

EVALUATION OF THE USE OF BETA-BLOCKERS IN HEART FAILURE THERAPY

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Purpose:

The purpose of this study is to determine if the number of outpatient visits has an effect on achieving target doses of beta blockers in heart failure therapy as well as to identify other limiting factors in achieving target doses.

Method:

This is a retrospective chart-review of patients with the diagnosis of heart failure and/or cardiomyopathy between September 1, 2005 and August 31, 2007 at Edward Hines, Jr. VA Medical Center. Inclusion criteria include age greater than 18 years, NYHA functional class II, III, IV, Stage C, or Stage D heart failure diagnosis. Exclusion criteria include a diagnosis of NYHA functional class I, Stage A or B heart failure, chronic obstruction pulmonary disease, hypertension, heart block, or diastolic dysfunction heart failure. Subjects who meet the inclusion criteria will be reviewed for the following: number of outpatient visits, use of metoprolol succinate, carvedilol, or bisoprolol, doses of the above mentioned medications, additional heart failure indicated medications, blood pressure, heart rate, jugular venous distention, ejection fraction, symptoms of heart failure (i.e. dyspnea, shortness of breath, paroxysmal nocturnal dyspnea, edema, exercise intolerance), and hospitalization due to heart failure. Primary outcomes include: percentage of patients on target doses of metoprolol succinate, carvedilol, and bisoprolol; and comparison of the service line provider (i.e. cardiology, general medicine, etc.) following those patients; comparison of the number of outpatient visits between patients with and without target doses. Secondary outcomes include: percentage of patients being treated with the mentioned beta-blockers, comparison of prescribing patterns between metoprolol succinate, carvedilol, and bisoprolol, comparison of heart failure treatment in Edward Hines, Jr VA Hospital to current heart failure guideline recommendations, and documentation of symptom improvements.

Results:

This research is in the data collection phase. Final results with conclusion will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

To review beta-blockade therapy indicated for heart failure.
To review limiting factors in achieving target doses of beta-blockers in heart failure.

Self Assessment Questions:

Which beta-blockers are indicated for the treatment failure and what are the respective target doses?

What are some identifiable limiting factors to achieving target doses?

EFFICACY OF CONTINUOUS PERIPHERAL NERVE BLOCKS IN THE MANAGEMENT OF TOTAL KNEE ARTHROPLASTY PAIN. DOES PREOPERATIVE EDUCATION IMPROVE PATIENT OUTCOMES RELATED TO PAIN CONTROL?

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PURPOSE: Narcotics work well as analgesics after total knee arthroplasty (TKA), but are associated with many adverse effects. Our purpose is to evaluate if continuous peripheral nerve blockade with ropivacaine and education during and after TKA decreases narcotic use and decreases side effects associated with narcotic analgesia.

METHODS: A chart review was conducted of TKA patients at Northwest Community Hospital. Patients were included if they had a unilateral TKA during the months of June to September 2007. Patients were separated into three groups: no continuous nerve block; continuous nerve block with or without preoperative pain pump and medication education. Standardized education was initiated in August 2007. Data collected included: amount of narcotic equivalents used (PACU and 48h postop), highest pain score in PACU, LOS in PACU and hospital, use of anti-emetics (PACU and 48h postop), and adverse events noted.

RESULTS: Data has been collected on 45 patients (5 no block; 26 block without education; 14 block with education). These preliminary results show an average PACU highest pain score of 5 (0-10) (3.8 no block, 2.92 block without, 3.82 with education). PACU LOS for most patients was > 90 minutes. Five patients required the use of anti-emetic in the PACU (1 no block; 4 block without education) and 14 required an anti-emetic on the floor (2 no block, 8 block without, 4 with education). The most common adverse event was breakthrough pain. Average LOS for the hospital is 3.5 days (3 no block, 3.77 block without, 3.36 with education). Further analysis is pending.

CONCLUSION: Our preliminary results suggest that average high pain score is lower for the groups receiving continuous nerve block. Treatment with continuous nerve block does not appear to affect PACU or hospital LOS. Anti-emetic use is slightly lower for the groups with continuous nerve blocks.

Learning Objectives:

Review current mode of administration of analgesics commonly used for postoperative pain after total knee arthroplasty.
Evaluate appropriateness of using continuous peripheral nerve block for postoperative analgesia after total knee arthroplasty.

Self Assessment Questions:

Traditional analgesics for postoperative pain include:

- a. Epidurals
- b. Localized analgesia
- c. Oral opioids
- d. Patient-controlled analgesia
- e. All of the above

Based on available literature continuous peripheral nerve blocks

- a. can be used safely in ALL individuals
- b. provide effective analgesia postoperatively
- c. decrease the amount of systemic opioid use postoperatively
- d. B and C are correct
- e. All of the above

IMPLEMENTATION AND EVALUATION OF AN ORDERSET FOR INR REVERSAL IN TRAUMA PATIENTS

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Purpose:

Clarian Health recently has implemented an order set to improve the initial assessment and potential treatment of trauma patients on anticoagulation prior to injury. The purpose of this study is to evaluate the effectiveness of the newly implemented order set in improving the standard of care for trauma patients treated at our facility.

Methods:

Adult patients (≥ 18 yrs) admitted to Methodist Hospital with trauma system activation and initial INR within 3 hours of admission greater than 1.5 will be assessed. Patients will be divided into two groups. The first serving as historical controls admitted from August 2005 to August 2007. The second group will include all patients who are admitted after the implementation of the INR reversal order set through March 2008. Data collection includes: injury severity, demographics, time to initial INR evaluation, utilization of reversal therapy, and outcomes. Data from both groups will be analyzed and compared to determine differences in the standard of care related to the INR order set. Primary endpoint is the time to documented INR reversal below 1.5. Secondary endpoints are the number of patients with initial INR assessment within 3 hours of admission, number of platelet units infused, number of red cell units infused, length of ICU stay, length of hospital stay, and mortality.

Results and Conclusions: Data collection currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe the potential benefit associated with INR reversal in trauma patients.

Assess the benefits and impact of implementation of order set driven INR reversal in trauma patients.

Self Assessment Questions:

Rapid reversal of elevated INR in trauma patients is associated with a mortality benefit. T or F

Implementation of order set driven INR reversal in trauma patients is associated with improved standard of care and/or outcomes. T or F

DISCONTINUATION OF HEMODYNAMIC SUPPORT IN PATIENTS RECOVERING FROM SEPTIC SHOCK

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Purpose: Septic shock is a leading cause of death in the United States, with a mortality rate of up to 50%. Endocrine deficiencies, such as vasopressin deficiency, may complicate septic shock. In this setting, exogenous vasopressin (AVP) infusions have been shown to increase plasma vasopressin levels and subsequently decrease catecholamine infusion requirements. While there are data and guidelines to direct initiation of agents to optimize hemodynamics, there are little data regarding the discontinuation of these therapies in patients in the recovery phase of septic shock. The primary objective of this study is to evaluate the incidence of hypotension in patients treated with concomitant therapy based on whether AVP or norepinephrine (NE) is discontinued first.

Methodology: Retrospective chart review of all patients admitted to the medical, surgical, and coronary intensive care units with septic shock receiving concomitant NE and AVP infusions. Patients who expire while receiving both agents will be excluded. Hypotension will be defined as reinitiation of discontinued therapy, increased dose of remaining therapy, or fluid challenge. Data to be collected include: baseline demographics, antimicrobial administration, corticosteroid use, APACHE-II score, doses of NE and AVP, hemodynamic parameters at the time of discontinuation of the first agent, and duration of therapy of each agent. Nominal data will be analyzed with chi-square, or Fisher's exact test where appropriate, while continuous data will be analyzed with Student's t-test.

Results and conclusions: To be determined.

Learning Objectives:

Review the use of vasopressin in the treatment of septic shock. Compare the effects on blood pressure with the discontinuation of norepinephrine vs. vasopressin.

Self Assessment Questions:

True or False: Vasopressin exerts its effects via the alpha receptors.

2. Therapies to improve hemodynamics in septic shock include:

- a. Norepinephrine
- b. Dopamine
- c. Normal saline
- d. Vasopressin
- e. All of the above

USE OF QUANTITATIVE BRONCHOALVEOLAR LAVAGE CULTURES: CLINICAL CHARACTERIZATION AND TREATMENT OF PNEUMONIA IN THE INTENSIVE CARE UNIT

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BACKGROUND: Nosocomial pneumonia is one of the major complications in the intensive care unit (ICU) leading to an increase in ventilator days, hospital stay, morbidity, and mortality. The use of quantitative bronchoalveolar (BAL) culture methods is accepted practice in the Methodist Hospital and Wishard Health Services (WHS) ICUs as a means to assist in the diagnosis of ventilator-associated pneumonia (VAP). The use of early broad spectrum antibiotics with de-escalation ensures early appropriate treatment as well as a decrease in the emergence of resistant organisms. Controversy exists regarding the exact duration of therapy required for successful treatment of VAP.

PURPOSE: This study will characterize and evaluate the use of BALs to diagnose and treat VAP in the ICUs at Methodist Hospital and WHS.

METHODS: This is a retrospective observational study involving hospitalized patients with suspected VAP who underwent diagnostic quantitative BAL at Methodist Hospital or WHS between January 1, 2006 and December 31, 2007. Data that will be collected and analyzed include: WBC and chest x-ray the day the BAL was performed, empiric antibiotic selection, duration of antibiotic therapy, characterization of de-escalated antibiotic regimen, organism and susceptibility information, adverse events, length of ICU and hospital stay, and clinical outcome.

RESULTS and CONCLUSIONS: To be discussed upon completion of data collection.

Learning Objectives:

Explain the rationale for de-escalation of an antibiotic regimen based on culture results for patients with confirmed VAP.

Identify common pathogens and strategies for the treatment of patients with suspected and confirmed VAP.

Self Assessment Questions:

The need for empiric gram-positive coverage for patients with suspected VAP is no longer recommended in the guidelines published in 2005 by the American Thoracic Society and Infectious Diseases Society of America. T/F

De-escalation of antibiotic therapy leads to an increase in resistance as a result of exposing an organism to multiple antibiotics. T/F

MEDICATION RECONCILIATION FAILURE MODE AND EFFECTS ANALYSIS

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Purpose: Medication reconciliation is a vital aspect of patient care and Joint Commission now includes this area of practice as a National Patient Safety Goal. To improve patient safety, a FMEA (Failure Mode and Effect Analysis) process will be conducted focusing on medication reconciliation. A FMEA focusing on medication reconciliation has not previously been conducted at Saint Joseph Regional Medical Center (SJRCM). The FMEA model is a Joint Commission accepted method that allows identification of potential problems at various steps in the medication reconciliation process, as well as implement changes to positively impact patient safety. The objective of this study is to analyze the existing medication reconciliation process at three SJRCM hospitals, as well as the changing process due to the future addition of Genesis, an electronic medical records system.

Methods: As approved by Institutional Review Board, a multidisciplinary team will meet to evaluate the medication reconciliation process, specifically pertaining to the Emergency Department (ED). The team will assess the current process based on the 10 steps of FMEA, including reviewing the process and brainstorming for potential areas of failure and opportunities for improvement. These areas will be assessed to address effects that may occur should the system fail, and the team will rank the effects based on severity, probability of the failure occurring, and detection of the failure occurring. Risk priority numbers (RPN) will be attached to each effect, and failure modes prioritized for taking action. Action plans will be created to decrease high-risk failures, and follow-up assessments are predicted to show reduced RPN. The results of this study will affect medication reconciliation for the ED at the SJRCM South Bend, Mishawaka, and Plymouth campuses, and may be implemented hospital wide as well as shared with the corporate office, Trinity Health.

Learning Objectives:

Describe the Failure Mode and Effects Analysis process.

Identify areas of medication reconciliation in the ED that have high RPN and list potential plans of action to improve RPN.

Self Assessment Questions:

1.) When conducting a FMEA, risk priority numbers are determined based on:

- a.) severity
- b.) probability
- c.) detection
- d.) all of the above

2.) List 2 possible action plans for high risk failures.

BARCODE MEDICATION ADMINISTRATION (BCMA) AT AN ACADEMIC MEDICAL CENTER: ASSESSMENT OF COMPLIANCE AND EVALUATION OF EXPANSION INTO A CRITICAL CARE SETTING

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Purpose: Barcode scanning at the point of medication administration (BCMA) has been shown to improve the accuracy of medication administration and documentation, resulting in enhanced medication safety. Froedtert Hospital is a 450-bed academic medical center located in Milwaukee, Wisconsin. BCMA using Epic software was implemented on two units in October of 2006, followed by the majority of non-critical care units during the first and second quarters of 2007. Monitoring adherence to barcode scanning on a continuous basis is necessary in order to provide constructive feedback and to sustain improvements. Furthermore, communication and follow-through with nursing staff is vital to BCMA success. The objective of this project is to promote medication safety at the point of administration through increasing the consistent use of barcode scanning and evaluating the expansion of BCMA into a critical care setting.

Methods: While acceptance has generally been positive, consistent use of BCMA is necessary to maximize patient safety related to medication administration. Medications that are not scanned are currently monitored on an ongoing basis to identify trends related to staff, reasons for overriding alerts, and medications not scanned. Initial implementation of BCMA in a critical care setting will be evaluated, including improvements in documentation time, errors prevented with BCMA, and reasons for medications not scanned. Nursing concerns with BCMA will be addressed in order to guide nurses in improving the safety of the medication administration process through accurate and correct documentation. BCMA implementation in the critical care setting will be closely monitored and evaluated in order to identify challenges related to BCMA in acutely ill patients, standards for medications not scanned, and which medications may be reasonably overridden in emergency situations.

Results: Evaluation and assessment of BCMA is ongoing. Results to date will be presented at the Great Lakes Residency Conference.

Learning Objectives:

To understand the challenges associated with the implementation of barcode medication administration (BCMA) at an academic medical center and in a critical care setting.
To understand the importance of compliance with barcode medication administration (BCMA) in medication error prevention and the promotion of patient safety.

Self Assessment Questions:

What are some of the complications associated with the implementation of and adherence to barcode medication administration (BCMA)?
What challenges to implementing barcode medication administration in a critical care setting (intensive care unit) are more prevalent than in a non-critical care setting (medical/surgical unit)?

PK/PD ANALYSIS OF PSEUDOMONAS AERUGINOSA BACTEREMIA AND ASSESSMENT OF RISK FACTORS FOR ADVERSE OUTCOMES

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Background

Recent published reports show that in many instances current dosing strategies of piperacillin tazobactam (PT) may not achieve adequate pharmacodynamic target attainment (TA) in the treatment of *P. aeruginosa*, particularly in isolates with higher minimum inhibitory concentrations (MICs). However little data has been published on the possible association of a lower probability of pharmacodynamic target attainment and negative outcomes.

Methods

An analysis of the pharmacodynamic profile of PT using a previously published model of PTs pharmacokinetic profile in hospitalized patients. A 10,000 patient Monte Carlo simulation will be run using this profile and dosing schemes which have traditionally used to treat pseudomonal bacteremia at Henry Ford Hospital (4.5 G Q6 or Q8). The second portion of the study is a nested case control study of a cohort of patients with pseudomonal bacteremia. Fifty patients with clinically evaluable pseudomonal bacteremia treated with PT will be identified as having a low likelihood of pharmacodynamic target attainment. This group will be matched with 50 patients with a high likelihood of target attainment. Additional data to be collected include other potential predictors of negative outcomes which have been identified in other studies of gram negative bacteremia. Descriptive statistics will be used to describe the rates of pharmacodynamic target attainment achieved by current dosing practices at HFH. In the analysis of PK/PD target attainment and associated clinical outcomes, a student's t test will be used for all continuous variables and a chi square or Fishers exact test will be used for all categorical variables. A stepwise logistical regression will be used to assess independent risk factors for clinical and microbiological failure including mortality.

All results will be completed and presented at GLPRC in April

Learning Objectives:

List the pharmacokinetic/pharmacodynamic targets necessary to optimize beta lactam antibiotics.
Describe the relationship between PK/PD target attainment and clinical outcome.

Self Assessment Questions:

True or false: Pharmacodynamic activity for beta-lactams is best described by the ratio of maximum serum antibiotic concentration (Cmax) to MIC (Cmax:MIC).
True or false: A Monte Carlo simulation is method to predict pharmacodynamic target attainment by means of a computer program, using a population of MICs for a given pathogen and a population of expected serum concentrations for a given antimicrobial agent.

IMPLEMENTATION OF AN IV IRON PROTOCOL AND ITS EFFECTS ON ANEMIA MANAGEMENT

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Purpose: Implement an IV iron protocol, measure compliance with protocol, assess patient outcomes based on the Kidney Disease Outcome Quality Initiative (KDOQI) recommended anemia goals and to decrease the amount of Aranesp usage at the dialysis clinic.

Background: Anemia is a common complication of advancing chronic kidney disease (CKD) and end stage renal disease (ESRD), and it is associated with increased risk of morbidity and mortality.

The World Health Organization defines anemia as <13g/dl in men and < 12g/dl in women.

Iron dextran may be used for treatment of anemia. It can replenish depleted iron stores and help maintain concentrations of iron in the bone marrow, where it may be incorporated into hemoglobin.

Methods: This is a prospective, observational study. 130 patients will be evaluated over three months. Patients that meet criteria will be placed on the IV Iron Protocol and receive iron dextran per protocol.

Exclusion Criteria: Patients that develop an infection and require IV antibiotics, patients with shown evidence of inflammation, and patients already on maintenance IV iron will be excluded.

Hemoglobin and hematocrit will be measured biweekly throughout the study. Serum ferritin and transferrin saturation (TSAT) will be measured every three months.

For those included, pre-study iron parameters and Aranesp usage will be compared to post-study iron parameters and Aranesp usage to determine response rate to IV iron dextran. All adverse drug events will be recorded.

Results/Conclusions: Pending. They will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify anemia in hemodialysis patients.

Design a treatment plan for dialysis patients with anemia.

Self Assessment Questions:

True/False: IV iron therapy should be held in patients being treated with an active infection.

What is the KDOQI hemoglobin/hematocrit goals for anemia in hemodialysis?

- A. 9 - 11/34 - 36%
- B. 10 - 11/32 - 37%
- C. 11 - 12/33 - 36%
- D. 11 - 13/34 - 37%

EVALUATION OF EVIDENCE-BASED PRACTICE GUIDELINES FOR THE MANAGEMENT OF SEVERE SEPSIS AND SEPTIC SHOCK AT A COMMUNITY TEACHING HOSPITAL

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BACKGROUND: Severe sepsis is a clinical condition characterized by systemic inflammation with organ dysfunction. Despite advances in care, the number of annual cases has continued to rise, with mortality rates ranging between 30-50%. Due to the heterogeneous patient population affected, and the wide spectrum of patient presentation, treatment is complex and has led to inconsistencies in therapeutic management and endpoints. In 2004, an international consensus conference published the Surviving Sepsis Guidelines, which advocated systematic evaluation of patients for the following interventions proven to reduce mortality: early and appropriate antibiotic therapy, early goal-directed therapy, low-dose steroids, and drotrecogin- α . In October 2007, full implementation was achieved at ALGH by bundling the interventions into a written order set.

PURPOSE: The purpose of this study is to evaluate the management of severe sepsis pre- and post order set implementation.

METHODS: This study is an observational trial, intended to evaluate all adult patients admitted to the medical and coronary intensive care units that meet the criteria for severe sepsis or septic shock. Retrospective data will be collected from December 2006 to February 2007, while prospective data on the use of the order set will be collected from December 2007 to February 2008. Guideline "bundle" compliance will be the primary endpoint, while secondary endpoints will include time to first antibiotic dose, antibiotic appropriateness, initiation of steroids, and mortality. Retrospective and prospective data will be compared in order to determine any correlation between order set implementation and improved patient care. This trial will also include a medication utilization evaluation of drotrecogin- α in the treatment of severe sepsis at ALGH.

RESULTS/CONCLUSIONS: Data collection and analysis is currently ongoing. Preliminary results and conclusion will be presented.

Learning Objectives:

Understand the basic pathophysiology of severe sepsis and septic shock, and the four interventions proven to decrease mortality.

Identify appropriate patients in which to utilize drotrecogin- α .

Self Assessment Questions:

Which of the following interventions has NOT been shown to improve survival in severe sepsis:

- a. glycemic control
- b. drotrecogin- α
- c. low-dose steroids
- d. early goal directed therapy

True/False: Prior to initiating drotrecogin- α , a thorough assessment of the patients bleeding risk should be conducted..

A BUSINESS STRATEGY FOR HOSPITAL OUTPATIENT SERVICES

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Purpose: As the practice of hospital pharmacy continues to expand, new opportunities for increasing services to patients and employees are frequently identified. Two services that are experiencing renewed interest are outpatient and mail order pharmacies that are owned and operated by hospitals. Outpatient pharmacies have the potential of capturing prescriptions generated on patient discharge, as well as employee prescriptions, whereas mail order is primarily directed toward employee prescriptions. These services provide a convenient alternative for patients and employees, as well as cost benefit for the hospital. The purpose of this project is to evaluate the advantages, disadvantages, and feasibility of hospital ownership of outpatient and mail order pharmacies.

Methods: In developing a new service, a business plan must be in place before commencement. An analysis of the core competencies of the pharmacy department must be determined and key stakeholders identified. Next, the business potential of the project must be evaluated. Potential customers will be identified, prescription volumes will be projected, and capture rates of potential customers will be estimated. A profit-loss statement and targeted customers will be identified. A cost savings analysis will be conducted for human resources to determine if a benefit exists with a hospital-owned outpatient pharmacy for employee prescriptions. Potential rebates will also be investigated with pre-existing pharmacy contracts. Next, appropriate locations will be identified, evaluated, and analyzed. Determination of eligibility for 340-B pricing will be investigated. Operational expenses involved in an outpatient pharmacy will also be identified and compared to projected profits over a five year time period. The current mail order contract will be evaluated, and top Pharmacy Benefit Managers will be identified and potential contracts evaluated. Results and conclusions are pending and will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the advantages and disadvantages to creating a hospital-owned outpatient or mail order pharmacy.

List the potential barriers to creating a hospital-owned outpatient or mail order pharmacy.

Self Assessment Questions:

True or false: Capturing employee prescriptions can represent a cost savings to an employer.

Multiple Choice: Common challenges to designing a hospital owned outpatient pharmacy includes the following except:

- a) Lack of retail experience
- b) Public access limitations
- c) Narrow profit margin tolerability
- d) Inability to provide all competitors services

STEP CARE THERAPY FOR NONSEDATING ANTIHISTAMINES: IMPACT ON COST

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Objective: Nonsedating antihistamines (NSA) step care therapy programs facilitate appropriate utilization of and cost savings for NSA by encouraging the use of over-the-counter (OTC) NSA medications. The objective of this study is to determine the differences in plan and member costs for members who do not initiate prior authorization (PA) for prescription NSA at the point-of-care and who choose to: 1) pay out-of-pocket (OOP) for the prescription; 2) obtain a prescription for an alternative medication that does not require a PA; and 3) use an OTC medication as intended by the program or not use any medication to alleviate allergy symptoms.

Methods: This retrospective pharmacy claims analysis evaluated claims from a large national pharmacy benefit manager (PBM). Claims for the month of August 2007 included those requiring prior authorizations by the PBM and excluded members who initiated PAs. Members who paid OOP for their NSA prescriptions were identified through a large community pharmacy database. Members who used other prescription medications were identified by matching claims data to a list of prescription medications used to treat allergic rhinitis. The remaining claims included members who used an OTC medication or became nonadherent.

Results: Preliminary results indicate 5,285 members had NSA prescriptions that required a PA initiation in August 2007. Fifty-two percent of members did not initiate a PA. Of those members who did not initiate a PA, 11.5% of members paid OOP for the NSA prescription, 20% of members tried a different prescription medication, and 68.8% of members used an OTC agent or were nonadherent.

Conclusion: To be determined.

Learning Objectives:

Describe the impact of the NSA step care therapy program on cost to members and the plan.

Identify the most common choice members turned to when they did not initiate a PA for the NSA step care therapy program.

Self Assessment Questions:

How much did it cost the member to use an alternate preferred-brand medication?

What was the most frequent prescription medication used by members who chose not to initiate a prior authorization?

PREVALENCE OF VENOUS THROMBOEMBOLISM IN A PEDIATRIC HOSPITAL

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BACKGROUND:

The development of venous thromboembolism (VTE) in children is considered rare and unusual, but the incidence is approaching 0.2% in North America. The true incidence of these complications in the pediatric population is suspected to be grossly underreported.

OBJECTIVES:

The primary objective of this study is to identify the prevalence of VTE in the inpatient pediatric population in a large, urban health system. The secondary objective is to assess risk factors associated with the development of VTE in pediatric patients.

METHODS:

This report will be a descriptive, retrospective cohort analysis of all pediatric patients who developed an initial VTE between the dates of September 2002 to August 2007. In order to ensure maximal inclusion, all patients with a VTE discharge diagnosis will be cross-referenced with a list of patients that have a positive radiographic screen for VTE during the study period to develop a list of cases. The finalized and confirmed VTE patient list will be matched with pediatric patients that did not develop a VTE during a hospitalization within the study period. Cases will be matched to controls on age, sex, length of hospital stay, and admitting service. Data to be collected includes patient demographics; length of hospital stay; length of immobilization; admission diagnosis; presence of indwelling catheters; surgical procedure performed; presence and description of traumatic injury; malignancy; and presence of systemic infection. Other parameters to be collected include laboratory data such as aPTT, INR, D-dimer; hypercoagulability studies, and the presence of mechanical or pharmacological VTE prophylaxis.

RESULTS/CONCLUSION:

Results to follow pending completion of data collection and analysis.

Learning Objectives:

Describe the current practice of VTE risk assessment in the pediatric patient.

Identify potential risk factors for the development of VTE in the pediatric patient.

Self Assessment Questions:

True/False: The American College of Chest Physicians has made specific recommendations for global VTE risk assessment for pediatric patients.

True/False: The risk factors for VTE development in children are known, identified, and routinely recognized in the medical community.

EVALUATING THE USE OF ACID SUPPRESSION THERAPY FOR STRESS ULCER PROPHYLAXIS IN NON-INTENSIVE CARE UNIT PATIENTS

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Background: ASHP guidelines, published in 1999, identified risk factors for which stress ulcer prophylaxis (SUP) would be indicated. Use of SUP in non-ICU patients is not recommended by these guidelines, but very little information is known about what places a general medicine patient at risk for gastrointestinal ulceration. Furthermore, some of the risk factors in the guidelines are also present in some general medicine patients. Many general medicine patients continue to receive SUP whether or not they have these risk factors.

Purpose: The primary objective will be to assess the appropriateness of SUP in non-ICU patients based on whether or not patients had an indication for use of these medications. Indications for use are taken from the ASHP guidelines for SUP. Secondary objectives include whether or not acid suppression therapy was continued at discharge and an inpatient cost analysis regarding overall SUP.

Significance: Since the publication of these guidelines, no trial has evaluated the appropriateness of SUP in non-ICU patients based on the indications listed in the guidelines, and the guidelines do not have specific indications for SUP in the non-ICU patients.

Methods: Three months worth of data will be collected from lists of general internal medicine physicians assigned to an inpatient service. Charts will be reviewed for any patient being treated by these physicians. Patients will be reviewed to evaluate whether SUP was indicated or not. Additionally, evaluation of SUP once the patients were discharged will be reviewed.

Results: Data collection is currently underway, and will be complete

Learning Objectives:

List potential risk factors for gastrointestinal ulceration in the general medicine patient population.

Evaluate current literature regarding stress ulcer prophylaxis in non-ICU patients.

Self Assessment Questions:

All of the following are risk factors for gastrointestinal ulceration in non-ICU patients except.

- A. hepatic failure
- B. history of GI bleed
- C. INR > 1.5
- D. Overt bleeding x 3 days

True or False: The current ASHP guidelines for stress ulcer prophylaxis recommend that all hospitalized patients receive prophylactic therapy.

INTENSIVE INSULIN THERAPY IN THE NEUROSCIENCE INTENSIVE CARE UNIT

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PURPOSE: Substantial evidence supports intensive insulin therapy in the Intensive Care Unit (ICU) due to the incidence of hyperglycemia in critically ill patients, potential complications of hyperglycemia, and benefits of tight glucose control on morbidity and mortality. Large studies in medical and surgical ICUs and smaller studies of Neuroscience Intensive Care Unit (NSICU) sub-populations have demonstrated benefits of intensive insulin therapy, including reduced incidence of infection. The University of Illinois Medical Center at Chicago (UIMCC) intensive insulin protocol to maintain blood glucose levels between 80 and 150mg/dl was implemented in the NSICU on June 18, 2007. It is hypothesized that tight glycemic control with intensive insulin therapy reduces the incidence of infection. However, studies have not evaluated this effect in the general NSICU population.

METHODS: This is a single-center, retrospective study of NSICU patients followed by Neurosurgery and/or Neurology services at UIMCC. Patients treated according to the intensive insulin protocol will be compared to patients treated prior to protocol implementation in the NSICU on June 18, 2007. The intensive insulin group will consist of patients who received insulin infusion per protocol to maintain blood glucose between 80 and 150mg/dl. The control group will consist of patients without insulin infusion after 2 consecutive blood glucose levels > 150mg/dl before protocol implementation. The primary objective is to compare the incidence of infection between the intensive insulin and control groups. Secondary objectives include evaluation of percentage of blood glucose levels falling in the desired range of 80-150mg/dl, incidence of hypoglycemia (blood glucose <60mg/dl), NSICU and hospital length of stay, and discharge disposition. Forty-six patients will be screened for inclusion in the insulin group, and 476 will be screened for inclusion in the control group. We anticipate the inclusion of approximately 45 patients in each group.

RESULTS/CONCLUSIONS: Data will be presented at Great Lakes.

Learning Objectives:

State the importance of glycemic control in the ICU population.
Describe the available data regarding intensive insulin therapy in NSICU patients.

Self Assessment Questions:

T/F: Large studies in NSICU patients have demonstrated significant benefits of intensive insulin therapy on incidence of infection.

T/F: Studies evaluating sub-groups of patients within the NSICU receiving intensive insulin therapy have suggested reduced incidence of infection compared to conventional therapy.

DEVELOPMENT OF AN ASSESSMENT TOOL TO IDENTIFY PATIENTS WITH LOW AND/OR ERRATIC VITAMIN K INTAKE WHILE ON WARFARIN THERAPY

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Purpose: Evidence suggests that alterations in dietary Vitamin K intake effects patient response to warfarin therapy. It is also thought that low vitamin K intake may be partially responsible for erratic changes in INR. The objective of this study is to develop and validate an assessment tool to identify patients whose low vitamin K intake is responsible for warfarin instability.

Methods: An assessment tool was developed to consider specific factors that have been proven to impact INR such as compliance, intake of multivitamins or nutritional support, hospitalizations, drug interactions, and dietary intake. Prior to commencement, the survey was evaluated by national experts in the field of anticoagulation. The survey tool was then modified based on expert recommendations. Subsequently, the tool was administered to 10 patients within the anticoagulation clinic to evaluate for face validity. After refining the survey questions, the survey was piloted in 50 patients. Cronbach's alpha will be used to determine questions that show good correlation to INR results. Questions illustrating poor correlation will be eliminated from the tool. The first test phase will be performed in 100 patients. The anticoagulation clinics medical records will be used to identify and exclude patients who have had any hospitalizations, addition of severe drug interactions, and noncompliance 1 month prior to the survey. To further substantiate the reliability of the survey, at least 50 patients from the initial test phase will repeat the test. The tool will be statistically tested for reliability and stability, and validation will be reliant on the extent to which items on the scale correlate with the INR.

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

Learning Objectives:

Describe the challenges and effects of Vitamin K on warfarin therapy
Design a step-wise approach to implement validation of a survey tool

Self Assessment Questions:

What characteristics of dietary vitamin K intake impact INR while on warfarin therapy?

- A. Absorption and bioavailability
- B. Drug interactions
- C. Compliance
- D. All of the above

Studies show that _____ mcg of vitamin K therapy in conjunction with warfarin therapy is adequate for INR stabilization.

- A. 50 mcg
- B. 75 mcg
- C. 100 mcg
- D. 250 mcg

EVIDENCE-BASED TREATMENT FOR EXTRAVASATION OF PHARMACEUTICALS

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PURPOSE: A multitude of pharmacotherapeutic agents have the potential to cause undesirable effects when intravenous administration extravasates into the surrounding tissue. Unfavorable consequences ranging from erythema to tissue necrosis and permanent disfigurement may result. Delays in recognition of extravasation and the administration of appropriate treatment can increase the potential for serious adverse effects. The purpose of this investigation is to gather information from institution reports regarding the extravasation of medications in both the pediatric and adult populations and to compare the appropriateness of actions taken in response to these events to those recommended in the current literature. The primary intent of this study is to improve patient care by way of improving awareness regarding consistent evidence-based treatment and prevention of extravasation injuries.

METHODS: Prior to initiation, this research protocol will be submitted to the Institutional Review Board for approval. A retrospective review will be performed to gather information from Adverse Drug Event (ADE) reports database of the institution. Data concerning incidents of extravasation of medications in either the pediatric or adult populations will be collected; this data will then be compared to currently accepted recommendations for individual agents published in the professional literature.

SUMMARY OF PRELIMINARY RESULTS: The primary agents extravasated in the adult population in this institution from 2003-2007 were contrast agents and dopamine, and the majority of these incidents occurred in the radiology department. In the pediatric population, the most commonly extravasated agent was parenteral nutrition/lipids, and this occurred most commonly in the pediatric ICU and the neonatal ICU. Data collection is in progress. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the medical risks associated with extravasation injury.
List available treatment options for extravasation injuries.

Self Assessment Questions:

1. Extravasation of which of the following agents may be appropriately treated with phentolamine?

- a. Dopamine
- b. Paclitaxel
- c. Heparin
- d. Linezolid

2. True/False All medications that have the potential for extravasation have evidence-based recommendations for treatment, if extravasation occurs.

PHYSICIANS' PERCEPTIONS OF ANTICOAGULATION MANAGEMENT BY COMMUNITY PHARMACISTS

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Objective: The 2008 Joint Commission on National Patient Safety Goals outlined 11 steps to reduce the risks associated with anticoagulants. One step is to implement an anticoagulation management program to individualize the care of each patient. Community pharmacist anticoagulation management supports continuity of care in the prevention and treatment of thromboembolic disease. Specially trained community pharmacists are in a prime position to work under a collaborative practice agreement with a physician to provide accessible and affordable anticoagulation management. The primary objective of this study is to evaluate physicians' perceptions of specially trained pharmacists providing anticoagulation management in the community pharmacy setting. Secondary objectives are to determine opportunities for community pharmacy-based anticoagulation management under a collaborative agreement.

Methods: The top 400 physician prescribers of warfarin were identified based on prescription claims data for 180 grocery store pharmacies in the Chicagoland area. Prescribers were randomly assigned to receive a survey by fax or postal mail. Distribution of the survey occurred in 3 phases. The survey included three demographic-based, three knowledge-based, and ten perception-based questions. Prescribers were asked to disclose demographic information, experience with anticoagulation management at their practice, perceived barriers to community anticoagulation management, and thoughts on pharmacy payment.

Results: Descriptive statistics will be used to evaluate physicians' perceptions. Physicians' perceptions will be analyzed based on demographic information, satisfaction with their current anticoagulation management, views on collaborative agreements with pharmacists, perception of pharmacists' qualifications, and professional relationships with community pharmacists.

Conclusions: The results are expected to provide insight on physicians' perceptions of pharmacists establishing collaborative practice agreements in the community pharmacy setting. This will be useful in identifying opportunities for community pharmacists to develop an anticoagulation management service and improve patient outcomes.

Learning Objectives:

Describe the role of the community pharmacist in providing pharmaceutical care to patients with anticoagulation needs.
Identify the challenges community pharmacists face in developing an anticoagulation service.

Self Assessment Questions:

Pharmacists can only provide anticoagulation management in ambulatory care clinics. True or False?

2. Two barriers that community pharmacists may encounter when evaluating whether to develop collaborative practice agreements with physicians for anticoagulation management are lack of physician support and lack of time. True or False?

ASSESSING THE IMPACT OF HIGH DEDUCTIBLE HEALTH PLAN BENEFIT DESIGN ON CHRONIC, PREVENTIVE MEDICATION ADHERENCE

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Purpose: Non-adherence to medications is a common problem in healthcare today. There is extensive debate surrounding High Deductible Health Plans (HDHP) and what affect they have on adherence. The purpose of the study is to analyze and report adherence rates for chronic, preventive medication classes under traditional four-tier copay versus HDHP benefit designs.

Methods: A retrospective claims analysis was performed using pharmacy claims from members enrolled in a managed care commercial pharmacy benefit. The study compares two populations of members enrolled in a traditional four-tier copay versus a HDHP benefit design. New starts on a statin, diabetes or antidepressant medication were identified and included in an analysis of medication adherence. Members receiving more than a one-month supply of the study medication were excluded. New starts were identified through a six-month observational period. Six-months of utilization data was analyzed to assess adherence to the study medication. A secondary analysis will also determine if age, gender, number of medications or drug cost affect a members adherence.

Results: Medication adherence was measured using a medication possession ratio (MPR). A Student t-test was used to determine statistical significance of adherence between members with traditional four-tier copay and HDHP benefit designs. A multivariate regression analysis was performed to determine the affect confounding factors have on adherence. Measures of central tendency (mean, median, mode) and measures of dispersion (range, standard deviation, percentiles) were calculated for each cohort, as well as the overall population. A gap analysis was used to determine if members had extended time periods between refills.

Conclusions: As final results are determined we will be able to support the value of providing additional benefit options for preventive medications within an HDHP.

Learning Objectives:

Understand how benefit design could impact adherence to chronic, preventive medications

Identify if there are differences in adherence to chronic, preventive medications for members with a traditional four-tier copay versus a HDHP benefit design

Self Assessment Questions:

T/F Study results show benefit design may be a factor impacting medication adherence.

What factors other than cost, could impact a medication adherence?

IMPLEMENTATION AND EVALUATION OF A PHARMACIST-MANAGED INPATIENT ANTICOAGULATION SERVICE

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Purpose: The Joint Commission has included the management of inpatient anticoagulation as a 2008 National Patient Safety Goal due to a high incidence of adverse events. A large amount of evidence exists supporting the implementation of pharmacist-managed anticoagulation services showing decreases in length of stay, adverse events, and supratherapeutic INR levels when pharmacists are involved. The primary objective of this project is to design and implement a pharmacist-managed inpatient warfarin service. The secondary objective is to improve the clinical outcomes of patients treated with warfarin during their hospital stay by evaluating the incidence of adverse vents and INR values.

Methods: The objectives of this service will be met through the development of an inpatient warfarin service. The development of the service will include a hospital guideline defining the service including key concepts in the management of warfarin: indication for use, monitoring parameters, and drug interactions. Dosing nomograms will be created and aid with prescribing the appropriate dose of warfarin for a specific patient. The pilot will involve a multidisciplinary team composed of pharmacists and the consulting physician(s). During the pilot, the physician(s) will determine the appropriateness of warfarin therapy for the patient and write an order consulting pharmacy to dose and manage the medication if the patient fulfills the required criteria. The warfarin service has been approved by the Pharmacy and Therapeutics Committee. A retrospective chart review will be conducted to collect data from March 1st to June 1st 2008. Data will be compared to a control group consisting of patients who were not managed by pharmacy. Outcomes will be measured through data collected from medical records. This study received approval from the Investigational Review Board of Mount Carmel Health System. **Results/Conclusion:** Implementation of the service is in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe the components of a pharmacist-managed warfarin service.

Identify the obstacles involved in implementing a pharmacist-managed inpatient warfarin dosing protocol.

Self Assessment Questions:

True or False: The Joint Commission requires that an anticoagulant management program is in place by October 1, 2008.

Which of the following anticoagulants is not included in the 2008 National Patient Safety Goal 3E? A.

Lovenox/enoxaparin B. Coumadin/warfarin C. Heparin D. Arixtra/fondaparinux E. All of the above are included.

ASSESSING THE IMPACT OF AN INTERDISCIPLINARY HEALTHCARE TEAM ON LIPID CONTROL IN AN AMBULATORY PHARMACY SETTING

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Objective: High cholesterol is known to be a key factor in the development of cardiovascular morbidity and mortality in patients. With growing health care costs and declining physician-patient time, pharmacists are offering their services to show they can assist in the management of hyperlipidemia. Goals of this study are to: 1) determine the percentage of patients that have reached their LDL goal as determined by both the NCEP and the NCQA standards, 2) assess if patients with diabetes are managed more aggressively by determining the percentage at goal < 70 mg/dL, and 3) determine if the frequency of patient care affects these values.

Methods: A retrospective chart review of patients currently seen in an interdisciplinary practice at a major university who have had at least three fasting lipid panels will be performed. The percentage drop in LDL, triglycerides, total cholesterol and rise in HDL will be calculated by comparing their initial lipid values against their most recent values. Patients will be stratified as primary prevention versus secondary prevention versus patients with diabetes.

Results: Measured outcomes will include 1) the percentage of primary prevention, secondary prevention, and diabetes patients currently meeting NCEP and NCQA LDL goals, and 2) the percentage of patients controlled versus the average number of visits they had during the course of treatment to determine if frequency of care has an impact on lipid control.

Conclusions: The findings of this study will help determine if patients seen in an interdisciplinary setting for lipid management were effectively treated and reached their LDL goal. It will also highlight the impact pharmacists can make on treating hyperlipidemia as a key member of a professional healthcare team.

Learning Objectives:

Describe how an interdisciplinary team can effectively manage hyperlipidemia in the patient population.

Identify if the frequency of patient visits has an impact on reaching lipid goals.

Self Assessment Questions:

The ATP III guidelines currently recommend that patients with established CHD should be started on a cholesterol-lowering medication along with therapeutic lifestyle changes when their baseline LDL cholesterol is equal to or greater than:

- a) 100 mg/dL
- b) 120 mg/dL
- c) 130 mg/dL
- d) 140 mg/dL
- e) 150 mg/dL

TRUE or FALSE: According to the ATP III Final Report, growing evidence shows that higher-risk patients with diabetes carry an absolute risk for major adverse coronary events similar to that of non-diabetic patients with established coronary heart disease.

VITAMIN D STATUS MONITORING AND FOLLOW-UP IN AN ELDERLY VETERAN LONG TERM CARE POPULATION: A RETROSPECTIVE ANALYSIS

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Purpose:

Vitamin D deficiency/insufficiency is a widespread problem in the elderly, particularly in institutionalized and geriatric populations. Vitamin D levels decline due to multiple factors associated with aging. Vitamin D is important for bone health, and vitamin D deficiency/insufficiency can cause or worsen osteopenia and osteoporosis. Prior research has shown that vitamin D supplementation can reverse the negative effects of hypovitaminosis D on bone mineral density. Furthermore, recent meta-analyses of randomized controlled trials concluded that vitamin D supplementation appears to reduce the risk of falls and fracture among older individuals. Clearly, vitamin D deficiency is a common, fixable risk factor for osteoporosis and its complications. However, little is known about the occurrence and treatment in Hines patients. The primary purpose of this project is to evaluate the Extended Care Center (ECC) at Hines VA Hospitals awareness and treatment of vitamin D deficiency/insufficiency.

Methods:

A retrospective chart review will be performed at Edward Hines, Jr. VA Hospital. A list of ECC patients with documented serum 25(OH)vitamin D levels measured between January 2001 and December 2006 will be generated from the computerized patient record system (CPRS). All ECC residents during January 2001 through December 2006, excluding hemodialysis patients and patients with history of parathyroidectomy, are eligible for inclusion. Patients medical records will be reviewed from the date of vitamin D level measurement until 12 months later or discharge from the ECC (whichever comes first), during which the following will be assessed: serum 25(OH)vitamin D levels, vitamin D therapy regimen (including formulation, dose, frequency, and length of treatment), and length of time to follow-up after initiation of vitamin D therapy. The data analysis will focus primarily on descriptive statistics.

Learning Objectives:

To determine the frequency of vitamin D insufficiency/deficiency among monitored patients in the Extended Care Center at the Hines VA.

To assess the treatment and follow-up that occurs when patients are identified to have low vitamin D levels.

Self Assessment Questions:

T/F: Females who suffer osteoporotic fracture have a worse prognosis than age-matched males.

T/F: Recent meta-analyses of randomized controlled trials concluded that vitamin D supplementation appears to reduce the risk of falls and fracture among older individuals.

A COMPARISON OF THE DELAY BETWEEN MANUSCRIPT PUBLICATION DATES AND APPEARANCE IN ONLINE REFERENCE DATABASES

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Purpose: Healthcare professionals and medical communication associates rely on electronic literature searching databases to provide guides to the most up-to-date scientific information. As a result, it is extremely valuable to know which secondary source (Pubmed, Medline, or Embase) provides the timeliest information. Knowing which database has the most current and accurate publications available may decrease workload and time spent on researching new literature. This project was designed to determine which literature databases provide published information in the most prompt and accurate manner, utilizing the largest scope of references.

Methods: A retrospective and prospective observational review will compare Datavision with Pubmed, Medline and Embase for prasugrel and gemcitabine manuscripts. Data review period will be for manuscripts published between 1 January 2005 and 1 January 2008. Data collected will include the manuscript submission date, publication date, and the date the publication was available in various secondary reference databases (both electronic and hardcopy publication dates). The primary endpoint will be a comparison of the delay between a manuscript publication date in a journal and the date of availability in the secondary reference databases. Secondary outcomes will compare the scope of references available in the various databases, and the timespan from submission to publication using Datavision's journal database and the results seen in the primary analysis.

Results: According to the Datavision report, between 01 January 2005 and 13 August 2007, 170 manuscripts and articles were published in various journals for gemcitabine (n = 143) and prasugrel (n = 27).

Data collection is ongoing and results are pending.

Learning Objectives:

List the secondary literature databases

Determine which secondary literature databases provide published information in the most prompt and accurate manner

Self Assessment Questions:

Which of the following are secondary literature databases?

- a. Pubmed
- b. MedLine
- c. Biosis
- d. Embase
- e. All of the above

Answer: e - All of the above

From the current research results, which database provides the timeliest access to manuscripts?

- a. Medline
- b. Embase
- c. Pubmed
- d. A and B

Answer: c - Pubmed

IMPLEMENTATION AND EVALUATION OF A PIPERACILLIN/TAZOBACTAM STEWARDSHIP PROGRAM

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Purpose: Implementation of an antimicrobial stewardship program has been shown to decrease growing rates of resistance to broad-spectrum antibiotics as well as improve patient care while reducing medication costs. The Zablocki Veterans Affairs Medical Center (ZVAMC) currently does not have an antimicrobial stewardship program in place. Piperacillin/tazobactam (P/T) is an unrestricted, broad-spectrum antibiotic frequently utilized at the ZVAMC. To begin the stewardship program, criteria for use of P/T was developed with a computerized order set being implemented to guide appropriate prescribing of P/T. The primary objective of this study is to evaluate the change in usage of P/T before and after the implementation of this computerized order set. The secondary objective is to advance the stewardship program by adding other broad-spectrum antimicrobials with the goal of improving appropriate use of these agents.

Methods: The ZVAMCs computerized system was used to determine baseline usage of P/T at our facility. Computerized criteria for use of P/T was instituted in the facility's provider order entry system guiding providers to utilize P/T in patients who meet specified criteria. All patients started on P/T were evaluated within 72 hours of initiation to assess appropriateness of P/T based on culture results and the patient's clinical state. Recommendations for alternative therapy were discussed with the prescriber. Data collected included patient's age, weight, creatinine clearance, indication, dose of P/T, length of treatment, concomitant antibiotics, if P/T therapy was de-escalated, length of stay, and daily cost of P/T. In addition, recommendations for alternative therapy were recorded along with if those recommendations were accepted. Data collected prior to initiation of restrictions will be compared with data collected after initiation of restrictions to assess efficacy of the management program.

Results: Data collection is currently in progress and will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

Explain the methods for implementing an effective antimicrobial stewardship program.

Explain the benefits of implementing an antimicrobial stewardship program.

Self Assessment Questions:

Who should be involved in the implementation of an antimicrobial stewardship program?

- a. Infectious Disease pharmacist
- b. Infectious Disease physician
- c. Microbiology lab director
- d. Computer programmer
- e. All of the above

What are the benefits of an antimicrobial stewardship program?

- a. Decreased rates of resistance to broad-spectrum antimicrobials
- b. Decreased costs for antimicrobials
- c. Decreased patient length of stay
- d. All of the above

EPIDEMIOLOGY AND TREATMENT CONSIDERATIONS OF COMMUNITY-ASSOCIATED METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (CA-MRSA) INFECTIONS IN 2007

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Purpose: Methicillin-resistant *Staphylococcus aureus* (MRSA) has been implicated as a cause of infection in numerous patients without previously defined risk factors. Currently, there is no optimal treatment regimen or treatment guideline available for the management of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections. Drugs that have been recommended for the treatment of CA-MRSA infections include vancomycin, clindamycin, trimethoprim/sulfamethoxazole, and linezolid. This research aims to fill a critical void in defining optimal treatment regimens for CA-MRSA infections by determining if a relationship exists between in vitro susceptibility results of CA-MRSA isolates and clinical outcome in patients with infections due to CA-MRSA. This information will allow clinicians to base their antibiotic decisions upon sound pharmacodynamic, microbiologic, and epidemiologic data. This study is a continuation of a previously conducted study to provide a larger sample size of CA-MRSA isolates in an attempt to provide more meaningful data.

Methodology: Subjects were identified by microbiologic surveillance cultures at Wishard Health Services between January 1, 2007 and December 31, 2007. The medical record for each subject was retrospectively reviewed to identify the study population using the CDC definition of CA-MRSA, and subsequently obtain details about the epidemiology, clinical course and treatment outcomes for each case. A sampling of clinical CA-MRSA isolates will be tested for antimicrobial susceptibility utilizing the Etest methodology in order to obtain the exact MIC for agents believed to be active against CA-MRSA. Using this information, we will determine if in vitro susceptibilities correlate with clinical outcome. The results from 2007 will be compared to those of the 2006 study data. Furthermore, we will attempt to derive an evidence based treatment algorithm based upon the variables of in vitro activity, pharmacokinetics, pharmacodynamics, and clinical cure rates.

Results and conclusions to be presented.

Learning Objectives:

Describe the differences in epidemiology and clinical features of HA-MRSA and CA-MRSA.

Identify antibiotics expected to obtain clinical cure rates for infections due to CA-MRSA based on pharmacodynamic principles and clinical experience.

Self Assessment Questions:

Skin and soft tissue infections are the predominate manifestations of a CA-MRSA infection? T/F

Older agents such as SMX/TMP are not as effective against CA-MRSA as newer agents such as Linezolid? T/F

SUSCEPTIBILITY PROFILE OF C. ALBICANS FROM VAGINAL ISOLATES PRIOR TO AND FOLLOWING FLUCONAZOLE INTRODUCTION

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Background: Vulvovaginal candidosis, caused by *Candida* spp., is the second most common vaginal infection in women following bacterial vaginitis. Current treatment options for uncomplicated vulvovaginal candidosis include over-the-counter antifungal agents and a single oral dose of fluconazole. Fluconazole has been used extensively for uncomplicated vulvovaginal candidosis since introduction leading to an unknown impact on susceptibility.

Purpose: The purpose of this study is to investigate the susceptibility trends in clinical isolates of *C. albicans* from women presenting with acute vulvovaginitis. A secondary objective is to assess susceptibility trends in other antifungal agents.

Methods: *C. albicans* isolates from 1986-2007 were randomly selected from a clinical culture bank with a corresponding patient data base of women presenting to a clinic with acute vulvovaginitis. Unique single cultures were obtained from each patient. Microdilution susceptibility was performed according to CLSI guidelines. Minimum inhibitory concentrations (MIC) of the isolates were determined for: fluconazole, flucytosine, clotrimazole, miconazole, ketoconazole, itraconazole, amphotericin B and voriconazole. The MIC50 and MIC90 for each drug were then calculated for the time periods (per): 1986-1989 (per1), 1992-1996 (per2), and 2005-2007 (per3).

Results: A total of 125 isolates were included in the study: n=39 for per1, n=39 for per2, and n=47 for per3. The MIC50/MIC90 (mcg/mL) for fluconazole was 0.25/1, 0.25/0.5, and 0.25/2 for per1, per2, and per3 respectively. The corresponding MIC50/MIC90 for flucytosine were 0.25/1, 0.25/2, and 0.5/64; for miconazole were 0.03/1, 0.03/0.03, and 0.03/0.06; for voriconazole were 0.125/0.5, 0.06/0.125, and 0.03/0.03; and for amphotericin B were 0.03/0.03, 0.03/0.03, and 0.06/0.125. The MIC50/MIC90 for clotrimazole, ketoconazole and itraconazole remained 0.03 across all time periods.

Conclusion: The MIC90 for fluconazole, flucytosine, and amphotericin B have increased over the last 20 years while voriconazole has decreased. The clinical significance of these trends is unknown and fluconazole pharmacokinetics in the vaginal tract should be considered.

Learning Objectives:

Describe the susceptibility patterns of *C. albicans* from clinical vaginal isolates.

Describe the pharmacokinetic considerations of fluconazole in regards to the treatment of vaginal infections.

Self Assessment Questions:

Fluconazole is fungicidal against most *C. albicans*. T/F

Fluconazole levels in the vaginal tract are similar to those achieved in the blood. T/F

IMPLEMENTATION AND EVALUATION OF COMMUNITY-ACQUIRED PNEUMONIA GUIDELINES AT A COMMUNITY HOSPITAL

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Statement of Purpose: Community-acquired pneumonia (CAP) remains the seventh leading cause of death. Guideline directed pathways improve process of care and improve clinical outcomes including mortality. The Infectious Disease Society of America and the American Thoracic Society published consensus guidelines for CAP in July 2007. In the fall of 2007, the physician order set was re-aligned with the updated guidelines under the guidance of Infectious Disease and the Infection Control Committee. Implementation was begun in December 2007 with an updated physician order set placed on the hospital intranet. A CAP in-service was given during a Emergency Department Unit meeting and pocket cards with the CURB-65 CAP severity index and the preferred empiric antibiotic therapies have been distributed to the ED and to physicians. The purpose of this evaluation is to assess whether the implementation of a new pathway for CAP has optimized antibiotic therapy and decreased length of stay.

Statement of Methods: A 45 day prospective chart review study will be performed in February through March 2008 for those diagnosed with CAP. Empiric antibiotics used and length of stay will be recorded. Current clinical outcomes will be contrasted with those of a 45 day retrospective chart review study from February-March 2007.

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

Learning Objectives:

Discuss the use of the CURB-65 severity index in triaging patients for inpatient status.

Review important factors necessary to direct empiric antibiotic therapy

Self Assessment Questions:

Guideline directed therapy for Community-acquired pneumonia can decrease mortality: T or F?

Empiric therapy for Community-acquired pneumonia can involve three different antibiotics: T or F?

TREATMENT OF THE ALCOHOL WITHDRAWAL SYNDROME WITH BENZODIAZEPINES IN AN INPATIENT VA SETTING

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Background:

The alcohol withdrawal syndrome (AWS) can present with a variety of symptoms. Minor withdrawal symptoms include insomnia, anxiety, gastrointestinal upset, headache, diaphoresis, palpitations, and anorexia. Severe symptoms include seizures, delirium tremens, and death.

Benzodiazepines are considered the drugs of choice for the treatment of alcohol withdrawal. They stimulate GABA receptors and provide a pharmacologic substitute for alcohol. Objective rating scales have been developed for alcohol withdrawal to provide a standardized clinical assessment of symptoms and give a numerical index of severity. Trials have shown the symptom-triggered approach to be as effective as fixed-dose therapy. Furthermore, the symptom-triggered approach results in considerably less medication used and shorter duration of treatment without an increase in adverse outcomes.

Purpose:

To review what methods are being practiced at Jesse Brown VA Medical Center (JBVAMC) for the management of alcohol withdrawal and compare them to published studies to create a protocol for managing alcohol withdrawal.

Methods:

A retrospective, electronic chart review of Veterans at JBVAMC with encounters for various ICD-9 codes that correspond to alcohol use who were treated with benzodiazepines between January 1, 2003 and September 10, 2007. Exclusion criteria include positive toxicology screen or admitted active use of cocaine, opiates, marijuana, or benzodiazepines on admission or patients who leave the hospital against medical advice. The following data will be collected: demographics, benzodiazepine dose and route of administration, selected laboratory values/monitoring parameters, and targeted past medical history. The primary endpoint will be duration of medication treatment and total amount of benzodiazepine administered within the first 7 days of hospitalization. Secondary endpoints include length of hospital stay, development of seizures or delirium tremens, adverse drug reactions, and death.

Results/Conclusions:

Data collection and analysis are ongoing.

Learning Objectives:

Review the symptoms and progression of alcohol withdrawal syndrome.

To understand the different methods of benzodiazepine treatment used for alcohol withdrawal syndrome.

Self Assessment Questions:

True or False: Seizures typically occur within 12 hours of cessation of alcohol.

True or False: In the treatment of alcohol withdrawal, lorazepam has been shown to be more effective than chlordiazepoxide.

DOES DOSING OF MYCOPHENOLATE MOFETIL 500 MG QID VS 1000 MG BID IMPACT EFFICACY AND TOLERABILITY AFTER RENAL TRANSPLANTATION

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INTRODUCTION: Mycophenolate mofetil (MMF) improves outcomes of kidney transplant (KTx) recipients. However, MMF is often associated with adverse events that require dose reduction, interruption or withdrawal of therapy. Several investigators have noted that MMF dose reduction (<2 g/day) may be associated with suboptimal outcomes in KTx patients. In this retrospective data analysis, we examined if MMF dose reduction, extending dosing interval to 500 mg QID or conversion to mycophenolate sodium salt has had any effect on acute rejection (AR), tolerability, graft survival and glomerular filtration rate (GFR) in KTx patients.

RESULTS: We present preliminary data on 64/64 KTx patients. All patients received induction with either thymoglobulin, daclizumab or basiliximab. Steroid free maintenance with MMF and calcineurin inhibitors was used in 39/64 cases. Group A was the dose reduction group and Group B received standard dose MMF. Data for all Groups, including Group C (500 mg QID) and Group D (mycophenolate sodium), is still being collected and will be available at the time of presentation. AR rates and GFR at 6 and 12 months post-transplant is shown below.

Table 1

	Group A n=18 (n,%)	Group B n=21 (n,%)	p-value
AR 6 months	4 (22.2)	12 (57.1)	0.049
AR 6-12 months	2 (11.1)	1 (4.8)	0.586
GFR 6 months	55.1 (14.8)	56.31 (18.8)	0.839
GFR 12 months	64.55 (16.4)	61.64 (20.3)	0.681

CONCLUSION: Preliminary results show that patients in the MMF dose reduction Group experienced a higher rate of early AR (22% vs 57%, p 0.049). Final conclusions are pending completion of data collection.

Learning Objectives:

Describe the mechanism of action of mycophenolate mofetil.
Describe the impact of dose reduction of mycophenolate mofetil on outcomes of renal transplant recipients.

Self Assessment Questions:

TRUE/FALSE Mycophenolate mofetil is a pro-drug that works by inhibiting de novo purine synthesis in all nucleated cells capable of this process.

TRUE/FALSE Dose reduction of mycophenolate mofetil results in higher incidence of acute rejection episodes in renal transplant patients.

ANTIBIOTIC LOCK THERAPY FOR CATHETER-RELATED BACTEREMIA

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PURPOSE: Catheter-related bacteremia is estimated to affect at least 25% of patients with long-term central venous catheters (CVCs) with an attributable mortality of 3 to 25%. The pathogenesis in long-term CVCs is believed to be complicated by intraluminal biofilm formation that requires luminal drug concentrations to be several hundred-fold greater than standard serum levels for catheter sterilization. Consequently, the Infectious Diseases Society of America (IDSA) guidelines recommend systemic antibiotic therapy and catheter removal except in select situations when catheter salvage utilizing systemic therapy and antibiotic lock therapy may be feasible. Despite IDSA endorsement, evidence supporting antibiotic lock therapy is limited. The primary objective of this study is to evaluate the use of antibiotic lock therapy for achieving catheter salvage in catheter-related bacteremia. The secondary objective is to describe any complications related to antibiotic lock therapy.

METHODS: A retrospective descriptive chart review of all patients receiving antibiotic lock therapy for the treatment of catheter-related bacteremia from December 2001 to December 2007 was conducted. The primary outcome measure is catheter salvage, defined as fever disappearance and negative blood cultures within 72 hours as well as the absence of documented relapse with the same organism within 90 days. The secondary outcome measure is antibiotic lock therapy complications including the development of metastatic foci of infection, line occlusion, tunnel infection, sepsis, and adverse drug events. Data collection includes patient demographics and co-morbidities, catheter type and insertion site, vital signs, blood culture results with susceptibilities, systemic treatment regimens, antibiotic lock therapy regimens, and patient outcomes. If applicable, data collection also includes documented relapses with positive blood cultures, relapse treatment regimens, and reason for catheter removal. This study has been approved by the MetroHealth Institutional Review Board.

RESULTS/CONCLUSION: Study results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the therapeutic implications of biofilm formation in central venous catheters.

Identify the role of antibiotic lock therapy in the management of catheter-related bacteremia.

Self Assessment Questions:

True or False: Antibiotic lock therapy reduces the duration of systemic antibiotics needed in catheter-related bacteremias.

True or False: One of the goals of adding heparin to antibiotic lock solutions is to potentially inhibit biofilm formation.

EVALUATION OF THE SAFETY AND EFFICACY OF PERIOPERATIVE THROMBOPROPHYLAXIS WITH LOW MOLECULAR WEIGHT HEPARINS FOR PATIENTS ON WARFARIN UNDERGOING INVASIVE CARDIAC PROCEDURES

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Background: The safety and efficacy of perioperative bridging with low molecular weight heparins (LMWH) have been studied for various indications and types of procedures. However, there is a need to evaluate the safety and efficacy of bridging patients undergoing invasive cardiac procedures such as placement of pacemakers, implantable cardioverter defibrillators, biventricular pacemaker-implantable cardioverter defibrillators, and ablations. The objective of this study is to evaluate the safety and efficacy of thromboprophylaxis with LMWH in patients on warfarin undergoing invasive cardiac procedures.

Purpose: To assess the safety and efficacy of our current practice at Harper University Hospital for perioperative bridging with LMWH in patients undergoing invasive cardiac procedures

Methods: Patients on long-term warfarin therapy who required outpatient periprocedural bridging with LMWH in preparation for cardiac procedures will be identified through the pharmacy database. These patients followed by the outpatient anticoagulation clinic from January 2003 through December 2006 will be included. Patients who underwent bridge therapy with unfractionated heparin for invasive cardiac procedures and patients followed by their primary care physicians will be excluded from this study. The safety and efficacy will be assessed by evaluating any bleeding events or thromboembolic events, respectively, during perioperative bridging. Medical charts will be reviewed to obtain the following: indication for anticoagulation, type of cardiac procedure, BUN, serum creatinine, INR, PT, CBC, dose and duration of LMWH, time of discontinuation and reinitiation of anticoagulation, evidence of any bleeding or thromboembolic events. All data will be recorded without patient identifiers and maintained confidentially.

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

Learning Objectives:

Discuss the role of low molecular weight heparins (LMWH) in perioperative bridging
Discuss the advantages and disadvantages of bridging a patient using LMWH versus unfractionated heparin

Self Assessment Questions:

True or False: All patients on chronic anticoagulation need to be bridged with LMWH when undergoing invasive procedures
Which is not a potential advantage of LMWH over unfractionated heparin?

- More predictable anticoagulant response
- Lower incidence of HIT
- Complete reversal by protamine
- Subcutaneous administration

ASSESSING THE APPROPRIATENESS OF VITAMIN K USE FOR MANAGEMENT OF SUPRATHERAPEUTIC INTERNATIONAL NORMALIZED RATIOS

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Background: Supratherapeutic international normalized ratios (INRs) increase the risk for dangerous hemorrhages. In 2004, the American College of Chest Physicians updated the CHEST guidelines with recommendations for the management of supratherapeutic INRs. Vitamin K is the first-line treatment for the reversal of warfarin-induced coagulopathy. Inappropriate prescribing may increase the risk of thromboembolic events and prolong the time it takes to re-anticoagulate the patient. In 2005, Clarian Health developed guidelines for vitamin K use based on the 2004 CHEST guidelines.

Purpose: Assess adherence to Clarian Health's guidelines for vitamin K use and determine if inappropriate prescribing leads to prolonged hospital length of stay or time to achieve a therapeutic INR

Methods: A retrospective chart review of patients admitted and discharged from Methodist Hospital between January 1, 2007 and December 31, 2007. Charts for patients who received both warfarin and vitamin K were reviewed to assess adherence to Clarian Health's vitamin K dosing guidelines for reversal of warfarin. Patients less than 18 years of age, trauma patients, and patients with coagulopathies unrelated to warfarin use were excluded. Primary endpoints include the percentage of inappropriate orders, length of hospital stay, and time to achieve a therapeutic INR.

Results & Conclusion:
Pending

Learning Objectives:

Review the ACCP recommendations for the use of phytonadione to reverse supratherapeutic INRs.
Identify treatment options used to reverse supratherapeutic INRs secondary to warfarin use.

Self Assessment Questions:

True or False: According to the 2004 CHEST recommendations, phytonadione should not be used in patients with a significant bleed if their INR is less than five.

Which of the following complications is more likely to occur if a patient is administered too much phytonadione?

- Hemorrhagic Stroke
- Ischemic Stroke
- Acute Myocardial Infarction
- 2 and 3
- All of the above

INTENSIVE INSULIN PROTOCOL IMPLEMENTATION AND OUTCOMES IN THE MEDICAL AND SURGICAL WARDS AT A VETERANS AFFAIRS MEDICAL CENTER

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OBJECTIVES In-hospital hyperglycemia is an important marker for clinical outcomes and mortality in patients. Intensive insulin therapy has been shown to significantly reduce morbidity and mortality in surgical intensive care patients. Literature supports a basal-bolus insulin regimen approach in hospitalized patients that has been shown to improve glycemic control. Lexington Veterans Affairs Medical Center (VAMC) implemented an intensive insulin protocol on the all medical and surgical wards in July 2007. Few studies have been published regarding basal-bolus insulin protocol outcomes in medical units. This study will evaluate the outcomes of such protocol in the non-ICU setting.

METHODS A retrospective, observational, single-center study was conducted to compare pre-and post-implementation data. Included were patients admitted to Lexington VAMC for at least 72 hours who had either diabetes diagnosis and active outpatient diabetes medication prescriptions, or 2 blood glucose readings of at least 180 mg/dL during their hospital stay. Excluded were those in the ICU, and those not admitted to the medical and surgical wards. Primary outcomes are percent of time patients blood glucose levels were in range (80-110 mg/dL) and number of hypoglycemic episodes per patient. Secondary outcomes include blood glucose reading morning following admission, mean blood glucose level during hospital stay, and length of stay.

Statistical analyses include students t-tests for parametric data; Wilcoxon rank-sum for non-parametric data. Chi-square and Fishers exact tests for categorical data. P-values of 0.05 will be statistically significant. Averages, standard deviations and counts will be used for descriptive statistics.

PRE-IMPLEMENTATION RESULTS To date, 315 patients have been evaluated, mean age 70 years old and mean recent HbA1c 7.6%. The mean initial blood glucose was 193 mg/dL, blood glucose during hospital stay 172 mg/dL, length of stay 7.4 days, and 0.72 hypoglycemic episodes per hospital admission (315/433).

CONCLUSIONS Pending.

Learning Objectives:

Compare and contrast monotherapy with sliding scale insulin and basal-bolus insulin regimens.

Evaluate the use of protocols in the treatment of inpatient hyperglycemia.

Self Assessment Questions:

T/F Insulin glargine is considered a basal insulin.

T/F Improving glycemic control has been shown to decrease hospital and intensive care unit length of stay.

DEVELOPMENT AND EVALUATION OF GUIDELINES FOR THE TREATMENT OF ACUTE SYMPTOMATIC ETHANOL WITHDRAWAL IN INPATIENTS AT A COMMUNITY TEACHING HOSPITAL

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Management of acute symptomatic ethanol withdrawal is complex. Patients can present with a wide range of signs and symptoms, which can lead to life threatening complications. Benzodiazepines, used as part of a symptom-triggered treatment approach, are the cornerstone of therapy. Patients presenting with acute ethanol withdrawal symptoms are managed inconsistently among different providers, resulting in large variations in treatment.

Purpose:

A comprehensive literature review will be conducted to evaluate the management of ethanol withdrawal. Based on this review, the current order set will be updated, evidence-based guidelines will be developed, and the management of patients and safety of therapy pre- and post-implementation of the order set and guidelines will be evaluated.

Methods:

Data will be collected retrospectively from February 2007 and March 2007 to evaluate current practice patterns. Inclusion criteria will include patients ≥ 18 years of age with a blood alcohol level ordered, an admitting or inpatient diagnosis of ethanol detoxification/withdrawal, and/or use of an ethanol withdrawal management order set. Patients with polysubstance abuse will be excluded. Implementation of the updated order set is expected to occur in March 2008. After implementation, collection of prospective data is planned to occur from March 2008 to April 2008 for patients with the same inclusion and exclusion criteria as the retrospective patients. Outcome measures include time to the first dose of benzodiazepine, average Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar) score during the alcohol withdrawal episode, time to reach a CIWA-Ar score < 8 , hospital length of stay, total milligrams of medication used, percentage of patients admitted to the ICU for delirium tremens management, and those developing seizures, encephalopathy, and/or other adverse drug reactions.

Results/Conclusion:

Data collection is ongoing. Preliminary results and analysis will be presented.

Learning Objectives:

To understand the progression of ethanol withdrawal symptoms and the necessity for frequent monitoring of these patients.

To understand primary and adjunctive treatment options for management of patients experiencing ethanol withdrawal symptoms.

Self Assessment Questions:

Which of the following pharmacologic classes has been shown to decrease signs and symptoms of ethanol withdrawal, decrease risk of seizures, and decrease risk of delirium tremens?

- neuroleptic agents
- antiepileptic agents
- beta-adrenergic antagonists
- benzodiazepines

Patients in ethanol withdrawal can continue to develop symptoms 2-3 days after cessation of alcohol consumption.

- true
- false

IMPLEMENTING CENTER OF EXCELLENCE CRITERIA FOR PEDIATRICS IN THE HOME INFUSION PRACTICE SETTING

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Purpose: The Center of Excellence is an internal status that is used to establish concrete criteria to describe the quality of service provided to achieve program excellence. Other current internal CoE programs include Nutrition CoE, Hemophilia CoE, Heart Failure CoE, and Sleep Therapy CoE. The purpose of a Pediatric Center of Excellence (CoE) program in the home infusion and alternate site of care practice setting is to ensure that pediatric patients receive the highest quality of care. Center of Excellence criteria set standards to be met by multidisciplinary home care teams in improving patient care and outcomes. The Center of Excellence program will focus on multiple aspects of care including: nutrition, transplant, hematology/oncology, and infectious disease. The outcomes of the program include: assisting in management of various disease states, improving patient and family quality of life, increasing parent/caregiver and patient satisfaction, reducing re-hospitalization, increasing physician and referral source confidence, documenting clinical competence and confidence, and increasing market presence and patient census.

Methods: Components of the Pediatric Center of Excellence will address criteria such as commitment, interdisciplinary collaboration, leadership, competence, qualifications, patient census growth, and standardization. The criteria will be met by team members of intake, reimbursement, pharmacy, nursing, dietary, management, and clinical liaison. The outcome will be measured by census growth and analysis of patient, caregiver, physician and other care provider satisfaction surveys from start of care to discharge from service over a three-month time period. All completed surveys will be analyzed using descriptive statistics. All data recorded will be anonymous and maintain confidentiality.

Results/Conclusion: Data collection is in progress. Total of 100 surveys were mailed out to patients, caregivers, and healthcare providers. Results and conclusion will be presented at the conference.

Learning Objectives:

To identify the criteria for the Pediatric CoE program

To determine if a Pediatric CoE program can improve patient, caregiver, and physician satisfaction

Self Assessment Questions:

Managing a child's home infusion therapy only focuses on a single aspect of care. (T/F)

For successful program outcomes when managing a child's home infusion therapy includes:

- Identifying patient and family needs and satisfaction
- Identifying physician and other care provider needs and satisfaction
- Multidisciplinary home care teams
- All of the above

USE OF TRAVOPROST FOR GLAUCOMA IN VA PATIENTS

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Purpose:

Family history of glaucoma, elevated IOP, systemic vascular disease and diabetes are risk factors for glaucoma development. Topical agents to lower intraocular pressure are first-line management for glaucoma. Travoprost (Travatan) is one of four topical prostaglandin analogs available in the United States. As with most topical agents, they are associated with side effects such as hyperemia, iris pigmentation changes and darkening of eyelash growth. In 2003, the VA system signed a contract that required all prostaglandin naive patients be initiated on travoprost. Additionally, many local VA groups decided to conduct a therapeutic interchange and make travoprost the prostaglandin of choice. This study is being conducted by multiple sites to describe the experience of a VA multi-site therapeutic interchange to travoprost and selection of travoprost as the prostaglandin of choice following the contract. One of the aims of this study is to define the number of changes back to original or alternative prostaglandin therapy following travoprost therapy and reasons for such action to determine the outcomes of a national therapeutic interchange.

Methods:

This is a retrospective study of two parts: a prescription database evaluation to identify potentially eligible patients, followed by a medical record review of a randomly selected subset of patients. The study will review patients that received at least one 30-day supply prescription for travoprost between August 1, 2003 and April, 2005 at North Chicago VA Medical Center. The record review will begin from the date of travoprost initiation and follow the patient for at least 6 months. This particular subset study will analyze the percentage of patients converted to travoprost in comparison to the percentage of patients that switched to another prostaglandin. Additionally, it will further analyze the percentage of patients switched back to their original prostaglandin in comparison of patients that switched to another prostaglandin.

Results/Conclusion:

The results and conclusions of this study will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

To define the number of switches back to original ophthalmic prostaglandin or another ophthalmic prostaglandin.

To summarize the reason for a switch back to original ophthalmic prostaglandin or another ophthalmic prostaglandin.

Self Assessment Questions:

T/F Family history of glaucoma, decreased IOP, systemic vascular disease and diabetes are risk factors for glaucoma development.

T/F A patient's IOP measurement is an objective lab value used to determine response to glaucoma medications.

INTEGRATION OF MEDICATION THERAPY MANAGEMENT SERVICES (MTMS) IN AMBULATORY PHARMACIES THROUGH INVOLVEMENT IN THE WISCONSIN PHARMACY QUALITY COLLABORATIVE (WPQC)

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Background: Ambulatory pharmacists are in a state of transition from a product-focused role to a more patient-focused role. There are many barriers which prevent pharmacists from performing MTMS; the most significant being a lack of standardized reimbursable services, reimbursement rates, billing software and documentation requirements. MTMS encompass both appointment-based medication reviews (termed Level 2 services) and intervention-based services (Level 1 services), which can be completed in the pharmacy workflow. The Pharmacy Society of Wisconsin formed the WPQC, comprised of pharmacists and payors, to develop not only standardized services, rates and billing software, but a quality credentialing process for participating community pharmacies.

Purpose: To integrate MTMS at UW Health pharmacies involved as beta-test and pilot sites.

Methods: A survey was created and distributed to pharmacy staff to assess compliance with WPQC quality based requirements (pharmacy best practices). Feedback was used to develop an implementation plan to incorporate WPQC quality based requirements in the pharmacies. In addition, UW Health practice guidelines were developed for each best practice. Using tools such as a medication history form, informational posters for show and tell and a checklist of pharmacy services provided, one best practice will be implemented on a weekly basis. Also, a system for recognizing opportunities to provide MTMS services was developed and workflow improvements were identified to allow better service provision.

The standardized billing and documentation system was developed to alleviate many of the barriers to performing MTMS. The beta-test period, a time to identify efficiencies and deficiencies of the system, started in January 2008 in six pharmacies, including one of the UW Health pharmacies. Pharmacists are using the new system to provide Level 1 and Level 2 services. Data will be collected to evaluate time spent providing services and revenue generated.

Results/Conclusions: Data collected during the beta-test period will be presented at the conference.

Learning Objectives:

Develop an understanding of the process of integration of an MTMS program into a pharmacy workflow.

Identify quality based requirements (pharmacy best practices) which are required to participate in the WPQC program.

Self Assessment Questions:

Which of the following are current barriers to providing MTMS?

- a. Documentation requirements
- b. Reimbursement rates
- c. Lack of standardized reimbursable services
- d. All of the above

True or False Pharmacists are encouraged to show and tell at each consultation.

MEDICATION USE EVALUATION OF ARGATROBAN

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Background: Argatroban is a synthetic direct thrombin inhibitor that reversibly binds to the thrombin active site and does not require the co-factor antithrombin III for antithrombotic activity. It is capable of inhibiting the action of both free and clot-associated thrombin and does not interact with heparin-induced antibodies. Argatroban is indicated as an anticoagulant for prophylaxis or treatment of thrombosis in patients with heparin-induced thrombocytopenia (HIT) and heparin-induced thrombocytopenia and thrombosis syndrome (HITS). HIT is an antibody-mediated, adverse effect of heparin that is important because of its strong association with venous and arterial thrombosis with a devastating impact on the patient (physically and financially).

Purpose: Due to 2008 National Patient Safety Goal 3E, to reduce the likelihood of patient harm associated with the use of anticoagulation therapy, it is expected to see more use of heparin and possibly argatroban. The purpose of this study is to evaluate the appropriate use of argatroban in patients with suspected or confirmed HIT.

Methods: Prior to collecting data, Institutional Review Board (IRB) approval was granted. A retrospective review of fifty patients receiving argatroban therapy from July 2007 - November 2007 will be conducted. The following data will be collected from electronic records: initial and discontinued date and time for argatroban infusion, HIT test and PF4 antibody test order and result date and time, total number of argatroban bags dispensed after these test results.

Results: Data is currently being collected and results will be presented at the conference.

Learning Objectives:

Determine process improvements to aid in diagnosis and treatment of HIT.

Understand when it is appropriate to use argatroban.

Self Assessment Questions:

Argatroban can be co-administered with heparin, low molecular weight heparin or warfarin. T/F

When is it appropriate to discontinue argatroban and restart heparin?

RISK FACTORS FOR PAN-RESISTANT ACINETOBACTER BAUMANNII AT SINAI-GRACE HOSPITAL

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Background:

Acinetobacter baumannii (ACB) is an aerobic, Gram-negative bacilli commonly found in the environment and an important pathogen in critically ill intensive care unit patients. Common risk factors for ACB infections include immunosuppression, mechanical ventilation, prolonged hospitalization and history of antibiotic exposure. ACB is often multiple-drug resistant and sometimes resistant to all antibiotics. In 2007, Sinai-Grace Hospital (SGH) experienced an increase in pan-resistant ACB.

Purpose:

To identify the risk factors involved in SGHs recent increase in pan-resistant ACB infections. In addition, patient outcomes, susceptibilities and antibiotic therapy were assessed.

Methods:

A single site, retrospective chart review from January to December 2007. Patients who were ≥ 18 years and had culture positive ACB were eligible for inclusion. For patients with multiple positive cultures and/or multiple isolates with different susceptibilities, only the first isolate was included. Pan-resistant organisms were defined as strains resistant to all antibiotics with the exception of colistin (polymyxin B) and tigecycline. Data collection included demographics, APACHE II score, Charlson score, co-morbidities, residence in an extended care facility, hospitalization in the previous 90 days, antibiotic exposure in the previous 30 days, antibiotic therapy and time to appropriate antibiotics. Known risk factors such as mechanical ventilation, tracheostomy, trauma injury, and immunosuppression were also documented. Microbiologic data collected included culture site and antimicrobial susceptibility results. Outcomes assessed included length of stay, ICU admission and in-hospital mortality. Patients with pan-resistant ACB were compared to patients with non pan-resistant ACB using bivariate and multivariate analyses of risk factors and clinical outcomes.

Results:

Data, results and conclusions will be discussed at the Great Lakes Pharmacy Resident Conference.

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Learning Objectives:

Identify risk factors for pan-resistant ACB compared to non pan-resistant ACB.

Discuss outcomes of patients with pan-resistant ACB.

Self Assessment Questions:

True or False: ACB can colonize the respiratory tract.

True or False: Known risk factors for ACB include mechanical ventilation, ESRD and CVA.

CHARACTERIZATION OF HYALURONIDASE USE FOR EXTRAVASATION IN AN ACADEMIC MEDICAL CENTER

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Purpose: Extravasations result when an intravenous medication leaks from a vein into the surrounding tissue spaces during medication administration. The Ohio State University Medical Center (OSUMC) has developed guidelines for the treatment of extravasation which include the use of hyaluronidase for extravasation of medications such as: potassium chloride, contrast media, and vancomycin. Hyaluronidase is one treatment available to limit the extent of tissue damage after extravasation occurs. Hyaluronidase is an enzyme that aids the diffusion and absorption of medications injected concomitantly by decreasing the barrier action and viscosity of these agents. Over the past few months, the perceived increase in the use of hyaluronidase for vancomycin extravasations, partnered with a request from the peripherally inserted central catheter (PICC) team to only administer vancomycin via a central line, prompted a review of hyaluronidase use with a specific focus on use associated with vancomycin. The goals of this evaluation are 1) to characterize hyaluronidase use at OSUMC with an additional focus on vancomycin, 2) to evaluate compliance with OSUMC recommended treatment guidelines and 3) to determine if vancomycin administration should be restricted to infusion via a central line.

