution?

- A Device security
- B Information security
- C Infection prevention and control
- D All of the above

Which of the following is a benefit of pharmacists receiving real-time surveillance alerts?

- A Real-time alerts decrease the number of pharmacist interventions.
- B Pharmacists can prevent medication errors that would have gone unnoticed.
- C Mobile devices cause more complexity and do not improve accuracy.
- D Pharmacists can reduce medication safety.

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-891-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACOKINETICS AND INVESTIGATION OF OPTIMAL DOSE OF INVANZ (ERTAPENEM) IN HEMODIALYSIS PATIENTS

Judy Wong, PharmD*; Lama Hsaiky, PharmD, BCPS; Sin-Ling T Jennings, PharmD, BCPS; Francine Salinitri, PharmD; Rabih Bazzi, MD Raymond Cha, PharmD

Oakwood Hospital and Medical Center, 18101 Oakwood Blvd, Dearborn, MI, 48124

judy.wong@oakwood.org

Background: In 2012, the number of newly reported cases of end stage renal disease (ESRD) in United States was 114,813, and 86% of these patients were started on hemodialysis (HD). Ertapenem (Invanz), a carbapenem, is widely used to treat gram negative infections, and therefore, it has high utility in treating infections in ESRD patients. Currently the recommended dosage for HD patients is 500 mg intravenous once daily per package insert. The daily dosing regimen may cause inconvenience to ESRD patients who have HD three times a week.

Purpose: To evaluate the pharmacokinetic profile of ertapenem one gram three times weekly in ESRD patients.

Methods: The study is a prospective, open-label, pharmacokinetic study evaluating a one gram dose of ertapenem in ESRD patients on HD. Up to ten patients will be recruited for the study. Patients are excluded if they have a history of seizures, suspected infection, allergy to beta-lactams, a history of Clostridium difficile infection, probenecid, or pregnant. Each patient will receive a one-time dose of ertapenem and seven blood draws: prior to drug administration, 0.5 hour, 1-hour, 2-hours, 6-hours, and 12-hours post-drug administration, and one prior to their next HD session. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) will detect the amount of ertapenem in the plasma samples. Win-NonLin will be used to apply a non-compartmental model to concentration versus time data to estimate area-under-the-curve (AUC), peak concentration, and elimination rate. Descriptive statistics will be used to describe the demographics and pharmacokinetic parameters. Pharmacodynamic parameter attainment, AUC/minimum inhibitory concentration (AUC/MIC), will be estimated from MIC90s.

Results/Conclusion: Data collection and analysis are ongoing. Preliminary results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the practicality of the current dosing recommendation per package insert in ESRD patients.
Describe the pharmacokinetic properties of ertapenem in ESRD patients

Self Assessment Questions:

What is the approximate area-under-the-curve (AUC) of ertapenem in ESRD patients?

- A: AUC of 700 mcg*h/mL
- B: AUC of 1000 mcg*h/mL
- C: AUC of 1700 mcg*h/mL
- D: AUC of 2000 mcg*h/mL

Which of the following represents the current dosing recommendation for ertapenem in end stage renal disease (ESRD) patients?

- A: 500 mg IV every 48 hours
- B: 1000 mg IV every 48 hours
- C: 500 mg IV every 24 hours
- D: 1000 mg IV every 24 hours

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-694-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

RETROSPECTIVE REVIEW OF SHORT-TERM VANCOMYCIN USE FOR SKIN AND SOFT TISSUE INFECTIONS

Lauren R Wood*, PharmD; Lauren F Lopez, PharmD, BCPS; Grant M Walliser, PharmD

Grant Medical Center, 15226 Ulery Rd, Centerburg, OH, 43011

lauren.wood@ohiohealth.com

Purpose: Concern for methicillin-resistant Staphylococcus aureus (MRSA) skin and soft tissue infections (SSTIs) has led to increased vancomycin use. Vancomycin is often started empirically for MRSA coverage and later discontinued in favor of other treatments. The goal of this study is to describe patients that are receiving vancomycin as an empiric antibiotic, who are then transitioned to another therapy within 48 hours of admission. This information will help to evaluate the appropriateness of vancomycin as an empiric agent for SSTIs and highlight the potential impact of the new SSTI treatment guidelines published by the Infectious Diseases Society of America.

Methods: This retrospective, descriptive study has been approved by the OhioHealth institutional review board. The electronic medical record will be reviewed for adults treated for an SSTI who received intravenous vancomycin and were discharged from the hospital within 48 hours of admission between July 2013 and June 2014. Exclusion criteria will include: age <18 years, pregnant/breastfeeding patients, inpatient for >48 hours, patients discharged within 48 hours due to death, outpatient IV vancomycin therapy immediately prior to admission, and patients discharged on IV vancomycin. Study variables collected will include: age, gender, immunocompromised state (diabetes, human immunodeficiency virus/acquired immune deficiency syndrome, or neoplasm), history of an SSTI, history of MRSA, date of admission, season of admission, SSTI diagnosis, SSTI category (purulent or nonpurulent), systemic signs of infection (temperature, heart rate, respiratory rate, white blood cell count, subjective fever), whether an incision and drainage was performed, antibiotics prior to vancomycin use, physician prescribing antibiotics, antibiotics after vancomycin, and readmission within 30 days. Descriptive statistics will be utilized. Information collected from this study will be used to build physician education and treatment order sets.

