INCIDENCE AND OUTCOMES OF PATIENTS WITH METABOLIC ACIDOSIS TREATED WITH SODIUM BICARBONATE

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Metabolic acidosis commonly occurs in patients who are critically ill as a result of four different mechanisms: loss of bicarbonate, gain of hydrogen ions, failure to excrete daily acid load and dilution of extracellular bicarbonate. Metabolic acidosis has been associated with impaired cellular functions as well as end organ failure. Sodium bicarbonate is a drug that has been used for decades and has been shown to effectively raise the arterial pH. It has been assumed that correcting the arterial pH may prevent end organ failure and possibly improve survival. Nevertheless, despite the widely accepted use of intravenous sodium bicarbonate in the clinical settings, no study has been conducted to determine whether it improves patient survival. Therefore, the purpose of this study is to 1) characterize the pattern of intravenous sodium bicarbonate use in critically ill patients with concurrent metabolic acidosis, 2) determine how well patients respond to the treatment.

Methods include generation of a list of patients who received intravenous sodium bicarbonate between January 01, 2003 and January 30, 2004, from the hospital pharmacy dispensing record. A retrospective review will then be conducted on the eligible patients, who received intravenous sodium bicarbonate via push . Data will be collected from the existing medical charts which includes: demographic information, past medical information, concomitant medications, diagnoses, vital signs, laboratory values and cultures, hemodynamic parameters, cumulative sodium bicarbonate dose and APACHE II score. All parametric and non-parametric data will be expressed as mean ± standard deviation. Results will be analyzed and presented at the Great Lake Conference.

Learning Objectives:

To determine the clinical response and outcomes of patients who received intravenously sodium bicarbonate for the treatment of metabolic acidosis.

To identify the mortality rate in ICU patients with metabolic acidosis who received intravenous sodium bicarbonate.

Self Assessment Questions:

True or False: Patients with metabolic acidosis and high lactic acid levels have poor outcomes despite the administration of sodium bicarbonate.

True or False: Correcting the arterial pH increases the survival of critically ill patients who present with metabolic acidosis

EVALUATION OF THE SECONDARY PREVENTION OF MYOCARDIAL INFARCTION IN PATIENTS WITH CORONARY ARTERY DISEASE AND HYPERLIPIDEMIA IN A UNIVERSITY HOSPITAL SETTING

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Objective: To ensure that the current approach to secondary prevention of myocardial infarction in patients with coronary artery disease (CAD) at The University Hospital adheres to the American Heart Association (AHA)/American College of Cardiology (ACC) guidelines. Methods: A single center, retrospective study of 129 patients discharged from The University Hospital between January 1, 2003 and September 30, 2003 with a primary diagnosis of Acute Myocardial Infarction (AMI) and secondary diagnoses of CAD and hyperlipidemia. Discharge medications were reviewed to evaluate if patients were prescribed the four AHA/ACC guideline recommended medications: an antiplatelet agent, an Angiotensin Converting Enzyme (ACE) Inhibitor, a ß-blocker, and a 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) Reductase Inhibitor. Results: Sixty-three patients (48.8%) were not prescribed at least one of the four medications recommended by the AHA/ACC for secondary prevention of MI. Of these 63 patients, only 10 patients (15.9%) had a documented contraindication to one of the AHA/ACC recommended medications. One hundred twenty seven patients (98.4%) were prescribed aspirin or another antiplatelet agent. Ninety patients (69.8%) were discharged home on an ACE-Inhibitor. One hundred seventeen patients (90.6%) were prescribed a ß-blocker upon discharge. One hundred nineteen patients (92.3%) were prescribed an HMG-CoA Reductase Inhibitor. Conclusions: Despite the nationally recognized guidelines developed for the secondary prevention of MI and death in CAD patients, a large number of patients were not prescribed at least one of the four recommended medications upon discharge. ACE-Inhibitors were the agents omitted most upon discharge.

Learning Objectives:

Identify risk factors for developing coronary artery disease.

Identify the four recommended classes of medications that should be prescribed to each MI patient.

Self Assessment Questions:

Why is the identification and aggressive management of CAD risk factors important?

What medication did the study find was not being prescribed as often as the other medications?

RISK OF HYPONATREMIA IN PATIENTS TREATED WITH SELECTIVE SEROTONIN RE-UPTAKE INHIBITORS

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The use of SSRI's has increased greatly in recent years, and health care experts frequently consider SSRI's to be the first-line of treatment for depressed patients. These agents are preferred due to the lack of anti-cholinergic side effects, urinary hesitancy, cardiotoxicity, and/or postural hypotension that are linked with other antidepressants. However, even with the popular increase in the use of SSRI's, there are reports of SSRI-induced hyponatremia. Patients with hyponatremia may be asymptomatic or present with nausea, anorexia, muscle cramps, weakness, fatigue, confusion, and disorientation. Severe hyponatremia may result in serious neurologic sequelae, such as coma, seizures, and or death. Serum sodium levels should be checked periodically in all patients soon after they start taking any SSRI, especially during the first 2 to 4 weeks of treatment.

The primary objective is to assess the association of hyponatremia with selective serotonin reuptake inhibitors (SSRI's) at the North Chicago VA (NCVA). The secondary objectives of this project are to assess and compare baseline serum sodium levels with sodium levels during SSRI therapy, to assess and determine if monitoring parameters for hyponatremia are necessary for patients receiving SSRI therapy at the NCVA, to assess the relation between age, sex, and the risk of SSRI-induced hyponatremia, and to determine if selected SSRI's are associated with a greater incidence of hyponatremia.

Data from this retrospective study will be obtained from 100 outpatients that are being treated or have been treated with SSRI therapy in the last five years. Patients that will be excluded from the study are those that receive concomitant medications that decrease serum sodium levels, and those with a diagnosis of schizophrenia or schizoaffective disorder.

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

Learning Objectives:

Identify the clinical manifestations of SSRI-induced hyponatremia

Identify appropriate monitoring parameters of serum electrolyte levels after the initiation of SSRI therapy.

Self Assessment Questions:

Patients with hyponatremia may be asymptomatic or present with nausea, anorexia, muscle cramps, weakness, fatigue, confusion, and disorientation. T/F

Serum sodium levels should be checked periodically in all patients soon after they start taking any SSRI, especially during the first 2 to 4 months of treatment. T/F

PHARMACIST MANAGED CONVERSION OF INTRAVENOUS TO ORAL ANTIBIOTICS FOR COMMUNITY ACQUIRED PNEUMONIA

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Background: Community acquired pneumonia is the sixth leading cause of death in the United States. Each hospitalized episode incurs a cost of approximately seventy-five hundred dollars. There are many studies published showing the benefits of performing a conversion of intravenous to oral antibiotics including reducing length of stay and cost associated with unnecessary intravenous antibiotic therapy.