Methods: This evaluation is a retrospective chart review of patients who received hyaluronidase during the months of September through November 2007. Exclusion criteria includes: patients < 18 or ≥ 89 years of age, pregnant females, incarcerated patients, and those using hyaluronidase for indications other than extravasation. Patients will be identified based on dispensing records in the pharmacy information system. Data to be collected includes: drug extravasated, needle size, site of extravasation, documentation of hyaluronidase administration, physician notification, documentation of monitoring and patient education, and submission of an adverse drug event report. Prior to commencement of the study IRB approval will be obtained.

Conclusions: Data analysis is currently in progress. Results and conclusions will be presented.

Learning Objectives:

Review the appropriate use of hyaluronidase.

Understand the OSUMC recommended treatment guidelines.

Self Assessment Questions:

Hyaluronidase can be used for extravasation of medications such as: potassium chloride, contrast media, and vancomycin. True/False

Based on the results of this evaluation, can you conclude that vancomycin should only be administered via a central line? Yes/No

EFFECT OF HEALING TOUCH (COMPLEMENTARY MEDICINE TECHNIQUE) ON THE USE OF SEDATIVES AND SLEEP AIDS IN HOSPITALIZED PATIENTS

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Background:

A 2006 survey conducted by the American Hospital Association revealed that approximately 23% of hospitals within the United States offer one or more complementary therapies.

Complementary therapies and alternative medicine are increasing in prevalence in the United States health-care system. Complementary therapy incorporates non-traditional practices with traditional (Western) medicine. Rather than focusing solely on disease and cure, complementary therapies center on the patients overall health and healing.

Grant Medical Center utilizes a variety of complementary therapies to assist in the control of patient anxiety and pain, two conditions that can contribute to sleep disturbances.

Decreased amount and declining quality of sleep are of vital concern for hospitalized patients. The inability to obtain the necessary sleep for healing can result in confusion, irritability, psychological distress, anxiety, or delirium. Numerous medications are available to assist patients in falling and remaining asleep.

Purpose:

The purpose of this investigation is to determine if a change occurs in patients use of sedatives and sleep aids following the provision of healing touch, a complementary therapy that strengthens and reorients a patients energy fields.

Methods:

This study will be a retrospective chart review of hospitalized patients receiving healing touch and prescription sleep aids or sedatives. The following data will be collected from the medical record: demographic information, sedative or sleep aid prescribed, and sedative or sleep aid use before and after provision of this complementary therapy.

Results and Conclusions:

Study results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the prevalence of complementary and alternative therapies.

Describe the relationship between complementary therapies and medication use.

Self Assessment Questions:

T/F: The National Institutes of Health (NIH) are involved in research associated with complementary therapies.

T/F: The use of sedatives and sleep aids decreased following provision of healing touch.

RETROSPECTIVE EVALUATION OF PREVENTION STRATEGIES FOR CONTRAST-INDUCED NEPHROPATHY IN PATIENTS UNDERGOING CARDIAC

CATHETERIZATION: A FOCUS ON AGENT SELECTION, PATIENT CHARACTERISTICS, AND PATIENT OUTCOMES

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Purpose: Contrast-induced nephropathy is a condition that can cause detrimental effects in high-risk cardiac patients. Risk factors for developing contrast-induced nephropathy include: chronic kidney disease, diabetes mellitus, hypovolemia, concurrent nephrotoxic drug use, anemia, congestive heart failure, age greater than 75 years, hypertension, hypotension before or during the procedure, use of an intra-aortic balloon pump, percutaneous coronary intervention, and multiple myeloma. Risk also increases depending on the type and volume of contrast media administered. Possible prevention strategies include hydration with normal saline, sodium bicarbonate in dextrose, and administration of N-acetylcysteine. Currently at The University Hospital in Cincinnati, Ohio no guidelines or protocols guiding patient or agent selection for the prevention of contrast-induced nephropathy in cardiac patients exist.

Methods: A retrospective chart review is being conducted at a teaching and research institution. The study will quantify the incidence of contrast-induced nephropathy in cardiac patients at The University Hospital and identify trends in patient characteristics associated with agent selection for the prevention of contrast-induced nephropathy. Results will be used to develop a protocol for the prevention of contrast-induced nephropathy based on risk factor stratification. Patients greater than 18 years of age admitted to the cardiology service and undergoing cardiac angiography on January 1 through June 30, 2007 will be included in the study. Patients with end stage renal disease requiring dialysis and patients without baseline serum creatinine concentrations will be excluded. Demographic data and risk factors as listed above will be collected from computer medical records. Descriptive statistics and chi square will be used to analyze the data.

Results: Data collection and analysis are ongoing and will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: To be presented at the meeting.

Learning Objectives:

Identify patients at risk for contrast-induced nephropathy.

Understand the risks and benefits of the available agents for the prevention of contrast-induced nephropathy.

Self Assessment Questions:

N-acetylcysteine should be initiated after contrast media has been administered to the patient. True or False.

Diabetes mellitus and congestive heart failure are risk factors for contrast-induced nephropathy. True or False.

MULTIDISCIPLINARY REVIEW OF PRACTITIONER HANDWRITING LEGIBILITY IN THE ACUTE CARE SETTING

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Purpose:

Misinterpretation of handwritten orders continues to be a major contributor to medication errors in the inpatient setting. Accrediting bodies such as The Joint Commission continue to address the topic of handwriting legibility during survey visits. Computerized physician order entry (CPOE) offers one solution to this problem by allowing the prescriber to enter orders electronically. To support the implementation of CPOE at Riverside Methodist Hospital, a multi-institution study will be performed to determine legibility of handwritten orders as judged by a multidisciplinary group of physicians, pharmacists, and nurses.

Methods:

Participating facilities will retrospectively collect 210 randomly selected handwriting samples, from December 9 to December 15, 2007, from an electronic order management system into which all handwritten orders are scanned by hospital staff. A "sample" will be defined as one set of orders written at the same time by a single practitioner. Samples from the six participating institutions will be compiled and sent to an alternative participating facility selected at random to eliminate the possibility of participants recognizing practitioners handwriting from their parent institution. Samples will be examined by a multidisciplinary team who practice at the reviewing facility. Each sample will be rated on a five-point scale, ranging from "Completely illegible", to "Completely legible". A statistical analysis of overall legibility rating will be performed on all samples, and further analysis will be conducted to determine if any difference exists in legibility ratings by physicians, pharmacists, and nurses.

Results/Conclusions:

Results are still being collected and will be presented at the conference.

Learning Objectives:

To determine what sort of illegible handwriting can lead to errors.

To discover how a multidisciplinary team of health care professionals rate the written orders of various practitioners.

Self Assessment Questions:

T/F Handwriting errors only occur when orders are written.

T/F Computerized physician order entry (CPOE) will eliminate ALL illegible handwriting in the field of medicine.

FOCUSED SURVEILLANCE OF COMMON MICROORGANISM SUSCEPTIBILITIES AMONG PATIENTS PRESENTING AN URBAN EMERGENCY DEPARTMENT

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PURPOSE: Antibiograms provide information regarding susceptibilities of common pathogens to certain antibiotics. They are frequently compiled by microbiology departments of medical institutions. These antibiograms are often reported based on type of patient care unit (i.e. medical versus intensive care). Generally, emergency departments do not have specific antibiograms. Without knowledge of resistance patterns in the community, prescribers may not empirically choose optimal antimicrobial therapy in emergency departments. The purpose of completing this study will allow the development of an antibiogram and improve inappropriate antibiotic prescribing in an urban emergency department.

METHODS: This is a retrospective analysis of susceptibilities of the three most common organisms identified in the emergency department at Detroit Receiving Hospital between January 2000 and December 2007. In addition, a prospective analysis will be performed regarding the appropriateness of prescribing practices following development of the antibiogram and physician education. Data to be collected consists of age, sex, admitting service, date and site of culture, organism, susceptibilities, and minimum inhibitory concentration (MIC). Patients will be included if they were admitted to the emergency department during the study period with cultures that grew one of the following organisms: *Pseudomonas aeruginosa* (PA), *Staphylococcus aureus* (SA), and *Escherichia coli* (E. coli). Data from these isolates will be analyzed and compiled into an emergency department-specific antibiogram. After development of the antibiogram, education will be provided to the emergency medicine physicians in the form of a hard copy of the antibiogram and brief inservices by emergency medicine clinical pharmacy specialists. The primary outcome of the prospective evaluation is the appropriateness of antibiotic selection after the distribution of the completed antibiogram and inservices to the emergency medicine physicians.

RESULTS AND CONCLUSIONS: Data and results to be presented.

Learning Objectives:

Describe the importance of an emergency department specific antibiogram.

Identify three of the most common organisms seen in the emergency department.

Self Assessment Questions:

Hospital-wide antibiograms should routinely be used in the emergency department due to similarities in organism resistance? T/F

What does the abbreviation "MIC" stand for?

- a. Minimum inhibitory concentration
- b. Minimum inhibitory calculation
- c. Maximum inhibitory concentration
- d. Minimum interference concentration

EVALUATION OF INTRAVENOUS HALOPERIDOL USE IN AN ACADEMIC MEDICAL CENTER

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Background: Sudden death associated with antipsychotic drug use dates back to the 1960s. Healthcare professionals have been particularly interested in Torsades de Points (TdP). The QTc interval is used as a marker in determining if a patient has an increased risk for TdP. There are many predisposing factors to QTc prolongation such as: advanced age, diet, obesity, medications, electrolyte disturbances, hypothyroidism, alcoholism, hypoglycemia and preexisting cardiac disease. Any use of an antipsychotic drug should be individualized with predisposing factors taken into consideration to minimize any cardiac complications.

Purpose: In the fall of 2007, the FDA alerted healthcare professionals of revisions to the labeling of haloperidol. These revisions stated that TdP and QTc prolongation had been observed in some patients who received higher doses of intravenous haloperidol. The FDA's review was unable to determine any estimates of significant QTc prolongation or TdP following the administration of intravenous haloperidol. Although currently haloperidol is not approved by the FDA for intravenous use, its common "off label" use led the FDA to recommend ECG monitoring in this warning. This prompted a review of The Ohio State University Medical Center's use of intravenous haloperidol. The review will assess whether this new FDA warning had impact on this practice and how the institution's practice compares to this new recommendation. It will then be determined whether to recommend any modifications to the institution's IV push guidelines.

Methods: This evaluation is a retrospective review of all patients receiving intravenous haloperidol two months preceding and following the FDA warning in September 2007. Patient age, location of patients receiving any intravenous haloperidol and the dosages used will be evaluated. Institutional Review Board (IRB) is pending.

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

Learning Objectives:

Assess the benefits and risks with the use of intravenous haloperidol.

Discuss appropriate guidelines for use of intravenous haloperidol.

Self Assessment Questions:

T/F Haloperidol when used intravenously, may cause TdP if patients have predisposing factors.

T/F When used with caution, intravenous haloperidol can be used safely and effectively.

EVALUATION OF LINEZOLID UTILIZATION FOR RESISTANT GRAM-POSITIVE INFECTIONS ON AN INPATIENT REHABILITATION UNIT

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Background: In July of 2004 the Infectious Diseases Society of America (IDSA) released the "Bad Bugs, No Drugs" Campaign, highlighting the rise of antibiotic resistance and the decreasing number of novel antibiotics available. In recent years the incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE) has drastically increased while there have only been two novel antibiotics that have reached the market since 1998. There have also been several cases of vancomycin-resistant *Staphylococcus aureus* documented since 2002. Linezolid was approved by the FDA in 2000 and represents an alternative to vancomycin in the treatment of resistant gram-positive infections. The increasing concern of antibiotic resistance has prompted a review of linezolid prescribing practices in the treatment of resistant gram-positive infections at an academic medical center.

Purpose: The purpose of this evaluation is to determine the appropriateness of use of linezolid therapy at a rehabilitation unit of an academic medical center.

Methods: Investigational Review Board approval was achieved prior to commencement of this evaluation. A retrospective review of all patients receiving linezolid at a rehabilitation hospital from 7/1/06 to 6/30/07 will be completed using the health-systems pharmacy information system. The following data will be collected from the electronic medical record: age, gender, origin of admission and diagnosis, start and stop date of linezolid therapy, ordering service, indication for linezolid therapy, other antibiotics for gram positive infections, clinical findings, adverse effects, platelet counts, cultures, and sensitivities. Analysis will be done to determine appropriateness of linezolid therapy and prescribing patterns of physicians at a rehabilitation hospital.

Results/Conclusion: Data collection and analysis are in progress. The results and conclusions of this evaluation will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review appropriate antimicrobial options for MRSA and VRE infections.

Provide recommendations for the use of linezolid in the hospital setting.

Self Assessment Questions:

Platelets should be monitored on a regular basis while on linezolid therapy. T/F

A positive urinalysis (leukocyte esterase, WBCs, or bacteria) alone is reason enough to treat a patient with linezolid. T/F

GLUCOSE CONTROL IN PATIENTS WITH ACUTE INTRACEREBRAL HEMORRHAGE

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Purpose: Hyperglycemia is associated with poor outcomes in acute intracerebral hemorrhage (ICH), but the optimal level of glucose control has not been determined. While aggressive glucose control may be beneficial in certain critically ill populations, it is unclear if outcomes would be improved in patients with acute ICH. Intensive insulin therapy may have detrimental effects in neurologic injury by increasing hypoglycemia and worsening cerebral ischemia. It is necessary to determine an optimal strategy for glucose management in acute ICH to reduce morbidity and mortality associated with this condition. We hypothesize hyperglycemia or hypoglycemia in acute ICH will be associated with poor clinical outcomes and an increase in the development of medical complications. The primary objective of this study is to determine the impact of serum glucose on clinical outcomes in patients with acute ICH. The secondary objective is to determine the impact of serum glucose on medical complications. Completion of this study will therefore provide evidence regarding optimal blood glucose levels in patients with acute ICH.

Methods: This is a retrospective evaluation of adult patients with acute spontaneous ICH admitted to Detroit Receiving Hospital between January 2005 and December 2007. Exclusion criteria are symptom onset > 24 hours prior to admission and ICH due to trauma or vascular malformation. Patients are stratified according to mean serum glucose level during the first five days of ICU admission: <60 mg/dL, 60-110 mg/dL, 110-150 mg/dL, 150-180 mg/dL, or >180 mg/dL.

The primary outcome measure is functional outcome based on modified Rankin scale score. Secondary outcomes include Glasgow coma score during hospital stay, Glasgow outcome scale score at discharge, hospital and ICU length of stay, in-hospital mortality, and incidence of medical complications. Outcomes will be compared according to blood glucose stratification.

Results: Data analysis, results, and conclusions will be presented at the conference.

Learning Objectives:

Describe the negative effects of hyperglycemia in acute ICH.
Discuss the limitations of available data regarding insulin for the treatment of hyperglycemia in patients with acute ICH.

Self Assessment Questions:

Which of the following are negative effects of hyperglycemia in acute ICH?

- a. inflammation
- b. cerebral edema
- c. vasoconstriction
- d. thrombosis
- e. all of the above

The American Heart Association/American Stroke Association currently recommends administering insulin to treat blood glucose > 185 mg/dL and possibly > 140 mg/dL in patients with acute ICH.

- a. True
- b. False

ALIGNING CRITICAL CARE PHARMACY SERVICES WITH THE RECOMMENDATIONS FROM THE AMERICAN COLLEGE OF CLINICAL PHARMACY AND THE SOCIETY OF CRITICAL CARE MEDICINE

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Purpose: The Task Force of the Clinical Pharmacy and Pharmacology Section of the Society of Critical Care Medicine and the American College of Clinical Pharmacy published a position paper on critical care pharmacy services. The purpose of this study is to evaluate the services provided by the Intensive Care Unit pharmacists at this institution and make necessary and feasible changes according to the recommendations in the position paper.

Methods: Prior to initiation this study will be presented to the Institutional Review Board for approval. Upon approval, the study will commence by administering a survey to the Intensive Care Unit (ICU) pharmacists to identify the level at which they are performing the activities outlined in the position paper. A meeting will then be held with the pharmacy administration team to determine changes that are feasible. A written proposal of changes will be presented to the ICU pharmacists and the pharmacy administration team for approval. Guidelines, as well as educational material, will be developed for clarity of the proposed changes and uniformity in their implementation. Once the changes have been put into practice, a competency will be given to all the ICU pharmacists and to any pharmacists that wish to become certified to work in the ICU.

Results/Conclusions: Results and conclusions from the implementation of additional services will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the variety and depth of services that can be provided in the ICU by pharmacists
Identify the benefits of pharmacist intervention and services in the ICU

Self Assessment Questions:

Is it possible to provide additional services without increasing the workload of the pharmacists?

Is it necessary to implement every recommendation brought forth by the Society of Critical Care Medicine and the American College of Clinical Pharmacy?

OUTCOMES OF AN INPATIENT TOBACCO CESSATION PROGRAM

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Purpose:

The Department of Veteran Affairs issued a performance measure stating that patients admitted to a medical center with a diagnosis of pneumonia, myocardial infarction (MI), or congestive heart failure (CHF) who are current tobacco users should be properly counseled and prescribed medications to promote tobacco cessation. The William S. Middleton Veteran Affairs Medical Center (VAMC) elected to implement a tobacco cessation program to target all patients admitted to the cardiology/general medicine ward of the hospital, regardless of diagnosis code. Patients identified as tobacco users who are interested in quitting are consulted to the inpatient tobacco cessation team. The team of pharmacists is responsible for counseling patients regarding the benefits of tobacco cessation, cognitive and behavioral coping strategies, and the various pharmacotherapies offered. The team is also responsible for prescribing the appropriate pharmacologic agent(s) based on current medical condition and patient preference. Upon discharge, the patients are encouraged to enroll in the established outpatient tobacco cessation clinic for 3 months of follow-up. The objective of this study is to review the outcomes of this inpatient tobacco cessation program and estimate workload required to expand this service to the entire hospital.

Methods:

A retrospective chart review will be conducted reviewing all inpatient records for patients with a current tobacco use status admitted to the cardiology/general medicine ward. Data from two months prior to the implementation of the program through two months post implementation will be included. The review will include admission diagnosis, patient age, patient gender, current tobacco use status, if counseling was offered, if pharmacotherapy was offered or prescribed, if the patient followed up with the outpatient tobacco cessation clinic, and length of time spent counseling the patient and prescribing medications. The patients admitted prior to the tobacco cessation program implementation will be compared to the patients admitted after its implementation.

Results:

Forthcoming

Conclusions:

Forthcoming

Learning Objectives:

List 3 challenges to counseling inpatients regarding tobacco cessation.

Identify average time requirements needed to provide effective tobacco cessation counseling.

Self Assessment Questions:

List 3 challenges to counseling inpatients regarding tobacco cessation.

What is the average time requirement needed to provide effective tobacco cessation counseling?

PHARMACY LEADERSHIP CRISIS: VALIDATING A TOOL TO MEASURE LEADERSHIP QUALITIES

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Purpose: The research authored by Sara White places pharmacy in a leadership crisis. To answer the crisis, the search to measure leadership with a validated instrument began. Previous literature of tests within the profession of pharmacy lacks uniformity, making it hard to compare and failing to validate the study instruments.

Background: The dimensions of leadership among health-system pharmacists will be compared using known instruments to test the validity and applicability of these instruments to identify pharmacy leaders. The survey involved the following five instruments: tolerance for ambiguity, locus of control, entrepreneurial orientation, job satisfaction, and multifactor leadership questionnaire. Tolerance for ambiguity is hypothesized to be a leadership trait; to be tolerant means that a person comfortably faces change and reacts accordingly. Locus of control is hypothesized to be more internal in leaders. An external locus of control means the pressures of the environment surrounding the individual easily sway an individual's thoughts and responses; whereas, an internal control places the influence within the individual. Entrepreneurial orientation is hypothesized to be high in leaders. Leaders will seek out new opportunities to further themselves. Job satisfaction is hypothesized to be high. The idea is that a person happy in their profession will seek out opportunities to lead the profession. Multifactor leadership questionnaire (MLQ) identifies characteristics of a leader from the styles of transformational, transactional or laissez-faire.

Methods: The constructed survey was distributed using the Modified Dillman methodology to 5,000 pharmacists via an internet and email method. The responses of pharmacists in various health-system roles compared should validate leadership traits displayed on the five instruments. The results of this survey will allow for some broad conclusions about leadership in health-system pharmacy, but a closer evaluation of the data will further characterize the current and future readiness to lead within the profession.

Learning Objectives:

Understand the meaning and correlation of these five instruments.

Application of these instruments to the profession.

Self Assessment Questions:

Correlations can be established between pharmacists and tolerance for ambiguity. T/F

Pharmacy leadership is easily assessed by the use of questionnaires. T/F

IMPLEMENTATION OF A RAPID INFUSION PROTOCOL FOR RITUXIMAB AT THE UNIVERSITY OF WISCONSIN HOSPITAL AND CLINICS

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Background: Rituximab is typically titrated over 5-6 hours for the first infusion and 3-4 hours for subsequent infusions due to the risk of severe infusion related reactions. Several studies have shown that rituximab can be safely infused over 90 minutes (rapid infusion) in patients who have tolerated a previous infusion of rituximab for the treatment of non-Hodgkins lymphoma (NHL).

Purpose: The purpose of this project will be to implement a rapid infusion protocol for rituximab in NHL patients at our institution. After implementation, a retrospective review will be conducted to determine if there is any correlation between NHL disease-related and treatment-related characteristics and the ability to utilize rapid infusions of rituximab.

Methods: Patients who have CD20 positive NHL, have tolerated a previous infusion of rituximab without interruption of the infusion, and have received their last dose within 6 months will be eligible for the rapid infusion protocol. Ineligible patients will include those who did not tolerate their previous dose of rituximab, have a peripheral lymphocyte count greater than 30,000, are enrolled in an investigational protocol, are being treated by a pediatric hematologist, have an indication other than NHL, or are receiving their first cycle of a treatment regimen. Any patient who experiences an adverse reaction will have the infusion stopped and restarted utilizing the "first dose" protocol. Appropriate practitioner education and documentation measures will be conducted and developed as part of implementation. An IRB approved retrospective medication use evaluation (MUE) will be performed to determine if there is any correlation between NHL disease-related and treatment-related characteristics and the ability to utilize rapid infusions of rituximab. A few of the data elements that will be evaluated are pathology, stage and site of disease, and stage of treatment (e.g. induction, maintenance).

Results/Conclusion: Results are pending implementation of rapid infusion protocol.

Learning Objectives:

Identify some of the infusion related reactions which have occurred with rituximab and potential risk factors.
Identify appropriate steps required when implementing a new protocol that impacts many different disciplines within the health care team.

Self Assessment Questions:

True or False: Hypotension, bronchospasms, and urticaria are examples of reactions which can occur with rituximab.

True or False: In general, patients that tolerate infusions of rituximab administered by traditional infusion rates (over 3 to 6 hours) will likely tolerate 90 minute infusions of rituximab in the future.

EFFECT OF OBESITY AND ANTIBIOTIC DOSING ON SURGICAL SITE INFECTIONS

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Purpose: Surgical site infections (SSI) are the second most common nosocomial infection and are a significant cause of morbidity and mortality. The Centers for Medicare and Medicaid Services and the Centers for Disease Control and Prevention launched the National Surgical Infection Prevention Project to reduce the rate of SSI. National guidelines for SSI prophylaxis are used as core measures at most institutions including the University Hospital-Cincinnati. Obese patients are at greater risk for surgical site infections than normal weight patients and the prevalence of obesity in the US is rising, approaching 30% in 2000. Little literature exists concerning the effect of antibiotic dosing on SSI in obese individuals.

The objectives of this study were:

- 1) Describe the role of obesity, antibiotic dose, and antibiotic selection on the risk for infection in patients undergoing the following procedures: coronary artery bypass graft, spinal fusion, laminectomy, vascular leg graft, hip replacement, knee replacement, hysterectomy, cesarean section, and crani tumor resection.
- 2) Determine optimal prophylactic antibiotic choice and dose for obese patients undergoing these surgical procedures.

Methods: IRB approval was obtained prior to conducting this study. A University Hospital Infection Control Database and a decision support database were used to identify surgical procedures for a 2-year period during 2005-2007 and SSI. Baseline characteristics and demographics were collected from the patients chart. Measures of obesity included total body weight, BMI, and percent above ideal body weight. A regression model was developed to evaluate the relationship between SSI and measures of obesity, age, gender, drug selection, drug dose, time of administration, length of procedure, and frequency of appropriate intra-operative doses. The relationship between infection rate and compliance with SSI prophylaxis guidelines was assessed.

Results: In progress.

Conclusions: In progress.

Learning Objectives:

Describe current national surgical site infection guidelines
Explain the relationship between obesity and surgical site infections

Self Assessment Questions:

Which of the following are current standard surgical site infection prophylaxis recommendations?

- a. Routine prophylaxis against bacterial species of concern in surgical site
- b. Routine prophylaxis against fungal species of concern in surgical site
- c. Antibiotic administration at cut time +/- 30 minutes
- d. Repeat dosing if the procedure is longer than 12 hours
- e. a, c, and d

Which of the following are proposed theories for increased surgical site infections in obese patients

- a. Altered pharmacokinetics of some antibiotics
- b. Decreased tissue penetration of antibiotics
- c. Impaired immune function due to obesity
- d. All of the above

DEVELOPMENT OF AN OUTPATIENT ANTICOAGULATION MANAGEMENT SERVICE

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Background: Long-term anticoagulation is necessary for patients with a number of indications, including atrial fibrillation, mechanical heart valves and recurrent thromboembolism. Because warfarin has a narrow therapeutic range, is susceptible to many drug and food interactions, and exhibits significant interindividual variation in dosing requirements, close monitoring is necessary to avoid unfavorable outcomes and to maximize effectiveness. The Joint Commission 2008 National Patient Safety Goal 3E requires that organizations have a process implemented by January 2009 that reduces the likelihood of patient harm associated with the use of anticoagulation therapy. Several studies have concluded that patients treated using a systematic anticoagulation monitoring and management program have lower rates of significant bleeding and thromboembolic events and have fewer hospitalizations and emergency department visits than patients managed with usual medical care.

Purpose: The purpose of this project is to establish a pharmacist-run outpatient anticoagulation management service by Spring 2008 to improve patient outcomes through close monitoring and ongoing intervention.

Methods: After project conceptualization, a working committee of pharmacists formed to develop and operationalize the anticoagulation service. A business proposal and pro forma budget were developed and presented to the Chief Operating Officer for approval. Given the complexity of service development and implementation, the pharmacy resident leading the project recruited a lead pharmacist for each essential component of service implementation (e.g., staffing, facilities, billing). Several physician groups, including orthopedic surgery, internal medicine and cardiology, were surveyed to gauge interest in using the service. The development of an anticoagulation management protocol, selection of point-of-care testing equipment, and anticoagulation documentation software are areas being addressed by the larger working committee.

Results/Conclusions: Methods for organizing and accomplishing this work along with results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the rationale for establishing an outpatient anticoagulation management service.

Describe the utility of a team approach when planning and implementing a patient care service.

Self Assessment Questions:

True or False - Data demonstrate that patients followed by a clinical pharmacy anticoagulation service are 39% less likely to experience an anticoagulation therapy-related complication than patients managed in the usual manner.

Which of the following are important considerations when implementing a new pharmacy managed clinical service?

- a. Staffing competencies
- b. Multidisciplinary approach
- c. Support from administration
- d. All of the above

RISK FACTORS FOR HYPOGLYCEMIA WITH THE USE OF A PROTOCOL FOR TIGHT GLUCOSE CONTROL IN AN INSULIN TAKING VETERAN POPULATION IN THE ICU

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Purpose: Several earlier trials suggested that tight glucose control in the ICU had mortality and morbidity benefits. However, two later studies were stopped early due to lack of efficacy and safety concerns including hypoglycemia. Hypoglycemia may go unrecognized in critically ill patients and the long term consequences are not known.

A small pilot study conducted at Edward Hines, Jr VA Hospital found the incidence of hypoglycemia in the ICU, defined as blood glucose < 60mg/dl, to be roughly 68%. There are some questions regarding the insulin protocol and whether it is being implemented correctly. The purpose of this study is to identify risk factors for hypoglycemia in insulin taking veterans in the ICU.

Methods: This is a retrospective chart review of veterans admitted to the ICU from July 1st, 2006 to July 1st, 2007. Inclusion criteria includes: all veterans admitted to the ICU during the study period and being given insulin by any route. Exclusion criteria includes: patients in the ICU not on insulin and subsequent admissions to the ICU if a patient was admitted more than once during the study period. All patients that meet inclusion criteria will be evaluated for serum creatinine at time of event, liver function (ALT, AST and admitting albumin), nutritional status, presence of sepsis based on positive blood culture, age, BMI based on dry weight, diagnosis of diabetes prior to admission into the ICU, previous use of insulin and/or oral diabetic agents prior to admission into the ICU, length of stay to event, nutritional mode, use of inotropes, type of insulin and dose, presence of malignancy and steroid use.

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

Learning Objectives:

Describe the incidence of hypoglycemia in the ICU in patients receiving insulin.

Describe risk factors for hypoglycemia in the ICU

Self Assessment Questions:

T/F The number of days spent in the ICU are fewer in diabetic patients under tight glycemic control.

T/F Tight glycemic control post-MI is associated with lower 1-year mortality rates

RETROSPECTIVE EVALUATION OF CIRCUIT SURVIVAL TIME FOR CONTINUOUS RENAL REPLACEMENT THERAPY AT THE UNIVERSITY OF TOLEDO MEDICAL CENTER.

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Background: Epoprostenol is a prostacyclin that is primarily used in patients with pulmonary hypertension. Besides causing vasodilation of the pulmonary artery, epoprostenol inhibits platelet aggregation thru activation of adenylate cyclase. At the University of Toledo Medical Center (UTMC), epoprostenol, unfractionated heparin (UFH), or the combination of the two agents are used to prevent continuous renal replacement therapy (CRRT) circuit clotting. Currently, data is limited on the use of epoprostenol to prolong circuit survival time in patients receiving continuous venovenous hemodialysis (CVVHD) or continuous venovenous hemodiafiltration (CVVHDF).

Purpose: To determine the average circuit survival time for patients receiving CVVHD or CVVHDF with epoprostenol, UFH, or the combination of the two agents.

Methods: A retrospective chart review of patients who received CVVHD or CVVHDF at UTMC will be conducted. Inclusion criteria are ICU admission, ≥ 18 years old, and use of epoprostenol, UFH, or both agents for anticoagulation therapy during CRRT. Patients are excluded if they received CRRT ≤ 12 hours. Data collected includes demographics, admitting diagnosis, past medical history, type and cause of renal failure, date and time CRRT initiated and discontinued, platelets, PTT, INR, sepsis, circuit survival time, anticoagulation used, rate of anticoagulant infusion, and CRRT parameters including dialysate flow rate. The primary outcome is circuit survival time. Analysis of the means will be done using a Student t-test or Mann Whitney U test depending on whether the data is parametric or nonparametric. The average circuit survival time during CVVHD and CVVHDF for epoprostenol, UFH, and epoprostenol plus heparin will be compared using ANOVA.

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

Learning Objectives:

Recognize the importance of anticoagulation during CRRT.
Discuss the efficacy of epoprostenol to prevent clotting of the circuit in patients receiving CVVHD or CVVHDF at the UTMC.

Self Assessment Questions:

There is strong data to support the use of epoprostenol as anticoagulation in patients receiving CVVHD and CVVHDF. T/F
List an adverse event that may be seen with epoprostenol when used to prolong circuit survival time in patients receiving CRRT.

QUALITY ASSESSMENT OF THE APPROPRIATENESS OF PARENTERAL NUTRITION IN PEDIATRIC PATIENTS

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Purpose: The Surgical Nutrition Support Team at the University of Wisconsin Hospital and Clinics (UWHC) currently manages the use of parenteral nutrition (PN) only in adult patients under a collaborative practice agreement with a general/trauma surgeon. However, approximately 30-40% of the PN written for at UWHC are for pediatric patients, who are currently managed by individual physicians. The specific aims and objectives of this investigation are: to evaluate the current prescribing patterns and use of PN in pediatric patients at the UWHC, to assess the use of PN in pediatric patients as prescribed by individual physicians at the UWHC compared to established evidence-based guidelines (i.e., the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Standards for Specialized Nutrition Support for Hospitalized Pediatric Patients), and to evaluate the need for and feasibility of implementing a multidisciplinary Pediatric Surgical Nutrition Support Team to manage specialized nutrition support.

Methods: This protocol is approved by the Institutional Review Board at UWHC. Data is collected by conducting a retrospective chart review of pediatric patients ($n=66$) who received at least one day of PN from January 1, 2007 to July 1, 2007. The following data is collected: height, weight, age, sex, admitting service, number of NPO days before PN was started, whether or not the patient had tried and failed EN, whether or not the patient had a functional GI tract (according to A.S.P.E.N. criteria/guidelines), duration of PN, whether or not the patient had a clear indication for the use of PN (according to A.S.P.E.N. criteria/guidelines), if the final PN formulation met stability requirements, the route used for administration (central or peripheral), final volume of PN, and the lipid, protein, and dextrose contents in grams/day.

Conclusion: Data collection and evaluation are ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify a baseline of pediatric parenteral nutrition prescribing patterns by individual physicians in a large academic medical center.

Identify the appropriate indications for the use of pediatric parenteral nutrition, according to evidence-based guidelines (American Society for Parenteral and Enteral Nutrition Standards for Specialized Nutrition Support for Hospitalized Pediatric Patients).

Self Assessment Questions:

What is the minimum percentage of lipid that can be added to a 3-in-1 parenteral nutrition solution in order to maintain stability of the lipid emulsion?

How long can a pediatric patient be safely maintained with no nutritional intake?

COMPARISON OF SYSTEMIC STEROID DOSING FOR PEDIATRIC STATUS ASTHMATICUS

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Background:

Asthma is one of the most common childhood diseases and it affects more than 6 million children. The National Institutes of Health released their guidelines for diagnosis and management of asthma in August 2007. One of the most significant updates involved lowering systemic steroid dosing for the inpatient management of status asthmaticus. The 2007 guidelines recommend 1-2 mg/kg/day (in 1 or 2 divided doses) of prednisone, prednisolone, or methylprednisolone with an adult max of 40-60mg/day, compared to the previous guideline of 4mg/kg/day divided every six hours (adult max 120-180mg/day) for the first 48-72 hours with subsequent dose reduction to 2mg/kg/day. There is little evidence supporting the most appropriate dose of systemic steroids in status asthmaticus treatment; however, both efficacy and side effects must be balanced.

Purpose:

The primary objective is to determine the impact of systemic steroid dosing on inpatient length of stay for patients admitted with status asthmaticus. Secondary objectives include determination of steroid dosing practices by admitting service, impact of steroid dosing on the need for the escalation of care, asthma re-admission rate within 1 month of a previous status asthmaticus admission, and rate of discharge on an asthma controller medication.

Methods:

An IRB-approved retrospective chart review of pediatric patients admitted for status asthmaticus from October 1, 2007 to March 31, 2008 will be performed. The patients will be identified using billing codes for status asthmaticus. Exclusion criteria: direct PICU admission, pregnancy, have a diagnosis of cystic fibrosis or bronchopulmonary dysplasia, chronic oral steroid use, patients with significant comorbidities (tracheostomy, neurologic compromise, etc.), or home oxygen use. Demographic, asthma history, status asthmaticus treatment information, outcome, and adverse effect data will be collected.

Results:

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

Learning Objectives:

Discuss the impact of steroid dosing on patient length of stay for status asthmaticus

Identify the major differences between the old (2002) and new (2007) asthma treatment guidelines.

Self Assessment Questions:

True/False: Steroid dosing in status asthmaticus is standardized and agreed upon.

The NIH Asthma guidelines currently recommend _____mg/kg/day of methylprednisolone, prednisolone, or prednisone for the inpatient treatment of status asthmaticus.

- 4 mg/kg/day
- 1-2 mg/kg/day
- 0.5 mg/kg/day
- 6 mg/kg/day

MANAGEMENT OF ANEMIA BY A PHARMACIST IN A CHRONIC KIDNEY DISEASE PATIENT PRIOR TO DIALYSIS

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Background: Chronic kidney disease (CKD) is a disease of multiple etiologies and is defined as the progressive loss of renal function over several months to years. It is characterized by the gradual replacement of normal kidney architecture with interstitial fibrosis. The final result of CKD is end-stage renal disease, which is defined as having a glomerular filtration rate (GFR) of <15 mL/min per 1.73m² body surface area. CKD has many pathophysiological effects on the body including anemia. The primary cause of anemia in this population is due to erythropoietin deficiency. Pharmacists play an important role in preserving quality of life for such patients by actively trying to maintain and upkeep the factors associated with anemia such as hemoglobin and iron indices.

Purpose: To compare hemoglobin and iron indices prior to pharmacist intervention to after pharmacist intervention.

Methods: This is a retrospective observational medical chart review of subjects who have CKD and receive their medical care and monitoring at the University of Illinois Medical Center at Chicago (UIMCC). Subjects will be pulled from the Cerner powerchart medical profile database at UIMCC. Medical records that will be analyzed will be from August 2005 through August 2007. Data collected will include: subjects medical record number, age, sex, race, hemoglobin, hematocrit, total iron binding capacity, transferrin saturation, ferritin, blood pressure, parathyroid hormone, serum creatinine, estimated glomerular filtration rate, erythropoietin stimulating agent (ESA) dose, and total elemental iron dose (oral and intravenous).

Inclusion/Exclusion Criteria: Subjects who are > 18 years of age with CKD present, patients of UIMCC within the proposed study time frame, and receiving ESAs by the nurse in the renal-hypertension clinic during this time. Subjects not meeting above requirements and not seen by a pharmacist were excluded.

Data & Results: Data collection in progress and results will be presented at conference.

Learning Objectives:

To discuss the role of a pharmacist in chronic kidney disease.

To discuss the effects of anemia in a patient.

Self Assessment Questions:

True/False: The goal hemoglobin level once on an ESA is >12g/dL.

True/False: Erythropoietin interacts with progenitor stem cells to increase red blood cell production.

DESIGN AND IMPLEMENTATION OF A CAM-ICU BASED DELIRIUM TREATMENT ALGORITHM FOR MEDICAL INTENSIVE CARE UNIT PATIENTS

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Purpose: The incidence of delirium in the intensive care unit (ICU) ranges from 20-80% and has been shown to increase mortality rates, length of hospital and ICU stay; as well as decrease median days alive without mechanical ventilation, and increase the incidence of cognitive impairment at hospital discharge. The purpose of this project was to develop and implement a treatment algorithm for delirium in our medical intensive care unit (MICU) using the confusion assessment method for the intensive care unit (CAM-ICU) as a screening tool for delirium.

Methods: An extensive literature search was used to provide current evidence on the screening methods for delirium along with non-pharmacologic and pharmacologic treatments for delirious patients. This evidence, along with input from physicians, nurses, and pharmacists within our institution, was used to create an algorithm for the treatment of delirious patients. The CAM-ICU was implemented by holding nursing education sessions over a period of two months. Nursing staff was subsequently tested at the bedside and assessed as to their competence in performing CAM-ICU assessments. Data will be collected to assess compliance with using the CAM-ICU, the incidence of delirium, and the effectiveness of the algorithm on our MICU patients. Approval by our institutions investigational review board is currently pending.

Results: The treatment algorithm was completed and approved by the MICU oversight committee and is implemented within our MICUs. Nursing education for use of the CAM-ICU and the algorithm has been completed. Follow up research on the impact of the implementation of this algorithm is currently under way.

Learning Objectives:

Describe the confusion assessment method for the intensive care unit (CAM-ICU) as a screening tool for delirium.

Discuss current pharmacologic strategies for the treatment of delirium in the ICU.

Self Assessment Questions:

What symptoms, as described by the CAM-ICU, must a patient exhibit to be considered delirious?

Name two pharmacologic strategies for treating delirium in the ICU.

EVALUATION OF THE IMPACT OF THE USE OF RISPERDAL CONSTA (RISPERIDONE MICROSPHERES) IN PATIENTS WITHIN A COMMUNITY MENTAL HEALTH CLINIC

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Background: Risperdal Consta (risperidone microspheres) is a long-acting atypical injectable antipsychotic. Currently it is the only available long-acting injectable (LAI) atypical on the market. Risperdal Consta is FDA approved for the treatment of schizophrenia; the treatment of acute mania or mixed episodes associated with bipolar I disorder; and the treatment of irritability/aggression associated with autistic disorder. The benefits of LAIs are numerous and include medication consistency, increased compliance and perhaps cost benefits. While there are benefits to using this LAI drawbacks do exist, including the need for oral treatment overlap and an increased cost when compared to other agents on the market. The purpose of this study is to evaluate the use of Risperdal Consta within a community mental health center to determine its therapeutic use, as well as potential pharmacoeconomic advantages or disadvantages.

Methods: This retrospective chart review will evaluate patients initiated on risperidone microspheres while admitted to the inpatient psychiatric unit from the time period of January 1, 2006 to December 31, 2006. Data will be collected for the year prior to the initiation of therapy as well as one year after initiation of therapy, so that patients will serve as their own control. The primary objective is to evaluate patient outcomes, including number of hospitalizations, patient compliance, and total patient cost. Secondary outcomes included adherence to clinic visits and utilization of oral pharmacotherapy.

Results/Conclusions: Data is currently in the process of being collected and analyzed. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the benefits of long-acting injectable (LAI) antipsychotics over oral antipsychotics in the management of schizophrenia and bipolar I disorder.

Identify at least two potential disadvantages to using LAI antipsychotics in the management of schizophrenia and bipolar I disorder.

Self Assessment Questions:

Which of the following is available as a long-acting injectable (LAI) antipsychotic?

- a. quetiapine
- b. chlorpromazine
- c. risperidone
- d. olanzapine

Which of the following is NOT an advantage that LAI antipsychotic offer over oral antipsychotics?

- a. Greater improvement in global functioning
- b. Increased adherence to medication
- c. Greater ease of administration
- d. Improved bioavailability

APPROPRIATE USE EVALUATION OF VANCOMYCIN IN 1ST NEUTROPENIC FEVER

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Background: Neutropenia in cancer patients is a major risk factor for the development of infectious complications. Patients may present solely with a fever that must be treated as an active infection until proven otherwise. According to the National Comprehensive Cancer Network (NCCN) guidelines, it is recommended to empirically treat with an anti-pseudomonal beta-lactam with or without an aminoglycoside. They further state that vancomycin may be initiated; however, therapy should be limited to patients at high risk for serious gram-positive infections and not be considered as part of initial routine therapy for neutropenic fever. The purpose of this study is to evaluate the appropriateness of vancomycin use in first neutropenic fever according to the NCCN recommendations in a tertiary care health-system.

Methods: A retrospective chart review evaluating hematology/oncology patients at Indiana University Hospital and Methodist Hospital with an ICD-9 discharge code for neutropenic fever between September 2007 and February 2008 that receive vancomycin therapy. These patients must have an absolute neutrophil count (ANC) < 500 cells/mm³ with a fever of at least 38.3°C or 38.3°F for greater than one hour. Patients with testicular cancer receiving high dose chemotherapy with stem cell rescue will be excluded from the study. The primary endpoint is the number of patients that remain on vancomycin for greater than 72 hours that do not meet prescribing criteria. Secondary endpoints include: the number of patients initiated on vancomycin without risk factors for serious gram positive infections, the number of patients that are restarted on vancomycin, and the number of gram positive bacterium cultured.

Results/Conclusions: Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

List the appropriate indications in which a patient may be empirically started on vancomycin therapy for neutropenic fever according to the NCCN recommendations.

Recommend criteria for vancomycin discontinuation after 72 hours of empiric therapy.

Self Assessment Questions:

Which of the following may warrant initiation of vancomycin therapy in a patient with new onset neutropenic fever:

- Localized abdominal rash
- A patient with central line access for dialysis
- Prophylaxis with a fluoroquinolone antibiotic
- All of the above

According to the 2007 NCCN guidelines, for all patients with first neutropenic fever empiric therapy should include an anti-pseudomonal beta-lactam and vancomycin, with or without an aminoglycoside. T/F

IMPACT OF PHYSICIAN EDUCATION BY A PHARMACIST ON ACE INHIBITOR PRESCRIBING IN HEART FAILURE PATIENTS WITH LEFT VENTRICULAR DYSFUNCTION

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Purpose: In heart failure (HF) patients with left ventricular dysfunction (LVD), treatment with an angiotensin converting enzyme inhibitors (ACEI) is a Class I recommendation by the American College of Cardiology (ACC) and the American Heart Association (AHA) unless contraindicated. ACEI at intermediate to high doses have been shown to slow the progression of cardiac remodeling, and reduce HF complications and hospitalizations when compared to low doses. For a variety of reasons, recent studies have shown there are many HF patients with LVD who are not currently being treated with ACEI at recommended doses. This study aims to evaluate ACEI dosing in HF patients with LVD at Mercy Hospital and Medical Center (MHMC). Following physician in-service by a pharmacist, this study will also assess the impact of the educational intervention on achievement of target doses of ACEI in HF patient with LVD.

Methods: Patients for this study will be identified by DRG coding as having HF and LVD. The study will be a pre/post study design. A retrospective chart review of 50 patients will be conducted to collect baseline data on current ACEI prescribing in HF patients with LVD treated with enalapril or lisinopril at MHMC. Patients will be classified as receiving either low-dose ACEI or medium/high dose ACEI based on current guideline recommendations. Mean ACEI dosing will also be calculated across the sample of patients. Resident physicians will be in-serviced by a pharmacist on ACEI target dosing for enalapril and lisinopril according to ACC/AHA guideline recommendations. A prospective chart review of 50 patients will then be conducted. ACEI dosing will again be classified as either low or medium/high, and mean ACEI doses will be calculated across all patients. Rate of prescribing at medium/high doses will be compared to baseline data using McNemars test.

Results/Conclusion: Data collection is in progress.

Learning Objectives:

Explain the rationale for using angiotensin converting enzyme inhibitors (ACEI) for the treatment of heart failure with left ventricular dysfunction.

List the target treatment doses for enalapril and lisinopril as recommended in the ACC/AHA Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult.

Self Assessment Questions:

All heart failure patients with left ventricular dysfunction should receive ACEI therapy unless contraindicated? T/F

There is no evidence to show that target doses of ACEIs slow the progression of disease in heart failure. T/F

SYNERGY TESTING AGAINST MRSA USING THE ETEST METHOD

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Purpose: Many patients present to the hospital with MRSA infections. Several antibiotics such as, Vancomycin, Daptomycin, Quinupristin/Dalfopristin, Linezolid, Gentamicin, Rifampin, Clindamycin, Tigecycline and Sulfamethoxazole/Trimethoprim, have demonstrated activity against MRSA. It is not uncommon to see these medications used in combination despite a lack of evidence. The use of etest strips to test for synergy has been shown to correlate well to the standard of time-kill synergy testing. Therefore, this study will evaluate the usefulness of using Etest strips to test for synergy against MRSA and attempt to correlate the results to patient outcomes.

Methodology: This study is a retrospective review of patients that have received combination treatment for MRSA. Selection of MRSA isolates will take place based on several factors. First, the patient must have an infection of MRSA that is being treated with two antibiotics targeting that infection. Patients must also be greater than 18 years of age and patients must also have been admitted as an inpatient at Bronson Methodist Hospital. Isolates will be collected from a stockpile of frozen samples from the past several months. Data will be collected on 35 therapeutic regimens obtained from 23 different patients. Once isolates have been obtained, the specimens will be plated onto agar plates and Etest strips containing drug will be added. The Etest strips used will be based on the patients treatment regimen while admitted to the hospital. Results will be correlated to clinical effect based on the following: time to defervescence, time for return of sterility to an otherwise sterile site, time for white blood cell count to return to less than 10,000 and time to change of antibiotic regimen. Synergy will be evaluated using the Fractional Inhibitory Concentration Index. This method has been validated by several studies against organisms including MRSA.

Results: Pending

Conclusions: Pending

Learning Objectives:

Describe steps involved in synergy testing using Etest strips.

Describe the clinical significance of antimicrobial synergy in providing patient centered pharmaceutical care.

Self Assessment Questions:

True/False The MIC for each drug involved must be determined prior to testing for synergy.

What are the advantages and disadvantages of using Etest strips for synergy?

EVALUATION OF TIGHT GLYCEMIC CONTROL IN MECHANICALLY VENTILATED PATIENTS

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Background: Tight glycemic control with intensive insulin therapy has been shown to reduce morbidity and mortality in critically ill patients. Nursing driven protocols have been shown to safely and effectively achieve glycemic goals.

Purpose: The purpose of this study was to evaluate the safety and efficacy of our intensive insulin protocol, which was implemented in spring 2005 to achieve blood glucose values of 80 - 110 mg/dl in mechanically ventilated patients.

Methods: Prior to initiation, the study was submitted for approval to the Human Investigation Committee (HIC). A retrospective chart review evaluating blood glucose control in mechanically ventilated patients on the intensive insulin protocol was conducted. Mechanically ventilated patients were identified between January and September 2007. Patients were included if they were mechanically ventilated for 12 hours or longer and were initiated on the intensive insulin protocol. The medical record was used to extract patient information regarding demographics, medical history, type of nutrition, laboratory values, and concomitant medication administration. Baseline blood glucose values were obtained prior to insulin infusion, as well as the initial insulin dose, and time to reach therapeutic blood glucose levels. Blood glucose values and insulin doses were collected. The frequency of blood glucose measurements, the percent therapeutic and time to reach therapeutic blood glucose values, number of insulin infusion adjustments, and maximum infusion rate. Safety was assessed by measuring the incidence of hypoglycemic events defined as blood glucose levels less than 60 mg/dl.

Results/Conclusions:

To be determined based upon data analysis and will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Understand the benefit of initiating an Intensive Insulin Protocol to manage hyperglycemia in Critically Ill Patients.

Describe the barriers of implementing and modifying a protocol in an acute care setting.

Self Assessment Questions:

What are the advantages of maintaining tight glycemic control in critically ill patients?

How should we improve the intensive insulin protocol in order to reach therapeutic blood glucose levels faster and without increasing a risk for hypoglycemia?

INFLUENCE OF AGE ON HIV INFECTION TREATMENT OUTCOMES IN ANTI-RETROVIRAL THERAPY-NAIVE PATIENTS

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Background: Clinical trials validating the safety and efficacy of anti-retroviral therapy (ART) in the treatment of HIV infection have generally included younger patient populations aged 18 to 37 years old. As a result, there is a lack of data on the safety and efficacy of ART in patients over the age of 50 years. Therefore, as increasing numbers of older patients are diagnosed with HIV infection, and as current HIV-infected patients live longer, it is imperative to evaluate the safety and efficacy of ART in this older patient population.

Objective: The primary objective is to determine the safety and efficacy of initial ART on the immunological and virological outcomes of HIV-infected patients (≥ 60 years old) compared to younger HIV-infected patients (≤ 49 years old). A secondary objective is to compare initial ART regimens in older versus younger HIV-infected patients to evaluate if the initial ART regimen was selected based on the presence of co-morbidities.

Methods: This is a retrospective, observational, matched cohort study. HIV positive patients ≥ 18 years of age initiated on ART at Wishard Health Services in the Special Medicine Clinic between January 1, 1999 and September 30, 2007 will be potentially included in the analysis. Subjects will be identified by reviewing the clinics ongoing patient database. Subjects with a prior history of ART, prisoners, and subjects with less than 6 months of follow up data will be excluded. Subjects in each group will be matched according to baseline CD4+ cell count, baseline HIV viral load (VL), date of initiation of ART, and initial ART regimen. Successful virologic response will be defined as an undetectable HIV viral load assessed at least 6 months after the initiation of ART. Successful immunologic response will be defined as a positive change in CD4+ cell count.

Results & Conclusion: To be discussed upon the completion of data collection.

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Learning Objectives:

1. List 3 mechanisms hypothesized to be responsible for the discordant immune function response in older versus younger HIV patients being started on ART.
2. Identify at least 2 theorized reasons why there is currently an increase in the diagnosis of HIV/AIDS in adults aged 60 and over.

Self Assessment Questions:

1. Clinical trials validating the safety and efficacy of anti-retroviral agents generally include subjects aged _____.
A. 8-18 years old
B. 18-35 years old
C. 18-50 years old
D. 25-50 years old
E. 30-60 years old
2. Although older patients typically had more co-morbid disease states present at diagnosis of HIV than younger patients, they were noted to have better compliance to the ART regimen. T/F

ADHERENCE WITH ASTHMA GUIDELINES: AN ASSESSMENT OF A STEP CARE INTERVENTION PROGRAM FOR LONG-ACTING BETA2-AGONISTS

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Purpose:

Long-acting beta2-agonists (LABAs) are used for the long-term management of persistent asthma. A large pharmacy benefit manager (PBM) has designed a LABA Step Care Therapy program to help ensure the safe and appropriate use of LABAs as stated in NAEPP guidelines. The primary objective of this study is to evaluate the efficacy of the LABA Step Care Therapy program in promoting the use of LABA therapy in addition to inhaled corticosteroids (ICS) as recommended in the NAEPP guidelines. The secondary objective is to assess member adherence and persistency to ICS and LABA combination therapy.

Methods:

Administrative pharmacy claims data that were processed through the LABA Step Care Therapy program from December 1, 2006 through August 31, 2007 will be identified and included in the study. Prescription claims will be reviewed retrospectively for three months after the LABA Step Care Therapy program intervention denial, to determine the proportion of members who have received a prescription for an ICS along with a LABA. Prescription claims for members who initiated an ICS along with the LABA will be reviewed for a six-month period to determine their adherence and persistency with the combination regimen. Adherence will be assessed using the medication possession ratio (MPR), which is defined as total days supply of combination therapy that members received to the total number of days between the first and last refill plus the days supply of the last refill. Persistency will be measured by determining the average number of days members remained on combination therapy during the six-month follow-up period.

Results:

The preliminary results for the primary endpoint suggest that up to 36% of the patients received an asthma medication other than LABAs within three month following a LABA Step Care Therapy Program intervention denial.

Conclusions:

The conclusions are pending completion of data collection.

Learning Objectives:

Describe the purpose of a LABA Step Care Therapy Program.
Discuss the adherence and persistency rates that are associated with the program.

Self Assessment Questions:

What is FDA's recommendation in regards to the use of LABAs in asthma management?
What are adherence and persistency rates with ICS in the LABA Step Care Therapy Program?

PHARMACY INTERVENTIONS TO INCREASE THE QUALITY OF CARE ON ACUTE CARE FOR ELDERLY (ACE) UNITS

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PURPOSE

Elderly patients account for well over one half the population in our hospitals. They frequently have comorbid medical conditions as well as altered pharmacokinetic and pharmacodynamic profiles that make medication use more challenging. It follows that pharmacists should be able to positively impact care for the elderly by focusing attention on optimizing their medication use. This project will identify areas where current care of elderly patients could be improved at Aurora St. Lukes Medical Center (ASLMC). The project will determine the most effective and efficient use of a pharmacist's time on general medicine teams and implement formulary changes that will benefit elderly patients at all Aurora Hospitals, thereby improving the care of elderly patients.

METHODOLOGY

Training materials were created for staff pharmacists and residents who practice on general medicine floors that highlighted frequent medication challenges in elderly patients. After review of the materials, pharmacists documented daily interventions initiated during and outside of multidisciplinary team rounds. Data was compiled at the end of three months to determine intervention trends. Medications that frequently require interventions will be the focus for the remainder of the project. A summary document will be developed and presented to the Pharmacy and Therapeutics Committee proposing physician and pharmacist collaborative practices, automatic dose reductions, and automatic substitutions with the support of clinical data and primary literature.

PRELIMINARY RESULTS

The data suggests there is potential for pharmacists to collaborate with nursing and physicians to improve the care of elderly patients in our hospitals. Establishing automatic dose reductions for diphenhydramine, prochlorperazine, metoclopramide, and promethazine may facilitate proper dosing of these medications in elderly patients. In addition, automatically substituting other drugs for acetaminophen/propoxyphene napsylate, amitriptyline, and meperidine may result in better patient care.

CONCLUSIONS

Results and conclusions of this study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe pharmacokinetic changes in older adults that can contribute to significant adverse drug events.
Recognize medications that have been reported to contribute to cognitive impairment in elderly patients.

Self Assessment Questions:

List two physiologic changes that occur in elderly patients resulting in the need for medication dose adjustments.
Identify three Beers list medications that can cause sedation and recommend appropriate dose reductions.

ANALYSIS OF MEDICATION USE IN ELDERLY EMERGENCY DEPARTMENT PATIENTS AT THE UNIVERSITY OF ILLINOIS MEDICAL CENTER AT CHICAGO

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Purpose: Geriatric adults comprise an estimated 12% of the U.S. population, and accounted for approximately 15% of emergency department (ED) visits in 2002. Thirty to 50% of geriatric patients are discharged from the ED with a new prescription, and 6-10% of these represent a potentially inappropriate medication (PIM) for an elderly patient.

The purpose of this study is to assess prescribing habits in the University of Illinois Medical Center at Chicago ED to identify potentially inappropriate prescribing habits and to assess risk factors in geriatric patients which may make them more likely to receive a PIM. The study goal is to identify areas requiring improvement in the ED treatment of elderly patients and detect those patients who may most benefit from interaction with an ED clinical pharmacist.

Methods: A retrospective, descriptive study will be performed, and approval from the IRB has been obtained. A computer-generated list will identify subjects age 65 years and older with ED visits from March 1 through July 31, 2007. The first 100 eligible subjects, chronologically by ED visit date, will be included. Data collected will include subject demographic and baseline health characteristics, time of ED triage, Emergency Severity Index rating, home medications, medications administered in the ED, discharge medications, and the number of medications each subject was taking. Subjects' medication lists will be assessed for PIMs, per the 2003 updated Beers Criteria. Medications prior to presentation and upon discharge will be assessed for drug-drug interactions. Subjects' disposition from the ED will also be recorded.

Descriptive statistics will illustrate demographic and baseline characteristics, while odds ratios will determine categorical variables' effects upon use of PIMs. Regression analysis will analyze for differences in subjects who did and did not receive PIMs.

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

Learning Objectives:

To describe the challenges of caring for elderly patients in the emergency department.
To identify risk factors that may make elderly patients more likely to receive potentially inappropriate medications.

Self Assessment Questions:

Geriatric patients are less likely to experience adverse effects of medications than younger adult patients. True or False
Geriatric patients can be treated the same as younger adult patients, as advancing age should not substantially affect their medical management. True or False

GLYCEMIC CONTROL IN NEUROSCIENCE AND SPINE SURGERY PATIENTS

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PURPOSE: The benefits of glycemic control in both diabetic and non-diabetic surgical ICU patients and those undergoing cardiovascular procedures are well documented in the literature. Literature demonstrating benefits for stroke patients and those undergoing spine surgery is now emerging. At our institution, retrospective data analysis in neuroscience and spine patients reveals an opportunity for improved glycemic control. The primary objective of this project is to evaluate the impact of multidisciplinary education and pharmacist intervention on glycemic control in neuroscience and spine patients. Further, a secondary objective will be to compare spinal surgery infection rates before and after these interventions are made. Although the complication of post operative infection can be attributed to a multitude of factors, the risk is increased in the setting of hyperglycemia.

METHODS: Retrospective, baseline data collection includes pooling all available fingerstick glucose readings for each patient admitted to the spine and neuroscience units from September through December 2007. Infection rates for patients undergoing laminectomies for this time period will also be collected. Intervention will then be made in the form of education, provided through informational posters, small group in-services to nurses on these units, interaction and distribution of informational pocket-cards at the Nursing Skills Day In-service, and a presentation to physician staff on the neuroscience and spine surgery units regarding current literature support and Riverside Methodist Hospital baseline data of fingerstick glucose readings. In addition, Glucose Tracking sheets will be created daily for a total of three weeks in February for these same physicians. Information included on Glucose Tracking sheets include patient name, location, glucose readings from fingersticks in the last 24 hours, and current antidiabetic therapy. Fingerstick glucose and laminectomy infection data collected January through March will model baseline data.

RESULTS/CONCLUSIONS: Results and conclusions will be presented at the conference.

Learning Objectives:

Discuss literature support for glycemic control in neuroscience and spine surgical patients.

Evaluate the impact of multidisciplinary education and pharmacist intervention on glycemic control in Riverside Methodist Hospital neuroscience and spine surgical patients.

Self Assessment Questions:

There is evidence to support glycemic control in patients with or without diabetes. T/F

Benefits of glycemic control include decreased mortality, morbidity, infection rate, and length of stay. T/F

ASSESSMENT OF PATIENT COMPREHENSION OF TYPE 2 DAIBETES MELLITUS

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The purpose of this study is to assess patient knowledge of diabetes mellitus and disease progression as well as patient perception of diabetes control. In a pharmacist managed interdisciplinary diabetes care clinic, type 2 diabetes mellitus patients were asked to complete a brief survey assessing knowledge of the disease state. The survey examined the patients knowledge of their disease including risk factors and potential complications as well as blood glucose, blood pressure, and hemoglobin A1c goals. Patient perception of disease state control was compared to laboratory data in the chart after the patient visit. Patients were divided into two groups. Group one contains patients not followed in this clinic and group two contains patients followed in the interdisciplinary clinic. Collected data was compared to patient specific goals set by the American Diabetes Association, American Association for Clinical Endocrinologist, and American Geriatric Society for diabetes management. Other questions examined were the patients perception of their own disease state. These answers were compared with documentation in their chart of their actual disease progression. Information about the patients disease state was obtained from the chart after the patient had completed the survey about the progression of their disease state.

Learning Objectives:

Discuss the barriers to patient education.

Does an interdisciplinary approach increase the patient's knowledge of their disease state?

Self Assessment Questions:

Do patients followed in an interdisciplinary diabetes care clinic have a better perception of their disease control?

What aspects of diabetes mellitus are the patients least knowledgeable?

EVALUATION OF INPATIENT VENOUS THROMBOEMBOLISM PROPHYLAXIS PRESCRIBING AT A VA HOSPITAL

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Purpose: Hospital stays and procedures performed during hospitalization put patients at risk for developing venous thromboembolism (VTE). The appropriate use of prophylactic medications can prevent the occurrence of VTE. Evidence-based guidelines are available which provide recommendations for the use of VTE prophylaxis; however, recent data show that these medications are currently underutilized. The primary objective of this study is to determine if patients are receiving medication for prophylaxis as is recommended by evidence-based guidelines. Other endpoints will determine if prophylaxis is being provided at an appropriate dose at the appropriate time and for the proper duration. Finally, we will examine the presence of documentation in patient care notes about blood clot risk assessment in order to comply with the proposed National Consensus Standards for the prevention of VTE.

Methods: A retrospective chart review is proposed in order to evaluate the use of prophylactic medications at the William S. Middleton Memorial Veterans Hospital. Electronic medical records will be used to identify subjects who have been admitted to the hospital between 11/1/2007 and 11/31/2007. Data collected from this population will include: basic demographics, labs, admission diagnosis, existing risk factors for VTE and for bleeding, type and dosing of prophylaxis (if any) used, time to initiation of prophylaxis, and duration of use. Appropriate use will be determined by evidence-based guidelines, primarily the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy (CHEST) guidelines.

Results/Conclusions:

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

Learning Objectives:

Identify major risk factors for VTE in hospitalized patients.

Evaluate recommendations for use of VTE prophylaxis in hospitalized or surgical patients

Self Assessment Questions:

Risk factors for VTE in a hospitalized patient include:

- a. active cancer
- b. immobility
- c. congestive heart failure
- d. all of the above

T/F: ACCP recommendations suggest that immobile patients with any risk factors should receive VTE prophylaxis.

EVALUATION OF ANTIBIOTIC TURN AROUND TIME IN NEUTROPENIC PATIENTS WITH SEPTIC SHOCK

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Purpose: Septic shock is associated with a high mortality rate of 40 to 70%. Early diagnosis, resuscitation and appropriate treatment within 6 hours is essential to patient survival. The current Surviving Sepsis guidelines produced by the Society of Critical Care Medicine recommend initiation of appropriate antibiotics within the first hour of diagnosis. To date, there has only been one clinical trial that has determined the benefit between time to first dose of antibiotics and survival in septic patients. In the neutropenic patient it is conceivable that any delay in appropriate antibiotic therapy could have a detrimental outcome for the patient. The purpose of this study is to evaluate the health systems adherence to a 1 hour turn around time for antibiotics in neutropenic patients with septic shock. In addition the initial antibiotic selection will be evaluated for appropriate drug based on culture results, dose and frequency. Patient outcomes of survival, length of stay in the intensive care unit and in the hospital as well as duration of ventilator support will also be studied.

Methods: This study is a retrospective chart review. A list of patients that received a vasopressor from October 2006 to January 2007 was generated from the health systems electronic medical record to identify patients with septic shock (defined as hypotension requiring vasopressors due to a documented or suspected infection). Patients were defined as neutropenic if the absolute neutrophil count was less than 1,500 cells per mL. Data collected included: baseline demographics, hospital admission diagnosis, intensive care unit admission diagnosis, duration of ventilator support, vasopressor use, antibiotic use, time to first dose of antibiotics, microbiology culture results, length of intensive care unit and hospital stay as well as discharge diagnosis. In addition, the time the antibiotic order was written, verified and administered was also evaluated.

Results/Conclusion: Pending

Learning Objectives:

Evaluate the current literature regarding antibiotic turn around time in severe sepsis.

Describe the relationship between time to first dose of antibiotics and mortality in septic patients.

Self Assessment Questions:

In the literature presented, mortality increased by almost 50% when comparing patients that received an antibiotic within the first hour versus the sixth hour after onset of persistent or recurrent hypotension. True or False

Time to first dose of antibiotics influenced survival the most in patients with septic shock. True or False

EPIDEMIOLOGICAL REVIEW OF MAGNESIUM AND STATINS FOR THE PREVENTION OF DELAYED CEREBRAL ISCHEMIA SECONDARY TO SUBARACHNOID HEMORRHAGE

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Background: Aneurysmal subarachnoid hemorrhage (aSAH) represents only a small percentage of all stroke cases, however it is associated with significant morbidity and mortality. Thus, aggressive interventions are necessary to prevent mortality and long term complications. Delayed cerebral ischemia (DCI), as a result of cerebral vasospasm, is one of such complications which is associated with poor clinical outcomes. Nimodipine is widely used in the prophylaxis of vasospasm due to its cerebrovascular selectivity. Despite its clinical benefits in reducing neurologic consequences, vasospasm remains a devastating complication of SAH. Magnesium and statins have recently shown promising clinical results and are currently used for DCI prophylaxis in aSAH patients in some neurocritical care units.

Purpose: To investigate the impact of nimodipine containing therapy, with and without magnesium infusion or statins, on the incidence of clinically significant vasospasm following aSAH. The secondary objective of this study is to evaluate the adverse effects of magnesium and/or statins, and medical complications of these patients.

Methodology: A retrospective cohort evaluation of consecutive aSAH patients admitted to Detroit Receiving Hospital over a 3-year period. All aSAH patients who fulfilled the predefined inclusion and exclusion criteria are included in the study. Patients were stratified as follows: nimodipine, nimodipine+magnesium, nimodipine+statins, nimodipine+magnesium+statins. Vasospasm was measured by cerebral angiography, Transcranial Doppler and clinical assessment. Functional outcome was assessed using modified Rankin score, Glasgow outcome scale, and hospital length of stay. Other outcomes evaluated included adverse effects of the regimens and other medical complications. Results and conclusion: Data analysis, results, and conclusions will be presented at the conference.

Learning Objectives:

Discuss the proposed pathophysiology, risk factors and standard treatment therapy for delayed cerebral ischemia associated with aneurysmal subarachnoid hemorrhage.
Describe the efficacy and safety of magnesium and statins for the prevention of DCI associated with SAH.

Self Assessment Questions:

Nimodipine has been shown to improve neurologic outcome in aSAH patients, however it does not appear to reduce the incidence of vasospasm. T/F

Statins are thought to reduce vasospasm by inducing smooth muscle relaxation and vessel dilatation due to its calcium blocking effect. T/F

THE EFFECT OF BODY MASS INDEX ON GLYCEMIC CONTROL FOLLOWING KIDNEY TRANSPLANTATION WITH A STEROID MINIMIZATION PROTOCOL

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BACKGROUND: A clinical condition, transplant-associated hyperglycemia (TAH), has been coined to differentiate it from post-transplant diabetes mellitus (PTDM). Patients post-transplant are at risk for development of TAH due to long-term use of steroids and other immunosuppressants. Other factors predisposing patients for TAH include age, obesity, male gender, non-Caucasian, and a family history of diabetes. Patients developing TAH are associated with the development of metabolic derangements such as obesity, weight gain, dyslipidemia, as well as, placing them at an increased risk for PTDM. Due to the unwanted adverse effects of glucocorticoids, steroid minimization has been evaluated post-transplant. However, the use of steroid minimization in the obese patient has not been elucidated to determine whether, if any, decrease in the development of TAH or PTDM occurs.

PURPOSE: The purpose of this study is to determine if there is a correlation between elevated body mass index (≥ 30) and the development of TAH or PTDM.

METHODS: This is an observational study in which patient charts/records are being reviewed from time of transplant to a minimum of 3 months post-transplant. Patients from 2004-present are included if they are receiving their first kidney transplant and are utilizing a steroid minimizing protocol. Exclusion criteria include patients receiving steroids for other medical conditions or patients with a previous history of long-term steroid use and patients with a history of diabetes.

RESULTS: Data collection is ongoing.

CONCLUSION: Conclusions to be presented.

Learning Objectives:

Compare and contrast TAH and PTDM
Identify risk factors for developing TAH/PTDM

Self Assessment Questions:

JC is a 28 y/o BM status post kidney transplant using a steroid sparing regimen. His medical history reads as follows:
PMH: HTN and obesity (BMI = 32),
FHx: Mother (alive) - Type 2DM diagnosed 7/98, HTN, STEMI (7/98), CVA x 2 (6/00 & 7/05); Father (alive) - Type 2DM diagnosed 6/02, HTN, HLD
SHx: non-smoker (30 year pack history), denies EtOH and illicit drugs

Which of the above factors DOES NOT predisposes JC to TAH/PTDM?

- A. Family history of DM
- B. Obesity
- C. Non-caucasian race
- D. Age

JC comes into your clinic 1 month status post kidney transplant. He was instructed to fast, no food and only water for 12 hours prior to the visit prior to coming to the office for labwork. His labs read as follows:
140 | 105 | 14_ Glucose: 125mg/dL; Calcium: 9.4; HgbA1C: 8%

4 | 22 | 0.9

Which of the following statements would be correct?

- A. JC has PTDM due to HgbA1C > 7%
- B. JC has TAH due to FBG 110-125 mg/dL
- C. JC has PTDM due to FBG of 125
- D. JC has TAH due to HgbA1C > 6.5%

IMPLEMENTATION OF A MEDICATION REFILL AND EDUCATION PROGRAM FOR POST-TRANSPLANT PATIENTS

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Background: Recipients of solid organ transplantations face many post-operative challenges. These patients often have difficulty managing an overwhelming number of medications and dosing schedules. Complicated medication regimens may lead to a higher incidence of non-compliance, which may increase the risk of organ rejection.

Purpose: To implement a medication refill and education service for post-transplant patients in order to improve compliance with their therapy and increase refill retention rates for our pharmacy.

Methodology: Upon discharge from the hospital, every post-transplant patient that receives their discharge medications from our retail pharmacy will be encouraged to participate in a program that offers three different one-on-one counseling sessions with a pharmacist. Topics covered include: organ rejection, medication side effects, and compliance issues. Patients will also be offered refill reminders for three months following discharge from the hospital. A prescription delivery service will be implemented for those patients that require home delivery of medications. Transplant coordinators and nurses, transplant physicians, and the entire pharmacy staff will be educated about the service. A retrospective prescription refill evaluation will be completed to compare pre- and post-program refill retention rates. Aside from improving patient education, an assessment will be made to determine what impact the service had on the pharmacy's refill retention rates of post-transplant prescriptions.

Results/Conclusions: Data collection is ongoing. Preliminary results indicate that the pharmacy's retention of post-transplant prescription refills has more than doubled since initiation of the service. More detailed results and analysis will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

Identify marketing strategies designed to promote a medication refill and education program for post-transplant patients.

Recognize the impact that a pharmacist-managed medication refill and education service may have on a pharmacy's refill retention rates of post-transplant prescriptions.

Self Assessment Questions:

List three marketing techniques that can be used to help enroll patients in a pharmacist-managed education program for transplant patients

Describe three tactics a pharmacy can employ to help increase refill retention rates of post-transplant prescriptions.

ERYTHROPOIESIS STIMULATING AGENTS NATIONAL PRACTICE GUIDELINES:

CLINICAL COMPLIANCE ASSESSMENT AND PHARMACOECONOMIC ANALYSIS OF INPATIENT ANEMIAS

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Purpose: Erythropoiesis stimulating agents (ESAs) have been shown in clinical trials to increase the risk for death and serious cardiovascular events when administered to a target hemoglobin greater than 12 g/dL. These safety concerns led to a CMS review of ESAs and to changes in Medicare criteria for reimbursement. The purpose of this project is to evaluate the compliance of Aurora Health Care hospitals and clinics with new local and national CMS ESA guidelines in patients with chronic renal failure and anemia of critical illness.

Methods: The initial steps of this project involved data collection to determine the baseline compliance of Aurora Health Care with reimbursement guidelines. Data was retrospectively collected for twenty-five chronic renal failure patients receiving ESAs during a one month time period. Data was also collected for forty patients receiving ESAs in intensive care units (ICUs) at St. Lukes Medical Center through prospective chart review.

All findings are being reviewed and compiled and will be used to implement strategies necessary to ensure or improve the adherence of the Aurora Health Care systems with CMS guidelines.

Results/Conclusions: Data collection is in progress; results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Understand the risks associated with inappropriate use of ESAs.

Identify patients who are not appropriate candidates for ESA therapy based on hemoglobin levels.

Self Assessment Questions:

What are two risks associated with the inappropriate use of ESAs?

What is an appropriate hemoglobin target range for chronic kidney disease patients receiving ESAs?

STANDARDIZATION OF CONTINUOUS RENAL REPLACEMENT THERAPY REPLACEMENT FLUIDS

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Purpose: Continuous renal replacement therapy (CRRT) fluids are considered high-risk medications by the Institute of Safe Medication Practices (ISMP). The ISMP and the Joint Commission recommend standardization and minimization of concentrations available for high-risk medications. Currently, the regional healthcare system prepares each replacement fluid bag individually starting with sterile water and adding prescribed electrolytes. The purpose of this project is to standardize CRRT replacement fluids using a commercially available product.

Methods: This project involves the implementation of a new procedure and product for CRRT replacement fluid preparation. Research will be conducted to investigate the feasibility of using an available commercial CRRT replacement fluid. Due to higher sodium concentrations in the commercial CRRT replacement fluid, the use of a citrate solution with lower sodium content as an anticoagulant, rather than the 4% sodium citrate that is currently being used, will be investigated. The use of an alternate citrate solution will be implemented using adjusted electrolyte concentrations with the current method of CRRT fluid preparation. After a period of data collection, the data will be evaluated and used to select a commercial product. The standard replacement fluid on the pre-printed orders will then be changed to the composition of the commercial replacement fluid formulation. Current methods of compounding replacement fluids will continue for a short data collection period. Fluid composition, patient electrolyte lab values and supplements given will be monitored. Full implementation of the commercial CRRT replacement fluid will then occur. New pre-printed orders to utilize the new commercial product will be written and approved. Education will be provided to pharmacists, nurses and nephrologists throughout the project. Ongoing data collection, evaluation and modification will follow the implementation of standardized CRRT replacement fluids to validate that the project is functioning successfully and to identify and solve unexpected problems.

Results: Pending
Conclusions: Pending

Learning Objectives:

Identify the risks involved in providing CRRT replacement fluids.
Justify the standardization of CRRT replacement fluids using commercial products.

Self Assessment Questions:

What are two risks associated with CRRT replacement fluids?
What are two points used to justify the utilization of commercial CRRT replacement fluids?

ANALYSIS OF PATIENTS WHO DEVELOP LATE-ONSET HYPERKALEMIA WITH SPIRONOLACTONE THERAPY.

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Background: In 1999, the RALES trial demonstrated a substantial mortality benefit of spironolactone when added to standard therapy in patients with advanced heart failure. According to a Canadian study, local prescribing rates for spironolactone more than tripled in the 2 years following the publication of RALES. In addition, rates of hospital admission and death from hyperkalemia more than doubled. Hyperkalemia is a well established adverse effect of spironolactone. Close monitoring is recommended after initiation of therapy; however some patients develop hyperkalemia after several weeks to months of stable therapy

Objective: Identify the incidence of late-onset hyperkalemia and the associated risk factors.

Methods: Retrospective chart review of patients followed at University of Illinois Medical Center Heart Failure Clinic. Adult patients will be included if they were treated with spironolactone for heart failure and excluded if they used spironolactone for less than 2 months or were lost to follow-up. Patients will be stratified into two groups based on the presence or absence of hyperkalemia. Data, including medication list and laboratory parameters, will be collected at time of initiation of spironolactone and at time of hyperkalemia or end of study period. The incidence of late-onset hyperkalemia will be identified using descriptive statistics. Group data will be analyzed to determine risk factors for developing hyperkalemia after being on a stable dose. This will be done by comparing changes in characteristics between patients who have developed hyperkalemia on spironolactone and patients who have not.

Results: Data collection is on-going. Currently data has been collected on thirty-nine patients. Thirty are in the control group and five are in the hyperkalemia group. Four patients have been excluded.

Learning Objectives:

Review the place of spironolactone in heart failure.
Review mechanisms of potassium homeostasis.

Self Assessment Questions:

How might an increase in a patient's beta-blocker therapy effect serum potassium levels?
What are interventions that can be done to correct the hyperkalemia?

COMPARING RATES OF DVT PROPHYLAXIS BEFORE AND AFTER A PHARMACY INITIATED DVT RISK ASSESSMENT AND RECOMMENDATION TOOL

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Purpose: Venous thromboembolism (VTE) occurs commonly among hospitalized patients, with 250,000 cases each year in the United States. Even with well-respected, published guidelines, deep vein thrombosis (DVT) prophylaxis is often not maximized. The purpose of this research will be to assess current rates of DVT prophylaxis, initiate the use of a risk assessment and recommendation tool, and increase the rate of DVT prophylaxis used.

Methods: This project consists of three phases. In the first phase, rates of DVT prophylaxis and appropriateness were assessed. This was done by conducting a retrospective chart review of patients discharged starting October 1, 2007 until information was obtained on 500 patients. In the second stage, the electronic medical record was used to alert the clinical pharmacist to patients qualifying for DVT prophylaxis using risk factors from the admission history. These risk factors included: patient immobility, history of VTE or cancer, smoking, obesity, central line access, pregnancy, age 75 and above, use of hormonal products at home, scheduled surgery, and admission for trauma or to any intensive care unit. A risk assessment and recommendation tool was then placed on the patients chart. Recommendations were made according to the hospital DVT prophylaxis protocol. In the final stage of the study, rates of DVT prophylaxis and appropriateness will be re-assessed and compared to results from phase one.

Preliminary Results: Phase one data showed that DVT prophylaxis was attempted in 45.6% of inpatients. However, only 38.4% of patients received appropriate medical DVT prophylaxis.

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

Learning Objectives:

Identify risk factors for VTE.

Recommend appropriate medical prophylaxis according to Chest guidelines.

Self Assessment Questions:

Post-surgical patients are the only patients in need of DVT prophylaxis. T/F

A 25 year old patient with breast cancer does not need DVT prophylaxis. T/F

ASSESSMENT OF THE TREATMENT OF HOSPITAL AND VENTILATOR ASSOCIATED PNEUMONIA AT A UNIVERSITY HOSPITAL

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The American Thoracic Society (ATS) in cooperation with the Infectious Disease Society of American (IDSA) proposed a new set of guidelines for the treatment of hospital acquired pneumonia/ventilator associated pneumonia (HAP/VAP) in 2005. At the core of the guidelines is the principle concept that initiating late and/or inappropriate initial drug therapy has been shown to increase mortality in the patients with pneumonia. The guidelines serve as a structure upon which clinical decisions can be made. The difference in antibiogram from institution to institution, formulary considerations, and patient specific factors prevent the formation of a universal antibiotic regimen recommendation; therefore, each institution will be somewhat unique in its interpretation of appropriate antibiotic regimen. The purpose of this study is to quantify and evaluate the current treatment practices for HAP/VAP at Rush as compared to the ATS/IDSA guidelines in an attempt to improve the quality of care at RUMC. This study was previously performed last year and hindered by poor recruitment and a retrospective means of analysis. The number of patients analyzed was 10 over the course of 6 months whom met the inclusion criteria. Eight out of 10 patients were treated inappropriately per the guidelines. Of these patients, 4 died during their hospital stay. As the previous data was lacking in terms of sample size, it is unclear what effect the treatment choices had on outcomes. The current study is a prospective analysis of patients being treated for HAP/VAP. The proposed sample size for the study under way will be approximately 100 patients. Increasing the sample size should overcome the limitations from the last study and provide us with a better understanding of the data we collect.

Learning Objectives:

Understand recent ATS/IDSA guidelines for the treatment of HAP or VAP.

How are these guidelines implemented in a university hospital setting?

Self Assessment Questions:

What variable is associated most with mortality in HAP or VAP patients?

How long would you treat a E. coli hospital-acquired pneumonia?