Results/Conclusion: Collection of information is in progress. Final results and conclusions will be presented at the Great Lakes Residency conference.

Learning Objectives:

Identify patients in which vancomycin is an appropriate empiric antibiotic choice for the treatment of a skin or soft tissue infection.
Discuss an appropriate treatment regimen for a patient with a skin or soft tissue infection.

Self Assessment Questions:

Which of the following adverse events can be caused by vancomycin?

- A: Nephrotoxicity
- B: Muscle pain
- C: Ototoxicity
- D: Both A and C

Which organization published new treatment guidelines for the treatment of skin and soft tissue infections in 2014?

- A: National Institutes of Health
- B: Infectious Diseases Society of America
- C: Center for Disease Control
- D: US Department of Health and Human Services

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-696-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

CHARACTERIZING ACUTE KIDNEY INJURY DUE TO VANCOMYCIN IN COMBINATION WITH MEROPENEM AND ITS COMPARISON TO ALTERNATIVE -LACTAM/VANCOMYCIN THERAPY

Lucia Y. Wu*, PharmD; Sandra K. Lemon, PharmD, BCPS; Jarrett R. Amsden, PharmD, BCPS

Community Health Network, 1500 N. Ritter Ave, Indianapolis, IN, 46219
lwu@ecommunity.com

Background:

Literature regarding the incidence of acute kidney injury (AKI) in patients receiving vancomycin and piperacillin-tazobactam (PT) together has led prescribers to shy away from the combination and use meropenem and vancomycin instead. Jensen et al. observed patients on PT or meropenem had similar decreases in eGFR but the PT group had a slower recovery of kidney function. The purpose of this study is to determine the incidence and patient characteristics of those who developed AKI while receiving vancomycin and meropenem, with further plans to compare this data with previously collected PT and vancomycin data.

Methods

A retrospective comparative chart review was conducted in patients admitted from 6/1/11 through 6/30/13 who received both vancomycin and meropenem during admission. For this IRB approved study, AKI is defined as an increase in SCr ≥ 0.3 mg/dL after 48 hours of concomitant antibiotic therapy. Patients who subsequently developed AKI will be matched by age 5 years and date of admission 7 days to those who did not develop AKI after receiving both antibiotics. Inclusion criteria entailed patients 18-89 years old with a baseline SCr prior to therapy. Exclusion criteria included those with acute renal failure at admission, a past medical history of stage III or higher chronic kidney disease, receiving any type of dialysis, or have structural kidney disease. RIFLE criteria was used to evaluate degree of AKI. Other data collected include ICU/hospital length of stay, other nephrotoxins, urine output, comorbidities, 30 day readmissions, and recurrence of AKI on readmission within 30 days.

Results:

Preliminary data reveals that 3.8% of all patients and 10% of patients included in study developed AKI with concomitant meropenem and vancomycin therapy. These preliminary numbers suggest the incidence of AKI caused by the study combination is similar to that previously found for vancomycin and PT.

Learning Objectives:

Discuss causes of drug induced acute kidney injury

Identify risk factors for vancomycin associated nephrotoxicity

Self Assessment Questions:

Through which mechanism do penicillins cause acute kidney injury?

- A: Glomerular disease
- B: Indirect nephrotoxicity
- C: Interstitial nephritis
- D: Tubulointerstitial injury

When using vancomycin, which of the following could cause an increased risk of nephrotoxicity?

- A: Aiming for a vancomycin trough > 20 mcg/mL
- B: Dosing vancomycin at 1 gm every 24 hours
- C: Giving vancomycin for 3 days
- D: Using vancomycin and doxycycline together

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-697-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

A PHARMACIST-LED INITIATION OF INPATIENT TOBACCO CESSATION INTERVENTION

Kimberly Wurtz, Pharm.D.*, Maria Wopat, Pharm.D., BCACP, TTS, Megan Heim, Pharm.D., BCACP

Veteran Affairs - William S. Middleton Hospital, 2500 Overlook Terrace, Madison, WI, 53705

kimberly.wurtz@va.gov

Purpose: Tobacco use is the number one preventable cause of death. Currently, five million patients in the United States die from tobacco use annually, making tobacco cessation intervention crucial. Hospitalization presents a unique opportunity for this intervention as it disrupts a patient's normal tobacco use habits and creates a potential teachable moment for tobacco cessation. Many hospitals initiate pharmacotherapy for tobacco cessation and quality measures for tobacco cessation intervention for hospitalized patients were recently developed by the Joint Commission. Hospitalized patients that receive a counseling intervention in addition to pharmacotherapy are more likely to refrain from smoking than those only receiving pharmacotherapy (95% confidence interval [CI] = 1.22, 8.14; $P = .018$). The William S. Middleton Memorial Veterans Hospital has established outpatient tobacco cessation services, however these services in the inpatient setting are not consistently provided and no standardized process has been established. The purpose of this study is to develop and assess a pharmacist-led initiation of tobacco cessation intervention for tobacco users hospitalized at this facility.