Our primary objective is to reduce the duration of unnecessary intravenous antibiotic use for community acquired pneumonia by one day.

Methods: We plan to utilize both retrospective and prospective data on the duration of the intravenous antibiotic use, duration of unnecessary intravenous antibiotic use, length of stay and physician refusal reasons. Interventions in the prospective group will include educational sessions and active pharmacy recommendations. Statistical analysis will be performed using the Student's t-test and Chi square. To achieve statistical significance, seventy-five patients must be enrolled to detect a one-day reduction of the use of unnecessary intravenous antibiotics.

Preliminary Results: Based on an evaluation of historical controls, the duration of unnecessary intravenous antibiotic use is 3.15±2.67 days, an average length of stay of 6.13 days, and the duration of intravenous antibiotic therapy is 4.48 days.

Conclusions: Yet to be determined

Learning Objectives:

Discussion of empiric treatment regimens for community acquired pneumonia

Describe the role of a pharmacist in the management of community acquired pneumonia

Self Assessment Questions:

What are the most common organisms encountered in community acquired pneumonia?

What criteria need to be met before converting a patient from intravenous to oral antibiotic therapy?

A QUALITY IMPROVEMENT INITIATIVE FOR EPOPROSTENOL (FLOLAN®) AND BOSENTAN (TRACLEER®) DISPENSING IN A TERTIARY ACADEMIC MEDICAL CENTER

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Background/Objective: Epoprostenol and bosentan are two medications that require patient enrollment in a special program with the distributors before patients can receive them. At The Ohio State University, no formal process exists for pharmacists to verify that patients are properly enrolled in the program or to enroll new patients in the programs. If patients are not properly enrolled, this can create significant financial and legal liabilities for the hospital. The objective of this study is to implement a quality improvement initiative for epoprostenol and bosentan dispensing using Deming's Plan, Do, Check, Act (PDCA) methodology.

Methods: Interviews were conducted with all pharmacy staff involved in the current epoprostenol and bosentan dispensing process, including the cardiology clinical specialist, cardiology specialty resident, floor pharmacist, and purchasing manager. A web search was conducted to determine other hospitals' dispensing procedures. Additionally, similar large academic medical centers were contacted to determine their procedure for dispensing epoprostenol and bosentan. A pre-implementation survey addressing knowledge of the enrollment and dispensing process was conducted to assess baseline knowledge of the pharmacy staff.

A "how to" guide will be created in addition to a pulmonary hypertension patient database. The database will include all patients on epoprostenol or bosentan and will be posted on the pharmacy intranet. These resources will be accessible to all pharmacists throughout the medical center. Additionally, an in-service will be performed to educate the staff regarding their role in ensuring proper dispensing of epoprostenol and bosentan. A post-implementation survey of pharmacy staff and database completion assessment will be conducted to determine if the change was effective.

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

Learning Objectives:

Understand that restrictions apply to epoprostenol and bosentan distribution.

Describe how the PDCA cycle can be used to improve the medication use system in any health system.

Self Assessment Questions:

Bosentan and epoprostenol can be ordered from and distributed by any wholesaler.
a.True
b.False

PDCA is an acronym for:
a.Percutaneous Dermal Coronary Angioplasty
b.Prepare, Document, Compile, Assume
c.Prepare, Designate, Collaborate, Associate
d.Plan, Do, Check, Act

EVALUATING THE EFFICACY AND SAFETY OF A SWITCH FROM SIMVASTATIN TO PRAVASTATIN WHILE TAKING CONCOMITANT NEFAZADONE.

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BACKGROUND:
A drug interaction has been described between simvastatin and nefazodone which results in elevated drug levels of simvastatin, placing patients at risk for developing adverse reactions. Pravastatin is similar to simvastatin, but lacks this drug/drug interaction. Patients who are on this combination will be switched from simvastatin to pravastatin. The study will evaluate what happens to cholesterol control when patients are switched. Study goals also include determining dosage equivalence between simvastatin and pravastatin, adverse drug monitoring, and change in pain scores using a validated symptom score.
METHODS:
This study will be an open label, non-randomized pilot study. A computerized search will identify patients who are taking simvastatin and nefazodone concomitantly. Primary care providers (PCP) and their patients will be contacted regarding the interaction and an offer to change simvastatin to pravastatin will be made. At the initial visit, written informed consent will be obtained; at that time the switch to pravastatin will be made. At initial and subsequent visits, fasting lipid profile (FLP), liver enzymes, CK levels, and the McGill Pain Questionnaire will be obtained. Follow-up appointments will be done every 4-6 weeks until LDL is at or below goal according to NCEP guidelines, or as directed by the PCP. A retrospective electronic and paper chart review of enrolled patients will be performed. The following information will be gathered before and after nefazodone addition to simvastatin: simvastatin dose, length of therapy, FLP, liver enzymes, CK levels, McGill Pain Questionnaire, and documented chart complaints of muscle related pain. Additional data including age, race, gender, and body mass index will also be collected. The same data will then be collected prospectively after the switch to pravastatin.
PRELIMINARY RESULTS:
This study is in the enrollment phase. Ten to twenty patients are expected to be enrolled; at this time five patients are enrolled.

Learning Objectives:

Describe the interaction between simvastatin and nefazadone.

Understand the clinical implications of concurrent use of simvastatin and nefazadone.

Self Assessment Questions:

The cytochrome P450 substrate responsible for the interaction between simvastatin and nefazadone is:
a) CYP1A2
b) CYP2C9
c) CYP2D6
d) CYP3A4

Concomitant use of simvastatin and nefazodone has been shown to increase simvastatin levels to 20 times higher than when simvastatin is used alone. (T/F)

EVALUATION OF A FEBRILE NEUTROPENIA ALGORITHM WITH RESPECT TO EMPIRICAL ANTIFUNGAL THERAPY IN ADULT HEMATOLOGY/ONCOLOGY PATIENTS

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Background: Profound and prolonged neutropenia following cancer chemotherapy or bone marrow transplantation is a major risk factor for invasive fungal infections (IFIs). The high rates of mortality associated with IFIs and the difficulty in diagnosis warrants the use of empirical antifungal therapy (EAT). Conventional amphotericin B (CAB) is considered to be the standard of care in persistently febrile neutropenic patients. However, infusion-related reactions and nephrotoxicity limit its use. Although liposomal amphotericin B (LAMB) has demonstrated similar efficacy to CAB and is generally better tolerated, it is associated with a high acquisition cost. Voriconazole, a new second-generation azole antifungal, is a potential alternative for empirical therapy of IFIs. An algorithm for the management of febrile neutropenia (FN) was implemented at the University of Michigan Hospitals and Health Centers (UMHHC) on January 1st, 2003. The new algorithm recommends voriconazole as an alternative to LAMB in all adult hematology/oncology patients, except those patients with evidence of hepatic dysfunction or who are receiving gemtuzumab (Mylotarg®).
Objectives: Primary objective - To evaluate how the recently implemented algorithm for the treatment of FN is being applied throughout UMHHC, specifically with respect to EAT. Secondary objectives – To compare the safety, effectiveness, and cost of voriconazole with that of LAMB for the empirical treatment of FN in adult hematology/oncology patients.
Methods: This is a single center, retrospective chart review. Patients who received LAMB prior to implementation of the FN algorithm and patients who received either LAMB or voriconazole subsequent to implementation will be identified. The clinical and economic outcomes of the two groups will then be compared. Patients will not be included in the review if they have a documented IFI at the time of the admission during which LAMB or voriconazole is received or within 24 hours of receiving EAT.
Results: Data collection is in progress. Results will be presented.