PREDICTORS OF DIURETIC RESISTANCE IN ACUTE DECOMPENSATED HEART FAILURE

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Purpose

Intravenous (IV) diuretic therapy is the primary treatment modality in patients with acute decompensated heart failure (ADHF) and evidence of volume overload. Many patients develop diuretic resistance and fail to respond to diuretic therapy. However, the incidence of diuretic resistance in patients with ADHF is unclear and there are no known predictors of its occurrence. Our primary objective is to describe the incidence of and identify independent predictors of diuretic resistance in patients with ADHF. Secondary objectives include comparing treatment modalities and outcomes of patients with and without diuretic resistance.

Methods

A retrospective chart review of adult patients admitted to the University of Illinois Medical Center at Chicago for ADHF between 1/1/06 and 12/31/06 was conducted. ADHF patients with evidence of fluid overload who received initial treatment with an IV diuretic are eligible for inclusion. Patients who received IV vasoactive therapy within the first 4 hours after admission will be excluded. Data will be collected from electronic patient charts and from nursing flow sheets. Diuretic resistance is defined as a urine output (UOP) of <500 mL within 2 hours and/or <1000 mL within 4 hours of receiving IV diuretic in patients with normal renal function (UOP of <250 mL within 2 hours and/or <500 mL within 4 hours in patients with renal impairment (serum creatinine >2.0 mg/dL or CrCl <30 mL/min). The following characteristics will be compared between patients with and without diuretic resistance: clinical presentation, past medical history, chronic medications, IV diuretic dose, and baseline laboratory values including assessments of renal function. Additionally, treatment of diuretic resistance, length of stay, and clinical outcomes will be compared between groups.

Results and Conclusions

A total of 263 potential patients have been identified. Patient screening and data collection are ongoing.

Learning Objectives:

Describe the implications of diuretic resistance on the treatment of heart failure patients

Discuss the impact of the possible identification of predictors of diuretic resistance in heart failure patients

Self Assessment Questions:

Which of the following has not been independently associated with chronic diuretic resistance?

- A. Pump failure death
- B. Higher hospital readmission rates
- C. Increased total mortality
- D. Increased rates of sudden death
- E. All of the above have been associated with chronic diuretic resistance

Which of the following has been associated with early escalation of therapy in acute decompensated heart failure?

- A. Decreased length of hospital stay
- B. Decreased need for ICU transfer
- C. Decreased cardiovascular mortality
- D. All of the above
- E. A & B

EVALUATION OF VARIOUS BODY WEIGHT PARAMETERS IN CALCULATING CREATININE CLEARANCE

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Purpose: Many equations and adjustments to body weight and ideal body weight have been suggested in the literature when calculating creatinine clearance and drug clearance. This analysis will serve to determine whether this parameter succeeds in providing a good estimate in our specific patient population.

Methods: This study is a retrospective, observational, descriptive analysis reviewing creatinine clearances derived from all urine collection studies over the last five years. Urine creatinine values from 24-hour urine collections will be used to determine true creatinine clearances. The patients actual weight, adjusted weight, and ideal weight will then be used to calculate creatinine clearance via the Cockcroft and Gault equation, and the results compared. Creatinine clearance estimates from these two measures will be contrasted to glomerular filtration rates as estimated by the Modification of Diet in Renal Disease equation. Finally, regression analysis using all of the data will be used to calculate what adjustment to weight in the Cockcroft and Gault equation best fits the data collected in our patient population.

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

Learning Objectives:

Review the different equations utilized in assessing a patient's renal function.

Review the effect on different patient specific parameters on the calculation of renal function.

Self Assessment Questions:

T/F A 24 hour urine collection study can be truncated to a shorter time frame as long as the collection period is greater than 12 hours.

T/F Creatinine Clearance by its inherent nature will overestimate glomerular filtration rate.

CONTINUANCE OF ROSIGLITAZONE THERAPY IN PATIENTS WITH CONGESTIVE HEART FAILURE: A RETROSPECTIVE REVIEW

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Purpose:

Diabetes is currently estimated to be prevalent in 20.8 million Americans. The Framingham Heart Study demonstrated that patients with diabetes are two to five times more likely to be diagnosed with heart failure than patient without diabetes. More recent evidence has demonstrated an increased risk of congestive heart failure in association with rosiglitazone use for treatment of diabetes. Based upon this evidence, the FDA recently added a black box warning regarding the risk of heart failure to rosiglitazone prescribing information. Subsequently, rosiglitazone has been removed from the VA national formulary and new prescriptions for rosiglitazone initiation will not be approved. In order to comply with recommendations from VISN Formulary Leaders and the Medical Advisory Panel (MAP), current rosiglitazone use needs to be evaluated to determine if still appropriate. The primary objective of this retrospective study is to determine the continued incidence of rosiglitazone use in patients with a history of congestive heart failure (CHF). Secondary objectives include determining if a relationship exists between rosiglitazone use and worsening of CHF, determining if a relationship exists between the presence of cardiovascular risk factors and worsening of CHF in patients receiving rosiglitazone, examining the relationship between rosiglitazone use and LDL levels, and determining the degree to which target A1c is achieved from addition of rosiglitazone.

Methods:

A retrospective chart review will be performed on all patients identified by electronic pharmacy records with an active prescription for rosiglitazone as of October 31, 2007. Data collected will include demographics, medications, pertinent laboratory results, presence of cardiovascular risk factors, history of cardiovascular disease, New York Heart Association (NYHA) classification of heart failure, number of congestive heart failure (CHF) exacerbations, and number of CHF-related admissions. Approximately 600 charts will be reviewed.

Result/Conclusions:

Results and conclusions are pending.

Learning Objectives:

Discuss the appropriateness of rosiglitazone use in patients with CHF based upon current literature.

Describe the degree to which hemoglobin A1c is decreased with use of rosiglitazone.

Self Assessment Questions:

Rosiglitazone is contraindicated for use in patients during which NYHA stage(s) of heart failure?

- A) I
- B) II
- C) III
- D) IV
- E) III, IV
- F) II, III, IV
- G) I, II, III, IV

True or False: Rosiglitazone is superior to insulin therapy when trying to lower a hemoglobin A1c level from 10.5% to a goal of <7%.

CLINICAL EVALUATION OF TOBACCO CESSATION RATES AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Patients who quit smoking can significantly decrease their risk of developing long-term complications, including heart disease, stroke, cancer, and emphysema. Pharmacological agents have been shown to be valuable in improving smoking cessation rates compared to placebo. Increasing patients access to tobacco cessation therapy could help reduce smoking related health problems among patients at the Huntington VA Medical Center. The hospital previously required attendance at a smoking cessation class prior to starting a tobacco cessation agent. This has transitioned to an open access clinic that allows all providers the ability able to prescribe tobacco cessation agents without patients attending a class. Furthermore, improving smoking cessation rates among our patients will ultimately alleviate economic burden on the healthcare system. It is estimated that for each pack of cigarettes sold, in the U.S., the nation spends \$7.18 on smoking related healthcare expenses and loss of productivity, totaling 150 billion dollars per year. The purpose of this project is to establish a method to allow a smoking cessation clinical reminder to help healthcare providers offer smoking cessation products and evaluate tobacco cessation rates at the Huntington West Virginia Veterans Affairs Medical Center after allowing access to tobacco cessation aids through primary care clinics.

Methods: Retrospective chart-review with telephone follow-up of tobacco cessation rates after 3 months of tobacco cessation therapy will be performed. In addition, a comparison between smoking cessation classes versus physician prescribing will be evaluated. The primary endpoints of this study will be to implement a new procedure for offering smoking cessation aids and evaluate tobacco cessation at 3 months. Secondary endpoints will be rate of side effects or adverse events associated with therapy, an evaluation of cost-effectiveness, and a measurement of pharmacist workload.

Results/Conclusions: Results and analysis will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

1. List five health risks associated with chronic tobacco use.

Apply the five As for promoting tobacco cessation among patients: Ask, Advise, Assess, Assist, and Arrange.

Self Assessment Questions:

Which is not a contraindication to starting bupropion therapy for smoking cessation?

- a. h/o seizures
- b. Bulimia
- c. Anorexia
- d. All the above
- e. None of the above

True or False: Varenicline tablets can be split.

EVALUATION OF CLOPIDOGREL USE AT A PEDIATRIC TEACHING HOSPITAL

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TITLE: Evaluation of clopidogrel use at a pediatric teaching hospital

PURPOSE: The rarity of thromboembolic events in children has led to limited testing and use of antithrombotic medications in this population. For pediatric patients, aspirin is the only antiplatelet medication recommended by the American College of Chest Physicians in the 2004 Antithrombotic and Thrombolytic Therapy guidelines. According to the guidelines, there are no dosage recommendations or known uses of clopidogrel in children. Since 2004, however, clopidogrel has been utilized for prophylaxis of thrombosis in pediatric patients. Adult dosing data has been extrapolated to estimate approximate dosing for pediatric patients. The purpose of this study is to evaluate the use of clopidogrel for prophylaxis of thrombosis at a tertiary acute care pediatric hospital.

METHODS: The pharmacy computer system was used to identify all patients who received clopidogrel prior to discharge from the hospital during the 32 month period between May 2005 and December 2007. A retrospective chart review for identified patients is ongoing. Data being collected includes patient demographics (age, gender and weight), indication for clopidogrel therapy, clopidogrel loading and maintenance doses (total dose and weight-based dose), duration of clopidogrel therapy, and concurrent use of other anti-platelet medications. Occurrence and description of adverse drug reactions (bruising, bleeding, rash, gastrointestinal upset or other reported reactions) will be reported. Clopidogrel therapy will be evaluated using measures of efficacy, including absence or occurrence of thrombotic events. Data analysis will be performed with descriptive statistics.

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

Learning Objectives:

Understand the current literature regarding clopidogrel use in pediatric patients.

Recognize the limitations to use of clopidogrel in the pediatric population and the necessity of further research.

Self Assessment Questions:

True or False: Minor bleeding is the most commonly reported adverse reaction in children taking clopidogrel.

True or False: Pediatric patients should not receive loading doses of clopidogrel.

CORRELATION BETWEEN CYCLOSPORINE TROUGH BLOOD CONCENTRATIONS AND INCIDENCE OF ACUTE GRAFT VERSUS HOST DISEASE IN PEDIATRIC BONE MARROW TRANSPLANTATION PATIENTS.

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Background: Acute graft versus host disease (aGVHD) is a common complication of allogeneic bone marrow transplant (BMT). It is the result of immunologically competent donor T lymphocytes attacking the host organ systems. It can be prevented by using prophylactic immunosuppressive agents such as calcineurin inhibitors (cyclosporine, tacrolimus). Cyclosporine (CSA) acts by competitively binding and inhibiting calcineurin, a phosphatase enzyme which suppresses T lymphocyte activation.

A correlation between CSA trough concentration and decreased incidence of aGVHD has been demonstrated in adult patients. The therapeutic range targeted in these studies was very wide, between 100-500 ng/mL. Data in pediatric patients are very limited, especially in those receiving a matched unrelated (MUD) transplant.

Objectives: 1) Determine the correlation between the risk of developing grade II to grade IV aGVHD and cyclosporine trough blood concentrations measured over a period of 100 days after an allogeneic BMT; 2) report the target range that best prevented grade II to IV aGVHD; 3) examine the correlation between relapse rate, survival rate and aGVHD.

Methods: This is a retrospective chart review of patients who received a MUD allogeneic BMT between January 1995 and December 2007. Patients <18 years of age and receiving cyclosporine until Day 100 after transplant will be included. Data on patient and donor demographics, human leukocyte antigen match, original disease, chemotherapy preparative regimen, and immunosuppressive regimen will be collected. Mean CSA blood trough concentrations and dose changes over the first 100 days will be recorded. The rate of aGVHD, relapse of malignancy, and survival rates will be evaluated. Statistical analysis will include descriptive statistics, Cox proportional hazards modeling, and multiple logistic regression analysis.

Results/Conclusions: Data collection is ongoing. Results and analysis will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

Understand the correlation between cyclosporine trough blood concentration and incidence of grade II to grade IV acute graft versus host disease.

Understand the correlation between aGVHD, relapse of malignancy, and survival.

Self Assessment Questions:

What is acute graft versus host disease?

There is a correlation between cyclosporine trough blood concentrations and risk of developing grade II to IV aGVHD. T/F?

ORAL CHEMOTHERAPY ADHERENCE AND SAFETY IN AN OUTPATIENT ONCOLOGY SETTING

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Background: The landscape of cancer chemotherapy has been evolving over the past years, transitioning from predominantly intravenous therapy to an increasing use of oral agents. The use of oral chemotherapy agents has shifted the responsibility of adherence from the healthcare providers to the patients. Miscommunication, inadequate patient education, financial considerations, difficulty in obtaining the medication and poor side effect management can all lead to suboptimal adherence. Efforts to improve patient adherence have revealed that a multi-modal approach, including patient education, convenience of care and increased monitoring, has the greatest impact.

Purpose: The purpose of this study is to measure patient adherence to oral chemotherapy, to assess the impact of pharmacy and nursing intervention on adherence, patient satisfaction and adverse drug event reporting and to define the potential role for a clinical pharmacist to improve patient outcomes with oral chemotherapy.

Methods: In this prospective study, adult patients at an outpatient oncology clinic receiving capecitabine, temozolomide, erlotinib or imatinib for the first time are eligible to participate and informed consent will be obtained. Patients will be enrolled in a sequential study design with the first 20 patients will be assigned to the control group and the next 20 patients in the intervention group. The control group will receive a survey on their first follow-up visit assessing their compliance, level of difficulty in obtaining the medication, side effects experienced and their corresponding management and overall satisfaction with treatment. Patients enrolled in the intervention group will receive an offer for additional counseling, assistance in obtaining the prescription, a phone call one week later to assess adherence and side effects and the same survey (as control group) on their first follow-up visit.

Results/Conclusions: Data collection in progress: results will be presented at conference.

Learning Objectives:

Evaluate the current healthcare systems ability to appropriately manage patients taking oral chemotherapy

Discuss barriers to adherence of oral chemotherapy medications

Self Assessment Questions:

T/F: Oral chemotherapy requires the same diligence in prescribing, documentation, adherence and monitoring as intravenous chemotherapy.

List 3 barriers to adherence of oral chemotherapy medications

THE IMPACT OF PHARMACIST IN THE EMERGENCY DEPARTMENT

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Purpose: Akron City Hospital of the Summa Health System is the first level one trauma center of Akron, Ohio. The healthcare teams consist of knowledgeable emergency department physicians, skilled surgeons, medical residents, proficient nursing as well as the recent addition of pharmacist as active participants in medication management. There has been an increase in attention directed towards pharmacy involvement in medication safety for emergency departments nationwide. The interest of ED pharmacist intervention has led to; the development of pharmacy positions designated specifically for emergency, residency programs for intense ED training and the emergence of research to evaluate aspects of pharmacy contribution to the ED. There is a general expectation that pharmacist will positively impact patient care, however the degree of pharmacist intervention has yet been established objectively. The objective of this study is to determine the role of the emergency department pharmacist, to quantify pharmacy activity while working in the ED based on number of interventions, amount of pharmacy involvement in terms of time and savings associated with pharmacy recommendations and to determine ED staff use, reliance and comfort in pharmacy presence as a readily available resource.

Methodology: Previously documented interventions will be obtained from a database known as Clinitrend to impartially evaluate the involvement of pharmacists in the ED. A survey will be developed and distributed to ED staff for anonymous completion to subjectively assess the perception of pharmacy interaction with the interdisciplinary team. A similar survey will be prepared for completion by the current ED pharmacists to assess the impression of the pharmacist role in the emergency department. The results from the Clinitrend database will establish the pharmacist position in the ED. The survey will provide information regarding staff opinion of pharmacy usefulness in the emergency department. The survey will also indicate pharmacist utility in the emergency department.

Results/Conclusions: Data analysis, results and conclusion will be presented at the Great Lakes Resident Conference.

Learning Objectives:

To determine the specific role of pharmacist in the emergency department

To determine how pharmacy services are most effectively utilized in the emergency department

Self Assessment Questions:

The specific role of the pharmacist in the emergency department includes:

- A. Work as a member of the healthcare team to optimize patient pharmacotherapy
- B. Screen medication orders in the computer for the appropriateness of therapy
- C. Provide drug information
- D. Assisting with codes
- E. All of the above
- F. Two of the above

Pharmacy services in the emergency department are most effectively utilized through:

- A. Providing drug information over the phone
- B. Placing the pharmacist in a central, highly visible area of the emergency department
- C. Having the pharmacist activity participate in patient care by interacting with the healthcare team
- D. Physically retrieving medication from the pharmacy
- E. All of the above
- F. Three of the above

EVALUATION OF INPATIENT ANTICOAGULATION MANAGEMENT IN A COMMUNITY HOSPITAL.

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Background: Saint Margaret Mercy Healthcare Center (SMMHC) is involved with the Institute for Healthcare Improvements (IHI) nation-wide 5 Million Lives Campaign. One of the goals of this campaign is to reduce incidence of patient harm due to high-alert medications, including warfarin and other anticoagulants. The objective of this study was to evaluate and improve warfarin prescribing at St Margaret Mercy.

Methods: The study was approved by the SMMHC IRB Committee. A randomized, retrospective medication use evaluation (MUE) was performed, including patients that received at least 3 doses of warfarin during a single admission from January 1, 2007 to June 30, 2007. The primary endpoints included bleeding events (major and minor), International Normalized Ratio (INR) < 1.5, and INR > 4. Secondary endpoints included reversal agent usage and number of days until INR reached therapeutic range. A pilot study of clinical pharmacy managed warfarin was then initiated, using an existing warfarin protocol. Data was evaluated on 50 patients using the same primary and secondary endpoints.

Results: One hundred patient charts were reviewed in the initial evaluation. Major and minor bleeds occurred in 5% and 15% of patients, respectively. An INR of > 4 was documented in 8% of patients, while 7% had an INR < 1.5 after being in therapeutic range. In the follow-up MUE in which warfarin was managed by a clinical pharmacist, major and minor bleeds occurred in 2% and 12% of patients, respectively. An INR > 4 occurred in 8% of patients, while an INR < 1.5 after being in the therapeutic range was documented in 2%.

Conclusion: The initial MUE revealed that the majority of patients were being managed by physicians. A clinical pharmacy-managed warfarin pilot study showed improvement in many patient outcomes including fewer minor bleeds, better INR control, and less usage of reversal agents.

Learning Objectives:

Outline the implementation of a clinical pharmacy driven warfarin dosing protocol

Review the MUE results from the physician managed warfarin dosing and compare them to the clinical pharmacist managed dosing

Self Assessment Questions:

1. The majority of patients in both studies were being treated with warfarin for which two indications?
 - a. DVT and PE
 - b. Atrial fibrillation and DVT*
 - c. Atrial fibrillation and PE
 - d. DVT and DVT/PE prophylaxis
2. In which patient outcome did the clinical pharmacy managed pilot NOT show an improvement compared with the initial MUE?
 - a. Use of reversal agents
 - b. Incidence of minor bleeds
 - c. INRs < 1.5 after being therapeutic
 - d. INRs > 4*

EVALUATION OF HALOPERIDOL TABLETS ADMINISTERED RECTALLY FOR THE TREATMENT OF NAUSEA AND VOMITING IN HOSPICE PATIENTS

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Purpose: Approximately 40% of terminally ill patients experience nausea and/or vomiting in the last 6 weeks of life. Haloperidol is an accepted treatment for metabolic causes of nausea and vomiting. In clinical practice, commercially available haloperidol tablets are commonly administered rectally to hospice patients that cannot tolerate oral administration. The objective of this study is to review and evaluate the rectal administration of commercially available haloperidol tablets for the treatment of nausea and vomiting in hospice patients.

Methods: This study is pending approval by the Institutional Review Board. A retrospective chart review of patients discharged from an inpatient hospice unit in Columbus, Ohio between January 1, 2008 and April 30, 2008 will be conducted. All patients who receive haloperidol for the treatment of nausea and vomiting by any route of administration will be included. Patients who receive other antiemetics concurrently or who receive haloperidol exclusively for agitation or terminal restlessness will be excluded. Information collected to evaluate the efficacy of haloperidol for the treatment of nausea and vomiting will be documented on a data extraction tool without patient identifiers. Primary outcome measures will be the response of nausea and vomiting to haloperidol administered rectally: improvement, worsening, or resolution. Secondary outcome measures will be the response of nausea and vomiting to haloperidol administered by any other route.

Because there is no published literature to support or refute rectal administration of haloperidol alone, this study will be a significant contribution to the palliative care literature. Patients and caregivers will potentially benefit from the ease of administration of haloperidol rectally, rather than subcutaneously, when a patient is at home and cannot tolerate oral administration. Hospice organizations may benefit from decreased unneeded inpatient stays and cost-effective symptom management.

Learning Objectives:

Describe the anatomy and physiology of the rectum pertaining to drug administration.

Identify the role of haloperidol administered rectally in the treatment of nausea and vomiting in hospice patients.

Self Assessment Questions:

Haloperidol has which of the following pharmacokinetic properties that makes it a plausible drug for rectal administration:

- a. Hydrophilic
- b. Lipophilic
- c. Enteric coated
- d. Extended release

T/F Haloperidol is often used in hospice patients for nausea and vomiting because it is highly sedating.

BENEFIT OF PHARMACIST-OBTAINED MEDICATION HISTORIES IN THE INTENSIVE CARE UNIT

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Purpose: Incomplete and incorrect medication histories are a significant source of medication errors. Pharmacist-obtained medication histories taken in general care patients have been shown to be more complete than those obtained by other care providers. This study compares pharmacist-obtained medication histories with the histories of other care providers of critically ill patients in the intensive care unit (ICU).

Methods: We performed a retrospective chart review of 200 consecutively enrolled patients admitted to the ICU between July and October 2007. The APACHE IV database was queried to obtain the patient list, age, sex, ICU length of stay (LOS), hospital LOS and admission type. Paper medical records were accessed to obtain copies of the medication histories obtained by pharmacists and physicians in the ICU. The initial history-and-physical (H&P) medication list was compared with the pharmacy medication history to identify differences between them. Differences were recorded and referred to as variances; only prescription and scheduled-use over-the-counter medications were assessed. The ICU admission orders were compared with the initial H&P to identify orders that varied intentionally from the medication list. All other variances were considered unintentional. Medication orders were then reviewed for 48 hours after the pharmacy history was made available to identify medication changes attributable to the pharmacy history. Endpoints included the percentage of unintentional variances per pharmacy history and the number of medication changes attributable to the pharmacist-obtained medication history.

Results: Demographic data has been compiled. The average age was 53 years, percent male and female was 53% and 47%, respectively. The average ICU and hospital LOS was 3.6 days and 14 days. The percentage of unintentional variances and number of medication changes attributable to the pharmacy history will be obtained after all patients records have been reviewed.

Conclusions: Outcomes and subsequent conclusions will be determined.

Learning Objectives:

Understand the impact medication history errors have on the burden of medical errors.

Describe barriers to obtaining an accurate medication history in the ICU

Self Assessment Questions:

List 3 types of errors commonly found in medication histories.

Describe the benefit of pharmacist-obtained medication histories in the ICU.

DEVELOPMENT OF AN EMPIRIC TREATMENT STRATEGY IN THE EMERGENCY DEPARTMENT FOR THE TREATMENT OF SKIN AND SOFT TISSUE INFECTIONS BASED ON INSTITUTION-SPECIFIC EPIDEMIOLOGY

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Purpose: Community epidemiological patterns and susceptibility data are important considerations when selecting empiric antibiotic therapy for skin and soft tissue infections (SSTI) in the emergency department (ED). This study assessed community infectious epidemiology, compared appropriateness of commonly used antibiotics, and developed an empiric treatment strategy for SSTI in the ED.

Methods: Patients ≥ 3 months old were retrospectively identified using microbiology reports from two affiliated EDs. Patients with impetigo, perianal cellulitis, Bartholin's cyst, diabetic foot infections, venous stasis ulcers, pressure ulcers, surgical site infections, necrotizing infections, and human or animal bites were excluded. Data collected included patient demographics, bacterial pathogen isolated, and antibiotic susceptibility. Susceptibility to the following antibiotics was assessed: ampicillin, ampicillin/sulbactam, cefazolin, levofloxacin, tetracycline, trimethoprim/sulfamethoxazole, clindamycin, erythromycin, vancomycin, and linezolid. A simulation model was developed using the probability of isolating a particular organism and susceptibility data. Antibiotic success rates were calculated.

Results: To date, 73 patients have been evaluated. The median age was 21 (0.3-77) years, 8% (6/73) had diabetes mellitus, 96% (70/73) resided at home, 1% (1/73) had a history of intravenous drug abuse, 40% (14/35) had a documented history of methicillin-resistant *Staphylococcus aureus* (MRSA), and 6% (4/73) had a documented hospitalization at the study institution within 3 months prior to ED visit. The most common organism was MRSA (77%) followed by methicillin-sensitive *Staphylococcus aureus* (21%), and *Streptococcus agalactiae* (1%). Using epidemiology and susceptibility data, the predicted success rate reported for each antibiotic is as follows: trimethoprim/sulfamethoxazole (100%), vancomycin (99%), linezolid (99%), tetracycline (96%), clindamycin (94%), levofloxacin (84%), erythromycin (26%), cefazolin (23%), ampicillin/sulbactam (22%), and ampicillin (4%).

Conclusion: MRSA is a common pathogen of SSTI encountered in the ED. Therefore, empiric treatment coverage must include MRSA. Based on calculated success rates, low cost of treatment, and favorable adverse effect profile, the recommended antibiotic of choice at our institution is trimethoprim/sulfamethoxazole.

Learning Objectives:

Describe patient specific variables that should be considered when selecting initial antibiotic treatment for SSTIs in the ED.

List the most common bacterial organism associated with SSTIs.

Self Assessment Questions:

Physical examination, patient demographics, most likely bacterial pathogen, source of infection, and local epidemiology and susceptibility data are some of the variables to consider when selecting initial antibiotic treatment.

T or F

Which of the following antibiotics would NOT be an appropriate empiric treatment choice when MRSA is suspected?

- Trimethoprim/sulfamethoxazole
- Ampicillin/sulbactam
- Linezolid
- Vancomycin

HYPERTONIC SALINE SOLUTION AND FUROSEMIDE FOR THE TREATMENT OF ACUTE DECOMPENSATED HEART FAILURE

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Objective:

Previous studies have used diuretic therapy, human B-type natriuretic peptide, or adrenergic agonists to treat acute decompensated heart failure. These medications are often associated with increased mortality, decreased renal function, and increased costs. Recently, Aspirus Wausau Hospital (AWH) in Wausau, Wisconsin changed its preferred medication for acute heart failure from loop diuretics to hypertonic saline and high-dose furosemide. The primary objective of this study was to determine the effects of hypertonic saline solution with furosemide on renal function, weight loss, serum sodium levels, and 30-day hospital readmission rate.

Methods:

A retrospective case control study of approximately 80 patients admitted to AWH will be conducted. In order for patients to be accepted, they must have a diagnosis of heart failure supported by radiograph or positive Framingham criteria during the months of February 2006 to June 2007. Exclusion criteria includes enrollment in hospice, no diagnosis of heart failure, or no follow up data. The following data will be collected: patient demographics, heart failure etiology, baseline hemodynamic values, echocardiogram data within 6 months of admission, current home medications, doses of hypertonic saline solution and furosemide received, medications received during hospital course, pertinent lab values one day prior to initiating hypertonic saline solution and furosemide and for the duration of admission, adverse events associated with furosemide therapy, New York Heart Association criteria for heart failure on admit and discharge, discharge status, discharge medications, and follow-up lab values and medications. A control group, consisting of patients treated with loop diuretics, will also be assessed. The control group will be from June 2005 to May 2006, and will have the same data collected as the treatment group.

Results/Conclusion:

Data analysis and collection is currently ongoing. The results and conclusion will be presented at the conference.

Learning Objectives:

Address the concern of diuretic resistance in patients with acute heart failure.

Discuss the impact of hypertonic saline and high-dose furosemide on patients with acute heart failure.

Self Assessment Questions:

True/False. More than 80% of patients who are hospitalized for acute decompensated heart failure receive an IV diuretic.

True/False. The mechanism of action of hypertonic saline is believed to move fluid from the extravascular space into the vasculature and promote renal arteriole blood flow.

DETERMINING THE ADULT PATIENT POPULATION THAT WOULD DERIVE THE MOST BENEFIT FROM PROSPECTIVE PHARMACIST REVIEW IN THE EMERGENCY DEPARTMENT

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Purpose: The Joint Commission Medication Management Standard, MM 4.10, indicates that all medication orders are reviewed for appropriateness. At Saint Josephs Hospital, in Marshfield, WI, medication orders within the emergency department (ED) are not currently reviewed by a pharmacist prior to administration, and therefore bypass an important safety step in the medication management process. Currently literature exists regarding drug therapy problems (DTP) in pediatric patients seen in the ED, but there is limited data in the adult population. The Joint Commission is currently evaluating the extent for standard implementation in the emergency department setting.

Objectives: The primary objective of this study is to quantify the rate of actual or potential DTPs, as defined by Strand and Cipolle, in adult patients seen in our rural 500 bed community teaching hospital ED. The secondary objective of this study is to describe patient characteristics that potentially correlate with the incidence of actual or potential DTPs in the ED.

Methods: An IRB exemption form was submitted to the Institutional Review Board. A stratified sampling of 100 charts in patients aged 18 years or greater, who were seen in the ED during 2006 were reviewed retrospectively. The following data was collected without patient identifiers and maintained confidentially: patient demographics (age, gender, weight, allergies), reason for ED visit (primary diagnosis/chief complaint), other comorbidities, how the patient arrived to the ED (self, ambulance, helicopter), time admitted to ED, length of time spent in ED, medication list, relevant labs, written, verbal, or undocumented medication orders, and identified actual or potential drug therapy problems. Provider documentation was reviewed for treatment rationale when identifying actual or potential drug therapy problems.

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

Learning Objectives:

Discuss the importance of having a pharmacist prospectively review medication orders in the ED.

Identify the most frequent actual and potential DTPs seen in a rural 500 bed community teaching hospital ED.

Self Assessment Questions:

List the 7 types of actual or potential drug therapy problems.

Describe the extent to which MM 4.10 is to be implemented in the emergency department setting to be considered compliant with Joint Commission standards.

ASSESSMENT OF TECHNICIAN ATTITUDES TOWARD CLINICAL SERVICES IN COMMUNITY PHARMACY

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PURPOSE: To determine technicians knowledge of and attitudes toward clinical services in the community setting. To identify barriers that may inhibit technician understanding and/or willingness to support clinical services. To evaluate how technicians attitudes affect the type and amount of clinical services delivered in the community setting.

METHODS: A web-based survey was sent via e-mail to approximately 900 SUPERVALU Pharmacies inviting all pharmacy technicians over 18 years of age to complete the survey. The survey was accessible for two weeks. A reminder e-mail was sent out one week after the initial e-mail to remind pharmacy technicians to complete the survey. All responses were recorded anonymously. Data will be analyzed using SPSS. The results of the survey will be analyzed to determine which factors (gender, age, number of years of pharmacy technician experience, services available, level of involvement, incentive to participate, and general satisfaction) correlate with technicians attitudes toward clinical services.

RESULTS: The survey will be e-mailed to all SUPERVALU Pharmacies on January 14, 2008. Data analysis to occur in February. Results will be presented at the 2008 Great Lakes Pharmacy Residency Conference.

CONCLUSION: The results of this study will help develop further technician training on clinical services. If technicians attitudes toward clinical services are positive and they understand their value in terms of patient health and outcomes, it is expected that the services will be successful. More clinical service development will be possible by having the entire pharmacy team appreciate the service being provided. However, if technicians do not understand why clinical services are important to community pharmacy and the health of patients, then it is likely that the information the technicians are receiving is not presented in such a way that yields positive outcomes.

Learning Objectives:

Identify technician-related factors that contribute to barriers that may affect clinical pharmacy services in the community setting
Describe the correlation between technicians attitudes and their participation in delivering clinical services in the community setting

Self Assessment Questions:

Which of the following is the most common reason why technicians do not participate in or promote clinical pharmacy services in the community setting?

- a. Pharmacy is too busy
- b. Not enough training in clinical services
- c. Patients are not interested
- d. No incentive to provide/promote clinical services

True or False: The majority of technicians feel that clinical pharmacy services are an important part of community pharmacy.

RETROSPECTIVE EVALUATION OF SURGICAL ANTIMICROBIAL PROPHYLAXIS: APPROPRIATENESS OF THERAPY, AND ASSESSMENT OF INFECTION RATES.

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Background: The National Surgical Infection Prevention Project guidelines and other literature illustrate dosing, timing, and duration of antibiotic administration is important for preventing infections. Re-dosing of antibiotics and stopping antibiotic administration upon closure of surgical incision within 48 hours post surgery has been shown to be effective in reducing SSI. Using appropriate methods in administering SSI prophylaxis can reduce unnecessary antibiotic exposure and reduce the number of SSI.

Purpose: The primary objective of this study is to determine if antimicrobials are used appropriately as prophylactic agents and assess the affect on surgical infection rates.

Methods: Patients who received antimicrobial surgical prophylaxis for procedures from January 1, 2006 to September 30, 2007 will be evaluated. The study is IRB approved. The patient sample will be extracted from the Surgical Care Improvement Project (SCIP) database along with the following patient specific information: sex, race, surgical procedure, surgery start date and time, surgery end date and time, antibiotic name, route of administration, time of antibiotic administration, antibiotic allergy, infection status prior to surgery, date of post operative infection diagnosis, and time of discharge from acute care. The surgical procedures include coronary artery bypass graft, other cardiac surgery, colon surgery, hip and knee arthroplasty, abdominal and vaginal hysterectomy, vascular surgery, and other major surgery. Outcome measures will include infection rates, type of infection, administration of antibiotic within one hour of the procedure and discontinued within 48 hours of the end of the procedure, appropriate antibiotic re-dosing, correlation between appropriate antimicrobial use and length of stay, and correlation between appropriate antimicrobial use and surgical infection rates.

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

Learning Objectives:

Recognize the importance of appropriate use of antimicrobials in surgical site infection prophylaxis.

Discuss the efficacy of the antimicrobial agents used for preventing infections in the patient population at the University of Toledo Medical Center.

Self Assessment Questions:

Give examples of types of surgical procedures for which antimicrobial surgical prophylaxis is recommended.

In what surgical procedure(s) is it appropriate to use vancomycin for the prevention of surgical site infections.

TIGHT GLUCOSE CONTROL IN THE HOSPITALIZED TRAUMA POPULATION

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In response to recent clinical trials demonstrating the benefit of tight glucose control in a heterogeneous ICU population many medical centers have aimed for a target glucose range of 80-110mg/dL for all ICU patients. These studies did not show a benefit in the small number of trauma patients which they included. Serum glucose concentrations in individuals who experience a traumatic event will increase, and it has been theorized that this may be a natural, beneficial response. The purpose of this study is to evaluate our glycemic control in trauma patients before and after institution of tight glucose control in the ICU. As a secondary outcome, we will compare mortality, ICU and hospital length of stay between the two groups to help determine the effects of aggressive glucose management on the trauma patient population. This is a retrospective chart review of patients admitted to Methodist Hospital for trauma between September 2006 and September 2007, were admitted to the ICU for greater than 48 hours, and are greater than or equal to 18 years of age. Current institution practice is to maintain a goal range of 80-110mg/dL in all ICU patients. Data will be collected for average glucose level, amount of insulin given, ICU length of stay, hospital length of stay, discharge disposition, pertinent medical history and severity of trauma. A comparison will be made with data previously collected between January 2003 and December 2003 which was before implementation of tight glucose control in the ICUs at Methodist Hospital. The average blood glucose for the 418 critically ill trauma patients was 14340mg/dl in 2003. Presently, 412 patients have been identified this past year who meet entry criteria for this study.

Learning Objectives:

Determine the benefit or risks of tight glucose control in the critically ill trauma patient population.

Identify the current evidence for maintaining tight glucose control in critically ill patients.

Self Assessment Questions:

What is the currently accepted goal blood glucose range for tight control in the ICU?

a. 50-100mg/dl b. 70-120mg/dl c. 80-110mg/dl d. <160mg/dl

What was the most common reason for admission to the ICU for patients in both the Van Den Berghe and the Krinsley trials?
a. Cardiac b. Respiratory c. Surgical d. Trauma

COMPARISON OF ENTERAL PRODUCTS FOR TUBE FED PATIENTS WITH TYPE 2 DIABETES

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Background: Diabetes mellitus is a metabolic disorder characterized by elevated blood glucose concentrations caused by abnormal insulin production and action. The established benefits of tight glycemic control in the acute care setting include improvements in immune function with decreases in inflammation and oxidative stress. The standard of care for nutrition support in diabetic patients who require enteral nutrition is to provide standard enteral products composed of a high content of low molecular weight carbohydrates, a low fat content, and moderate amounts of protein (15-20% of total calories). Supplemental insulin is usually administered to treat hyperglycemia.

Purpose: The purpose of the current study is to compare blood glucose responses of enterally fed patients with type II diabetes who consume a standard enteral nutrition formula followed by a diabetes-specific enteral nutrition formula.

Methods: Twelve extended-care patients diagnosed with type II diabetes will be enrolled. Each patient will receive a currently available standard enteral nutrition formula (control product) for six to eight days. Patients will then receive an investigational diabetes-specific enteral nutrition formula (study product) for five days. During the entire study period, glucose concentrations will be continuously monitored using the FreeStyle Navigator Continuous Monitoring System (Abbott Diabetes Care, Alameda, CA). This is an investigational device consisting of a sensor which is subcutaneously placed and is designed to continuously monitor interstitial blood glucose concentrations. Data variables to be collected are baseline hemoglobin A1C, continuous blood glucose concentrations, and capillary fasting blood glucose concentrations. Secondary variables include the amount of control and study product administered, type and amount of any beverage or food consumed by mouth, and type and dose of diabetes medications given. Any adverse events that may occur will be reported according to protocol.

Results: Data collection and evaluation are ongoing. Results and conclusions will be presented.

Learning Objectives:

Compare the glycemic effects of two enteral nutrition formulas in patients with type II diabetes mellitus.

Identify risk factors for elevated blood glucose concentrations during enteral nutrition therapy.

Self Assessment Questions:

What type of tube feeding product is currently considered standard of practice for patients with type 2 diabetes?

T/F Controlling hyperglycemia has no proven benefit.

EFFECT OF ALDOSTERONE ANTAGONISTS ON SHOCK FREQUENCY WITH IMPLANTABLE CARDIOVERTER DEFIBRILLATORS

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Purpose:

Implantable Cardioverter Defibrillator (ICD) shocks are unpleasant and can lead to significant anxiety over possible future shocks. Therapy that can reduce ICD shocks may help improve the quality of life for ICD patients. Aldosterone activity is implicated in cardiac remodeling, which provides a substrate for development of arrhythmias that necessitate ICD shocks. Aldosterone antagonist (AA) treatment can help attenuate this remodeling. However, whether aldosterone antagonists can reduce the frequency of ICD shock frequency is unknown and warrants investigation. Therefore, this study is being performed to determine if AA therapy has an effect on (1) the incidence of shock frequency or antitachycardia pacing or (2) the incidence of non-sustained ventricular tachycardia (NSVT) in patients with ICDs.

Methods:

This study is a retrospective medical record review of patients who have an ICD and were either (1) being treated with an AA or (2) were candidates for AA therapy but not receiving one. The frequency of ICD shocks, antitachycardia pacing and episodes of NSVT are being collected and compared between the two study groups.

Results:

At this time data has been obtained for 15 patients in the AA group and 25 patients in the non-AA group. In the AA group, there have been a total of 2 ICD shocks, 0 episodes of antitachycardia pacing, and 8 episodes of NSVT, averaging 0.2 ICD shocks and 0.8 episodes of NSVT per patient year. In the non-AA group there have been a total of 6 ICD shocks, 11 episodes of antitachycardia pacing, and 56 episodes of NSVT, averaging .29 ICD shocks, 0.5 episodes of antitachycardia pacing, and 2.7 episodes of NSVT per patient year.

Conclusion:

As of 1/15/08 with 40% of the patient data collected, there appears to be a divergence in the number of ICD events with fewer in the AA group.

Learning Objectives:

Describe the current role of aldosterone antagonists in cardiac patients.

Discuss the role of aldosterone in cardiac remodeling and the potential role of aldosterone antagonists in attenuating its effects.

Self Assessment Questions:

ACC/AHA guidelines for the treatment of heart failure in adults recommend the use of aldosterone antagonists for the following patient population.

- a. Stage B patients that are intolerant to an ACE inhibitor.
 - b. Stage C heart failure patients that are still symptomatic despite being on target doses of ACE inhibitors and Beta-blockers.
 - c. Stage C heart failure patients that are still symptomatic despite being on target doses of ACE inhibitors and Beta-blockers and have not responded to digoxin treatment.
 - d. Stage C heart failure patients who are currently being treated with both an ACE and an ARB
- e. b and d

Which of the following effects has aldosterone been reported to have on the heart? (select all that apply)

- a. Cardiac fibrosis and remodeling
- b. Decrease in the gap junction protein connexin-43
- c. Increase in the gap junction protein connexin-43
- d. Increase in the outward potassium current Ito.

IMPACT OF A PHARMACIST MANAGED MEDICATION RECONCILIATION PROCESS

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Background: Medication reconciliation requires healthcare professionals to identify and resolve discrepancies in a patients medication regimen during changes in level of care and/or settings. Joint Commission included this concept initially as part of their 2006 National Patient Safety Goals, carried it through in 2007, and continues to survey on this in 2008. Reconciliation can be a valuable means to improve patient safety, but judgment-based training and knowledge is necessary to achieve this goal. Mercy General Health Partners (MGHP), a 282-bed, faith-based organization located in West Michigan, is the focus of this study.

Purpose: To demonstrate that a pharmacist-managed reconciliation process provides increased satisfaction, improved quality measures, and saved resources compared to previous methods used at MGHP.

Methods: Using forms created by MGHP's parent company, Trinity Health, medication reconciliation was performed by nurses; subsequently, pharmacists carried out reconciliation using the same forms. Four specific outcomes were analyzed: fiscal stewardship, infiltration, quality, and satisfaction. Fiscal stewardship data was collected by direct observation of form completion time and related salary expenses from both nurses and pharmacists. Infiltration was defined as comparing percentage of forms completed to total number of patients on the nursing floor. A committee was formed to review pharmacist-run forms and collate related data to examine quality of the new process. Satisfaction was measured by a survey distributed to hospital physicians. This initial survey contained questions pertaining to medication reconciliation and required an overall quality rating of the process done by nursing staff. This same survey will be repeated with questions pertaining to the process done by pharmacists.

Results and Conclusions: Final analyses will be presented at the conference.

Learning Objectives:

Identify obstacles in implementing an effective medication reconciliation process in a community hospital

Explain why an effective medication reconciliation process is an integral part of patient safety in healthcare.

Self Assessment Questions:

Name five common obstacles encountered in establishing a medication reconciliation process.

True or False: Patients are at highest risk for medication errors during transitions in medical care.

MEASURING OUTCOMES OF RECOMBINANT FACTOR VIIA UTILIZATION IN WARFARIN-INDUCED INTRACRANIAL HEMORRHAGE.

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Purpose

Recombinant Factor VIIa (rFVIIa) is a human coagulation factor intended to promote hemostasis by activating the extrinsic pathway of the coagulation cascade, and therefore carries a risk of thrombosis, particularly in patients with existing risk factors. Many case reports have examined the use of rFVIIa in patients with excessive or life-threatening blood loss occurring in an array of clinical settings. Despite increased use, rFVIIa currently does not have FDA label indication for intracranial hemorrhage or warfarin-associated intracranial hemorrhage, and no controlled clinical trials have been completed. The goal of this research is to determine the effectiveness and safety of rFVIIa in patients with warfarin-induced intracranial hemorrhage.

Methods

A literature review was completed to evaluate the current evidence for use of rFVIIa in intracranial hemorrhage with anticoagulation. The first phase of research included a random, retrospective chart review of 50 patients from September 2006 through September 2007 to determine the utilization, indication, and outcomes generated with use of rFVIIa. The second phase collected data from all patients with a primary diagnosis of intracranial hemorrhage with anticoagulation. Outcomes including length of stay, laboratory values, adverse events, cost of hospitalization, and discharge disposition will be analyzed to determine if a difference exists between conventional therapy and treatment with rFVIIa.

Results

Data collection is in process. Results from the study will be presented at the conference.

Conclusion

rFVIIa is utilized for various indications; however, the evidence for use in intracranial hemorrhage with anticoagulation is limited. Determining whether an adverse event is attributable to the underlying condition or the medication therapy is difficult based on high patient acuity and extraneous factors including comorbidities. Results of this study will contribute to evidence-based literature and improve therapeutic selection for treatment of intracranial hemorrhage with anticoagulation.

Learning Objectives:

Review the literature pertaining to off-label utilization of rFVIIa.
Identify adverse events associated with rFVIIa treatment.

Self Assessment Questions:

Standard medical therapy for intracranial hemorrhage with anticoagulation includes:

- (a) Vitamin K
- (b) Fresh Frozen Plasma
- (c) rFVIIa
- (d) (a) and (b)
- (e) All of the above

Which of the following is not a factor included in calculating a Charlson Comorbidity Index

- (a) Age
- (b) Gender
- (c) Previous Myocardial Infarction
- (d) Renal Impairment

CLINICAL AND MICROBIOLOGICAL OUTCOMES IN PATIENTS TREATED WITH LINEZOLID OR VANCOMYCIN FOR METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) PNEUMONIA

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BACKGROUND:

Healthcare-associated infections are a significant cause of morbidity and mortality among hospitalized patients. According to data from the National Nosocomial Infection Surveillance (NNIS) System, *Staphylococcus aureus* (*S. aureus*) is the most common cause of nosocomial pneumonia. Among *S. aureus* isolates, the rate of methicillin-resistant *S. aureus* (MRSA) is increasing. In 2004, the NNIS System estimated the incidence of MRSA among ICU patients to be nearly 60%.

Vancomycin and linezolid are the only FDA approved agents for the treatment of MRSA pneumonia. Traditionally, vancomycin has been the gold standard of therapy until linezolid was introduced to the market in 2000. Very few comparative trials of these agents have been conducted to evaluate clinical outcomes. Additionally, current studies available have used standard doses of vancomycin that often result in subtherapeutic levels. This makes it difficult to determine if one antibiotic is preferable to the other.

PURPOSE:

The objective of this study is to evaluate microbiologic and clinical outcomes of patients treated with linezolid or vancomycin (target trough of 15-20 mcg/mL) for the treatment of MRSA pneumonia.

METHODS:

This study is a retrospective chart review of patients who received either vancomycin or linezolid for the treatment of documented healthcare-associated MRSA pneumonia between February 2006 and August 2007. Patients were excluded from the study if they were less than 18 years old, had polymicrobial infections, or multiple sites of infection prior to the positive MRSA culture. Each linezolid patient was then matched to a vancomycin patient based on level of care (ICU vs. medical floor), APACHE II score (if in the ICU), and age (+/- five years).

Data collection included: patient demographics, antibiotic use during admission, culture results, CBC, radiologic findings, and progress note documentation to determine clinical outcome.

RESULTS/CONCLUSIONS:

Data collection in progress. Results to be presented at the conference.

Learning Objectives:

Describe the mechanism of how *Staphylococcus aureus* isolates develop resistance to methicillin.

Describe current treatment options available and appropriate dosing strategies to treat healthcare associated MRSA pneumonia.

Self Assessment Questions:

True or False. The mechanism of vancomycin resistance is related to the ability of *S. aureus* to develop efflux pumps to prevent vancomycin from reaching its target.

What agents are currently FDA approved to treat healthcare associated MRSA pneumonia infections?

- a. Tigecycline and Vancomycin
- b. Vancomycin and Linezolid
- c. Linezolid and Synercid
- d. Bactrim and Vancomycin

HOSPITALIZATION AND MEDICATION COMPLIANCE ASSOCIATED WITH THE USE OF LONG-ACTING RISPERIDONE INJECTION FOR THE TREATMENT OF SCHIZOPHRENIA AND SCHIZOAFFECTIVE DISORDER IN A VETERAN POPULATION

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Background:

Medication noncompliance is a significant challenge in the treatment of schizophrenia, contributing to exacerbations of psychotic symptoms, relapse, and rehospitalizations. Long-acting risperidone injection is the only atypical antipsychotic available in a depot formulation FDA-approved for the treatment of schizophrenia or schizoaffective disorder. The active drug is contained in extended-release microspheres suspended in an aqueous solution that is administered as an intramuscular injection biweekly. A previous study conducted in a veteran population determined that psychiatric-related hospitalizations decreased from 75% to 42% after injection initiation. Length of stay and medication compliance significantly improved.

Purpose:

The purpose of this retrospective review is to determine whether use of long-acting risperidone injection improves compliance and reduces the number and length of psychiatric-related hospitalizations in patients with schizophrenia or schizoaffective disorder.

Methods:

This study will be a retrospective, electronic chart review of patients 18 years and older with schizophrenia or schizoaffective disorder who were initiated on long-acting risperidone injection between December 1, 2003 and November 30, 2006. Patients will be followed for 9 months pre- and post-initiation of the injection. Patients enrolled in an open study of the injection and those who were not permanent residents of Chicago will be excluded. The following data will be collected: demographics; all antipsychotic(s) used immediately prior to hospitalization, injection initiation, and concurrently; reason(s) for initiating and discontinuing the injection; strength, duration, number of injections, and any adverse reactions; number of psychiatric-related hospitalizations 9 months pre- and post-initiation of the injection; length of stay; and cost of medications. Primary endpoints will be the change in the number of hospitalizations, average length of stay, and medication compliance. Secondary endpoints will include adverse effects associated with the injection, reasons for discontinuing the injection, and cost comparisons between the injection and oral antipsychotic(s) used.

Results/Conclusions:

Data collection and analysis are ongoing.

Learning Objectives:

Describe potential advantages and disadvantages of using long-acting risperidone injection compared to oral antipsychotics.

Identify patients who would benefit from conversion to the injection.

Self Assessment Questions:

True or False: Risperidone is the only atypical antipsychotic available in a depot formulation.

True or False: Oral antipsychotics must be continued for the first week of therapy with the injection.

STABILITY OF MOXIFLOXACIN IN AN EXTEMPORANEOUSLY COMPOUNDED ORAL LIQUID

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Purpose: Moxifloxacin is a synthetic, broad-spectrum fluoroquinolone antimicrobial agent. It has in vitro activity against gram-positive and gram-negative organisms, as well as atypical organisms and anaerobes. Moxifloxacin is currently available as an intravenous formulation, tablets, for oral administration and as a 0.5% ophthalmic solution. It is not currently available in an oral liquid dosage form. Since moxifloxacin is able to provide good tissue penetration, offers once-daily administration schedule and is generally well-tolerated, a liquid formulation would be beneficial for both pediatric and adult patients who are unable to swallow tablets or who receive medication by a nasogastric or gastrostomy tube. A liquid dosage form would also provide an easy and accurate way to measure and administer a specific weight-based dose for pediatric patients. The objectives of this study are to prepare sugar-containing and sugar-free moxifloxacin suspensions from commercially available tablets and determine the stability of the formulation over a 90-day period.

Methods: Moxifloxacin sugar-containing suspension will be prepared from commercially available 400-mg moxifloxacin tablets, Ora-Plus and Ora-Sweet. The sugar-free suspension will be prepared by substituting Ora-Sweet with Ora-Sweet SF. Three 60-mL samples of both the sugar-containing and sugar-free suspensions will be prepared and stored at room temperature in amber, plastic prescription bottles. A 1-mL sample will be withdrawn from each of the six bottles immediately after preparation and at 7, 14, 30, 60 and 90 days and assayed by stability-indicating high-performance liquid chromatography. Data to be collected includes the concentration of moxifloxacin at days 0, 7, 14, 30, 60 and 90 for the sugar-containing and sugar-free formulations as well as pH and taste. Stability of moxifloxacin is defined as maintenance of greater than or equal to 90 percent of the initial concentration.

Results: Results and conclusions will be presented at the conference.

Learning Objectives:

Discuss the indications, mechanism of action and available dosage forms of moxifloxacin.

Review the procedure in determining the stability of moxifloxacin oral suspension.

Self Assessment Questions:

An oral suspension of moxifloxacin will provide benefit against respiratory tract infections caused by *Pseudomonas* sp. T or F
An extemporaneously compounded oral liquid of moxifloxacin is stable for 90 days in both sugar-containing and sugar-free vehicles. T or F

**NOCTURNAL LEG CRAMPS IN THE ELDERLY:
RANDOMIZED CONTROLLED TRIAL OF
ERGOCALCIFEROL (VITAMIN D2) FOR A PAINFUL AND
DISTRESSING PROBLEM**

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Purpose:

Approximately 30% of persons over 50, and 50% of those over 80, have nocturnal leg cramps (NLC) for which there is no FDA approved treatment. The fact that vitamin D deficiency is associated with muscle weakness, limb pain, hypocalcemia and tetany, the presence of vitamin D receptors on skeletal muscle, and that some drugs that cause only mild hypocalcemia trigger leg cramps indicate a possible relationship between vitamin D levels and NLC. In the PIs clinical practice at the VA, over 80% of patients have suboptimal vitamin D levels. The primary objective of this study is to determine if treatment with oral ergocalciferol 50,000 units once daily for 10 days, followed by once weekly for 7 weeks will result in fewer and less severe cramps than placebo.

Methods:

This study was approved by the UW-Madison and William S. Middleton VA Hospital IRBs. Seventy patients over the age of 50 years that experience NLC will be enrolled. All patients who have been on quinine in the past were mailed a flyer advertising the trial. Additionally, if these patients had an appointment at the VA, they were offered a flyer by their provider. Patients who meet inclusion criteria will be randomized to receive either placebo or vitamin D 50,000 units to be taken daily for 10 days followed by once weekly for 7 weeks. Patients will be contacted by phone a total of six times and will have serum 25-OHD and calcium levels checked prior to the study, during, and upon completion. Students unpaired t-test will be used to compare the number of cramps per week for the treated group compared to the control group, $\alpha=0.05$, $\beta=0.8$, two sided test.

Results/Conclusion: Data collection is in process and will be presented.

Learning Objectives:

Define the prevalence of vitamin D deficiency in patients who have nocturnal leg cramps.

Determine if treatment with prescription strength vitamin D reduces the incidence and severity of nocturnal leg cramps.

Self Assessment Questions:

There is a possible correlation between low levels of vitamin D and NLC. T/F

Repletion of vitamin D may lessen the burden of nocturnal leg cramps. T/F

**THE EFFICACY AND SAFETY OF VARENICLINE IN THE
VETERAN AFFAIRS POPULATION**

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Purpose: Varenicline is currently a second or third line agent among the Veteran Affairs (VA) population for smoking cessation. Criteria for use states that each patient must fail nicotine patches and/or bupropion, or have a contraindication for bupropion before varenicline is approved. Studies proving efficacy and safety have thus far been studied in a healthy younger to middle age population. The objective of this study is to determine the efficacy and safety of varenicline in the VA population.

Methods: The study group will be obtained from a pharmacy report of varenicline prescriptions and will include subjects from three VA facilities in Ohio. A prospective study will be conducted via a patient survey that will be mailed with a stamped addressed return envelope. A follow up telephone survey will be conducted for patients who do not respond to the mailed survey. An estimated 100 subjects will be included in this descriptive study. Inclusion criteria include any VA patient greater than age 18 that has had a prescription filled for varenicline prior to October 8, 2007. Patients had to have failed nicotine patches and/or bupropion. Exclusion criteria include patients who have not previously tried the nicotine patch or bupropion. Patients who do not return a survey or refused a telephone survey will also be excluded. Patient charts will be retrospectively reviewed for patient's age, concomitant drugs Nortriptyline or Clonidine and concomitant disease states such as liver disease including cirrhosis, hepatitis, or fatty liver, impaired kidney function, diabetes, coronary artery disease, chronic obstructive pulmonary disease, asthma, hypertension, cancer, depression, and body mass index. The primary outcome is quit rate at 12 weeks. The secondary outcomes are: the time to quit, relapse rates, and side effects.

Results/Conclusion: Pending

Learning Objectives:

Determine efficacy of varenicline.

Determine safety of varenicline.

Self Assessment Questions:

What is the mechanism of action of varenicline?

What are common side effects of varenicline?

MEDICATION COUNSELING OF HOSPITALIZED PATIENTS

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Background: The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey is a nationally standardized survey to measure patients' perspective on healthcare. Developed by The Centers for Medicare & Medicaid Services and the Agency for Healthcare Research and Quality, it allows the community to compare ratings among hospitals. This survey has two questions pertaining to patient communication about medications. "Before giving you any new medicine, how often did hospital staff tell you what the medicine was for," and "before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?" Results from October 2006 through June 2007 at Evanston Northwestern Healthcare show that 71% of patients reported that hospital staff always told them what their new medications were for and 37% of patients reported that hospital staff always described possible side effects in a way they could understand.

Purpose: To expand the current inpatient pharmacist medication counseling program with the goal of improving satisfaction ratings.

Methods: Patients age >18 years admitted to the general medicine and general medicine with oncology floor after January 2nd, 2008 will be included. Pharmacists will counsel patients that are started on a medication that they were not taking at any time prior to their current admission. Counseling will include the indication and common side effects of the medication plus written information. After discharge, patients at random will be surveyed by an outside vendor that includes HCAHPS questions. Data analysis for this project will compare the results of the HCAHPS questions pertaining to medication communication for those patients that were counseled by a pharmacist to those patients that received standard care.

Results/Conclusion: The results and conclusion of this project will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain the benefit of pharmacist provided patient education in the hospital setting.

Describe the challenges of starting a new program in a hospital setting.

Self Assessment Questions:

True/False: The ASHP 2015 Goals state that 50% of recently hospitalized patients (or their caregivers) will recall speaking with a pharmacist while in the hospital.

True/False: HCAHPS is one of several nationally standardized, publicly reported, hospital surveys?

VALIDATION OF THE SPNS ADHERENCE TOOL IN HIV/AIDS PATIENTS

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The objective of this study is to determine if the SPNS index based adherence tool, or one of the three weighted questions is a predictor of adherence as determined by improvement or maintenance of the surrogate marker, viral load, and if there is a correlation between scores of > 10 and an undetectable viral load as defined as a viral load less than 400 copies/ml and a viral load less than 50 copies/ml. This study is a retrospective chart review of corresponding CD4 counts and viral loads in 100 patients visiting an inner city HIV clinic from January 1, 2007 until September 30, 2007. Data will be obtained from an internal data base at the clinic and information from patients seen within the specified time period will be used. Adherence will be measured using a three question survey with each answer correlating to a number, to determine good or poor adherence. After the data is collected it will be run against the patients' viral load to see if the SPNS index based adherence tool, or one of the three weighted questions is a predictor of adherence as determined by improvement or maintenance of the surrogate marker, viral load. Our preliminary results do show a significant correlation between a SPNS score of greater than 10 and a viral load of less than 200 copies ($p=0.001$). Other variables will be looked at for other correlations. Overall it appears that the SPNS adherence survey does correlate to a lower viral load in our patient population. More specific patient data will be presented along with the individual breakdown to see if any one specific question correlates with a low viral load.

Learning Objectives:

Explain the importance of adherence in the HIV population

Discuss the pros and cons of measuring adherence using different methods (i.e. pill counts, pharmacy refills, MEMS caps)

Self Assessment Questions:

Was the speaker clear in explaining the importance of adherence in the HIV population

Was the information discussed in a manner that was easy for the audience to comprehend

EVALUATION OF PATIENTS PREVIOUS EDUCATION AND ASSESSMENT OF INHALER TECHNIQUE IN AN ADULT INDIGENT POPULATION WITH ASTHMA OR COPD

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Purpose: The National Asthma Education and Prevention Program concluded that pharmacist educational interventions may improve self-management of asthma and merits more clinical research. The objectives of this study are: (1) Determine if patients recall being taught how to use their metered dose inhaler (MDI) and/or dry powder inhaler (DPI) and if so by whom and method used. (2) Determine if patients are correctly using their inhaler(s) and which steps are incorrect.

Methods: The study will be conducted at 5 federally qualified health centers. Patients >18 years old diagnosed with COPD or asthma who use a MDI/DPI are eligible. Patients who do not speak Spanish or English will be excluded. Contact authorization forms will be placed in the charts of eligible patients and patients will be asked to participate during their regularly scheduled clinic visit. Those interested will be scheduled for a research appointment. At that visit, an orally administered survey will evaluate whether patients were taught how to use a MDI/DPI, who taught them, and by what teaching method. The patient will also be asked to demonstrate MDI/DPI inhaler technique and will be evaluated using the 7 steps from the Guidelines for the Diagnosis and Management of Asthma and the Micromedex Care Notes System, respectively. The investigator will evaluate technique, and if incorrect, improper steps will be documented and accurate technique will be demonstrated by the investigator as needed. Patients will be reassessed until all steps are correct with a demonstration inhaler. All patients will receive a handout in their preferred language showing proper inhaler steps.

Preliminary Results: Data collection begins in February evaluating: number of patients previously educated, by whom, and method(s) used; and number of patients incorrectly using their MDI/DPI and steps incorrectly demonstrated.

Conclusion: Results will determine the need for developing a more standardized education program.

Learning Objectives:

Understand the importance of inhaler education and appropriate inhaler technique.

Demonstrate the steps to the appropriate use of a MDI and DPI.

Self Assessment Questions:

True/False: There is not an inhaler available to prevent the decline of lung function in patients with COPD.

True/False: Patients should hold their breath for a minimum of 15 seconds after inhalation of medication.

ERYTHROPOIESIS STIMULATING AGENTS ONCOLOGY NATIONAL PRACTICE GUIDELINES: CLINICAL COMPLIANCE ASSESSMENT AND PHARMACOECONOMIC ANALYSIS

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Purpose: The primary use of erythropoiesis stimulating agents (ESAs) in oncology populations is to decrease blood transfusions in patients with chemotherapy induced anemia, anemia related to myelodysplastic syndrome (MDS), and anemia of chronic disease. FDA has raised concerns with the safety of ESAs due to recent clinical trial findings. Safety concerns with ESA use included: increased risk of thrombosis, cardiovascular events, tumor progression, and reduced survival. Based on the recent clinical trials, the Center for Medicare/Medicaid Services (CMS) developed a new national coverage determination (NCD) document that states appropriate ESA use. The purpose of this project is to assess and evaluate the ESA usage at Aurora Health Care and determine if the usage is within the new oncology national practice guidelines.

Methods: Perform ESA literature review of efficacy and safety to aid in evaluation of the use of ESAs at Aurora Health Care System. Educate physicians, nurses, pharmacist and other health care professionals in guideline changes. Determine current compliance to the CMS NCD document by a retrospective review of inpatient oncology areas and system wide Vince Lombardi Cancer Clinics. Develop and implement a physician pre-printed order, monitoring form, and other interventions deemed necessary. Perform subsequent retrospective reviews for comparisons to previous data collected. Determine common misuses of ESAs and develop plans to aid in appropriate usage. Evaluate concomitant data of blood transfusions in relation to changes in ESA use. Execute pharmacoeconomic analysis and review of economic impact of ESA usage within the Aurora Health Care system.

Results/Conclusions: Data collection is in progress; results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Recognize the risks associated with ESAs and describe appropriate usage.

Understand the CMS national coverage decision and the implications that these decisions have on an institution.

Self Assessment Questions:

True/False: Erythropoiesis stimulating agents are associated with an increase risk of thrombosis, cardiovascular events, tumor progression, and reduced survival.

True/False: The CMS NCD document states that ESA initiation is only reasonable and necessary if the patients hemoglobin is < 10g/dl (or hematocrit is < 30%).

EVALUATION OF NARCOTIC UTILIZATION AND PAIN MANAGEMENT OUTCOMES WITH LOCAL ANESTHETIC PUMP (ON-Q) POST-THORACOTOMY

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Background: Thoracotomy is a painful surgical procedure and inadequate pain control leads to an increased length of stay and morbidity. Opioids such as morphine are currently considered the standard of care for the management of post-operative pain. Large doses of opioids are frequently needed to control the pain from this procedure. High doses of opioids can cause adverse effects such as pruritus, nausea, vomiting, constipation, ileus and respiratory depression. These events can limit the amount of opioids that can be given, ultimately leading to inadequate pain control. Subsequently, ambulation, extubation and other recovery parameters may be delayed. An alternative to frequent and/or high dose opioid therapy is the On-Q pain pump, an elastomeric, external device that delivers a continuous infusion of local anesthetic (bupivacaine or ropivacaine) directly into the patients surgical site for non-narcotic post-operative pain relief.

Objective: The purpose of this review is to assess the effectiveness of On-Q pain pumps at decreasing post-operative pain, decreasing concomitant narcotic utilization and improving timely rehabilitation.

Methods: An institutional review board approved, retrospective case matched review of post-thoracotomy patients treated with On-Q pain pump or opioid pain medications will be conducted. Eligible patients are those who underwent a thoracotomy at The Ohio State University Medical Center between November 1, 2005 and June 30, 2008. Prisoners, pregnant females, patients <18 or >89 years of age will be excluded. Patients treated with On-Q pumps will be retrospectively case matched with patients who were managed without On-Q pumps post-thoracotomy by age, weight, sex, serum creatinine, liver function, pulmonary function and surgeon. The primary outcomes of this study will be narcotic utilization and pain scores post thoracotomy. Secondary outcomes will include time to extubation, ambulation, foley removal, first bowel sound, oral diet as well as pulmonary function post extubation, adverse events, length of stay and mortality.

Learning Objectives:

Review the adverse events associated with high dose/frequent opioid use.

Explain the On-Q pain pump technology, how it works, what surgical procedures it has been successfully used in and its advantages in pain control.

Self Assessment Questions:

Common adverse events associated with high dose opioid pain medication include all of the following except:

- a. Nausea and vomiting
- b. Pruritus
- c. Respiratory depression
- d. Diarrhea
- e. Urinary retention

True or False: The On-Q pain pump provides a continuous infusion of local anesthetic directly into the patients surgical site for post-operative pain relief for up to five days.

MEASURING MEDICATION SAFETY WITH SMART INFUSION PUMPS

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Statement of Purpose: The objective of this study is to use pooled continuous quality improvement logs (CQI)/performance enhancement reports generated from smart infusion pumps as a tool to study intravenous medication infusion errors. To resolve disparities between I.V. infusion medication decision support and alerts that are provided, we will summarize user responses and variances between the medication rules set and programmed values to provide data regarding 1) drug library demographics 2) frequency and nature of I.V. infusion soft alerts, and 3) most common medications involved.

Statement of Methods Used: Institutional Review Board (IRB) approval has been obtained from The Ohio State University, Office of Responsible Research Practices. Performance enhancement reports (CQI logs) from four volunteer hospital/health systems will be provided by the pump manufacturer. To be included in this study, the drug libraries at each of these institutions had to be extensive (having 30 or more drugs in the library with established soft or hard limits). Institutions must also have had complete implementation of smart pump technology with active drug library (decision support) for at least six months. The rate of potential adverse drug events intercepted using smart pumps will be calculated by dividing the number of programming alerts by the total number of programming opportunities.

Summary of Results to Support Conclusion: Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the variability in health-system drug libraries.

Identify which medications produce the greatest number of soft alerts.

Self Assessment Questions:

Smart IV infusion pumps drug libraries have standardized care areas (i.e., critical care, med/surg, pediatrics).

Once an institution creates a drug library, it does not need monitored or updated.

EVALUATION OF ANTI-FACTOR Xa ACTIVITY OF PROPHYLACTIC DALTEPARIN IN CRITICALLY ILL AND NON-CRITICALLY ILL TRAUMA PATIENTS: THE EXPLICIT-PILOT TRIAL

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Venous thromboembolism (VTE) is a serious complication of trauma and critical illness. Low molecular weight heparins (LMWH) are standard of care for VTE in high-risk trauma patients. Preliminary information regarding the pharmacokinetics and pharmacodynamics of LMWH in critically ill patients suggests alterations that may have important patient outcome implications. We hypothesize that trough anti-factor Xa concentrations are more often less than or equal to 0.05 units/mL in critically ill compared to non-critically ill trauma patients.

Critically ill patients (n=20) will be in the Surgical/Trauma Intensive Care Unit under the care of a critical care board-certified physician and have an Injury Severity Score (ISS) greater than 15. Non-critically ill patients (n=5) will be on general surgical floors and have an ISS greater than or equal to 10. Following the third dose of dalteparin, anti-factor Xa concentrations will be drawn at 12 and 24 hours post dose. In the critically ill group, if the anti-factor Xa concentration is less than or equal to 0.05 units/mL at 12 hours dalteparin will be changed to 5,000 units every 12 hours; if the concentration is greater than 0.05 units/mL at 12 hours, but less than or equal to 0.05 units/mL at 24 hours, then dalteparin will be changed to 7500 units daily. No dose changes will occur in the non-critically ill group. After dose changes, patients will have a final anti-factor Xa concentration drawn prior to the fourth dose of the new dalteparin regimen. The primary outcome is the proportion of critically ill to non-critically ill patients with pre-dose steady-state anti-factor Xa concentrations less than 0.05 units/mL. Secondary outcomes include comparisons of (1) intra-patient (paired) changes in pre-dose steady-state anti-factor Xa concentrations following the prophylactic dosage regimen adjustment in critically ill patients, (2) incidence of in-hospital VTE, and (3) in-hospital bleeding.

Learning Objectives:

Stratify trauma patients into high or low risk for VTE.
Discuss utility of anti-factor Xa in a trauma patient population.

Self Assessment Questions:

Above which RAP score threshold is a trauma patient defined to be at high risk for VTE:

- a. > 2
- b. > 5
- c. > 7
- d. > 10

True or False: All trauma patients should receive LMWH for VTE prophylaxis as soon as it is safe to do so.

IMPROVEMENT OF PHENYTOIN USAGE AND MONITORING IN THE HOSPITAL SETTING WITH THE INTERVENTION OF A PHARMACY DOSING SERVICE

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Purpose

Evidence-based approach to phenytoin empiric dose selection, concentration monitoring, and dose adjustment through development and implementation of a phenytoin dosing service.

Methods

Initially a medication use evaluation was prospectively performed in patients admitted to Sparrow Hospital from October 2007 to January 2008 who received either phenytoin or fosphenytoin. Criteria for data collection included: empiric dosing, dose adjustment, adverse events, seizure rates, primary indication for admission, length of stay, demographics, and appropriate monitoring relative to admission, seizure, and changes in daily dose, interacting medications, and organ system function. Recommendations for improvement of substandard criteria include developing a phenytoin dosing service and establishing standardized administration times of phenytoin. A phenytoin dosing policy will be developed. Patients will be monitored using the policy and data will be collected and compared to the original criteria data to quantitatively measure benefit. A seminar will also be presented to pharmacy staff detailing the findings of the medication use evaluation, a review of current literature of appropriate phenytoin use, and an overview of the phenytoin-dosing program.

Summary

Data from the medication use evaluation of 50 patients shows: 27% adherence to weight-based maintenance dosing, 34% adherence to a time of 3 days or greater between phenytoin concentrations, 70% adherence to phenytoin concentrations drawn greater than 8 hours post-dose, 83% adherence to an albumin concentration either within 7 days before or within 1 day after phenytoin concentrations, and 62% adherence to appropriate dose adjustment based on adjusted phenytoin concentrations. The phenytoin dosing policy has been developed and patient enrollment in the second phase of the study will soon begin.

Conclusions

Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe pharmacokinetic issues that need to be addressed when practicing evidence-based phenytoin dosing.
List effective interventions pharmacists can make with a phenytoin-dosing program.

Self Assessment Questions:

True or False. Phenytoin concentrations should be adjusted with other parameters such as albumin, renal function, and concurrent valproic acid to provide more accurate assessment.
True or False. Empiric phenytoin dosing in obese patients should be based on total body weight.

IMPROVING MANAGEMENT OF HYPERTENSION IN PATIENTS INFECTED WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV): AN OUTPATIENT STUDY

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Background: The advent of intensive highly active antiretroviral therapy (HAART) has proven to effectively control disease progression and extend survival in HIV-infected patients. In addition to an improved life expectancy, there has been an increase in the incidence of middle-aged adults diagnosed with HIV-infection. With more HIV-infected patients living into their sixties, early diagnosis and treatment of co-morbid conditions is essential to improving patient outcomes. The HIV outpatient clinic at University of Louisville HealthCare (ULH) serves as a primary care clinic for HIV-infected patients and currently does not have an established protocol to assist healthcare providers in hypertension management.

Purpose: To improve hypertension management in the HIV outpatient population, through multidisciplinary education and implementation of a hypertension management protocol.

Methodology: A retrospective chart review was conducted on 50 randomly selected HIV clinic patients identified by ICD-9 code as hypertensive between 2005 to 2007. Each chart was evaluated for hypertension control and appropriateness of therapy based on guidelines developed by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure and the Management of Chronic Kidney Disease in HIV-Infected Patients: Recommendations of the HIV Medicine Association of the Infectious Diseases Society of America. Data from the primary retrospective analysis was incorporated into an educational session outlining current treatment guidelines and presented to HIV providers. To evaluate the effectiveness of the education a pre-test and post-test was completed by the attendees. A hypertension protocol was designed and distributed to HIV providers to assist in designing optimal therapeutic regimens.

Preliminary Results: Results from the initial retrospective chart review revealed that 36% of HIV clinic patients demonstrated uncontrolled hypertension. Of the 64% of patients with controlled hypertension, only 44% of those were receiving optimal medication therapy.

Conclusion: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify therapeutic goals for hypertensive patients as established by JNC7 and IDSA guidelines.

Review the JNC7 algorithm for treatment of hypertension.

Self Assessment Questions:

True or False: When designing a medication regimen two or more antihypertensive agents may be initiated when SBP > 20 mmHg or DBP > 10 mmHg above goal.

True or False: The AASK trial was the first study to show ACE inhibitors have a renoprotective effect in African-Americans.

SURVEY OF INTERVIEWING TECHNIQUES USED TO EVALUATE POTENTIAL RESIDENCY CANDIDATES

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Purpose: The purpose of this study was to determine if there is a standard on the structure and content of pharmacy residency interviews.

Methods: A self-administered, web-based survey containing 37 questions was emailed to all PGY1 pharmacy residency program directors listed in the American Society of Health-Systems Pharmacists residency database (n=534).

Results: A total of 276 responses were received (52%). The majority of respondents represented community hospitals or academic institutions with greater than 400 beds. Nearly all programs require candidates to submit a curriculum vitae, academic transcript, letter of intent, and letter(s) of recommendation. Over 50% of programs contact references provided by the candidate. Most programs only invite one or two candidates on each interview day. If multiple candidates are invited, they are typically together for a general program overview, tour of the facility, and meals. Over 75% of programs indicated that they ask questions on experiences, time management, leadership, interpersonal communication, and extracurricular activities. Approximately 50% of programs ask applicants to answer clinical questions during the interview and 30% require candidates to give a presentation, most of which are formal and last 15-29 minutes. The majority of programs use a rating or scoring sheet to evaluate candidates after the interview and 45% of respondents indicated that the same interviewers are used for each candidate to ensure that candidates are objectively evaluated.

Conclusions: The majority of pharmacy residency programs have similar standards for their application process, interview structure, basic interview questions, and candidate evaluation. However, the content of residency interviews was variable with regards to clinical evaluation and presentation requirements.

Learning Objectives:

Discuss similarities in the structure and content of PGY1 pharmacy residency interviews.

Identify the different interviewing techniques utilized by PGY1 pharmacy residency programs.

Self Assessment Questions:

Which of the following do most residency programs require prior to the interview process?

- a. Curriculum vitae
- b. Academic transcript
- c. Letter(s) of recommendation
- d. All of the above

Most residency programs require formal 15-29 minute presentations.

- a. True
- b. False

ASSESSMENT OF PRESCRIBER ANTIBIOTIC COMPLIANCE WITH THE INFECTIOUS DISEASES SOCIETY OF AMERICA (IDSA) NEUTROPENIC FEVER GUIDELINES IN A COMMUNITY BASED TEACHING HOSPITAL (THE PACING INVESTIGATION)

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Purpose:

Febrile neutropenia is a major risk factor for the development of infections in immunocompromised patients. Severe and prolonged neutropenia increases the risk for infection and once an infection develops, significant morbidity and mortality may ensue. The IDSA developed guidelines to aid in the diagnosis and treatment of individuals at risk for febrile neutropenia. The purpose of this study is to assess the extent to which prescribers at our institution comply with the IDSA guidelines.

Objectives:

The primary objective is assessment of guideline compliance with the initial antibiotic therapy use/duration. Secondary objectives include assessment of compliance with vancomycin, antifungal, and colony-stimulating factor use/duration.

Methods:

Prior to commencement, this study will be submitted to the Institutional Review Board for approval. Hospitalized patients treated for febrile neutropenia from 7/1/07- 12/31/07 will be included. Potential subjects will be identified by a daily quality assurance report of all inpatients with hematological lab values outside the standard range. In addition, pharmacy clinical coordinators will log all patients treated with antibiotics for documented febrile neutropenia. Patients younger than 18 years of age will be excluded. The following data will be collected: patient demographics, co-morbidities (e.g. chronic obstructive pulmonary disease, diabetes, and active cancer), chemotherapy regimen(s), vital signs, absolute neutrophil count, duration of neutropenia, microbiology cultures, chest x-rays, antibiotic/antifungal use/duration, and colony-stimulating factor use/duration. The data obtained from patients identified as being treated for febrile neutropenia will be reviewed to rate compliance with the IDSA febrile neutropenia guidelines. Each patient's care will be rated as compliant with the IDSA guidelines or noncompliant. Provider documentation will be reviewed to determine if reasons for non-compliance with the IDSA guidelines were addressed.

Results/Conclusions:

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

Learning Objectives:

Describe the IDSA guidelines as it relates to the initial management of febrile neutropenic patients.

List appropriate indications for vancomycin, antifungal, and colony-stimulating factor use during febrile neutropenia.

Self Assessment Questions:

T/F: According to the IDSA, the single most important factor in determining successful discontinuation of antibiotics is resolution of fever.

If vancomycin use is indicated, which of the following regimens should not be used for the treatment of febrile neutropenia?

- a. Vancomycin and cefepime
- b. Vancomycin and gentamicin
- c. Vancomycin and imipenem
- d. Vancomycin and ceftazidime

EVALUATION OF A SINGLE-UNIT PILOT TO REDUCE MEDICATION RETURNS BY IMPLEMENTING DECENTRALIZED DISTRIBUTION WITH AN AUTOMATED DISPENSING CABINET

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Purpose: Riverside Methodist Hospital currently employs a hybrid distribution system. First doses are dispensed via automated dispensing cabinets or from the central pharmacy. An automated dispensing robot in the central pharmacy dispenses subsequent doses during a daily cart fill process. Current processes create a substantial volume of returned doses. Reloading and crediting returned doses burdens pharmacy labor and monopolizes the robot capabilities, thus impacting throughput and distribution of new doses. This project will include modifications and additions to a single units automated distribution cabinet in an attempt to reduce the return volume and identify advantages and disadvantages with this unit-based distribution model.

Method: Medication returns data was collected to identify an appropriate unit to pilot. Unit selection criteria included volume of returns, typical patient type and a narrow selection/variety of medications routinely administered. After selection of a unit, the returns data coupled with dispensing data was further evaluated to determine the most appropriate medication additions and deletions from the units automated dispensing cabinet. Following implementation, data will be collected to evaluate the quantity of returns to determine objective project results. Subjective nursing opinions will be measured using a survey of pharmacy services before and after the process change. Study results and outcomes will be used to analyze potential application and expansion of a decentralized distribution model.

Results/Conclusion: Results and conclusion to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To explain how medication returns effect the distribution process

To evaluate the impact of implementing a decentralized distribution model

Self Assessment Questions:

T/F According the ASHP survey a majority of health-systems pharmacies utilize a decentralized distribution model

T/F A decentralized model is appropriate for all hospital units.

AN EVALUATION OF EMPLOYERS PERCEPTIONS ON THE IMPORTANCE OF A TEACHING CERTIFICATE

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Purpose: Teaching opportunities present themselves on a regular basis to healthcare professionals such as pharmacists. Regardless of the type of teaching, it is beneficial for pharmacists to have some type of teaching foundation on which to build their teaching skills. Some residencies have developed teaching certificate programs to help fulfill this need. Although there are studies evaluating the perceptions of teaching certificates by residents, there is a lack of information on the perceptions of employers. It is unknown if college of pharmacy department chairs and experiential coordinators value these teaching certificate programs and what aspects they consider to be important.

Methods: A voluntary, anonymous, and confidential survey will be administered using commercially available survey software and will be distributed with a cover letter via electronic mail to all college of pharmacy department chairs and experiential coordinators. Contact information for college of pharmacy department chairs and experiential coordinators will be identified using their respective college of pharmacy websites. The survey consists of a brief demographic section and two sections evaluating the subjects' perceptions. One section consists of questions evaluating the perceptions of informal versus formal teaching training. The other section consists of questions identifying desirable skills and experiences when hiring pharmacy faculty or preceptors. The results from the survey will be used to develop a teaching certificate program for Henry Ford Hospital.

Results: Pending

Conclusion: Pending

Learning Objectives:

Describe the advantage of completing a teaching certificate program for a resident applying for an adjunct faculty/preceptor position.

List 3 components of a teaching certificate program.