Methods: A process was developed for a pharmacist-led tobacco cessation intervention in the inpatient setting. Medication history technicians would alert a pharmacist to patient interest in tobacco cessation. The pharmacist would then visit the patient and proceed with an intervention that included tobacco cessation pharmacotherapy initiation, counseling, and referral to the outpatient tobacco cessation clinic upon discharge. The primary end point that will be measured is the percent of patients who accepted the intervention after speaking with the pharmacist. Other data collected includes general demographics, medical and medication history, and tobacco-related information (tobacco habits, previous tobacco cessation attempts and outcomes, methods used for cessation and why past quit attempts failed).

Results/Conclusions: This study is currently in progress.

Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the importance of tobacco cessation services in the Veterans Affairs system.

Review the effective treatment for tobacco cessation.

Self Assessment Questions:

What is the number one cause of preventable death in the United States?

- A: Obesity
- B: Alcohol Use
- C: Tobacco Use
- D: Illicit drug use

What has been found to be the most effective treatment for tobacco cessation?

- A: Pharmacotherapy alone
- B: Counseling alone
- C: E-cigarettes
- D: Pharmacotherapy plus counseling

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-698-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

EVALUATION OF OUTPATIENT ANTICOAGULATION IN RELATION TO PUMP THROMBUS AND BLEEDING EVENTS IN PATIENTS WITH CONTINUOUS FLOW LEFT VENTRICULAR ASSIST DEVICES

Olga Yankulina*, PharmD; Long To, PharmD, BCPS; J.A. Morgan, MD
Henry Ford Health System, 2799 West Grand Boulevard, Detroit, MI, 48202
oyankul1@hfhs.org

Purpose: Over 5 million Americans suffer from heart failure and 10% of them have end-stage heart failure. Treatment options for these patients are limited to either heart transplantation or ventricular assist device. However, due to the lack of donors there are an increasing number of patients who undergo continuous flow left ventricular device (CF-LVAD) implantation. The objective of this study was to identify characteristics of patients with Heartware or Heartmate II LVADs admitted for pump thrombosis and/or bleeding events in relation to their outpatient anticoagulation management up to 1 year post discharge, or until January 11th, 2015. The primary aim for this study was to determine an optimal INR range for LVAD patients. Secondary aims included, identifying complications in LVAD patients such as stroke (hemorrhagic and ischemic), pump thrombus, and bleeding events (e.g. gastrointestinal).

Methods: This was a retrospective nested case control study that was approved by the IRB at Henry Ford Hospital, an 877-bed tertiary care center in Detroit, MI. Patients who received a CF-LVAD since 2006 and had their anticoagulation managed by the health-system anticoagulation clinic were included. Patients were excluded if they experienced a major ischemic or hemorrhagic event during hospital admission for LVAD implantation or within 14 days of discharge and if they expired within 30 days of LVAD implantation. Descriptive analysis will be performed to evaluate patient characteristics (e.g. BMI, comorbidities and age), CF-LVAD characteristics (e.g. indication) and anticoagulation management (e.g. LMWH use prior to event); statistical tests will be utilized if needed. Continuous probability density function for both pump thrombi and bleeding events will be utilized to attempt to establish an optimal INR range. Complications will be evaluated with student's t-tests, Chi square or Fishers exact test as indicated.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify serious complications that are associated with continuous-flow left ventricular devices.

Recognize risk factors for bleeding and thrombotic events in patients with continuous-flow left ventricular devices.

Self Assessment Questions:

Which of the following thrombotic events is a serious complication seen in patients with a continuous flow left ventricular device?

- A Portal vein thrombus
- B: Deep vein thrombus (DVT)
- C: Pump thrombus
- D: Superficial venous thrombus (SVT)

What patient characteristic has been associated with an increased risk of pump thrombus?

- A History of gastrointestinal bleed
- B Gender
- C Body mass index (BMI)
- D Indication for CF-LVAD implantation

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-699-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF AN INTRAVENOUS COMPOUNDING WORKFLOW MANAGEMENT SYSTEM ON WASTE IN A SAFETY NET HOSPITAL.

Thomas J. Yu*, PharmD; Zahra Khudeira, PharmD, MA, BCPS, CPPS; Sameer Shah, PharmD, MHA; Karen Trenkler, PharmD, MS, BCPS
Sinai Health System, 1720 S Michigan Ave Unit 1910, Chicago, IL, 60616
thomas.yu@sina.org

Purpose:

Intravenous (IV) compounding is a prominent high risk area in hospitals nationally. Incorrectly compounded sterile products (CSPs) may cause patient harm. In 2014, Mount Sinai Hospital implemented an IV compounding workflow management system to enhance medication safety primarily in the inpatient setting. This technology provided automated IV compounding procedures through barcode scanning of IV ingredients, photographing workflow, and calculating IV product needs. This system also enabled remote pharmacist checking and tracking of IV products throughout the hospital. A reduction in IV medication waste was expected through the prevention of compounding errors and admixture duplication. The purpose of this study was to determine the cost savings by waste reduction of IV products.