Learning Objectives:

To describe the current standard of practice as it relates to the use of empirical antifungal therapy in patients with febrile neutropenia (FN).

To understand the potential clinical and economic impact of incorporating voriconazole into the FN treatment guidelines based on a single institution's experience.

Self Assessment Questions:

The primary benefit(s) of voriconazole over liposomal amphotericin B (LAMB) when used as empirical antifungal therapy in the setting of febrile neutropenia (FN), is/are as follows:

a. Voriconazole is less expensive.
b. Voriconazole demonstrates broader antifungal activity.
c. Voriconazole is not associated with infusion-related reactions.
d. All of the above

Which of the following accurately summarizes the results from the major trial comparing voriconazole to LAMB as empirical treatment in the setting of FN?

a. Voriconazole was shown to be equivalent to LAMB based on the stratified composite outcome.
b. Voriconazole was not shown to be non-inferior to LAMB based on the stratified composite outcome.
c. Voriconazole was associated with significantly fewer breakthrough fungal infections as compared to LAMB.
d. (b) and (c)

MEDICATION ERROR PREVENTION USING BEDSIDE BAR CODE SCANNING TECHNOLOGY

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The results of the 1999 IOM report have indicated that as many as 7,000 deaths per year occur due to medication errors. In an attempt to improve the medication use process, barcode technology has been implemented in the hospital setting to provide another check in the medication administration process.

The purpose of this project was to track medication errors prevented by using a bedside bar code scanning system in the hospital setting and identify possible areas for improvement in the medication use process. This was accomplished through a retrospective review using medication error reports generated through the MedPoint" (Bridge Medical, Inc) barcode scanning system. All error messages generated were filtered, categorized and investigated by reviewing patient medication administration records and physician orders to substantiate that a medication error was prevented.

Possible medication errors data was collected for a six week time period. A total of 1,125 possible medication errors for "wrong patient" or "no order in system" were alerted to the users of the Medpoint bar code scanning system. Through chart review, 42% of possible medication errors were determined to have been medication errors prevented by the use of the bedside bar code scanning system. Insulin, maintenance intravenous fluids, opiates, and intravenous antibiotics were the most frequent medications involved in possible errors that were prevented.

Bar code scanning systems enhance patient safety and are useful in identifying and preventing possible medication administration errors. Prevented medication error data obtained from bedside bar code scanning systems should be interpreted cautiously and used as a means to improve the medication use process.

Learning Objectives:

To define how bedside barcode scanning systems can be used to prevent medication errors.

To identify how barcode technology can be used to improve the medication administration process.

Self Assessment Questions:

Bedside barcode scanning systems can do which of the following:
a. Enhance patient safety
b. Automate error reporting
c. Identify medications that are a risk for administration errors
d. All of the above

Barcode technology's limitations prevent it from being used in medication use process improvement
a. True
b. False

THE DEVELOPMENT OF A WEB-BASED DRUG INFORMATION DATABASE

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Introduction

A web-based application is being developed that is capable of electronic documentation, audit, cataloging and retrieval of pharmacist and pharmacy resident responses to drug information questions.

A pharmacist, or pharmacy resident, enters the content of a drug information consultation, including both question and answer, into the application. To ensure the content and accuracy of the question and answer there is a verification step. After verification, the submission is catalogued for future reference. Pharmacists can search for and retrieve previously verified submissions. Reports can be generated to help assess staff competence in providing drug information responses and objectively assess departmental impact of this application.

Purpose

The purpose of this study is to develop and implement the drug information database application, conduct a one-month pilot, and then assess the impact it has had on the department.

Methods

This study will include a survey sent out to the pharmacists to assess their perception of the database. In addition, reports will be generated to objectively assess the impact of this application. From these data, we will formulate a plan for further development and implementation.

Results

The process of development and implementation will be presented, along with obstacles and challenges encountered. In addition, departmental impact of the database will be detailed. This will include results of the pharmacist survey, data from the reports generated by the database, revisions of department policy, plans for future change and departmental implications.

Conclusion

This new application provides a tool to ensure the quality of drug information consultations provided in the increasingly complex environment of an academic medical center. In addition, the database helps meet ASHP accreditation standards.

Learning Objectives:

To identify the benefits of having a centralized drug information database that is accessible via the Internet

To recognize obstacles in the development and implementation of an electronic drug information database specific to a particular institution

Self Assessment Questions:

ASHP accreditation standards require that a system be in place to ensure the quality and content of drug information consultations provided by both pharmacists and pharmacy residents. True False

Experience in development and implementation of electronic drug information databases in tertiary academic medical centers is well detailed in the literature.
True False

HOSPITAL PHARMACY COST SAVINGS INITIATIVE

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Introduction: Rising drug costs and decreasing reimbursement have forced healthcare organizations to streamline practice to relieve budgetary strains. Froedtert Hospital Department of Pharmacy (DOP) has self-managed ongoing cost savings initiatives (CSI) for several years. Past CSI success has lead senior administration to entrust the continued management, exploration and expansion of these initiatives to the DOP.
Purpose: Develop and implement a systematic, structured approach to help identify, organize, prioritize and expedite the implementation and tracking of CSI.
Methods: Potential CSI were identified from departmental management and staff ideas, a review of the current literature, and recommendations from our purchasing group. The CSI implementation process included development of a standard electronic template. Initiatives were entered into the template to provide background information, potential cost savings, and timelines with defined endpoints. Proposed CSI were then reviewed to help select and prioritize target initiatives. The overall identification and implementation process was tracked by maintaining a CSI master spreadsheet. Entries on this spreadsheet included a brief overview of each initiative which facilitated communication between management and staff in conjunction with weekly meetings.
Results: Over 30 potential CSI were identified and classified as operational/purchasing or clinical in nature. Five of the clinical CSI have been implemented at this time while several more are in process. Annualized data for cost savings realized with these implemented CSI is pending.
Conclusion: Utilization of a systematic, structured approach for the identification, implementation and tracking of CSI has enhanced our efforts to reduce expenditures. Future directions may include development of a standardized self-evaluation tool. Hospital pharmacy managers might then utilize this tool to determine if the CSI identified in this project could be implemented at their institutions.