Self Assessment Questions:

Pharmacists receive formal training in regards to their teaching skills. True or False

College of pharmacy department chairs value formal versus informal training in regards to teaching when hiring full-time faculty. True or False

PACLITAXEL PHARMACOGENOMIC AND PHARMACOKINETIC CORRELATIVE STUDY

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Purpose: Paclitaxel is an effective agent against a broad range of malignancies. Anti-tumor activity is attributed to paclitaxel interacting with tubulin microtubules and antagonizing disassembly with subsequent mitotic arrest. Studies have shown that paclitaxel is primarily metabolized via CYP450 enzymes 2C8 and 3A4 to inactive metabolites. Prior pharmacokinetic studies have documented inter-patient variability and potential unpredictable toxicity. Single-nucleotide polymorphism in the CYP450s has been attributed to variations in drug metabolism. A pharmacogenomic study of enzymes that metabolize paclitaxel along with a pharmacokinetic analysis would provide a better understanding of drug disposition.

Methods: Thirty patients were recruited to a Phase I clinical trial evaluating PTK787 in combination with paclitaxel. Pharmacokinetic data was available on all thirty patients with DNA for pharmacogenomic data available from eighteen patients. Of those 18, seven had DNA extracted from whole blood using a QIAmp DNA MiniKit (Qiagen, Valencia CA) and 11 were extracted from formalin fixed paraffin embedded tumor tissue using a RecoverAll Total Nucleic Acid Isolation Kit (Ambion, Austin TX). Genotyping was performed using real-time polymerase chain reaction with pre-designed TaqMan SNP Genotyping Assays for CYP2C8*2, 2C8*3, 2C8*4, 3A4*1B, 3A5*3 (Applied Biosystems, Foster City CA). Analysis of the production of paclitaxel metabolites (3OH-paclitaxel and 6OH-paclitaxel), will be correlated with CYP P450 genotypes.

Results/Conclusion: Data collection is ongoing, final results and conclusion will be presented at the conference.

Learning Objectives:

Describe the metabolism and elimination of paclitaxel.

Be able to discuss the rationale for evaluating single-nucleotide polymorphism in relation to drug disposition.

Self Assessment Questions:

Which cytochrome P450 enzymes are responsible for paclitaxel metabolism?

A. 2D6

B. 3C4

C. 2D6

Telomerase chain assays are utilized to replicate and extract patient deoxyribonucleic acid. T/F

A PILOT STUDY TO EVALUATE THE INCIDENCE OF INVOLUNTARY MOVEMENTS AMONG ELDERLY PATIENTS RECEIVING ATYPICAL ANTIPSYCHOTICS

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Purpose: Atypical and typical antipsychotics have been associated with numerous acute and chronic involuntary movement disorders called extrapyramidal symptoms (EPS). Tardive dyskinesia (TD) is one of the most serious EPS because it may be irreversible after drug cessation and there is no known treatment. Elderly patients receiving typical antipsychotics are at a significantly greater risk of developing TD compared to their younger counterparts. TD has been reported to manifest in 50% of older patients receiving typical antipsychotics and the incidence is lower with atypical antipsychotics. However, to date, there are no prospective trials examining the risk of movement disorders with atypical antipsychotics solely in the geriatric population. The purpose of this study is to evaluate the incidence of TD in elderly patients treated with atypical antipsychotics after 1, 3, 6 and 12 months of treatment.

Methodology: The study will be a prospective, open label trial that will include patients 65 years or older, initiated on an atypical antipsychotic for any disease state. Patients will be excluded if <65 years old, treated with Clozapine or diagnosed with one of the following: definitive TD, abnormal involuntary movements with no history of antipsychotic drug treatment, and/or neurological disorders. Demographic information, psychiatric diagnosis, antipsychotic prescribed, adverse effects, Abnormal Involuntary Movement (AIMS), Simpson-Angus (SAS), Barnes Akathisia (BAS) rating scale scores, anticholinergic administered and the manifestation of movement disorder will be collected. Chi square analysis will be used to assess the incidence of TD and the student t-test will be used to assess the mean change in SAS and BAS scores.

Results/Conclusion: Pending completion of data collection

Learning Objectives:

Describe the difference in typical vs. atypical antipsychotics and review the serious adverse effects of antipsychotic therapy
Summarize the literature that evaluates the incidence of tardive dyskinesia in the elderly population

Self Assessment Questions:

The extrapyramidal symptoms associated with the typical antipsychotics are caused by the drug being loosely bound to the dopamine (D2) receptor.

- a. True
- b. False

In addition to tardive dyskinesia, pseudoparkinsonism is another side effect commonly seen in the elderly patient receiving a typical antipsychotic.

- a. True
- b. False

USING THE BEERS CRITERIA TO ASSESS POTENTIALLY INAPPROPRIATE MEDICATION (PIM) PRESCRIBING IN HOSPITALIZED ELDERLY PATIENTS

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Purpose: Medications deemed potentially inappropriate according to the Beers Criteria for elderly patients (65 years) are regularly prescribed in hospitals. The Beers Criteria have increasingly become a measure of healthcare quality in elderly patients. The objective of this study is to assess prescribing frequency of Beers Criteria medications at a 500-bed community teaching hospital.

Methods: Prior to initiation, the study was submitted to the Institutional Review Board; an exemption was granted. Potentially inappropriate medications (PIMs) for elderly patients were selected from the most recently revised 2003 Beers Criteria. Only those agents considered inappropriate irrespective of diagnosis were assessed. Lastword Drug Class Audit tool was used to determine the most frequently prescribed PIMs at St. Josephs Hospital in Marshfield, Wisconsin. In this retrospective review, 209 randomly selected patients aged 65 years admitted to a general medicine or surgical recovery ward from April-September 2007 were included. Patients were excluded if the electronic medical record was incomplete, or if the patient was initially admitted to palliative care, oncology, or intensive care. Selected PIMs were evaluated for prescribing patterns and occurrence upon admission, during hospital stay, and at discharge. Demographic and clinical information collected include patient age, living arrangement prior to and after hospitalization, admitting service, and length of stay. Any potential correlation among data will be noted.

Conclusions: Data collection is in process to assess potentially inappropriate PIM prescribing. Results will be presented comparing PIMs prescribed prior to admission, PIMs continued upon admission, PIMs newly prescribed during hospital stay, and PIMs prescribed upon hospital discharge.

Learning Objectives:

Understand why the Beers Criteria have increasingly become a measure of healthcare quality in elderly patients.

Recognize how hospitalization may affect the number of PIMs prescribed to elderly patients at a 500-bed community teaching hospital.

Self Assessment Questions:

T or F: Beers Criteria medications are rarely prescribed to hospitalized elderly patients.

T or F: Health Plan Employer Data and Information Set (HEDIS) has used a selection of medications from the Beers Criteria to assess the quality of managed healthcare plans.

IMPACT OF INTENSIVE INTERVENTION ON GLYCEMIC CONTROL AND COMPLIANCE IN PATIENTS WITH DIABETES IN A PHARMACIST MANAGED CLINIC

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BACKGROUND:

Uncontrolled diabetes mellitus is associated with increased morbidity, mortality and healthcare costs. The American Diabetes Association guidelines recommend maintaining fasting blood glucose (BG) between 90-130 mg/dL, postprandial BG <180 mg/dL, and A1C < 7%. Strong evidence demonstrates that achieving these goals decreases the risk of microvascular and macrovascular complications as well as death.

At our institution, sixty-seven percent of patients managed in the Diabetes Clinic have not achieved glycemic control. Barriers to achieving BG control include poor clinic attendance and non-compliance with the following: self-monitoring BG, bringing log books to appointments, having blood-work completed prior to appointments and calling the pharmacist to report BG levels.

PURPOSE:

To evaluate pharmacist-based telephone interventions on BG control and patient compliance in a multi-disciplinary diabetes clinic

METHODS:

Approximately 20 patients will be identified and will serve as their own control. Patients will be retrospectively evaluated for 1 year according to standard care, which includes appointment confirmation calls by registration, diabetes education, and adjustments in insulin regimens during clinic visits. With standard care the patient is responsible for calling the pharmacist to report BG values when instructed. Patients will be prospectively evaluated for 1 year according to intensive intervention, which includes standard care plus calls to patients by a pharmacist to confirm appointments, and remind patients to bring log-books and have blood-work completed prior to appointments. Patients will be asked to call to report BG values one or two weeks following his/her appointment; however, a pharmacist will contact the patient if he/she fails to call the clinic more than 3 days after scheduled call date. Data will be evaluated for change in A1C, average pre-meal and post-meal BG values, measures of compliance and percent of patients achieving A1C goal.

RESULTS AND CONCLUSIONS:

Data collection is ongoing. Results will be presented at conference.

Learning Objectives:

Define the A1C, pre-prandial glucose and post-prandial glucose goals according to current diabetes guidelines and describe the complications associated with uncontrolled diabetes

Review literature demonstrating benefits of telephonic interventions by healthcare professionals

Self Assessment Questions:

Which of the following are benefits of tight glycemic control?

- A. Decreased risk of microvascular complications
- B. Decreased risk of macrovascular complications
- C. Decreased mortality
- D. Decreased health care costs
- E. All of the above

True or False: Telephonic interventions by healthcare professionals have demonstrated improved adherence to screening for complications and improved A1C testing rates.

AN EVALUATION OF OUTCOMES IN PATIENTS WITH CLINICAL ISOLATES OF LINEZOLID-RESISTANT VANCOMYCIN-RESISTANT ENTEROCOCCUS (LRVRE) POSSESSING THE G2576T MUTATION

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Background: Linezolid has become a common therapy for patients with vancomycin-resistant enterococcal (VRE) infections, leading to concerns over the development of linezolid-resistant vancomycin-resistant enterococci (LRVRE). Evaluations of susceptibility testing methods have demonstrated overreporting of linezolid resistance when phenotypic testing methods are employed. Because false reporting of linezolid resistance may negatively impact patient care, accurate detection of linezolid resistance is critical. A point mutation (G2576T) detectable by polymerase chain reaction (PCR) allows for reliable identification of linezolid resistance. We hypothesize that clinical outcomes in patients with LRVRE isolates (as defined by the presence of the G2576T mutation on PCR) will differ from those with linezolid-susceptible VRE (LSVRE) isolates.

Methods: This retrospective case-control study evaluates the impact of linezolid resistance in patients with VRE clinical isolates. Patients with PCR-confirmed LRVRE isolates prior to January 2008 (cases) were matched to patients with LSVRE isolates (controls) in a 1:3 ratio based on age and site of VRE isolation. The primary endpoint evaluates the difference in length of stay (days of hospitalization post-isolation of VRE) in patients with clinical isolates of LRVRE versus those with LSVRE. Secondary endpoints include mortality, antibiotic usage (drug and number of defined daily doses received), and linezolid usage (number of defined daily doses received). Inpatient medical records were reviewed for patient demographics, co-morbidities, length of hospital stay, antibiotics received, duration of antibiotic use, and mortality. A student's t-test will be used to evaluate continuous variables, and nominal variables will be evaluated using a Chi square or Fisher's exact test when appropriate.

Results: Prior to January 2008, 23 VRE isolates were found to possess the G2576T mutation, and 19 isolates have been found to be genetically distinct through pulsed-field gel electrophoresis (PFGE) classification. Data collection and analysis is ongoing.

Study conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the genetic mutation associated with linezolid resistance among enterococci.

Explain how false reporting of linezolid resistance has the potential to impact patient care

Self Assessment Questions:

Both the presence of the G2576T mutation and the number of genes containing this mutation has been correlated with linezolid resistance. (T/F)

Patients with clinical isolates of VRE reported as linezolid resistant based on phenotypic testing methods are more likely than patients with linezolid susceptible isolates to suffer increased morbidity and resource utilization. (T/F)

EVALUATION OF THE EFFECTIVENESS OF PHARMACISTS IN EDUCATING PATIENTS IN A VA PRIMARY CARE CLINIC

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Purpose: One component of pharmaceutical care is providing education to patients about their medications. While many surveys exist that contain components of patient education, none to date have specifically looked at patient education given by clinical pharmacists in a primary care pharmacotherapy clinic setting. The objectives of this study are to develop and implement a patient-based survey to establish baseline data on the quality of education given to patients by clinical pharmacists in primary care clinics at the Cincinnati VA Medical Center, as well as to indicate areas of opportunity that are the most valued by the patients.

Methodology: This study has been approved by the University of Cincinnati IRB as well as the Cincinnati VAMC R&D Committee. The survey being used will address both the patients' perceptions of how well pharmacists are providing education as well as the patients' values for the different components of education. Patients will be recruited from within the Cincinnati VAMC primary care clinics. Patients with at least one previous encounter with a primary care clinical pharmacist within the past year and with at least one current prescription will be asked to participate in the study. Patients will be instructed to complete the survey in privacy, place the surveys in an envelope, and return them anonymously to the pharmacy department via drop-boxes or the mail. To interpret the data, results from section one, which is focused on patients' perceptions of quality of education provided, will be combined with results from section two, which is focused on patients' values of education, to generate total scores. Total scores will then be used to indicate areas of weakness that are most valued by the patients. In addition, patient characteristics will be reviewed via individual sample t-tests to look for significant differences with regards to patient satisfaction.

Learning Objectives:

Discuss reasons why it is important to assess patient satisfaction on a routine basis in the profession of pharmacy.
Identify areas of pharmacy education provided by outpatient clinical pharmacists that patients value most.

Self Assessment Questions:

True or False: While many accrediting bodies acknowledge that patient satisfaction and patient education are important, there currently are no official requirements to assess these components within the healthcare field.

True or False: Patients value obtaining education on their medications' mechanisms of action the most.

IMPACT OF INCENTIVIZED VOLUNTARY TABLET SPLITTING PROGRAMS ON ADHERENCE AND PERSISTENCY

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Purpose: The objective of this study is to measure the impact of incentivized voluntary tablet splitting programs (VTSPs) on adherence and persistency among clients of a large pharmacy benefit manager (PBM).

Methods: This study will be conducted using a retrospective, case-control study design employing pharmacy claims maintained by a large PBM. The PBM offers incentivized VTSPs with designated selective serotonin reuptake inhibitors, HMG-CoA reductase inhibitors, and angiotensin receptor blockers. Members who enrolled in any of the PBMs VTSPs between February 2007 and April 2007 and had a previous fill history of the medication within nine months before enrollment will be included in the study group. Members who qualified for VTSP participation, but did not enroll in the program during the same time period will be included as the control group. To examine the impact of the VTSPs, nine-month pre- and post-period adherence and persistency values will be computed and compared between the two groups. Adherence will be assessed using the medication possession ratio (MPR), which is defined as the total days supply of medication divided by the number of days between the first and last refill plus the days supply of the last refill. Persistency will be measured by quantifying the gaps between refills to determine the percentage of days the member remained on therapy. Data will be extracted, cleaned, and analyzed using SAS 9.1.2. Adherence and persistency in the two groups will be statistically compared by independent sample t tests at an alpha level of 0.05.

Results/Conclusions: Pending completion of data collection.

Learning Objectives:

Describe the rationale behind the implementation of tablet splitting programs
Describe the impact of incentivized VTSPs on adherence and persistency for medications for chronic health conditions

Self Assessment Questions:

Why are SSRIs, HMG-CoA reductase inhibitors, and ARBs appropriate for tablet splitting?

In what ways do tablet splitting programs benefit the PBM, the client, and the member?

INITIAL TIMING AND FREQUENCY OF MONITORING OF CHILDREN AND ADOLESCENTS ON ANTIDEPRESSANT THERAPY FOR MAJOR DEPRESSIVE DISORDER

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Purpose:

Due to increased risk of suicidality, the FDA recommends that children and adolescents treated with antidepressants are monitored weekly during the first 4 weeks of treatment or dosage change, every other week during the next 4 weeks, at 12 weeks, and as clinically indicated thereafter. The purpose of this study is to measure the timing and frequency of follow-up visits during the initial phase of antidepressant therapy in pediatric patients and compare this monitoring pattern to FDA recommendations.

Methods:

Patients met initial study qualifications if they were diagnosed with major depressive disorder (MDD) and treated in the Behavioral Health system at Nationwide Children's Hospital. Patients were identified for inclusion based on MDD-specific diagnosis codes and occurrence of an initial psychiatry visit at Behavioral Health between 2005 and 2007. Following chart review, data was collected from charts of patients receiving initial therapy with an antidepressant for the treatment of MDD between 2005 and the present. Patients greater than 18 years of age at the time of antidepressant initiation were excluded from the study. Patients were also excluded if, at the time of data collection, 12 weeks had not passed since antidepressant initiation. Data collected includes gender, age, ethnicity, date of initiation of antidepressant, name and strength of antidepressant, dosage changes, dates of follow-up appointments, date and reason for discontinuation, and mention of suicidal ideation or behavioral change within 12 weeks of antidepressant initiation. Primary outcome variables are time to first visit after initiation of the antidepressant, frequency of visits, and adherence to the FDA-recommended level of care. Secondary outcome variables include incidents of suicidal ideation, suicide attempts, and suicide completions.

Learning Objectives:

To explore the relationship between antidepressant use and suicidality.

To assess the feasibility of FDA monitoring recommendations in clinical practice.

Self Assessment Questions:

What are the current FDA recommendations for monitoring pediatric patients on antidepressant therapy?

According to the results of this study, clinicians are closely following FDA recommendations for antidepressant therapy monitoring. True/False

THE USE OF ERYTHROPOIESIS-STIMULATING AGENTS (ESA) IN A VA HEALTHCARE SETTING

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Background:

Anemia, left untreated, often results in increased morbidity and mortality. Treatment of anemia with erythropoiesis-stimulating agents (ESA) is directed at achieving desired hemoglobin (Hgb) levels with goals to decrease transfusion requirements, improve quality of life and decrease rates of hospitalization and death. However, the safe use of these agents has become an important consideration due to results of recently published clinical trials. The FDA has issued alerts and warnings beginning in November 2006, followed by the VA-PBM and the National Kidney Foundation (NKF) which recommended maintaining Hgb levels between 10g/dl - 12g/dl (not to exceed 13g/dl) for chronic kidney disease (CKD) patients and <12g/dl for other patients receiving ESA.

Purpose:

The purpose of this retrospective review is to evaluate the use of ESA at JBVAMC against current guidelines and recommendations.

Methods:

This study will be a retrospective chart review of patients being treated with ESA who belong to one of the following categories: CKD patients with Hgb levels > 13g/dl, non-CKD patients with Hgb levels > 12g/dl, or cancer patients not receiving concomitant chemotherapy. The review will include data from the time period following the first FDA issued alert on November 1, 2006 until September 30, 2007. The following data will be collected: basic demographics, indication for ESA therapy, instances of elevated Hgb, interventions in response to elevated Hgb and follow-up evaluations of Hgb levels after an intervention. Criteria for exclusion are patients deceased during time of data collection, elevated Hgb levels during a hospitalization/emergency room visit, Hgb levels from lab samples drawn shortly after dialysis, or patients not on ESA within one month of Hgb level. The primary endpoints will be number of patients/instances of elevated Hgb, number of interventions performed and appropriateness of indication for ESA use.

Results/Conclusions:

Data collection and analysis are ongoing.

Learning Objectives:

Review the role of ESA in the management of anemia in CKD and cancer patients.

2. Describe the potential risks associated with elevated Hgb levels while being treated with ESA in both CKD and cancer patients.

Self Assessment Questions:

True or False. The current KDOQI guidelines recommend a target Hgb level between 10g/dl- 13g/dl for anemic CKD patients being treated with ESA.

True or False. ESA are currently not recommended for anemic cancer patients receiving concomitant chemotherapy

CONTINUANCE OF ROSIGLITAZONE THERAPY IN PATIENTS WITH A HISTORY OF CARDIOVASCULAR EVENTS: A RETROSPECTIVE REVIEW

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Purpose:

Currently an estimated 20.8 million Americans have diabetes. According to mortality data from national health statistics, diabetes is the sixth leading cause of death in the U.S. In addition, cardiovascular disease accounts for approximately 65% of deaths in patients with diabetes. Recent evidence has demonstrated an increased risk of cardiovascular events, including myocardial infarction, in association with rosiglitazone use. Subsequently, rosiglitazone has been removed from the VA national formulary and new prescriptions for rosiglitazone initiation will not be approved. In order to comply with recommendations from VISN Formulary Leaders and the Medical Advisory Panel (MAP), current rosiglitazone use needs to be evaluated to determine if still appropriate. The primary objective of this retrospective study is to determine the current incidence of rosiglitazone use in high-risk patients (defined as patients with history of acute myocardial infarction, angina, coronary artery bypass graft, percutaneous coronary intervention, or angioplasty) throughout VISN 12. Secondary objectives include examining the relationship between rosiglitazone use and AMI or angina; determining if a relationship exists between rosiglitazone use and the need for coronary artery bypass graft (CABG), percutaneous coronary intervention (PCI), or angioplasty; if a relationship exists between the presence of cardiovascular risk factors and incidence of cardiovascular events or the need for coronary procedures in patients taking rosiglitazone; and the degree to which target A1c is achieved from addition of rosiglitazone.

Methods:

A retrospective chart review will be performed on all patients identified by electronic pharmacy records with an active prescription for rosiglitazone as of October 31, 2007. Data collected will include demographics; medications; pertinent laboratory results; presence of cardiovascular risk factors; and history of cardiovascular disease, CABG, PCI, and angioplasty. Approximately 600 charts will be reviewed.

Result/Conclusions:

Data collection is on-going and results are pending.

Learning Objectives:

Discuss the appropriateness of rosiglitazone use in patients with cardiovascular disease based upon current literature.

Describe the effect of rosiglitazone use on hemoglobin A1c.

Self Assessment Questions:

True or False: Rosiglitazone is associated with an increased risk of acute myocardial infarction according to recent literature.

True or False: Rosiglitazone is superior to insulin therapy when trying to lower a hemoglobin A1c of 10.5% to less than 7.0%.

A RISK BENEFIT ANALYSIS OF VENOUS THROMBOEMBOLISM PROPHYLAXIS PATIENTS WITH INTRACRANIAL HEMORRHAGE

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Purpose: Venous thromboembolism (VTE) is a significant cause of morbidity and mortality following intracerebral hemorrhage (ICH). Unfortunately, pharmacologic prevention remains controversial due to the risk of catastrophic intracranial bleeding. Thus, there is an urgent need to assess for bleeding complications associated with VTE prophylaxis in ICH patients, particularly the timeframe for safe administration. The purpose of this study is to evaluate risk factors for bleeding complications associated with the use of low-dose unfractionated heparin (LDUH) in patients with ICH.

Methods: A retrospective cohort study, identified from a demographic database, will include all eligible ICH patients admitted to Detroit Receiving Hospital between 2005 and 2007. Primary outcome variables collected will include bleeding complications of heparin, the time to initiation of therapy from hospital admission and onset of symptoms, LDUH dose, length of therapy, and reason for discontinuation/held doses. Secondary outcome variables collected will include hospital and ICU length of stay, Glasgow outcome score at hospital discharge and rehabilitation discharge, and discharge destination. Other patient characteristics that will be collected will include: age, gender, past medical history, past medication history, admission Glasgow coma score, admission APACHE II score, type and location of injury, co-morbid conditions, and daily maximum intracranial pressure (if applicable). Laboratory values of interest will be recorded at baseline and daily including glucose, serum creatinine, blood urea nitrogen, hemoglobin, hematocrit, platelets, PT/INR, aPTT, ALT, AST. **Results/Conclusion:** Data collection is in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe neurological factors, in addition to risk factors acquired through ICU stay, which are thought to place ICH patients at increased risk of bleeding.

Discuss current literature available regarding the use of early antithrombotic prophylaxis in neurosurgical patients.

Self Assessment Questions:

True or False: There is evidence to suggest a four-fold increased incidence of DVT and PE in patients with ICH compared to ischemic stroke.

True or False: A survey of neurosurgeons in the United Kingdom revealed that subcutaneous heparin is used only in 32% of neurosurgery units.

IMPACT OF STANDARDIZED, PRE-PRINTED CRITICAL CARE UNIT (CCU) ORDERS ON ADHERENCE TO DEEP VEIN THROMBOSIS (DVT) PROPHYLAXIS PRESCRIBING IN AN 18 BED CCU OF A COMMUNITY HOSPITAL.

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Purpose:

The Seventh American College of Chest Physicians (ACCP) Conference on Antithrombotic and Thrombolytic Therapy guidelines recommends all patients admitted to the CCU be assessed for venous thromboembolism (VTE) and given DVT prophylaxis in the form of low molecular weight heparin or low dose unfractionated heparin. The objective of this study was to determine if the implementation of pre-printed CCU standing orders affected the risk of DVT prophylaxis.

Methods:

The Health Alliances pharmacy billing database identified patients charged for at least one dose of medication in the CCU at St Luke Hospital West. Patients who spent more than 24 hours in the CCU in November 2007 were evaluated as baseline patients. Critical Care Admission Pre-printed Standing Orders were created and available in each CCU patients chart at admission. In February 2008, after the implementation of the Pre-printed Standing Orders, data were collected on patients admitted to the CCU. The following data were collected at baseline and post implementation of the order set: primary diagnosis, length of stay in the CCU, patients deep vein thrombosis risk factors, type(s) of DVT prophylaxis prescribed, contraindication(s), if any, to DVT prophylaxis. The following laboratory data was also recorded: hemoglobin, hematocrit, platelet count, PT/INR, aPTT, anti-factor Xa, serum creatinine and creatinine clearance. The primary comparison points for this study were changes of rates of DVT prophylaxis prescribing and/or documented contraindications to DVT prophylaxis.

Results:

The Pre-printed Standing Orders have been created and approved by the CCU committee. Baseline data has been collected and analysis is on going. Post Standing Orders implantation data will continue until at least 50 patients have been admitted to the CCU.

Conclusions:

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

Learning Objectives:

Review the indications for DVT prophylaxis of the inpatient.
Define appropriate pharmacologic and non-pharmacologic DVT prophylaxis regimens.

Self Assessment Questions:

Which of the following is not an indication for DVT prophylaxis?

- A. Acute myocardial infarction
- B. Heart failure
- C. Ischemic stroke
- D. Severe lung disease
- E. Unilateral lower leg fractures
- F. Cancer
- G. Acute spinal cord injury or trauma

Which of the following is a contraindication for pharmacologic DVT prophylaxis?

- A. Open surgical wound
- B. Creatinine clearance less than 30 ml/min
- C. Concurrent use of platelet inhibitors
- D. Uncontrolled hypertension

IMPACT OF HIGH VANCOMYCIN MINIMUM INHIBITORY CONCENTRATIONS ON CLINICAL CURE IN CRITICALLY ILL PATIENTS WITH MRSA BACTEREMIA

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Background: Vancomycin is often used first-line for treating methicillin-resistant *Staphylococcus aureus* (MRSA) but increasing minimum inhibitory concentrations (MIC) brings reservation to this strategy in the critically ill. We sought to report the distribution of MRSA based on MIC and determine the impact of a high MIC to vancomycin on cure rates in critically ill patients. Cure rates based on attainment of an optimal trough/MIC ratio were also evaluated.

Methods: Consecutive critically ill adult patients with MRSA bacteremia were retrospectively evaluated. The distribution of MRSA with a vancomycin MIC of ≤ 0.5 , 1, and 2 mcg/ml were reported. Patients were stratified into 2 groups (MIC = 2 and MIC < 2) and clinical and microbiological cures were compared at the end of therapy. Patients were then stratified according to attainment of a trough/MIC ratio ≥ 5 and clinical cure was evaluated.

Results: To date, 26 patients have been evaluated with an age of 64 \pm 14 years and APACHE II score of 24 \pm 6. The duration of therapy was 10 (3 - 34) days and the most common source of bacteremia was catheter-related (46%). The distribution of MRSA with a vancomycin MIC of ≤ 0.5 , 1, and 2 was 54%, 12%, and 35%, respectively. There was no difference in clinical cure (67% vs. 65%, $p=1.000$) or microbiological cure (100% vs. 94%, $p=1.000$) in patients with an MIC = 2 and < 2, respectively. For patients who had serum vancomycin troughs measured ($n=22$), 91% attained a trough/MIC ratio ≥ 5 . Clinical cure was achieved in 65% of patients with a trough/MIC ratio ≥ 5 and 50% with a trough/MIC ratio < 5 ($p=1.000$).

Conclusion: Our findings suggest that clinical cure is not affected by a high MIC to vancomycin. This could be influenced by the optimal pharmacodynamic parameters achieved by most patients.

Learning Objectives:

Discuss the impact of MRSA bacteremia on patient morbidity and mortality.

Describe the importance of pharmacodynamic considerations in optimizing vancomycin therapy.

Self Assessment Questions:

With regard to MRSA infections, which of the following is not true?

- a. Hospitalized patients with MRSA infections are associated with longer average lengths of stay, higher total charges, and higher in-hospital mortality.
- b. The incidence of MRSA infections is increasing in both hospital and community settings.
- c. Vancomycin treatment failures are uncommon in MRSA strains that are susceptible to vancomycin (MIC ≤ 2 mcg/ml).
- d. MRSA has developed resistance to all B-lactam antibiotics.

Vancomycin therapy is least affected by which of the following considerations?

- a. Antimicrobial concentration greater than the MIC for the majority of the dosing interval.
- b. Attainment of a serum trough concentration at least 5 times the MIC
- c. High peak vancomycin concentrations
- d. The presence of "heterogenous" resistance

THE DEVELOPMENT AND IMPACT OF MEDICATION SAFETY COMPETENCIES ON HEALTH SYSTEMS PHARMACISTS

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Purpose: The Joint Commission and the Institute for Safe Medication Practices provide recommendations for designing safe medication practices in medical facilities and health systems. Educational competencies are a common method used for staff education and development, however, the effectiveness of educational competencies is not routinely assessed. Therefore, the purpose of this study is to assess the medication safety knowledge base of the Henry Ford Hospital pharmacists and their perceptions of their role in preventing medication errors. This study will also assess the results of an educational competency concerning medication safety and its impact on the study individuals knowledge of medication safety.

Methods: This study is a prospective analysis of the Henry Ford Hospital pharmacists knowledge of medication safety, an intervention through competencies, and a reassessment of their knowledge after the competency is performed. This study will utilize a two-group pre-test/post-test design. The groups being compared are pharmacists who attend the medication safety competency ("active" group) and pharmacists who do not attend the medication safety competency ("control" group). The medication safety competency will include an overview of the National Patient Safety Goals, common mechanisms for medication errors in pharmacy operations and the Joint Commissions recommendations for safe medication prescribing and dispensing. The effectiveness of the medication safety competency will be assessed using a pre- and post-test administered to the pharmacists. The tests will be issued to all pharmacists who meet the inclusion criteria, and will consist of questions pertaining to medication safety practices and recommendations.

Results: The results and conclusions are pending and will be presented at the Great Lakes Residency Conference.

Learning Objectives:

1. Review the National Patient Safety Goals that pertain to medication administration and safe practices.
2. Describe a technique for evaluating the medication safety knowledge of hospital pharmacy staff.

Self Assessment Questions:

1. What is confirmation bias and how does it contribute to medication errors?
2. What are some common techniques used to prevent "sound alike look alike" errors?

THE EFFECT OF TOPICAL PRODUCTS ON THE ACCURACY OF SELF MONITORED BLOOD GLUCOSE

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Purpose: The American Diabetes Association acknowledges the potential for inaccuracy of SMBG by recommending patients be evaluated for proper meter technique upon initiation and at regular intervals thereafter, while also advising an assumed error of 10% when using blood glucose meters. It has been established that meter inaccuracy is due to a number of factors including but not limited to: improper coding, incorrect control testing, inadequate blood sample, expired test strips, incorrect application of blood, and not properly washing hands before testing. This study was designed to evaluate the effect topical products have on SMBG if not properly washed off prior to testing and to also determine what the best form of washing is.

Methods: This study was designed as a randomized, cross over study. After being consented patients were randomized by the flip of a coin to either the alcohol washing group or the soap and water washing group. After this every patient washed their hands and forearm with soap and water. Baseline blood glucose levels were drawn from the patients palm and forearm with a FreeStyle Freedom meter. Lotion was then applied to the patients forearm and an apple was cut and wiped on the patients palm, while these products dried patients were asked a series of questions from a questionnaire. Blood glucose was again checked and recorded at both these sites. According to prior randomization patients washed both areas with the designated washing method and their blood glucose was checked one last time.

Results: The study is in progress. Complete results are anticipated for the presentation.

Conclusion: pending

Learning Objectives:

Determine whether lotion or residue from an apple interfere with SMBG.

Compare the efficacy of alcohol swabbing vs. washing with soap and water at removing previously applied study agents.

Self Assessment Questions:

According to the American Diabetes Association, how often should a diabetic patient taking oral hypoglycemic agents check their blood sugar?

Lotion is associated with large changes in blood glucose readings. T/F

HOW TO CHOOSE: AN ANALYSIS OF HOW SENIORS SELECT MEDICARE PART D PLANS

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Purpose: In January 2006, Medicare launched a complex prescription drug benefit program called Part D. Seniors had dozens of plan options but received relatively little guidance regarding plan selection. Inappropriate plan selection may result in a significant financial burden for beneficiaries. The purpose of phase two of this study is to clarify aspects of decision-making among seniors enrolled in Part D. We previously conducted a randomized, controlled, interview-based study to measure the effect of information provision on the decision-making process. Part D beneficiaries were provided either personalized plan information with the projected costs for their current plan versus the least expensive plan, or information about accessing the Medicare website. In the initial study it was identified that on average, beneficiaries could save \$230 by switching to the least expensive plan. The intervention group plan-switching rate was 28 percent, while the comparison group rate was 17 percent. However, our findings were unclear in a variety of criteria on which seniors appear to have based their decisions since chose not switch even when provided information describing cost savings.

Methods: Telephone interviews will be conducted with beneficiaries from the phase one study. We will attempt to identify criteria used for plan choice, assess satisfaction with their 2007 plan, and evaluate the method used to select their 2008 plan. Additionally, beneficiaries will rank hypothetical plans to further clarify plan preferences. By identifying plan preferences and understanding what compels seniors to change plans, we will be better able to improve Part D to help seniors select appropriate plans.

Preliminary Results: Data collection is ongoing.

Funding for this project was received from the Brookings Institution, the National Bureau of Economic Research, the John D. and Catherine T. MacArthur Foundation, the Charles Stuart Mott Foundation, the Robert Wood Johnson Foundations, and the National Institute on Aging.

Learning Objectives:

Review the diversity of plan types and coverage for Medicare Part D plans.

Understand why seniors often do not select the least expensive plan and what influences their choice of plan.

Self Assessment Questions:

What resources are available to seniors that want to learn more about the various Part D plans?

2. When informed that there are cheaper alternatives to their current plan, when are seniors able to switch plans and what type of information is most likely to make them go through with switching to a new plan?

EVALUATION OF A PHARMACIST-RUN ERYTHROPOIESIS-STIMULATING AGENT MONITORING CLINIC IN A VETERANS AFFAIRS HEALTHCARE SYSTEM

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BACKGROUND

Randomized, controlled trials have demonstrated that using erythropoiesis-stimulating agents (ESAs) to target hemoglobin levels greater than 12 g/dL increases the risk of cardiovascular adverse events and death. Numerous consensus groups have published updated clinical guidelines recommending a target hemoglobin of 11 - 12 g/dL and ferritin greater than 100 ng/mL to maintain adequate iron for erythropoiesis.

A medication use evaluation (MUE) of ESAs was conducted at the Veterans Affairs Ann Arbor Healthcare System from July 2006 through June 2007. More than 35% of patients had hemoglobin greater than 12 g/dL or no hemoglobin value within 60 days prior to the MUE; more than 50% had ferritin less than 100 ng/mL or no value within 6 months prior to the MUE. A pilot pharmacist-run ESA monitoring clinic was implemented to promote safe and efficacious use of ESAs and standardize monitoring of hemoglobin and iron status. This study evaluates differences in prescribing and monitoring practices before and after implementation of the clinic.

METHODS

The clinic monitors outpatients with active ESA prescriptions. Hemoglobin is assessed every 2 weeks during initiation or titration of therapy and every 4 - 6 weeks when hemoglobin is stable; iron status is assessed every 3 months.

Patients in the clinic are evaluated against inclusion and exclusion criteria (inclusion: patients monitored by clinic; exclusion: patients unwilling/unable to give informed consent, patients who will be followed by clinic for less than 8 weeks before study completion). Patients in the study complete a baseline and endpoint SF-12 quality of life assessment.

After a 4-month study period, another MUE will be conducted. MUE data will be used to assess differences in prescribing and monitoring practices before and after implementation of the clinic. Differences in quality of life will be assessed by evaluating changes in baseline and endpoint SF-12 scores.

RESULTS AND CONCLUSIONS

Pending

Learning Objectives:

Discuss updated guidelines for management of ESA therapy.

Describe the prescribing and monitoring practices of prescribers at the Veterans Affairs Ann Arbor Healthcare System before and after the implementation of the pharmacist-run ESA monitoring clinic.

Self Assessment Questions:

True or False: Patients who are using ESAs should have their hemoglobin maintained between 11 - 12 g/dL.

True or False: Patients should have their hemoglobin monitored every 2-3 months when they are on a stable dose of an ESA.

ASSESSING PEDIATRIC DOSE RANGE ALERTS IN CPOE EFFECTS ON PRESCRIBING MEDICATION ORDERS

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Statement of purpose: To assess the effect dose-range alerts in a CPOE system have on medication orders. With the ability of CPOE systems to display flags and alerts to physicians entering orders, it should improve accuracy and appropriateness of medication doses. However setting up standard dose ranges has resulted in excess displayed alerts and possibly alert fatigue. This is particularly noteworthy in a pediatric population in which most dosages are done on a mg/kg basis. It remains to be seen how tailoring specific dose ranges can have on orders themselves. Reducing the number of alerts displayed to the physician may result in a higher percentage of the orders being changed to the correct dosage. Determine if adjusting dose-alert ranges specific to a pediatric population will reduce inappropriate medication dosing. Reducing number of displayed dose-alerts should increase physician proper medication dosing practice.

Statement of methods: Health care professionals use a new implemented CPOE system to order medications in the emergency department and ambulatory clinics. The CPOE system had standard dose alerts based on First Databank installed. Dose alerts were found to be inappropriate and were redesigned using Lexi-Comp pediatric dosing guidelines. A detailed monthly report was used to establish a baseline of dose alert flags and the # of orders overridden by enterer. Each order was reviewed with the patients chart to analyze whether the alerted medication order had been corrected. After reviewing the orders new dose-ranges will be again implemented. Following monthly reports will be reviewed based on the new dose ranges.

Learning Objectives:

The importance of developing institution specific dose ranges for CPOE systems.

How effective dose range alerts can be when used properly.

Self Assessment Questions:

Did the presenter do a good job of explaining how the project was carried out?

Did the presenter do a good job of communicating the importance of using tailored dose ranges versus commercial standards?

EXPANDING A COMMUNITY PHARMACY BASED FITNESS, NUTRITION, AND WEIGHT MANAGEMENT PROGRAM IN A MULTI-SITE GROCERY CHAIN PHARMACY

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Background:

Obesity has been closely linked with increased morbidity and mortality and has become a major public health concern. The economic impact of obesity is significant, with estimated direct medical costs of more than \$95 billion.

Previous studies have demonstrated that effective pharmacist intervention can assist patients with weight loss and reduce the risk of weight-related complications. A community pharmacy based fitness, nutrition, and weight management program was previously developed and executed by McNeal, et al, in a single location of a large grocery chain pharmacy with one pharmacist and dietician. The program established that community pharmacists can play an important role in improving the health of patients. The purpose of this project was to expand the initial program, provided by multiple pharmacists and dieticians, to several pharmacy locations. The objective of the study was to evaluate the program for clinical impact on patient outcomes, quality of life and patient satisfaction.

Methods: The program was expanded to 23 pharmacy locations beginning January 2008. Eight clinical pharmacists and two pharmacy residents in collaboration with several dieticians traveled to the various locations to provide the service. The program consisted of twelve weekly one-on-one sessions with either a pharmacist or dietician to encourage lifestyle modifications, set individualized goals, and discuss educational topics regarding nutrition and behavior modifications. The expansion of the program was considered successful if 33% of Patient Care Center pharmacies had enrolled patients within the first three months. Clinical impact was determined by comparing patient specific parameters from baseline to the end of the 12-week period. Patients completed the Short Form-36 Health Survey (SF-36) at baseline and the conclusion of the program to measure quality of life. A patient satisfaction survey was administered at the completion of the program.

Results: Pending

Conclusions: Pending

Learning Objectives:

Describe the morbidity and mortality associated with obesity.

Discuss the clinical impact on patient outcomes of a community pharmacy based fitness, nutrition and weight management program, including its effect on quality of life and patient satisfaction.

Self Assessment Questions:

True or False: Even a modest weight loss may be beneficial in decreasing obesity related health risks.

True or False: Obesity may be caused by a wide range of environmental, genetic, behavioral, and physiologic factors.

A RETROSPECTIVE REVIEW OF BIVALIRUDIN VERSUS GLYCOPROTEIN IIB/IIIA INHIBITORS PLUS HEPARIN FOR PERCUTANEOUS CORONARY INTERVENTION

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Background: In previous studies, bivalirudin, a direct thrombin inhibitor, was found to be non-inferior to the combination of a glycoprotein IIb/IIIa inhibitor (gIIb/IIIa) plus heparin when used during percutaneous coronary intervention (PCI). However, bivalirudin has exhibited decreased bleeding complications and decreased length of stay. The objective of this study is to determine the real life benefits with the use of bivalirudin during PCI at an academic medical center as compared to gIIb/IIIa plus heparin.

Methods: A retrospective review will be conducted in all patients admitted to a cardiology service who underwent PCI. Patients with a diagnosis of ST segment elevation myocardial infarction will be excluded. Demographic data will be collected, as well as, catheterization indication, procedure performed, concomitant medications, bleeding complications and blood product administration, medication dosing, and length of stay. Major bleeding will be defined as intracranial, intraocular, or retroperitoneal hemorrhage, clinically overt blood loss resulting in a decrease in hemoglobin of more than 3 g/dL, any decrease in hemoglobin of more than 4 g/dL, or transfusion of 2 or more units of packed red blood cells or whole blood. Minor bleeding will be defined as clinically overt bleeding that did not meet criteria for major bleeding. IRB approval was obtained for this study.

Results: Between December 1, 2006 and May 31, 2007, 122 patients received bivalirudin while 233 patients received eptifibatide and 73 patients received abciximab as adjunctive therapy for PCI. 51% of the bivalirudin and 64% gIIb/IIIa group were male. The average age was 63.5 and 62.1 in the bivalirudin and gIIb/IIIa groups, respectively. The results will be analyzed to see if there is a difference in severity or incidence of bleeding and length of stay between both groups.

Conclusions: The results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the various drug therapies and available indications for their use during PCI.

Describe the risk factors associated with bleeding during PCI

Self Assessment Questions:

T / F Bivalirudin is indicated for use during PCI.

T / F Female gender, renal impairment, and age are all risk factors for bleeding during PCI.

PSYCHOLOGICAL BARRIERS TO INSULIN USE IN A VETERAN POPULATION

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Background: According to the Diabetes Attitudes, Wishes and Needs (DAWN) study "Only 26.9% of the patients not on insulin reported that insulin would help them to manage their disease better". Furthermore, 25% of patients will refuse insulin once prescribed by their physician. Diabetes educators at the 2005 American Association of Diabetes Educators annual meeting identified patient fear, needles and injection pain, complications (amputations or kidney failure), weight gain, inconvenience, physical resistance, more time-consuming, inadequate support and cost as the components of "psychological insulin resistance".

Purpose: The primary purpose is to compare those willing versus those unwilling to begin insulin therapy as it relates to their attitudes towards the components of "psychological insulin resistance". The secondary purpose is to determine how ethnicity, education level and length of diabetes diagnosis relate to the components of "psychological insulin resistance".

Methods: Type 2 diabetic patients, who have not used insulin, are <90 years and have a hemoglobin A1c >9% were asked to complete an anonymous survey about their attitudes towards insulin therapy. The survey is adapted from a validated survey developed in: "Petra F, Crispin AA, Stridde E, et al. Development and validation of a new measure to evaluate psychological resistance to insulin treatment. Diabetes Care. 2007;30(9):2199-204". Additional information collected included education level, ethnicity and duration of diagnosis. Patients were identified in the Diabetes Education Class and a computer generated list. The qualifying patients were given the survey either in person or by mail and were asked to complete and return the survey. Bivariate analysis will be used to compare those willing versus those unwilling to use insulin and we will explore factors associated with willingness to use insulin in a multivariate analysis.

Results/Conclusion: Data Collection is in progress. Results and conclusion will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Examine what specific components of psychological insulin resistance are most prevalent in veterans unwilling to start insulin therapy.

Determine if education level, ethnicity and duration of diagnosis predispose patients to certain components of psychological insulin resistance.

Self Assessment Questions:

True/False: Fear of needles is the only reason that patients are unwilling to use insulin.

True/False: Because a majority of patients believe that insulin will help them better manage their diabetes, greater than 95% are willing to use it.

IMPACT OF A PHARMACISTS EDUCATIONAL INTERVENTION ON PATIENT KNOWLEDGE REGARDING ANTIDEPRESSANT USE

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Purpose: Assess the impact of a pharmacist's educational intervention on patient knowledge regarding antidepressants and to determine if a correlation exists between patient knowledge of antidepressants and severity of depression symptoms.

Methods: An original survey was developed to assess patient knowledge of antidepressant medications before and after an educational intervention. The survey included questions regarding side effects, safe use of antidepressants, predicted onset of pharmacological effects, and expected duration of therapy. The Patient Health Questionnaire depression module (PHQ-9) was included to assess severity of depression symptoms. The study sites included three outpatient clinics affiliated with a medical center. Patients were asked to participate if they had a diagnosis of depression, were at least 18 years of age, and had received treatment for a minimum of thirty days with one of the following antidepressants: (1) selective serotonin reuptake inhibitors, (2) serotonin/norepinephrine reuptake inhibitors, (3) bupropion. Patients were excluded if they could not speak and read English or if they were pregnant. Eligible patients were identified by the presence of one of the specified antidepressants on their medication list. After consent was obtained, patients were given the pre-intervention survey and PHQ-9. A pharmacist then conducted a 15-20 minute educational session regarding the topics in the survey. An antidepressant handout supplemented the pharmacist's verbal instruction. Four weeks after the initial session, the survey and PHQ-9 were re-administered. **Anticipated results:** Measured outcomes include the knowledge score (percent of questions answered correctly) and the PHQ-9 score. A 30% change in the knowledge score from baseline to follow-up is expected. Low PHQ-9 scores are expected to correlate with high knowledge scores.

Conclusions: Patient knowledge of antidepressants remains a major factor in medication adherence and the successful treatment of depression. Results are expected to demonstrate an effective intervention to increase patient knowledge regarding antidepressants.

Learning Objectives:

Identify the goals of therapy in the treatment of depression
Recognize the barriers to the effective treatment of depression

Self Assessment Questions:

What is the recommended duration of treatment with antidepressants in a patient with a first diagnosis of depression?
A. At least 5-7 months
B. At least 9-12 months
C. At least 12-15 months
D. At least 15-18 months

Barriers to effective treatment of depression include which of the following:

- A. Lack of follow-up
- B. Inadequate duration of therapy
- C. Perceived lack of efficacy
- D. Intolerable side effects
- E. All of the above

EVALUATION OF ANTIRETROVIRAL THERAPY CHANGES IN A VETERANS AFFAIRS HIV POPULATION

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Purpose: More than 22,000 patients are treated for Human Immunodeficiency Virus (HIV) in the Veterans Affairs (VA) network. Patients with HIV are living longer due to treatment with highly active antiretroviral therapy (HAART). Unfortunately, this treatment can be associated with resistance and adverse effects, necessitating modifications to therapy. Indications for changing therapy include: virologic failure, immunologic failure, difficult adherence to medication secondary to complex administration schedules and adverse effects. Long-term toxicities associated with antiretroviral therapy include lipodystrophy, diabetes, renal, hepatic, and cardiovascular disease, and bone disorders. The primary purpose of this study is to determine the reasons and assess the appropriateness of HAART changes within the Roudebush VA Medical Center HIV clinic.

Methods: A list of patients enrolled in the Roudebush VA HIV clinic was generated utilizing the electronic medical record system. A retrospective chart review of approximately 210 patients on antiretroviral treatment from 1997 to present was conducted. Data collected includes patient demographics, antiretroviral regimen history and duration, viral load and CD4 at time of therapy changes, available genotypes if resistance suspected, reported adverse reactions, and assessment of compliance based on refill history.

Preliminary Results: Preliminary results are available on 20 patients. The average age was 51, 100% were male and 65% were Caucasian. A total of 51 treatment regimens were used. The most commonly prescribed HAART regimen was zidovudine, lamivudine, and a non-nucleoside reverse transcriptase inhibitor (NNRTI) at 22%, followed by zidovudine, lamivudine, and a protease inhibitor (PI) at 10%. The most common reason to modify treatment was virologic failure at 49%, followed by reported drug toxicity at 33%. Nonadherence was documented in 80% of patients with virologic failure.

Conclusions: Conclusions will be presented at the Great Lakes Conference pending completion of data collection.

Learning Objectives:

List four indications when it may be appropriate to modify HAART.

Describe the role of adherence in obtaining HIV treatment goals, while recognizing challenges associated with prolonged use of antiretrovirals.

Self Assessment Questions:

Which of the following is the least appropriate reason to modify HAART?

- A. Nausea
- B. Osteoporosis
- C. Virologic failure
- D. Fat redistribution

True or False: A 95% adherence rate to HAART has similar virologic failure rates to an 80% adherence rate.

IMPLEMENTATION AND EVALUATION OF MEDICATION RECONCILIATION ACROSS THE CONTINUUM OF CARE IN AN ACADEMIC MEDICAL CENTER

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Background: Implementing meaningful, effective standard medication reconciliation processes has proven to be challenging for many organizations. An analysis assessing compliance with all five elements of performance associated with National Patient Safety Goal 8A & 8B revealed that several gaps exist within the organization. In an effort to ensure full compliance with standards set forth by The Joint Commission, a standardized process to complete medication reconciliation has been developed and implemented in all non-inpatient care areas throughout The University of Wisconsin Hospital and Clinics (UWHC).

Objective: To describe the approach for implementation of medication reconciliation processes in all non-inpatient care areas within UWHC and to evaluate the accuracy and completeness of medication reconciliation activities in both the inpatient and non-inpatient care areas.

Methods: A Medication Reconciliation Steering Committee was formally established and is charged with developing standardized processes and workflows, developing training and education materials, outlining specific accountabilities for staff training and implementation and for developing sustainable auditing mechanisms to ensure compliance. Meetings were held with leaders/managers from four major areas: clinics, procedure areas, perioperative areas and the emergency department. Workflows for each area were developed and documented. Four workflows were identified and endorsed by the Steering Committee: paper, traditional electronic medical record, and the new integrated medical record. Chart audits are being performed between December 2007 and January 2008 in all non-inpatient care areas. Medication history notes will be evaluated for completeness and accuracy. Non-inpatient care areas will be evaluated to assess if all elements of performance are being achieved. In the inpatient care areas, assessment of the reconciliation process evaluates the number of discrepancies found between admission orders, transfer orders, and upon discharge compared to the patient's current medication list.

Results/Conclusion: Data collection is currently underway. Final results and conclusions will be presented at the conference.

Learning Objectives:

1. Describe implementation expectations mandated by The Joint Commission to successfully meet National Patient Safety Goal 8A and 8B.
2. Discuss common challenges/barriers for implementing a standard process across all patient care areas

Self Assessment Questions:

1. What is the only form of documentation required by the Joint Commission to meet NPSG 8?
2. T/F: A fragmented medication reconciliation documentation system may introduce unwanted errors in the medication use system.

USE OF PHARMACY TECHNICIANS TO ENHANCE EFFICIENCY WITH MEDICATION RECONCILIATION

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All areas of patient care have recently been challenged with implementing a medication reconciliation (MR) process based on JCAHO National Patient Safety Goal requirements. Research has shown that pharmacist involvement in MR, specifically obtaining medication histories, improves patient safety and reduces unintended medication errors. At our hospital, nurses perform the admission medication history. Pharmacists must then verify this history and utilize it to reconcile medications on admission as well as discharge. The current process is time consuming and inefficient because pharmacists often must re-work the initial history due to missing data and/or inaccuracies. In many hospitals, budgetary constraints preclude expanding pharmacists' roles to include obtaining medication histories. The purpose of this study is to evaluate whether the use of trained pharmacy technicians can increase efficiency with the MR process, decrease pharmacist workload, and improve pharmacist satisfaction.

Prior to project implementation, data were collected at baseline which included the amount of time pharmacists currently spend on MR activities, the number of patients in which an admission MR was not completed in a timely manner, and the results of a survey assessing pharmacist satisfaction.

This project will be implemented in three phases. In Phase I of the study, decentralized pharmacy technicians were hired and trained to clarify and verify nurse medication histories using data from multiple sources, to document histories in the electronic medical record, and to work with a pharmacist to reconcile medications on admission and discharge. Phase II is currently underway and expands pharmacy technicians' roles to obtain medication histories directly from patients in Emergency Services and on other inpatient units when a nursing history has not been obtained in a timely fashion. Phase III will complete the transfer of responsibility for all admission medication histories from nursing to pharmacy.

In March, Phase II will be fully implemented and data will be collected and compared to baseline data.

Learning Objectives:

After attending this presentation, the practitioner should be able to:

Explain one advantage and disadvantage of utilizing pharmacy technicians versus pharmacists to obtain medication histories

Discuss the importance of streamlining the medication reconciliation process to allow pharmacists increased time for other clinical responsibilities

Self Assessment Questions:

Which of the following statements is true regarding utilizing a pharmacy technician to obtain medication histories? Pharmacy technicians are unable to:

- a. Gather and compare data from multiple sources
- b. Provide clinical judgments
- c. Perform data entry tasks

According to JCAHO National Patient Safety Goals, which of the following is not specifically required in the medication reconciliation process?

- a. A current list of medications is provided to the patient upon discharge
- b. The medications ordered are compared to the patient medication list and reconciled
- c. The pharmacy must create a complete list of the patient's medications on admission

ENSURING SAFE USE OF ENOXAPARIN, WARFARIN, AND VITAMIN K IN THE EMERGENCY DEPARTMENT AND CLINICAL DECISION UNIT

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Introduction: Anticoagulants have been shown to be effective in the treatment and prevention of thromboembolic events. One of the 2008 National Patient Safety Goals is to reduce the likelihood of patient harm associated with the use of anticoagulation therapy. In the 5 Million Lives Campaign, the Institute for Healthcare Improvement has identified appropriate and safe use of anticoagulants, including the use of vitamin K as a goal to prevent harm from high alert medications. Anticoagulant and vitamin K use is not limited to inpatient therapy and their use continues to cause errors and patient harm. In the emergency department (ED,) warfarin-related adverse events account for 14% of the cases identified that lead to severe hemorrhage due to excessive anticoagulation. Safe use of anticoagulants has been associated with a decrease in the occurrence of these events. There is limited data evaluating the safe use of these medications in the ED.

Purpose: This study identifies ways to improve the appropriateness and safety of warfarin, enoxaparin and vitamin K in the ED and clinical decision unit (CDU) of a level 1 trauma center and evaluates system-based changes designed to improve the safe use of these medications.

Methods: Phase 1 is a retrospective chart review to identify opportunities to improve the appropriateness and safe use of warfarin, enoxaparin, and vitamin K for patients who received warfarin, enoxaparin or vitamin K in the DEM or the CDU. Phase 2 is enhanced model designed to improve the safe use of these medications based on the findings of phase 1. Appropriateness and safety will be identified and evaluated using data collected which includes indication, dose, laboratory tests, drug interactions, adverse events, and patient education.

Conclusions: Results and conclusions are pending and will be presented at the residency conference.

Learning Objectives:

Identify opportunities to improve the appropriateness and safety of warfarin, enoxaparin, and vitamin K use in the emergency department and 23 hour clinical decision unit.

Define enhanced ED pharmacist activities that will improve appropriate and safe use of warfarin, enoxaparin, and vitamin K use in the emergency department.

Self Assessment Questions:

True or False One of the 2008 National Patient Safety Goals is to reduce the likelihood of patient harm associated with the use of anticoagulation therapy.

True or False The pharmacist can have a role in assuring appropriate and safe use of warfarin, enoxaparin, and vitamin K in the emergency department.

EVALUATION OF A PHARMACIST MANAGED MEDICATION REVIEW CLINIC

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Background: Providing direct patient care in pharmacist-managed clinics is a revolutionary concept that continues to push the boundaries of pharmacist's scope of practice. Numerous clinic trials have proven that such clinics can result in proper management of chronic disease states, fewer adverse reactions from medications, and improvement in adherence to complicated medication regimens. While many of these reported successful practices were based on a collaborative practice with primary care physicians, it is rare for a pharmacy-managed clinic to function within a primary care physician residency program.

Purpose: To assess the efficacy of a pharmacist managed medication review clinic (MRC).

Methods: Medication review clinic (MRC) will operate based on an established referral protocol and a collaborative practice agreement between the referring physician(s) and the pharmacist. Ancillary staff will be educated about the MRC referral process and collaborative practice agreement. All patients referred to the MRC, for medication education or management, will be followed prospectively to evaluate the efficacy of the entire MRC process. Following each MRC visit, the pharmacist will communicate the recommendations to the appropriate physician via the health systems computerized medical record. The physician will notify the pharmacist if the recommendation was accepted or rejected. In either instance, the pharmacist will follow-up with the patient or evaluate appropriate clinical outcomes resulting from an accepted/rejected recommendation. In addition, for rejected recommendations, the pharmacist will follow up with the appropriate physician to identify the reason for rejected recommendation.

Efficacy of the MRC will be based on number of appointments scheduled during the one year study period, number of pharmacy recommendations accepted, number of pharmacy recommendations rejected, reason for the rejected recommendation, number of patients achieving desired clinical outcomes, and number of patients achieving clinical outcomes due to pharmacy recommendations. All clinical outcomes will be evaluated based on current available clinical guideline.

Learning Objectives:

Describe how a pharmacy-managed clinic operates within a primary care physician residency program.

Explain the areas of improvement necessary to provide optimal patient care in a pharmacist-managed clinic based on a collaborative practice agreement.

Self Assessment Questions:

Is the model created replicable and functional at other teaching institutions?

(T/F) The most common barrier confronting pharmacists in pharmacy-managed clinics within a teaching institution is physician resistance to pharmacy recommendations.

PHARMACISTS ROLE IN PEDIATRIC ANTICOAGULATION

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Background:

The incidence of thromboembolic events in children has been increasing. This high risk condition requires therapeutic intervention to decrease morbidity and mortality. Anticoagulation management guidelines have been developed for adults, however optimal studies in pediatric patients are lacking. Current practice for pediatric anticoagulation has been extrapolated from adult data. Adult guidelines are not optimal due to epidemiologic differences in thromboembolic disorders and age dependent aspects of hemostasis. Anticoagulation involves use of agents with narrow therapeutic ranges. Subtherapeutic patients may be at increased risk of thromboembolic events, while supratherapeutic patients are at high risk for bleeding complications. Pharmacists have a critical role in managing anticoagulation therapy. By improving the pharmacists knowledge and comfort level within our institution, we may ultimately improve our current level of patient care with pediatric anticoagulation issues.

Purpose:

To assess the knowledge and comfort level of pharmacists in managing pediatric anticoagulation and discuss the benefits of implementing a pharmacy anticoagulation service.

Methodology:

Pharmacists knowledge and comfort level of pediatric anticoagulation will be assessed by completion of a pre- and post-test and survey of pharmacists employed at Children's Hospital of Michigan. A presentation on the overview of anticoagulation, focusing on pediatrics, will be given between the tests. Results of the tests will be evaluated using appropriate statistics. Areas of deficiency will be addressed. A pediatric anticoagulation protocol will be developed by a multidisciplinary committee.

Results/Conclusions:

Analysis is in process, to be presented at the conference.

Learning Objectives:

List two reasons why pediatric patients may be at greater risk for adverse events with anticoagulation therapy compared with adults.

Discuss the importance of a pharmacist's involvement in pediatric anticoagulation.

Self Assessment Questions:

Adult anticoagulation guidelines are appropriate for pediatric patients. T or F

Pharmacists may improve patient care by participating in an anticoagulation service. T or F

VANCOMYCIN ACCUMULATION IN THE VETERAN PATIENT

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Objective: This project measures the proportion of veteran patients that accumulate vancomycin over long-term therapy as well as the rate at which vancomycin accumulates in individual patients. Secondary objectives include testing pre-identified predictors of accumulation and identifying additional predictors as part of a clinically-based model of vancomycin accumulation.

Research Design: The project is a retrospective, cohort study sampling a patient population in which vancomycin accumulation is easily detectable. The primary endpoint is the timecourse of the vancomycin concentration ratio (denominator: day 5-7 baseline level after vancomycin start or last change) during the treatment period. Secondary endpoints are new-onset renal insufficiency or nephrotoxicity and other possible accumulation predictors for inclusion in a multivariable regression model with repeated measures.

Methodology: A database search has identified veteran inpatients given vancomycin between January, 2000, and September, 2007, for at least 14 continuous days without a change in regimen dose or frequency. Examining at least 91 patients will obtain 90% power to exclude the prediction that 50% of patients accumulate if the true proportion is not 33% to 67%. However, as many patients as possible will be included to maximize effect estimate precision. Multiple administration periods from individual patients given vancomycin at different times may be included. Periods are excluded if usual population pharmacokinetics suggest a vancomycin half-life that would not be at steady-state by day 5-7 after the last change, or if the weekly vancomycin concentration levels were measured at a problematic time or unavailable. The electronic medical record will be used to collect the following information: age, gender, height, vancomycin indication, microbiology culture results, infection-related procedures, concomitant medications, administration times where available, dose and frequency information, dosing decisions, as well as basic metabolic panel, vancomycin concentration level, and weight during therapy.

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

Learning Objectives:

List the complications of long-term vancomycin therapy.

Characterize the current clinical evidence for vancomycin accumulation.

Self Assessment Questions:

When vancomycin is given for at least 2 weeks, what is the percentage of veterans who accumulate the drug?

- a. 33% to 67%
- b. less than 33%
- c. greater than 67%

Name one risk factor for vancomycin accumulation.

ASSESSMENT OF VENTILATOR ASSOCIATED PNEUMONIA (VAP) AND DEVELOPMENT OF A CONSISTENT APPROACH TO TREATMENT IN ACCORDANCE WITH ACCEPTED GUIDELINES AT AN ACADEMIC MEDICAL CENTER

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Purpose:

Froedtert Hospital is a 450-bed academic medical center with 60 critical care beds. Strategies for improving outcomes among patients with ventilator associated pneumonia (VAP) have received increasing attention both nationally and at Froedtert Hospital in recent years. The purpose of this project is to optimize antimicrobial therapy for the treatment of VAP through the evaluation of treatment regimens and documentation of related patient outcomes. The goal is to foster a consistent approach to treating VAP across all critical care areas of Froedtert Hospital.

Methods:

The project used a concurrent observational method to evaluate the treatment of VAP across Froedtert Hospital from October 2007 through January 2008. Pharmacists identified patients with actual or suspected VAP for inclusion to the project. The primary objective was to evaluate antimicrobial therapy. Treatment regimens were then evaluated for adherence to the 2005 American Thoracic Society and Infectious Disease Society of America (ATS/IDSA) guidelines for the empiric treatment of VAP. In addition, assessment was made of antibiotic choice for narrow spectrum therapy after culture results were reported. The secondary objectives are to quantify the various organisms identified in the VAP patients at our institution and identify risk factors in patients infected with multi-drug-resistant (MDR) organisms. Patient outcome data includes mortality rates, ventilator days, ICU and non-ICU length of stay, and time to clinical resolution of infection.

Summary of Preliminary Results:

Fifty-nine patients from four intensive care units were identified as having been treated for VAP during the four month data collection period. Analysis is ongoing and results will be presented.

Learning Objectives:

To understand and be able to distinguish between ventilator-associated pneumonia and hospital acquired pneumonia in hospitalized patients.

To understand the principles of treatment of ventilator associated pneumonia and be able to choose appropriate antimicrobial agents based on patient risk factors and time of onset of pneumonia.

Self Assessment Questions:

A young man is admitted to the ICU for respiratory distress and remains intubated for 48 hours. There is concern that he has pneumonia developing on the 3rd day after intubation. Respiratory cultures are ordered. He has a past medical history of hypertension and diabetes but has not been hospitalized in the last year. Which one of the following antibiotics would you recommend for empiric therapy?

- a. Ceftriaxone
- b. Cefipime
- c. Piperacillin-tazobactam
- d. Vancomycin

Risk factors for multi drug resistant organisms causing ventilator associated pneumonia per the ATS-IDSA guidelines include:

- a. Immunosuppressive disease or therapy
- b. Antimicrobial therapy in the last 90 days
- c. Residence in a nursing home and immunosuppressive therapy
- d. Chronic dialysis within 30 days and home wound care
- e. All of the above

EVALUATION OF A CHARGE ON MEDICATION ADMINISTRATION SYSTEM AND ITS IMPACT ON FINANCIAL PERFORMANCE AND WORKLOAD WITHIN AN ACADEMIC MEDICAL CENTER

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The University of Wisconsin Hospitals and Clinics (UWHC) will be implementing an integrated electronic health record (EHR). This system will enable UWHC to charge for medications upon administration, transitioning from the current charge capture system of charging upon medication dispensing. It is unknown the extent to which this new charge capture system will affect the departments operations and the hospitals financial performance.

The objectives of this project are to evaluate the impact of a charge on medication administration system on department financial performance and technical staff workload within the inpatient setting.

The current accuracy of nursing documentation of medication administration will be determined. Applying this documentation accuracy measure, projections of potential changes in revenue will be calculated to determine the impact that this new charging method will have on hospital gross and net revenue. Time studies will also be performed to project changes in pharmacy staff workload related to charging and crediting of medication doses following the transition to charge on medication administration.

Results regarding the accuracy of our current charge capture system will be displayed as the percentage of doses documented as administered over doses dispensed. Financial projections of changes in revenue will be displayed as the amount of revenue that would be gained or lost if the hospital had been using a charge on medication administration system. Potential time savings for technical staff will be displayed as minutes saved per day and total FTE time saved.

Learning Objectives:

Describe the benefits and limitations of a charge capture system that charges for medications at the time of administration.

Identify critical factors needed for successful implementation of a charge capture system that charges for medications at the time of administration.

Self Assessment Questions:

What is the most important element needed for successful implementation of a charge capture system that charges at the time of medication administration?

- a. An accurate audit system
- b. Use of bar-code medication administration
- c. Accurate documentation of medication administration

True or False: With advancing technology that is being used within hospitals, charging at the time of medication administration is becoming easier to implement.

EVALUATION OF THE PRESCRIBING PRACTICES FOR TREATMENT OF PRESUMPTIVE AND DEFINITIVE CLOSTRIDIUM DIFFICILE-ASSOCIATED DIARRHEA (CDAD) AT ONE UNIVERSITY-BASED INSTITUTION

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The empiric treatment of Clostridium difficile-associated diarrhea (CDAD) has not been studied extensively in clinical trials nor is it recommended in clinical practice guidelines; however, anecdotal reports of it do exist. The primary objective of this single-center, retrospective study is to determine how patients with presumptive and definitive CDAD were treated at the University of Illinois Medical Center at Chicago (UIMCC) over a five-year period. The investigators will evaluate if patients were treated empirically without objective diagnostic data as well as to establish the incidence of empiric CDAD treatment in the UIMCC population.

The study was submitted to and approved by the Institutional Review Board prior to data collection. Adult patients initiated on metronidazole or oral vancomycin at the UIMCC from 9/1/02 through 8/31/07 were identified through either the pharmacy, nursing, or billing databases. Those with positive Meridian Premier Toxin A and B tests within the same time range were collected from the laboratory's records. Patients receiving metronidazole or oral vancomycin for reasons other than CDAD were excluded from the study. The following data will be collected for each study participant: demographic, laboratory, and culture data, co-morbid diseases, antibiotic usage, relevant medication usage, related physical exam findings, drug-induced side effects and complications associated with CDAD. The primary outcome parameters are type of diagnostic work-up and treatment received by patients with presumptive or definitive CDAD at the UIMCC. Secondary outcome parameters include treatment failures, treatment-induced side effects, and complications associated with C. difficile infection in the patient population studied. The data collected during this study will be analyzed using descriptive statistics.

The results and conclusion from this study will be presented at the Great Lakes pharmacy resident conference.

Learning Objectives:

To identify the changing epidemiology of Clostridium difficile.
To describe the current standard of care for the approach to patients with Clostridium difficile as part of their differential diagnosis.

Self Assessment Questions:

The following is NOT a risk factor for developing Clostridium difficile-associated diarrhea.

- a. Prior exposure to antibiotics
- b. Lactobacillus use
- c. Advanced age
- d. Immunocompromised state
- e. Gastrointestinal surgery

It is important to identify an infection with Clostridium difficile early and treat accordingly, as it can lead to the following complications:

- a. Pseudomembranous colitis
- b. Toxic megacolon
- c. Colectomy
- d. Death
- e. All of the above

IMPACT OF PHARMACIST EDUCATION ON PHYSICIAN PRESCRIBING OF ERYTHROPOIESIS-STIMULATING AGENTS

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Purpose:

Erythropoiesis-stimulating agents are utilized in the management of anemia due to cancer chemotherapy, chronic renal failure, and zidovudine treatment, as well as to reduce allogenic blood transfusion in surgery patients. Recently, new data has surfaced calling the safety of these agents into question. Emerging studies indicate that achieving target hemoglobin >12 g/dL is related to adverse outcomes including disease progression, increased mortality, and venous thromboembolism. Baseline compliance to the new anemia management guidelines is currently unknown at Riverside Methodist Hospital. The purpose of this evaluation is to determine baseline prescribing and analyze the impact of pharmacist education on appropriate physician prescribing of erythropoiesis-stimulating agents.

Methods:

A literature review was conducted to evaluate the current standards of practice for erythropoiesis-stimulating agents. A random, retrospective chart review of fifty patients from December 2007 who were ≥18 years old who received at least one dose of an erythropoiesis-stimulating agent during the study period was conducted to determine baseline usage of epoetin alfa and darbepoetin alfa as well as adherence to current practice recommendations. Data collected include: patient demographics, prescribing patterns, compliance to current recommendations, adherence to laboratory monitoring, and outcome data including transfusions, blood pressure, and thrombotic events. Education on appropriate use of erythropoiesis-stimulating agents including approved indications, dosing, reimbursement, and current literature with an emphasis on safety data was presented to physicians and nurses in the oncology and nephrology departments. After the educational sessions were completed, a follow up chart review of fifty patients was conducted to determine the impact of pharmacist education on appropriate physician prescribing of erythropoiesis-stimulating agents. Secondary endpoints include incidence of appropriate monitoring of hemoglobin, iron supplementation if indicated, hypertension, and thrombotic events.

Results/Conclusions:

Data collection is ongoing. Results and analysis will be presented at the Great Lakes Regional Pharmacy conference.

Learning Objectives:

To discuss current literature regarding the safety of erythropoiesis-stimulating agents

To describe the impact of pharmacy education on prescribers adherence to current practice guidelines for erythropoiesis-stimulating agents

Self Assessment Questions:

True or False: Erythropoiesis-stimulating agents are approved for the treatment of anemia in cancer patients undergoing radiation monotherapy.

True or False: Erythropoiesis-stimulating agents should be titrated to a target hemoglobin above 10 g/dL and less than 12 g/dL for the treatment of anemia due to cancer chemotherapy and chronic renal failure.

EFFECTS OF NEW ONSET POST-TRANSPLANT DIABETES MELLITUS ON LONG TERM GRAFT SURVIVAL IN KIDNEY TRANSPLANT PATIENTS

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Purpose:

New onset post-transplant diabetes mellitus (PTDM) occurs when solid organ transplant recipients who were non-diabetic before transplant develop diabetes after transplant. The development of PTDM can result in increased risk of rejection, increased loss of graft, and decreased survival. The purpose of this study is to determine how PTDM affects graft-related complications, including graft loss and episodes of graft rejection, in kidney transplant recipients. Secondary objectives will include looking at how PTDM and glycemic control affect mortality, renal function, and proteinuria.

Methods:

This study will be conducted as a retrospective review of patients presenting to University of Illinois Medical Center at Chicago receiving cadaveric or living renal transplants. Prior to commencement, this study will be submitted to the Institutional Review Board for approval. Patients presenting for a renal transplant during the 9 year study period will be included. Transplant recipients under the age of 18 will be excluded. Data will be collected for renal transplant recipients in the study period that did not develop diabetes, those who developed PTDM, and those who were diabetic prior to transplant. Diagnosis of PTDM will be based on fasting plasma glucose >126 mg/dl on at least 2 occasions or receipt of treatment with an agent for hyperglycemia. The following data will be collected: patient age, weight, ethnicity, gender, family history of diabetes, medications used to treat diabetes, serum creatinine, urine protein, hemoglobin A1c, fasting blood glucose, BK virus nephropathy, graft rejection, graft loss, mortality, and transplant characteristics including induction immunosuppression, maintenance immunosuppression, human leukocyte antigen (HLA) match, crossmatch, CMV status, and need for plasmapheresis.

Results/Conclusion:

664 patients have been enrolled. Data is still being collected. Results and conclusion will be presented at the Great Lakes Conference.

Learning Objectives:

Identify factors associated with developing post-transplant diabetes mellitus (PTDM).

Discuss the long-term complications associated with developing PTDM.

Self Assessment Questions:

Which of the following are associated with developing new onset PTDM?

- A. Cytomegalovirus (CMV)
- B. Ethnicity
- C. Immunosuppression
- D. All of the above

PTDM increases risk of rejection episodes, True or False.

PATIENT AND PHYSICIAN PERCEPTIONS OF DIABETES EDUCATION AND MANAGEMENT

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Purpose

The purpose is to determine and compare patient and physician opinions on the importance of diabetes education. It will determine patient beliefs on diabetes education, perceptions of access to this education, and potential barriers they face in receiving education. It will also determine physician beliefs on the barriers patients face in obtaining education and compare these to patient beliefs. Additionally, the project will determine the amount of time physicians feel they spend educating and managing diabetic patients and their feelings regarding pharmacists as a primary provider of diabetes management.

Methods

Two surveys will be initiated at an Internal Medicine clinic to meet the stated purpose. The patient survey will be given verbally by pharmacists involved in the study. It will focus on patients' feelings towards diabetes education, where they receive the majority of their diabetes education, and whether they completed formal diabetes education. Additionally, patients will be asked to rank their current understanding of various diabetes topics. The physician survey will be given using the web-based service Zoomerang and will be composed of multiple choice and Likert scale questions. It will focus on physicians' perceptions of patients' ability to receive formal diabetes education and disease state management, limitations preventing patients from receiving formal diabetes education, and how diabetes education and management may affect clinic patients' overall healthcare status. In addition, it will obtain physicians' beliefs on the amount of time they spend educating and managing patients with diabetes and their opinions of pharmacists as a major provider of a diabetes management service.

Data analysis will be conducted using appropriate parametric and nonparametric statistical tests, and will compare survey results. Both surveys will be approved by the Institutional Review Board before data is collected.

Conclusion

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

Learning Objectives:

Evaluate the difference between patients and physicians' perceptions of barriers to diabetes education.

Summarize physicians' beliefs regarding pharmacists as a primary provider of diabetes management.

Self Assessment Questions:

T/F: Patients felt they did not receive diabetes education because no inexpensive option was available.

T/F: Physicians strongly agreed that a pharmacist providing diabetes management would improve overall care of patients with diabetes.

DEVELOPMENT AND IMPACT OF A PHARMACIST EDUCATION AND MONITORING PROGRAM FOR MEDICATION NONADHERENT MULTIPLE SCLEROSIS PATIENTS

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PURPOSE: Multiple sclerosis (MS) immunomodulatory therapies have significantly improved our ability to manage this chronic, debilitating disease. Nevertheless, medication nonadherence as well as insufficient disease and drug therapy patient education contribute to suboptimal outcomes. The purpose of this study is to evaluate the impact of a pharmacist-based monitoring and education pilot program on adherence, clinical status, and pharmacy satisfaction amongst medication nonadherent MS patients.

METHODS: Diplomat Specialty Pharmacy (DSP) recently designed and implemented a pilot MS program aimed to improve medication adherence, patients understanding of the disease and non-pharmacological methods for symptom management, and patients ability to self-manage MS medication side effects. This program targets medication nonadherent MS patients over the age of eighteen receiving at least three months of interferon-beta or glatiramer acetate therapy who choose to enroll. Nonadherence is defined by a medication possession ratio (MPR) less than 0.9 using the Standardized Therapy Adherence Research Tool (START, Pfizer) and pharmacy refill records. The program is operated via telephone and mail. Following an initial consultation, pharmacists perform assessments and interventions at eight-week intervals, with additional two-week follow-ups as necessary. Interventions include education about MS, symptom management techniques, and immunomodulating therapy counseling. Pharmacists also provide patient-specific recommendations to improve adherence. Information regarding patients clinical status and satisfaction with pharmacy services are collected as part of routine practice and for quality improvement purposes. An analysis will be performed at baseline and months three, six, nine, and twelve. The analysis focuses on the change in patients self-reported clinical status, as measured by a simplified Expanded Disability Status Scale (EDSS) and the Multiple Sclerosis Impact Scale (MSIS-29), throughout their enrollment in the program. MPRs and patient satisfaction are also evaluated.

RESULTS: Data collection is in progress.

Learning Objectives:

Identify factors which may lead to suboptimal outcomes amongst MS patients, particularly those known to decrease medication adherence.

Discuss the role of pharmacist-based interventions in nonadherent patients with multiple sclerosis.

Self Assessment Questions:

Which of the following is not associated with medication non-adherence amongst multiple sclerosis patients?

- a. Complicated dosing schedules
- b. Inconvenient administration
- c. Physical disabilities
- d. Lack of supportive provider-patient relationships
- e. All of the above

True or False: It is not advisable to periodically review injection training with multiple sclerosis patients to identify recurring problems and reinforce key points, such as injection-site reaction management and site rotation.

EVALUATION OF DEXMEDETOMIDINE VERSUS PROPOFOL FOR SEDATION IN PATIENTS FOLLOWING MAJOR CARDIOTHORACIC SURGERY

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Purpose: Dexmedetomidine is an attractive agent for post-operative sedation because it has analgesic properties and does not cause respiratory depression. The main objective was to compare post-operative opioid use in patients who received dexmedetomidine versus propofol. Quality of sedation, adverse drug events (ADE), and length of mechanical ventilation were assessed as secondary objectives.

Methods: This retrospective study included adult patients who underwent coronary artery bypass graft or valve repair/replacement surgery. Patients with chronic narcotic use, liver failure, or renal failure were excluded. Patients were stratified into two groups based on the sedation method post-operatively (dexmedetomidine vs. propofol). Post-operative opioid requirements were recorded for the duration of the sedative infusion. All opioid doses were converted to milligrams of morphine equivalents and compared between groups. Quality of sedation was reported as the percentage of assessments that were classified as calm or sedated using the institutional sedation scale. ADEs evaluated included bradycardia and hypotension.

Results: To date, 36 patients have been evaluated (dexmedetomidine n=20; propofol n=16). Demographics were similar between groups. The sedative duration was 4 hours and 3.5 hours for the dexmedetomidine and propofol groups respectively (p=0.175). Dexmedetomidine patients received 0 (0-10) mg morphine equivalents whereas propofol patients received 2 (0-33) mg (p=0.005). No opioids were required during sedation in 65% of dexmedetomidine and 19% of propofol patients (p=0.008). The quality of sedation was similar between the two groups (dexmedetomidine=79%; propofol=84%, p=0.667). Similarly, there was no difference in the percentage of patients who experienced an ADE (dexmedetomidine=65%; propofol=69%, p=0.813). All ADEs were hypotension related. The length of mechanical ventilation was 6 (2.5-17.5) hours for dexmedetomidine and 5.8 (3.5-44.5) hours for propofol (p=0.472).

Conclusion: The use of dexmedetomidine in patients following major cardi thoracic surgery yields lower opioid requirements, however this does not shorten the length of mechanical ventilation.

Learning Objectives:

Describe the pharmacokinetic properties of dexmedetomidine.

List the common side effects associated with dexmedetomidine.

Self Assessment Questions:

Which sedative agent has a shorter half life?

- A. propofol
- B. dexmedetomidine
- C. there is no difference in the length of the half life

The most common adverse effects with dexmedetomidine are:

- A. hypotension
- B. bradycardia
- C. respiratory depression
- D. A and B
- E. all of the above

FREQUENCY OF POTENTIALLY INAPPROPRIATE MEDICATION USE IN ELDERLY HOSPITALIZED PATIENTS WHO HAVE EXPERIENCED A FALL

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Background: Falls in elderly hospitalized patients are a major problem facing modern healthcare organizations. The direct costs associated with falls related injury significant. However, national quality monitoring organizations are currently tracking falls data and making them available to the public. This may impose major indirect long term costs at the organizational level. In addition, Medicare is no longer providing financial support to treat results of preventable adverse events during hospitalization such as falls. Medications can play a significant role in mental status changes, gait disturbances, and sedation in elderly patients, all of which can result in a fall. Therefore, attention should be given to medication use practices to prevent falls.

Purpose: To determine if use of potentially inappropriate medications in elderly hospitalized patients is associated with falling.