Methods:

The study time-frame will range from May 28, 2014 through March 31, 2015. The primary outcome is determination of cost-savings from IV medication waste prevention after implementation of an IV compounding workflow management system. Retrospective reports will be generated from this IV workflow system to determine prevented errors and waste. Preparation time will be examined using IV workflow system reports as a secondary outcome to ensure workflow efficiency. These preparation reports will be compared to previous in-house time studies.

Results:

In the first five months of implementation, a cost savings of \$2,348.33 to \$3,658.18 was seen in prevented compounding errors. After approximately 9,500 dispensed CSPs, 11.9 compounding errors were prevented for every 1,000 CSPs. Baseline waste of 4 weeks was collected and will be compared to future waste samples. Preparation time improved from 7.2 minutes in 2012 to 3.7 minutes in 2014 five months after IV workflow system implementation. Data collection is still ongoing and results will be finalized and presented at the Great Lakes Pharmacy Resident Conference.

Conclusions:

Finalized conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the benefits of an intravenous compounding workflow management system

Identify areas where waste management can be improved for compounded sterile products

Self Assessment Questions:

Which of the following best describes an IV compounding workflow management system?

- A Requires users to make manual calculations
- B: Eliminates the need for a pharmacist check
- C: Reduces intravenous medication waste
- D: Prevents all intravenous compounding errors

All of the following can be prevented with an IV compounding workflow management system except:

- A Duplication of missing IV medication
- B Incorrectly selected IV medication
- C Incorrectly stored IV medication
- D Absence of filter needle use with ampules

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-950-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

THE USE OF 16S AND 18S POLYMERASE CHAIN REACTION AS A TOOL FOR ANTIMICROBIAL STEWARDSHIP

Filiz Yucebay, Pharm.D.* Elise Gilbert, Pharm.D., BCPS, Danielle Smith, John Esterly, Pharm.D., BCPS AQ-ID, Chao Qi, Ph.D., Mike Malczynski, B.S., Mike Postelnick, RPh, BCPS AQ-ID, Milena McLaughlin, Pharm.D., MSc, BCPS

Northwestern Memorial Hospital, 251 E Huron St, Suite LC-700, Chicago, IL 60611

fyucebay@nm.org

Purpose: Genotypic identification of organisms via Polymerase Chain Reaction (PCR) and Deoxyribonucleic Acid (DNA) sequencing is used to identify medically important organisms when they fail to grow via culture based techniques. 16S and 18S ribosomal RNA (rRNA) are conserved genotypic regions that can be used to sequence clinically relevant organisms. 16S rRNA in bacteria and 18S rRNA in yeast and fungi may provide an alternative method to, or complement existing, identification processes in the acute inpatient setting. Despite the advantages of using PCR to identify infecting organisms, large-scale studies have yet to be completed to assess clinical utility of this technology. Northwestern Memorial Hospital (NMH) has been conducting 16S/18S rRNA PCR since 2008 to aid in identification of difficult to culture organisms. The purpose of this study is to assess the use of 16S/18S rRNA PCR and how results effect overall antibiotic days of therapy (DOTs) in the clinical setting.

Methods: This is a retrospective study of patients admitted to NMH between October 2008 and November 2014 who had a 16S/18S rRNA PCR of sterile site specimen. A list of patients who have had a 16S/18S rRNA PCR laboratory test will be identified by molecular epidemiology and populated into a database. Patients will be excluded if they were <18 years at the time of PCR or not treated at NMH. The aim of this study is to assess the use of 16S/18S rRNA PCR at NMH between 2008 and 2014 and its effect on quantity of antimicrobial use in days of therapy. The objective is to determine if patients who have had an organism identified by 16S/18S PCR test had fewer DOTs than patients without an organism identified.

Results/Conclusion: Data collection and analysis are pending. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance of hospital antimicrobial stewardship in reducing antimicrobial overuse.

Identify what clinical specimen types are preferred to be used in 16S/18S rRNA PCR for microbial identification.

Self Assessment Questions:

According to the Infectious Diseases Society of America, what clinical outcome can an antimicrobial stewardship program promote?

- A: Increasing health care costs
- B: Limit selection for antimicrobial resistant strains
- C: Promote generic antimicrobial use
- D: IV to oral medication selection

Which of these cultures is defined as coming from a sterile site and may be appropriate for use in a 16S/18S PCR?

- A: Wound Culture
- B: Urine Culture
- C: Bronchoalveolar Lavage
- D: Blood Culture

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-700-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

PHARMACIST ASSESSMENT OF ANTIMICROBIAL DE-ESCALATION IN AN INTENSIVE CARE UNIT

John R. Zaccardelli* Pharm.D., Norm Buss Pharm.D.

Henry Ford Macomb Hospital, 15855 19 mile road, Clinton Township, MI, 48038

jzaccar1@hfhs.org

Purpose: Recently there has been an accumulation of evidence proclaiming the benefits of antimicrobial stewardship within hospitals. The Centers for Medicare and Medicaid Services (CMS) may propose requirements in the near future for certain antimicrobial stewardship activities. Currently, Henry Ford Macomb Hospital does not have an antimicrobial stewardship pharmacist on staff, but there appears to be ample opportunities for such involvement. This is evident in the intensive care unit (ICU) where de-escalation of antimicrobial therapy can have profound effects on patient outcomes. This study intends to assess when it is appropriate to de-escalate antibiotic therapy by a pharmacist review in an intensive care unit in a 300+ bed community hospital.