Learning Objectives:

Describe the potential benefits of utilizing an electronic template to provide structure and a systematic approach to cost saving initiative implementation.

Describe cost saving initiatives that were identified at Froedtert Hospital and may be applicable to other institutions.

Self Assessment Questions:

True or False - Rising drug costs and decreasing reimbursement have forced healthcare organizations to hire additional pharmacists.

True or False - Utilization of a systematic, structured approach for the identification, implementation and tracking of cost saving initiatives may enhance efforts to reduce expenditures.

RACIAL DISPARITY IN THE PRESCRIPTION OF DEPOT ANTIPSYCHOTIC MEDICATIONS

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Background and Purpose: Several studies have shown that African-American schizophrenic patients are more likely to be prescribed a long-acting depot antipsychotic than Caucasian patients. This study proposes to determine if differences in predictors of medication compliance can account for this racial disparity in depot prescribing patterns. Numerous predictors of medication non-compliance have been identified. Two factors that have consistently been shown to be predictors of medication non-compliance in schizophrenic patients are homelessness and substance abuse co-morbidity.

Research Design/Methodology: The working hypothesis for this study is that racial disparity in depot antipsychotic prescribing can be accounted for by differences in predictors of medication non-compliance (i.e., homelessness and substance abuse co-morbidity) between African and Caucasian American schizophrenic patients. The study will be conducted as a retrospective chart review of all patients with a diagnosis of either schizophrenia or schizoaffective disorder that were provided with outpatient mental health services within VISN 12 of the Veteran's Affairs Health Care System in 2003. Data collected for this project will be subjected to statistical analysis with a 2x2x2x2 Analysis of Variance (ANOVA). The dependent variable will be Route of Administration . The independent variables will be Race, Homelessness and Substance Abuse Co-morbidity.

Results: Data collection is pending.

Learning Objectives:

To determine if factors other than race can explain why African American schizophrenic patients are more likely than Caucasian patients to be prescribed a depot antipsychotic.

To establish a basis for developing psychosocial intervention strategies for improving medication compliance amongst African American schizophrenic patients at the Zablocki Veterans Affairs Medical Center.

Self Assessment Questions:

Which of the following factors are known to be predictors of a medication compliance:
1.Homelessness
2.Medication Side Effects
3.Substance Abuse Co-morbidity
4.1 and 3 above
5. All of the above

True or False. Schizophrenic patients are more likely to be non-compliant with their medications than patients being treated for non-Psychiatric illnesses.

A PROSPECTIVE ANALYSIS OF INTRAVENOUS AMIODARONE DOSING TECHNIQUES TO TREAT ATRIAL FIBRILLATION IN AN ACUTE TERTIARY CARE SETTING

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Amiodarone is considered a "broad spectrum" antiarrhythmic agent used to treat both atrial and ventricular arrhythmias. Atrial fibrillation (AF), the most prevalent heart rhythm disorder in the United States is associated with an increased risk of morbidity and mortality. Riverside Methodist Hospital has experienced an influx of patients being transferred into the Coronary Care Unit to administer boluses of intravenous (IV) Amiodarone to treat AF. There has also been an escalating concern with the serious adverse effects associated with its administration. Several studies have evaluated Amiodarone in the treatment of AF. However, there is not considerable evidence evaluating the various IV Amiodarone administration methods in improving clinical outcomes and converting patients to normal sinus rhythm. The present study was designed to assess the impact of various IV Amiodarone dosing regimens, adverse effects, and the time it takes to convert AF patients to normal sinus rhythm.

Patients were studied prospectively via a daily chart review until discharge. The study population was identified by the HBOC pharmacy information system and the clinical pharmacy staff. Patients included in the study were admitted to the hospital with recurrent, paroxysmal, resistant, or new onset AF. Recent post cardiac surgery patients were excluded due to the fact that a current hospital protocol already exists to treat AF in this population. The primary end point is to identify the different IV Amiodarone dosing strategies, the amount of time it took to convert to normal sinus rhythm, and the safety and efficacy associated with its administration. More specifically hemodynamic instability, thyroid function, liver function tests, and QTc intervals were assessed.

The final results and educational data from this analysis will be presented at the Great Lakes Residency Conference.

Learning Objectives:

To be able to effectively determine the populations in which Amiodarone should be used to treat AF.

Recognize the adverse effects and risks associated with IV Amiodarone administration.

Self Assessment Questions:

IV Amiodarone administration is associated with hemodynamic instability? (T / F)

Consensus guidelines exist for the proper dosing and administration of IV Amiodarone in AF? (T / F)

EVALUATION OF DRUG INFORMATION RESOURCES IN EMERGENCY DEPARTMENTS

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Introduction: Up-to date drug information is essential for optimal patient care. It is unclear what resources are available for use by staff in hospital emergency departments (ED).

Background: Drug-related events are a common cause of patient visits to EDs. A recent analysis showed that as many as 28% of all ED visits were drug-related. It is estimated that 8.6 to 24% of patients with a drug-related event require hospital admission. In addition, the ever-changing drug market has made keeping up with the latest information a challenge for physicians and nurses. There is limited biomedical literature evaluating the sources of drug information in EDs. The majority of these evaluate the impact of ED poison information resources on poison control centers. Therefore, we decided to conduct a survey to identify and evaluate drug information resources available in EDs.

Methodology: Directors of various EDs nationwide will be sent a 38-item questionnaire requesting information regarding ED demographics, pharmacy services, and available drug information resources. The survey consists of multiple choice, fill-in-the-blank, and short answer questions. Participation is voluntary. Participants are not required to identify him/her self or their institution.

Results: The answers to the completed surveys will be tabulated. The sources of drug information available in EDs will be identified and ED staff and physician satisfaction with these resources will be assessed.

Conclusions: The results of this survey should provide insight into the sources of drug information available in EDs. Options for improving drug information in EDs will be identified.

Learning Objectives:

Identify the sources of drug information available in EDs.

Assess ED staff and physician satisfaction with current available drug information resources.

Self Assessment Questions:

Identify some similarities and differences in the drug information resources available in various EDs.

Assess the degree of physician satisfaction with the drug information resources available in an ED.