Methods: This study will be a retrospective, observational, descriptive evaluation of medications received by elderly patients hospitalized between July 2006 and June 2007 who experienced a fall. A list of all patients aged 65 and older who fell during this time will be obtained from our legal department. A six hour time period preceding the fall will be reviewed on the medication administration record of each patient to determine if any potentially inappropriate medications were administered. Medications will be deemed potentially inappropriate if they are included on the Beers list and their potential adverse effects could have contributed to a fall. A small number of additional medications will also be included due to their frequent use at our institution and similarity to other medications on the list. The total number of PIMs and any co-morbid disease states which may have predisposed the patient to falling will also be evaluated.

Results: Data gathering is in progress, results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain how physiologic and psychosocial changes associated with aging can result in an increased propensity for elderly patients to experience adverse drug events

Describe the Beers Criteria and how their application to clinical pharmacy practice may reduce the risk of adverse drug events in elderly hospitalized patients

Self Assessment Questions:

Which of the following medications should be used with caution in elderly patients?

- a. Diphenhydramine
- b. Meperidine
- c. Prochlorperazine
- d. Diazepam
- e. All of the above

What easy to recognize variable is the most reliable risk indicator of an adverse drug event occurring in an elderly patient?

DOES BODY WEIGHT IMPACT THE EFFICACY OF VASOPRESSIN THERAPY IN THE MANAGEMENT OF SEPTIC SHOCK?

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Patients in septic shock often require continuous infusions of supraphysiologic catecholamines to maintain adequate blood pressure and tissue perfusion. Despite their utility and efficacy, catecholamine vasopressors have been associated with adverse effects such as tachycardia, arrhythmias, and myocardial, mesenteric and peripheral ischemia. Vasopressin has been used in catecholamine-refractory septic shock in an attempt to decrease vasopressor requirements. The body's physiologic response to shock states includes increased circulating vasopressin concentrations. However, patients with septic shock exhibit a relative deficiency of circulating vasopressin after the initial increase. Subsequently, exogenous vasopressin is often administered for its vasoconstrictive effect in septic shock. Like other potent vasoconstrictors, it has been associated with adverse effects related to its pharmacologic effects on the vasculature. The catecholamine vasopressors are typically titrated to a blood pressure response within dose ranges in terms of mcg/kg/minute. Vasopressin dosing is designed for physiologic replacement and titrated for blood pressure only to a limited extent. The purpose of our study is to determine if body weight has an impact on vasopressin efficacy in the management of septic shock.

The study has been approved by the institutional review board. Our study is a retrospective correlative study. Data will be collected on all patients who received vasopressin in addition to catecholamine vasopressors for the management of septic shock over a 24 month period. The primary outcome is the mean change in vasopressor dose at 1 and 2 hours after vasopressin initiation. Secondary outcomes include changes in systolic, diastolic, and mean arterial pressure, changes in heart rate, corticosteroid use, amount and type of intravenous fluid replacement, and incidence of adverse effects. Vasopressor dose response and blood pressure will be analyzed relative to vasopressin dose in units/kg/min. Corticosteroid use, amount of IV fluid replacement, and adverse effects will be analyzed with descriptive statistics.

Results will be presented.

Learning Objectives:

Describe the rationale for use of vasopressin in septic shock.

Discuss limitations of available data regarding vasopressin dosing in septic shock.

Self Assessment Questions:

TRUE/FALSE: Circulating vasopressin levels are elevated in septic shock.

TRUE/FALSE: Vasopressin dosing in septic shock is intended to provide physiologic replacement.

STUDENT PERCEPTION OF WIKI IN AN ELECTIVE COURSE

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PURPOSE: This study surveyed third professional year pharmacy students enrolled in a pharmacy elective course in order to (1) describe student experiences and overall satisfaction with using wiki and (2) evaluate whether level of involvement in a wiki is associated with student performance or satisfaction. Faculty experience with using wiki was also assessed.

METHODS: A pre- and post-survey was used to evaluate previous experiences and satisfaction with wiki use as a voluntary option for participation points. Level of student involvement will be compared to student reported course performance and wiki satisfaction. Faculty feedback and experiences both in the classroom and with using wiki will be gathered.

RESULTS: Based on responses from the pre-survey 50% (14/28) of the students have used a wiki; none reported collaborating or participating in a wiki prior to the course. Of those who have used a wiki, 79% (11/14) have a very positive or positive attitude toward wikis, 86% (12/14) find wikis very useful or useful and 100% (14/14) said they use wikis to search for information. Information from the post-survey and faculty feedback is pending.

CONCLUSION: Students who are aware of wikis have a favorable attitude towards them. Wikis may provide a tool to actively involve students and to foster the idea of student-directed learning.

Learning Objectives:

Define the concept of wiki

List three areas in which wikis can be utilized

Self Assessment Questions:

Which of the following best defines the concept of a wiki?

- a. hypertext documents created by users as a way to collaborate
- b. file-sharing systems used as a way to collaborate
- c. webpages created by users as a way to collaborate
- d. data-management systems used as a way to collaborate

A wiki can be utilized as a way to: _____.

- a. communicate among researchers
- b. collaborate and share information
- c. aid student learning in the classroom
- d. all the above

THE USE OF PSYCHOTROPIC AGENTS IN CHILDREN WITH PSYCHIATRIC EMERGENCIES

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Background:

The etiologies of most psychiatric emergencies in patients with aggression presenting to the Emergency Department (ED) are unknown. Aggressive patients often pose a danger to themselves and the people providing supportive care; therefore, the goals of medication management include alleviation of agitation and control of aggression or violent behaviors, but not to overly sedate the patient, hindering assessment and further care.

Purpose:

To evaluate the overall medication use practice in children treated for psychiatric emergencies with aggression in the ED at Cincinnati Children's Hospital Medical Center (CCHMC).

Methods:

This is a retrospective review of patients who presented to the ED between July 1, 2005 and December 31, 2007 and received a psychotropic medication (haloperidol lactate, ziprasidone mesylate, olanzapine, risperidone, lorazepam, midazolam, diphenhydramine) for the treatment of aggression. A query of the EDs electronic record system using ICD9 codes, specifically for mental disorders, was executed to retrieve the dose, route of administration, and adverse drug reactions (ADRs) observed for the aforementioned psychotropic agents used for psychiatric emergencies. Additional data collected from this query include: patient demographics, documentation of physical restraint use, ECG orders and co-medications (benztropine, lorazepam, diphenhydramine) administered with haloperidol lactate. Patients were excluded if they: were over the age of 18, did not receive a dose of a psychotropic agent or had a positive urine toxicology screen for substances other than current home medications.

Results/Conclusion:

Data collection and analysis are ongoing. The results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Understand the major differences (i.e., mechanism of action, dosing and ADRs) among psychotropic agents utilized in the ED for psychiatric emergencies.

Identify and determine if the most commonly used psychotropic agent in the ED for patients with aggression is appropriately dosed and administered with respect to associated adverse effects.

Self Assessment Questions:

T/F - EPS is attributed to the unregulated activity of ACh when haloperidol binds to D2-receptors in the nigrostriatal system of the brain.

T/F - Atypical antipsychotics possess quinidine-like properties and are capable of causing QTc prolongation.

RAPID INFUSIONS OF MONOCLONAL ANTIBODIES VERSUS STANDARD INFUSIONS AND THE INCIDENCE OF ACUTE INFUSION REACTIONS

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Background: The use of monoclonal antibodies in combination with standard chemotherapy has increased treatment efficacy in both solid tumor and hematological malignancies. Due to their ability to slow progression and improve patient survival, many of them are now recommended as first line treatment in combination with chemotherapy for the treatment of various malignancies. Recent studies suggest that these agents can be infused at a rate faster than that in the package labeling without an increase in the number of acute infusion reactions.

Purpose: To determine if accelerated infusion rates of monoclonal antibodies are associated with an increase in the occurrence of acute infusion reactions compared to standard infusion rates.

Methodology: This study will be a retrospective chart review of patients receiving bevacizumab, trastuzumab, or rituximab for treatment of malignancy from January 2006 through March 2008. Patients will be divided into groups based on the type of monoclonal therapy infusion rate (standard vs accelerated) they receive. All patient specific data will be reported with numerical identifiers to maintain confidentiality. A retrospective chart review will be performed to gather the following patient specific information: age, gender, cancer diagnosis, chemotherapy regimen received, monoclonal antibody received, number of infusions, pre-medications, drug allergy information, and the occurrence of infusion related reactions. The primary outcome is an infusion related reaction defined as any adverse reaction for which the infusion was stopped or treatment was required. Multivariate regression analysis will be performed to determine if there is an association between infusion rate and hypersensitivity reactions. The variables included in the primary analysis will include: age, gender, cancer diagnosis, chemotherapy regimen, infusion number, premedications, and the monoclonal antibody received. Any acute infusion reaction found will be graded based on the National Cancer Institute Common Terminology Criteria (NCI CTC).

Results and Conclusions: Will be presented at residency conference.

Learning Objectives:

Review the different types of monoclonal antibodies.
Identify which monoclonal antibody carries the highest risk of an acute infusion reaction.

Self Assessment Questions:

Which of the following monoclonal antibodies is chimeric?
A. Trastuzumab
B. Bevacizumab
C. Rituximab
T/F Trastuzumab carries the highest risk of an acute infusion reaction.

WEIGHT-BASED DOSING OF DALTEPARIN TO TREAT PULMONARY EMBOLISM OR DEEP VEIN THROMBOSIS IN PATIENTS WEIGHING GREATER THAN 150 KG

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Background: Low-molecular weight heparin (LMWH) is indicated for use in treatment of deep vein thrombosis (DVT) and pulmonary embolism (PE). Few studies include patients weighing greater than 150 kg, therefore additional efficacy and safety data is needed before LMWH can routinely be used in this patient population.

Purpose: The objectives of the study will be to demonstrate that: 1) actual body weight dosing of dalteparin in patients weighing greater than 150 kg results in therapeutic anti-Xa levels; 2) therapeutic anti-Xa levels result in positive outcomes with regard to hemorrhagic events and DVT/PE recurrence.

Methods: This will be an open label prospective and retrospective study. The combined target sample size will be 30-45 patients. **PROSPECTIVE PORTION:** Adult patients weighing greater than 150 kg with a diagnosis of new/recurrent DVT/PE will be considered for inclusion. Patient demographic information including age, sex, height and weight will be recorded, along with vital signs and laboratory data. Comorbidities and medication regimen will also be noted. Patients will be given 100 units/kg of dalteparin subcutaneously every 12 hours, with dosing based upon actual body weight. A blood sample will be drawn 3-4 hours after the second dose and the anti-Xa level measured. Dosing adjustments will be made until the anti-Xa level is therapeutic. Patients will be contacted 30 days after the start of dalteparin to inquire about hemorrhagic events or DVT/PE recurrence. Descriptive statistics will be used to examine the objectives. **RETROSPECTIVE PORTION:** Patients will be identified from hematologist Dr. Palascak's patient database. Dalteparin medication regimen and anti-Xa levels drawn will be noted. Inclusion criteria, exclusion criteria, data collection and data analysis will be identical to the prospective portion of the study.

Results: Patient accrual is ongoing

Conclusions: To be presented at meeting

Learning Objectives:

Review the mechanism of action of low molecular weight heparins.
Review dalteparin pharmacokinetics in obese patients.

Self Assessment Questions:

Low molecular weight heparins act as anticoagulants by binding to antithrombin III, which results in inactivation of coagulation factor Xa. True/False
There is a significant correlation between volume of distribution/clearance and actual body weight in obese patients. True/False

PROMOTING EVIDENCE-BASED USE OF TOTAL PARENTERAL NUTRITION (TPN) IN THE ACUTE CARE SETTING: EVALUATING THE OVER-UTILIZATION OF TPN SOLUTIONS AND STANDARDIZING TPN FORMULAS

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Purpose:

Total Parenteral Nutrition (TPN) is a form of nutrition that can be life-saving, but its use has inherent risks and is expensive. Clinically significant complications from TPN use are a major concern that includes: line infections, re-feeding syndrome, and hyperglycemia. Current literature suggests the use of TPN should be reserved only after enteral nutrition (EN) is contraindicated. JCAHO recognizes recent evidence that "standardized" parenteral formulations have been shown to be practical - potentially improving outcomes for most patients, and therefore, states that organizations are encouraged to begin transitioning to these products in anticipation of future inclusion under the National Patient Safety Goals (NPSG). A "standardized" formula will provide many beneficial components including maintained quality and consistency through good manufacturing practice (GMP) standards, reduced risk of calculation errors, and will allocate staff resources to specialty patients requiring "customized" TPN. By promoting evidence-based use of TPN, patient care will be optimized by reducing complications and length of stay - ultimately, resulting in reduced cost both to the patient and the institution.

Methodology:

Project goals include assessing whether patients are appropriately receiving TPN, and if so, whether these patients may benefit from a "standardized" TPN formula. A retrospective review over a four week period was conducted on thirty-three adult patients receiving parenteral nutrition (PN). PN orders were evaluated for prescriber sub-specialty, electrolyte changes, indication for TPN, and duration of therapy. In addition, a second retrospective review was conducted on twenty-seven patients receiving TPN. These patients are being evaluated to assess if a "standardized" formula(s) exists that may be as or more appropriate. If time permits, a collaborative practice agreement will be investigated and criteria will be established for a select patient population who are able to benefit only from a "customized" formula. Depending on if the majority of patients may appropriately receive a "standardized" formula(s), a PN order set will be developed and implemented.

Results/Conclusions:

Results and conclusions will be presented at the GLPRC

Learning Objectives:

List two clinically significant complications from TPN use that are a major concern.

Identify two beneficial components that a "standardized" formula may provide.

Self Assessment Questions:

True/False. One advantage of a "standardized" formula is that it will allocate staff resources to specialty patients requiring "customized" TPN.

True/False. Joint Commission on Accreditation of Healthcare Organizations (JCAHO) encourages organizations to begin transitioning to "standardized" TPN solutions in anticipation of future inclusion of these products under the National Patient Safety Goals (NPSG).

DECREASING LENGTH OF HOSPITAL STAY THROUGH ANTIBIOTIC OPTIMIZATION

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Purpose: At Froedtert Hospital, a 450-bed academic medical center, patients with self-pay insurance status or other confounding social factors who are prescribed outpatient parenteral antimicrobial therapy (OPAT) have been noted to have a delay in hospital discharge. Confounding social factors include situations such as patients with insurance who are unwilling to participate in OPAT care or who are known current intravenous (IV) drug abusers. Coordination of OPAT requires extensive planning and patient education. Outpatient care is often addressed after the patient is stable and ready for discharge resulting in inadequate time to coordinate care and subsequent discharge delays. The objective of this project is to determine reasons for the delay in hospital discharge among patients with self-pay insurance status or other confounding social factors who are prescribed OPAT and to streamline workflow by optimizing antibiotic selection with the goal of reducing length of stay.

Methods: A retrospective review of patients who received IV antibiotics through the day of discharge and were listed as self-pay insurance status was conducted from January through September 2007. Patients with insurance and confounding social factors were referred by social workers and pharmacists. Discharge summaries and patient charts were utilized to determine patients who were prescribed OPAT. Data collection parameters included were length of stay, diagnosis, allergies, antibiotics prescribed, length of antibiotic treatment, culture results and antibiotic narrowing, primary medical service, and infectious disease consultation obtained. Based on the information retrieved from this retrospective review and literature sources, patients were assessed for alternative options to OPAT. A proactive IV antibiotic discharge program that provides earlier involvement of a multidisciplinary team in the discharge planning process will be developed.

Results/Conclusions: Implementation of the program is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List characteristics of an appropriate candidate for OPAT according to the IDSA practice guidelines for OPAT.

Describe antibiotic optimization techniques that can assist with streamlining workflows when discharging patients prescribed OPAT.

Self Assessment Questions:

According to the IDSA practice guidelines for OPAT, which of the following is characteristic of an appropriate candidate for OPAT?

- A. A treatment option for the patient is enteral antimicrobial therapy.
- B. The outpatient environment is unsafe and inadequate to support care.
- C. The patient and / or caregiver are willing to participate in OPAT care.
- D. The patient has unreliable means for communication (e.g. no telephone).

Answer: C

True or False. Early communication between physicians, nurses, pharmacists, and case workers can assist with streamlining workflows when discharging patients prescribed OPAT.

Answer: True

PRELIMINARY STEPS TOWARD COMPLIANCE WITH THE JOINT COMMISSIONS 2008 NATIONAL PATIENT SAFETY GOAL (NPSG) 3E: REDUCE THE LIKELIHOOD OF PATIENT HARM ASSOCIATED WITH THE USE OF ANTICOAGULATION THERAPY

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Purpose: As identified by the Joint Commission and the Institute for Safe Medication Practices, anticoagulation is a high risk treatment, which commonly leads to adverse drug events due to the complexity of dosing these medications, monitoring their effects and outpatient compliance issues. It has been established that the use of standardized practices can improve therapeutic outcomes and reduce the likelihood of medication misadventures associated with the use of anticoagulant therapy.

In accordance with NPSG 3E, the following abbreviated implementation expectations will apply January 1, 2009:

1. A defined anticoagulant management program is implemented to individualize care provided to each patient.
2. Oral unit dose products and pre-mixed infusions are used, when available.
3. Warfarin is dispensed for patients in accordance with established monitoring procedures.
4. Approved protocols are utilized for initiation and maintenance of anticoagulation therapy
5. For all patients receiving warfarin, baseline and current INRs are available and used to monitor/adjust therapy.
6. Dietary services are notified of all patients receiving warfarin and responds accordingly.
7. Programmable pumps are used for continuous heparin infusions.
8. A policy addresses baseline and ongoing lab tests for heparin and LMWH.
9. Education is provided regarding anticoagulation therapy to prescribers, staff, patients and families.
10. Patient/family education includes the importance of follow-up, monitoring, etc.
11. Anticoagulation safety practices are evaluated.

The purpose of this project is to evaluate current practice at Grant Medical Center relative to NPSG 3E.

Methods: A gap analysis will be performed to determine current practice, desired practice, and required action steps to assure full compliance with NPSG 3E. Identification of gaps will involve collaboration with various disciplines (nursing, dietary, physicians, etc.), data collection utilizing Quality Resource Management, Process Excellence involvement for statistical analysis and chart review to obtain additional information.

Results and conclusions will be discussed at the conference.

Learning Objectives:

Understand the rationale and implementation expectations for Joint Commissions NPSG 3E.

Understand the importance of using standardized practices in order to reduce the likelihood of patient harm associated with the use of anticoagulants.

Self Assessment Questions:

Describe the key components of NPSG 3E.

Describe a process to evaluate compliance with National Patient Safety Goals.

EVALUATION OF THE SAFETY AND EFFICACY OF INTRAVENOUS INFUSION OF PHYTONADIONE

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Background: The American College of Chest Physicians (ACCP) published recommendations for the management of non-therapeutic INRs in 2004. They advocate the use of intravenous phytonadione when the oral route cannot be used or when holding warfarin is not enough for the INR to return to therapeutic levels. Prior to the recommendations, the ACCP had recommended subcutaneous over both the intravenous and oral routes for the reversal of anticoagulation. A meta-analysis of studies using oral and intravenous phytonadione concluded the two routes are similar in efficacy when managing excessive anticoagulation. The use of oral and intravenous phytonadione was more effective at achieving the target INR when compared to withholding doses of oral anticoagulation and demonstrated the inferiority of subcutaneous phytonadione compared to the oral and intravenous routes. Despite the lack of difference in efficacy between subcutaneous phytonadione and placebo, the 1995 guidelines still cast a shadow of doubt over the safety of intravenous infusion of phytonadione. The purposes of this study are to evaluate the safety profiles seen with using intravenous infusion of phytonadione and to compare the current treatment practices for using phytonadione to reverse excessive anticoagulation at RUMC as compared to the ACCP guidelines.

Methods: The RUMC computer database was utilized to search for patients who received phytonadione as from March to December 2007. Patient charts are reviewed for adverse reactions to intravenous phytonadione and for usage in accordance with the ACCP 2004 recommendations. To be included patients must be at least eighteen years of age, receive phytonadione during hospitalization, and been taking oral anticoagulation therapy prior to the administration of phytonadione. Patients were excluded if phytonadione was used for liver failure or pre-surgically in patients not on vitamin K antagonists.

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

Learning Objectives:

Review the CHEST Consensus Conference Recommendations for managing elevated INRs or bleeding in patients receiving vitamin K antagonists.

Identify serious adverse effects of intravenous phytonadione.

Self Assessment Questions:

Routes of administration of phytonadione recommended by the 2004 CHEST Guidelines for supratherapeutic INRs in patients receiving vitamin K antagonists are:

- a. Oral
- b. Subcutaneous
- c. Intravenous
- d. a and c
- e. all of the above

A 66 y.o. male with a history of atrial fibrillation arrives in the emergency room with an INR of 10.5. He is A&O x3 and has a large bruise on his right upper arm (from when he accidentally bumped into a doorway), but you do not notice any obvious bleeding. His hemoglobin is 11.9. His dose of warfarin was increased about 1 week ago from 4mg daily to 6mg daily. Would you give this patient phytonadione? If so, how much and by what route?

IMPACT OF A WRITTEN GUIDELINE AND EDUCATION TO PREVENT CONTRAST INDUCED NEPHROPATHY IN PATIENTS UNDERGOING CEREBRAL ANGIOGRAPHY

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Background: Contrast induced nephropathy (CIN) is a severe adverse event associated with the use of contrast dye. Most studies evaluating therapies to prevent CIN involve patients undergoing cardiac catheterization. Data for the prevention of CIN in the neuroscience patient population undergoing cerebral angiography is lacking. Therapies to prevent CIN in these patients may be overlooked even though they receive a similar amount of dye compared to cardiac catheterization patients, may have multiple exposures, and be at risk for CIN. The objective of this study is to evaluate the impact of a written guideline and education for prevention of CIN in the neuroscience population.

Methods: This is a single center, retrospective analysis of patients undergoing cerebral angiography from April 2007 to May 2008. A guideline developed by pharmacists and physicians in the neuroscience intensive care unit identified high risk patients and treatment options (n-acetylcysteine and/or sodium bicarbonate or hydration) to prevent CIN. The guideline was implemented as an order set in a computerized physician order entry system. Education was given to nurses and physicians. Statistical analysis will compare the pre-guideline retrospective controls to the post-guideline group. The primary endpoint is the frequency of high risk patients who received CIN preventative treatment. The secondary endpoint is the incidence of contrast induced nephropathy defined by a rise in serum creatinine greater than or equal to 0.5mg/dL or 25% increase in serum creatinine from baseline at 48-72 hours after administration of the contrast agent.

Results: Preliminary research has identified 27 patients meeting predetermined high risk criteria for therapy out of 210 undergoing cerebral angiography prior to guideline implementation from April to November 2007. Of these 27, eleven (40%) patients were given therapy to prevent CIN. Additional data collection is ongoing and will be presented at the Great Lakes Pharmacy Conference.

Conclusion: Pending

Learning Objectives:

Identify patients at high risk for contrast induced nephropathy.
Review treatments used to prevent contrast induced nephropathy.

Self Assessment Questions:

- 1) Which of the following are risk factors for developing contrast induced nephropathy?
 - a) Amount of dye given and repeat exposures
 - b) Elevated baseline serum creatinine
 - c) Diabetes
 - d) Age
 - e) All of the above
- 2) Which of the following are treatment options to prevent contrast induced nephropathy?
 - a) Diuretics
 - b) n-acetylcysteine
 - c) Sodium bicarbonate hydration
 - d) B and C only
 - e) All of the above

IMPROVEMENT STRATEGIES FOR COMMUNICATION OF MEDICATION SIDE EFFECTS AS REPORTED BY HCAHPS PATIENT SATISFACTION SURVEY SCORES

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Purpose:

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) initiative is designed to provide a standardized survey instrument to measure and publicly report patient satisfaction with critical aspects of the hospital experience. Comparable data on the patients perspective of hospital care is collected which allows for objective and meaningful comparisons among hospitals in areas important to consumers. One such medication-specific aspect, which scores below 50% nationally, includes the communication of medication side effects. Anticipation of required public reporting of this data, to begin in March 2008, has created incentives for hospitals to improve their quality of care and enhance public accountability by providers.

Methods:

Community Health Network has developed a multi-hospital network implementation strategy to enhance the communication of medication side effects between hospital staff and patients resulting in the improvement of HCAHPS satisfaction scores. Interventions identified include placing common side effects on the medication administration record (MAR) and educating staff on the importance of this initiative. Identification of the top 200 medications, based on volumes dispensed throughout the Indianapolis-area network hospitals, was performed. Side effects specific to these medications were also identified by pharmacists and listed on the MAR, which is readily available to the nurse at the patients bedside. Survey data collected will be used to evaluate the effectiveness of the interventional strategies previously described. Data will be benchmarked externally among other hospitals nationally as well as internally between specific units and hospitals within the health system. The primary outcome to be measured is the percent of always responses reported when asked about the communication of side effects associated with any new medications. Statistical analysis will be performed to determine whether scores have increased post-implementation versus pre-implementation of these strategies.

Results and Conclusions:

Data collection is in progress. Results and Conclusions will be presented at Conference.

Learning Objectives:

Describe the importance and key components of the HCAHPS initiative.

Identify areas in which pharmacy staff can help improve HCAHPS survey scores, specific to communication of medication side effects.

Self Assessment Questions:

True or False: The HCAHPS survey is designed to measure the patients satisfaction with their inpatient hospital stay.
True or False: Required HCAHPS survey data will become publicly reported in March of 2008.

ASSESSING FACTORS INFLUENCING PATIENTS DECISIONS TO OBTAIN SHINGLES VACCINE IN COMMUNITY PHARMACIES

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Shingles, the secondary infection of the varicella-zoster virus, is a painful and debilitating condition that affects 20-30% of Americans over a lifetime. Since the approval of the shingles vaccine, community pharmacists' role has been essential in educating patients and administering the shingles vaccine.

However, the percentage of indicated patients vaccinated with the shingles vaccine remains significantly low.

Objectives: 1) To identify factors that influence patients' decisions to receive the shingles vaccine in community pharmacies. 2) To assess subjects' satisfaction with the shingles immunization service provided by community pharmacists in a grocery chain pharmacy.

Methods: The shingles vaccine research study was conducted in 7 different sites of a grocery chain pharmacy that offers extended immunization services in the Chicagoland area. All participating pharmacists were trained via a study informational session. This session included a review of the shingles disease state, shingles vaccine and the study methods including inclusion and exclusion criteria. Patients of age 60 and older were recruited to participate by the trained community pharmacists. All subjects who agreed to participate were asked to complete Part 1 of the study survey. This survey was used to gather subjects' demographic information and to identify factors influencing subjects' decisions to be immunized against shingles. The participants were offered the shingles vaccine from the immunizing pharmacist based on the current immunization protocol. Subjects who received the shingles vaccine were also asked to complete part 2 of the survey. This part of the study survey evaluated subjects' satisfaction with the shingles immunization service offered by community pharmacists. All completed, unidentifiable surveys were collected and reviewed by the investigators.

Results: Responses of the survey will be analyzed via SPSS. It is anticipated that upon this analysis, the positive and negative factors influencing subjects' decisions to obtain the shingles vaccine will be identified.

Conclusions: In progress

Learning Objectives:

Discuss the zoster vaccine indications and contraindications

Identify the different roles of part I and part II of the study survey

Self Assessment Questions:

According to the Shingles Prevention Study, the beneficial effects of the zoster vaccine are a 51% decrease in shingles episodes and 66% decrease in postherpetic neuralgia cases.

- a) True
- b) False

According to the ACIP, all of the following are contraindications for the zoster vaccine except:

- a) Active tuberculosis
- b) Diabetes
- c) High dose steroids
- d) Active HIV infection

COMPARISON OF SIMPLIFIED DIGOXIN DOSING NOMOGRAM TO TRADITIONAL DOSING METHODS IN HEART FAILURE PATIENTS IN THE MODERN ERA: A PROSPECTIVE STUDY

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Background: Digoxin is a commonly prescribed medication for the treatment of heart failure (HF). Based on results from post-hoc analyses of several large clinical trials, the new recommended target for serum digoxin concentration (SDC) is < 1.0 ng/mL in patients with HF. We previously developed a new, simplified digoxin dosing nomogram designed to achieve a target SDC between 0.5 - 0.9 ng/ml based on retrospective data. The relationship between P-glycoprotein genetic polymorphisms and the precision of dosing nomogram in achieving target SDC is not known.

Objectives: The primary objective of this study is to prospectively compare the effectiveness in achieving a target SDC between 0.5 - 0.9 ng/ml between our proposed digoxin dosing nomogram, and standard dosing practices. The secondary objective is to investigate the influence of genetic polymorphisms on digoxin dosing in achieving target SDC using our nomogram.

Methods: Patients will be evaluated prospectively and results will be compared to those from historical controls. All patients must be at least 21 year old and must have a diagnosis of heart failure. Patients are excluded if they are pregnant, have unstable renal function, are on hemodialysis, or are taking other medications known to interact with digoxin. For the prospective arm, digoxin dose will be determined based upon a patient's ideal body weight and creatinine clearance using the proposed dosing nomogram. Steady-state SDC and creatinine will be assessed 2 - 4 weeks after initiation or change in digoxin dose. Genetic testing for digoxin polymorphisms will be performed on DNA samples from patients in the prospective arm. Patients in the historical control arm will be identified from laboratory records of SDC measured between January 1, 2003 and August 31, 2006.

Results: In process of data collection

Learning Objectives:

Describe the current recommendations on therapeutic serum digoxin concentrations (SDC) for use in heart failure and explain the rationale for these recommendations.

Describe how to use the proposed digoxin dosing nomogram and our methods for evaluating its effectiveness.

Self Assessment Questions:

True/False: Post-hoc analysis of the DIG trial showed that heart failure patients with SDC of 0.5 ng/ml - 0.8 ng/ml had a 6.3 % lower all-cause mortality, compared to placebo.

True/False: The 2006 HFSA heart failure guidelines recommend target SDC of < 1.0 ng/ml.

EVALUATION OF CURRENT PRESCRIBING PRACTICES AND DOSING OF EPOETIN ALFA

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Background:

Anemia is defined as a condition where there is a lower than normal number of red blood cells in the body or a reduction in the body's hemoglobin level. Epoetin alfa is FDA indicated for the treatment of anemia caused by neoplastic disease, chemotherapy (non-myeloid malignancy), chronic renal failure, induced by zidovudine and as allogenic prophylaxis for blood transfusion prior to surgical procedure. In addition, epoetin alfa is used for a variety of other non-FDA approved forms of anemia. Recent revisions to the product labeling of epoetin alfa and other Erythropoiesis-Stimulating Agents (ESAs) have outlined warnings of increased incidence of stroke and cardiovascular events when hemoglobin levels are raised above 12mg/dl.

Purpose:

This study will evaluate the use and indication of epoetin alfa at UPMC and assist in coming up with a way to minimize adverse events and cost while optimizing appropriate usage and patient outcomes. The results will then be used to create a protocol for the use of epoetin alfa within the institution.

Methods:

After IRB approval, a retrospective chart review of 80 patients who received epoetin alfa at UPMC will be performed from a list of patients generated by the Department of Pharmacy. A data collection form was developed to obtain hospital admission date and discharge date, admitting diagnosis, history of present illness, past medical history, epoetin alfa indication, medication list, hemoglobin, hematocrit, transferrin saturation, serum ferritin, MCH, MCV, folic acid, B-12 levels, platelet count, blood pressure, initial dose, dose adjustments, discharge dose, duration of treatment, and if the patient required a blood transfusion. Patient identifiers will be removed from the collected data except date of admission and date of discharge and each patient will be assigned a study number.

Results:

Data collection is in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

To determine if the appropriate use and indication and duration of therapy of epoetin alfa is being used in patients at the University of Toledo Medical Center.

To determine if the appropriate lab values and patient parameters are met prior to use of epoetin alfa. Also, to determine if the appropriate monitoring is completed for patients prescribed therapy with epoetin alfa.

Self Assessment Questions:

The FDA has issued a black box warning for Erythropoiesis-Stimulating Agents (ESAs) indicating that treatment to hemoglobin levels greater than what level should be avoided due to increased risk of stroke and cardiovascular events?

Name three FDA approved indication for epoetin alfa.

IMPACT OF MULTIMODAL PRE-EMPTIVE AND ADJUNCTIVE ANALGESIA ON CONCOMITANT OPIOID USE, LENGTH OF STAY, AND POST OPERATIVE PAIN CONTROL IN TOTAL KNEE ARTHROPLASTY.

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Background: Total knee arthroplasty (TKA) is one of the most prevalent and painful orthopedic surgical procedures. Multimodal analgesia combines the use of pharmacological agents with different mechanisms of actions which act synergistically to decrease postoperative pain, while pre-emptive analgesia involves the administration of analgesics prior to painful stimuli in order to prevent central sensitization and thus the amplification of pain. Adjunctive analgesia is the addition of non-opioid medications with different mechanisms of action to a pain regimen to improve pain management. Literature has suggested that pre-emptive and adjunctive analgesia are both associated with decreased side effects and opioid use.

Purpose: The purpose of this study is to determine if multimodal analgesia is associated with decreased side effects and post-operative opioid use at Froedtert Hospital, a 450-bed academic medical center. Froedtert Hospital's multimodal therapy regimen for knee replacements includes: acetaminophen, celecoxib, gabapentin, and a continuous ropivacaine peripheral nerve block. Inclusion criteria: primary total knee replacement, single surgeon, continuous femoral and sciatic nerve blocks, and spinal anesthesia. The primary objective is to determine the impact of multimodal pre-emptive and adjunctive analgesia on concomitant opioid use, length of stay, and post operative pain control in total knee arthroplasty (TKA). Secondary objectives include the incidence of side effects.

Methods: The pharmacy computer system, billing information, and medical record were used to obtain data both prior to and after the implementation of multimodal therapy. Data collection included: a medication use evaluation of opioid use after surgery, length of stay, and post-operative pain control via visual analog pain scores. There are approximately 100 patients in the study and control groups.

Results/ Conclusions: Data is pending statistical analysis and is powered to determine a statistical difference in length of hospital stay, side effects, and post-operative opioid use. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Understand the mechanism by which multimodal analgesia reduces painful stimuli and prevents the amplification of pain. Identify the benefits of multimodal analgesia

Self Assessment Questions:

T/F: Multimodal analgesia uses a combination of analgesic agents and techniques which can reduce the incidence of side effects and allow for lower doses of the individual drugs.

T/F: Pre-emptive analgesia is the administration of analgesics prior to painful stimuli in order to prevent central sensitization and thus the amplification of pain.

RETROSPECTIVE EVALUATION OF ANTIFUNGAL DRUG COSTS AND UTILIZATION FOLLOWING IMPLEMENTATION OF A POSACONAZOLE PROPHYLAXIS PROTOCOL IN ADULT PATIENTS WITH ACUTE MYELOGENOUS LEUKEMIA

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Posaconazole is a new azole antifungal agent approved in September 2006. A recent trial published in The New England Journal of Medicine demonstrated that posaconazole prophylaxis provided a survival benefit in patients with acute myelogenous leukemia (AML), the first antifungal agent to show a mortality benefit in this patient population. Due to this landmark trial, we chose to implement a posaconazole prophylaxis protocol in patients with AML at the University of Michigan. Due to limited experience with posaconazole prophylaxis, many questions relating to cost and drug utilization remain unanswered. The objective of this study is to determine how implementation of a posaconazole prophylaxis protocol will affect the cost of antifungal drug therapy and how it will change the utilization of other antimicrobial agents.

Patients 18 years of age and older who underwent induction or reinduction therapy for the treatment of AML will be included in this retrospective cohort study. All data collected prior to implementation of the posaconazole prophylaxis protocol will be compared to the data collected after implementation of the protocol. The primary outcome of this study will be antifungal drug costs and will be analyzed using a Cox proportional-hazards survival model to analyze differences in cost, while accounting for mortality. Secondary cost related outcomes will include antibacterial drug expenditure, total antimicrobial drug expenditure, total pharmacy costs, and total hospitalization costs. Secondary outcomes to assess posaconazole efficacy and anti-infective agent utilization include total days of antibacterial therapy, changes in antifungal drug therapy and the reasons for the changes, total days of double coverage with antifungal agents, and percent of patients prescribed an antifungal agent upon discharge. Additional data to be collected will include demographic information, duration of fever, duration of neutropenia, and length of stay. We will also record the incidence of acute renal failure, liver dysfunction, and other clinically significant toxicities leading to changes in antifungal drug therapy.

Learning Objectives:

1. Compare and contrast the two different antifungal drug use strategies (empiric therapy vs. prophylaxis) used in the neutropenic patient

Describe the difficulties and problems associated with the use of posaconazole

Self Assessment Questions:

Which of the following is true of the original antifungal drug use strategy (empiric therapy) in patients with AML?

- a. Antifungal agents were implemented at the first sign of neutropenic fever
- b. Antifungal agents were only utilized if a fungal infection was confirmed by culture
- c. Antifungal agents were started after 5-7 days of neutropenic fever and when a fungal infection was suspected or confirmed
- d. Antifungal agents were rarely used in AML patients

Which of the following is true about the azole antifungal agent posaconazole?

- a. It is available as an oral suspension and as an intravenous solution
- b. It requires a high fat meal for adequate absorption
- c. It can be conveniently dosed once daily
- d. It has no activity against *Aspergillus* species

THE USE OF SODIUM POLYSTYRENE SULFONATE (SPS) IN THE INPATIENT MANAGEMENT OF HYPERKALEMIA COMPARED WITH NON-SPS BASED INTERVENTIONS

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Background: Hyperkalemia is a common and potentially life-threatening problem. Depending on the definition used, the overall incidence of hyperkalemia in hospitalized patients is estimated to be 1.3% to 10%. Hyperkalemia may result from a variety of causes including increased potassium load, transcellular shift of potassium, and reduced urinary excretion of potassium. Medications have been cited as the primary or contributory cause of hyperkalemia in 35% to 75% of hospitalized patients. Sodium polystyrene sulfonate (SPS), a cation-exchange resin, is commonly employed to lower total body potassium. Although there are no clear guidelines for its use, SPS has been widely accepted as a mainstay of therapy for moderate hyperkalemia. Currently, there is limited data on what the precise requirement of SPS is for a specific potassium concentration. Often times, the dosage of SPS is dependent on comorbid conditions, concomitant medications and the providers experience in managing hyperkalemia.

Purpose: The purpose of this study is to examine the use of SPS in managing hyperkalemia compared to non-SPS based interventions (i.e. changes in therapy with hyperkalemia-precipitating medications) in the inpatient setting.

Methods: The study group will include patients who developed hyperkalemia (defined as serum potassium > 5.1 mEq/L) during their hospitalization between January 1, 2006 and December 31, 2006. The primary endpoint will be the mean change in serum potassium concentrations associated with SPS use and non-SPS based interventions. The following data will be collected: age, gender, weight, height, serum creatinine, past medical history, concomitant use of hyperkalemia-precipitating drugs, SPS dose, administration date and time of SPS, changes in therapy with hyperkalemia-precipitating medications for the purpose of reducing potassium concentration, serum electrolyte concentrations before and after intervention, and electrocardiogram changes.

Results/Conclusion: Data collection and analysis are ongoing. Results will be presented at the conference.

Learning Objectives:

Describe the use of SPS in managing hyperkalemia.

Describe the effect of SPS on serum potassium concentrations.

Self Assessment Questions:

SPS is a cation-exchange resin that is used to lower total body potassium. T F

Medications known to precipitate or exacerbate hyperkalemia include:

- a) Angiotensin-converting enzyme inhibitors
- b) Beta adrenergic antagonists
- c) Furosemide
- d) A & B
- e) A, B, & C

ANALYSIS OF ADHERENCE TO CHEMOTHERAPY REGIMENS AT AN URBAN ACADEMIC MEDICAL CENTER

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Purpose/Methods: Recently there has been emphasis placed on patients receiving chemotherapy at the recommended doses and time interval, to ensure optimal results. Our urban setting provides an opportunity to examine multiple variables that might impact adherence. We performed a retrospective analysis of adult patients diagnosed with a solid malignancy or lymphoma treated between September 2004 and 2006 at University of Illinois. Patients receiving oral anticancer agents were excluded. Demographic data and planned chemotherapy regimens were reviewed. The planned chemotherapy regimens were compared with actual administration. Adherence was determined by the frequency of dose delays, reasons for dose reductions and delays, and frequency of early termination of chemotherapy. These data were compared between Black and other minorities (B/OM) to Whites (W) and between the palliative and curative setting. Descriptive statistics were used to analyze the data.

Results: Of the 350 patients treated during this time period, 102 have been analyzed thus far (35M:67F, 80%B/OM:20% W, mean age 55.5 yrs). 85.3% had dose reductions, delays, and/or early termination of therapy. The most common reasons for dose reduction were adverse events and changes in organ function. Reasons for dose delays ≤ 7 days were commonly not documented while the most common reason for dose delays > 7 days was myelosuppression in both W and B/OM. Other causes for dose delays include adverse events, infection/fever, failed appointments, holidays, and vacations. The total frequency of non-adherence to chemotherapy was higher in W than B/OM (95% vs. 84%). The frequency of non-adherence was higher in the palliative setting than curative setting (93.6% vs. 78.2%).

Conclusion: Dose reductions, delays, and/or early termination of therapy are common in patients receiving cancer chemotherapy at our institution, leading to high non-adherence rates even in the curative setting.

Learning Objectives:

Describe the frequency of dose reductions, delays, and early termination of chemotherapy at an urban academic medical center.

Compare the reasons for chemotherapy dose reductions, delays, and early termination between Blacks/other minorities and Whites at an urban academic medical center.

Self Assessment Questions:

True or False: Studies have shown that African-Americans (Blacks) have decreased survival rates in breast cancer even after stage at diagnosis and biological factors are controlled.

List the top 3 reasons for chemotherapy delays based on the research presented.

COMPARISON OF ARGATROBAN DOSING TECHNIQUES: NOMOGRAM VERSUS NON-NOMOGRAM DIRECTED THERAPY

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Background:

In 2004, an argatroban dosing nomogram was instituted at William Beaumont Hospital. The nomogram recommends an initial dose and provides guidance for making dose adjustments to achieve an aPTT value 1.5-3 times the patient's baseline aPTT value. An initial dose of 1.2 mcg/kg/min is recommended in non-ICU patients and a dose of 0.8 mcg/kg/min is recommended for ICU patients or those with hepatic dysfunction. A retrospective evaluation of the nomogram found that minimal dosing adjustments were required to achieve a therapeutic aPTT and a low rate of both new thrombotic episodes and major bleeding events. During the course of this evaluation, approximately 50% of patients were not started on a suggested initial nomogram dose. The clinical course for these patients is unknown compared to those who started on suggested nomogram doses.

Purpose:

The purpose of this study was to compare the laboratory and clinical outcomes in patients who were started on argatroban using initial nomogram suggested doses versus non-nomogram doses.

Methods:

A retrospective study was performed evaluating patients on argatroban from March 2004 forward. Fifty patients were selected sequentially and included in each comparison arm. The following data was collected: demographics, medication history, laboratory data, argatroban dosing, and any major bleeding or thrombotic events. The primary endpoint was the percentage of patients who achieved a therapeutic aPTT with the initial dose. Secondary endpoints included the time-weighted dose and the percentage of time a therapeutic aPTT was achieved. Major bleeding was defined as a decrease in hemoglobin of ≥ 2 g/dL with overt bleeding, a decrease in hemoglobin of ≥ 1 g/dL with overt bleeding requiring transfusion of ≥ 2 units pRBC/FFP, or any intracranial, retroperitoneal, or major prosthetic joint bleeding. Bleeding and thrombotic events were physician adjudicated.

Results and Conclusion:

Final results will be presented at the conference.

Learning Objectives:

Identify how argatroban is dosed differently in clinical practice compared to manufacturer recommendations.

Compare and contrast the clinical outcomes in patients started on argatroban using nomogram versus non-nomogram directed dosing regimens.

Self Assessment Questions:

True or False. In clinical practice, initial argatroban dose requirements are lower than those recommended by the manufacturer.

In an evaluation of argatroban at our institution, patients initially dosed according to the nomogram:

- a) achieved therapeutic aPTT with minimal dosing adjustments
- b) showed a low rate of new thrombotic episodes
- c) showed a low rate of major bleeding events
- d) all of the above

REVD: RETROSPECTIVE EVALUATION OF VANCOMYCIN DOSING IN PEDIATRIC POPULATIONS - 15 MG/KG VERSUS 10 MG/KG

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Purpose: The usual vancomycin dosage regimen for pediatric patients older than one month is 40mg/kg/day in two or three divided doses. Interpretation of this recommendation varies by prescriber at our institution; some order 10mg/kg/dose while others order 15mg/kg/dose. The objective of this study is to evaluate the efficacy of these two regimens 10 mg/kg/dose versus 15 mg/kg/dose in reaching therapeutic peaks and troughs when used for initial vancomycin dosing in the pediatric population.

Methods: This study has been submitted to the Institutional Review Board for approval. The institutions electronic medical record will be used to identify a random sample of pediatric patients who received vancomycin from June 2006 through June 2007. Patients excluded from the study are those younger than three months of age or older than 16 years, patients receiving vancomycin 20 mg/kg for CNS infections, patients receiving ExtraCorporeal Membrane Oxygenation, and patients with a creatinine clearance less than 70 ml/min according to the Schwartz Estimate.

Patient characteristics including age, weight, height, serum creatinine, and the patients vancomycin dosing and sampling histories will be collected. Timing of the doses and serum samples will be evaluated and serum concentrations will be corrected for levels that are drawn before or after the ideal times. At this institution, therapeutic troughs for pediatric patients are 5 to 10 mcg/ml drawn 30 minutes prior to the preceding dose and therapeutic peaks are 20 to 40 mcg/ml drawn 60 minutes after a one-hour infusion.

The Chi Square method will be used to compare the two dosing regimens.

Results: Research in progress.

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

Learning Objectives:

To determine if 10mg/kg/dose or 15mg/kg/dose is more effective in achieving therapeutic vancomycin levels by the third dose.

Evaluate adherence with blood draw timing.

Self Assessment Questions:

True or False. The correct dosing for CNS infections is 15mg/kg.

True or False. A peak serum level of 21 mcg/L drawn at 16:00 is an acceptable peak concentration for a dose that was administered at 12:00.

THE EFFECT OF WARFARIN ADHERENCE AIDS ON INR STABILITY

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Background: Treatment with warfarin is complicated by the drugs narrow therapeutic range and significant drug and dietary interactions. Over anti-coagulation can lead to serious bleeding risks, while under anti-coagulation increases the risk of clotting. Despite frequent monitoring, the international normalized ratio (INR) commonly falls above or below the therapeutic range, placing the patient at risk for bleeding or thromboembolism. Poor patient adherence to warfarin is a leading cause of unstable anticoagulation.

Purpose: The present study will determine the effect of an adherence aid on INR stability in patients on chronic warfarin therapy.

Methods: In this study, subjects will serve as their own controls to determine if filling a patients monthly pill box with the appropriate dose of warfarin by a clinician will improve INR stability. Subjects are those with a history of poor warfarin adherence followed at the Antithrombosis Clinic at the University of Illinois at Chicago Medical Center who are at least 18 years old and have been on warfarin therapy for at least 6 months and will continue to be on therapy for another 6 months. Exclusion criteria include current participation in the Medication Therapy Management Clinic. Subjects are provided a monthly pill box and are called prior to their clinic appointment to remind them to bring their warfarin and pill box. Pharmacists then dispense the appropriate dose of warfarin into the pill box for the appropriate amount of time until their next clinic visit. Upon return, subjects are questioned regarding their compliance, signs and symptoms of bleeding and/or clotting, recent illness, new medications, and dietary habits, as is the usual course of practice in clinic. Data from 3 months prior to using the pill box will be compared to data from 3 months during pill box use to determine if use of the pill box improves adherence, time spent in the therapeutic range and adherence.

Results: To be presented.

Conclusion: To be presented.

Learning Objectives:

Name common reasons for INR to be out of range.

Describe lifestyle choices that can help maintain an in-range INR.

Self Assessment Questions:

List 3 common reasons for INR to be out of range.

Acute alcohol consumption can increase the INR. T/F

PHARMACY TECHNICIAN REGULATIONS: CURRENT STATUSES AND HOSPITAL PHARMACY DIRECTOR PERCEPTIONS

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Background: In Ohio, as in many states, licensure, certification, or registration are not currently required for pharmacy technicians. Ohio Senate Bill 203, or "Emilys Law", has been proposed in response to a medication error that resulted in the death of a pediatric patient. Under the proposed "Emilys Law," pharmacy technicians would be required to be trained, tested, and registered as certified by the Ohio Board of Pharmacy. Pharmacy technicians may substitute the certification requirement with completion of an educational program and designated hours of pharmacy technician training. The pharmacy technician to pharmacist ratio will be restricted to 3:1 under the law.

This study has three objectives: First is to educate hospital pharmacy directors on the requirements of Senate Bill 203. Second is to determine if hospital pharmacies are prepared to become compliant the requirements of Senate Bill 203, and third to assess perceptions of hospital pharmacy directors about the potential impact of Senate Bill 203 on patient safety, customer service, and pharmacy technician recruitment and retention.

Methodology:

A survey will be sent to Directors of Pharmacy at hospital pharmacies in the State of Ohio. We will collect data on health-system demographics, current status of pharmacy technician certification, current status of pharmacist to technician ratios, and perceptions on the potential impact of Senate Bill 203.

Learning Objectives:

Evaluate the status of pharmacy technician certification, pharmacy technician: pharmacist ratios, and licensure in the Great Lakes Residency Conference Region.

Identify potential impact of government-issued regulations for pharmacy technicians on health-system pharmacies.

Self Assessment Questions:

Most states currently recognize PTCB certification of pharmacy technicians. T or F

Most states currently license pharmacy technicians. T or F

CROSS-SECTIONAL ANALYSIS OF TRAMADOL UTILIZATION AND IMPACT ON RECOVERY AMONG PATIENTS WITH SUBSTANCE ABUS

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Statement of Purpose: The objective of this study is to determine if there is an association between prescription tramadol utilization and relapse to substance abuse among patients completing a 21 day substance abuse treatment program.

Methodology: The Department of Veterans Affairs electronic medical record system will be used to identify patients enrolled in the 21 day substance abuse treatment program at the Chillicothe VAMC between January 2007 and August 2007. Inclusion criteria will be age 18 to 65 years and completion of the 21 day substance abuse treatment program. Patients prescribed an opiate, benzodiazepine, or any other controlled substance while enrolled in the treatment program will be excluded from the study. The relapse rate of patients prescribed at least a 30 day supply of tramadol for pain originating from any source will be compared to the relapse rate of patients not prescribed tramadol during the 21 day substance abuse treatment program. Patient charts will be evaluated six months after the completion of the treatment program to determine if relapse to substance abuse has occurred.

Results: Preliminary results show a statistically significant difference in relapse rate between patients prescribed at least a 30 day supply of tramadol for pain originating from any source and patients not prescribed tramadol during the 21 day substance abuse treatment program. Subgroup analysis did not show a statistically significant difference in polysubstance abuse group and alcohol abuse alone group.

Conclusion: In the overall group analysis, there was a difference in relapse rates between patients prescribed tramadol and patients not prescribed tramadol during substance abuse treatment. The results warrant further investigation.

Learning Objectives:

Identify the abuse potential of tramadol in patients with a history of substance abuse.

Describe the trend in relapse rates among patients prescribed tramadol versus patients not prescribed tramadol during substance abuse treatment.

Self Assessment Questions:

Which of the following receptors is tramadol believed to have agonist activity at in high doses?

Was there a difference in relapse rates between patients prescribed tramadol and patients not prescribed tramadol during the 21 days substance abuse treatment program?

THE PREVALENCE OF NEPHROTOXICITY IN HIV-INFECTED PATIENTS WITH AND WITHOUT TENOFOVIR-CONTAINING ANTIRETROVIRAL THERAPY

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Background: The use of the nucleotide reverse transcriptase inhibitor tenofovir disoproxil fumarate (TDF) has been associated with nephrotoxicity including acute renal failure. However, the prevalence of TDF-associated nephrotoxicity in HIV-infected patients is not well characterized. The primary objective of this study is to compare the prevalence of nephrotoxicity in HIV-infected patients treated with TDF to patients not treated with TDF.

Methods: This retrospective cohort study evaluates the prevalence of nephrotoxicity in patients enrolled in the Northwestern University HIV Outpatient Study (HOPS) between August 2001 and August 2007. Nephrotoxicity was defined as: a \geq grade 1 elevation in serum creatinine (Scr) as defined by the National Institutes of Health (NIH) Division of AIDS adverse event criteria; \geq stage 3 renal disease according to the Kidney Disease Outcomes Quality Initiative (K/DOQI) definitions (glomerular filtration rate [GFR] < 60 ml/min/1.73 m² as calculated by the simplified Modification of Diet in Renal Disease (MDRD) equation); a $\geq 20\%$ decline from baseline in creatinine clearance by Cockcroft-Gault or acute renal failure as defined by the AIDS Clinical Trials Group as a Scr of > 1.5 mg/dL or a 1.3-fold increase in Scr above baseline. The patients' first event of nephrotoxicity was considered the study endpoint. The primary endpoint of nephrotoxicity was evaluated using a Chi-square test. Data collected includes: use of antiretrovirals throughout the study time period, demographics, CD4 count, HIV RNA viral load, Scr, concomitant nephrotoxic medications and diagnoses of comorbidities (hypertension, diabetes, hepatitis C or B). Risk factors associated with the development of nephrotoxicity in this cohort were characterized using a Student's t-test for continuous variables and Chi-square or Fisher's exact test for categorical variables.

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

Learning Objectives:

Characterize the incidence of tenofovir-associated nephrotoxicity observed in previous studies.

Identify potential causes of nephrotoxicity or decreased renal function in patients with HIV

Self Assessment Questions:

True or false: tenofovir is renally eliminated and doses must be adjusted for decreased renal function. (TRUE)

Nephrotoxicity or decreased renal function in patients with HIV or AIDS have been associated with:

- a. HIV-associated nephropathy
- b. Comorbid diabetes or hypertension
- c. Antiretroviral toxicity
- d. HIV immune complex disease
- e. All of the above
- (e - all of the above)

CONCURRENT MUE FOR RESTRICTED MEDICATIONS

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Purpose: The purpose of this project was to implement a concurrent MUE process that evaluates patients who are on ezetimibe or a thiazolidinedione (TZD) and do not demonstrate significant improvement in laboratory parameters or develop contraindications to therapy.

Methods: Initial data collection was done by review of individual electronic medical records. Patients with new ezetimibe or TZD prescriptions between October 2006 and September 2007 were reviewed manually. All new prescriptions for ezetimibe and TZDs dated after September 30, 2007 will be evaluated through an automated process that is currently being developed. Data collected from the ezetimibe chart review included: low density lipoprotein (LDL) levels before and at least two weeks after administration of ezetimibe, percent change in LDL from baseline, number of days to follow-up lab, and documented adverse drug reactions (ADRs). Data collected from the TZD chart review included: glycosylated hemoglobin (A1c) before and at least three months after administration of a TZD, percent change in A1c from baseline, number of days to follow-up lab, ADRs, and heart failure diagnosis at baseline and follow-up. After analyzing data, ezetimibe patients with $< 10\%$ decrease in LDL from baseline and missing labs within a specified time frame were reviewed more intensively by a pharmacist. TZD patients meeting the following criteria were also reviewed more intensively by a pharmacist: $> 0.5\%$ above A1c goal, missing labs within a specified time frame, and documented contraindication. A reviewer evaluated data and patient charts to identify possible explanations for ineffective therapy such as: ADRs, non-compliance, and other changes in therapy.

Results/Conclusions: Data collection is ongoing. Results, analysis, and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Be able to identify some possible advantages to discontinuing an ineffective medication.

Be able to identify some potential causes for ezetimibe ineffectively lowering LDL.

Self Assessment Questions:

What is the average decrease in LDL that can be expected with ezetimibe?

- a. 5%
- b. 18%
- c. 25%
- d. 35%

Which of the following is a contraindication to using a TZD:

- a. Hyperlipidemia
- b. Heart Failure NYHA class III
- c. Gout
- d. Erectile dysfunction

IMPLEMENTATION OF ELECTRONIC PHARMACIST CLINICAL DOCUMENTATION AT AN ACADEMIC MEDICAL CENTER

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Background: The University of Wisconsin Hospital and Clinics (UWHC) is implementing a system-wide electronic health record (EHR). After implementation of the pharmacy component of the EHR, significant changes will be made to clinical pharmacists' daily workflows and activities. A consistent process to document pharmacists' interventions and clinical activities within the EHR is needed.

Objectives: Primary to develop and implement a pharmacist clinical documentation module within the EHR in order to obtain baseline documentation data prior to implementation of computerized provider order entry (CPOE). Secondary to identify and report lessons learned from module development and the implementation process; to create consistent processes to document and utilize pharmacist interventions.

Methods: 1) Examine and analyze the current paper documentation system elements to aid in EHR design. 2) Build the pharmacist clinical documentation module within a test environment. 3) Obtain design validation for the module and test using pharmacy informatics staff and clinical pharmacists. 4) Create a policy and procedure defining pharmacist documentation expectations endorsed by the Pharmacy Practice and Pharmacy Performance Improvement and Regulatory Compliance (PPIRC) committees. 5) Train module end-users via computer-based training. 6) Implement the intervention documentation module and basic pharmacist notes. 7) Collect pre-CPOE intervention data (e.g., number and type of interventions, intervention outcome, and economic/therapeutic significance) by utilizing reports built within the EHR or via chart review. 8) Ensure that key interventions and pooled intervention data are reviewed and discussed at the Pharmacy Practice and/or PPIRC committees on a monthly basis. 9) Assist pharmacy informatics staff with the design of future interventions and notes.

Results: The historic paper intervention documentation system did not adequately capture or describe clinical pharmacists' interventions. The second most common intervention reported was "other" (17.4 percent of all interventions). Currently, the intervention module build is being finalized.

Learning Objectives:

Identify major steps to implementing an electronic pharmacist clinical documentation system within an EHR.

Describe key benefits to electronic clinical documentation versus manual documentation.

Self Assessment Questions:

What are example data that can be collected to determine whether pharmacist clinical activities change after implementation of CPOE?

What are three possible performance improvement projects that utilize pharmacist-documented interventions?

IMPLEMENTATION OF A HEALTH SYSTEM COMMUNITY PHARMACY PROFITABILITY IMPROVEMENT INITIATIVE

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Purpose: The University of Wisconsin Hospital and Clinics currently owns and operates 15 ambulatory pharmacies which dispense over 670,000 prescriptions annually for patients. Several trends within the community pharmacy industry have created challenges for sustaining positive pharmacy financial performance. The objective of this project is to lead an interdepartmental steering committee to accomplish the following: 1) identify strategies for improving the profitability of the UW Health community pharmacies, 2) define the potential impact and feasibility of each strategy and identify financial metrics that provide direct measurement for each strategy, 3) prioritize strategies for implementation, 4) create a specific plan with accountability for implementing each strategy, and 5) create ongoing decision support and measurement systems to continuously measure the impact of financial performance improvement initiatives throughout the network of pharmacies.

Methods: The pharmacy profitability improvement steering committee involves collaboration among the Vice President of Finance, representatives from Decision Support, the Vice President of Patient Business Services, Ambulatory Pharmacy Management, the Director of Pharmacy and a Pharmacy Resident. Strategy implementation teams are formed and guided under the direction of the steering committee. The resident is responsible for coordinating and leading this committee.

Results: Several strategies are currently in various stages of implementation. Several measurements that predict profitability have been identified including net revenue per prescription, labor cost per prescription, total operating cost per prescription, profit from over-the-counter sales, prescriptions filled per pharmacist (and technician) per hour, hours of pharmacist (and technician) labor per prescription, and prescriptions dispensed per business day. A description of specific causes of poor financial performance, strategies identified to improve this performance and the current state of implementation of each strategy will be presented.

Conclusions: Performance metrics with specified outcomes and accountability are necessary for identifying performance improvement strategies with the highest impact on profitability.

Learning Objectives:

Describe the primary causes of declining financial performance in health-system community pharmacies and key strategies for improving the performance related to each cause.

Explain the use of quarterly, monthly and daily performance metrics for tracking and improving financial performance.

Self Assessment Questions:

Describe two community pharmacy industry trends that negatively impact the net margin of a pharmacy and describe a strategy for improving the impact of each trend on the pharmacy.

How does the use of performance metrics on a quarterly, monthly, and daily basis lead to financial performance improvement?

EVALUATION OF THE PROGRESSION OF DIABETIC PROTEINURIA AND DECLINE IN RENAL FUNCTION IN PATIENTS RECEIVING THERAPY WITH ANGIOTENSIN CONVERTING ENZYME INHIBITORS (ACEI) ALONE, ANGIOTENSIN RECEPTOR BLOCKERS (ARB) ALONE, OR COMBINATION THERAPY.

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Purpose: Proteinuria is a surrogate marker for renal disease progression and although data favor both ACEIs and ARBs in reducing proteinuria, data for renal outcomes only exist for the ARBs. There is a lack of long-term studies that used combination therapy of ACEI and ARB to evaluate reduction in proteinuria and renal disease progression. The primary outcome of this study is 50% reduction in proteinuria or protein excretion of less than 1g in patients on ACEI compared to ARB or the combination therapy of ACEI and ARB. Secondary outcome is progression of renal dysfunction as measured by a doubling of serum creatinine. **Research Design:** The study will be a retrospective chart review of computerized patient medical records at the Cincinnati VAMC between 01/01/2004 and 12/01/2007. **Methods:** The study operates under the hypothesis that there is no difference in the reduction of proteinuria in patients on ACEI compared to patients on ARB alone or the combination of two agents. The institution's computerized patient database was used to identify patients that had a diagnosis of diabetes in 2004 in Cincinnati VA Medical Center using ICD codes. Data to be collected includes the following parameters: serum creatinine (SCr), proteinuria or microalbuminuria, drugs that the patients were on (ACEIs, ARBs, or a combination), demographic information and co-morbidities: age, race, BMI, cardiovascular disease, peripheral vascular disease, cerebrovascular disease, hypertension, hemoglobin A1C, and albumin. After executing inclusion and exclusion criteria, patients will be divided into 3 groups: patients on ACEIs alone, patients on ARB alone, and patients on a combination therapy of ACEI and ARB. Another computerized search will be performed of the same patients in 12/2007 evaluating for the following: proteinuria or microalbuminuria, SCr, pharmacological agents that the patients are currently on for diabetic proteinuria (ACEIs, ARBs, and combination).

Results: In progress

Learning Objectives:

To determine which RAS agent provides the greatest reduction of proteinuria.

To evaluate correlation between demographic factors, co-morbidities and degree of reduction of proteinuria

Self Assessment Questions:

ARBs are the preferred RAS agents in patients with diabetic nephropathy in the VA system? T/F
A diabetic patient with proteinuria 3.2g has been treated with lisinopril 20mg qday with minimum improvement. What would be the next step:
a) Add ARB to the current regimen
b) Increase dose of lisinopril to 40mg qday
c) Consider dialysis

EVALUATING AND IMPROVING THE FORMULARY SYSTEM AT AN ACADEMIC HEALTH SYSTEM

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Background: The formulary system is a process that determines and continually reviews medications available for dispensing, which the Pharmacy and Therapeutics Committee identifies as most clinically appropriate and cost effective for optimal patient care. This is accomplished through drug use evaluations and analysis of clinical evidence to determine the medications safety, efficacy, and cost implications as well as comparison of agents deemed therapeutic alternatives. Medication orders at Evanston Northwestern Healthcare (ENH) are entered using computerized physician order entry (CPOE). When a prescriber orders a non-formulary medication, they must identify their reason for selecting the non-formulary agent, for example "no formulary alternative" or "treatment failure with formulary alternative". In some instances the non-formulary medication has a formulary therapeutic alternative (identified and approved by the P&T Committee) and a therapeutic substitution alert notifies the prescriber, giving the option to choose the alternative or continue with the original order. Despite this option for therapeutic substitution, non-formulary drug utilization remains an area for improvement at ENH.

Purpose: The purpose of this project is to evaluate the current utilization of non-formulary medications and identify and implement strategies to improve formulary compliance.

Methods: The most frequently ordered non-formulary agents were identified through an evaluation of non-formulary medication order reports over a three month period. Focusing on these agents, strategies to improve formulary compliance were identified. Multidisciplinary committees will evaluate these strategies and implement those determined to be most effective. Comparison of non-formulary medication order data before and after implementation will be done to determine the effectiveness of these strategies.

The results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the importance of adherence to the formulary system.
Identify strategies for improving formulary compliance.

Self Assessment Questions:

True or false: Formulary decisions based on costs should be made only after the safety and efficacy of the medication have been established.
List 2 advantages of maintaining adherence to the hospital formulary.

EFFICACY AND SAFETY OF SITAGLIPTIN (JANUVIA) IN A COMMUNITY HOSPITAL SETTING

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OBJECTIVE

Evaluate the safety and efficacy of sitagliptin (Januvia) in inpatient diabetes care.

BACKGROUND

Diabetes is associated with poor outcomes such as increased length of stay, infections, and mortality. Oral anti-diabetes medications have limitations to their use. Metformin is contraindicated with serum creatinine 1.5 in men and 1.4 in women due to increased risk of lactic acidosis. Sulfonylureas cause release of insulin in a non-glucose dependent fashion and have been associated with greater risk for hypoglycemia and weight gain. Thiazolidinediones are contraindicated in active liver disease and they may also cause edema and worsen symptoms of heart failure. Sitagliptin, the first FDA approved dipeptidyl peptidase-4 inhibitor increases the levels of incretin hormones, which causes a release of insulin in a glucose dependent fashion.

METHODS

The study will be a retrospective electronic chart review. There are two parts to the study. The first part of the study will compare the different regimens of patients receiving sitagliptin. Data collection will include average daily plasma glucose levels (PGL), PGL for the first 24 hours, PGL 24 hours prior to discharge, highest and lowest PGL, length of stay, if sitagliptin was a home medication or started in the hospital, classes of other anti-diabetes medications, corticosteroid and D5W use, presence of infection or hypoglycemia, and duration of type 2 diabetes mellitus (T2DM). The second part will include the same data collection for patients not receiving sitagliptin. Patients will be identified using ICD-9 codes of 250.00 (Diabetes Mellitus Type 1 or 2) or 250.02 (T2DM). Comparison of this data to patients on sitagliptin will be included in the second part of the research. Paired t-tests will be used to compare difference in plasma glucose levels.

RESULTS/CONCLUSIONS

Data collection is in progress and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Compare the occurrence of hypoglycemia with sulfonylureas and sitagliptin.

Compare the efficacy of oral anti-diabetes medications in regimens that include sitagliptin to those that do not.

Self Assessment Questions:

- 1) What is the mechanism of action of sitagliptin (Januvia)?
 - a) Agonists of peroxisome proliferator-activated receptor-gamma (PPAR)
 - b) Inhibition of dipeptidyl-peptidase-4 (DPP-4)
 - c) Glucagon-like peptide-1 (GLP-1) analog
 - d) None of the above
- 2) Sitagliptin (Januvia) is approved for use as monotherapy.
 - a) True
 - b) False

MANAGING SICKLE CELL PAIN CRISIS

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Purpose: to analyze the appropriateness and effectiveness of adequate pain control in sickle cell patients admitted for vaso-occlusive crisis in a community hospital.

Methods: A retrospective, observational study. A census was gathered for all patients admitted to the hospital between January 2001 to July 2008 with either a diagnosis of sickle cell disease or sickle cell trait. Chart reviews were then performed to gather all medication and laboratory data needed and information was input into a Microsoft excel database.

Results (preliminary): Data is still being collected at this point.

Conclusions: Sickle cell anemia can be a potentially devastating disease with many possible complications. Vaso-occlusive crisis is one complication that, as of yet, does not have any guidelines on how to properly treat patients with the acute attack. All patients are different and have a varying degree of narcotic tolerance, which can make managing all patients with vaso-occlusive crisis very difficult. We are hoping to provide information to the community medical professionals on how well vaso-occlusive crisis is being managed in patients with sickle cell disease admitted to St. Elizabeths Hospital.

Learning Objectives:

Identify the pathophysiology of pain associated with vaso-occlusive crisis.

Identify appropriate strategies to effectively manage acute and chronic pain in patients with vaso-occlusive crisis.

Self Assessment Questions:

- What are the different supportive care measures that should be provided to sickle cell patients with vaso-occlusive crisis?
- What are appropriate strategies to control acute and chronic pain in sickle cell patients with vaso-occlusive crisis?

DEVELOPMENT OF A PHARMACIST MANAGED ANEMIA CLINIC

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Purpose: Erythropoietin Stimulating Agents (ESAs) have been a source of recent debate in the medical field. While they represent large costs to institutions and insurance companies, they can also improve the quality of life for patients with anemia and reduce hospitalizations. Recently the FDA has mandated changes to labeling requirements for ESAs and the Centers for Medicare and Medicaid and insurance companies have tightened rules for coverage and reimbursement for their utilization. A pharmacist-managed anemia clinic can increase the effectiveness of the use of ESAs and improve patient care.

Methods: Reengineering of the anemia clinic was completed in November 2007 within a local nephrology practice in Lafayette, Indiana. The population included patients with chronic kidney disease who required anemia treatment who were not yet receiving dialysis. Over 2000 charts were reviewed to identify patients receiving anemia treatment, in the process of an anemia workup, or who would need treatment within the next 3 months. Anemia protocols were developed for nurses and pharmacists to make changes to ESA and iron therapy during clinic visits. The pharmacist consulted with the billing department to address ESA or iron administration reimbursement concerns. A Microsoft Access database was developed for storing patient information and clinic visits and creating reports. A scope of practice was written to allow pharmacists and nurses to manage anemia treatment according to the established protocols collaboratively with the nephrologists.

Summary/Conclusion: Anemia treatment protocols are an excellent method to streamline processes within the anemia clinic and improve patient outcomes by reaching treatment goals more effectively. A scope of practice establishes a collaborative agreement between physicians and non-prescribers and a clinic database tracks patient outcomes and provides an electronic record of treatment. The lack of available funding and pharmacist availability are barriers to overcome to fully implement this project.

Learning Objectives:

Describe methods for development and implementation of a pharmacist managed anemia clinic.

List anemia treatment goals for patients with chronic kidney disease.

Self Assessment Questions:

What potential barriers are there for successful implementation of a pharmacist managed anemia clinic?

What is the target hemoglobin for patients with chronic kidney disease receiving treatment with erythropoietin stimulating agents (ESAs)?

EFFICACY OF ANTI-REFLUX MEDICATIONS IN THE NEONATE WITH FEEDING-ASSOCIATED APNEIC EPISODES

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Background: A causal relationship between gastroesophageal reflux (GER) and apnea of prematurity (AOP) in the neonate has been postulated. Clinicians frequently prescribe medications that have been approved for GER (primarily metoclopramide) as an off-label treatment for AOP when nursing staff reports that apneic episodes are associated with feedings. Efficacy of this practice is poorly established, and growing concern regarding adverse effects of metoclopramide in the neonate give motive for reassessing the efficacy of this practice.

Purpose: To evaluate the efficacy of anti-reflux medications (prokinetic agents, histamine receptor antagonists and proton pump inhibitors) used in the treatment of feeding-associated apneic episodes.

Methods: A retrospective chart review of neonatal intensive care unit (NICU) patients treated with a prokinetic agent (metoclopramide), a histamine antagonist (H2RA) or a proton pump inhibitor (PPI) for at least three consecutive days for feeding-associated apnea was performed. The frequency of apneic episodes during the 72 hours before and the 72 hours after anti-reflux medications were initiated was averaged and the time periods were compared using paired analysis.

Results: Metoclopramide alone did not lower the incidence of reflux-associated apneic episodes. A significant decrease in apnea was observed in infants who were treated with both metoclopramide and ranitidine. After treatment with anti-reflux agents, infants who were not receiving concomitant caffeine experienced a significant decrease in apneic episodes.

Conclusions: Results from this study are consistent with previous studies that show no improvement in apneic episodes with metoclopramide, however, this study may show some benefit from the use of an H2RA. Further studies evaluating the efficacy of an H2RA or PPI alone may be of value. Although caffeine is proven to be effective for purely central apnea, infants not receiving caffeine may have benefited from anti-reflux treatment because caffeine may aggravate reflux.

Learning Objectives:

Describe treatment options for apnea of prematurity and reflux in the neonate.

Understand the pathophysiology of reflux and the proposed mechanism of pharmacologic therapy in reflux-associated apnea.

Self Assessment Questions:

T/F: The association between reflux and apnea in the neonate is well defined in the literature.

T/F: Use of metoclopramide in the neonate with apnea should be considered effective and without risk.

IMPLEMENTING AND OPTIMIZING STANDARDIZED ANTICOAGULATION THERAPY FOR INPATIENTS IN ACCORDANCE WITH THE 2008 NATIONAL PATIENT SAFETY GOAL REQUIREMENT 3E

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The 2008 National Patient Safety Goals (NPSG) requirement 3E, requires that institutions that provide anticoagulation therapy initiate standardized practices in order to reduce patient harm associated with anticoagulation therapy. This study will focus on expectation (M) C 8 "The organization has a policy that addresses baseline and ongoing laboratory tests that are required for heparin and low molecular weight heparin therapies." The intention is to optimize identification and treatment of heparin induced thrombocytopenia (HIT). A clinical decision report was used to identify patients with a diagnosis of thrombocytopenia between January 1, 2007 and September 30, 2007. A total of 357 patients were identified. Of the 357 patients identified only 81 patients received some type of anticoagulation therapy, and only these charts were collected and reviewed. Currently, the retrospective chart review is still in progress. To date, 4 patients have been identified with a confirmed diagnosis of HIT or suspected HIT. A review of the remaining charts along with the already collected data will hopefully provide an overview of how patients at our institution are both managed and treated when HIT is suspected. This data will be used by the pharmacy department to make any necessary revisions to the current heparin monitoring protocol so that the identification and management of HIT may be optimized.

Learning Objectives:

Effectively identify the signs of heparin induced thrombocytopenia.

Understand the importance of proper anticoagulation therapy in patients with heparin induced thrombocytopenia.

Self Assessment Questions:

Was the information presented today useful?

What may improve the way this information was presented?

PHARMACIST INTERVENTIONS IN AN ANTICOAGULATION MANAGEMENT CLINIC: IMPACT ON PATIENT OUTCOMES

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Background:

Oral anticoagulation therapy, specifically warfarin, is indicated for the treatment/prevention of atrial and venous thromboembolism, acute myocardial infarction, and atrial fibrillation. An increasing number of indications results in a greater number of patients needing management. The FDA recently added a black box warning for warfarin; stating regular monitoring of International normalized ratio (INR) should be performed on all treated patients. Numerous studies have shown that closely managed patients on oral anticoagulation therapy improve clinical outcomes. Often times, their management is facilitated through a physician-based practice. With the current workload of physicians, pharmacists have increasingly stepped into the role of management of these patients by developing anticoagulation clinics. The purpose of this study is to compare patient outcomes of a pharmacist-managed anticoagulation clinic and a physician based anticoagulation management practice.

Methods:

This study is a retrospective case-crossover design of patients on warfarin therapy. Thirty-five patients that were managed by both a physician and the pharmacist anticoagulation clinic during the period October 2006-September 2007 were included in the analysis. Chi-square and t-paired tests were used for statistical analysis. Institutional Review Board approval was obtained for this study. The following variables were examined: gender, baseline age and weight, duration of therapy, ethnicity, payer, type of management at time of visit (pharmacist or physician-based), number of patients with therapeutic range with a difference of <1 , assigned therapeutic range, rationale for anticoagulation therapy, co-morbidities, and confounding factors. Outcomes that were measured include the following: INR within range, within ± 0.2 , outliers; time within range; time between visits; major or minor bleeding events; ER visits or hospitalizations.

Results:

Results and conclusions will be presented at the conference.

Learning Objectives:

Understand the role pharmacists as physician extenders play in management of anticoagulation therapy

Compare outcomes between physician and pharmacist clinic and explain the significance of any differences

Self Assessment Questions:

What indications require anticoagulation therapy?

Can pharmacists produce outcomes that are equivalent to physician-based practices? (Y/N)

RETROSPECTIVE EVALUATION OF THE USE OF INTRAVENOUS N-ACETYLCYSTEINE IN ACUTE AND CHRONIC ACETAMINOPHEN OVERDOSE

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Objective: Analgesics are the primary responsible agent for poison exposures in adults, accounting for 15% of reported adult exposures in 2005. Acetaminophen (APAP) was responsible for 187 poisoning deaths and intravenous (IV) N-acetylcysteine (NAC) was given in 7041 APAP overdose cases. A Cochrane meta-analysis regarding acute APAP overdose concluded there are no adequately designed randomized trials demonstrating the most beneficial dosage, duration, or route for NAC. Moreover, evidence-based guidance for the role of IV NAC in the management of chronic APAP overdose is lacking. Although current practice mimics the general algorithm for acute APAP overdose, key unanswered questions regarding chronic APAP overdose remain, specifically the dosage of IV NAC and duration of therapy.

Methodology: This retrospective study includes patients admitted to The University Hospital for APAP overdose that received IV NAC between August 2004 and September 2007. Subjects were identified using a pharmacy-billing database. Differences in IV NAC treatment regimens and associated outcomes between patients presenting with acute and chronic overdose were compared. Data that was collected includes: APAP product ingested; total reported APAP dose; time of ingestion; position on Rumak-Matthew severity of ingestion nomogram; presence of coingestants; dosage and duration of NAC treatment; serum APAP concentrations; laboratory information; Child-Pugh score; Model For End-Stage Liver Disease score; need for intubation; mortality; and liver transplantation. Primary outcomes include incidence and time to resolution of liver injury, duration of IV NAC treatment, and differences in outcomes between patients with acute and chronic APAP overdose.

Results: This study has been approved by the investigational review board and data collection is currently ongoing.

Learning Objectives:

Describe the mechanism of acetaminophen-induced liver toxicity and role of N-acetylcysteine in prevention and management

Determine the difference in outcomes for patients with acute or chronic overdose

Self Assessment Questions:

True or False - The primary route of elimination for acetaminophen is via the CYP450 pathway.

True or False - The time to resolution of liver injury and the duration of intravenous N-acetylcysteine was longer in patients with chronic overdose versus those with acute overdose.

EVALUATION OF GLYCEMIC CONTROL IN MEDICAL-SURGICAL PATIENTS

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Purpose: Tight glycemic control has been demonstrated to be clinically beneficial in diabetic patient who are hospitalized. Saint Margaret Mercy (SMM), a combined 800 bed community hospital in Indiana, is taking an initiative to increase quality of care by improving glycemic control. This is part of an endeavor lead by the Institute for Healthcare Improvements nation-wide 5 Million lives campaign. The purpose of this study is to evaluate glycemic control in medical-surgical patients at SMM and to analyze the necessity of a hospital wide glycemic control protocol.

Methods: A randomized, retrospective medication use evaluation (MUE) was performed on medical-surgical patients with a known diagnosis of type I or type II diabetes mellitus. A list of patients receiving insulin glargine, regular, and aspart from January 1, 2007 to July 31, 2007 was obtained. Patients were screened using an online pharmacy database and randomly selected for chart review. Inclusion criteria included hospital stay on a medical-surgical unit and diagnosis of type I or type II diabetes mellitus. Patients in the ICU, stepdown ICU, and rehabilitation unit were excluded. Primary endpoints included incidence of hypoglycemia and hyperglycemia. Secondary endpoint was length of hospital stay.

Results: Ninety patient charts were reviewed. The average patient age was 61 years (ranging from 23 to 90 years) and average length of stay was 6 days (ranging from 2 to 16 days). Fifty one percent (N=46) of patients experienced both hyperglycemia and hypoglycemia during hospital stay. Hypoglycemia alone was observed in 46 patients (51 percent) and the incidence of hyperglycemia alone was 98 percent (N=88).

Conclusion: The MUE revealed that many patients are experiencing poor glucose control. The results of this study will be used to develop and implement an insulin protocol to improve glycemic control for medical-surgical patients.

Learning Objectives:

Identify the benefits of tight glycemic control in Type I and Type II diabetic medical-surgical patients.

Discuss the role of subcutaneous basal-bolus insulin regimen in improving tight glycemic control in medical-surgical patients.

Self Assessment Questions:

Clinical trials have shown that intensive insulin therapy reduces morbidity and mortality in medical-surgical patients. (True/False)

Glargine is a long-acting insulin that has peakless effect over 24 hours. (True/False)

PROTOCOL-DRIVEN MANAGEMENT OF SEPSIS

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Purpose: Saint Margaret Mercy is a two campus, 800+ bed community hospital located in Northwest Indiana. The hospital currently does not have a standardized practice in the management and treatment of sepsis. Previous studies have demonstrated that providing timely and appropriate management of sepsis improves outcomes. The purpose of this study is to implement a protocol to provide timely and accurate management of sepsis.

Methods: This study was approved by our institutions IRB Committee. A randomized retrospective medication use evaluation was performed in patients with diagnosed of sepsis, severe sepsis and septic shock. Patients were included if they were greater than 18 years of age, had a suspected source of infection and at least 2 of the following SIRS criteria: heart rate > 90 beats/minute, temperature < 36C or > 38C, respiratory rate > 20 breaths/minute and WBC < 4 or > 12. The primary outcomes recorded were mortality and length of hospital stay (LOS). Other variables collected were appropriate and timely use of fluids, vasopressors, antibiotics, steroids, drotrecogin alfa, and insulin infusions.