Methods: This study is a prospective pharmacist review for the opportunity to de-escalate antibiotics along with a retrospective review as a control group. Charts will be followed until empiric antibiotics are de-escalated, antibiotics are discontinued or empiric therapy is deemed appropriate. Subjects must be 18 years or older, have an inpatient admission to the ICU, be diagnosed with suspected or confirmed pneumonia and be receiving empiric antibiotics to be included in the study. Charts will be excluded if they do not meet diagnosis criteria or antibiotic therapy is less than 48 hours in duration. The primary outcomes include the time period at which de-escalation occurs and the number of pharmacist interventions made to de-escalate antibiotic therapy. De-escalation is defined as empiric therapy streamlined to targeted therapy that decreases antimicrobial exposure. Targeted therapy will be based on microbiology data, the patients clinical status, and antimicrobial spectrum of activity. Secondary outcomes are the number of attempts to contact the physician and whether or not the recommendation was accepted.

Results: The study is currently ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify when antibiotic de-escalation occurred most often during treatment

Describe the number of opportunities for the pharmacist to de-escalate therapy

Self Assessment Questions:

Which of the following describes antibiotic de-escalation?

- A: Empiric therapy changed to targeted therapy
- B: Only using monotherapy
- C: Adding a medication to cover for pseudomonas aeruginosa
- D: Narrow therapy changed to Empiric therapy

What medication should be de-escalated, if culture results indicate Mycoplasma pneumoniae growth?

- A: Azithromycin
- B: Vancomycin
- C: Moxifloxacin
- D: Doxycycline

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-15-701-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPACT OF BODY MASS INDEX ON NOREPINEPHRINE REQUIREMENTS AND HEMODYNAMICS IN SEPTIC SHOCK

*Kara E. Zacholski, PharmD; Linda A. Park, PharmD, BCPS; Krista A. Wahby, PharmD
Detroit Receiving Hospital, 4201 Saint Antoine
Boulevard, Detroit, MI, 48201
kzachols@dmc.org

Norepinephrine (NE) is the first line vasopressor (VP) for septic shock. No recommendations exist for weight-based NE dosing and thus obese patients may receive higher NE doses. The hypothesis of this study was to determine if obese patients receive higher doses of NE thereby achieving target mean arterial pressure (MAP) faster than patients with lower body mass index (BMI).

This retrospective study evaluated adult patients who received NE as the initial VP of choice. Patients were divided into 3 groups based on BMI: < 30 (n=31), 30-40 (n=27), and > 40 (n=27). We evaluated NE dosing, time to MAP > 65 mmHg for 3 consecutive hours and adverse effects. Data is reported as mean standard deviation unless otherwise noted and in the order of BMI < 30, 30-40, and > 40. A p-value < 0.05 was considered significant.

Eighty five patients were included. There were no differences in baseline demographics and severity of illness scores among the 3 groups. Average weights for the 3 groups were: 7614, 9915, and 14442 kg, respectively, p<0.001. There was no significant difference in time to achieve target MAP > 65 mmHg for 3 consecutive hours. There was no significant difference in total weight-based dose (mg/kg) 2.15, 1.11, and 1.85, p=0.11. Duration of NE increased proportionally with BMI, 1.72, 2.51, and 4.35 days, respectively, p=0.05. Acute kidney injury (AKI) was seen more in the higher BMI groups, 74%, 91%, and 100%, p<0.001. No difference in incidence of other adverse effects. Mortality rates were similar among the 3 groups.

No difference in time to achieve MAP > 65 mmHg was observed among the three groups. Interestingly, patients with a higher BMI were on NE longer and had a higher incidence of AKI. It is unclear if this was a dose related side effect.

Learning Objectives:

Explain the alterations in pharmacokinetics seen in obese critically ill patients.
Identify appropriate fluid resuscitation in patients with severe sepsis.

Self Assessment Questions:

Which of the following describes how volume of distribution is affected in obese patients?

- A: No changes are seen in volume of distribution
- B: Decreased distribution of hydrophilic medications
- C: Decreased distribution of lipophilic medications
- D: Increased distribution of lipophilic medications

Which of the following if the recommended volume of fluid resuscitation for patients with severe sepsis?

- A: 10 mL/kg bolus
- B: 20 mL/kg bolus
- C: 30 mL/kg bolus
- D: 40 mL/kg bolus

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-15-702-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

OPTIMIZATION OF NERVE BLOCK AND EPIDURAL ORDERING

Jessica E Zahn, PharmD; Allan Loeb, RPH, MS; Andrew Kolinski, PharmD, BCPS
Aurora Health Care, 3935 W Mitchell St., Milwaukee, WI, 53215
jessica.zahn@aurora.org

Purpose: There is a need to study the complete medication use process from ordering through administration/documentation of femoral nerve blocks and epidurals within the Aurora Health Care system. There exists significant process gaps and inefficiencies in the initial ordering of these products by the prescriber and related communication to the pharmacy for preparation, leading to frequent manipulation of the orders by pharmacists for accurate dispensing and documentation. The objectives of this project are to identify, evaluate, and develop solutions to current barriers in entire femoral nerve block and epidural order processing in addition to decreasing the amount of pharmacist manipulation of orders and follow-up phone calls to physicians.