EVALUATING THE IMPLICATIONS OF ADDING A LONG ACTING ATYPICAL ANTIPSYCHOTIC TO THE FORMULARY OF AN INPATIENT UNIVERSITY HOSPITAL

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Purpose:
Atypical antipsychotics are the treatment of choice for many types of psychotic and mood disorders. Despite their better efficacy and improved side effect profile, noncompliance remains a serious problem. Currently long acting parenteral forms of conventional agents have been used where noncompliance leads to recidivism or significant morbidity.

Recently, Risperdal® has become available in a parenteral long acting formulation. Its unique pharmacokinetic profile produces steady state concentrations only after two biweekly injections and concurrent oral treatment. The costs associated with these injections and continuous oral therapy during this 3-4 week period comes at a significantly greater cost. Preliminary results suggest that this formulation carries with it the benefits of atypical antipsychotics in a formulation that improves compliance, which appears to lead to significantly better outcome. Currently reimbursement for this formulation has yet to be determined.

This study is aimed at determining the costs associated with inpatient utilization of long acting conventional antipsychotics. This analysis will assess the potential costs associated with using Risperdal® Consta™ in an inpatient setting.

Methods:
Inpatients that received fluphenazine decanoate or haloperidol decanoate between the dates of 1/1/2002-12/31/2003 were identified through billing. Demographic information was collected regarding age, gender, and diagnosis. Data was collected to determine if patients were initiated or maintained on either decanoate formulation and concurrent adjunctive medications.

Results:
Two hundred eight patients received haloperidol decanoate and seventy patients received fluphenazine decanoate during the specified dates. Preliminary results have shown that the majority of patients receiving the long acting conventional antipsychotics were concurrently receiving additional medications such as oral atypical and conventional antipsychotics, as well as antimuscarinic agents, and beta-blockers for associated side effects.

Conclusion:
A conservative estimate of adding Risperdal® Consta™ to the formulary was projected to be $30,000 additionally each year. Alternatives to offset these costs will be presented.

Learning Objectives:

To identify the recent utilization and cost of long acting conventional antipsychotics

Assess the impact of adding Risperdal® Consta™ to the formulary and evaluate alternatives to offset these cost

Self Assessment Questions:

What type of formulation is Risperdal® Consta™?
a.Decanoate
b.Hydrochloride
c.Microspheres
d.Enanthane

How long does it take Risperdal® Consta™ to reach steady state?
a.2 weeks
b.1 month
c.2 months
d.4 months

ECONOMIC EVALUATION AND APPROPRIATENESS OF GASTROINTESTINAL (GI) STRESS ULCER PROPHYLAXIS WITH PANTOPRAZOLE IN MEDICALLY ILL PATIENTS

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Acid-suppressive medications are commonly prescribed in hospitalized patients, but little is known about their appropriateness in medically ill patients. Guidelines have been established by ASHP for stress ulcer prophylaxis and they do not recommend stress ulcer prophylaxis for adult-patients in non-ICU patient setting without underlying risk factors. The aim of this study is to evaluate the appropriateness of stress ulcer prophylaxis at Rush University Medical Center. In addition the assessment of economic impact of stress ulcer prophylaxis associated to the department of pharmacy as well as the medical center. This will be a retrospective review of 500 patients in general medical ward receiving stress ulcer prophylaxis during their inpatient stay. Patients charts were reviewed from October 2003 to February 2004 and data will be reviewed at 1 month and 4 months. Inclusion criteria include patients on oral pantoprazole in medical wards. Exclusion criteria include peptic ulcer disease, severe GERD, or any other condition requiring chronic use of acid-suppressive therapy. Results: Appropriate oral pantropazole prescribed in 67/462 (15%) of patients. 85% of patients were inappropriately prescribed GI stress ulcer prophylaxis and 98/462 (21%) of patients had discharge prescriptions for pantoprazole. 40/462 (8%) of patients were inappropriately discharged on pantoprazole. Consequently, patients who receive GI stress ulcer prophylaxis during their hospital admission not only result in unnecessary expense to the medical center but to the patient as well. Often times patients are discharged with an unnecessary prescription for a proton pump inhibitor.

Learning Objectives:

Discuss the current guidelines and risk factors for GI stress ulcer prophylaxis

Discuss the financial implications of using oral pantoprazole for GI stres ulcer prophylaxis in medically ill patients

Self Assessment Questions:

What percentage of cost would have been saved by not using any GI stress ulcer prophylaxis

Stress ulcer prophylaxis in indicated in patients using steroids and NSAIDS. T/F

IMPACT OF A STRATIFIED INTERVENTION TO IMPROVE THE QUALITY OF DIABETES CARE IN A MANAGED CARE POPULATION.

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Purpose: Less than five percent of patients with diabetes receive the level of care recommended by the American Diabetes Association (ADA) clinical guidelines. Annual guideline changes lead to significant challenges in keeping healthcare professionals aware of the most recent clinical recommendations. Healthcare utilization costs may be lower in patients who receive the most contemporary care for their diabetes. This study will attempt to determine if an intervention by medical personnel will increase the number of patients with diabetes receiving care recommended by the ADA guidelines and result in less cost.

Methods: As part of a diabetes disease management program offered through a local health maintenance organization educational mailings on ADA guidelines and diabetes complications were sent to physicans and patients. A representative chart review was performed in two subsets, one served as the intervention and the other the control group, of these patients to evaluate current ADA guideline compliance. The primary care providers of the intervention group received two educational sessions on ADA guidelines, complications of diabetes, and computerized patient tracking software that gave reports on guideline compliance. Intervention group patients were monitored by the software, and were invited to attend one educational session about diabetes and its complications. The evaluation of provider and patient knowledge of diabetes by a quiz and changes in cost of care through resource utilization review were performed prior to and three months after the intervention. There were no additional interventions in the control group.

Results: Provider enrollment and data collection are currently ongoing. Baseline chart review data demonstrated 32% versus 43% compliance with the ADA guidelines (p=0.4652) in the intervention and control groups, respectively. Providers scored a baseline average of 73.4% on the knowledge quiz.

Conclusion: Data collection and analysis is anticipated to be complete by April 2004. Further results and analysis will follow.

Learning Objectives:

Become familiar with the recommendations from the ADA guidelines.

Describe the effects of medical personnel intervention with providers and patients on attainment of the recommendations from the ADA guidelines.

Self Assessment Questions:

Patients with Diabetes have a goal HbA1c of <7.5%. T F

Patients with Diabetes should be counseled on the need to have their physician check their feet once a year? T F

EVALUATION OF THE PRESCRIBING PATTERNS AND AVOIDANCE OF ADVERSE EFFECTS ASSOCIATED WITH THE CONTINUATION OF HOME MEDICATIONS IN THE INTENSIVE CARE UNIT

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Patients are often emergently admitted to the intensive care units (ICU) and treated for their primary diagnosis; however, chronic conditions are frequently overlooked and home medications are not promptly re-instituted. Complications related to this practice include resurfacing of symptoms associated with the chronic condition and withdrawal of home medications. Ultimately, these complications could lead to increased morbidity and length of stay. As a result, the role of a pharmacist on a multidisciplinary healthcare team could greatly influence prescribing patterns and have a positive impact on patient outcomes.