Results: Out of 60 patients, the average LOS for sepsis, severe sepsis and septic shock were 10.7, 8.5 and 14.3 days, respectively. The mortality rate for severe sepsis was 11.7% and septic shock was 18.3% with combined mortality of 30%. Adequate fluid therapy was provided in 45.2% of severe sepsis cases and 42.1% of those with septic shock. Blood cultures prior to antibiotic therapy were not achieved in 33.3% of patients. Antibiotics were not provided within 4 hours in 21.7% of patients.

Conclusions: More optimal management is needed to treat septic patients. Sepsis protocol will be presented at Pharmacy and Therapeutic Committee.

Learning Objectives:

Describe the timeline of providing fluid therapy, antibiotic therapy and vasopressor use in the management of sepsis.
Describe the role of a sepsis protocol in providing timely and accurate management of sepsis.

Self Assessment Questions:

True or False: Drotrecogin alfa is indicated in all patients presenting with signs and symptoms of sepsis.
True or False: Antibiotic therapy must be provided within 3 hours of a patient presenting with sepsis.

TECHNICIANS OBTAINING MEDICATION HISTORIES IN THE EMERGENCY DEPARTMENT (T.O.M.H.E.D.)

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Background and Purpose:

The emergency department (ED) at St. Lukes Medical Center in Milwaukee has been struggling to obtain medication histories to begin the process of medication reconciliation. The department has also experienced an increase in patient acuity, resulting in less time for medication histories to be completed by nursing staff. The purpose of this project is to train pharmacy technicians to obtain medication histories of patients who are admitted to the hospital through the ED.

Methods:

A training manual, competencies, and mock interviews will be established to train technicians in how to properly obtain a medication history, and technicians will then train in the ED and a classroom setting. The pharmacy department will work with the ED to ensure integration of technicians into the department. Technicians that staff in the ED will be evaluated for accuracy and completeness of the medication histories they complete. Accuracy will be assessed by re-collecting medication histories for patients seen by the technician and comparing the two medication histories, looking for items that do not match. A medication history will be considered complete if it has the name, strength, dose, route, and frequency of all medications that the patient is taking. These data will be compiled to give feedback to the technicians on how to improve their performance and they will be re-trained as necessary. A cost-benefit analysis and survey to hospital nurses will be completed to determine the benefit of providing this service within the ED and possibly expanding it to other admission intake areas within the hospital. Once the project has been implemented successfully, the program will be launched for use in other areas of St. Lukes Medical Center and other Aurora Health Care emergency departments.
Conclusion: The results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of using a technician to obtain a medication history as compared with using an ED nurse.
Identify critical components of training a technician to obtain a medication history.

Self Assessment Questions:

One of the benefits of using a technician to complete a medication history is that they are less likely to be interrupted and have to take care of other patient issues. (T/F)
Give 3 examples of important components necessary for adequately training a pharmacy technician to obtain a medication history.

ASSESSMENT OF A CLINICAL PHARMACIST IN A PAIN CLINIC SETTING

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Pain is a common issue causing patients to seek medical attention. Advances in understanding the causes of pain and its treatment have led to the development of specialty pain clinics run by teams of doctors specializing in pain management. Clinic settings have added clinical pharmacists to their medical team as providers of useful information about drug therapy. The Outpatient Care Center at the University of Illinois Medical Center at Chicago has a specialty pain clinic. A pharmacist has been added to this clinic a half day a week to compile patient medication records, recommend drug therapies, provide medication counseling, and address insurance issues.

The primary purpose of this study is to determine the impact of a clinical pharmacist on patients' pain management. A secondary purpose of this study is to quantify the pharmacists' role as a team member in the Pain clinic.

Subjects visiting the pain clinic for clinical services between November 1, 2007 and May 2, 2008 on days the pharmacist is present will be considered for the study. Subjects will be asked to complete a series of surveys. The first survey asks the subject to describe and rate their pain as well as to describe their goals of therapy and to rate the importance of each goal. Follow-up surveys will be obtained at the subjects' regularly scheduled visits to the pain clinic or by telephone if there is no follow-up visit. The follow-up surveys use the same questions as in the initial survey. They will also be asked to indicate if the clinical pharmacist helped in their pain management. The pharmacists' activities, including caring for the subject and interventions made with the medical team, will be documented.

Patient outcomes and pharmacist interventions remain under investigation, with data collection and evaluation currently in progress.

Learning Objectives:

Evaluate the impact of a clinical pharmacist for chronic pain management

Discuss pertinent issues health care providers face when managing chronic pain.

Self Assessment Questions:

1.) What is a common perception patients have about pain medications?

- A.) They can cause addiction
- B.) They can have many side effects
- C.) They can be on the medication life-long
- D.) All of the above

2.) What services can a clinical pharmacist provide in a pain management clinic?

- A.) Provide drug therapy counseling to patients
- B.) Provide knowledge in drug therapy for pain management
- C.) Provide monitoring and drug interaction information
- D.) All of the above

EVALUATING PATIENT SATISFACTION AND CHANGE IN BLOOD GLUCOSE WITH THE USE OF EMAIL TO COMMUNICATE PATIENT SELF-MONITORED BLOOD GLUCOSE LEVELS AND DRUG REGIMENS IN TYPE 2 DIABETES MELLITUS

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PURPOSE: Diabetes control is a difficult task for patients and health care providers. Delays in reaching goal blood glucose levels may be due to infrequent follow up. Using the internet to increase access to health information and medical advice is up and coming. Although few studies have examined the use of email as a form of patient-provider contact, current evidence shows promise. This study was designed to evaluate patient satisfaction of weekly email communication with a pharmacist to adjust hypoglycemic medications based on self-monitored blood glucose.

METHODS: A three month, prospective, pharmacist-run, diabetes study is being conducted at a family medicine residency. Recruited patients have uncontrolled Type 2 Diabetes Mellitus (HbA1c >7%), are taking oral antihypoglycemic medication or insulin, test their blood sugar at least twice daily, and have access to personal email. Once recruited, informed consent will be obtained along with the initiation of a consult agreement. Under Ohio law, pharmacists, patients and physicians can enter into a consult agreement which permits the pharmacist to assist in modifying a specified drug regimen. A secure email process will be used to ensure patient confidentiality. Patients will be required to send weekly emails containing self-monitored blood glucose levels to the pharmacist. The pharmacist will review the blood glucose readings and reply with any adjustments to their medication regimen. The primary outcome of patient satisfaction will be assessed by a patient questionnaire at the end of the three month enrollment. Analysis of compliance will be evaluated by reviewing the number of missed emails and the delay in opening email replies assessed via an email return receipt. Secondary outcomes will include changes in HbA1c and self-monitored blood glucose levels.

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

Learning Objectives:

Discuss the advantages and limitations of email as a form of patient-provider communication.

Discuss the role of pharmacists in the management of diabetes.

Self Assessment Questions:

Are patients accepting of email as a method to communicate their blood sugars and medication regimens with a pharmacist? Could this pharmacist run email service be replicated in other primary care physician offices or other settings?

IMPLEMENTATION OF A TECH-CHECK-TECH PROGRAM

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Purpose

Pharmacists at Aurora Health Care currently perform the final check on medications for cartfill and unit based cabinet (UBC) restocks. Tech-check-tech programs allow trained and validated pharmacy technicians to perform the final check on medications that would normally be checked by a pharmacist. By utilizing pharmacy technicians to check medications for cartfill and UBC restocks, pharmacists would be able to dedicate more time to clinical activities and provide improved patient care. This project will involve implementing a tech-check-tech program in the cartfill and UBC restocking processes at multiple facilities within the Aurora Health Care system.

Methods

Data regarding the number of doses checked by a pharmacist in cartfill and UBC restocking, and the time required to check those doses, was collected. Workflow policies and procedures were created for both processes. Training modules were developed for both processes that were both didactic and experiential in nature to properly train the technicians. A quality assurance program was also created to monitor the accuracy of the tech-check-tech program. A variance request was approved by the Wisconsin Pharmacy Examining Board prior to implementing the program. The tech-check-tech program has been implemented in both the cartfill and UBC restocking processes at Aurora St. Lukes Medical Center, and will be expanded to include other facilities within the Aurora Health Care system. Data regarding the accuracy of the program will be collected and provided to the Wisconsin Pharmacy Examining Board.

Conclusions

Results and conclusions of this project will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Understand the value of implementing tech-check-tech programs into various areas of central pharmacy workflow
Explain one quality assurance technique that can be used to monitor accuracy of tech-check-tech programs

Self Assessment Questions:

What areas of the central pharmacy workflow can benefit from the implementation of a tech-check-tech program?
What is a reasonable accuracy rate to expect pharmacy technicians to have while checking medications?

SURVEY INVESTIGATING THE SATISFACTION OF THE MEDICAL STAFF WITH COGNITIVE SERVICES PROVIDED BY CLINICAL PHARMACY AT A VA HOSPITAL

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Purpose: Clinical pharmacy services are one of the main cognitive products provided to the medical staff in the hospital setting. The objective of this study is to assess and place a value on the clinical pharmacy services provided to the inpatient house staff and to identify possible areas for improvement.

Methods: A survey was developed online through www.esurveyspro.com, with a hard copy available as well if needed. Both forms of the survey will be distributed to the medical staff via listservs from the Cincinnati VA Medical Center (VAMC) and the University of Cincinnati (UC). The survey will address drug information, monitoring, education/counseling, and drug recommendations, with responses measured via a Likert scale. Demographic data will also be collected and maintained confidentially. A locked box will be kept at the Healthcare Unit Coordinators desk within the 6 North/6 South nurses station at the VAMC for the medical staff to drop off hard copies, if used. Hard copies can also be mailed back to the secretary at UC, where they would be blinded prior to delivery to the investigators. Descriptive statistics, including mean, median, and mode, as well as standard deviations, will be utilized for data analysis. Analyses will also be performed to identify if there are differences between different populations for specific issues.

Preliminary Results: Data collection is ongoing.

Conclusions: When the data is collected, the results will be utilized to assess the current services provided and suggests areas for improvement, if indicated.

Learning Objectives:

Explain why assessing the satisfaction of the medical staff with clinical cognitive pharmacy services is important for the pharmacy department.

Identify areas that the medical staff feels need improvement with the clinical pharmacy services provided.

Self Assessment Questions:

Which of the following services was not addressed in the survey provided to the medical staff:

- Drug Recommendations
- Monitoring
- Drug Information
- Drug Interaction Evaluation
- Patient Education/Counseling

True / False: According to the survey results, the medical staff is most satisfied with the drug information provided by clinical pharmacy.

ROSUVASTATIN (CRESTOR) PRESCRIBING IN A VETERAN POPULATION: A RETROSPECTIVE ANALYSIS

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Purpose:

There are a variety of medications available to choose from when treating dyslipidemia. The Edward Hines Jr. VA hospital has recommended formulary agents, for instance, lovastatin, pravastatin, and simvastatin; however, some of the nonformulary agents frequently requested include atorvastatin, ezetimibe, and rosuvastatin. The primary purpose of this research project is to evaluate the efficacy and safety of rosuvastatin compared to other lipid lowering therapies previously used in patients at the Edward Hines Jr. VA hospital.

Methods:

All patients currently on rosuvastatin during the month of January 2008 were pulled from the electronic medical records at the Hines VA. Patients who meet inclusion and exclusion criteria will be evaluated.

Inclusion Criteria:

- * >18 years of age
- * diagnosis of dyslipidemia
- * use of rosuvastatin
- * use of a different lipid lowering drug prior to rosuvastatin
- * serum creatinine lab values prior to addition of rosuvastatin and 6 weeks after
- * AST/ALT lab values prior to rosuvastatin treatment and 6 weeks after
- * fasting lipid panels prior to rosuvastatin treatment and 6 weeks after

Exclusion Criteria:

- * less than 6 weeks of rosuvastatin therapy
- * less than 6 weeks of therapy on previous lipid-lowering therapy.

Statistical analysis:

We will describe the patient population in terms of baseline characteristics using the following:

- * counts and percentages for categorical variables
- * means and standard deviations for continuous variables

Primary outcome of efficacy will be evaluated using a paired t-test to compare the average LDL, HDL, TG and total cholesterol in the pre and post-rosuvastatin period. Similarly, we will measure safety by comparing the average serum creatinine, AST and ALT in the period before rosuvastatin to the average values in the period following rosuvastatin treatment using a paired t-test.

Results/Conclusions:

The study is currently in the data collection phase and results will be presented at GLPRC.

Learning Objectives:

Determine efficacy of rosuvastatin therapy compared to patients previous treatment through evaluation of lipid panels
Determine secondary safety of rosuvastatin therapy compared to patients previous treatment through the evaluation of creatinine, liver function tests and creatinine phosphokinase

Self Assessment Questions:

How frequently do you measure a lipid panel and liver function tests in patients being treated with a statin?

Which populations should rosuvastatin be dosed more conservatively in?

EVALUATION OF THE HEPATITIS B IMMUNE GLOBULIN PROTOCOL FOR HEPATITIS B VIRUS POSITIVE LIVER TRANSPLANT RECIPIENTS AT NORTHWESTERN MEMORIAL HOSPITAL

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Orthotopic liver transplantation (OLT) has become an accepted treatment for patients who develop end-stage liver disease secondary to hepatitis B virus (HBV). Hepatitis B immune globulin (HBIG) is used as passive immunoprophylaxis alone or in combination with anti-HBV nucleoside analogs to decrease recurrence rates. After transplantation, HBV reinfection can occur if hepatitis B surface antibody (anti-HBs) titers are not maintained at sufficient levels to protect the new organ. Currently, there are not defined standards for monitoring anti-HBs titers in post-OLT patients. Some centers dose HBIG to maintain certain anti-HBs titers, while others administer it in a fixed-dose schedule. The fixed-dose strategy, which is utilized at Northwestern Memorial Hospital (NMH), requires less monitoring but is more expensive, as patients anti-HBs titers may be unnecessarily supratherapeutic.

This retrospective chart review included all adult HBV positive liver transplant recipients who received HBIG therapy at NMH between September 2003 and September 2007. The primary objective of this study was to evaluate the effectiveness of the current fixed-dose HBIG protocol used at NMH by assessing the anti-HBs titers maintained. Passive immunity was defined as maintaining anti-HBs titers >500 IU/L for 6 months post-transplant and >150 IU/L thereafter, as well as no detectable HBV DNA. Other data endpoints collected include patient demographics, HBIG dosing, dose frequency, and duration of therapy, additional antiviral and immunosuppressive therapy, and laboratory data including hepatitis B surface antigen, hepatitis B e antigen, hepatitis B e antibody, pre and post-transplant HBV DNA levels, liver function tests, and patient and graft survival.

It is anticipated that the results will show current anti-HBs titers are unnecessarily supratherapeutic and therefore dosing frequency may be reduced. Sixty-six patient charts have been identified for review and final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the serology markers important in diagnosing and monitoring patients with hepatitis B infection.

Explain the mechanism of action of HBIG.

Self Assessment Questions:

True or False: Hepatitis B e antigen is the serologic hallmark of hepatitis B infection.

True or False: HBIG is an antibody directed against hepatitis B surface antigen that is currently used to maintain passive immunity against HBV.

THE EFFECT OF AMLODIPINE ON CYCLOSPORINE SERUM CONCENTRATIONS IN A PEDIATRIC STEM-CELL TRANSPLANT POPULATION

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Background/Purpose: Cyclosporines inhibition of production and release of interleukin II has created an essential role in the therapy against graft versus host disease for pediatric stem-cell transplant patients. At varied points in cyclosporine therapy with concomitant administration of amlodipine, it has been noticed at Riley Hospital for Children that cyclosporine serum concentrations spontaneously increase. There is a lack of evidence in a pediatric population describing this interact; therefore, this and recent observations at Riley Hospital are the driving forces of this study. The primary objective of this project is to identify the impact of amlodipine on cyclosporine serum concentrations in pediatric stem-cell transplant patients. **Methods:** This retrospective, pilot study assesses the impact of amlodipine on cyclosporine serum concentrations in this patient population. The patients were identified from Riley Hospital for Children database of patients who have received stem-cell transplants from September 1, 2005 to December 31, 2007. The data collected via chart review consists of cyclosporine doses and serum concentrations from two weeks before the initiation of amlodipine therapy to four weeks after the initiation of amlodipine therapy.

Results and Conclusions: Data analysis, results, and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the mechanism by which cyclosporine induces hypertension as an adverse effect.

Summarize the importance of anticipating changes in cyclosporine serum concentrations in order to improve the prevention of graft-versus-host disease.

Self Assessment Questions:

T/F Cyclosporine serum concentrations should be drawn every other day for the entire length of therapy.

As shown from the results of this study, should cyclosporine dosing be more closely monitored when initiating amlodipine therapy?

- a. True
- b. False

UTILIZING INTENSIVE CARE UNIT ANTIBIOGRAM DATA TO IMPROVE APPROPRIATE INITIAL THERAPY FOR GRAM-NEGATIVE BACTEREMIA AND NOSOCOMIAL PNEUMONIA: ASSESSMENT OF TWO DIFFERENT APPROACHES

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Purpose:

Appropriate empiric antibiotic therapy, defined as providing initial therapy with at least one agent having in-vitro activity against the identified organism(s), has been proven to have a substantial mortality benefit for patients with HAP or bacteremia. National guidelines for HAP and the Surviving Sepsis guidelines remain vague in their recommendations for antibacterial selection and further recommend that the choice of empiric therapy should be guided by the local susceptibility patterns directed against suspected microorganisms. To date, limited data exist for methods to incorporate local susceptibility data. Frequently, clinicians utilize this data to construct regimens to provide empiric coverage directed against *Pseudomonas* spp. However, no data have demonstrated an advantage of this approach over one that targets all causative Gram-negative organisms. We therefore constructed this retrospective analysis to determine which approach provided appropriate empiric therapy most often with a beta-lactam containing regimen.

Methods:

Institutional Review Board approval was received before the commencement of the study. The microbiological database was reviewed for all positive Gram-negative blood and respiratory cultures in both the medical and surgical intensive care units from January 1, 2007 through June 30, 2007. These positive cultures were analyzed to determine each organism's frequency and susceptibility pattern in each unit. Beta-lactam containing regimens were constructed for bacteremia and nosocomial pneumonia to provide the highest likelihood of providing appropriate empiric therapy for Gram-negative organisms. The microbiological database was then queried for a second time to obtain all positive Gram-negative blood and respiratory cultures in each unit from July 1, 2007 through December 31, 2007. These cultures were then analyzed to see which of the previous beta-lactam regimens, if any, provided appropriate empiric coverage most often.

Results: Pending

Conclusions: Pending

Learning Objectives:

Understand the mortality benefit associated with appropriate empiric antimicrobial therapy in hospital-acquired pneumonia (HAP) and bacteremia.

Compare two different beta-lactam based regimens for empiric treatment of HAP and bacteremia at an academic medical center.

Self Assessment Questions:

Appropriate empiric antimicrobial therapy is defined as empiric regimens having

- a. A beta-lactam with in vitro activity against all isolated organisms.
- b. At least one agent with in vitro activity against all isolated organisms.
- c. A beta-lactam with in vivo activity against all isolated organisms.
- d. At least one agent with in vivo activity against all isolated organisms

Which of the following is the least important factor in determining an appropriate empiric antimicrobial regimen for our patients.

- a. Drug allergies
- b. Cost
- c. Previous antibiotic exposure
- d. Pharmacokinetic/Pharmacodynamic considerations

USE OF TRAVOPROST FOR GLAUCOMA IN VA PATIENTS

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Background: Glaucoma affects 15 million people resulting in 12,000 new cases of blindness per year. The goal in the treatment of glaucoma is to prevent a loss of vision. There are currently no treatments for the optic neuropathy of glaucoma therefore treatment is focused on the one risk factor that can be modified, intraocular pressure. Currently there are five classes of medications that can be used to lower eye pressure and the prostaglandin analogs are the newest class. There are four topical prostaglandins approved in the United States; latanoprost (Xalatan), bimatoprost (Lumigan), travoprost (Travatan), and unoprostone (Rescula). The major adverse effects reported with the prostaglandins include hyperemia, iris pigmentation changes, and darkening of eyelash growth. In August 2003 the Department of Veterans Affairs awarded a contract that stated all treatment naïve patients would be initiated on travoprost as the agent of choice. This provides the opportunity to observe rates of adverse effects in this large patient population.

Purpose: To determine within the VA population newly initiated on travoprost if there are greater rates of adverse effects compared to the published literature.

Methods: This is a retrospective, multi-center, cohort study. Patients who had at least one 30 day supply prescription for travoprost between August 1, 2003 to April 1, 2005 and did not meet any exclusion criteria were divided into two groups; new starts or conversions. Patients were excluded if they were identified as having a history of ocular surgery, laser intervention, or other ocular pathology except glaucoma and ocular hypertension. The number of patients reporting adverse effects was evaluated along with the specific adverse effect experienced. The percentage of patients reporting the following adverse effects: eye pain, visual disturbances, tearing, pruritis, hyperemia, and hyperpigmentation will be compared to the occurrence reported in published literature.

Results: Pending

Conclusions: Pending

Learning Objectives:

Review the medications used to treat glaucoma

Review the common adverse effects associated with topical prostaglandins

Self Assessment Questions:

What is the goal of therapy with travoprost?

What is the most common adverse effect associated with travoprost?

DEVELOPMENT OF PERIPHERAL NEUROPATHY IN PATIENTS RECEIVING BORTEZOMIB

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Purpose: Peripheral neuropathy (PN) is a well-known side effect of several chemotherapeutics. Bortezomib, indicated for the treatment of myeloma and mantle cell lymphoma, can result in dose-limiting PN. Myeloma trials demonstrate a 34 - 36% incidence of new or worsening symptoms of sensory PN with 12% of patients requiring a dose reduction at least once and 4% discontinuing therapy due to PN. In lymphoma patients, PN was reported at 55% and was the leading cause of treatment discontinuation due to an adverse event in 10% of patients. Deficiencies in vitamin B12 are associated with the development of PN and small studies have demonstrated lower B12 levels in myeloma patients. The purpose of this study is to evaluate bortezomib dose adjustments or discontinuation of therapy due to PN and the corresponding B12 levels.

Methods: This is a retrospective review correlating dose-limiting PN from bortezomib with B12 deficiency. The study is IRB approved. Eligible patients must be at least 18 years with myeloma or lymphoma and have B12 levels within 6 months of initiation of bortezomib. Patients from October 2004 through September 2007 will be included. The primary endpoint is dose-limiting toxicity due to PN and the corresponding B12 levels. A secondary endpoint is the incidence of B12 deficiencies. Demographics include age, height, weight, gender, diagnosis, time since diagnosis, history of diabetes or neuropathy, chronic steroid use, and previous chemotherapy. Dose, duration, and reasons for dose reduction or discontinuation of bortezomib will be collected. B12 levels will be collected at baseline and during therapy as well as homocysteine and methylmalonic acid. Supplementation with B12 and use of gabapentin or pregabalin for neuropathy will be collected.

Results: Data collection is in process. Study analysis, results, and conclusions will be presented.

Learning Objectives:

Assess incidence of dose reductions or discontinuation of bortezomib due to peripheral neuropathy.

Identify association, if any, with vitamin B12 deficiency and the development of peripheral neuropathy.

Self Assessment Questions:

Was there a correlation in incidence of development of peripheral neuropathy and low vitamin B12 levels?

What was the incidence of low vitamin B12 levels in myeloma or lymphoma patients?

INCIDENCE OF LEUKOPENIA WITH CONCOMITANT USE OF VALGANCICLOVIR AND MYCOPHENOLATE

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Purpose:

Mycophenolate mofetil (MMF), an immunosuppressive agent and valganciclovir (VGCV), an antiviral agent are commonly used together in transplant recipients. The incidence of leukopenia has been reported as 11 to 38 percent for MMF 2 to 3 g per day and 11 to 49 percent for VGCV 450 to 900 mg per day. When leukopenia of unknown etiology occurs during the concomitant use of these two drugs, clinicians commonly reduce the dose of MMF rather than adjust the dose of VGCV. This is done despite knowing that subtherapeutic doses of MMF increase the risk of acute rejection and graft loss. The purpose of this study is to compare the incidences of leukopenia and neutropenia with concomitant use of VGCV and MMF to that with MMF alone in kidney transplant recipients.

Methods:

Approval of the institutional review board has been obtained for this study. The medical records of kidney transplant recipients will be used to collect baseline patient demographics, reason for transplant, date of transplant, drug therapy during study period, renal allograft function and leukocyte differentials at baseline and post transplant. Patients 18 years or older at the time of renal transplantation and receiving immunosuppressive therapy with MMF, cyclosporine, and prednisone and cytomegalovirus prophylaxis with either VGCV or acyclovir (ACV) will be eligible for study inclusion. Patients with a known hematological disorder, white blood cell count less than 3,000 cells per mm cubed at baseline, who required cytomegalovirus treatment or received a T cell depleting antibody within 6 months post transplant, or received drug therapy associated with neutropenia will be excluded from the study. The incidence of leukopenia and neutropenia during post transplant weeks 9 to 12 will be compared between kidney transplant recipients receiving VGCV and MMF combination (VGCV group) and MMF alone (ACV group).

Results:

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

Learning Objectives:

Explain the mechanism of action of mycophenolate mofetil

Explain the mechanism of action of valganciclovir

Self Assessment Questions:

True/False The mechanism of action of mycophenolate mofetil suggests that it will cause lymphocytopenia rather than neutropenia

KT is a 56 year old male eleven days s/p a living unrelated kidney transplant secondary to end-stage renal disease. Over the course of the past week, KT has experienced diarrhea with approximately six loose bowel movements per day. C. difficile infection has been ruled out and it is thought that KT's diarrhea is due to his high dose mycophenolate mofetil (MMF) therapy. KT is currently receiving MMF 1000 mg po bid. KT's transplant pharmacist has recommended decreasing his dose of MMF to 500 mg po bid. Reducing the dose of MMF may cause which of the following?

- A. graft rejection
- B. neutropenia
- C. constipation
- D. increased cyclosporine concentrations

THE USE OF MEMANTINE IN THE VA POPULATION

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Background:

Greater than 50% of adults over the age of 85 will develop some form of dementia. The most common forms of dementia are Alzheimer's disease, Lewy body dementia, and vascular dementia. Treatment goals for these patients include delaying functional decline, preserving cognitive abilities, decreasing behavioral and psychological symptoms, minimizing caregiver burden, and improving quality of life for patients and caregivers. Currently, cholinesterase inhibitors and NMDA-receptor antagonists are the medications used as cognitive enhancers in the treatment of dementia. Clinical trials have shown significant cognitive improvement in patients using the NMDA-receptor antagonist, memantine, when compared to placebo. Memantine has also demonstrated benefit when used in patients that were already stabilized for 6 months or more on the cholinesterase inhibitor donepezil. Statistically significant benefits in the areas of cognition, behavior, and performing activities of daily living were associated with memantine use. Additionally, the safety and tolerability of memantine have been demonstrated to be similar to placebo.

Purpose:

The purpose of this retrospective review is to interpret the effect of memantine on the treatment of patients at this institution with moderate-to-severe dementia.

Methods:

This study will be conducted as a retrospective electronic chart review of all patients that received a prescription for memantine between January 1, 2004 and May 31, 2007. These patients will be followed through September 15, 2007. Inclusion criteria consist of all patients on memantine during the study period. The following data will be collected: demographics; memantine dose, reasons for discontinuation, and duration of therapy; concurrent cholinesterase inhibitor(s); and scheduled medications that may affect cognition. The primary endpoint will be the effect of memantine on cognition. Secondary endpoints will include change in number of activities of daily living, effect on caregiver burden, reason for discontinuation, and time to institutionalization.

Results/Conclusions:

Data collection and analysis are ongoing.

Learning Objectives:

Identify the advantages and disadvantages of using memantine alone and in combination with cholinesterase inhibitors in patients with moderate-to-severe dementia.

Review the process for evaluating patients on memantine and identify areas for improvement in regards to current prescribing and monitoring practices.

Self Assessment Questions:

True or False. Almost 75% of the total costs associated with Alzheimer's disease are related to institutionalization and caregiver burden.

True or False. Studies have consistently shown increased rates of adverse events and higher discontinuation rates with memantine when compared to placebo.

PHARMACOGENETICS OF MYCOPHENOLATE MOFETIL TOXICITY IN PEDIATRIC KIDNEY TRANSPLANT RECIPIENTS: A PILOT STUDY

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Purpose: Mycophenolate Mofetil (MMF) is an immunosuppressive pro-drug used to improve graft survival and patient outcomes in kidney transplantation. When taken orally, MMF is rapidly converted to its active form mycophenolic acid (MPA) and subsequently metabolized via glucuronidation by the highly polymorphic uridine diphosphate-glucuronosyltransferases (UGTs) 1A8, 1A9 and 2B7 in the gastrointestinal tract and liver. Genetic variations, or polymorphisms, in UGT genes are associated with differences in rate of MPA metabolism resulting in large interpatient differences in total drug exposure. Overexposure of MPA results in adverse events (AE), most frequently leukopenia and diarrhea, which are the primary causes of MMF dose reduction or discontinuation. Pediatric kidney recipients are more likely to experience AEs than adults. The primary objective was to obtain preliminary data on the frequencies of UGT variants in pediatric kidney transplant recipients experiencing significant AEs requiring a MMF dose reduction or discontinuation.

Methods: Kidney transplant recipients receiving MMF as part of their immunosuppressive therapy were enrolled. Subjects' medical charts were reviewed retrospectively and all subjects were genotyped for known variants in the UGT 1A8, 1A9, and 2B7 genes. Subjects who experienced an AE (diarrhea or leukopenia) related to MMF therapy comprised the AEs group, while a matched cohort of subjects taking MMF without significant AE served as the control group. Blood or buccal swab samples for DNA were obtained at a regularly scheduled visit, and genotyping was performed using published methods.

Results/Conclusions: The frequencies of UGT variants in this population and the relationship between genetic variants and AE will be presented. This study will help define the role of pharmacogenetic testing to predict the individual response to MMF. Ultimately such genotyping may aid in the prospective optimization of individual MMF dosing to decrease the likelihood of AE and long-term complications.

Learning Objectives:

Explain the role of UGTs involved in the clearance of mycophenolic acid.

Explain the role of genetic screening in individualized drug therapies used to improving patient outcomes and preventing adverse events.

Self Assessment Questions:

(T/F) MMF has a strong exposure-response relationship in kidney transplant recipients.

(T/F) Pediatric kidney transplant recipients on MMF therapy have a higher likelihood of experiencing drug-related adverse events than adults

EVALUATION AND IMPLEMENTATION OF PHARMACIST PROSPECTIVE MEDICATION REVIEW IN PATIENTS AT RISK FOR FALLS

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Purpose: Inpatients who fall and sustain injury encounter hospital charges estimated to be over \$4,200 higher than patients who do not fall. Various factors such as age, disease state, and medications may result in an increased risk of falls. Although many risk factors are inevitable, medications that increase the likelihood of falling can often be avoided. Prior to implementation of this project, pharmacists at St. Rita's Medical Center retrospectively reviewed patient medications after a fall had occurred. The purpose of this project is to implement a pharmacist performed prospective medication review in patients at risk for falls and to evaluate the impact of pharmacist intervention in reducing patient falls.

Methods: The neuroscience unit, identified as the floor with the highest percentage of patient falls, will serve as the sample population. Each patient's risk for falling will be evaluated via the Morse Fall Scale (MFS), and patients with a MFS ≥ 45 are at high risk to fall. Medications that increase the likelihood of falling will be determined based on the Beers criteria and relevant studies and categorized according to the AHFS Pharmacologic-Therapeutic Class. A daily report will identify patients with a MFS ≥ 45 with high risk medications on his or her profile. A pharmacist will review these patient profiles and make recommendations as necessary. Demographic data including MFS, age, sex, and drug class will also be collected. The primary outcome will be the percentage of acute care falls that occurred under prospective medication review as compared to retrospective medication review. Secondary outcomes include the percentage of falls in the neuroscience unit, the percentage of falls potentially attributed to drug causes, and the percentage of acute care falls stratified by drug class.

Results/Conclusions: Results and conclusions are pending and will be presented at GLPRC.

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Learning Objectives:

To describe the impact of inpatient falls on health care.

To review medications that increase the risk of patient falls.

Self Assessment Questions:

Antipsychotics, anticonvulsants, and benzodiazepines are medications that may contribute to patient falls. True or False
Phenytoin and digoxin blood levels should be closely monitored in patients at high risk of falling. True or False

A COMPARISON OF COGNITIVE SERVICES TRAINING TECHNIQUES FOR PHARMACISTS IN A LARGE, COMMUNITY PHARMACY CHAIN: LIVE WORKSHOP VERSUS COMPUTER-BASED METHODS

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Purpose

As the role of pharmacists in the community setting evolves from being dispensing-focused to more clinical, pharmacists with a desire to provide cognitive services need to receive on-the-job training. There are several methods of on-the-job training available to educate pharmacists on new procedures, topics, and therapies. Two community-based methods are face-to-face continuing education programs and computer-based training. The purpose of this project was to compare and evaluate two cognitive service training methods. The objectives were to compare the effectiveness of a live workshop and web-based training methods in a controlled environment, to compare the costs of two training methods for community pharmacists, and to assess pharmacists preferences for methods of training and professional development.

Methods

Pharmacists were recruited from a large grocery store chain pharmacy to participate in a randomized, comparative study of training methods for community pharmacists. Participants were randomly assigned to one of two groups: a live workshop or a computer-based group. The live workshop included a lecture, demonstrations, case studies, role-playing, and a question and answer session. The computer-based group included video lectures and demonstrations which were watched during downtime in the pharmacy over a three-week period. Pharmacists were trained on how to provide a healthcare screening for diabetes, hypertension, and cholesterol, advise the patient on what actions need to be taken as a result of the service, follow-up as necessary, and properly document the encounters. To compare the two training methods the evaluation included differences in training assessment scores administered to the two groups, differences between test patient evaluations utilizing a pharmacy student as a test patient performed within one month of completing training, cost analysis, and a survey of pharmacists preferences for training.

Results/Conclusion: Pending project completion.

Learning Objectives:

Describe the components of a healthcare screening provided by pharmacists in a grocery chain pharmacy.

Discuss the various methods of assessment for pharmacists participating in training on how to provide health care screenings.

Self Assessment Questions:

Which of the following fasting blood sugar results would be considered pre-diabetic?

- a. 98 mg/dL
- b. 112 mg/dL
- c. 150 mg/dL
- d. 179 mg/dL with polydipsia
- e. 220 mg/dL

T/F: Adults (> 20 years old) should have their cholesterol screened every five years.

MANAGEMENT AND OUTCOMES OF PATIENTS WITH MULTI-DRUG RESISTANT ACINETOBACTER SPP. BACTEREMIA OR PNEUMONIA AT AN ACADEMIC MEDICAL CENTER: A RETROSPECTIVE EVALUATION

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Background: *Acinetobacter* spp. is a micro-organism increasingly associated with nosocomial infections. Due to this organism's ability to rapidly develop resistance, multi-drug resistant (MDR) isolates are becoming a major cause for concern worldwide. The purpose of this study is to: 1) describe the in vitro antibiotic susceptibility patterns for clinical MDR *Acinetobacter* spp. isolates; 2) describe the clinical antibiotic choices used to treat these infections; and 3) evaluate clinical and microbiologic outcomes in patients with MDR *Acinetobacter* spp. bacteremia and pneumonia.

Methods: Patients were identified retrospectively using a prospectively compiled clinical culture database. All medical and surgical intensive care unit (ICU) patients greater than or equal to 18 years of age with blood or respiratory cultures positive for *Acinetobacter* spp., clinical signs/symptoms of infection, and carbapenem resistance between December 2006 and February 2008 were identified. Patients who were pregnant, under hospice care, or diagnosed with cystic fibrosis were excluded. Pertinent demographic and laboratory data was collected along with antibiotic regimens targeted against MDR *Acinetobacter* spp. APACHE II and SOFA scores were calculated. Primary outcomes are (1) clinical cure: resolution of clinical signs and symptoms of infection, (2) microbiologic cure: documented eradication of *Acinetobacter* spp. infection at hospital discharge; and (3) recurrence of MDR *Acinetobacter* spp. infection within 30 days of antibiotic discontinuation. Secondary endpoints include *Acinetobacter*-specific antibiotic duration, prior antibiotic exposure, hospital length of stay, ICU length of stay, duration of mechanical ventilation, number of patients requiring vasopressor therapy, changes in renal function with intravenous colistimethate, and in-hospital mortality. Descriptive statistics will be used as appropriate.

Results: Institutional Review Board (IRB) approval has been obtained and data collection is currently under way.

Conclusions: To be presented (as available) at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe evolving resistance patterns for *Acinetobacter*-related infections.

Discuss the roles of tigecycline and colistimethate (colistin) in the treatment of multi-drug resistant *Acinetobacter*.

Self Assessment Questions:

Which of the following antibiotics was considered the "gold standard" for *Acinetobacter* spp. infections prior to the emergence of multi-drug resistant strains?

- a) Amikacin
- b) Imipenem
- c) Piperacillin/Tazobactam
- d) Tigecycline

Due to the increase in multi-drug resistance, the _____ class of antibiotics, in particular _____, has seen a resurgence of use?

- a) Aminoglycoside, Tobramycin
- b) Tetracycline, Tigecycline
- c) Carbapenem, Imipenem
- d) Polymyxin, Colistimethate

EFFICACY OF INTRAVENOUS LEVETIRACETAM IN STATUS EPILEPTICUS

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Introduction: Status epilepticus (SE) is a major medical emergency responsible for significant morbidity and mortality. The recommended first-line treatment for SE involves lorazepam and phenytoin. The introduction of intravenous (IV) levetiracetam prompted interest in its use for SE. The adverse event profile of levetiracetam is considered more favorable than that of phenytoin. However, there is little data on the efficacy of IV levetiracetam use in SE.

Purpose: The primary objective of this study is to compare the failure rates of intravenous levetiracetam and phenytoin for SE. The secondary objective of this study is to identify patient characteristics that may predict better outcomes with IV levetiracetam.

Methods: In this retrospective cohort study patients were identified from pharmacy records of inpatients at Northwestern Memorial Hospital based on receipt of intravenous phenytoin or levetiracetam for SE between December 2006 and October 2007. The primary outcome of failure to respond to therapy was defined as one of the following: continued seizure activity despite receipt of a loading dose of a study drug, stated failure in the chart by the physician, evidence of seizure activity on electroencephalogram (EEG), or administration of another antiepileptic drug after loading dose of a study drug. The rate of failure between phenytoin and levetiracetam will be compared using either chi-squared or Fisher's exact test.

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

Learning Objectives:

Describe standard treatment for a patient who presents with status epilepticus.

Describe the efficacy of intravenous levetiracetam in status epilepticus.

Self Assessment Questions:

True or False: After patients fail to respond to lorazepam and phenytoin, there is little data to support one anti-epileptic drug over another.

True or False: Intravenous levetiracetam appears to be effective in the treatment of status epilepticus.

INCIDENCE OF REJECTION AND INFECTION IN HEART TRANSPLANT RECIPIENTS WITHIN THE FIRST YEAR POST-TRANSPLANT

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PURPOSE: Episodes of acute allograft rejection within the first year of heart transplant decrease long-term survival. The routine use of antibody induction therapy remains a prominent controversy and individual institutions must evaluate the literature and assess the outcomes associated with their choice of induction therapy. The primary objective of this study is to identify the association of three induction immunosuppression therapies (no induction, rabbit antithymocyte globulin and muromonab-CD3) with the incidence of infection and biopsy-proven rejection in heart transplant recipients within the first year post-transplant.

METHODOLOGY: This is an observational, retrospective, cohort study of patients who underwent heart transplantation from January 2004 through December 2006. Patients will be identified through the use of the Organ Transplant Information System (OTIS). Once identified a retrospective chart review of OTIS and both the electronic and paper components of the permanent medical record will be performed. Patients will be divided into 3 groups: group 1 including patients receiving no induction; group 2 including patients receiving rabbit antithymocyte globulin for induction; and group 3 including patients receiving muromonab-CD3 for induction. Demographic data from recipients and donors will be collected. Concomitant maintenance immunosuppression and opportunistic infection prophylaxis will also be assessed. Biopsy data will be collected to identify the incidence of rejection, while laboratory data and use of antimicrobial agents will be utilized to determine infection rates. Descriptive statistics will be performed first and presented as mean plus or minus standard deviation for continuous data and frequency and percentage for categorical data. A chi-square test will be used for evaluation of categorical data and a 2-sided student's t-test will be used to analyze outcomes between induction groups, as appropriate. A p value of <0.05 will be considered statistically significant.

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

Learning Objectives:

1. Explain the significance of rejection episodes with respect to their impact on survival and the pharmacologic methods to prevent such episodes.

2. Describe the significant findings of rejection and infection in the University of Michigan heart transplant program in relation to type of induction immunosuppression used.

Self Assessment Questions:

True or False: There is no link between rejection episodes within the first year post-transplant and survival.

True or False: We found no difference in rejection and infection rates in our transplant population in relation to the type of induction immunosuppression used.

RETROSPECTIVE EVALUATION OF VENOUS THROMBOEMBOLISM PROPHYLAXIS IN ADULT CANCER PATIENTS

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BACKGROUND

Patients diagnosed with cancer and admitted to the hospital have a six-fold higher risk for developing venous thromboembolism (VTE) than general medical or surgical patients. Current National Cancer Care Network and American Society of Clinical Oncology guidelines recommend that all cancer patients without contraindications be given prophylactic anticoagulants; however, there is limited published data specifically in the cancer population.

PURPOSE

The objective of this study is to assess the safety and efficacy of VTE prophylactic agents in the oncology population at our institution and identify areas for improvement.

METHODS

Patients receiving prophylaxis against VTE with unfractionated heparin, enoxaparin, or fondaparinux while admitted to Karmanos Cancer Center were identified via the pharmacy database. Patients' medical records were reviewed retrospectively for the duration of their hospital stay. Data collection includes demographic information, evidence of blood clot formation, evidence of bleeding, and laboratory data. Additionally, the medical record was reviewed for any VTE events occurring during the 30 days after hospital discharge.

RESULTS and CONCLUSIONS

The results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Assess the benefit/risk of thromboembolism prophylaxis in cancer patients by identifying risk factors for developing VTE and absolute contraindications to anticoagulants.

Evaluate the literature supporting the use of unfractionated heparin, low molecular weight heparin, and fondaparinux to prevent venous thromboembolism.

Self Assessment Questions:

List 3 cancer-related risk factors for the development of venous thromboembolism in hospitalized cancer patients.

True or False: According to available guidelines, fondaparinux is the agent of choice for venous thromboembolism in cancer patients.

EVALUATION OF THE USE OF DROTRECIGIN ALFA (ACTIVATED) IN SEVERE SEPSIS

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Purpose: Drotrecogin alfa (activated) is the first agent approved by the FDA for the treatment of severe sepsis. Severe sepsis is sepsis associated with at least one acute organ dysfunction resulting from a generalized inflammatory and procoagulant response to an infection. Approximately 750,000 cases of sepsis occur annually in the United States with an associated mortality of 30% to 50%. Prompt diagnosis and early goal directed therapy are crucial in the treatment of sepsis. The purpose of this study is to characterize and describe the use of drotrecogin, the incidence of adverse effects, and the mortality in our institution.

Methods: Prior to collecting data, Institutional Review Board (IRB) approval was achieved. A retrospective review occurred in patients who received drotrecogin alfa (activated) from July 1, 2006 to June 30, 2007. Exclusion criteria include less than 18 years of age, age greater than 89, pregnant females, and incarcerated patients. Data collected includes admission diagnosis, APACHE II score at initiation of therapy, number of organ system failures, absolute and relative contraindications, dosing, length of therapy, site of infection, hematological studies, and use of concurrent anticoagulants. The primary outcomes evaluated include appropriate patient selection, survival rate at time of discharge from the hospital, and incidence of bleeding.

Results: Results and conclusions for 100 patients are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the indication for use and dosing of Drotrecogin alfa (activated) in severe sepsis.

Recognize potential adverse events associated with Drotrecogin alfa (activated).

Self Assessment Questions:

A patient weighs 250 kg. What weight should be used in order to dose Drotrecogin alfa (activated)?

- Ideal body weight
- Adjusted body weight
- Total body weight

Bleeding is a potentially serious adverse event associated with Drotrecogin alfa (activated). True or False

ASSESSMENT OF THE EDUCATION NEEDS OF PHARMACISTS PROVIDING CARE FOR HOSPICE PATIENTS AND CAREGIVERS IN THE COMMUNITY

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Purpose: Most hospice patients live at home while receiving end-of-life care and symptom management. Hospice patients and their caregivers rely on community pharmacists for appropriate counseling regarding use and side effects of their hospice medications. Currently, no published studies have assessed community pharmacists' knowledge and comfort with medication used for hospice care in the United States. The goal of this study is to assess community pharmacists' current knowledge of and comfort with controlled drug dispensing laws, therapeutic uses and key counseling points for hospice patients and caregivers.

Methods: An online survey will be developed to assess the pharmacists' current comfort and knowledge related to: state of Ohio controlled drug dispensing laws, therapeutic and off-label uses, counseling of hospice prescriptions, opioid diversion, and addiction concerns. The survey will be distributed February 2008 using the online tool, SurveyMonkey, to Ohio pharmacists that hold membership with the Ohio Pharmacists Association. Study participants will be defined as practicing in the community setting where prescriptions are directly dispensed to the patient with the opportunity for direct patient interaction. Comfort with provision of pharmaceutical care to both hospice patients and caregivers will be assessed with Likert scale questions. Knowledge base will be evaluated using multiple choice questions founded on evidence-based literature. Results obtained from the completed surveys will be de-identified to maintain confidentiality. Data analysis will be conducted using SPSS statistical software. Prior to distribution of the survey, the project will be approved by an Investigational Review Board.

Results/Conclusion: Preliminary results to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify a need for pharmacy education surrounding the provision of pharmaceutical care for hospice practices.
Develop a continuing education seminar for pharmacists focused on hospice practices guided by the results of the online survey.

Self Assessment Questions:

True/False: Pharmacy schools within the United States provide hospice and palliative care educational courses as part of the core curriculum.

True/False: Terminally ill patients have specific exemptions under Ohio law for controlled substance dispensing.

ERTAPENEM AS AN EMPIRIC SUBSTITUTION FOR AMPICILLIN/SULBACTAM IN COMPLICATED INTRA-ABDOMINAL INFECTIONS

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Purpose:

Complicated intra-abdominal infections (cIAI) are most frequently caused by *Escherichia coli*. The 2006 hospital-wide antibiogram reported *E. coli* susceptibility to ampicillin/sulbactam (A/S), ertapenem, and piperacillin/tazobactam (P/T) as 52%, 100%, and 92%, respectively. This is a retrospective review of empiric use of A/S, ertapenem, and P/T for postoperative cIAI during a 3 month period. The proportion of patients without risk factors for *Pseudomonas aeruginosa* who received P/T is also reported.

Methods:

In May 2007, ertapenem became the recommended agent by the Antibiotic Subcommittee for non-ICU patients with postoperative cIAI. Staff was notified through the Pharmacy and Therapeutics bulletin. When A/S was prescribed, a pharmacist was to contact the physician for an ertapenem switch. If P/T was prescribed, the case was reviewed for *P. aeruginosa* risk, and physician was contacted. IRB approval was obtained prior to study commencement. Patients were identified through daily reports of A/S, ertapenem, and P/T use by the general surgical service. Data collected included patient demographics, operative procedure, antibiotic indication, days of postoperative antibiotics, and microbiology results (including *Clostridium difficile*) until discontinuation of antibiotics or hospital discharge. Appropriateness and timing of preoperative antibiotic prophylaxis were reviewed.

Preliminary Results:

Results for 60/110 patients are reported. Thirty-five patients met inclusion criteria. Prescribing of A/S, ertapenem, and P/T was 14%, 23%, and 63%, respectively. In 46% of cases, guidelines for appropriate antibiotic selection were followed. P/T was used in 46% of patients without *P. aeruginosa* risk. Pharmacist interventions were poorly documented and infrequent.

Conclusions:

Compliance with the guideline was poor. In the antibiotic resistance era, patients without *P. aeruginosa* risk factors should not receive P/T. Additional, formal re-education of physicians with consistent pharmacist interventions is necessary. The complete analysis of 110 patients including 65 cIAI patients will be presented at the 2008 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the role of ertapenem for the treatment of complicated intra-abdominal infections.

Discuss appropriate empiric use of antibiotics in complicated intra-abdominal infections.

Self Assessment Questions:

T/F Ertapenem has activity against the most common bacteria in intra-abdominal infections.

T/F *Escherichia coli* is the most common pathogen in complicated intra-abdominal infections.

EVALUATION OF IMMUNOSUPPRESSIVE MEDICATION CHANGES IN KIDNEY TRANSPLANT PATIENTS

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Background: The Ohio State University Medical Center (OSUMC) performs approximately 250 kidney transplant each year. Patients receiving kidney transplants require immunosuppressive therapy for the remainder of the life of their transplanted kidney. At OSUMC, initial maintenance immunosuppressive therapy is usually composed of cyclosporine and sirolimus. These medications cause side effects that may require a modification in immunosuppressive therapy to benefit the patient.

Objective: The purpose of this evaluation is to determine the percent of patients requiring immunosuppressive medication modification after transplant and to determine the reasons as to why these therapy changes occur.

Methods: This is a retrospective review of patients who received a kidney transplant from April 2002 through March 2003. Patients included in the evaluation are ages 18-65, receiving his/her first kidney transplant, and receiving the kidney from a living donor. Changes in immunosuppressive therapy at any time after transplant will be recorded for four years after transplant, and reason for immunosuppressive regimen change will be determined. In addition, the following data will be collected: reason for transplant, serum creatinine starting at time of transplant and every six months; immunosuppressive medication levels up to one month prior to regimen change; and time lapse from transplant date to date of regimen change. Institutional Review Board (IRB) approval is pending.

Learning Objectives:

Understand the major side effects of immunosuppressive medications used in kidney transplant.

Identify primary reasons immunosuppressive therapy is adjusted in kidney transplant patients at OSUMC.

Self Assessment Questions:

What is the most common reason cyclosporine was discontinued or changed in kidney transplant patients at OSUMC? A) Hypertension B) Nephrotoxicity C) Too many drug interactions D) Inability to achieve therapeutic range
Sirolimus may cause mouth ulcers and poor wound healing. T/F

EFFECT OF LONG ACTING OPIOIDS ON TESTOSTERONE IN CHRONIC NON-MALIGNANT PAIN

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Background: Previous studies have acknowledged the association between opioid medications and hypogonadism. These studies have concentrated primarily on conducting patient surveys in regards to the association of sexual dysfunction with testosterone levels associated with chronic opioid therapy. Currently there are no studies done in the Veterans Affairs (VA) population in regards to chronic opioid therapy, testosterone response and prevalence of erectile dysfunction (ED).

Purpose: The primary objective of this study is to determine if total testosterone levels decrease after initiation of chronic long acting opioids. The secondary objectives are to determine whether there is an opioid related dose response on total testosterone levels and to determine the number of patients who developed erectile dysfunction after starting opioid therapy. Lastly, to determine if diabetic patients have a more pronounced total testosterone lowering after chronic opioid therapy compared to those without diabetes.

Methods: Using the facility's electronic record system, patients who filled prescriptions for fentanyl, methadone, morphine sulfate SA and oxycodone SA, from January 1, 1998 to October 31, 2007 will be enrolled in this study. Inclusion criteria consist of the following lab data: total testosterone levels, FSH and LH. Patients will be excluded if they have primary hypogonadism, tumors or cysts of pituitary or hypothalamus, chronic renal and liver disease, AIDS and HIV. Other exclusion criteria includes previous or current therapy on ketoconazole, glucocorticoids, alkylating agents or radiation, prior testicular surgery, noncompliance with opioid medication, or on testosterone replacement at time of lab draw. Compliance will be assessed by chart review. Total testosterone levels will be compared before and after opioid therapy is initiated. Opioid doses will be converted to methadone equivalent doses (MED) for comparison. ICD-9 codes will be used to identify patients with erectile dysfunction (ED) or diabetes (DM).

Results: Pending

Conclusions: Pending

Learning Objectives:

Determine the effects of chronic long acting opioids on testosterone levels.

Explain how opioids lower testosterone levels.

Self Assessment Questions:

T/F Chronic long acting opioids lower testosterone levels

T/F Patients with low testosterone levels are at increased risk of osteoporosis and thyroid dysfunction.

ESTIMATED CREATININE CLEARANCE USING VARIOUS METHODS

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Background: It is essential that renal function is accurately evaluated in order to adapt dosage of medications, particularly in drugs with narrow therapeutic indices. The direct measure of renal function by inulin or radioisotope studies is expensive, labor intensive, and clinically impractical. In the clinical setting, prediction equations are used to obtain a rapid estimation of creatinine clearance. The influence of body weight in some of these methods lacks extensive study. The objective of this study is to compare the accuracy of prediction equations used to estimate creatinine clearance and test the hypothesis that the use of an adjusted body weight in the Cockcroft-Gault formula provides a more accurate estimate than ideal or total body weight in obese patients. The results of this study will serve to further develop a renal dosing protocol within the institution.

Methods: The health systems electronic medical record system will be used to identify patients who have had a 24-hour urine collection performed to assess creatinine clearance. The following data will be collected: gender, age, height, actual body weight, serum creatinine, serum urea nitrogen, and albumin. Patients measured creatinine clearance will be compared to creatinine clearance calculated from prediction equations. The Cockcroft-Gault equation will be calculated using ideal, total, and an adjusted body weight.

Results/Conclusions: Data collection is in process. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify the importance of obtaining an accurate assessment of renal function.

Recognize the different prediction equations and associated limitations used for calculating creatinine clearance in the clinical setting.

Self Assessment Questions:

Having an inaccurate measure of renal function while dosing medications may result in which of the following:

- a. Increased drug-related toxicities
- b. Supratherapeutic doses
- c. Subtherapeutic doses
- d. A & B only
- e. All of the above

Defend or challenge the theory of using adjusted body weight when using the Cockcroft-Gault formula in obese patients.

DEVELOPMENT AND ASSESSMENT OF STANDARDIZED ANTICOAGULATION PRACTICES USING FOCUS-PDCA

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Purpose: The Joint Commission 2008 National Patient Safety Goal (NPSG) 3E is to decrease the likelihood of patient harm associated with anticoagulant use. Various other healthcare quality groups (e.g. National Quality Forum (NQF), Leapfrog) have provided metrics and best practice recommendations for anticoagulation use.

Objectives: Primary: To develop a system for the institutions ongoing assessment and performance improvement of anticoagulation management. Secondary: To achieve regulatory compliance and maximize externally reported quality measures related to anticoagulation use.

Methods: A proposal will be submitted to the institutions quality council to charter a team with the following objectives: perform a gap analysis to assess the institutions current level of compliance with NPSG 3E, NQF and Leapfrog requirements and recommendations; identify and prioritize areas for improvement; assess opportunities for standardizing anticoagulant use; develop specific recommendations and strategies to achieve improvements; identify measures to be monitored to ensure compliance and to determine effectiveness of anticoagulant use; determine resources to implement improvements, maintain compliance and perform ongoing monitoring. The team will be comprised of medical, pharmacy, nursing, laboratory, nutrition, information technology services, and quality improvement personnel. Three subgroups of the team will be coordinated. The self-assessment subgroup will perform a gap analysis of the institutions anticoagulation practices versus best practices. The metrics subgroup will identify a set of measures to assess the current/baseline and ongoing effectiveness of anticoagulant management. The best practice subgroup will: benchmark the institutions anticoagulation practices against other institutions; develop a business plan and return on investment analysis of the resources required to complete the activities to achieve and maintain anticoagulation best practices. The team will use the FOCUS-PDCA methodology to select and pilot specific strategies/interventions in order to develop recommendations for potential implementation across the institution.

Results: Data collection in progress.

Learning Objectives:

Describe an approach to achieve compliance with The Joint Commission NPSG 3E.

Explain the FOCUS-PDCA methodology.

Self Assessment Questions:

True or False: The Joint Commission NPSG 3E requires implementation of a defined anticoagulant management program to individualize patient care.

True or False: Developing a business plan with return on investment is a successful strategy to obtain the resources required to implement an anticoagulation management program.

INCIDENCE OF THROMBOEMBOLIC EVENTS IN PATIENTS WITH COLORECTAL CANCER RECEIVING THE COMBINATION OF BEVACIZUMAB-BASED CHEMOTHERAPY AND ERYTHROPOIETIN STIMULATING AGENTS

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Background: Bevacizumab, a vascular endothelial growth factor inhibitor approved for metastatic colorectal cancer, and erythropoietin stimulating agents (ESAs) have been associated with arterial and venous thromboembolic events.

Bevacizumab may double the incidence of thromboembolic events when used in combination with chemotherapy. A meta-analysis of randomized trials completed by the manufacturer found an incidence of arterial thromboembolic events of 4.4% in patients receiving bevacizumab in combination with chemotherapy compared to 1.9% among patients receiving chemotherapy alone.

Various studies have evaluated the use of recombinant erythropoietin or darbepoetin alfa as prevention or treatment of anemia in cancer patients. The relative risk for thromboembolic events has shown to be higher in ESA-treated patients compared with controls, with a median incidence of 4.5% (0 to 30%).

Due to the lack of studies evaluating the combination of these two drugs, we are investigating whether the incidence of thromboembolic events increases when the drugs are used in combination versus alone.

Methods: Patients treated between February 2004 to September 2007 will be identified retrospectively using a pharmacy-generated database. Patients with colorectal cancer from University Hospital, Veteran Affairs Medical Center of Cincinnati and private practices will be divided into 3 groups: bevacizumab alone, ESAs alone, and bevacizumab plus ESAs. Patients greater than or equal to 18 years who received chemotherapy for the treatment of colorectal cancer will be included. Data collected will include patient demographics, laboratory data, cancer diagnosis and treatment, cardiac history, current anticoagulation or antiplatelet therapy, risk factors for a thromboembolic event, and dose and duration of bevacizumab and ESAs. Data will be collected up to 40 days post last dose of bevacizumab or ESAs. Data collection is currently ongoing and the analysis of results is pending.

Learning Objectives:

1. Identify the proposed mechanisms of thromboembolic events due to bevacizumab and erythropoietin stimulating agents.
2. Review the potential variables that may influence the incidence of thromboembolic events associated with bevacizumab and erythropoietin stimulating agents.

Self Assessment Questions:

1. Bevacizumab may cause thromboembolic events by:
A. Diminishing the regenerative capacity of endothelial cells
B. Potentiating angiogenesis
C. Increasing hemocrit and blood viscosity via over production of erythropoietin
D. Both A and C
2. True or False: Risk factors such as ≥ 65 years old, prior arterial thromboembolic event, and poor performance status should be taken in consideration when making treatment decisions about bevacizumab and erythropoietin stimulating agents

PHARMACIST AND NURSE DEVELOPED ONLINE PHARMACOLOGY EDUCATION MODULES: IMPLEMENTATION AND EVALUATION.

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Purpose: A great deal of a nurses workday is spent performing functions which require advanced knowledge of medications. Despite responsibilities in medication administration, monitoring drug effects, and providing patient education on drug therapies, many nurses still feel they have a limited understanding of pharmacology. Providing educational tools in pharmacology may increase the drug therapy knowledge of nurses. The purpose of this study is determine if diabetes mellitus and pain management pharmacology modules implemented in nurses will result in acquisition and retention of medication knowledge.

Methods: A team of pharmacists and nurses will collaborate to create two educational modules with a focus on drug therapy in pain and diabetes. These modules will be available to a sample of employed nurses and nursing students through an online teaching program. An initial evaluation (pretest) will assess the participants baseline knowledge of pharmacology. In addition, a survey of a nurses perceived comprehension of medications will be given prior to module completion. Participants are asked to perform another evaluation (post-test) immediately following completion of each module, and then asked to perform a final evaluation (retention test) and follow-up survey approximately four weeks later. Data to be collected includes participant demographics, survey findings, as well as pre-test, post-test, and retention test results. Nurses and nursing students under 18 years of age or who are non-English speaking will be excluded from analysis.

Results: Results are pending at this time and will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: The results from this study will help determine the value of pharmacist and nurse developed pharmacology modules. If nurses acquire and retain medication knowledge following module completion, a demonstration of competency in these and additional online modules may become a requirement of all newly hired nurses at Mount Carmel.

Learning Objectives:

- Describe the importance of drug therapy knowledge in hospital nursing staff.
- Determine the effect of educational modules on the aptitude of hospital nurses in the specific areas of diabetes and pain management pharmacology.

Self Assessment Questions:

- True/False: Pharmacists play an essential role in the education of nursing staff in the hospital setting.
- List three methods of how to involve departments of pharmacy in the education of nurses.

DEVELOPMENT OF A PHARMACIST-CONDUCTED DISCHARGE COUNSELING AND MEDICATION RECONCILIATION SERVICE

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PURPOSE: It is estimated that each year 20% of hospital discharges result in adverse medical events and re-hospitalizations that could have been prevented and that 27% of patients do not understand their medications when they leave the hospital. Some of these problems could be attributable to medication errors that occur due to a lack of standardization and a breakdown in the continuity of care that is often present during the traditional discharge process. The Joint Commission Patient Safety Goals require that hospitals accurately and completely reconcile medications across the continuum of care, and ASHP recommends that pharmacists be involved in this process. Prior to this study, MidMichigan Medical Center - Midland had no standardized process for reconciling the discharge medication list or for providing patients with medication counseling at the time of discharge. This study is designed to determine whether a pharmacist-conducted medication reconciliation and discharge counseling service could reduce medication errors made at the time of discharge and improve patient understanding of their medications.

METHODS: Each patient discharged from the general medical/surgical floors from February 11th to March 9th 2008 will be eligible to participate in the study. A pharmacist will conduct a chart review and medication reconciliation for each study patient at the time of discharge, and any potential errors will be recorded and addressed. Each study patient will also be randomized to receive either discharge counseling from the pharmacist or to receive only discharge instructions as provided by their physician and nurses. Each study patient who is able will be asked to complete a five-question telephone survey, which will be conducted within 14 days following discharge. Monitoring parameters will include the number of errors corrected on the discharge medication list and patient understanding of medications as measured by the telephone survey.

RESULTS and CONCLUSIONS: To be presented.

Learning Objectives:

Describe potential problems with the traditional patient discharge process

Identify ways in which pharmacists may positively impact patient safety during the discharge process

Self Assessment Questions:

Twenty percent of hospital discharges each year result in adverse medical events and re-hospitalization. T/F?

This study provides evidence that pharmacists may reduce the number of medication errors made at the time of discharge. T/F?

EFFICACY OF INTRAVENOUS AND SUBCUTANEOUS INTENSIVE INSULIN PROTOCOLS BY MEANS OF COMPUTERIZED PHYSICIAN ORDER ENTRY IN THE INPATIENT MEDICINE POPULATION

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Purpose: Previous practices for glycemic control at University Hospital include insulin infusions in intensive care unit (ICU) patients and sliding scale insulin for the non-intensive care unit patients. In order to improve glycemic control, new intravenous intensive insulin and subcutaneous basal bolus correction insulin protocols were implemented in the medical intensive care unit, medical step-down unit, and the general medicine unit in September, 2007. A retrospective review was conducted in order to evaluate the efficacy and safety of these newly implemented intensive insulin protocols.

Methods: Patients were identified for inclusion using records from point of care glucose testing. Any patient who received point of care blood glucose testing from October 1, 2007 to November 25, 2007 in the general medicine unit, medical step-down, and the medical intensive care during their hospital stay will be eligible for inclusion. Patients with diabetic ketoacidosis and hyperglycemic hyperosmolar state were excluded. The intravenous intensive insulin therapy protocol and the subcutaneous basal bolus correction insulin protocol were ordered using computerized physician order entry in these units. All outcomes were compared to a control population. The control population included patients who received point of care glucose testing in the a general medicine unit, medical step-down, and medical intensive care unit one year prior to the implementation of the intensive insulin protocols, from October 1, 2006 to November 25, 2006. The primary endpoint, the percentage of time patients were hyperglycemic (>180 mg/dl), will be compared between the two groups. Secondary endpoints included the percentage of time hypoglycemic (<60 mg/dl), the percentage of time within an ideal glucose range (70-140 mg/dl), mean blood glucose, inpatient mortality, hospital length of stay, ICU length of stay, and days requiring mechanical ventilation.

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

Learning Objectives:

Describe the prevalence of hyperglycemia in hospitalized patients, and the impact it has on morbidity and mortality.

Review the components of intravenous and subcutaneous intensive insulin therapy protocols, and their effects on inpatient glycemic control.

Self Assessment Questions:

The use of intensive insulin therapy in critically ill patients has resulted in:

- A. Decreased mortality
- B. Fewer days on mechanical ventilation
- C. Shorter ICU and hospital stays
- D. All of the above

T or F: Hyperglycemia in the hospitalized patients can be attributed to many causes, including the stress of illness or underlying glucose intolerance.

SUBSTITUTION OF INSULIN PEN DEVICES FOR MULTI-DOSE VIALS

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PURPOSE: Hospital insulin use is on the rise, likely due to the increasing incidence of diabetes and the need for tighter glycemic control in the inpatient setting. The substitution of insulin pen devices with safety needles for the traditional multi-dose vials with syringes provides an opportunity to both reduce cost and improve safety across the care continuum. The purpose of this project is to implement this substitution in a community hospital in order to reduce cost, reduce error through formulary reduction, and reduce nursing needlestick injury.

METHODS: A cost-analysis was performed on insulin usage data from September 2006 to October 2007. This analysis evaluated the cost of replacing each brand of insulin pen device with its corresponding vial and the potential for therapeutic substitution across brands. The results of the cost-analysis were presented to key stakeholders: endocrinologists and diabetes nurse educators to determine the final formulary of pen devices and provide input for a therapeutic substitution policy. The policy will be presented to the Pharmacy and Therapeutics Committee for approval. Training for pharmacy and nursing staff on pen device administration will be conducted through the manufacturers training personnel. Additional education on new policies and procedures with the pen devices will be provided by the pharmacy resident and preceptor. Surveys will be conducted before and after the conversion with a sample of nurses to assess needlestick injury and administration issues arising with the pen devices. Insulin error data from the previous six months has been reviewed and will be compared to data gathered after the conversion. A second cost-analysis will be completed after the conversion to determine if the estimated cost savings is realized.

RESULTS: The initial cost-analysis demonstrates a significant cost savings for drug product. Baseline error and needlestick data have been collected, post-conversion data is pending.

CONCLUSIONS: Pending.

Learning Objectives:

Review the benefits and drawbacks of currently available insulin pen devices.

Identify the barriers to substituting insulin vials with pen devices in a community hospital.

Self Assessment Questions:

T/F: The potential cost-savings realized from the substitution of insulin pen devices for multi-dose vials primarily results from dispensing less drug product per patient.

Describe three ways that insulin pen devices can improve patient safety.

EVALUATION OF THE NEW HEART FAILURE MEDICATION RECONCILIATION CLINIC

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BACKGROUND: Medication errors may result from inaccurate medication histories and can have significant consequences in patient care. Implementing a medication reconciliation process, particularly during transitions in care, may help mitigate medication errors. In 2006, the heart failure (HF) population at the Louis Stokes Cleveland VAMC (LSCVAMC) had a thirty-day readmission rate of ~28%. HF hospital readmissions may result from patient misunderstanding about medication changes made during hospital admission. A multidisciplinary clinic that will perform medication reconciliation within one-week of hospital discharge for HF patients will be implemented on February 23, 2008.

OBJECTIVES: The initial phase of the project involved the development of a plan for implementing the new HF Medication Reconciliation Clinic. The second phase involves an assessment of whether the clinic will have a positive impact on: (1) Medication adherence in HF patients, (2) Thirty-day readmission rate for HF, (3) Patient knowledge of HF issues.

METHODS: Patient medication adherence & knowledge of HF will be evaluated by conducting an interview during the patients HF Medication Reconciliation Clinic visit. The visit will occur within seven days of discharge following a hospital admission for HF. A standardized "tool" will be used to interview all patients, to promote intra-rater and inter-rater consistency. Thirty-day readmission rates will be determined by conducting a search in the corporate database, VISTA/DHCP, for all patients admitted for HF. The readmission rate for patients seen in the HF Medication Reconciliation clinic will be compared to the historical readmission rate of 28%, as well as the concurrent readmission rate for patients who do not attend the clinic (i.e., "no-shows").

ANTICIPATED OUTCOMES:

1. A reduction in the overall thirty-day readmission rate for HF by 50%.
2. Hospital readmissions will be lower for those who attend the clinic.
3. Patients will have a better understanding of their HF by attending the clinic.

Learning Objectives:

Describe the three steps of the medication reconciliation process.

Identify the functions of providers in a HF Medication Reconciliation Clinic.

Self Assessment Questions:

Which of the following is considered to be the three step process of medication reconciliation?

- a. Clarification, Confirmation, Reconciliation
- b. Questioning, Authentication, Reconciliation
- c. Verification, Clarification, Reconciliation

All HF medication discrepancies must be resolved by the provider on the day of the HF Medication Reconciliation Clinic.

- a. True
- b. False

EVALUATION OF A WEIGHT-BASED ARGATROBAN NOMOGRAM

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PURPOSE: The development of heparin-induced thrombocytopenia (HIT) produces a prothrombotic state that can result in thrombosis, amputation, or death. Argatroban is one of two direct thrombin inhibitors which the American College of Chest Physicians recommends as first-line therapy for HIT and is the agent of choice at BMC. Since there is no standard recommendation for dosage adjustment with argatroban, it is difficult to provide consistent recommendations. This study's purpose is to evaluate our current argatroban use in order to provide a dosing service that provides optimal patient outcomes.

OBJECTIVES: The primary objective of this study is to determine the mean time to argatroban dose stabilization defined as two consecutive therapeutic activated partial thromboplastin times (aPTTs). Secondary objectives include determining the duration of treatment with argatroban, and the effect of using the following aPTT values on the determination of a target therapeutic range: a standardized range of 50 to 100 seconds (1.5 to 3 times 33 seconds, the upper limit of normal), or an individualized range of 1.5 to 3 times the patient's baseline aPTT (baseline defined as last aPTT before starting argatroban or as last aPTT prior to heparin product administration).

METHODS: A retrospective chart review was performed on all patients receiving argatroban between January 2006 and December 2007. Patient demographics and relevant lab values were collected. Major bleed was defined as a hemoglobin drop of ≥ 2 g/dL, transfusion of ≥ 2 units packed red blood cells or progress note stating intracranial, retroperitoneal, or bleeding into a prosthetic joint. The primary outcome of mean time to argatroban dose stabilization will be evaluated by gathering the first eight aPTT values after argatroban initiation.

RESULTS/CONCLUSIONS: Results will be presented at a later date.

Learning Objectives:

Assess the current methods of dosing argatroban at BMC.
Identify the most appropriate target aPTT range for argatroban therapy.

Self Assessment Questions:

Argatroban requires dosage adjustment for hepatic dysfunction. T/F

Argatroban should be discontinued once patients on warfarin reach an INR of 2.5. T/F

JUSTIFICATION OF THE ONCOLOGY PHARMACIST IN AN OUTPATIENT ONCOLOGY CLINIC

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Background: Outpatient Oncology Center is located in Saint Margaret Mercy, a community-based hospital located in Hammond, Indiana. Primary population can be represented mostly by southern Cook County Illinois and Lake County Indiana, which accounts for approximately 2,000 patient visits per year.

Objective: Evaluate indication and dosing for administration of darbepoetin alfa in outpatient oncology clinic.

Methods: Retrospective chart review of encounters from January 2006 to October 2007. Study involved a diverse patient population with chronic kidney disease and malignancies. The evaluation comprised of analyzing proper indication of use and dosing as well as reimbursement for darbepoetin. The information was extracted from electronic and paper charts and analyzed to assess compliance with clinical practice and reimbursement.

Results: Out of 26 patients, the average age is 66 years old, primarily consisting of female (62%). Diagnoses included renal (65%), oncology (31%), and miscellaneous diseases (4%). There were a total of 270 renal and 71 oncology encounters averaging 6.8 months and 4.7 months respectively. Out of 361 total encounters only 30% had hemoglobin levels checked for proper dosing. Six patients (23%) never had hemoglobin checked. The total acquisition cost of darbepoetin for 361 encounters was \$109,873 with a reimbursement of \$66,520.

There was a 40% loss of revenue for darbepoetin due to inappropriate billing and dosing.

Conclusion: Analysis of darbepoetin usage suggests implementing a clinical pharmacist in outpatient oncology clinic could improve patient care and increase revenue by standardizing anemia management.

Learning Objectives:

Review dosing and indication for usage of darbepoetin.
Review anemia management guidelines in chronic kidney disease and oncology patients.

Self Assessment Questions:

Darbepoetin should be dosed based on hemoglobin levels. T/F
Answer: True

Darbepoetin is effective regardless of iron store. T/F
Answer: False

IMPROVING PATIENT OUTCOMES: THE EFFECT OF COMMUNITY PHARMACIST INVOLVEMENT WITH MEDICATION RECONCILIATION

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Objective: To evaluate the effect of community pharmacist involvement with hospital or long term care facility discharge medication reconciliation on patient outcomes.

Methods: The Joint Commission defines medication reconciliation as the process of comparing a patient's medication orders to all of the medications that the patient has been taking. The reconciliation is completed to avoid medication errors such as omission, duplications, dosing errors or drug interactions and should be completed following every transition in care. The community pharmacist should be actively involved in this process to ensure positive patient outcomes. Prescription records for July 1, 2007 to August 31, 2007 will be reviewed. They will be reviewed for documentation, changes that needed to be made, and any other notes that were recorded by pharmacists. From December 19, 2007 to February 14, 2008 pharmacists will be alerted of evaluations on the medication reconciliation they completed. A standardized system will be used to complete the reconciliation. Beginning February 15, 2008 the data will be retrospectively reviewed. Data collected will include: discrepancies in medication, dose, dosage form or directions; formulary changes, duplications, interactions; failure to restart or discontinue medications upon discharge; and cost saving interventions. If changes or clarifications are necessary, the appropriate prescriber will be contacted and any changes will be communicated to the patient. Data will be presented utilizing descriptive statistics.

Results:

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

Learning Objectives:

Identify the importance of involving the community pharmacist in the medication reconciliation process.

To determine the effect standardization has on the medication reconciliation process.

Self Assessment Questions:

Will the use of a standardized medication reconciliation tool be of use at your practice site?

Do pharmacists at my practice site participate actively in medication reconciliation? Do opportunities exist for expanded involvement?

INTEGRATING CONTINUING PROFESSIONAL DEVELOPMENT (CPD) INTO REGIONAL PHARMACY PRACTICE

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Purpose:

Continuing Professional Development (CPD) is a life-long learning model successfully implemented in Australia, New Zealand, Canada, and the United Kingdom for evaluation of professional competency in the practice of pharmacy. The CPD model has been discussed as a method of enhancing the existing system of Continuing Education (CE) through a self directed, cyclical process that involves Reflection, Planning, Action, Evaluation, and Recording. Limited information and examples are available as guidance for developing CPD programs in the United States. The objective of this study is to implement and evaluate a pilot CPD program within the Marshfield regional pharmacists group.

Methods:

All pharmacists from Marshfield Clinic system and Saint Josephs Hospital were surveyed on current professional development and learning methods. Of 103 pharmacists eligible to participate, 23 pharmacists enrolled in the pilot program. In a two month period, participants will be expected to establish a professional development goal and complete one cycle of the CPD model. Participants were given a one hour orientation on the CPD concept and worksheets to facilitate documentation of activities. Group discussion sessions will be coordinated and surveys used to solicit feedback throughout the pilot. At the end of the pilot, participants will be asked to report on the results of the CPD intervention (e.g. accomplishment of goals) and to evaluate any change in their professional development approach. Pharmacists not participating in the pilot will also be surveyed to identify any changes in overall workforce learning attitudes during the pilot period. Results will be analyzed to identify the impact of CPD (in both pilot participants and nonparticipants) and the challenges and barriers to implementing a CPD program in a regional pharmacy practice setting. This information will be communicated to the Division of Education and pharmacy departments.

Results: Pending.

Conclusions: Pending.

Learning Objectives:

Identify and describe the key components of the Continuing Professional Development (CPD) model.

Adapt CPD concepts to current professional development practices.

Self Assessment Questions:

The key components of the Continuing Professional Development (CPD) model are:

- A. Observing, Listening, Doing, Analyzing, Recording
- B. Reflection, Planning, Action, Evaluation, Recording
- C. Analysis, Design, Development, Implementation, Evaluation

How is the CPD model different from Continuing Education (CE) program?

EFFECTIVE VANCOMYCIN DOSING AND MONITORING DURING SLOW LOW EFFICIENCY DAILY DIALYSIS

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Background: There is limited data on vancomycin clearance during Slow Low Efficiency Daily Dialysis (SLEDD), but it is estimated that only a small amount of vancomycin is cleared. Ahern et al conducted a prospective pharmacokinetic evaluation of vancomycin during 24 hour SLEDD and concluded that vancomycin clearance during SLEDD was variable and prolonged. With variable clearance of vancomycin for patients who receive SLEDD, therapeutic levels to treat infections should be monitored to ensure clinical and microbiological cure.

Purpose: The purpose of this study is to assess the adequacy of current vancomycin dosing practices in patients undergoing SLEDD at a large community teaching hospital, and determine the need for vancomycin dosing and monitoring guidelines.

Methods: A retrospective chart review was conducted to evaluate current vancomycin dosing and monitoring practices for 100 medical or surgical ICU patients who were admitted July 2006 through July 2007 that received SLEDD and vancomycin concurrently. The prospective clinical study will include the first 50 patients between October 2007 and June 2008 in the medical and surgical ICU receiving SLEDD and vancomycin concurrently. Dosing and monitoring for all study patients will be per study protocol for the first two consecutive sessions of SLEDD, and then the clinical pharmacist will dose and monitor based on clinical judgement. Patients will be given a loading dose of 15 mg/kg as per protocol unless they were already receiving vancomycin prior to SLEDD. Random levels will be ordered prior to the initiation and 2 hours post SLEDD, and supplemental doses will be given after the random level is drawn post SLEDD. The principle investigator will monitor clinical improvement of patient (temperature, WBC, cultures, etc.) and levels as ordered per clinical pharmacist.

Results/Conclusion: Data collection in progress and preliminary data will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Compare and contrast available literature on vancomycin use during SLEDD.

List the potential risks and benefits of vancomycin dosing and monitoring guidelines in patients receiving SLEDD.

Self Assessment Questions:

True or False: Vancomycin clearance during SLEDD ranges from 50%-70%.

True or False: The filter utilized during SLEDD will affect the clearance of vancomycin.

EFFECTIVENESS OF PHARMACIST INTERVENTION IN BLOOD PRESSURE CONTROL IN PATIENTS WITH UNCONTROLLED HYPERTENSION: ATTEMPT TO REACH BP GOAL

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Purpose: The purpose of this study is to evaluate the impact of a pharmaceutical care service on blood pressure (BP) in patients with uncontrolled hypertension.

Methods: This is a 6-month prospective randomized controlled clinical study. Potential study participants were identified from referrals generated from two outpatient clinics in the Gundersen Lutheran system. One-third of the identified patients were randomized to control group and two-thirds to intervention group. Exclusion criteria includes: non-English speaking patients, no home telephone service, less than 18 years of age, pregnant, have controlled hypertension as defined by JNC-VII, or receive primary care outside of the Gundersen Lutheran system. The patients in the control group will continue to receive "usual care" and BP data will be collected at 0 and 6 months from their medical records. The intervention group has 2 scheduled visits with a pharmacist at 0 and 3 months with a minimum of three follow-up telephone calls in between appointments. Final BP reading will be taken at 6 months. All patients will be given a home BP monitor and educational pamphlet to aid in better monitoring and control

Preliminary Results: 59 potential study participants were identified and referred. 8 of the 59 were excluded from the study. 20 patients were randomized to control and 16 patients volunteered for the study. The number of participants in control and intervention groups total 49. Baseline characteristics for the intervention group are as follows: 3 male and 13 female, average age is 66 years, average BMI 32.5, average SBP is 147, and average DBP is 74. Baseline characteristics for the combined control group are as follows: 12 male, 21 female, average age is 67 years, average BMI 30.7, average SBP is 153, and average DBP is 80. The results of the second study will be presented at the conference.

Learning Objectives:

Understand the need for national control of hypertension

Be able to correlate the compliance issues with patient characteristics

Self Assessment Questions:

What is the approximate national average of hypertensive patients that are controlled?

- A. 70%
- B. 50%
- C. 80%
- D. 30%

What is the most indicated antihypertensive agent for hypertensive patients with Diabetes?

- A. Thiazides
- B. Beta blockers
- C. ACE Inhibitors
- D. Calcium Channel Blockers

REVIEW OF CHANTIX (VARENICLINE) USE IN THE VA POPULATION WITH AND WITHOUT CONCOMITANT FORMALIZED SMOKING CESSATION COUNSELING IN THE INITIAL 8 MONTHS OF USE.

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Purpose:

Retrospective analysis to determine the success rate of smoking cessation in patients using Chantix (varenicline) with and without counseling.

Background:

Currently nearly 45 million American adults are smoking. Two of the most commonly used methods of cessation include counseling and pharmacotherapy, which tend to have higher success rates than an individual abstaining on their own. Counseling has shown an additional two percent success rate than just abstinence alone.