Methods: A work group was organized among key stakeholders in the process consisting of pharmacy, nursing, medical staff (anesthesia, surgery) and informatics caregivers to review current ordering, preparation, and medication documentation practices within the system to identify opportunities to increase process efficiencies. Work group meetings were also accompanied by site visits, in which the process was observed to gain an in-depth understanding of variations in practice at different hospital sites. Baseline data was gathered to better understand the characteristics and nature of phone interventions from pharmacists, cost based on proposed supply and product changes, in addition to tracking types of modifications to medication orders in the electronic health record by pharmacists to ensure accurate dispensing and documentation. This information was compiled to enhance the build for both order sets within the electronic health record, providing prescribers with better customization options and more accurate administration guidelines that would lead to downstream clarifications for subsequent users.

Results/Conclusion: Implementation of the revised peripheral nerve catheter and labor and delivery epidural order sets is set for March 2015. Further results and conclusions from the implementation will be shared at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify process inefficiencies within the Aurora Health Care System when ordering femoral nerve block and epidural infusions.
Restate the automated changes within the electronic health record that allowed caregivers to engage in more streamlined communication when ordering these infusions.

Self Assessment Questions:

Which of the following statements is true when describing the medication use process for nerve blocks and epidurals within Aurora Health Care?

- A: Pharmacists were required to frequently intervene on medication orders
- B: Individual hospitals within the Aurora Health Care system have similar processes
- C: The electronic health record at Aurora Health Care allowed for unified order sets
- D: Baseline data suggested that pharmacists were spending the majority of time on phone calls

Which of the following changes were made to the electronic health record order set to streamline communication between pharmacists and prescribers?

- A: Nerve block infusions were categorized by elastomeric pump type
- B: Parameters for each elastomeric pump's functionality were left out
- C: Vague automatically generated messages that required pharmacist clarification
- D: Both A & C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-892-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

IMPLEMENTATION OF PROTOCOL-GUIDED TREATMENT OF DIABETIC KETOACIDOSIS

Kelly E Zander, PharmD*; Breanna L Carter, PharmD, BCPS; Angela M Brenner, PharmD; Tyler J Van Schyndel, PharmD, BCPS
Ministry Health - St. Joseph's Hospital - WI, 611 Saint Joseph Avenue, Marshfield, WI, 54449
Kelly.Zander@ministryhealth.org

Purpose:

Diabetic ketoacidosis (DKA) is an acute complication of diabetes mellitus that can cause potentially life-threatening metabolic abnormalities. The American Diabetes Association (ADA) provides recommendations for the multifaceted treatment of DKA that consist of adequate fluid resuscitation, proper insulin therapy, and balanced electrolyte replacement. Literature suggests that the implementation of a DKA treatment protocol can shorten the time to anion gap closure by 33 percent and decrease hospital length of stay by 30 percent. The purpose of this project is to implement a DKA treatment protocol at a tertiary care hospital.

Methods:

A DKA treatment protocol was created based on the 2009 ADA recommendations and implemented in a medical intensive care unit. This quality improvement project was exempt from review by the Institutional Review Board. Retrospective chart reviews will be conducted to gather and assess patient data before and after protocol implementation to identify improved treatment strategies. Data collection will include patient demographics, fluid and electrolyte replacement, insulin infusion rates, laboratory values such as blood glucose, serum ketones, basic metabolic panel, magnesium, and phosphate, and time to anion gap closure. A transition period was included to allow for proper education and implementation of the protocol. Patients at least 19 years old with a diagnosis code of DKA or hyperglycemia who meet ADA criteria for DKA were included. Patients were excluded if they were less than 19 years of age, pregnant, septic, experiencing respiratory failure, or admitted to a general medical unit. The primary outcome for this study is time to closure of anion gap. Secondary outcomes include hospital and intensive care unit lengths of stay and the incidence of hypoglycemia and hypokalemia.

Results/Conclusion:

Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the recommended diabetic ketoacidosis treatment algorithm provided by the American Diabetes Association

Discuss identified barriers to protocol-guided treatment of diabetic ketoacidosis

Self Assessment Questions:

Which of the following is addressed in the American Diabetes Association diabetic ketoacidosis treatment algorithm?

- A: Magnesium replacement
- B: Nutritional status assessment
- C: Potassium replacement
- D: Calcium replacement

Which of the following was identified as the most significant barrier to the implementation of a diabetic ketoacidosis treatment protocol at Ministry Saint Josephs Hospital?

- A: Duplication of electrolyte replacement orders
- B: Lack of awareness the treatment protocol was available
- C: Patient non-compliance with treatment plan
- D: Lack of nursing education

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-15-703-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

HEALTH CARE PROVIDERS PERCEIVED SATISFACTION OF DIABETES WELLNESS SERVICES AND MEDICATION THERAPY MANAGEMENT PROVIDED IN A COMMUNITY PHARMACY SETTING

Mandy Zheng*, Pharm.D.; Jeffrey Hamper, Pharm.D.; Caitlin Malone, Pharm.D.; Susan Winkler, Pharm.D., BCPS, FCCP
.3030 Cullerton Street, Franklin Park, IL, 60130
mandy.zheng@albertsons.com

Purpose: Determine the overall satisfaction of health care providers regarding diabetes wellness programs provided by community pharmacists. The secondary objective is to determine the type of recommendations that are most useful and contribute to high satisfaction amongst providers.