This retrospective chart review looked at patients admitted to the Medical and Surgical Intensive Care units at The University Hospital of Cincinnati. Data was collected over a seven-month period beginning November 1, 2003 through May 30, 2004. Specific parameters that were identified and studied during each patient's hospital course were condensed to patients with preexisting cardiovascular and central nervous system histories. All patients being treated with past medical histories related to one of these categories was included into the analysis. Cardiovascular past medical histories including hypertension, congestive heart failure, and arrhythmias were included and monitored for heart rate, blood pressure, diuretic use, new onset arrhythmias, and the requirement PRN medications to control the underlying disease. Admission to the ICU with a history of using central nervous system medications was also monitored for HR, BP, the need for sedation, as well as the need for PRN sedatives.

The primary outcome assessed in this project is the effect a pharmacist has at preventing the delayed reinstitution of home medications on patients admitted to the Intensive Care Unit. Outcomes were measured by comparing the number of observed complications with the time required to restart medications; additionally, length of ICU stay was used to evaluate the impact of these practices.

Learning Objectives:

Demonstrate the importance of past medical histories and continuation of home medications.

Evaluate the role a pharmacist has on the reinstitution of home medications.

Self Assessment Questions:

It is not necessary to continue antihypertensive medications when a patient has been admitted for community acquired pneumonia. T or F

Patients on antidepressants at home often require more sedation in the ICU if not continued on their home medication upon admission. T or F

OUTCOME OF PATIENTS RECEIVING PIPERCILLIN/TAZOBACTAM VERSUS CARBAPENEMS FOR TREATMENT OF EXTENDED SPECTRUM BETA-LACTAMASE (ESBL)-PRODUCING ENTEROBACTERIACEAE SPP. INFECTIONS

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Isolates harboring extended-spectrum beta-lactamase (ESBL) enzymes are considered resistant to all penicillins, cephaolsporins and aztreonam, posing a therapeutic dilemma. The optimal treatment of infections caused by ESBL-producing bacteria is controversial, as no randomized trials have been performed to assess the most appropriate therapy. Recommendations for appropriate therapy are currently based on in vitro studies and observational data. The purpose of this study was to compare the clinical and microbial outcomes of patients with ESBL-producing Enterobacteraceae infections receiving pipercillin/tazobactam or carbapenem (imipenem or meropenem) therapy.

This was a retrospective review of the medical record. Patients with cultures positive for ESBL-producing Enterobacteraceae were identified via microbiology reports from January 1, 2001 through January 31, 2004. Charts and pharmacy records for patients with infections caused by ESBL-producing bacteria were retrospectively reviewed to assess antimicrobial therapy, clinical outcome, microbial outcome and risk factors associated with ESBL-producing Enterobacteraceae infections. Patients were included in analysis if they had a positive culture for ESBL-producing Enterobacteraceae, signs and symptoms of infection, received a minimum of 48 hours of pipercillin/tazobactam or a carbapenem and received treatment for the ESBL infection within 5 days of the positive culture. Patients were excluded if they had a polymicrobial infection or were receiving pipercillin/tazobactam for > 72 hours prior to a positive culture. Clinical and microbial outcomes will be compared using statistical analysis.

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

Learning Objectives:

Define ESBLs and describe their clinical importance.

Describe treatment options for treating ESBL infections.

Self Assessment Questions:

ESBLs are considered intrinsically resistant to which antimicrobials?

What are risk factors for acquiring ESBL infections?

MANAGEMENT OF HEPARIN-INDUCED THROMBOCYTOPENIA AT A MULTI-HOSPITAL HEALTH SYSTEM: EVALUATION OF ADHERENCE TO ESTABLISHED GUIDELINES AND IDENTIFICATION OF POSSIBLE RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF THROMBUS

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Introduction: Heparin-Induced Thrombocytopenia (HIT) is a devastating adverse effect that occurs in 2-3% of patients given heparin, with 30% to 75% of these patients developing thrombotic complications (HITT). However, it is suspected that many patients are being labeled as developing HIT who may not have the disorder. This would lead to the inappropriate use of expensive agents and the elimination of a reliable class of agents for anticoagulation/prophylaxis. In an effort to prevent the occurrence of inaccurate diagnoses and unnecessary exposure to agents with potentially serious adverse effects, guidelines were developed for the detection and treatment of HIT/HITT.

Development and/or the extension of venous thrombosis with recurrent pulmonary embolism are frequent in patients after the onset of HIT. However, risk factors for the development of thrombus associated with the diagnosis of HIT are poorly defined.

Objectives: Primary Objective - To evaluate adherence to established guidelines for the use of Direct Thrombin Inhibitors (DTI) for the management of heparin-induced thrombocytopenia at the Detroit Medical Center. Secondary Objective - To identify possible risk factors associated with the development of a thrombus secondary to the development of heparin-induced thrombocytopenia.

Methods: All patients admitted from June 1, 2002 through December 31, 2003 who received a Direct Thrombin Inhibitor at one or more of the Detroit Medical Center hospitals were included in a retrospective review. The following variables were collected from patient charts and evaluated for significance: race, age, sex, date of admission and discharge, date of initiation of DTI, dose route, frequency, diagnosis, APACHE II, reason for anticoagulation, concomitant disease states, medications, adverse event information and related medical management, baseline diagnostic and laboratory values, and vital signs. Patients receiving a DTI for any other reason than HIT/HITT were excluded from the study.

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

Learning Objectives:

Explain the significance of adherence to established DMC guidelines for use of Direct Thrombin Inhibitors - includes accurate determination of need, evaluation of appropriate drug selection, adherence to monitoring parameters, evaluation of incidences of adverse drug events, and appropriate documentation and follow-up for new diagnosis of heparin-induced thrombocytopenia.

Identify possible risk factors associated with the development of a thrombus secondary to the development of heparin-induced thrombocytopenia. These factors may include: hospital, age, gender, race, disease state and management, severity of disease, time to change to DTI, time of initiation of warfarin and discontinuation of DTI.

Self Assessment Questions:

T or F Adherence to established guidelines led to a decreased incidence of misdiagnosis and adverse drug events.

T or F Discontinuation of the DTI within five days of initiation of warfarin led to an increased incidence of thrombus development.

NESIRITIDE WASTE REDUCTION IN A HEALTHCARE SETTING

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Purpose: The purpose of this project is to decrease both inpatient and outpatient nesiritide wastage.