Approved May 2006, varenicline acts as a partial agonist of nicotinic acetylcholine receptors and has shown higher continued 4 week smoking abstinence with nausea and abnormal dreams most frequently reported in terms of side effects.

The objective of this study is to evaluate the efficacy and adverse drug reactions of varenicline in the VA population in the initial 8 months of use.

Methods and procedures:

This study will be conducted as a retrospective chart review evaluating the success rate of smoking cessation in patients using varenicline with or without counseling. The William S. Middleton VA Hospital pharmacy prescription database will be utilized to identify all patients' age 18 years or older receiving varenicline from May 2007 to January 1, 2008. The VA Computerized Patient Record System (CPRS) will be used to collect past bupropion and nicotine replacement therapy use, varenicline trial secondary to failure of other treatment modalities, duration of abstinence in the initial 8 months of varenicline, and adverse events with varenicline use. Records to be reviewed at 3 and 6 months after varenicline prescription received to determine success/failure.

Results: To be presented at Great Lakes.

Learning Objectives:

1. State the mechanism of action of varenicline and this might be beneficial versus conventional smoking cessation aids.
2. State the most commonly reported adverse effect of varenicline use during the course of the study presented.

Self Assessment Questions:

1. What is the mechanism of action of varenicline?
 - a. Inhibits weakly the neuronal uptake of dopamine, norepinephrine, and serotonin.
 - b. Agonist at the nicotinic cholinergic receptors at the autonomic ganglia, in the adrenal medulla, at neuromuscular junctions, and in the brain.
 - c. High affinity and selectivity at alpha-4-beta-2 neuronal nicotinic acetylcholine receptors producing agonist activity at a sub-type of the nicotinic receptor while also preventing nicotine binding to alpha-4-beta-2 receptors.
2. What was the most common adverse effect reported with varenicline use during the course of the study?
 - a. Suicide ideation
 - b. Aggressive behavior
 - c. Nausea
 - d. Abnormal dreams
 - e. Headache
 - f. Insomnia

SEROCONVERSION RATES WITH THE USE OF AN ACCELERATED HEPATITIS A AND/OR B VACCINE SCHEDULE IN HEART TRANSPLANT PATIENTS

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Background: The hepatitis B (Recombivax-HB; Engerix-B) and combination hepatitis A and B (Twinrix) vaccines are conventionally administered at zero, one, and six months. Recently, an accelerated schedule was FDA approved for the monovalent hepatitis B and combination hepatitis A and B vaccines at zero, one, and three weeks. Published data has been established in young healthy individuals demonstrating positive seroconversion rates using the accelerated vaccine protocol. Cleveland Clinics Cardiology service has adopted this protocol in patients awaiting heart transplantation prior to receiving immunosuppression. However, the success of this accelerated vaccine schedule in providing sufficient antibody titers in heart transplant patients has yet to be established.

Objective: The primary objective is to assess the rates of seroconversion at the time of transplantation in heart transplant patients receiving the accelerated hepatitis A and/or B vaccine.

Methodology: This study will be conducted as a retrospective chart review of heart transplant patients who received the accelerated vaccine protocol between January 2005 and December 2007. Adult heart transplant patients with negative hepatitis A and/or B antibodies at the time of transplant evaluation requiring the accelerated vaccine protocol were included. The primary endpoint is to determine the percentage of patients who seroconverted by the time of transplantation. In addition, the percentage of patients who seroconverted one month after the vaccination series and the number of completed vaccine doses will be assessed. Patient baseline characteristics including immune status, UNOS transplant status, co-morbidities, heart failure duration, and heart failure severity will also be evaluated.

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

Learning Objectives:

Define the difference between the standard and accelerated vaccination schedule.

Discuss the rationale for the accelerated vaccine protocol in the heart transplant population.

Self Assessment Questions:

What is the FDA approved accelerated schedule for the combination hepatitis A and B vaccine?

- a. 0, 1, and 6 months
- b. 0 and 12 months
- c. 0, 1, 3 weeks
- d. 0, 2, 4 weeks

True or False: An accelerated hepatitis vaccine will achieve rapid immunity against hepatitis in heart transplant patients prior to becoming immunocompromised.

RECOMBINANT HIRUDIN (LEPIRUDIN) USE IN PATIENTS WITH RENAL IMPAIRMENT AND HEPARIN-INDUCED THROMBOCYTOPENIA (HIT)

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Purpose

There is limited information available in the literature regarding the dosing of lepirudin in patients with HIT and severe renal impairment, defined as creatinine clearance less than 15 ml/min or serum creatinine greater than 6 mg/dl. The medical literature in this patient population consists largely of case reports. The primary objective of this study is to describe the therapeutic outcomes of lepirudin in patients with HIT and severe renal impairment who received lepirudin at Saint Joseph Mercy Health System (SJMHS). The secondary objective of the study is to evaluate the efficacy and safety of lepirudin in HIT patients with severe renal impairment compared to patients with either normal renal function or mild to moderate renal impairment.

Methods

Patients 18 years of age or older with a documented suspicion or diagnosis of HIT who received lepirudin at SJMHS from April 2002 to August 2007 were included in this retrospective study. Patients were excluded from the study if they received lepirudin for prevention of catheter occlusion, during a procedure (one-time dose), for venous thromboembolism (VTE) prophylaxis, or thrombocytopenia presumed not due to heparin therapy. The Cockcroft and Gault equation was used to calculate estimated creatinine clearance in all patients. The study objectives will be achieved by evaluating the percentage of patients with therapeutic activated partial thromboplastin time (aPTT) at 4-hour intervals in the first 24 hours of lepirudin initiation, appropriateness of patients doses, development of new thromboembolic complications, and occurrence of major bleeding events on lepirudin therapy. Data reported will also include patients history of HIT, inpatient mortality, and length of hospital stay.

Results/Conclusion

Data analysis is ongoing. Results and conclusion will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

Describe the role of lepirudin in heparin-induced thrombocytopenia (HIT).

Describe thromboembolic complications and bleeding events associated with lepirudin use in severe renal impairment.

Self Assessment Questions:

Discontinuing the use of unfractionated and low molecular weight heparin is sufficient to prevent thromboembolic complications associated with heparin-induced thrombocytopenia (HIT). True or False

Lepirudin does not require dosage adjustment in renal impairment. True or False

ASSESSMENT OF THE RESOURCES CONSUMED BY HEALTH-SYSTEM PHARMACY DEPARTMENTS WHEN PERFORMING A FORMULARY CONVERSION

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Purpose: The primary objective of this study was to assess the time resources consumed by health-system pharmacy departments when performing a formulary conversion to a new, branded product within an existing therapeutic class. Secondary objectives were to determine the dollar threshold that pharmacy departments must save before committing to a formulary conversion as well as determine the reasons to make formulary changes.

Methods: This descriptive analysis employed an electronic survey addressed to pharmacy management within 176 institutions of the University HealthSystem Consortium. Survey respondents estimated the time spent by pharmacists and pharmacy technician/clerical personnel to complete the necessary formulary conversion steps for a hypothetical product scenario. The formulary conversion steps reviewed with the participants included the following major categories: 1) Formulary Request and Pharmacy & Therapeutics (P&T) Monograph Development, 2) Contracting & Pricing, 3) P&T Meetings, 4) Clinical Services, 5) Product Inventory Procedures, 6) Information Technology, and 7) Billing Services.

Results: A response rate of 11.9% (21/176) was achieved. The mean estimated time to convert from one drug to another was 139.0+211.8 hours, with an associated staffing cost of \$5,695.35. The individual steps within the Clinical Services category (e.g., drug use evaluation, staff education, cost reporting, etc.) consumed the most pharmacist and pharmacy technician/clerical personnel time (53.5 and 19.5 hours, respectively). The efficacy, safety, and cost savings qualities of products were rated the most important decision-making factors when considering a formulary conversion. Respondents reported that a one-time savings to the pharmacy departments drug expenditure budget of \$30,881.05+\$49,018.28 must be met before a formulary conversion commitment is made.

Conclusions: The results reflect that when pharmacy management is making a formulary conversion decision, they must determine if the amount of time necessary to execute the conversion is the best allocation of their resources.

Learning Objectives:

Discuss the steps that need to be performed to conduct a formulary conversion.

Identify the most time consuming tasks for pharmacists and pharmacy technician/clerical personnel when executing a formulary conversion.

Self Assessment Questions:

1) According to this study, the most time consuming individual step of performing a formulary conversion for a pharmacist is?

- a) Conducting the literature review of the product
- b) Preparing for the pharmacy & therapeutics meeting
- c) Performing the drug use evaluation post-conversion
- d) Building the product into the automated systems involved in the medication use process

2) Please circle the three most important decision makers to consider when conducting a formulary conversion?

- a) Cost savings
- b) Efficacy
- c) Time commitment
- d) Clinician support
- e) Safety

INCIDENCE OF CARDIOVASCULAR EVENTS IN PATIENTS TREATED WITH ROSIGLITAZONE

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Background: Diabetes is a progressive disease that leads to multiple macro and microvascular complications. The risk of myocardial infarction (MI) and stroke is two to four times higher in patients with diabetes, making cardiovascular disease the leading cause of morbidity and mortality in this patient population. Rosiglitazone maleate, a peroxisome proliferator-activated receptor gamma agonist, has been shown to decrease fasting and postprandial glucose levels and modestly decrease hemoglobin A1c. Two recent meta-analyses have found an increased risk of MI and heart failure in patients receiving rosiglitazone compared to placebo or other anti-diabetic agents. The risk of MI has not been confirmed in prospective data. Fluid retention that may lead to or exacerbate heart failure is a known adverse event associated with the thiazolidinedione class. The FDA has issued new black box warnings for rosiglitazone regarding the risk of myocardial ischemia and heart failure due to post-marketing data.

Purpose: The purpose of this retrospective analysis is to evaluate the incidence of cardiovascular events in patients with type 2 diabetes treated with rosiglitazone at this institution.

Methods: This study will be a retrospective, electronic chart review of patients with type 2 diabetes initiated on rosiglitazone between the dates of September 1, 2002 and September 1, 2004. The following data will be collected at rosiglitazone initiation and on an annual basis: demographics, other anti-diabetic agent(s), history of cardiac disease, hemoglobin A1c, low-density lipoprotein cholesterol, lipid lowering agent(s), anti-platelet agent(s), smoking status, blood pressure, anti-hypertensive agent(s), and body mass index. The primary endpoints will be MI, cardiac revascularizations, and all cause mortality. The secondary endpoints will be a new diagnosis of heart failure and heart failure exacerbations leading to hospitalizations. Patients will be followed until the time of an event, discontinuation of rosiglitazone, or September 1, 2007.

Results/Conclusions: Data collection and analysis are ongoing.

Learning Objectives:

Identify potential risk factors for developing heart failure/exacerbating heart failure in patients treated with rosiglitazone at the Jesse Brown VA Medical Center.

Identify potential risk factors for developing myocardial ischemia in patients treated with rosiglitazone at the Jesse Brown VA Medical Center.

Self Assessment Questions:

True or False. Patients treated with rosiglitazone and insulin may have an increased risk of myocardial ischemia and heart failure.

True or False. As a result of the new FDA black box warnings, rosiglitazone is contraindicated in patients with a known history of coronary artery disease and NYHA class I and II heart failure.

EVALUATION OF A PHARMACIST-DRIVEN WEIGHT-BASED ARGATROBAN PROTOCOL IN A COMMUNITY HOSPITAL SETTING

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Background: Community Health Network (CHN) currently utilizes argatroban for the prophylaxis or treatment of thrombosis in most patients with suspected or confirmed HIT. CHN established a pharmacist-driven protocol to streamline the initiation and maintenance of argatroban dosing. The protocol suggests lower dosing in patients with liver function tests (LFTs) greater than three times the upper limit of normal. Recent studies have found additional patient characteristics that predict the need for lower argatroban dosing.

Objective: This study will be conducted to investigate the effectiveness of the pharmacist-driven protocol at CHN in regard to attainment of a therapeutic aPTT, avoidance of thrombotic and bleeding complications and cost. Secondly, the study will comprehensively investigate the various patient parameters associated with an appropriate initial argatroban dose.

Methods: A retrospective, non-interventional study will be conducted to evaluate the efficacy of the pharmacist-driven argatroban protocol and various patient parameters and their effect on argatroban dosing. All patients who were initiated on argatroban from September 1, 2004 (initiation of the argatroban protocol) to November 1, 2007 between the ages of 18 and 89 will be included in the study. The activated partial thromboplastin time (aPTT) of approximately 60 to 80 will be associated with a therapeutic argatroban concentration. Thrombotic complications of interest will include deep vein thrombosis, pulmonary embolism, and amputation or death related to heparin-induced thrombocytopenia. Linear regression will be used to determine any patient parameters that affect initial argatroban dosing and therapeutic maintenance doses.

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

Learning Objectives:

Identify patient characteristics that affect initial and maintenance dosing of argatroban.

Develop an updated pharmacist-driven argatroban protocol based on the subsequent study in collaboration with current recommendations in the literature

Self Assessment Questions:

T/F Does argatroban need to be adjusted initially in patients with renal dysfunction?

T/F Can argatroban be used in patients with hepatic impairment?

ASSESSMENT OF PROPHYLAXIS STRATEGIES FOR RADIOCONTRAST-INDUCED NEPHROPATHY IN PATIENTS HIGH-RISK

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Background:

Radiocontrast-induced nephropathy (RCIN) describes acute renal impairment occurring after exposure to radiocontrast media. While the incidence of RCIN is low, it is associated with adverse outcomes. Several strategies for prevention exist, including use of intravenous hydration, intravenous sodium bicarbonate, and N-acetylcysteine. While the most optimal prophylactic strategy is not established, it is apparent that certain patients are at higher risk for nephropathy and should be considered candidates for prophylaxis.

Purpose:

The primary study objective is to assess the frequency of use and type of prophylaxis strategies for RCIN employed within the Community Health Network, Indianapolis, Indiana.

Methods:

A retrospective, non-interventional observational study design will be conducted to describe the use of RCIN prophylaxis strategies. Patients included in the study will be hospitalized patients who received radiocontrast media for a procedure and who were at high risk for nephropathy, defined as those with diagnosis of diabetes mellitus or chronic kidney disease (SCr > 1.5 mg/dl or glomerular filtration rate < 60 ml/min/1.73m²). Patients to be excluded from the study are those undergoing coronary angiography/catheterization, under 18 or over 89 years old, prisoners, and pregnant patients. Data to be collected from medical records includes age, gender, length of hospital stay, contrast procedure performed, type and volume of contrast media used for procedure, presence of the predefined risk factors, serum creatinine prior to procedure and following procedure for 72 hours - if available, prophylaxis strategy - if employed, and any requirement of hemodialysis. Strategies considered to be prophylaxis include use of any of the following: fluid hydration, N-acetylcysteine, sodium bicarbonate.

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

Learning Objectives:

Identify risk factors associated with development of radiocontrast-induced nephropathy.

Describe prophylaxis strategies for prevention of radiocontrast-induced nephropathy.

Self Assessment Questions:

(T/F) Radiocontrast-induced nephropathy is often defined as a 25 percent elevation in serum creatinine or an absolute increase of 0.5 mg/dl, usually occurring two to seven days after contrast administration.

(T/F) Risk factors for radiocontrast-induced nephropathy may be related to the patient and also to the properties of the contrast agent.

THE RATE OF PRIMARY PREVENTION FOR OSTEOPOROSIS IN LONG-TERM GLUCOCORTICOID USE: A RETROSPECTIVE CHART ANALYSIS.

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PURPOSE: This study is designed to assess the rate at which bisphosphonates are prescribed for osteoporosis prophylaxis and treatment in patients receiving concurrent long-term glucocorticoid therapy. There is significant literature published demonstrating that there is a decreased risk for osteoporosis if bisphosphonates are prescribed as primary prevention in the long-term glucocorticoid therapy population. Despite these published benefits, gaps remain in physician prescribing patterns for these agents. Secondly, this study hopes to investigate which predictors positively and negatively influence the rate of primary prevention prescribing.

METHODS: Electronic medical records of 250 randomly-selected patients receiving long-term glucocorticoid therapy at a prednisone-equivalent dose of 5 mg or more with treatment duration of at least 3 months at 1 academic center in the United States will be reviewed. The rates of bisphosphonate use as primary osteoporosis prevention will be assessed. Patients medical history, indications for steroid use, dose of steroid, length of steroid treatment, prescribed bisphosphonate agent, and pertinent lab values will be documented. Glucocorticoid dose ≥ 7.5 mg/day, specialty care, postmenopausal status and history of GERD/PUD, will be collected and assessed as possible predictors of bisphosphonate use or non-use.

RESULTS: Nine hundred patients have been identified as meeting the inclusion criteria. Electronic medical records for 250 randomly selected patients will be reviewed. Data collection and analysis is currently underway.

CONCLUSIONS: This study will determine the rate of primary osteoporosis prevention prescribing in long-term glucocorticoid patients. Identified predictors of bisphosphonate use may be potential barriers to use. As such, this study hopes to discover a potential role for pharmacists to alleviate these barriers and ensure that all long-term glucocorticoid therapy patients receive appropriate bisphosphonate prophylaxis.

□

Learning Objectives:

Investigate the definitions used to characterize glucocorticoid-induced osteoporosis and discuss the criteria for determining preventative treatment of glucocorticoid-induced osteoporosis. Evaluate the agents that are being used for primary prevention of glucocorticoid-induced osteoporosis

Self Assessment Questions:

True or False

Primary prevention is described as the initiation of bone loss preventative therapy as soon as glucocorticoid therapy is initiated.

Agents that have been shown to increase bone mineral density in patients using systemic glucocorticoids at doses ≥ 5 mg/day for treatment duration ≥ 3 months include:

- Bisphosphonates (alendronate, risedronate)
 - Intranasal calcitonin
 - Calcium 1000 mg daily and vitamin D 400 IU daily supplementation
- i only
 - iii only
 - i and iii
 - ii and iii
 - i, ii, iii

DEVELOPMENT AND IMPLEMENTATION OF A PHARMACIST-RUN DIABETES EDUCATION PROGRAM

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Background: In 2005, the Centers for Disease Control and Prevention reported that 14.6 million people were diagnosed with diabetes in the United States. If not properly managed or controlled, diabetes can progress to serious and often life-threatening complications which have been shown to significantly increase patient morbidity, mortality, and economic burden. Studies have shown that education by health care providers, such as pharmacists, can help reduce patients risks of serious complications. Community pharmacists can apply their clinical skills to educate diabetes patients to monitor blood glucose levels, blood pressure, lipids, to improve nutrition, and utilize preventative care to prevent complications.

Hospital based community pharmacists are one of the primary access points for the Evanston Northwestern Healthcare (ENH) system due to their trusted relationship with their patients. In this capacity, they serve as a liaison between patients and physicians and can significantly impact patient outcomes.

The purpose of this study is to design and implement a pharmacist managed diabetes care clinic in a hospital based community pharmacy and to determine the effects of the service on patient outcomes.

Methods: Patients with a current diagnosis of type 2 diabetes or pre-diabetes will be recruited from the ENH pharmacies to participate in an education and screenings program. Patients will receive a baseline evaluation of glycosylated hemoglobinA1C values, fasting blood glucose, total cholesterol, blood pressure, and a self-assessment survey to determine patient understanding and knowledge of diabetes. The twelve week program will consist of group education sessions, one-on-one appointments, individualized screenings with feedback, and direct patient counseling. After twelve weeks, a repeat assessment of the baseline screenings will be performed to determine if the patients hemoglobinA1c, blood glucose, cholesterol, blood pressure, and patients understanding of the disease had improved.

Patient enrollment is ongoing. Results will be presented during the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the impact patient education services have on patients self management of diabetes and its complications.
Recognize the impact clinical pharmacists in the community setting have on patients disease state management.

Self Assessment Questions:

What measures can a clinical pharmacist in the community setting use to demonstrate positive patient outcomes in a diabetes education and monitoring program?

- a. changes in hemoglobin A1c
- b. improved fasting cholesterol panel
- c. improved patient self assessment
- d. all of the above

T/F Studies have shown that through disease state education and monitoring programs, pharmacists interventions improve patient outcomes.

ASSESSMENT AND IMPLEMENTATION OF BEST PRACTICES INVOLVING IMPROVING ANTICOAGULATION THERAPY

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PURPOSE

High alert medications are more likely to cause harm, and more serious harm, to patients than other medications. Reducing patient harm from anticoagulants, a high alert medication group, is an objective of the Institute for Healthcare Improvements (IHI) Five Million Lives Campaign and The Joint Commissions 2008 National Patient Safety Goals. The purpose of this project is to define current anticoagulation-related best practices, to assess Aurora Health Cares current anticoagulation practices, and to align Aurora Health Cares practices with established best practice standards.

METHODS

Current anticoagulation practice standards and guidelines will be gathered from the IHI, The Joint Commission, The American Society of Health-System Pharmacists (ASHP), and The Institute for Safe Medication Practices (ISMP). Each of Aurora Health Cares 13 hospitals will complete a gap analysis to determine the variances between Aurora Health Cares anticoagulation practices and established best practices. Based on the results of the gap analysis, strategies will be developed and implemented to align practices with established best practice standards. Implemented strategies will be assessed based on efficacy, safety, and the process and outcome measures designed by the IHI 5 Million Lives program.

PRELIMINARY RESULTS

The gap analysis has been completed for each of Auroras 13 hospitals. Results suggested that there are improvement opportunities in anticoagulant product and process standardization, monitoring, and patient and provider education. These opportunities have been compiled into a "Best Practice Standards" document, organized by rationale for the standard, the standards source, the status of the institution based on the gap analysis, and a recommendation and plan for meeting the standard

CONCLUSIONS

The final results and conclusions of this study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the incidence and significance of adverse drug events caused by anticoagulant medications.
List the recommendations put forth by 2008 National Patient Safety Goal 3E.

Self Assessment Questions:

Assess the limitations of the gap analysis method for data collection.

List the 3 main themes from the practice recommendations of ASPH, IHI, ISMP, and the Joint Commission.

MONITORING HEMOGLOBIN LEVELS IN PATIENTS ON ERYTHROPOIESIS STIMULATING AGENTS IN PHARMACIST-MANAGED CLINIC VERSUS USUAL CARE

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Recent studies have shown increased risk of death, cardiovascular and thromboembolic events, as well as tumor progression in patients on erythropoiesis stimulating agents (ESAs) with hemoglobin levels elevated > 12g/dL. In 2007 the FDA issued black box warnings on ESAs recommending target hemoglobin levels < 12g/dL. Within the Madison VA system, patients on ESAs are either followed by a pharmacist-managed clinic or usual care. We hypothesize the pharmacist-managed clinic will provide better monitoring of hemoglobin and intervention if hemoglobin elevated above target when compared to usual care. The primary objective of this study is to compare the number of patients meeting hemoglobin goal between pharmacist-managed clinic versus usual care. We will also identify if proper interventions occur when hemoglobin levels are above target and compare results between the two groups. The secondary endpoints include if iron studies are adequately monitored and whether iron supplements were used. Electronic medical records will be used to identify patients on ESAs between 7/1/2007 and 9/30/2007. Patients will be excluded if deceased during time of data collection, received one-time dose of ESA or if ESA used investigational. The data will include age, gender, indication for ESA, agent being used, hemoglobin level, interventions made when hemoglobin levels elevated above target, most current iron studies and when measured, and the clinic type responsible for hemoglobin monitoring. Chi-square test will be used to compare categorical values and a t-test to compare hemoglobin and ferritin/iron study means.

Learning Objectives:

Identify new hemoglobin guidelines for erythropoiesis stimulating agents.

Describe the structure of a pharmacist-managed erythropoiesis stimulating agents.

Self Assessment Questions:

What are the new hemoglobin guidelines for erythropoiesis stimulating agents?

List three FDA approved indications for using erythropoiesis stimulating agents.

IMPACT OF A GROUP HEART FAILURE CLINIC ON PATIENT OUTCOMES IN A VETERAN POPULATION

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Purpose: The purpose of this study was to evaluate the impact of a multidisciplinary group heart failure (HF) clinic on quality of life. Secondary outcomes evaluated were medication optimization, adherence rates, patient knowledge, and heart failure related hospital admissions and primary care visits. **Methods:** This retrospective, observational, single-center study was approved by the University of Kentucky Institutional Review Board and informed consent was obtained from all patients prior to participation. Baseline characteristics and other pertinent data were extracted using electronic chart review. Quality of life (QOL) was evaluated using the Kansas City Cardiomyopathy Questionnaire (KCCQ). Medication optimization was measured by initiation and titration of beta blockers and angiotensin converting enzyme inhibitors to meet national HF guidelines. Assessment of adherence to HF medications was measured using medication possession ratios (MPR). HF related hospital admissions and primary care visits were assessed comparing the number of visits in the year prior to first clinic visit to the number of visits in the year after the initial visit. Patient knowledge was measured using a purposely designed questionnaire given at each clinic visit. Paired t tests were used to assess the changes from baseline at each clinic visit and the overall change from baseline to final visit in all measures.

Results: A total of 44 patients met criteria for chart review. Paired t tests for KCCQ measures including quality of life ($p=0.144$), physical limitation ($p=0.006$), and overall summary score ($p=0.0003$) have been statistically significant or trending toward significance. HF related PC visits and hospitalizations showed a statistically significant decrease ($p=0.001$). Patient knowledge scores showed a positive trend in score improvement ($p=0.4$).

Conclusions: Preliminary results suggest that quality of life in the veteran population affected by HF is improved by participation in a multidisciplinary group clinic focused on education and disease state management.

Learning Objectives:

Identify HF patients who are eligible for medication optimization and review pertinent medical history for potential contraindications to medication adjustments.

Recognize the potential benefit and improved outcomes of adding a pharmacist to a multidisciplinary group clinic.

Self Assessment Questions:

True or False: HF is the most common Medicare diagnosis-related group and more Medicare dollars are spent for diagnosis and treatment of HF than for any other diagnosis.

True or False: Quality of life and physical limitation scores can be improved in HF patients by participating in a multidisciplinary group clinic focused on education and disease state management.

AN EVALUATION OF THE INPATIENT CHEMOTHERAPY PROCESS AT A COMPREHENSIVE CANCER CENTER

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Background: Delays in the administration of chemotherapy can increase length of stay as well as impact patient satisfaction. The pharmacy is often viewed as the primary source of the delays despite the many steps prior to and following the compounding, checking, and dispensing of chemotherapy. An increased number of reported delays have led to a re-evaluation of the chemotherapy process at The Arthur G. James Cancer Hospital at The Ohio State University. Increasing patient volumes, staffing shortages, and operational changes all potentially impact chemotherapy turnaround time. The steps prior to and following chemotherapy preparation that can contribute to delays include: patient assessment, central venous catheter (CVC) placement, order entry, endorsement by the attending physician, activation of the order by a pharmacist, delivery to the patient care area, and medication administration. Previous evaluations have shown endorsement delays, problem orders, waiting for labs, waiting for CVC placement, and bed availability as the most common reasons for chemotherapy delays.

Objective: The purpose of this evaluation is to determine where in the chemotherapy process delays are occurring, and to determine the reasons why these delays occur.

Methods: Times associated with chemotherapy order entry process (entry, endorsement, activation) and the administration time of the first medication associated with the chemotherapy regimen will be captured electronically through the CPOE system. Pharmacy technicians will manually record the times that the chemotherapy was delivered. Reasons for delays and pertinent comments are being captured manually by the pharmacists. Institutional Review Board exempt status pending.

Results and Conclusion: Data from this evaluation will serve as a foundation for a chemotherapy process improvement initiative. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the most common reasons for chemotherapy delays.
Discuss process improvement initiatives for decreasing chemotherapy turnaround time.

Self Assessment Questions:

True or False: The pharmacist is most frequently responsible for delays in chemotherapy administration.
List the top 3 reasons for chemotherapy delays.

A CHARACTERIZATION OF POLYPHARMACY IN AN INPATIENT BIPOLAR POPULATION

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Background: Bipolar disorder is a chronic illness characterized by recurrent episodes of mood instability that can be difficult to control. Current evidence-based consensus guidelines recommend monotherapy as initial treatment for acute mania, hypomania and dysphoric (mixed) mania. However, the goal of managing bipolar symptoms often necessitates the use of multiple medications, including: lithium salts, mood-stabilizing anticonvulsants, atypical antipsychotics, and antidepressants. Treatment can also include medications not supported by these treatment guidelines.

Purpose: The purpose of this study is to characterize the pharmacotherapy regimens used to manage acute bipolar symptoms in a sample of hospitalized patients and to compare these regimens to current guidelines.

Methods: This study is a retrospective chart review of 100 inpatients discharged between December 31, 2006 and July 1, 2007 with a bipolar disorder diagnosis. Patient data were categorized according to diagnosis and medication regimen at both admission and discharge. Adherence to current consensus guidelines was assessed by comparing medication regimens prior to admission and at discharge to the guideline algorithm. Secondary outcomes include: 1) the occurrence of polypharmacy prior to admission compared to the occurrence at discharge; 2) the impact of a diagnosis of borderline personality disorder (Axis II) on polypharmacy; and 3) the change in number of medications from time of admission to time of discharge.

Results/Conclusions: Analysis of data is ongoing. Results of this analysis and conclusions will be presented.

Learning Objectives:

To understand the current consensus guideline recommendations for the treatment of bipolar disorder.
To identify potential trends in non-adherence to the guidelines.

Self Assessment Questions:

True/False Treatment options for the acute management of bipolar disorder include lithium, valproic acid or an atypical antipsychotic.
True/False Regimens involving more than two agents are recommended for initial treatment.

ASSESSMENT OF DEPRESSION AFTER AN ACUTE MYOCARDIAL INFARCTION

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Background:

Depression has been recognized as an important predictor of morbidity and mortality in cardiac patients. Studies have shown that patients who develop depression after a myocardial infarction (MI) have increased mortality rates and are more likely to have a second cardiac event. The American Heart Association (AHA) acknowledges the psychosocial impact a MI can have on a patient and have devoted a section in their guidelines to this topic. The AHA recommends that each patient's psychosocial status be evaluated after a MI. The guidelines also offer treatment suggestions during the first year following hospital discharge.

Purpose:

The purpose of this retrospective study is to investigate if post-MI patients followed at the Jesse Brown VA Medical Center (JBVAMC) are appropriately being screened for depression according to AHA guidelines. Additionally, if a patient screens positive for depression, is some form of treatment being offered.

Methods:

This study will be a retrospective, electronic chart review of patients who experienced a MI between August 4, 2004 and December 31, 2006. The following data will be collected: demographics; targeted past medical history; date of the first MI; discharge medications post-MI; LDL; whether or not patient was screened for depression; whether or not patient screened positive for depression; whether or not treatment for depression was offered, accepted, and if it was non-pharmacologic or pharmacologic; and secondary cardiac events. The primary endpoint of the study is to determine if the post-MI patients are being screened for depression. Secondary endpoints will examine mortality, and incidence of second cardiac events, defined as non-fatal MI, revascularization, and unstable angina. Patients will be followed for one year, or until a second cardiac event occurs, or October 10, 2007.

Results/Conclusions:

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

Learning Objectives:

Review the association between depression and MI.

Identify potential benefits and risks for treating depression in the post-MI patient.

Self Assessment Questions:

True or False. Patients treated with sertraline post-MI are at greater risk for a recurrent MI.

True or False. Treating depression in a post-MI patient is contraindicated as it may increase heart rate.

EVALUATION OF A NON-CONVENTIONAL INTRAVENOUS TACROLIMUS DOSING REGIMEN FOR PROPHYLAXIS OF GRAFT-VERSUS-HOST-DISEASE IN ALLOGENEIC HEMATOPOIETIC CELL TRANSPLANT

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Background: Allogeneic hematopoietic cell transplant is indicated in hematologic malignancies, bone marrow failure states and some nonmalignant disorders. The tendency of donor cells to detect the recipient as foreign can lead to graft-versus-host disease (GVHD). The incidence of acute GVHD is estimated to occur in 20-50% of transplant patients. Tacrolimus is an immunosuppressive macrolide traditionally administered as continuous infusion which inhibits the calcium-dependent signal transduction pathway and blocks the earliest steps of T-cell activation.

Purpose: To determine if a twice daily dosing regimen of intravenous tacrolimus is safe and effective in preventing GVHD.

Methods: A retrospective chart review of patients that received the twice daily dosing regimen for GVHD prophylaxis was performed. The primary endpoint of the study was to determine the safety of tacrolimus twice daily as defined by renal toxicity compared to continuous infusion. Renal toxicity was described as serum creatinine > 2mg/dL or 2x the baseline measurement. Secondary endpoints included evaluating average tacrolimus serum concentrations, the incidence of grades 2-4 GVHD and the incidence of other toxicities including hyperglycemia, hypertension and neurologic toxicity.

Results: In the retrospective chart review, 43 patient charts were evaluated. Compared to previously published data, there was no difference in the incidence of renal toxicity in patients receiving the twice daily dosing regimen (60%) compared to continuous infusion (63%) (p= 0.808). The average tacrolimus serum concentration of the study population was 9.95 ng/mL. There was no significant difference in the incidence of grades 2-4 GVHD (37%) or grades 3-4 GVHD (19%) compared to previously published data.

Conclusion: Tacrolimus can be safely administered twice daily over four hours while providing effective GVHD prophylaxis. The results of this retrospective chart review warrant prospective evaluation of this dosing regimen.

Learning Objectives:

Describe common toxicities associated with the administration of intravenous tacrolimus and their reported incidence.

Recognize the contributions of a clinical pharmacist to multidisciplinary patient care in monitoring hematopoietic cell transplant patients.

Self Assessment Questions:

T / F Renal toxicity is the most common and problematic toxicity associated with administration of tacrolimus for GVHD prophylaxis.

T / F The targeted therapeutic tacrolimus serum concentration for GVHD prophylaxis is 15-20 ng/mL.

ADMINISTRATION OF ESOMEPRAZOLE FOR VARICEAL UPPER GASTROINTESTINAL BLEEDING

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Purpose: Variceal upper gastrointestinal bleeding (VUGIB) occurs in patients with chronic liver disease due to portal hypertension. VUGIB has a 30 to 50% mortality rate with 50% of patients experiencing re-bleeding. Primary therapy to control acute bleeding includes endoscopic intervention or transhepatic intrahepatic portosystemic shunt (TIPS). Pharmacologic management to reduce re-bleeding in the acute setting consists of intravenous (IV) octreotide for two to five days post endoscopic intervention. Patients with VUGIB undergoing an endoscopic intervention at Cleveland Clinic are frequently initiated on IV esomeprazole in addition to octreotide despite a paucity of evidence to support the use of a proton-pump inhibitor for this indication. The objective of this study is to determine whether administration of IV esomeprazole in addition to octreotide reduces the incidence of re-bleeding compared with octreotide alone in patients undergoing endoscopic treatment for VUGIB.

Methods: Non-interventional, retrospective cohort including patients with endoscopy-confirmed VUGIB undergoing band ligation or sclerotherapy, and receiving octreotide post endoscopic intervention. Patients will be divided into two groups: those receiving octreotide plus >40 mg daily of esomeprazole, and those receiving octreotide plus ≤40 mg daily of esomeprazole post endoscopy. Data collection will include baseline demographics, varix location and grade, type of endoscopic intervention, Child Pugh Class, baseline risk for re-bleeding, and dose and duration of esomeprazole and octreotide therapy. Incidence of re-bleeding will be determined based on documented re-bleeding episode, or a repeat endoscopic intervention or TIPS. Hematemesis, melena, hemoglobin, systolic blood pressure, heart rate, and number of units of blood products transfused will be recorded to determine the clinical significance of the re-bleeding episode. Length of hospital stay and in-hospital mortality will be collected. Statistical analysis will include two-sample Student's t-test for continuous data, Fisher exact or chi-square test for nominal data, and multivariate logistic regression analysis.

Results and conclusions: To be determined.

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Learning Objectives:

Review the pathophysiology and management of VUGIB
Identify the risk factors for re-bleeding in patients with VUGIB

Self Assessment Questions:

(T or F) Patients with an initial episode of VUGIB have a high risk for re-bleeding.

(T or F) Primary therapy to control an acute bleeding episode in a patient with VUGIB includes IV esomeprazole.

STEADY-STATE PHARMACOKINETICS OF CEFEPIME AND PIPERACILLIN/TAZOBACTAM ADMINISTERED BY PROLONGED INFUSION IN HOSPITALIZED PATIENTS

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PURPOSE: Gram negative organisms (e.g., *P. aeruginosa*) are becoming more resistant to available antibiotics resulting in elevated MICs. Beta-lactam antibiotic efficacy is best predicted by the time that serum concentrations exceed the MIC during a given dosing interval ($T > MIC$). Most studies indicate that $T > MIC$ should be at least 50%. The $T > MIC$ may not be adequate with the use of commonly prescribed dosing regimens, thus producing suboptimal results and providing selective pressure for further development of resistance. As a result, alternative dosing protocols have been developed at Methodist Hospital to evaluate the pharmacokinetics of two Beta-lactam antibiotics, cefepime and piperacillin/tazobactam, administered as prolonged infusions to demonstrate attainment of desirable serum concentrations.

METHODS: Patients admitted to Methodist Hospital or St. Francis Hospital who require antimicrobial therapy for a suspected or documented infection will be eligible for enrollment in the study. Patients will receive cefepime 1 gram every 8 hours, infused over 4 hours, or piperacillin/tazobactam 4.5 grams every 8 hours, infused over 4 hours, using a programmable infusion pump. A total of twelve patients will receive cefepime, and twelve patients will receive piperacillin/tazobactam. Pharmacokinetics will be calculated at steady-state using nine serum concentrations, drawn at one hour intervals. Urine will also be collected over the dosing interval to determine renal clearance of cefepime and piperacillin/tazobactam. Pharmacodynamic analysis will be performed by Monte Carlo simulation using pharmacokinetic parameters derived from this study and MIC data for common nosocomial pathogens at Methodist Hospital. The percent of $T > MIC$ and the cumulative fraction response will be calculated for each dosing regimen and organism using the pharmacodynamic targets of 60% $T > MIC$ for cefepime and 50% $T > MIC$ for piperacillin/tazobactam.

RESULTS AND CONCLUSIONS: Research is in process. Results and conclusions of the study will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the importance of optimizing dosage through pharmacokinetic and pharmacodynamic parameters.
Describe the advantages of using extended interval dosing regimens.

Self Assessment Questions:

Administering fluoroquinolones as a prolonged infusion would maximize bactericidal activity. True or False

In order to provide optimal serum concentrations, a provider may prolong the infusion of a Beta-lactam antibiotic. True or False

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF AN ORDER SET FOR THE TREATMENT OF DIABETIC KETOACIDOSIS

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PURPOSE: Diabetic ketoacidosis (DKA) is a medical emergency with life-threatening complications. Timely initiation of appropriate intravenous (IV) fluids and insulin will decrease morbidity and mortality from DKA. A study previously conducted at Methodist Hospital in Indianapolis, Indiana identified several areas for improvement in regards to DKA management. In this study, 71% of patients received IV fluid therapy that was deemed inappropriate. An order set for the treatment of DKA can facilitate appropriate treatment. The purpose of the study is to implement an order set for the treatment of DKA at Methodist Hospital and then assess the effectiveness of the order set post implementation.

METHODS: A multi-disciplinary group of health care providers were used in the creation of the order set. A retrospective chart review will be completed post implementation of the DKA order set. Inclusion criteria are a diagnosis for DKA and treatment with a computerized glucose control program. Patients will then be divided into control and protocol groups based use of the DKA order set. Patients who are pregnant or younger than 18 years old will be excluded. The primary endpoint of the study is time to anion gap clearance. Secondary endpoints include hospital length of stay measured in days, time to initiation of appropriate IVF measured in minutes, and rate of change in blood glucose measured during the first 24 hours after initiation of IV insulin. Adverse events that will be recorded include physician documentation of cerebral edema and/or volume overload. Other adverse events that will be monitored include hypoglycemia and over/under replacement of electrolytes, specifically potassium, magnesium, and phosphorus.

RESULTS/CONCLUSIONS: Pending based on completion of data collection and analysis

Learning Objectives:

Describe the key components of treatment for diabetic ketoacidosis that should be included in a diabetic ketoacidosis order set.

Summarize the impact of an order set for the treatment and management of diabetic ketoacidosis.

Self Assessment Questions:

Based on the ADA, treatment of diabetic ketoacidosis should focus on:

- a. electrolyte management.
- b. IV fluids.
- c. Insulin therapy.
- d. All of the above

True/False The use of an order set for the treatment of diabetic ketoacidosis improves patient outcomes.

RETROSPECTIVE CHART REVIEW OF LIPID-LOWERING THERAPY AFTER THE PUBLICATION OF UPDATED CLINICAL PRACTICE GUIDELINES

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Purpose: In 2001 the National Cholesterol Education Program released an updated version of the clinical practice guidelines for the treatment of dyslipidemia. The NCEP ATP III guidelines revised the risk stratification for patients; therefore requiring more aggressive lipid management along with treatment goals. It is widely acknowledged that elevated serum low density lipoproteins levels place a patient at a greater risk for cardiovascular morbidity and mortality. Numerous studies have shown reduction in cardiovascular events and mortality from lowering serum LDL levels. Therefore, identifying and achieving LDL goals in patients with high risk and elevated values is essential to reducing long term complication and decreasing healthcare expenditures associated with dyslipidemias. The purpose of the study is to assess whether patients receiving lipid lowering agents from a primary care provider versus clinical pharmacist managed dyslipidemia clinic are correctly risk stratified and achieving LDL, HDL, and non-HDL levels.

Methods: This study is a retrospective, observational, descriptive, and comparative analysis of patients treated for dyslipidemias from June 1, 2006 through December 31, 2007. Exclusion criteria included previous treatment of hyperlipidemia prior to study start date, not receiving regular follow-up at the Huntington VAMC, and triglycerides greater than 500 mg/dl. The data warehouse will be utilized to generate a report to identify all patients started on lipid lowering medications during the study period. All data regarding specific agents being used, LDL levels, HDL levels, and calculated non-HDL levels, and patient risk stratification and goal will be recorded, and specific provider information will be noted.

Results: Pending

Conclusion: Pending

Learning Objectives:

Review the National Cholesterol Education Program ATP III clinical guidance for the management of dyslipidemias.

Discuss treatment options for dyslipidemias

Self Assessment Questions:

What Framingham Score is used to suggest a patients LDL goal should be less than one hundred?

What are the CHD risk equivalents discussed in the NCEP ATP III guidelines?

SAFETY AND EFFICACY COMPARISON OF VARENICLINE, BUPROPION, AND NICOTINE REPLACEMENT PATCHES IN A VETERANS AFFAIRS MEDICAL CENTER (VAMC) TOBACCO CESSATION CLINIC

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Purpose:

Nicotine patches and bupropion are established therapies used alone or in combination for smoking cessation. Two well-designed smoking cessation trials comparing varenicline monotherapy to placebo and bupropion sustained-release (SR) monotherapy showed that 44% of patients using varenicline stopped smoking after 12 weeks compared to only 30% of bupropion SR and 18% of placebo patients. No published trials compare varenicline to combination varenicline plus bupropion SR or combination bupropion SR plus nicotine patches. This study will retrospectively determine the efficacy and safety of varenicline monotherapy compared to varenicline plus bupropion SR and to bupropion SR plus nicotine patches in a VAMC tobacco cessation clinic.

Methods:

The study included over 400 participants who attended at least the first two clinic sessions between July 2006 through March 2008. Participants were eligible to attend the clinic if they were interested in tobacco cessation and did not have contraindications to the drug therapies used in the clinic at the time of enrollment. Participants attending clinic between July 2006 and January 2007 received nicotine patches 14 mg daily x 2 weeks, then 7 mg daily x 4 weeks. Those attending between February 2007 and August 2007 received both varenicline 0.5 mg daily for days 1-3, 0.5 mg BID for days 4-7, then 1 mg BID thereafter and bupropion SR 150 mg daily for 3 days, then 150 mg BID thereafter for 12 weeks. Participants attending clinic between September 2007 through March 2008 received varenicline monotherapy 0.5 mg daily for days 1-3, 0.5 mg BID for days 4-7, then 1 mg BID for 12 weeks. Primary outcome measures were 12-week smoking cessation rates, clinic completion rates, reduction in cigarettes smoked, reduction in carbon monoxide levels, urges to smoke, self-confidence about quitting, and adverse effects.

Results/Conclusions:

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

Learning Objectives:

Determine the overall smoking cessation efficacy among the three interventions.
Describe the overall safety profile between the three treatment regimens.

Self Assessment Questions:

Multiple choice:

- a.) Varenicline + bupropion SR is more effective for smoking cessation than varenicline monotherapy, but increases the incidence of side effects.
- b.) Varenicline + bupropion SR is more effective for smoking cessation than varenicline monotherapy with no difference in the incidence of side effects.
- c.) Varenicline + bupropion SR is equivalent to varenicline monotherapy for smoking cessation, but increases the incidence of side effects.
- d.) Varenicline + bupropion SR is equivalent to varenicline monotherapy for smoking cessation with no difference in the incidence of side effects.

T/F: Varenicline-based regimens reduce the number of cigarettes smoked for each individual over a 12-week period compared to bupropion SR + nicotine replacement patches, but overall smoking cessation rates after 12 weeks do not differ between the three groups.

IMPACT OF EDUCATION AND DECLINATION WAIVER ON INFLUENZA IMMUNIZATION COMPLIANCE AMONG HEALTH CARE PERSONNEL IN A COMMUNITY TEACHING HOSPITAL

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Purpose: The Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP) published recommendations concerning vaccination of health care personnel (HCP) to ensure the optimal safety against influenza for staff, patients, and family members. The objective of this study is to assess if education and the implementation of a declination waiver impacts the rate of employee influenza immunization compliance and sick days within Mercy Hospital and Medical Center.

Methods: This study was approved by the Institutional Review Board prior to initiation. Starting September 2007, all Mercy Hospital employees were required to sign a declination waiver form if they chose not to receive the influenza vaccine. The declination form recorded the employees department, specific reason for refusal, and average contact time with patients. In October 2007, the influenza vaccination was made readily available to all employees at no personal cost. The primary investigator worked in conjunction with Employee Health to provide marketing materials encouraging vaccinations and raising awareness on how to receive an immunization. This information was posted and distributed to hospital employees in the form of fliers and newsletters. In addition, the primary investigator provided employee in-services to educate and encourage vaccination. A review will be performed to assess the impact of these interventions on immunization compliance among hospital employees. The total number of vaccinations administered will be recorded and compared with previous years. The number of sick days taken during the flu season will also be recorded and compared with previous years to determine if a relationship exists between vaccination compliance rates and employee sick days utilized. To maintain confidentiality, no employee identifiers will be used in this study.

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

Learning Objectives:

Identify the HICPAC and ACIP recommendations concerning influenza vaccination among health care personnel (HCP).
Identify the common reasons HCP did not receive the influenza vaccination during this past flu season.

Self Assessment Questions:

True/False: Influenza results in an average of 200,000 hospitalizations and 36,000 deaths per year in the United States.

True/False: The Centers for Disease Control and Prevention (CDC) recommends that the best way to prevent the flu is to receive a yearly flu vaccination.

THE IMPACT OF A COMPUTERIZED ORDER SET ON THE APPROPRIATE USE OF STRESS ULCER PROPHYLAXIS

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Purpose: The American Society of Health-System Pharmacists (ASHP) provides therapeutic guidelines on the appropriate use of Stress ulcer prophylaxis (SUP). Prophylaxis is recommended in patients admitted to the intensive care unit (ICU) meeting specific criteria. SUP agents include proton pump inhibitors (PPIs), H2 antagonist, and sucralfate. In the summer of 2007, a drug utilization evaluation (DUE) was conducted to evaluate the appropriateness of SUP for medical/surgical ICU patients. Results suggest SUP is being used appropriately when indicated according to the ASHP guidelines; however, it is being overutilized in patients with no indication for SUP. The overuse of SUP agents leads to excess cost and potential patient harm. Patient harm includes the increased risk of community-acquired pneumonia, interstitial nephritis, and *Clostridium difficile*. A SUP order set was developed in the fall of 2007 and initiated in January 2008. The purpose of this study is to compare the appropriate use of SUP, in adult medical/surgical ICU patients, before and after implementation of a computerized physician order entry (CPOE) order set.

Methods: This is a retrospective chart review of adult patients in the medical/surgical ICU before and after the implementation of a computerized SUP order set. Medical records for review will be selected from a list of admissions to the ICU. The pre-order set group will be admissions from April 1, 2007 through August 31, 2007. The post-order set group will be admissions from January 15, 2008 through April 30, 2008. Appropriate SUP use will be determined according to ASHP guidelines. Patients will be excluded with the following criteria; gastrointestinal bleed or gastric acid hypersecretion.

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

Learning Objectives:

To identify advantages CPOE order sets provide to health care professionals.

To recognize the effects computerized order sets have on appropriate medication usage.

Self Assessment Questions:

CPOE order sets are developed using evidenced-based medicine to decrease medication errors. True or False

It is obvious from the discussion that a 65 yo female on the general medicine floor being treated for pneumonia should be given omeprazole for SUP. True or False

AN EVALUATION OF THE USE OF LINEZOLID, DAPTOMYCIN, AND TIGECYCLINE IN HOSPITALIZED PATIENTS

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Purpose: Nosocomial infections due to gram positive organisms, including complicated skin or skin structure infections (cSSSI), pneumonia, bacteremia, endocarditis, and others, are becoming more common. The predominant pathogen among many of these infections is methicillin-resistant *Staphylococcus aureus* (MRSA). Infections caused by MRSA are associated with an increased incidence in septic shock, amputation, morbidity, and mortality. The standard therapy is usually vancomycin; however recent reports suggest that vancomycin may lead to suboptimal outcomes in certain clinical syndromes. Newer antistaphylococcal agents have been developed that are effective against many gram positive organisms, particularly MRSA. These include linezolid (Zyvox), daptomycin (Cubicin), and tigecycline (Tygacil). Due to the high cost associated with these agents and the potential for overuse, contributing to the development of resistance, the National Veterans Health Administration Pharmacy Benefits Manager (PBM) has developed criteria for the use of these newer gram positive agents. This study will evaluate the use of the alternative gram positive antibiotics at the Louis Stokes Cleveland VA Medical Center. Local adherence to the national PBM recommendations regarding the use of these agents will be evaluated along with end-of-therapy response to assess clinical outcomes.

Methods: A retrospective chart review of inpatients at the Brecksville and/or Wade Park campus who received treatment with linezolid, daptomycin, or tigecycline within the last 2 years (July 2005-July 2007) and are 18 years of age or older, were enrolled in the study. The data collected included patient demographics, medication order characteristics, drug therapy, and microbiological data. This data was collected using the Computerized Patient Record System (CPRS), entered into a Microsoft Access database, and analyzed using descriptive statistics.

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

Learning Objectives:

Identify the alternative antimicrobial agents used in the treatment of infections caused by gram positive organisms.

Discuss the specific guidelines, developed by the VHA Pharmacy Benefits Manager, for the use of these agents.

Self Assessment Questions:

Vancomycin is the only antimicrobial agent effective for the treatment of nosocomial infections caused by MRSA.

1. True
2. False

Which of the following agents should not be used in the treatment of pneumonia caused by MRSA?

- a. vancomycin
- b. daptomycin
- c. tigecycline
- d. linezolid

DEVELOPMENT OF A COUMADIN DOSING NOMOGRAM FOR AN INR GOAL OF 2.5 - 3.5

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BACKGROUND

Warfarin is used as the mainstay therapy for prevention of thromboembolic events/disease. Effectiveness and safety of warfarin therapy is critically dependent on sustaining a therapeutic international normalized ratio (INR). To facilitate efficacy and safety a nomogram can be utilized. Several studies report favorable results with the use of a nomogram targeting an INR of 2 - 3 compared to "standard care". No current literature supports a nomogram to target an INR of 2.5 - 3.5. The pharmacy department at St John Hospital and Medical Center (SJH&MC) provides a consult service for patients receiving warfarin. The current dosing nomogram targets an INR of 2 - 3. Approximately 5% of patients each year, who receive pharmacy based warfarin dosing, require a goal INR of 2.5 - 3.5. For these patients, the pharmacist uses clinical judgment in their dosing decisions.

PURPOSE

To develop a nomogram for the pharmacist managed anticoagulation consult service, specific to patients requiring a goal INR of 2.5 - 3.5.

METHODS

This study will utilize a retrospective analysis of warfarin dosing and patient response to determine a nomogram targeting an INR of 2.5 - 3.5. A prospective evaluation of the nomogram will then be performed. This is a retrospective chart review of inpatients requiring a goal INR of 2.5 - 3.5 from November 1, 2006 to October 31, 2007 at SJH&MC. Data sources will include the pharmacist data collection form, which identifies the INR goal for each patient and potentially medical records. Warfarin doses and therapeutic INR levels will be evaluated to develop a dosing nomogram that will be utilized via the pharmacy anticoagulation consult service at SJH&MC.

RESULTS

Data collection is in the initial stages, results are not yet available.

CONCLUSIONS

To be presented pending completion of data collection and analysis.

Learning Objectives:

Explain the importance of using a dosing nomogram in the management of patients requiring warfarin therapy.

Describe the potential impact of a warfarin dosing nomogram for INR goals of 2.5 - 3.5 on the participating patient population and SJH&MC.

Self Assessment Questions:

True or False: According to the 2008 JCAHO National Patient Safety Goals, a new goal to reduce the likelihood of patient harm associated with the use of anticoagulation therapy has been added.

Which of the following is (are) a TRUE indication(s) for a patient on warfarin therapy requiring an INR goal of 2.5 - 3.5?

- A. Patient with tilting disk valves and bileaflet mechanical valves in the mitral position
- B. Patient with mechanical prosthetic heart valves
- C. Patient who has a lupus anticoagulant or antiphospholipid antibodies
- D. A and B only
- E. All the above

EVALUATION OF CONTINUOUS INFUSION VANCOMYCIN IN THE PEDIATRIC POPULATION

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Background: Vancomycin is a glycopeptide antibiotic used to treat gram-positive infections caused by methicillin-resistant *Staphylococcus aureus* and enterococci. Vancomycin demonstrates time-dependent killing, therefore optimal dosing should maximize the amount of time that the concentration remains above the minimum inhibitory concentration. Traditionally, vancomycin is administered using intermittent infusions multiple times a day. An alternative dosing strategy is to use a continuous infusion, which could have several potential advantages. A continuous infusion provides a constant serum drug level, avoids unnecessarily high peaks, requires a lower amount of total drug, and has potentially lower costs. Additionally, it may be more beneficial to use a continuous infusion in children than in adults. Clearance of vancomycin in pediatric patients is 2-3 times faster than in adults which requires dosing every 6 hours compared to every 12 hours in adults. Also, many children require extended vancomycin infusion times in order to prevent side effects such as Redman's syndrome from using large mg/kg doses. Because children require more frequent dosing and possibly longer infusion times, it may be more beneficial to use a continuous infusion in these patients.

Objective: To evaluate the safety and efficacy of continuous infusion vancomycin in the pediatric population.

Methods: This is a retrospective, observational, descriptive study including patients less than 18 years of age who received continuous infusion vancomycin as inpatients from January 2004 to December 2007. Data collected from the medical record will include demographics, comorbidities, vitals, select laboratory values, site of infection, vancomycin regimen including dose changes, vancomycin levels, culture and sensitivities, concomitant antibiotics, concomitant nephrotoxic medications, and adverse effects. The information will be used to develop a protocol for dosing and monitoring continuous infusion vancomycin in pediatric patients.

Results/Conclusion: Data collection is currently ongoing. Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the pharmacokinetic and pharmacodynamic properties of vancomycin.

Identify several potential advantages of administering vancomycin as a continuous infusion in the pediatric population.

Self Assessment Questions:

True or False. Vancomycin is an antibiotic that demonstrates concentration dependent killing.

All of the following are potential advantages of administering vancomycin as a continuous infusion EXCEPT:

- a) lower cost
- b) maintains a constant level of drug in the body
- c) achieves high peak concentrations
- d) less total drug exposure

EVALUATION OF PHARMACY RESIDENTS BIostatistical KNOWLEDGE AND INTERPRETATION OF RESULTS

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Background: Health care professionals need to keep current on developments in biomedical literature and evidence-based medicine. In order to understand and appropriately apply information from the biomedical literature, health care professionals need a working knowledge of biostatistics and interpretation of study results. A recent report evaluated the biostatistical knowledge of medical residents and found that on average, residents could only interpret 8 of 20 questions over biostatistical analysis and interpretation of results. Pharmacists also need to be able to evaluate biostatistics and interpret the significance of results reported in biomedical literature.

Purpose: The objective of this project is to determine pharmacy residents biostatistical knowledge and interpretation of study results. Additionally, the results of the pharmacy residents will be compared to the previously published results of the medical residents.

Methods: A previously published survey to test for biostatistical knowledge and interpretation of study results will be administered to pharmacy practice and specialty residents currently enrolled in the Indiana Pharmacy Resident Teaching Certificate (IPTeC) Program. A 9-question demographic questionnaire will accompany the survey. Subjects will be e-mailed an invitation to participate in the survey and provided a link to the web-based survey. Survey responses will be anonymous, and recipients will be given two weeks to complete the survey. This project was approved by the local Investigational Review Board with exempt status from regulations for the protection of human subjects research.

Results and Conclusions: Information is pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

1. Describe the importance of statistical knowledge when interpreting biomedical literature.
2. Identify the commonly used statistical analyses used in the biomedical literature.

Self Assessment Questions:

1. List the 3 most common methodological and statistical flaws found in the biomedical literature.
2. List the 3 most common weaknesses in pharmacy residents statistical knowledge.

PHARMACY TURNAROUND TIME AFTER THE ADDITION OF A MEDICAL-SURGICAL SATELLITE PHARMACY

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Background: The implementation of decentralized satellite pharmacies has increased within hospital pharmacy departments since the 1980s. The decentralization of pharmacy services offers benefits including: increased clinical pharmacy services, enhanced control over the inventory of medications, reduced pharmaceutical costs, and improved medication turnaround time. Satellite pharmacies have also demonstrated improvements in interdepartmental relationships and communication between nursing and pharmacy staff. A medical-surgical satellite pharmacy will be added to a 424-bed hospital, which currently has specialty satellite pharmacies serving oncology, critical care, and the surgery center.

Purpose: To compare hospital-wide medication turnaround time before and after the addition of a medical-surgical satellite pharmacy, and to determine if a difference exists between the stages of the pharmacy medication distribution process.

Methodology: Through an IRB approved, prospective, randomized, two-phase study design, data will be collected prior to and after the implementation of a medical-surgical satellite. Medication orders will be tracked and timed by Pharm.D. candidates through three pharmacy distribution stages including medication order entry, dispensing, and delivery. The following medication orders will be excluded: STAT, now, and prn orders; floor stock medications; orders processed by specialty satellites; orders processed on weekends or third shift; orders not timed throughout the three pharmacy dispensing processes; and medications delivered via tube system. Four random orders per hour will be pulled after order-entry and assigned a serial number. Two of the four orders will be tracked throughout the dispensing processes and recorded on a spreadsheet. A difference in overall turnaround time between phases will be analyzed by a paired t-test (power=0.9; calculated sample size N=171), and differences in the three pharmacy distribution stages will be analyzed by a repeated measure ANOVA (power=0.8; calculated sample size N=304).

Results and conclusions: Preliminary results for the average pharmacy turnaround time prior to satellite implementation is 1 hour and 55 minutes.

Learning Objectives:

Evaluate the many variables that may affect pharmacy turnaround time in clinical practice.

Review the potential benefits of transitioning from a centralized to a decentralized pharmacy practice model.

Self Assessment Questions:

The decentralization of pharmacy services can improve medication inventory control and reduce pharmaceutical costs. (T/F)

Hospital pharmacy departments have trended towards a centralized practice model over the past twenty years. (T/F)

IMPACT OF PHARMACIST DISCHARGE COUNSELING ON HEART FAILURE PATIENTS

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Background: There are about 3.6 million hospitalizations that have heart failure as a primary or secondary discharge diagnosis each year. 1 Of these hospitalizations, about 40-50% are readmitted within six months of initial discharge. One of the factors contributing to this high readmission rate is nonadherence to prescribed medications. 2

Purpose: To determine if discharge counseling by a pharmacist can help patients and caretakers understand the importance of adhering to their prescribed medication regimen and their disease state, and in turn possibly reduce readmission rates in heart failure patients.

Methods: Patients who are admitted for HF or symptoms of a HF exacerbation will be randomly divided into two groups. During the course of each patient's hospital stay, a heart failure quiz will be administered to each patient and caretaker, assessing knowledge of the disease state and medications. One group will take the quiz prior to being counseled by a pharmacist; the other group will take the quiz after being counseled by a pharmacist. The pharmacist will counsel the patient on prescribed medications, diet and lifestyle. The study will compare baseline 30-day readmission rate with the 30-day readmission rate after the completion of this study. The quiz scores will also be compared between the two groups.

Results/Conclusions: To date, 18 patients agreed to participate in this study, 9 in each study group. The pre-test group averaged 73.3% on the quiz, where the post-test group averaged 91.1%. Data collection and analysis continues, and results will be presented at conference.

Learning Objectives:

Explain the impact heart failure patients have on a health system.

Summarize the impact of pharmacist discharge counseling on heart failure patients and the health system.

Self Assessment Questions:

T or F Medication nonadherence in heart failure patients contributes to their high readmission rates.

T or F Discharge counseling is one of the core measures set by JCAHO for patients admitted with heart failure.

ASSESSING PATIENT AND PROVIDER SATISFACTION OF A PHARMACIST MANAGED MEDICATION RENEWAL CLINIC

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Purpose: A medication renewal clinic serves as a medium to provide continuity of care for patients between visits with their primary care provider. This is accomplished through patient counseling and provision of prescription renewals. The purpose of this project is to develop and implement a pharmacist-run renewal clinic as well as assess patient and provider satisfaction.

Methods: Clinical pharmacists will review the electronic outpatient prescription file to determine if the patient is out of refills. They will also assess the patient's past appointment record and ensure a future scheduled appointment with their primary care provider (PCP). If the pharmacist feels it is appropriate for the patient to continue with the medication, the prescription will be renewed via electronic order entry. Patients seen by their PCP within the previous year will be given a one year supply. If a patient has not been seen within the previous year, a ninety-day supply will be issued and an appointment is scheduled with their PCP. Patients will be counseled on appropriate administration, adverse effects, and monitoring. The visit is documented in the patient's electronic medical record using a SOAP note template. At end of the visit, patients will be asked to complete an anonymous survey about their experience at the clinic. Primary care providers will participate in a recorded focus group session to assess their satisfaction with the medication renewal clinic. The patient satisfaction surveys will be analyzed with counts and frequencies of the responses. The provider focus group recording will be transcribed. A qualitative analysis of text will be performed using grounded theory in order to identify and develop the concepts, categories, and themes of the text.

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

Learning Objectives:

Examine the role of a medication renewal clinic in a primary care setting.

Discuss whether a medication renewal clinic is beneficial service to have available for patients.

Self Assessment Questions:

A medication renewal clinic is a medium for pharmacists to provide pharmaceutical care within a primary care setting.
True or False

Should patients have a place to receive assistance with medication needs in between visits with their primary care provider?

PHARMACOKINETICS OF INTRAVENOUS LEVETIRACETAM IN NEUROCRITICAL CARE PATIENTS

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Purpose: The purpose of this study is to determine pharmacokinetic characteristics of intravenous levetiracetam used for seizure prophylaxis in neurocritical care patients. Pharmacokinetic studies have been conducted in special populations including pediatrics, the elderly, and patients with renal or hepatic impairment. To date, no pharmacokinetic study has been published including neurocritical care patients receiving intravenous levetiracetam for seizure prophylaxis. It is unknown whether critical care patients display the same levetiracetam pharmacokinetics as healthy volunteers or patients with epilepsy.

Methods: Prospective, open-label, single-center, steady-state, pharmacokinetic study in 12 neurocritical care patients. Patients at least 18 years of age admitted to the Neurocritical Care Unit receiving intravenous levetiracetam therapy following a hemorrhagic stroke, subarachnoid hemorrhage, or isolated head trauma were screened for enrollment. Patients admitted with multi-system trauma, end-stage renal disease or requiring renal replacement therapy, and hemoglobin concentrations less than 7.0 g/dL were excluded. The first blood sample was collected immediately prior to infusing a dose of levetiracetam at steady-state to obtain a trough concentration. Following infusion of the dose over 15 minutes, serial blood samples were collected at time points of 10, 15 and 30 min and 1, 2, 3, 6, 9, and 12 hours after the end of infusion. Baseline characteristic data including age, weight, and renal function were used to evaluate for correlation with measured or calculated levetiracetam pharmacokinetic parameters. Maximum plasma concentration (C_{max}), time to C_{max} (t_{max}), area under the plasma concentration versus time curve (AUC), first-order terminal elimination rate constant (k_e), terminal half-life (t_{1/2}), total body clearance (CL), and volume of distribution (V_d) were calculated from individual plasma concentration-time profiles of levetiracetam.

Results and Conclusions: To be presented.

Learning Objectives:

1. Explain differences in intravenous levetiracetam pharmacokinetics between epileptic and neurocritical care patients.
2. Evaluate pharmacokinetic data of intravenous levetiracetam in neurocritical care patients and determine if normal doses achieve therapeutic serum concentrations.

Self Assessment Questions:

1. Intravenous levetiracetam is currently approved for use as seizure prophylaxis in neurocritical care patients. T/F
2. Intravenous levetiracetam pharmacokinetic studies have been published in all of the following populations EXCEPT:
a. elderly
b. pediatrics
c. critically ill
d. patients with renal failure

INCIDENCE OF CLOSTRIDIUM DIFFICILE - ASSOCIATED DIARRHEA AND ACUTE GRAFT-VERSUS-HOST DISEASE IN ALLOGENEIC BONE MARROW TRANSPLANT PATIENTS WITH AND WITHOUT FLUOROQUINOLONE GUT DECONTAMINATION

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Previous studies have related bacterial colonization prior to allogeneic hematopoietic stem cell transplant (alloHSCT) to infectious complications post-transplantation and both the occurrence and severity of acute graft-versus-host disease (GVHD). Several bone marrow transplant centers have adopted peri-transplant gut decontamination protocols for alloHSCT patients in attempts to reduce these complications. The objective of this study is to determine the impact of fluoroquinolone (FQ) gut decontamination on the incidence of Clostridium difficile-associated diarrhea (CDAD) and the incidence and severity of GVHD in alloHSCT patients. This study is approved by the Institutional Review Board of the University of Michigan Hospitals and Health Centers. The University of Michigan Blood and Marrow Transplantation Program database will be used to identify patients who provided informed consent to the investigation and underwent alloHSCT during the period between May 1, 2006 and December 15, 2008. This period of time encompasses approximately 1 year during which a fluoroquinolone gut decontamination protocol was in effect and 8 months following the protocols termination. Patients with documented quinolone allergy or who received etanercept during the study period will be excluded.

The following data will be collected: patient age, patient gender, donor age, donor gender, indication for alloHSCT, transplant type, conditioning regimen, immunosuppressive regimen, any serious or life-threatening infections that develop, GVHD presence and severity overall, GVHD presence and severity by site, incidence of CDAD, total days of fluoroquinolone therapy, and date of death if applicable.

Data is recorded in a database without patient identifiers and maintained confidentially. The final evaluation of data will include analyses of: rates of CDAD before and after the termination of the decontamination protocol, rates and severity of GVHD before and after the termination of the decontamination protocol, and rates of moderate-to-severe GVHD in patients who develop CDAD compared to patients who do not. Results will be discussed.

Learning Objectives:

Describe the rationale for gut decontamination of allogeneic hematopoietic stem cell transplant recipients
List conditions which predispose allogeneic hematopoietic stem cell transplant recipients to graft-versus host disease and infectious complications including Clostridium difficile-associated diarrhea

Self Assessment Questions:

Which of the following best summarizes the rationale for gut decontamination in allogeneic hematopoietic stem cell transplantation:

- a) Decrease infectious complications, increase Clostridium difficile-associated diarrhea
- b) Decrease infectious complications, decrease severity of acute graft-versus-host disease
- c) Decrease infectious complications, decrease Clostridium difficile-associated diarrhea
- d) Increase infectious complications, increase severity of acute graft-versus-host disease

Which of the following risk factors for Clostridium difficile-associated diarrhea is frequently exhibited by allogeneic hematopoietic stem cell transplant recipients:

- a) Use of broad-spectrum antibiotics
- b) Prolonged hospital stay
- c) Severe underlying illness
- d) All of the above

DETERMINING FACTORS THAT INFLUENCE PATIENT PARTICIPATION IN MEDICATION THERAPY MANAGEMENT

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Objective: (1) Determine what factors encourage or discourage patient participation in Medication Therapy Management Services (MTMS) and (2) utilize the collected data to improve current MTMS education and marketing for prospective patients and caregivers.

Methods: Patients and caregivers in attendance at the Central Ohio Area Agency on Aging - Aging and Caregiver Expo, on November 12, 2007, were asked to participate in a written survey that would assess factors that influence patient or caregiver participation in MTMS. The survey was developed, pilot tested, and then modified based on pilot patients understanding. Survey administrators were trained with a written protocol prior to the Expo. Before completing the survey, patients and caregivers were asked to read a brief description about MTMS containing basic facts about the services that are generally communicated to a patient or caregiver during an initial offer for MTMS. Information provided included the length of an appointment, how an appointment is generally conducted and a brief description of what is addressed during a MTMS session. The survey will assess if factors such as previous knowledge of MTMS, perceived value of MTMS, provider, setting (appointments face-to-face or over the phone), duration of appointment, or cost influence patients likelihood to participate in MTMS. Data collected will be analyzed to determine factors influencing patient participation in MTMS.

Results: Surveys have been distributed and collected and are currently undergoing analysis.

Conclusions: The compiled information will be used internally to modify existing education and marketing materials related to MTMS. In addition, data will be disseminated so that pharmacists and other health care professionals will be able to recognize and understand factors that may influence participation in MTMS and adapt their current MTMS education and marketing plans to better suit the needs of their patients.

Learning Objectives:

Understand factors that influence patient participation in MTMS. Identify opportunities for growth and enhancement of current MTMS education and marketing plans.

Self Assessment Questions:

True or False: Despite the ongoing continuing education and implementation of MTMS programs throughout the country, the patient decline rate for these services continues to be greater than expected.

Which of the following factors influence patient participation in MTMS?

- a) Previous knowledge of MTMS
- b) Perceived value of MTMS
- c) Setting for MTMS
- d) Duration of MTMS appointment
- e) All of the above

A RETROSPECTIVE EVALUATION OF A NURSING DRIVEN HEPARIN DRIP PROTOCOL

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Purpose: Intravenous unfractionated heparin is considered a standard treatment option for indications such as deep vein thrombosis, pulmonary embolism, and unstable angina. Close monitoring to a patient's activated partial thromboplastin time (aPTT) is necessary due to heparin's unpredictable dose response and narrow therapeutic window. Traditionally, heparin has been administered as a standard-fixed dose between all patients. Controlled trials concluded that dosing based on patient's actual body weight produces aPTT values more quickly at goal than traditional dosing. This strategy is also recommended by the 7th ACCP conference guidelines. Based on this data, the LSVAMC developed a nursing driven, weight based protocol with the aim to achieve and maintain therapeutic aPTTs in a more timely manner. It is the intent of this study to evaluate this protocol.

Methodology: A retrospective chart review will be performed to compare patients pre and post implementation of a heparin drip protocol. All inpatients started on the protocol for at least 24 hours, between implementation on June 20th, 2007 and December 31st, 2007, will be included until the number of post protocol patients reaches fifty. These patients will then be compared to patients who were on a heparin drip immediately prior to implementation and matched according to approximate weight and the unit the medication was administered. Primary data collected will include time to first therapeutic aPTT, number of rate adjustments necessary to produce the first therapeutic aPTT, and the percent of time a patient's aPTT is within therapeutic range. Data will be analyzed using both descriptive and inferential statistics.

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

Learning Objectives:

Explain why close monitoring of a patient's aPTT is necessary. Discuss the pros and cons of developing a nursing driven heparin drip protocol in a medical institution.

Self Assessment Questions:

List adverse events associated with both sub- and supra-therapeutic aPTT values.

Post protocol heparin drip patients were more closely monitored and within therapeutic aPTT values more frequently than pre-protocol patients at LSVAMC.

- a. True
- b. False

HYPERTONIC SALINE USE IN PEDIATRIC PATIENTS WITH TRAUMATIC BRAIN INJURIES; PROTOCOL DEVELOPMENT

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PURPOSE: Hyperosmotic therapy, such as mannitol or hypertonic saline (HS) solutions, in traumatic brain injury (TBI) is an accepted approach to decrease intracranial pressure (ICP). There are 2,685 deaths with 37,000 hospitalizations annually for children ages 0 to 14 with TBI. Hypertonic saline is a high-risk medication, and guidelines for its use in pediatric patients with TBI currently do not exist. At Toledo Children's Hospital (TCH), multiple physicians are involved in the care of the TBI patient, and may order HS, but there is no standard approach, resulting in inconsistent dosing patterns and monitoring. The objective of this study is to review treatment of patients previously treated with HS. After reviewing the TCH experience, a standardized approach for the use of HS in pediatric TBI patients will be developed.

METHODS: This study is a retrospective chart review, approved by the Institutional Review Board. Twenty-one patients admitted with TBI and treated at TCH Pediatric ICU with HS between March 2002 and August 2007 were included. The hospital's current computer programs were used for patient information retrieval. Data collected includes: demographic information (age, gender, weight, height, allergies, cause of injury, diagnosis); treatment, including hypertonic saline rate and duration of use; monitoring parameters (electrolytes, serum osmolality, renal function, CBC with differential, PT-INR, vital signs, ICP); concomitant medications; adverse drug reactions; and patient outcomes.

PRELIMINARY RESULTS: Data is currently being collated into an Excel spreadsheet, for analysis. Once usage trends, if any, are identified, a standard of use will then be proposed for review by physicians and pharmacists for approval and implementation.

Learning Objectives:

Discuss the role of hypertonic saline in the treatment of brain-injured patients.

Explain the advantages of developing standardized guidelines for the use of hypertonic saline in pediatric patients with traumatic brain injury.

Self Assessment Questions:

True / False Evidence exists in favor of using hypertonic saline in brain-injured patients with increased intracranial pressure.

Which of the following is TRUE with regard to hypertonic salines activity in traumatic brain injury?

- a. Increases intracranial pressure
- b. Decreases cerebral perfusion pressure
- c. Decreases intracranial pressure
- d. Decreases serum osmolality
- e. None of the above

PHARMACIST FACILITATED THERAPEUTIC INTERCHANGES IN THE AMBULATORY SETTING

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Purpose: Recently, a new ambulatory pharmacist position was approved at Froedtert Hospital based on an initial health-plan savings estimate of over \$500,000 through the implementation of pharmacist facilitated therapeutic interchanges and generic substitutions for employee patients. The purpose of this project is to develop and pilot a strategy for making these interventions, to establish collaborative practices between physicians and the ambulatory pharmacist, and to measure the clinical and economic outcomes of these interventions. The interchange of simvastatin for atorvastatin was selected as the initial intervention. Based on the success of the initial intervention, formal collaborative practice agreements will be established for this and other therapeutic interchanges.

Methods: A list of hospital employed patients with active prescriptions for atorvastatin on file between May 2006 and October 2007 was generated using Froedtert Primary Care Clinic electronic records. Sixty-one patients were considered eligible for the therapeutic interchange after three patients were excluded based on criteria determined by the pharmacist and approved by the primary care therapeutics committee. Letters were sent to the primary care provider and each patient notifying them of the patients eligibility for the interchange program. A pharmacist will contact all patients by phone to make the interchanges, discuss cost-savings and schedule a follow-up lipid panel. Interchanges will be documented in the patients electronic medical record. Patients refusing the interchange will be referred to their primary care providers. Economic outcomes will be assessed by the number of interventions made, amount of health-plan dollars saved by the institution and co-payment dollars saved by patients. Clinical outcomes will include fasting lipid results at three months and patient and physician satisfaction with the pharmacist interventions.

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

Learning Objectives:

Identify strategies to utilize a pharmacist to make therapeutic interchanges in an ambulatory setting.

Discuss the financial and clinical impact of the therapeutic interchange of atorvastatin to simvastatin on both the patient and the health-system.

Self Assessment Questions:

T/F Since atorvastatin and simvastatin have equal potency, doses should be converted using a one-to-one conversion.

List three possible contraindications or precautions to consider when switching a patient from atorvastatin to simvastatin.

IMPACT OF AN INSULIN INFUSION GUIDELINE ON THE MANAGEMENT OF HYPERGLYCEMIA IN THE OPERATING ROOM

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Hyperglycemia occurs frequently in patients with and without diabetes in the hospital setting, including during surgery. 1,2 Anesthesia and surgery are accompanied by a neuroendocrine stress response that results in peripheral insulin resistance, impaired insulin secretion, and increased hepatic glucose production. Rapid changes in physiology and homeostasis, as well as glucocorticoid administration, complicate glycemic control in the surgical patient population.

Tight glycemic control using insulin infusions has been shown to be beneficial in the post-surgical population. Intravenous insulin infusion is the optimal method for maintaining euglycemia in the surgical patient. In an effort to optimize the intra-operative care of the surgical patient, the University of Illinois Medical Center at Chicago (UIMCC) developed a guideline for the peri-operative treatment of hyperglycemia in both diabetic and non-diabetic adult patients undergoing elective or emergent surgical procedures. Appropriate co-administration of dextrose was recommended to minimize the risks of hypoglycemia, ketosis, and protein catabolism.

Objectives:

The primary objective of this quality assurance project is to evaluate the safety and efficacy of an insulin infusion guideline in both diabetic and non-diabetic adult patients undergoing elective or emergent surgical procedures at the UIMCC. This project will evaluate the surgical population that requires an intra-operative insulin infusion, time to euglycemia, incidence of hypoglycemia, need for co-administration of dextrose, and incidence of post-operative complications.

Methods:

Data collection will include all patients undergoing surgery between December 2007 thru February 2008 at UIMCC who received an insulin infusion in the operating room. Inclusion criteria are patients with known diabetes, morbid obesity (BMI > 35), sepsis, pregnancy, glucocorticoid usage, known or suspected active myocardial infarction, cerebral spinal cord ischemia, and surgery > 4 hours. Initiation and adjustment of insulin infusion and blood glucose monitoring will be accomplished using the UIMCC guideline for intra-operative insulin infusion.

Results and Conclusions:

Data collection currently in process.

Learning Objectives:

List three causes of hyperglycemia in surgical patients.

Describe three benefits of maintaining euglycemia in surgical patients.

Self Assessment Questions:

True or False: Only patients with diabetes should be started on insulin infusions intra-operatively.

True or False: Much of the data for intra-operative insulin infusions have been extrapolated from the cardio-thoracic surgery literature.

VARIATIONS IN ANTICOAGULANT AND ANTIPLATELET THERAPY FOR NON-ST ELEVATION ACUTE CORONARY SYNDROMES IN A MULTIPLE HOSPITAL SYSTEM

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Background: The current ACC/AHA guidelines for the management of patients with non-ST elevation acute coronary syndromes (ACS) recognize there are many possible treatment approaches with regard to antithrombotic and antiplatelet therapy in patients undergoing percutaneous coronary angiography with or without intervention. The guidelines recommend using glycoprotein receptor inhibitor (GPI)-based or bivalirudin-based treatments in patients undergoing PCI. These agents differ in cost, length and complexity of regimen, and time to sheath pull.

Purpose: The objective of this study is to determine the variations in antithrombotic and antiplatelet therapy at Community Health Network, a multiple hospital system.

Methods: A retrospective, observational, non-interventional study of patients of Community Health Network with non-ST elevation ACS undergoing angiography with or without intervention from November 2006 through September 2007 was conducted utilizing the electronic medical record system. In addition, data from the pharmacy computer system was used to approximate the cost of each regimen. Patients excluded from the study were those less than 18 years of age, greater than 89 years of age, and patients with ST-elevation myocardial infarction. Patient data collected included: demographic data, antithrombotic and antiplatelet regimen, dose, and acquisition cost of therapy. Data was analyzed by site to determine variation in practice with respect to cost of therapy per regimen, regimen utilized, and appropriate dosing. All patient identifiers were removed from collected data to protect confidentiality.

Results: Chart reviews are in progress and results are pending.

Learning Objectives:

List the appropriate treatment options for patients with NSTEMI/UA undergoing PCI.

Discuss the risks and benefits associated with a bivalirudin- or glycoprotein IIb/IIIa inhibitor-based treatment regimen.

Self Assessment Questions:

True or False: A potential benefit of bivalirudin-based treatment regimen is lower risk of bleeding.

List the three available glycoprotein IIb/IIIa inhibitors

IMPLEMENTATION AND EVALUATION OF A PATIENT SCORING SYSTEM FOR PHARMACOKINETICS

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Purpose: The role of pharmacists in the hospital setting is expanding and pharmacists continue to assume more patient care responsibilities. It is often a challenge for pharmacists to prioritize their workload and streamline workflows to meet these daily demands. Pharmacy administrators also face a growing challenge to accurately match allotted pharmacist personnel to the increasing demand for pharmacy services. There is considerable literature available to support the use of acuity models in nursing staffing levels. However, the literature is far more limited regarding the use of acuity models in pharmacy staffing. A patient scoring system would provide an approach to evaluate patients need for pharmacy services, workflow inefficiencies, personnel allocation, and trends in demands for services. The purpose of this project is to implement a patient scoring system for patients requiring pharmacokinetic services in a 450-bed academic medical center and evaluate the impact on staff satisfaction, pharmacist efficiency, and workflow design.