Methods: This is a prospective, survey-based study. All primary care providers of patients enrolled in either of two diabetes wellness programs in Albertsons pharmacies: Tools for Living Healthy with Diabetes or the Taking Control of Your Health program will be selected to receive a 13-item Likert-scale survey. Study participants include physicians, physicians assistants, nurse practitioners, and any other primary provider of the patient. Providers will receive a cover letter and a survey via facsimile along with the required documentation from the patient appointment, including the patient medication list, interview note, and encounter note describing the pharmacists interventions. The required documentation, along with the cover letter and blank survey will be also faxed to the Albertsons Department of Clinical Services for tracking purposes. All survey responses will be returned by the providers to the principal investigator via facsimile. Response rate will be determined by dividing the total number of completed surveys received by the total number of surveys sent. Completed survey results will be analyzed through descriptive statistics.

Results: Data collection is in progress.

Conclusions: It is anticipated that the results of this survey may help illuminate which aspects of a wellness program are most useful to providers. It may also identify the components that need improvement. Final results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Review the impact of community pharmacy-based diabetes management programs on clinical patient outcomes.

Describe the pharmacists responsibilities in community pharmacy-based diabetes management programs.

Self Assessment Questions:

Which of the following patient outcomes did the Diabetes Ten City Challenge community pharmacy program show to improve?

- A: Bmi
- B: Ldl
- C: Hgb A1c%
- D: All of the above

Which of following statements describe the responsibilities of the pharmacist in community pharmacy diabetes management programs?

- A: The pharmacist monitors for medication adherence issues.
- B: The pharmacist monitors for the adverse drug effects.
- C: The pharmacist can prescribe and initiate new medications
- D: Only A & B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-893-L04-P

Activity Type: Knowledge-based Contact Hours: 0.5

ASSESSMENT OF THE IMPACT AND SUSTAINABILITY OF RESIDENCY PROJECTS, PART II

Yi Zhou, PharmD, BCPS*; Troy Gulden, PharmD; Melanie Kuester, PharmD, BCPS; Christina White, PharmD, MBA, BCPS; Deanna Kania, PharmD, BCPS, BCACP

Veteran Affairs - Indianapolis VA Medical Center, 11975 Suncatcher Dr., Fishers, IN, 46037

yizhou88@gmail.com

Purpose:

The purpose of this project is to propose a new process for selecting and completing resident research projects that have a greater likelihood of having an impact at the Indianapolis VA Medical Center (Indy VAMC)

Methods:

Phase two of the project revolves around the development and implementation based on the findings presented in part one. Processes materials and education related to improving the research project experience and the likelihood of projects having an impact at the facility upon completion have been or are being developed.

Preliminary Results:

The following changes in the research process have been proposed for inclusion for the 2015 - 2016 residency year: ensuring all projects have at least two residents, three project mentors (one primary and two secondary), and utilize quality improvement (QI) principles. A singular process to vet ideas has been developed to be incorporated along with a residency project closeout form. Education on the new processes and any research or QI aspects will be completed this spring to ensure familiarity for all those involved in the resident research process.

Conclusions: It is anticipated that these changes will assist the facility in creating an outline for the development of research projects that when followed are more likely to result in impactful projects for the facility and result in less stress for the residents and project preceptors. Data will continue to be collected on the changes and the associated outcomes to be used in a future project. A questionnaire of additional VA and non-VA residency programs will also be developed in order to further refine the process and develop recommendations that may have greater applicability.

Learning Objectives:

List strategies to overcome the barriers of limited time in completing a research project

Identify strategies to develop meaningful research projects

Self Assessment Questions:

Which of the following can be used to allow more time to complete a residency research project?

- A: Pairing of residents
- B: Utilize APPE students to assist
- C: Start IRB application early
- D: All of the above

Which of the following can be used to develop more meaningful research projects?

- A: Review current residency projects for continuation
- B: Initiate QI project first as proof of concept with the intent for larger
- C: A & B
- D: None of the above

Q1 Answer: D Q2 Answer: C

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Activity Type: Knowledge-based Contact Hours: 0.5

DELIRIUM IN THE INTENSIVE CARE UNIT (ICU): ASSESSMENT OF CARE LEADING TO THE DEVELOPMENT AND IMPLEMENTATION OF A TREATMENT PROTOCOL

Kelsey C. Zielke*, Pharm.D; Melissa S. Forbes, Pharm.D., BCPS; Andrew J. Borgert, PhD

Gundersen Lutheran Medical Center, 1900 South Avenue, Mail Stop LML 001, La Crosse, WI, 54601

kczielke@gundersenhealth.org

Purpose:

Delirium in the intensive care unit (ICU) is associated with negative outcomes in patients including increased mortality, length of stay, cost and incidence of post-traumatic stress disorder. In 2013, the Society for Critical Care Medicine (SCCM) published guidelines for the management of pain, agitation and delirium in the ICU. The guidelines suggest implementation of protocols to help the multidisciplinary team guide management of these issues. This study aims to investigate the state of delirium recognition and pharmacologic treatment at Gundersen Lutheran Medical Center (GLMC) leading up to the planned implementation of a delirium treatment protocol.