Background: Nesiritide is a new medication used for congestive heart failure (CHF) exacerbations unresponsive to diuretic and nitroglycerin / inotrope therapy. Due to current dosing recommendations, it has the potential to create a great deal of drug wastage. In the outpatient CHF clinic, this wastage may be due to sending a fully reconstituted bag of nesiritide instead of only the amount needed by the patient. Approximately 85% of drug sent to the outpatient CHF clinic is wasted. Inpatient wastage is also excessive due in part to nurses requisitioning duplicate bags of nesiritide as well as interpatient variability on duration of therapy.

Methods: Retrospective chart reviews were conducted to determine the baseline amount of nesiritide wastage in the inpatient and outpatient settings. A new nesiritide dispensing protocol was developed so that the bolus would be sent in a syringe instead of the nurses generating the bolus from the infusion bag. In the CHF clinic, a pre-printed orderset was created so that the prescriber could easily indicate if the infusion duration would be 4 hours or 6 hours. In addition, a dosing table was created with 10kg weight ranges to simplify dispensing. Under the new protocol, the volume to dispense would be based on the patient's weight range instead of sending a standard 250mL bag. In the inpatient units, the pre-printed orderset was modified to include a weight-based dosing table similar to that initiated in the CHF clinic. Standard nesiritide administration times of 10am and 10pm were created so that all infusions would automatically be sent on the standard schedule instead of by nurse request. Nesiritide wastage under the new protocol will be compared to the calculated baseline wastage.

Results and Conclusions: Pending

Learning Objectives:

To determine if changing to standard administration times can decrease nesiritide wastage.

To determine if sending a weight-based volume of nesiritide to the outpatient CHF clinic can reduce nesiritide wastage.

Self Assessment Questions:

Nesiritide can cure CHF. T/F

Decreasing nesiritide wastage does not matter since it is an inexpensive drug. T/F

SUCCESS RATES OF SMOKING CESSATION EFFORTS IN VETERANS AT THE CINCINNATI VAMC

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Introduction: Cigarette smoking is an activity prevalent in about 48 million Americans. Smoking can lead to many serious health consequences such as heart disease, cancer, stroke, and chronic obstructive pulmonary disease. However, nicotine dependence is oftentimes difficult to overcome. Studies have shown that smoking cessation efforts using pharmacologic agents and regular counseling are associated with increased smoking abstinence. It has also been reported that smoking is a habit seen in a higher percentage of the male veteran population than in a nonveteran male population. To address this issue, the Cincinnati Veterans Affairs Medical Center (VAMC) offers a smoking cessation program that consists of weekly group counseling sessions and treatment with nicotine replacement patches and/or Zyban (sustained-release bupropion). The primary objective of this study is to determine the success rates of veterans who participate in the Cincinnati VAMC's smoking cessation program. Our secondary analysis will examine whether smoking cessation rates can be predicted by level of dependence (Fagerstrom Score), the presence of co-morbid depression (Zung Depression Scale), and/or type of intervention.

Methods: We will conduct a retrospective chart review of the electronic medical records of 102 patients who enrolled in the Cincinnati VAMC's smoking cessation program from June 2000 to June 2003. Smoking abstinence will be determined by expired breath CO levels <6 ppm at 3 weeks. Other clinical data that will be extracted from the progress note include scores from the Fagerstrom Test for Nicotine Dependence and Zung Self-Rating Depression Scale, type of intervention used (nicotine patches vs. Zyban vs. Zyban plus nicotine patches), and other concurrent medications. Correlations between continuous measures and CO levels will be calculated as appropriate using the Pearson or Spearman correlation. Analysis of variance will be used to analyze differences in CO levels for categorical variables.

Results: Data is currently being collected.

Learning Objectives:

To understand the health benefits of smoking cessation.

To list treatment options available for smoking cessation.

Self Assessment Questions:

True or False. Smoking can lead to many serious health consequences such as heart disease, cancer, stroke, and chronic obstructive pulmonary disease.

True or False. Smoking cessation efforts using pharmacologic agents is not associated with increased smoking abstinence.

IDENTIFYING AND REDUCING SOURCES OF POTENTIAL ERROR FOLLOWING IMPLEMENTATION OF A POINT OF CARE BAR CODE MEDICATION ADMINISTRATION SCANNING SYSTEM.

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Point of care bar code medication administration technology has been identified as one solution to reduce medication administration errors. The potential benefit of this technology to make medication administration safer has resulted in proposed federal regulations mandating all pharmaceutical manufacturers package their products with standardized bar codes.

A point of care bar code system has been implemented house-wide and has dramatically reduced medication administration errors and improved nurses' satisfaction with the medication use process. With new technology, its impact on the work environment is often not fully appreciated until after the technology is implemented. New sources of error are being identified that were previously not detected.

The purpose of this project is to identify and eliminate new potential sources of error related to the point of care bar code system. A multidisciplinary team of pharmacists, physicians, nurses, and other health care professionals will work together to flowchart the medication use process, including medication purchasing, repackaging, preparation, distribution, administration, and monitoring. The team will then apply the Healthcare Failure Mode and Effects Analysis principles to select potential sources of error with the greatest likelihood and potential for patient harm, and implement changes to reduce or eliminate their occurrence. Measurement techniques will be identified and used to determine the effectiveness of the improvements, if deemed necessary. The task force will also create strategies to ensure that the improvements will be maintained. Results will be presented.

Learning Objectives:

Describe the potential benefits of implementing a point of care bar code medication administration technology in an acute care setting.

Identify three potential sources of error related to the use of point of care bar code medication administration technology.

Self Assessment Questions:

True or False: Reducing medication administration errors will allow other medication errors to become more apparent.

True or False: Healthcare Failure Mode and Effects Analysis is an adaptation of an engineering process to be used retrospectively to evaluate a system or new technology.

THE RELATIONSHIP BETWEEN RELATIVE ADRENAL INSUFFICIENCY AND THE CLINICAL RESPONSE OF VASOPRESSIN IN SEPTIC SHOCK

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Vasopressin is a nonapeptide hormone primarily synthesized in the supraoptic nuclei of hypothalamus and stored in the posterior pituitary as granules. Vasopressin is released in response to alteration of plasma osmolality or baroreflex response due to changes in blood pressure. The physiological effects at different receptor sites cause vasoconstriction, free water retention, and promote adrenocorticotropin releasing hormone (ACTH) releases. In critically ill patients, who are in septic shock, hypotension can be attributed to relative adrenal insufficiency. Relative adrenal insufficiency is impaired physiological response of the hypothalamus-pituitary-adrenal (HPA) axis. Therefore, due to this pathophysiology behind relative adrenal insufficiency, this study was designed to characterize the patients who have positive response to vasopressin therapy and to determine the relationship between vasopressin response and relative adrenal insufficiency in septic shock.