Methods: Staff satisfaction and pharmacokinetic monitoring requirements were assessed prior to implementation of an electronic patient scoring system. The patient scoring system was developed for patients requiring pharmacokinetic services using the existing integrated computerized information system. The individual patient score is determined based on consult status, number of medications requiring pharmacokinetic monitoring, and status of drug levels, and is represented with an individual patient icon. This patient scoring system was implemented at Froedtert Hospital in November 2007. Follow-up surveys will be conducted to assess staff satisfaction and pharmacokinetic monitoring requirements after implementation of this system.

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

Learning Objectives:

Identify how a patient scoring system can be utilized to improve pharmacist assessment of workload.

Identify how a clinical information system can be used to assist in the organization of pharmacists approach to pharmacokinetic monitoring.

Self Assessment Questions:

True/False: A patient scoring system can be used to help clinical pharmacists prioritize their workload.

True/False: The status of levels for drugs requiring pharmacokinetic monitoring is an activity that affects the patients scoring icon.

PHARMACOGENETICS OF SSRI ADVERSE DRUG REACTIONS: BETA-ADRENERGIC RECEPTOR POLYMORPHISMS AND SEXUAL ORGASM DYSFUNCTION IN DEPRESSED PATIENTS RESPONDING TO SSRI DRUG THERAPY.

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Selective serotonin reuptake inhibitors (SSRIs) have been first-line drug therapy for patients diagnosed with major depressive disorder (MDD) over the past decade. Compared to other psychiatric medications this class of drugs is well tolerated, but many patients still complain of adverse drug reactions such as sexual dysfunction. Genetic variation in drug targets may potentially be responsible for altering the pharmacodynamic effects of medications. The purpose of this study is to test associations between Ser49Gly and Arg389Gly beta-1 receptor single nucleotide polymorphisms (SNPs) and self-reported sexual orgasm dysfunction scores as measured by the Changes in Sexual Functioning Questionnaire (CSFQ).

The study population (N=115) is derived from a cohort enrolled through a previous study that was approved by the Institutional Review Board at University of Iowa and received exemption approval at University of Michigan. The DNA samples have been genotyped at Ser49Gly and Arg389Gly SNPs using pyrosequencing technology. Clinically depressed outpatients (age 18 to 40) with no baseline sexual dysfunction, who have responded (HAM-D less than 10) to SSRI treatment after six weeks, were included in the study. Patients diagnosed with cardiovascular disease, diabetes mellitus, genitourinary disease, neurological conditions or other comorbid Axis I disorders were excluded from the study. Patients treated with other antidepressants or medications affecting sexual function were also excluded from the study. Sexual orgasm dysfunction was assessed by the CSFQ orgasm/completion subscale, which is comprised of three questions that yield scores ranging from 3 to 15. SNP genotypes were tested for associations with CSFQ orgasm/completion dysfunction classification and subscale scores by logistic and linear regression analysis.

Learning Objectives:

Discuss the potential for pharmacogenetics to reduce adverse drug reactions in clinical practice.

Explain the rationale for investigating associations between adrenergic function and drug-induced sexual dysfunction.

Self Assessment Questions:

How could a patient's genotype potentially help clinicians select the most appropriate pharmacotherapy?

What are three reasons to believe there may be an association between adrenergic function and drug-induced sexual dysfunction?

RETROSPECTIVE CHART REVIEW OF PATIENTS PRESENTING WITH SEIZURES TO A COMMUNITY EMERGENCY DEPARTMENT: AN EVALUATION OF TRAMADOL AS A CONTRIBUTING RISK FACTOR FOR SEIZURES

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Purpose:

Tramadol is a centrally acting analgesic known to decrease the seizure threshold and can induce seizures. The primary objective of this study is to investigate the relationship of seizures and concomitant use of tramadol with consideration of additional risk factors. This study will also attempt to identify prescribing practitioners of tramadol in order to provide education about the associated warnings and adverse drug reactions.

Methods:

This study is a retrospective chart review, case series design. Patients presenting with a chief complaint or primary diagnosis of seizure and taking tramadol as a home medication during the period of July 2005 to July 2007 in the emergency department were identified using The Jewish Hospital Emergency Department billing system. Patients determined not to have seizures upon further evaluation either in the emergency department or as an inpatient in the hospital were excluded from this study. The following data was collected: prior seizure history, anticonvulsant therapy, and use of medications known to lower seizure threshold including selective serotonin reuptake inhibitors (SSRIs) and tricyclic antidepressants (TCAs). If available, prescribing practitioners of tramadol were recorded.

Results/Conclusions:

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

Learning Objectives:

Review the incidence of seizures associated with tramadol use
Discuss contributing risk factors for tramadol-induced seizures

Self Assessment Questions:

True or False: The maximum recommended dose of tramadol in 24 hours is 800mg.

Which of the following medications can increase the seizure risk while taking tramadol?

- a. Escitalopram
- b. Amitriptyline
- c. Cyclobenzaprine
- d. Sertraline
- e. All of the above

THE IMPLEMENTATION OF HOME ORDER ENTRY AT A COMMUNITY HOSPITAL

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Background: Pharmacy is a customer-based service. The effectiveness of this service is volume dependent. If a constant rate of medication order request could be attained, the overall effectiveness of pharmacy-based customer service could be improved. Unfortunately, clinical and resource reality is often counter to this.

Purpose: For the purpose of this project, home order entry is a term that involves the process of pharmacists performing order entry away from the work site. The intent is to have the primary location be the pharmacists home. This concept of home order entry is already being applied in HMOs, the US department of veteran affairs, and some retail pharmacies. Within Parkview Health, implementation of home order entry was suggested to increase the customer service provided during periods of unexpected high order volume.

This project will describe the planning, implementation, and evaluation of the home order entry process recently developed at Parkview Health.

Methodology: Policies and procedures were developed for the process of home order entry. Trigger points for initiating home order entry were determined by an internal study conducted over three days. A subsequent internal study was performed to determine if home order entry would have been utilized, if available. Issues such as cost and staff criteria have been evaluated.

A survey was developed to determine the number of hospitals that have established and utilized home order entry. A total of 300 hospitals (criteria: greater than twenty five beds) within the Great Lakes Conference states were invited via email to participate in an online survey.

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

Learning Objectives:

To provide insight in the process of establishing Home Order Entry at a community hospital.

To discuss the implications of having Home Order Entry to augment hospital pharmacy services.

Self Assessment Questions:

Is the model created reproducible to other hospitals? True False

Is a major obstacle in establishing home order entry the available technology? True False

OUTCOMES OF AN ATYPICAL ANTIPSYCHOTIC METABOLIC SIDE EFFECT MONITORING CLINIC

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Purpose: Drug studies reviewing weight gain in patients treated with atypical antipsychotics have shown a variable weight gain from 0.5-5.0 kg over ten weeks when compared to placebo. Although many studies were conducted over a short period of treatment, this weight gain may not plateau for over a year if treatment continues. This may lead to a metabolic disorder increasing cardiovascular risk from glucose intolerance, diabetes, and elevated LDL, TG and lowered HDL. According to the "Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes," patients receiving an atypical antipsychotic should be monitored for personal and family history of obesity, diabetes, dyslipidemia, hypertension, and cardiovascular disease, their baseline weight, height, body mass index (BMI), waist circumference, blood pressure, fasting blood glucose (FBG) and lipid profile (FLP).

The William S. Middleton Memorial VAMC recently initiated a telephone based monitoring clinic for the atypical antipsychotics designed based on the consensus recommendations. The purpose of this study is to evaluate the impact of this service on monitoring adherence, patient outcomes, and physician satisfaction.

Methods: Prior to initiation, the study will be approved by the Institutional Review Board for approval. A retrospective chart review will be conducted, including all patients with atypical antipsychotics initiations six months prior and six months post the atypical antipsychotic monitoring clinic implementation. Each chart review will include monitoring adherence to the Consensus Guidelines, changes in weight, BMI, FBG, FLP, and BP, and interventions related to these patient parameters. The monitoring adherence, patient data, and interventions collected prior to the clinic initiation will be compared to similar information collected after initiation of the monitoring clinic.

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

Learning Objectives:

Describe the Consensus Guideline recommendations for monitoring metabolic side effects after atypical antipsychotic initiation.

Describe possible barriers to monitoring metabolic side effects after atypical antipsychotics within a VAMC setting.

Self Assessment Questions:

What are the Consensus Guidelines recommendations for monitoring metabolic side effects after atypical antipsychotic initiation?

What are potential barriers to monitoring metabolic side effects after atypical antipsychotics within a VAMC setting?

USING CLINICAL DECISION SUPPORT TO CLOSE THE GAP BETWEEN INFLUENZA IMMUNIZATION GUIDELINES AND PRACTICE.

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Statement of purpose: The objective of this research is to study the potential benefit of implementing clinical decision support (CDS) tools through computerized prescriber order entry (CPOE) to enhance prescribing patterns, adherence to guidelines and outcomes for patient populations. We are going to gather information on the effect of best practice alerts (BPA) on our institution and any potential benefits from the intervention. We will implement a best practice alert on influenza vaccination in clinics within the primary care network at Nationwide Children's Hospital. Our primary research question is does influenza best practice alert improve clinician adherence to the CDC/ACIP guidelines as compared to the control group? We hypothesize Influenza BPA will improve adherence to 2007-2008 influenza guidelines for vaccination in pediatric patients as compared to the control group.

Statement of methods: Clinic setting: The study will be conducted at Nationwide Children's Hospital's eight designated clinics in the Primary Care Network. Clinicians at the above mentioned clinics will be the subjects of this research project. Study intent is to focus on any patient that visits the clinic during the 2007-2008 influenza season. Randomized Cohort Design with an intervention and control arm. The intervention of displaying the best practice alert will be randomized to half of the practice settings with the other half of the clinics serving as the control group by not receiving the BPA. Compliance with vaccination guidelines and rates of vaccination will be compared for the alert and non-alerted clinics. Additional information collected: number of best practice alerts generated, number of patients who received 2 doses, user response to BPA, number of physicians per clinic, number of clinics. Patient characteristics: age, gender, number of patients per clinic, payor status, and race.

Summary of preliminary results: data collection in process.

Learning Objectives:

To evaluate and review the guidelines for influenza immunization for practitioners.

To examine the application of clinical decision support for improving guideline adherence.

Self Assessment Questions:

How effective was this presentation in communicating the guidelines regarding influenza immunization.

This presentation exemplified a method of using best practice alerts to promote practitioners adherence to evidence based medicine.

NEW APPROACHES TO ANTIMICROBIAL STEWARDSHIP: ESTABLISHMENT OF AN APPROPRIATE ANTIBIOTIC USE CARE BUNDLE

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Background/Purpose: Pharmacists play a key role in the appropriate use of antibiotics. An abundance of literature and a national guideline support formal antimicrobial stewardship teams. Cost and trends in resistance are the most frequent endpoints used to measure the success of such programs. Care bundles consist of a group of key evidence-based or logical actions, instituted over a specific time frame, which if delivered together have a greater clinical impact than if each element was instituted individually. Care bundles for other disease states, such as sepsis and ventilator associated pneumonia, do include some mention of antibiotics; however, care bundles have not yet been implemented specifically to address appropriate antimicrobial stewardship. Therefore, this study will evaluate the impact of such a program on selected patient care units at our institution and to validate the use of a care-bundle of quality indicators in the monitoring outcomes of a new stewardship program.

Methods: All patients between September 1, 2007 and April 30, 2008 admitted to either of two patient care units in which the stewardship program is being piloted will be included in this study. Data will be compared between the pre- and post-intervention groups. Information will be collected on each subject including demographics, antimicrobial therapy, outcome of infection, and the development of resistance. Information will be collected on each patient case including appropriate antibiotic selection, whether or not a clinical intervention was accepted, culture and susceptibility reports, whether or not de-escalation occurred, and the impact of the implementation of the stewardship care bundle. The primary endpoints will be: compliance with proposed care bundle criteria, general antimicrobial prescribing patterns, and comparative cost of all included antibiotics. Secondary endpoints will be: pathogen resistance patterns, acceptance rate of antibiotic interventions, patient outcomes, and the development of a model for an antimicrobial stewardship team.

Results: pending.

Learning Objectives:

Describe the rationale for the implementation of an antibiotic stewardship program.

Design the implementation of such a program at your institution.

Self Assessment Questions:

A 49 year old female became septic and was started on Vancomycin, Cefepime, and Tobramycin. On Day 2, the gram stains on 2 out of 2 blood cultures reveal gram negative, non-lactose fermenters, oxidase negative. On Day 3, the patient has clinically improved, and the culture report states that the microorganism is E.coli with the following antibiotic MIC susceptibilities:

Amikacin <1 Susceptible

Cefazolin 8 Intermediate

Cefepime <1 Susceptible

Ciprofloxacin 1 Susceptible

Imipenem <1 Susceptible

Piperacillin/Tazo 16 Susceptible

Tobramycin <1 Susceptible

Sulfameth/Trim <5 Susceptible

True or False: According to antibiotic stewardship guidelines, it would be more appropriate to leave the patient on both Cefepime and Tobramycin until 14 days post the first negative blood culture than to treat the patient with Cefepime or Bactrim alone for the same duration.

True or False: The self assessment question above is an example of de-escalation.

ENDOTOXIN MEASUREMENT AS A PREDICTOR FOR ADVERSE OUTCOMES IN THE CRITICALLY ILL

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Purpose

Critically ill patients are often npo, predisposing them to GI stasis which can lead to proliferation of indigenous flora of the GI tract, including endotoxin containing gram-negative bacteria. Circulatory abnormalities in these patients may further depress the GI tracts normal barrier function, allowing translocation of bacteria and endotoxin into systemic circulation. Our purpose is to determine if serum endotoxin levels in critically ill patients correlate to adverse outcomes.

Methods

A prospective pilot trial of 60 patients at high risk for bowel ischemia. Blood was sampled on days 0, 1, 2, 3, 5 and 7 for the endotoxin activity assay. The relationship between endotoxin levels and adverse outcomes was assessed using a calculated severity score based on injury, infection and organ failures.

Results

To date, 22 patients completed the study. Mean APACHE II score was 21.1 (6.4). At enrollment, 4 (21.1%) patients had low endotoxin levels, while the majority (78.9%) had intermediate (8, 42.1%) or high (7, 36.8%) endotoxin levels. On day 7, 2 (10.5%) patients had low endotoxin levels, while the majority had intermediate (2, 10.5%) or high (11, 57.9%) levels. The mean ICU and hospital LOS were 14.3 (8.4) and 18.4 (9.4) days, respectively. Higher APACHE II scores correlated with increased endotoxin levels with a trend toward statistical significance ($p = 0.069$). Hospital LOS, ICU LOS and ventilator days did not correlate with endotoxin levels.

Conclusions

Our data shows that a majority of patients admitted to the ICU have elevated endotoxin levels. Endotoxin levels correlated to APACHE II score, suggesting a relationship with severity of illness on admission. Mean endotoxin levels increased during hospital stay, while mean severity scores decreased, suggesting that endotoxin levels lag behind severity of illness. This signifies that an increase in endotoxin levels may be resultant of illness, rather than predictive.

Learning Objectives:

Identify patients at high risk for bowel ischemia.

Describe the potential use of obtaining endotoxin levels in critically ill patients.

Self Assessment Questions:

T/F Gram-negative bacteria containing endotoxin are part of the indigenous flora of the gastrointestinal tract.

T/F Providing early enteral nutrition to critically ill patients may reduce their risk for bowel ischemia.

DOES OUTPATIENT DISCHARGE MEDICATION COUNSELING BY A PHARMACIST IMPACT MEDICATION ADHERENCE AND KNOWLEDGE FOLLOWING CORONARY REVASCULARIZATION PROCEDURES?

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Background:

Following cardiac procedures, such as coronary artery bypass grafting (CABG) and percutaneous transluminal angioplasty (PTCA) with stenting, patients are often required to take an increased number of medications. Patients may not only be confused by the sheer quantity of medications, but may also feel overwhelmed by the need to take so many pills each day due to inconvenience and cost. Additionally, patients often do not "feel" the effects of these medications, and so they believe that the medications are not important to their therapy. A previous study has reported that only 50% of hospitalized patients reported being educated about medication changes, and only 30% received written information pertaining to medication usage. Another study concludes that medication adherence is enhanced by providing educational information to increase patient confidence.

Purpose:

The objective of this randomized study is to determine if outpatient pharmacist counseling during the first week after discharge following a coronary revascularization procedure will increase patient knowledge and adherence to medications in the months following these procedures.

Methodology:

Subjects were recruited and randomized after having CABG or PTCA with stenting at Blanchard Valley Hospital between October 1, 2007, and December 31, 2007. Patients in the intervention group met with a pharmacist for one individualized medication education appointment where they received both written and verbal information for cardiac medication in concise, simplistic terms, while patients in the control group had no pharmacist intervention. Two to three months following the coronary revascularization procedure both groups completed a survey measuring medication adherence and knowledge.

Results and Conclusions:

Results and conclusions are pending and will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

Understand the importance of providing medication education after cardiovascular procedures.

Identify the barriers that patients face leading to medication non-adherence.

Self Assessment Questions:

T/F

Most patients leaving the hospital receive adequate information about their medications.

Which of the following are a reason(s) that patients may be non-adherent with medications?

- A. Medications are expensive.
- B. Directions are confusing.
- C. Patients do not understand the purpose of the medications.
- D. All of the above.

DEVELOPING PHARMACIST SERVICES IN A COMMUNITY HOSPITAL EMERGENCY DEPARTMENT

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Purpose: At facilities nationwide, pharmacists have been integrated into hospital departments with widespread benefits reported. Reductions in medication errors and improvements in patient outcomes have been consistently shown. Emergency departments (ED) are known to have a particularly high potential for errors. Therefore, it seems logical that pharmacist services in the ED would positively impact patient safety with an associated cost savings for the facility. The purpose of this analysis is to determine the impact of pharmacist services in the ED at a community hospital with emphasis on ensuring safe, appropriate and cost-effective use of medications which are administered in a timely fashion.

Methods: A pharmacist will provide services in the ED forty hours weekly for a four week period. Functions will include: drug therapy recommendations; pharmacokinetic and renal dosing; facilitation of communication between the ED and central pharmacy; drug information; prospective review of medication orders; participation in code situations; patient education; and assistance with medication reconciliation. The following data will be collected both prior to and during the pilot: percentage of medication reconciliation forms which are complete (i.e. not requiring order clarification), turnaround time for medications sent by central pharmacy, and percentage of pneumonia patients receiving appropriate antibiotics within the timeframe set forth by the Joint Commission and CMS. All pharmacist activities and interventions will be documented and categorized. A survey will be distributed to ED physicians and staff both prior to and after the pilot period to evaluate perceptions, determine pharmacist services which are seen to be beneficial, and to gather suggestions for future pharmacist involvement in the department. Analysis of the objective and survey data will illustrate the impact pharmacist services in the ED have on patient care and staff satisfaction.

Results and Conclusions: To be presented at the conference. Data collection and analysis is in progress.

Learning Objectives:

Describe interventions that a pharmacist can make in an emergency department.

Identify the impact a clinical pharmacist in the emergency department can have on medication reconciliation, core measure compliance, and medication use through clinical interventions.

Self Assessment Questions:

List 4 services a pharmacist can provide in an emergency department to ensure appropriate medication use.

An emergency department pharmacist may help an organization comply with Joint Commission/CMS core measures but can have little effect on medication reconciliation. True or False

CLINICAL EVALUATION OF PIPERACILLIN/TAZOBACTAM MICs FOR TREATMENT OF PSEUDOMONAS AERUGINOSA INFECTIONS

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Background:

Pseudomonas aeruginosa is an aerobic gram-negative rod responsible for a myriad of infections. It is also known to harbor resistance to many antibiotic agents. This pathogen is associated with a high rate of morbidity and mortality. Piperacillin/tazobactam, is a ureido-penicillin type antibiotic coupled with a beta-lactamase enzyme inhibitor. The CLSI determines the susceptibility of *P. aeruginosa* to be resistant to piperacillin/tazobactam when the minimum inhibitory concentration (MIC) is greater than 64/4 mcg/ml. In population kinetic analysis of piperacillin/tazobactam, higher doses than customary must be used to achieve the target of attainment of 50% time above the MIC when the MIC is susceptible but elevated. Customary drug levels will often not provide the time above MIC for optimal therapy of *P. aeruginosa* unless a modified dosing regimen is used. Data is lacking that shows a difference in outcomes of those infections caused by *Pseudomonas* with elevated "susceptible" MIC values of 32/4 or 64/4 mcg/ml.

Methods:

This study will be a single center, retrospective trial of patients treated with piperacillin/tazobactam for *P. aeruginosa* infections as stratified by MIC of piperacillin/tazobactam. Patients who received piperacillin/tazobactam for an infection due to *P. aeruginosa* will be included in the study. This data will then be used to stratify patients into groups of those with pathogens exhibiting MICs of less than 32/4 mcg/ml and those greater than or equal to 32/4 mcg/ml. The primary endpoint will be difference in treatment failure and/or mortality between both groups. Treatment failure will be a composite endpoint defined as a worsening in signs/symptoms of infection, addition of another active antibiotic against *P. aeruginosa*, the replacement of piperacillin/tazobactam by an alternative agent, or mortality while receiving treatment. Secondary endpoint will be whether target of attainment is a predictor of treatment failure or mortality in patients treated with piperacillin/tazobactam.

Results: pending

Conclusions: pending

Learning Objectives:

Review CLSI breakpoints for *Pseudomonas aeruginosa* susceptibilities to piperacillin/tazobactam.

Demonstrate how to calculate target of attainment for piperacillin/tazobactam in a patient if the MIC of the pathogen is known.

Self Assessment Questions:

Piperacillin/tazobactam MIC for a certain *Pseudomonas aeruginosa* isolate is 64/4 mcg/ml; this is considered susceptible. T or F

Target of attainment calculations require knowledge of the MIC of the pathogen. T or F

VENOUS THROMBOEMBOLISM PROPHYLAXIS ASSESSMENT USING AUTOMATED TOOLS

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Venous thromboembolism (VTE) continues to be a significant risk for hospitalized patients despite the publication of evidence-based guidelines that promote prophylaxis by pharmacologic and mechanical means. The purpose of this project is to increase the proportion of patients receiving appropriate VTE prophylaxis by utilizing a computerized report-based workflow that allows pharmacists to identify patients without adequate VTE prophylaxis.

A report was created in our inpatient hospital computer system (Epic Systems, Verona, WI) that assesses clinical data specific to VTE risk and management including pharmacy order records, nursing documentation of care, and laboratory results. This report is printed daily and identifies patients who are not receiving appropriate VTE prophylaxis for their level of risk. Clinical pharmacists utilize the report to review each case and have the option to use an Excel-based program to generate a prophylaxis recommendation. The program assists the pharmacist in estimating the patient's level of risk and in determining a regimen that is in accordance with the institutions VTE prophylaxis guidelines.

Baseline data on the proportion of patients receiving both appropriate VTE prophylaxis and any VTE prophylaxis were collected from electronic records during January of 2008. The baseline data sets were compared against similar data collected during a one-month time period following the implementation of the automated screening workflow. The purpose of this comparison was to determine what impact the workflow had on the proportion of patients receiving appropriate VTE prophylaxis and any VTE prophylaxis.

The results and conclusions of this project are pending and will be presented at the Great Lakes Pharmacy Residency Conference in April.

Learning Objectives:

Describe two uses of online clinical decision support.

State one pro and one con for the use of an automated assessment tool in clinical pharmacy practice.

Self Assessment Questions:

One goal of clinical decision support is to reduce:

- Strain on the pharmacy workforce shortage
- The number of medication errors caused by poor decision making
- The amount of clinical knowledge required to practice pharmacy
- The number of drug interaction warnings viewed at order entry

True or False: The use of an automated screening tool eliminates the need for pharmacist input on VTE prophylaxis regimens.

OUTCOMES ASSOCIATED WITH PRE-ADMISSION METFORMIN USE IN DIABETIC PATIENTS WITH SEPTIC SHOCK: A RETROSPECTIVE COMPARISON

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Purpose: Septic shock is a state of sepsis with hypotension despite adequate fluid resuscitation. Limited treatment options to quell or reverse the detrimental effects of sepsis are available. It is recommended to stop metformin therapy in patients with sepsis due to increased risk of severe lactic acidosis. However, metformin has demonstrated neutral-to-possibly-beneficial effects in animal sepsis models by decreasing inflammatory cytokines and coagulation proteins. The purpose of this study is to examine the effects of pre-admission metformin use in patients with diabetes admitted with septic shock. The hypothesis is pre-admission metformin use is associated with a decreased severity and duration of organ dysfunction in patients with diabetes admitted for septic shock.

Methods: This is a retrospective cohort study. Patients with diabetes mellitus admitted for septic shock between January 2005 through August 2007 will be identified. Adult patients with vasopressor usage greater than 24 hours started within 48 hours of admission and evidence of sepsis (known or suspected infection and at least two of the following: WBC count greater than 12,000 or less than 4,000; temperature greater than 38 or less than 36 degrees Celsius; heart rate greater than 90 beats per minute) will be included. Patients will be divided into two groups: pre-admission metformin use (study) and no pre-admission metformin (control).

The primary objective is to compare the severity and duration of organ dysfunction from admission through hospital day 5 as determined by daily SOFA scores. The daily number of failed organs in the two groups will also be compared. Secondary objectives are time to resolution of elevated lactate levels or metabolic acidosis and durations of vasopressor therapy, mechanical ventilator requirement, and ICU and hospital stays.

IRB approval was obtained in November 2007. Data collection is ongoing.

Learning Objectives:

Describe the stages of sepsis and the body's inflammatory and procoagulant response to infection

Discuss the proposed rationale and effects of metformin in animal sepsis models

Self Assessment Questions:

What mediator of the coagulation cascade does metformin inhibit?

- a. Plasminogen activator inhibitor-1
- b. Activated protein C
- c. Antithrombin

Which stage of sepsis has severe hypotension despite adequate fluid resuscitation?

- a. Sepsis
- b. Severe sepsis
- c. Septic shock

ASSESSMENT OF VANCOMYCIN-RESISTANT ENTEROCOCCAL BACTEREMIA IN A HEMATOLOGY AND BONE MARROW TRANSPLANT POPULATION: OUTCOMES AND RISK FACTORS ASSOCIATED WITH TREATMENT FAILURE

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Objective: Infection is frequently seen in cancer patients and is often caused by gram-positive or gram-negative organisms. Historically, gram-positive infections have usually been caused by staphylococci, but the incidence of vancomycin-resistant enterococci (VRE) is on the rise. There are many potential risk factors that could help predict increased risk of treatment failure in an immunocompromised patient with VRE, including the medication used in treatment, such as linezolid or daptomycin. In order to determine the possible risk factors associated with treatment failure of infection by VRE in hematology or bone marrow transplant patients, we plan to assess treatment failure in patients treated with linezolid or daptomycin.

Methodology: The study will include inpatients of the University of Michigan Health System that: were greater than 18 years of age; received chemotherapy for leukemia, lymphoma, or other hematologic cancers, had documented positive blood culture data indicating infection with VRE and received primary therapy with at least two days of either linezolid or daptomycin. Each patient treated between the period of January 1, 2004- January 1, 2007 who met the study criteria for inclusion will be included in the final data analysis. Data collected will include baseline characteristics such as demographic information, primary hematologic diagnosis, chemotherapy regimen, presence of other antibiotic or antifungal treatments used concurrently, source of infection, and presence or removal of indwelling venous catheters. The effectiveness of the two treatments will be based on microbiological response to the two treatment options and the length of therapy required for a microbiologic response. Safety data will be collected and assessed for both groups of patients and used in final analysis. Data will be analyzed via a Cox proportional hazards analysis to predict resolution of infection (as measured by clearing of bacteremia). This protocol has been approved by the University of Michigan's institutional review board.

Learning Objectives:

Review two antibiotic treatments for vancomycin-resistant enterococci (VRE): linezolid and daptomycin

Describe the methodology that will be used to assess risk factors for VRE treatment failure

Self Assessment Questions:

True or False: Infections are infrequent in bone marrow transplant patients.

True or False: Gram positive infections are rare in patients with hematologic malignancies or in those who received a bone marrow transplant.

EVALUATION OF PHARMACIST MEDICATION ORDER REVIEW

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BACKGROUND:

Medication errors involve all aspects of the medication-use process including prescribing, transcribing, dispensing, administering, and monitoring. Pharmacist transcription of written prescriber orders may lead to errors that could potentially reach the patient. Evaluating the pharmacist order review and transcription process allows for system improvements to prevent further errors from occurring. An initial evaluation of the accuracy of this process was conducted in 2004 and the error rate was found to be 14.9%. Discussion of these results led to the implementation of a pilot program in the Spring of 2006 at William Beaumont Hospital. The program was designed to segregate the order review and transcription process. An evaluation is needed to assess the impact of a segregated order entry process on the transcription error rate.

PURPOSE:

The primary objectives of the study are to identify and describe errors associated with pharmacist medication order review and transcription in a segregated location, determine an error rate associated with pharmacist order entry in a segregated location, and compare this error rate with that seen in 2004.

METHODS:

In this retrospective study, prescriber-written medication orders were compared to the pharmacist-transcribed medication orders input into the pharmacy computer system. Medication orders were selected from a general medical unit for a two week time period in September 2007. Evaluation of the accuracy of pharmacy medication order transcription was based on correct patient name, drug name, dose, route, frequency, time, start/stop date and nursing instructions (if applicable). Cognitive components of pharmacist order review were also assessed and included renal dosing, duplicate therapy, and medication allergies. A point system was assigned to each evaluative component to calculate an error rate and assessment score.

RESULTS and CONCLUSIONS:

Data collection is in progress. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the types and causes of errors commonly associated with the medication process in the hospital.

Describe the impact of a segregated order entry process on the order entry error rate.

Self Assessment Questions:

Which of the following are types of medication errors?

- a. Wrong-dosage form error
- b. Improper dose error
- c. Wrong-administration-technique error
- d. Wrong time error
- e. All of the above

True or False:

Segregated order entry improves the error rate?

RETROSPECTIVE REVIEW OF BIOLOGICAL AGENTS USED FOR THE TREATMENT OF RHEUMATOID ARTHRITIS, CROHNS DISEASE AND PSORIASIS IN A VETERANS AFFAIRS (VA) POPULATION

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Purpose:

Biological agents are used for a variety of disease states, including rheumatoid arthritis (RA), Crohns disease and psoriasis. Current treatment guidelines for RA suggest initiating a biological agent as monotherapy or in combination after a suboptimal response to methotrexate is seen. The use of these agents should be considered for initiation in moderate-severe Crohns disease after lack of efficacy is demonstrated with steroids. In addition, the FDA has approved the use of biological agents in patients with chronic moderate-severe psoriasis who are candidates for systemic therapy or phototherapy. The goals of this review are to evaluate how biological agents are being utilized in one VA population and to compare this use to the recommendations of current treatment guidelines.

Methods:

The VAs electronic medical record system was used to generate a list of patients with an active prescription for adalimumab, etanercept or infliximab over a two-year period at the Roudebush VA Medical Center in Indianapolis, Indiana. Data was collected from each patient chart through searches of past medication use, hospital admissions and outpatient clinic provider documentation. The following data was collected: patient age, gender, primary indication for biological agent use, co-morbidities, current treatment regimen, previous treatment regimen(s), complications/adverse events during therapy, and reason for discontinuation of biological agent (if applicable).

Preliminary Results:

A medical record search identified 185 patients with a prescription for a biological agent filled at the Roudebush VA medical center from September 2005-September 2007. Males comprised 94% of the study population. The average age was 55 years. At the end of the study period, 71.4% of patients were still receiving a biological agent. At least one prior disease related medication was filled through the VA system in 98% of patients.

Conclusions Reached:

Conclusions will be presented at the Great Lakes Conference pending completion of data evaluation.

Learning Objectives:

Discuss how the biological agents adalimumab, etanercept and infliximab, are being utilized in one Veterans Affairs (VA) population with RA, Crohns disease and psoriasis.

Compare how biological agents are being used in one VA medical center to the recommendations of current treatment guidelines

Self Assessment Questions:

True or False: Biological agents are recommended for first-line use in all patients with rheumatoid arthritis.

True or False: Data has shown that etanercept is more effective at controlling psoriasis than either adalimumab or infliximab.

ACCURACY OF WRITTEN MEDICATION RECORDS IN AN ACADEMIC FAMILY PRACTICE CENTER.

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Purpose:

To evaluate the accuracy of written medication records in an academic family practice center. These data will serve as a comparator for an anticipated electronic medical record.

Methods:

Medication reconciliation is an important issue that has come to the forefront of the healthcare dialogue. The 2008 Joint Commission patient safety goals address medication reconciliation specifically as a goal across the continuum of care.

Primary outcome measure is percent of patients currently active medications that are accurately captured by the written medication record. Accuracy of an entry in the record is defined as correct identification of the drug name, strength, and dosing schedule. Secondary measures include the nature of discrepancies, suspected cause, potential severity, estimated length of time between a medication change and notice of the incongruity, estimated time since last pharmacist intervention, patient age, and total number of medications actually taken per patient. The study sample will include primary care patients age 18 and older arriving for regularly scheduled appointments with selected attending physicians at an academic, outpatient family practice clinic. New patients, pregnant women, and non-English speaking patients will be excluded. At the appointment, a trained pharmacist or pharmacy student will interview the patient and utilize available resources, including caregivers, pharmacy records, medication bottles, and medical records, to assess the patients current drug regimen. The list of medications obtained through interview and other resources will be considered the accurate standard. Concordance of the written medication record to this list will be evaluated and reported as a percentage. Discrepancies will be recorded and categorized using a standardized data collection form. Results will serve as a comparator for a future study of electronic medical record accuracy in the same practice site.

Results:

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

Learning Objectives:

Recognize the importance of medication reconciliation in outpatient practice.

Discuss factors that may contribute to medication record inaccuracy.

Self Assessment Questions:

True or False: Medication reconciliation in the ambulatory care setting is addressed by Joint Commission as a national patient safety goal.

True or False: The greatest contributor to medication record inaccuracy is patient modification of the medication regimen

THE USE OF MEGESTROL ACETATE FOR THE MANAGEMENT OF HOT FLASHES IN PROSTATE CANCER PATIENTS.

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Background

Prostate cancer can be treated several ways, one of which is androgen-deprivation therapy (ADT). ADT can be achieved via surgical intervention such as orchiectomy or medically via hormonal therapy. One of the most common side effects to ADT is hot flashes. Approximately seventy-five to eighty percent of men undergoing one of these treatments experienced hot flashes.

Hot flashes are a common and most bothersome side effect in men that have undergone hormonal deprivation for prostate cancer. They are characterized by a warming sensation usually followed by flushing and sweating.

Megestrol acetate is a synthetic progestin with antiestrogenic properties that may help relieve hot flashes due to ADT. The exact mechanism of why this medication may alleviate hot flashes is poorly understood. Two small studies have been published that suggest the use of megestrol acetate 20mg twice daily may be an effective treatment for the management of hot flashes in patients who have had ADT.

Purpose

The purpose of this study is to determine if megestrol acetate is efficacious for the management of hot flashes in men with prostate cancer. The primary endpoint is improvement in hot flashes. Secondary endpoints include establishing an effective dose, schedule, and duration of therapy.

Methods

This is a retrospective chart review study. A computerized generated list of all patients at the Jesse Brown VA Medical Center (JBVAMC) who received a prescription for megestrol acetate 40 milligrams between January 1, 2000 to August 31, 2007 for the indication of hot flashes due to ADT.

Exclusion criteria includes megestrol acetate for the use of appetite stimulation or patients on concurrent therapy with clonidine, selective serotonin reuptake inhibitors (SSRIs), and serotonin norepinephrine reuptake inhibitors (SNRIs), since they can also be used off-label to treat hot flashes.

Results/Conclusions:

Data collection and analysis are ongoing.

Learning Objectives:

Provide a rationale or cause for hot flashes in men.

Identify the different therapies used for treating hot flashes.

Self Assessment Questions:

True or False. Therapies used to treat hot flashes in prostate cancer patients are FDA approved.

True or False. Megestrol acetate is a synthetic progestin with estrogenic properties that may help relieve hot flashes due to ADT.

A SURVEY OF VETERANS AFFAIRS PHARMACY SERVICES IN THE EMERGENCY ROOM

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BACKGROUND: Pharmacy services in the emergency room (ER) were first described in the 1980s as a method to improve medication billing and inventory management. Twenty years later, pharmacy services in the ER have expanded into a more comprehensive model that includes complex clinical functions performed currently in some of the nations leading trauma centers. Recent literature, most notably the American Society of Health-System Pharmacists (ASHP) draft statement on the pharmacists role in the emergency department has generated increased interest in this topic. Currently, pharmacy services at the VA Ann Arbor Healthcare System (VAAHS) do not comply with many of the elements listed in ASHPs draft statement as "essential" practices for pharmacy services in the ER. Such services include pharmacist review of all non-emergent medication orders and provision of education to ER patients and medical staff. No literature describing pharmacy services offered in VA emergency rooms is available to provide guidance on the types of services relevant to emergency room care of the nations veterans.

METHODS: A 21-item survey will be designed; data collection will be performed using the web-based Survey Monkey host (www.surveymonkey.com). Question content will ascertain medical center and emergency room demographic data, as well as types and prevalence of ER pharmacy services, including clinical and distributive services. Email invitations to approximately 173 nationwide VA Chiefs of Pharmacy Service will be used to solicit survey responses during January and February 2008. A reminder email will be sent several weeks after the initial email invitation to encourage further participation.

RESULTS & CONCLUSIONS: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss areas of noncompliance between VAAHS emergency room pharmacy services and the ASHP draft statement on the role of pharmacists in the emergency department.

Determine scope and prevalence of pharmacy services provided by nationwide VA medical center emergency rooms.

Self Assessment Questions:

The American Society of Health-System Pharmacists (ASHP) cites prospective review of non-emergent medication orders, quality assurance activities, and education of patients and healthcare professionals as "essential pharmacy services" for emergency departments. True/False

Current pharmacy services in the emergency department at the VA Ann Arbor Healthcare System (VAAHS) are in compliance with essential services outlined in the ASHP draft statement "The Role of Pharmacists in the Emergency Department". True/False

EVALUATION OF THE ROLE OF EMERGENCY MEDICINE PHARMACISTS WITHIN CENTRAL OHIO AND THE IMPLEMENTATION AT A COMMUNITY HOSPITAL

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Background:

Previous research has shown emergency department inpatients to be at an increased risk for medication errors. Overcrowding and a sense of urgency are two reasons for this increased risk. In early 2007, the Joint Commission (TJC) proposed that emergency department medication orders receive a prospective review by pharmacists and established a requirement for retrospective medication order review when this is not possible as part of the Medication Management standard 4.10. Later that same year, TJC issued an urgent statement regarding prospective and retrospective review that would allow for a more liberal interpretation of the standard until a multidisciplinary task force proposes revisions.

The American Society of Health-System Pharmacists (ASHP) has continued to support prospective medication order review to ensure emergency department patients receive the same level of care as an inpatients. ASHP is currently drafting a statement to define the role of pharmacists in the emergency room. Clearly, there is an increased interest in prospective order review in the emergency room that has left many hospitals exploring the need for an emergency medicine clinical pharmacy service.

Methods:

A central Ohio hospital pharmacy survey is being conducted to gather hospital demographics, evaluate the prevalence of emergency medicine clinical pharmacy services, the hours of service, and the role of the clinical emergency medicine pharmacist. Additionally, intervention documentation and experiences from a trial period at a community hospital will be reviewed.

Results/Conclusion:

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

Learning Objectives:

Understand the prevalence of emergency medicine pharmacy services in the central Ohio area.

Understand the role of an emergency medicine clinical pharmacy service described by survey results.

Self Assessment Questions:

List 4 daily activities in which an emergency medicine pharmacist participates based on the survey results.

T/F: The primary role of an emergency medicine pharmacy service as described by the survey is medication dispensing.

USE OF ENOXAPARIN FOR DEEP VEIN THROMBOSIS PROPHYLAXIS IN BURN PATIENTS: EVALUATION OF PHARMACOKINETICS AND ANTI-FACTOR XA ACTIVITY

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BACKGROUND/PURPOSE:

Burn patients are at significant risk for the development of DVT. However, there is insufficient data to guide pharmacologic prophylaxis in this patient population. Also, the potential for the pharmacokinetics of enoxaparin to be altered in burn patients further complicates this issue. Despite the lack of prospective information to guide dosing, enoxaparin is commonly used for DVT prophylaxis in burn patients. This purpose of this investigation is to examine the pharmacokinetics and anti-thrombotic effects of two commonly employed prophylactic enoxaparin regimens in burn patients.

METHODS:

The study will enroll thirty adult burn patients admitted to the Wishard Memorial Hospital Burn Unit who are prescribed either subcutaneous heparin or enoxaparin for DVT prophylaxis (orders written for heparin will be automatically converted to enoxaparin). At the time of enrollment, subjects who meet study criteria will be stratified based on percent total body surface area burned. Following stratification, subjects will be assigned to receive either subcutaneous enoxaparin 30 mg every 12 hours or 40 mg every 24 hours. The pharmacokinetics of enoxaparin will be approximated using anti-factor Xa activity assessed at baseline and after seven days of therapy. Plasma will be collected from 0-12 hours for every 12 hour dosing interval and from 0-24 hours for every 24 hour dosing interval. Estimates of pharmacokinetic parameters, including volume of distribution at steady state, systemic clearance, maximum plasma activity, time to maximum plasma activity, and terminal elimination half-life will be obtained. Standard pharmacokinetic equations will be used to calculate secondary parameters of interest including area under the anti-factor Xa activity-time curve which will be used as a measure of enoxaparin exposure. Secondary study endpoints include incidence of DVT/PE and other complications.

RESULTS/CONCLUSIONS:

Research is in progress, results pending based on completion of data collection and analysis.

Learning Objectives:

Describe the rationale for DVT prophylaxis in burn patients, including why they are at increased risk of developing a DVT. Describe the role of anti-factor Xa monitoring in DVT prophylaxis with enoxaparin and how it differs in burn patients.

Self Assessment Questions:

TRUE/FALSE: Pharmacologic DVT prophylaxis is recommended in all burn patients.

TRUE/FALSE: The pharmacokinetics of enoxaparin can be potentially altered in burn patients so that the half-life is longer and volume of distribution is smaller.

EFFECT OF EARLY INITIATION OF ANGIOTENSIN CONVERTING ENZYME INHIBITORS OR ANGIOTENSIN II RECEPTOR BLOCKERS ON RENAL ALLOGRAFT FUNCTION POST TRANSPLANT

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Improved immunosuppression has increased renal allograft survival; however, loss of allograft function secondary to non-immunological causes such as hypertension has become a greater concern as patients live longer with their transplant. It has been demonstrated that improved blood pressure control reduces the incidence of nephropathy while increasing length of allograft survival and decreasing mortality. Prior studies have shown that angiotensin converting enzyme inhibitors (ACEI) and angiotensin II receptor blockers (ARB) are effective in reducing chronic allograft nephropathy secondary to hypertension post-transplant. The objective of this study is to examine the correlation of the time to initiation of ACEI or ARB with allograft function and mortality.

A retrospective review of renal transplant recipients from January 1, 1997 to January 1, 2007 will be conducted utilizing the University of Illinois Medical Center at Chicago's medical records. Patients will be excluded if they are presenting for a multiple-organ transplant, renal re-transplantation, younger than 18 or older than 65 years of age, have a survival time of less than 6 months post-transplant, or incarcerated at time of transplant or any point during follow-up period. Patient data will be stratified into three study groups: early ACEI/ARB initiation (within 30 days post-transplant), late ACEI/ARB initiation (greater than 30 days post-transplant), and patients receiving neither ACEI nor ARB. Collected data will include information regarding allograft function, demographic data, and information regarding potentially confounding variables. Graft function will be assessed using serum creatinine and estimated glomerular filtration rate as surrogates. Data will be collected at time of initiation of ACEI or ARB, and 2 weeks, and 1, 3, 6, 12, 18, 24, 36, and 48 months post initiation of ACEI or ARB. This study was approved by the Institutional Review Board prior to commencement.

Results and conclusions remain under investigation, with data collection and evaluation currently being conducted.

Learning Objectives:

Describe the role of non-immunological causes in nephropathy post renal transplant.

Discuss the use of angiotensin converting enzyme inhibitors and angiotensin II receptor blockers for control of hypertension post renal transplant.

Self Assessment Questions:

True or False. Uncontrolled hypertension post renal transplant has been associated with allograft nephropathy.

True or False. Time to initiation of ACEI or ARB post renal transplant have no correlation with allograft function.

TREATMENT STRATEGIES OF HEART FAILURE WITH PRESERVED EJECTION FRACTION

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Background: Heart failure has classically been considered a clinical syndrome associated with cardiac dilation and impaired contractility; however, recent studies identified an increasing number of patients presenting with clinical heart failure have a normal or preserved ejection fraction. In 2005, the American College of Cardiology and American Heart Association published updated guidelines with recommendations to control hypertension and ventricular rate in heart failure patients with preserved ejection fraction. Controlled studies that explored the role of angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), beta-blockers, and calcium channel blockers have provided inconclusive results to support a preference of agents in heart failure with preserved ejection fraction.

Purpose: The primary objective is to determine if a superior treatment option exists for the management of heart failure with preserved ejection fraction to prevent readmission or death due to heart failure. The secondary objectives include readmission or death due to other cardiovascular events: chest pain, myocardial infarction, revascularization procedures, unstable angina, diabetic complications, stroke, or peripheral arterial disease.

Methods: This study is a retrospective chart review of patients admitted to Methodist Hospital in Indianapolis with a documented diagnosis of heart failure between January 1, 2000 and December 31, 2003. Patients randomly selected from a generated list were included if diagnosis of heart failure with preserved ejection fraction defined as >40%. Patients were excluded if pregnant, cocaine addiction, severe aortic or mitral stenosis, pacemaker implantation, or concomitant medications: thiazolidinediones, non-steroidal anti-inflammatory drugs, COX-2 inhibitors, pregabalin, or cilostazol. Data collection includes patient demographics, concomitant disease states and medications, admission laboratory data, ejection fraction, and discharge medications (ACEI, ARB, beta blocker, or calcium channel blocker). Data will be reviewed to assess readmission rate or death for the primary or secondary outcomes.

Results and conclusions to be presented.

Learning Objectives:

Describe trends in prevalence and outcome of heart failure patients with preserved ejection fraction.

Identify appropriate treatment strategies in heart failure with preserved ejection fraction to support long-term management goals including blood pressure reduction, control of ventricular rate, and prevention of clinical symptoms.

Self Assessment Questions:

The survival of heart failure patients with preserved ejection fraction is similar to that of patients with reduced ejection fraction. T/F

Long-term goals in heart failure patients with preserved ejection fraction are to control congestion and to eliminate or reduce risk factors, including hypertension, tachycardia, and ischemia, that confer a predisposition to diastolic dysfunction. T/F

DEVELOPMENT AND VALIDATION OF THE VANCOMYCIN NOMOGRAM TARGETING SERUM TROUGH CONCENTRATIONS OF 10 - 18 MCG/ML

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Background:

Vancomycin is the drug of choice for treating infections caused by methicillin-resistant staphylococci, penicillin-resistant streptococci, corynebacterium, and penicillin resistant enterococci. Vancomycin exhibits concentration independent killing. Historically, serum trough concentration (TC) of 5-10 mcg/ml was considered clinically appropriate. The 2004 guideline from the American Thoracic Society recommends a serum TC of 15-20 mcg/ml for ventilator associated, hospital acquired, and healthcare associated pneumonia. Moreover, the Infectious Diseases Society of America (IDSA) advocates vancomycin serum TC of 15-20 mcg/ml for bacterial meningitis and 10-15 mcg/ml for bacterial endocarditis.

As higher serum trough concentrations are recommended by the IDSA guidelines and are being requested by Infectious Diseases physicians at St. John Hospital, the targeted TC of 5-20 mcg/ml obtained by the old vancomycin nomogram are no longer clinically appropriate.

Purpose:

To develop, implement, and validate a new vancomycin nomogram targeting serum TC of 10-18 mcg/ml.

Methodology:

Patients over 18 years of age with vancomycin dosed according to the nomogram will be included. Patients must have at least one serum TC available, stable serum creatinine, and no documentation of signs or symptoms of unstable renal function up to the time of the first serum TC. Exclusion criteria includes patients who are pregnant, breastfeeding, weigh less than 50 kg or more than 110 kg, or have estimated creatinine clearance (CrCl) less than 30 ml/min or greater than 110 ml/min.

The new nomogram was devised based on CrCl and actual body weight. Serum TC and time to targeted serum TC were compared between patients dosed according to the old nomogram and the new nomogram. Actual serum TC and predicted serum TC will be compared for validation of the new nomogram.

Results:

Results and conclusions are pending

Learning Objectives:

To justify development of a new vancomycin nomogram

To validate the new vancomycin nomogram

Self Assessment Questions:

What is the serum trough concentration for bacterial meningitis recommended by the IDSA guidelines?

YO is a 61 YO WM admitted for bacteremia. His height and weight are 65" and 89 kg. His serum creatinine upon admission was 0.7 mg/dl. The ID physician ordered vancomycin targeting serum trough concentration of 10-15 mcg/ml and consulted the pharmacist for dose recommendation. According to the vancomycin nomogram, what is the appropriate dose?

IMPACT OF GENERIC CONVERSION ON MEDICATION ADHERENCE: A RETROSPECTIVE ANALYSIS OF A MANAGED CARE DATABASE

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Background: Due to multiple blockbuster medications becoming generically available, many health plans are committed to strategies to drive generic utilization and ultimately provide cost savings for both the member and plan.

Purpose: To evaluate the effects of generic conversion by assessing medication adherence pre- and post-generic conversion.

Methods: A retrospective observational study was performed using pharmacy claims from commercial and Medicare members. This study analyzes pharmacy claims for three frequently prescribed cardiovascular medications that recently became generically available. This analysis will determine if members maintain adherence to generic medications after switching from the respective brand medication. The three cohorts identified in the study are members taking amlodipine, metoprolol succinate ER 25 mg, or simvastatin that have switched from Norvasc, Toprol XL 25 mg, or Zocor, respectively. Members are current users of the brand medication. An index date was identified for each member corresponding to the first fill of the generically equivalent product. Adherence was assessed using a medication possession ratio (MPR) for compliance and a gap analysis for persistency of therapy. The pre-index adherence was calculated using claims data 6 months prior to the index date. The post-index date adherence will be calculated using claims data for 6 months after the index date.

Results: Descriptive statistics including the measures of central tendency (mean, median), frequencies and counts will be calculated for the baseline characteristics of the different cohorts. Comparisons between the pre- and post-index group will use a paired Student t-test for matched continuous variables.

Conclusions: Lowering member cost share through generic utilization has the potential to improve adherence, thereby decreasing overall health care costs. The results of this study will be used to support and further promote generic medication program initiatives.

Learning Objectives:

Understand how medication adherence is determined in a managed care database.

Explain the impact of equivalent generic conversion on adherence in a managed care database.

Self Assessment Questions:

True or False: Adherence to long-term therapies for chronic disease states averages 50%.

What are some limitations using retrospective database analyses?

LEVOFLOXACIN INDUCED DYSGLYCEMIAS IN DIABETIC PATIENTS UNDERGOING TREATMENT FOR COMMUNITY ACQUIRED PNEUMONIA

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Purpose: Hypoglycemia is a well known complication associated with the treatment for diabetes mellitus and hypoglycemic episodes have been identified as an independent risk factor for mortality. The use of fluoroquinolones has been associated with uncommon and occasionally severe blood glucose abnormalities, with both hypoglycemia and severe hyperglycemia being described. Several case reports describe these detrimental effects in patients undergoing treatment with levofloxacin. One such case report attributes a fatality to levofloxacin induced hypoglycemia in a Type 2 diabetic patient. Another report described anoxic brain injury secondary to hypoglycemia in a non-diabetic patient undergoing treatment with levofloxacin. One hypothesis for fluoroquinolone induced hypoglycemia involves a drug induced transient increase in insulin secretion from pancreatic islet cells that may occur after a single dose. It has also been proposed that prolonged treatment with a fluoroquinolone may decrease insulin productivity or increase insulin degradation, resulting in hyperglycemia. This study is unique and important in that it will describe fluoroquinolone induced dysglycemias in diabetic patients, a population at inherent risk for this effect.

Methods: This study is a retrospective chart review conducted at the University of Illinois Medical Center at Chicago (UIMCC) in diabetic patients being treated for community acquired pneumonia admitted between January 31, 2006 to June 31, 2007. Subjects ≥ 18 years of age, diagnosed with diabetes mellitus, undergoing treatment for community acquired pneumonia who have received > 1 dose of levofloxacin, ceftriaxone or azithromycin are included in this study. Exclusion criteria includes use of a fluoroquinolone other than levofloxacin, crossover treatment with both levofloxacin and either ceftriaxone or azithromycin, and episodes of hypoglycemia before treatment or >4 days after discontinuation of antibiotic therapy.

Results and conclusions: Pending data collection. To be presented at Great Lakes Conference.

Learning Objectives:

Describe the potential mechanisms for fluoroquinolone induced dysglycemias.

Compare the incidence of dysglycemias in patients receiving quinolone based and non-quinolone based treatment for CAP.

Self Assessment Questions:

Independent factors putting patients at risk for hypoglycemia include: renal insufficiency, malnutrition, liver disease, sepsis/shock, pregnancy, malignancy, and stroke. T/F
Blood glucose levels >250 mg/dL have been shown to mediate many factors known to propagate illness including decreased immune function and wound healing, increased oxidative stress and inflammatory factors, propagation of endothelial dysfunction, promotion of procoagulant state, fluid shifts and electrolyte fluxes and exacerbation myocardial and cerebral ischemia. T/F

EVALUATION OF THE USE OF ERYTHROPOEISIS STIMULATING AGENTS (ESA) IN A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Recently, several warnings have been issued regarding ESA therapy. The risk of cardiovascular events, including death, has been shown to increase as serum hemoglobin concentrations exceed 12 gm/dL or increase greater than 1 gm/dL over a two-week period. The primary objective of this review is to determine whether the Richard L. Roudebush VA Medical Center patients are being prescribed ESAs for the appropriate indications. The secondary objectives include: 1) to determine if the medications are being dosed and titrated correctly; 2) to assess the appropriateness of iron administration; and 3) determine the incidence of adverse drug reactions. The results will then be used in support of a pharmacist-run ESA clinic within the institution.

Methods: The study is a retrospective evaluation of all patients who received prescriptions for either darbepoetin or epoetin alfa between March 2006 and March 2007. All of the patients will be included in the analysis. Data to be collected will include: age, gender, height, weight, race, indication, ESA used, dosage utilized, route of administration, hemoglobin, iron studies, use of chemotherapy, and status of intravenous or oral iron supplementation. An evaluation of appropriate monitoring parameters and adverse effects will also be included.

Preliminary Results:

- 151 patients received Darbepoetin and 50 patients received Epoetin alfa
- 97% of patients had a known and appropriate ESA indication
- 30.3% of patients received an appropriate initial dose
- 34.3% of patients had appropriate ESA dose titration or monitoring
- 55.2% of patients received iron therapy
- 92.8% of patients receiving iron therapy were given oral iron (mean Tsat 19.5%)
- 22.4% of patients experienced an adverse event while using an ESA

Conclusions: Results indicate that a pharmacist-run ESA clinic could be more beneficial and cost effective than current practice.

Learning Objectives:

List appropriate indications for initiating ESA therapy.

Explain the appropriate monitoring time line and dosing adjustments necessary for patients receiving ESA therapy.

Self Assessment Questions:

How often should Hgb be monitored after a patient has started ESA therapy?

- At baseline, every 6-8 weeks until target Hgb reached, then every 6 months thereafter
- At baseline, every 6-8 weeks until target Hgb reached, then every 3 months thereafter
- At baseline, every 3-4 weeks until target Hgb reached, then every 6 months thereafter
- At baseline, every 3-4 weeks until target Hgb reached, then every 3 months thereafter
- None of the above

Which of the following are FDA approved indications for ESA therapy?

- Chronic kidney disease
- Anemia caused by cancer
- Acute anemia in a medical ICU patient
- Both A&B
- All of the above

THE IMPACT OF A PHARMACIST-MANAGED ANTICOAGULATION CLINIC ON PATIENT OUTCOMES

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PURPOSE: Oral anticoagulation therapy with warfarin presents many challenges in clinical practice, and a growing body of literature suggests the benefits of clinical pharmacy services on the outcomes of patients receiving oral anticoagulation. Thus, in February 2008, the Monroe Clinic, a not-for-profit health system featuring a multi-specialty outpatient clinic and hospital, implemented a pharmacist-managed anticoagulation clinic. The purpose of this study was to evaluate the impact of ambulatory clinical pharmacy services, compared with usual care services, on the outcomes of patients receiving oral anticoagulation.

METHODS: This was a retrospective, cohort study, with a combined historical and parallel control group. Patients with an indication for long-term oral anticoagulation therapy from March 1, 2007 to June 30, 2007 and from March 1, 2008 to June 30, 2008 were identified within the institutions EPIC outpatient database based on ICD-9-CM diagnosis codes. A retrospective chart review was conducted to identify patients receiving warfarin therapy for greater than or equal to three consecutive months and to complete a standardized data collection form. Patients whose outpatient warfarin therapy was managed solely by physicians (usual care) were assigned to either the historical or parallel control group and were compared to patients whose warfarin therapy was managed by the anticoagulation clinic pharmacist. The primary study outcome was the combined occurrence of thromboembolic and bleeding events.

RESULTS/CONCLUSION: Data collection and analysis is ongoing, with preliminary results to be presented in April 2008.

Learning Objectives:

Identify patients requiring long-term oral anticoagulation, defined as greater than or equal to three consecutive months of therapy.

Discuss the potential benefits of a pharmacist-managed anticoagulation clinic on patient outcomes.

Self Assessment Questions:

According to the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy Evidence-Based Guidelines, what are the indications for long-term oral anticoagulation?

What laws are in place regulating collaborative drug therapy management by pharmacists in your state?

POST-OPERATIVE INFECTION RATES: A COMPARISON OF SMOKERS, NON-SMOKERS, AND PATIENTS ON NICOTINE REPLACEMENT THERAPY (NRT)

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Purpose: Smoking has been associated with decreased wound healing and post-operative infections. Since it is unclear whether or not the toxins of smoking have a greater negative effect on post-operative infections than nicotine alone, a study comparing the rates of post-operative surgical site infections in smokers, non-smokers, and patients on nicotine replacement therapy (NRT) was performed. The purpose of this study is to determine if the negative effects on wound healing are due to nicotine alone or the combination of nicotine and the additional toxin contained in cigarettes.

Methods: A retrospective chart review was conducted of 1539 surgical patients who were admitted to the Richard L. Roudebush VA Medical Center post-operatively between 12/1/2006 and 12/25/2007.

Results: Results will include the post-operative surgical site infection rates of smokers, non-smokers, and NRT patients. Smokers who smoke less than one pack per day will be compared to those who smoke greater than or equal to one pack per day to determine if the "occasional" smoker is at less risk for wound infection as compared to a "heavier" smoker. Surgical Care Improvement Project (SCIP) measures will be evaluated to determine if there is a difference in post-operative surgical site infection rates when each guideline is adhered to so as to eliminate other potential reasons for an increase in post-operative surgical site infections.

Conclusions: Conclusions will be presented at the Great Lakes Conference pending completion of data collection.

Learning Objectives:

Discuss the effects of smoking on wound healing.

List three factors that increase risk for post-operative surgical site infections.

Self Assessment Questions:

Which of the following mechanisms describe how smoking decreases wound healing?

- A. Decreased collagen synthesis
- B. Increased vasoconstriction
- C. Increased immunosuppression
- D. All of the above

Which of the following would increase risk for post-operative surgical site infection?

- A. Hyperalbuminemia
- B. Hyperglycemia
- C. Proper timing of antibiotics
- D. None of the above

HEPARIN INDUCED THROMBOCYTOPENIA IN THE CRITICALLY ILL: VALUE OF THE 4T SCORE AND COMPLIANCE WITH EVIDENCE-BASED GUIDELINES

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Purpose: Significant variability exists in the identification and treatment of heparin induced thrombocytopenia (HIT). We sought to evaluate the incidence of positive heparin-PF4 antibody assays based on the 4T Score (an objective criterion for HIT diagnosis based on: timing of thrombocytopenia, degree of thrombocytopenia, alternate causes of thrombocytopenia, and sequelae development) and compared practice patterns for the treatment of HIT with recommendations from evidence-based guidelines.

Methods: Consecutive adult critically ill patients were identified retrospectively using a laboratory report of heparin-PF4 antibody assays. Patients admitted on a direct thrombin inhibitor (DTI) or with a previous history of HIT were excluded. The 4T Score was calculated and the incidence of positive heparin-PF4 antibody assay results was compared among patients having a low (0-3 points), intermediate (4-5 points), or high (6-8 points) 4T Score. Compliance with treatment guidelines developed by the American College of Chest Physicians was assessed. Compliance was defined as adherence to all recommendations including: discontinuation of heparin, initiation of a DTI, ultrasonography of lower limbs, non-use of warfarin until platelet recovery, and avoidance of platelet transfusion.

Preliminary Results: To date, 15 patients have been evaluated. All patients had exposure to unfractionated heparin (87% received intravenous heparin and 13% received subcutaneous heparin). The percentage of patients with a positive heparin-PF4 antibody assay was 100% (1/1), 50% (3/6), and 0% (0/8) when a high, intermediate, and low 4T Score was calculated, respectively ($p = 0.026$). Compliance with guidelines was 0%. The primary reason for non-compliance was failure to initiate a DTI [93% (14/15)], followed by failure to perform ultrasonography [87% (13/15)]. Eighty-seven percent (13/15) were non-compliant with two or more recommendations and 67% (10/15) were non-compliant with three or more recommendations.

Conclusion: A high 4T Score can be useful in predicting HIT in the critically ill. Compliance with evidence-based guidelines is poor.

Learning Objectives:

Describe a strategy for the treatment of HIT based on evidence-based recommendations.

List therapeutic options for anticoagulation in patients with HIT.

Self Assessment Questions:

Which of the following agents can be used for anticoagulation in HIT?

- a. argatroban
- b. enoxaparin
- c. heparin
- d. A and B
- e. all of the above

Discontinuation of heparin is the only treatment strategy recommended for HIT. True or False

FORMULARY ERROR-PROOFING IN A PEDIATRIC TERTIARY CARE HOSPITAL

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BACKGROUND/PURPOSE: Pediatric patients are one population at high risk for medication errors. Out of every twenty medication orders in adult patients, one order has been estimated to contain a medication error. In pediatric patients, this number has been reported to be as high as one error in every 6.4 orders. Furthermore, at least fifty percent of preventable adverse drug reactions are related to errors associated with anticoagulants, opiates, and insulin. Two possible strategies to reduce the potential for errors include the composition and utilization of a high-alert medication list and the optimal use of computerized dose-checking software. The purpose of this project is to evaluate and modify a high-alert medication list and computerized dose-checking recommendations to reduce the potential for pediatric medication errors.

METHODS: In order to reduce the potential for medication errors at a tertiary care children's hospital, the dose-checking software and high-alert medication list currently in use will be assessed. A survey of pharmacists will be completed to determine baseline attitudes and perceptions toward dose-checking and high-alert medications. Current dose-checking information will be evaluated and compared to current literature. Recommendations will be made to update or change these guidelines based on the literature review. The number of recommended changes will be tracked. The number of pharmacist interventions before and after the change in computer system dosing parameters will also be noted. The current high-alert medication list will be assessed based on current literature and compared to the Institute for Safe Medication Practices high-alert list. Recommendations for changes, additions, or deletions will be made. The number of changes to this list will be tracked.

RESULTS/CONCLUSIONS: Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the process of maintaining and updating a high-alert medication list.

Identify the factors involved in determining appropriate dose-checking computer guidelines.

Self Assessment Questions:

Medication errors in pediatric patients are most commonly:

- (1) dosing errors
- (2) dispensing errors
- (3) administration errors

True or False - High-risk and high-alert medications are medications that have the highest risk of causing injury when misused.

RETROSPECTIVE REVIEW OF CURRENT ANTIEMETIC APPROACH IN PEDIATRIC CANCER PATIENTS RECEIVING INPATIENT CHEMOTHERAPY

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PURPOSE: The American Society of Clinical Oncologist (ASCO) current antiemetic guidelines suggest 5-HT₃ serotonin-receptor antagonist with, or without, a corticosteroid for the prevention of chemotherapy-induced nausea and vomiting (CINV). The objective of this study is to retrospectively evaluate the effectiveness of antiemetic approaches used for pediatric oncology patients at Kosair Children's Hospital to prevent and treat CINV.

METHODS: A retrospective chart review was conducted to identify patients who received antiemetics to prevent CINV from March 1, 2007 to August 31, 2007. Patients not receiving chemotherapy, those receiving oral chemotherapy, or those treated on an outpatient basis were excluded from review. The following data was collected: date and time of chemotherapy, dose of chemotherapy, emetogenic risk potential for chemotherapy, date and time of antiemetic therapy, dose and route of antiemetic therapy, number of vomiting episodes, number of as-needed antiemetics required, patient age, sex, allergies, type of cancer, and length of hospital stay. CINV regimens were compared with expert recommendations and trends of vomiting control were examined.

PRELIMINARY RESULTS: Data collection is ongoing. Results pending the completion of data collection.

CONCLUSIONS: Final conclusion is pending the results of data collected. Conclusion should demonstrate which antiemetic regimens were effective, or non-effective, in a retrospective, observational, oncology pediatric study. The data gathered will be used to direct clinicians in choosing the most effective antiemetic regimen to prevent and treat CINV in pediatric patients. The information will be presented to Kosair Children's Hospital oncology physicians, nurses, and pharmacists for further discussion. Results will facilitate a new antiemetic protocol at Kosair Children's Hospital.

Learning Objectives:

Describe Chemotherapy Induced Nausea and Vomiting (CINV) and its significance for the treatment and management of pediatric oncology patients.

Understand current antiemetic therapies used in the prophylaxis and treatment of CINV in pediatrics.

Self Assessment Questions:

Chemotherapeutic agents with the high emetic risk potential include all of the following, except:

- a. Bleomycin
- b. Cisplatin
- c. Cyclophosphamide ≥ 1500 mg/m²
- d. Dactinomycin

Aprepitant is a moderate inhibitor of CYP3A4 requiring the dose of which medication to be adjusted:

- a. Ondansetron
- b. Phenergan
- c. Dexamethasone
- d. All of the above

DECREASING VARIATION - USING CLINICAL DECISION SUPPORT TO IMPROVE COMPLIANCE WITH VENOUS THROMBOEMBOLISM PROPHYLAXIS GUIDELINES

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BACKGROUND: Improvements in medication prescribing through the use of computerized prescriber order entry (CPOE) with clinical decision support systems (CDSS) are well documented. Several studies have demonstrated CDSS improves ordering practices, reduces medication errors, increases the use of preventative services and improves adherence to standard of care guidelines. Adherence to guidelines is of particular importance as the majority of hospitals (83%) use this method to affect prescribing. Guidelines for the prophylaxis of venous thromboembolism (VTE) have received significant attention due to the clinical and economic impact of this disease. Studies have demonstrated the benefit of implementing CDSS to improve the adherence to guidelines for VTE prophylaxis, however these studies evaluated CDSS in electronic medical records (EMR) and complex web-based applications. With the low adoption of CPOE and even lower adoption of a complete EMR, it is important to evaluate less complex forms of CDSS.

PURPOSE: To determine the effect of CDSS on compliance of VTE risk assessment and prophylaxis with institutional guidelines.

METHODS: Approval from the institutional review board will be obtained prior to data collection. A retrospective chart review will be completed for all patients admitted to the hospital through the emergency department before and after the implementation of CDSS (7/1/05-12/31/05, 7/1/06-12/31/06). An algorithm will be developed to compare prescriber risk assessment and prophylaxis with guideline recommendations. The Health Systems Information Warehouse will be used to identify qualifying patients. Patients will be included in the review if they are least 18 years of age. Pregnant women, prisoners, and the mentally challenged will be excluded. VTE risk assessment and prophylaxis will be evaluated for compliance with institutional guidelines.

RESULTS: Pending

CONCLUSIONS: Pending

Learning Objectives:

Review the national and institutional guidelines for venous thromboembolism prophylaxis

Describe the impact of clinical decision support on the adherence to guidelines

Self Assessment Questions:

T/F Age is not a component of venous thromboembolism risk

T/F Clinical decision support is always helpful to prescribers

ASSESSING INSTITUTIONAL ANTICOAGULATION SAFETY PRACTICES

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Purpose:

Anticoagulation is a high-risk treatment, which commonly leads to adverse drug events due to the complexity of dosing these medications, monitoring their effects, and ensuring patient compliance. The JCAHO 2008 national patient safety goal requirement 3E states that all institutions must have methods in place in order to reduce the likelihood of patient harm associated with the use of anticoagulation therapy. The purpose of this project is to help identify events involving the use of anticoagulation medications that will allow Munson Medical Center (MMC) to create a dashboard that will assess the overall safety and efficacy of the anticoagulation program.

Methods:

Data will be retrospectively reviewed for a five-month period from June 1st 2007 through November 30th 2007. Data to be collected using medical coding will include all patients that received heparin, lovenox, lepirudin, or warfarin and experienced any of the following adverse events: major bleeding episodes (defined as a decrease in hemoglobin concentration of two g/dL requiring transfusion of two or more units of red blood cells, intracranial, intraarticular, intraocular, or retroperitoneal bleeding), thromboembolic complications (defined as an embolic or thrombotic cerebrovascular accident, pulmonary embolism, or deep vein thrombosis), and any fatal events. The data will be analyzed in order to determine areas of focus that will allow us to assess the anticoagulation safety practices in our institution.

Results:

Data collection will take place from February 1st 2008-February 29th

Conclusion:

This project intends to create a system that will identify key events related to anticoagulation therapy that will allow us to evaluate the safety practices of our institutions anticoagulation therapy and determine if additional interventions are needed.

Learning Objectives:

Identify adverse events that can impact anticoagulation safety practices

Identify potential solutions that may help an institution evaluate their anticoagulation safety practices

Self Assessment Questions:

What percentage of patients required transfusion of two or more units of red blood cells?

What were the top two adverse events that were found in this project?

INPATIENT USE OF PHYTONADIONE: A RETROSPECTIVE REVIEW

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PURPOSE: Due to a large number of clinical trials that have shown warfarin to be beneficial in patients with atrial fibrillation, warfarin is the most common oral anticoagulant used to prevent thromboembolic events. For this reason there has been an increase in the prescribing of phytonadione, which is used for the reversal of warfarin anticoagulation. Inappropriate use of phytonadione (eg. indication, dose, timing, and route) may lead to thromboembolic events and possibly warfarin resistance. One of the Joint Commission's National Patient Safety Goals (NPSG) for 2008 includes the implementation of a standard protocol for phytonadione usage in hospitalized patients by January 1, 2009. In order to comply with this NPSG, St. Vincent Hospital must evaluate phytonadione utilization, develop, and implement a protocol. Acute care for warfarin adverse effects specifically elevated INRs and/or bleeding, was addressed by Ansell and colleagues in the CHEST 2004 guidelines. However, there are minimal recommendations available that exclusively address warfarin reversal for urgent or emergent procedures (i.e cardiac catheterization, medical device placement, etc). The purpose of this study was to develop and implement a protocol that is specific for the basis of warfarin reversal (i.e procedural needs) and/or patient-specific factors (elevated INR and/or hemorrhage). **METHODS:** This was an IRB approved, retrospective, observational analysis of patients receiving phytonadione from July 1, 2006 - December 31, 2006. Patients were categorized into three populations by their reason for admission: cardiac catheterization, implantation of medical devices, or adverse effects from warfarin. Pregnant women, children, and prisoners were excluded. To assess the use and appropriateness of phytonadione therapy, warfarin data (date/time/indication/dose/INR) and phytonadione data (date/time/dose/route/total mg administered) were collected and analyzed. In addition, patient demographics and possible reasons for elevated INR and/or hemorrhage were recorded to identify patterns. **RESULTS and CONCLUSION:** Results and conclusions will be presented at the meeting.

Learning Objectives:

Compare and contrast the 2004 CHEST recommendations for phytonadione administration in the acute care situation, to situations in which the patient requires warfarin reversal for procedural needs.

When warfarin reversal is needed for a procedure, evaluate the appropriate timing for INR reevaluation.

Self Assessment Questions:

AW is a 47 yo African- American female with a history of atrial fibrillation, who presents to the emergency department with an INR of 2.2. She has severe chest pain and SOB. AW is a candidate for left heart catheterization within the next 12 hours. Would it be appropriate for the physician to order 1mg IVPB over 30 minutes? Yes or No

For the patient mentioned above, after administration of phytonadione when should the INR be reevaluated?

- A. 48 hours
- B. 14 hours
- C. 7 hours
- D. 4 hours

CLINICAL AND MICROBIOLOGICAL OUTCOMES ASSOCIATED WITH TIGECYCLINE IN THE TREATMENT OF CARBAPENEM-RESISTANT ACINETOBACTER BAUMANNII (CRAB)

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Purpose: Infections due to *Acinetobacter baumannii* are among the most difficult nosocomial infections to treat. Ampicillin-sulbactam and carbapenems have been the drugs of choice. The development of resistance to carbapenems (carbapenem-resistant *Acinetobacter baumannii* (crAb)) has limited treatment options. Tigecycline has demonstrated in-vitro activity against crAb, but clinical use data remains limited. The incidence of crAb at Cleveland Clinic has steadily increased since September, 2006 with tigecycline having been used in many cases. The aim of this study is to present our early experience with tigecycline in the treatment of crAb.

Methods: The primary objective will be to assess clinical and microbiological outcomes of patients with crAb infections treated with tigecycline. Secondary objectives will include: the incidence of recurrent crAb infections, the incidence of tigecycline non-susceptible crAbs, and the comparison of clinical and microbiological outcomes of tigecycline to those of other antimicrobials used to treat crAb. Retrospective chart review of patients age ≥ 18 years with a positive culture for crAb from September 1, 2006 to December 31, 2007. An isolate will be considered crAb if the MIC to imipenem is ≥ 8 mcg/mL. Data collected will include demographic, clinical, and microbiological information. The primary site of infection, duration of therapy, concomitant infections, and recurrent infection will be included. All statistical tests will be two-sided with a significance level of $p < 0.05$. Data related to the primary outcome will be analyzed using descriptive statistics. The Fishers exact test will be used for comparing tigecycline to other antimicrobials.

Results and Conclusions: Data collection is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

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Learning Objectives:

Describe virulence and resistance mechanisms observed in *Acinetobacter baumannii* and review treatment strategies for infections due to crAb.

Assess clinical and microbiological success rates in crAb infections treated with tigecycline.

Self Assessment Questions:

True or False: *Acinetobacter baumannii* is capable of acquiring resistance to multiple antimicrobial agents.

True or False: There is substantial clinical evidence to support the use of tigecycline to treat crAb.

INITIATION OF TREATMENT GUIDELINES FOR ACUTE HEART FAILURE SYNDROMES IN THE EMERGENCY DEPARTMENT

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PURPOSE: Each year there are over 1 million hospital discharges with a primary diagnosis of chronic heart failure. Approximately 80% of patients admitted for acute heart failure syndromes (AHFS) are admitted through the emergency department (ED), yet there are currently no published consensus guidelines for the management of AHFS in the ED. The objective of this study is to evaluate the impact of treatment guidelines implemented at Saint Joseph Mercy Hospital on the appropriateness of use and dosing of IV diuretics and nitroglycerin, documentation of response to diuretic therapy.

METHODS: Treatment guidelines for the management of AHFS in the ED at our institution were developed and approved by a multidisciplinary committee. These guidelines included recommended diuretic dose, use of IV nitroglycerin, and the option to discharge the patient to follow up in a heart failure clinic. A retrospective chart review was conducted on patients presenting with a diagnosis of AHFS with volume overload and who received an IV diuretic in the ED. Data was collected both before and after the implementation of these new guidelines. Initially data for 70 patients was collected and analyzed to provide baseline data; then a second retrospective review was conducted after the implementation of the guidelines to assess adherence and patient outcomes.

RESULTS: Baseline data was collected on 70 patients before implementation of the guidelines. Of the 38 patients with a documented home loop diuretic dose, 32 (84%) received an appropriate diuretic dose in the ED. Forty-six patients presented with at least one symptom of severe volume overload and only seven (15%) of these patients received IV nitroglycerin. Results for after implementation of the guidelines are being finalized and will be presented at the Great Lakes Pharmacy Residency Conference.

CONCLUSIONS: Conclusions are being finalized and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the role of IV nitroglycerin in the management of AFHS.
List monitoring parameters used to assess a patient's response to a loop diuretic.

Self Assessment Questions:

What is the treatment of choice for patients exhibiting signs and symptoms of severe volume overload AHFS?

- A) High-dose furosemide in combination with low-dose IV nitroglycerin.
- B) Low-dose furosemide in combination with aggressive, high-dose IV nitroglycerin.

True/False: There are well-designed, randomized controlled trials supporting the use and appropriate dosing of loop diuretics in patients with AHFS.

THE EFFECTIVENESS OF TRAZODONE AS A SLEEP AID IN ELDERLY HOSPITALIZED PATIENTS

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Background: Older individuals have different sleeping patterns when compared to their younger counterparts, spending less time in deep sleep (slow wave sleep) and more time in light sleep. They have a higher incidence of neurological disorders (e.g. Alzheimer's disease, Parkinson's disease, dementia and stroke), and medications (such as corticosteroids, diuretics, SSRIs and stimulants) which can contribute to sleep pattern alterations. These patients often require pharmacologic treatment to help them get to sleep and stay asleep, especially when they are admitted to the hospital. These medications include: alprazolam, clonazepam, lorazepam, temazepam, zolpidem and trazodone. Although low dose trazodone is commonly used as a sleep aid in the elderly, there is minimal evidence to support its use.

Purpose: To assess the efficacy of trazodone 25mg and 50mg as a sleep-aid for elderly inpatients, compare the efficacy of trazodone to zolpidem 5mg and temazepam 15mg, and compare the incidence of adverse reactions.

Methods: About 30 elderly patients (over 65 years old) started on trazodone at 25mg or 50mg at bedtime were surveyed using an adapted version of the Leeds Sleep Questionnaire (which is a standardized sleep questionnaire that analyzes various facets of sleep) to analyze the efficacy of sleep with trazodone. In addition, information on the patient's sleeping environment was collected. Adverse effects were assessed for the first 2 days after starting the medication and included daytime sleepiness and falls. Daytime sleepiness will be assessed using the adapted Leeds Sleep Questionnaire. Information on falls was obtained from the patient's chart. This same process was used in about 30 other patients started on zolpidem 5mg and temazepam 15mg. Sleep efficacy and risk of falls with trazodone 25mg and 50mg was compared to zolpidem 5mg and temazepam 15mg.

Results and Conclusions: Data collection currently in process and will be presented at the conference.

Learning Objectives:

Describe the efficacy of trazodone 25mg and 50mg vs. zolpidem 5mg and temazepam 15mg as a sleep aid in elderly inpatients.

Describe the adverse effects associated with these medications in elderly inpatients.

Self Assessment Questions:

True/False: Daytime sleepiness is something that needs to be monitored for the next day in elderly inpatients started on trazodone 25 or 50mg or temazepam 15mg.

Medications which can disrupt the amount and quality of sleep for elderly inpatients include:

- a. Furosemide
- b. Prednisone
- c. Temazepam
- d. All of the above
- e. None of the above

ESTABLISHING A POTENCY RATIO WHEN CONVERTING TO AND FROM ORAL METHADONE IN CHRONIC PAIN PATIENTS

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Purpose: While data exists to provide guidance when converting from opioids to oral methadone, there is little evidence to provide guidance when converting from oral methadone to other opioids. The objectives of this study are to answer the following questions: (1) What is the potency ratio when converting from oral methadone to other opioids? (2) What is the potency ratio when converting to methadone from another opioid in chronic pain patients? (3) How does the Akron General Medical Center (AGMC) Pain and Palliative Care Program opioid to methadone initial conversion ratio compare to the ratio once patients are on an equivalent dose?

Methods: This retrospective chart review of patients managed by the AGMC Pain and Palliative Care Program, was submitted to and approved by the Institutional Research Review Board. Patients were required to be enrolled in the program between July 2000 and August 2007, and switched from oral methadone to another opioid, or an opioid to oral methadone, to be included in the study. Patients discharged from the program on a methadone taper without follow-up, and patients with insufficient follow-up data were excluded from the study. The following data has been collected: patient age and sex, source of pain, reason for switching therapy, medication dose and frequency before and after switching, breakthrough pain medication dose and frequency before and after switching, number of visits and actual days until the patient is considered stable, and patient pain scores. Two study investigators verified each patient chart for eligibility. Patients were determined to have equal levels of analgesia once their pain score after switching therapies was equal to or better than the pain score prior to switching medications.

Results and conclusions will be presented at the meeting

Learning Objectives:

Review the pharmacology of methadone and its indications for use.

Discuss the benefits of using methadone over other opioids.

Self Assessment Questions:

How does the mechanism of action for methadone differ from other opioids?

What are two benefits of using methadone over other opioids?