Methods:

Prior to data collection, Institutional Review Board approval was obtained for this retrospective review. Patients were identified based on electronic medical record documentation of a positive CAM-ICU assessment while admitted to the GLMC ICU. Patients were excluded from the analysis if they were less than 18 years of age, experiencing delirium due to alcohol withdrawal or had pre-existing dementia. Data gathered from the electronic medical record included patient age, sex, comorbid conditions, inpatient medications at time of positive CAM-ICU score, initiation of first and second generation antipsychotics, pain scores and prior to admission medications. Duration of time patients had a positive CAM-ICU score was obtained from documentation in nursing flow sheets. Using collected data, patients documented as CAM-ICU positive were assessed for actions taken to address and treat their delirium. Specifically, modification of medication therapy following a positive CAM-ICU score was assessed. Appropriate statistical analysis as defined by a biostatistician was employed. Analyses of gathered data provided baseline data to support the recent implementation of a multidisciplinary delirium protocol aimed at promoting appropriate management of delirium in accordance with the 2013 SCCM guidelines.

Results:

Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss recommendations for treatment of delirium as recommended in the 2013 Society for Critical Care Medicine Clinical Practice Guidelines for the Management of Pain, Agitation and Delirium in the ICU.

Review the use of second generation antipsychotics for treatment of delirium and identify patient specific characteristics that would affect treatment choices.

Self Assessment Questions:

The 2013 Society for Critical Care Medicine Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium recommend which of the following for preventing and managing ICU delirium?

- A: Implementation of delirium prevention protocols that include use of
- B: Use of benzodiazepines as the preferred agent for sedation in ICU
- C: Nonpharmacologic interventions for the prevention of delirium
- D: Use of IV haloperidol for the initial treatment of delirium in patients

Which of the following is true of agents used to treat delirium?

- A: Second generation antipsychotics have minimal effect on QTc length
- B: Second generation antipsychotics are available in oral, intramuscular
- C: Second generation antipsychotics are preferred over first generation
- D: Scheduled use of second generation antipsychotics can reduce the

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-15-704-L01-P

Activity Type: Knowledge-based Contact Hours: 0.5

**MEDICATION ERRORS IN HOSPITALIZED PATIENTS WITH HIV:
IMPACT OF PROSPECTIVE REVIEW BY AN ON-CALL PHARMACY
RESIDENT.**

Katherine V. Zych, PharmD*; Amy Hanson, PharmD, BCPS; Paul
ODonnell, PharmD, BCPS
Rush University Medical Center, 1653 W. Congress
Parkway, Chicago, IL, 60614
katherine_zych@rush.edu

Purpose: Patients receiving antiretroviral therapy (ART) are at risk for medication errors at the time of hospital admission. In order to ensure high adherence rates are maintained as patients with human immunodeficiency virus (HIV) transition through the healthcare system, prompt clarification of ART regimens is imperative. The objective of this study is to evaluate the impact of pharmacy resident on-call (ROC) prospective medication reconciliation on ART medication errors around the time of order verification.

Methods: This interventional study will compare a pre-intervention phase (retrospective chart review) to a prospective interventional phase. The retrospective chart review will establish the prevalence of ART and opportunistic infection (OI) prophylaxis medication errors and act as a baseline comparison group for the prospective interventional phase. The prospective interventional phase will track ART-related medication errors that are addressed when a pharmacy ROC coordinates completion of a medication history with subsequent medication reconciliation for ART and OI prophylaxis agents ordered for hospitalized patients with HIV. Examples of medication errors include incorrect or incomplete ART or OI prophylactic regimens, dosing errors (including errors related to adjustment for renal or hepatic function), drug-drug or drug-food interactions and inappropriate formulations or routes of administration. Identified errors, prescriber intervention acceptance, and time to error resolution will be collected and analyzed. Patients ≥ 18 years of age with a history of receiving ART for the treatment of HIV prior to admission that provide consent will be included.

Results: This study is currently ongoing. As of January 29, 2015, thirty one patients have provided consent for enrollment. At this time there are a mean of 1.66 ART errors per patient in the prospective group, and incorrect ART timing represents the largest proportion of total errors. Complete results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe consequences of non-adherence to antiretroviral therapy regimens

Recognize the most common antiretroviral therapy medication errors in hospitalized patients with HIV and when they occur

Self Assessment Questions:

Which of the following events may occur if an incomplete ART regimen is administered to a patient during their hospital stay?

- A: Increase in CD4 cell count
- B: Increase in viral load
- C: Prevention of opportunistic infections
- D: Decreased development of resistance

During which of the following time points of a patient's hospital stay do most ART medication errors occur?

- A: Admission
- B: Unit transfer
- C: Room change
- D: Discharge

Q1 Answer: B Q2 Answer: A

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Activity Type: Knowledge-based Contact Hours: 0.5