This study is a prospective, observational study, which was conducted at the University of Illinois at Chicago (UIMC). All patients >18 years of age, admitted to UIMC MICU and received vasopressin for further management of refractory hypotension were included. However, subjects with conditions known to cause primary and/or secondary adrenal insufficiency, active peripheral or mesenteric vascular disease or prior administration of arginine vasopressin, and pregnant women were excluded from the study. The data will be expressed in mean + standard deviation. Comparison of the clinical response of vasopressin in patients with or without relative adrenal insufficiency will be assessed using unpaired student's t-test.

The results and the conclusion of the study will be presented at the Great Lakes Conference in April.

Learning Objectives:

Characterize the patients who have positive response to vasopressin therapy.

Determine the relationship between vasopressin response and relative adrenal insufficiency.

Self Assessment Questions:

T/F: The major culprit of relative adrenal insufficiency in septic shock is the increased circulating inflammatory mediators.

T/F: Vasopressin is given at 0.4 units/min for refractory hypotension in septic shock.

EVALUATION OF PHYSICIAN COMPLIANCE WITH A COMMUNITY ACQUIRED PNEUMONIA (CAP) PRESCRIBING PATHWAY AT AN ACADEMIC MEDICAL CENTER

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Background: Clinical Decision Support tools such as clinical prescribing guidelines and pathways provide a peer-reviewed, evidence-based approach to improve patient outcomes while minimizing medication errors. Previous data shows that although a variety of professional organizations provide consensus guidelines of medical practice, overall adoption, implementation and sustained use are less than expected.

In January 2000, The Ohio State University (OSU) Medical Center implemented a Community Acquired Pneumonia (CAP) Inpatient Guide based on the inpatient antibiogram and The Infectious Disease Society of America (IDSA) CAP guidelines for immunocompetent adults in 2000. The initial CAP Inpatient Guide recommended initiation of azithromycin +/- a ß-lactam or the fluroquinolone, levofloxacin. The antibiotics were positioned based on the patients Pneumonia Severity Index (PSI) and current resistance rates to Streptococcus pneumoniae. Pathway compliance was documented during the first year post implementation. Since then, the formulary fluroquinolone has been changed to moxifloxacin, and the IDSA guidelines for CAP have been updated. Within the December 2003 IDSA guidelines, misuse, overuse and resistance patterns of fluroquinolones were discussed and are a major concern to assure the efficacy of this antibiotic class for the future.

Purpose: Evaluate current compliance with the CAP Inpatient Guide at OSU and assess the use of antibiotics in hospitalized patients admitted for CAP.

Methods: This was a retrospective evaluation of all patients admitted between July 2002-December 2002, with an International Classification of Diseases, Ninth Revision (ICD-9) code 486 (simple CAP) and a Diagnosis Related Group (DRG) 89 or 90 (simple CAP with/without comorbidities) and treated with either azithromycin +/- ß-lactam or moxifloxacin. Data included (PSI) calculation with risk class assignment, antibiotic at the time of admission, any concomitant antibiotic therapy, age, gender, length of stay and mortality.

Results: Data analysis is currently in progress and finalized data will be presented.

Learning Objectives:

Demonstrate a working knowledge of the Infectious Disease Society of America's 2003 Update of Practice Guidelines for the Management of Community-Acquired Pneumonia in Immunocompetent Adults, and the potential for reduced susceptibility when misusing and overusing a class of antibiotics.

Evaluate the adoption of a clinical pathway/guideline at an academic medical center.

Self Assessment Questions:

Clinical Decision Support tools such as clinical guidelines and pathways can reduce medical errors and promote appropriate prescribing by a physician. (T/F)

Microbial resistance of fluroquinolones in Community Acquired Pneumonia patients has not been linked to resistance due to misuse and overuse. (T/F)

EVALUATION OF A WEIGHT-BASED HEPARIN NOMOGRAM: IMPACT OF HEPARIN BOLUS IN PATIENTS WITH ELEVATED INR VALUES ATTRIBUTABLE TO WARFARIN THERAPY.

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Introduction: The DMC anticoagulation protocol for unfractionated heparin (UH) is a modified version of the weight-based nomogram introduced by Raschke and colleagues. This protocol was developed in patients requiring full anticoagulant therapy with normal baseline anticoagulation parameters. Currently, there is no provision for patients with partially elevated international normalized ratio (INR) values due to the effects of warfarin. It has been noted that patients with baseline INR values 1.5 - 1.99 are often given more conservative bolus doses of heparin due to the staff perception of an increased risk for bleeding. The purpose of this study is to evaluate the impact of heparin boluses in patients with increased INR values, due to warfarin therapy, who require anticoagulation for venous thromboembolism (VTE).

Methods: This study retrospectively evaluates patients who were treated with UH per protocol for VTE between January 2001 and June 2003. Using the anticoagulation service patient monitoring records, patients with elevated INRs were compared to those with normal INRs. The percentage of patients at, above and below goal activated partial thromboplastin time (aPTT) 6 to 8 hours after receiving a UH bolus were evaluated.

Results: To date, 56 patients have been evaluated resulting in 75 data sets for analysis. Of these, 11 had an elevations in INR. Only 1 of 11 was dosed according to protocol, which resulted in an aPTT slightly above the target range. Another patient received the correct bolus dose with a reduced infusion and was found to be therapeutic. Four patients received non-protocol bolus and infusion. Of those, 1 was therapeutic and 3 were above the target range Five patients received an appropriate infusion without a bolus dose resulting in 1 patient below, 2 patients above and 2 patients within the target range. Further analysis is ongoing.

Learning Objectives:

Identify existing dosing methods for UH.

Discuss the benefits/limitations to weight-based UH nomograms.

Self Assessment Questions:

Patients dosed for unfractionated heparin using the standard nomogram (5000 unit IV bolus, then 1000 unit/hr infusion) experience less bleeding than those dosed using a weight-based model. True or False

What is the best approach to initiate treatment with UH for VTE in a 100kg male?

a. 5000 units SQ q 12 hrs
b. 5000 unit IV bolus, then 1000 unit/hr infusion
c. 8000 unit IV bolus, then 1800 unit/hr infusion
d. No bolus, only 1000 unit/hr infusion

MEMBER DIRECTED INITIATIVES TO INCREASE SPECIALTY PHARMACY UTILIZATION IN A HEALTH BENEFITS ORGANIZATION

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PURPOSE: To reduce injectable medication expenditures and enhance member compliance and convenience through specialty pharmacy utilization for injectable medications within a health benefits organization.
METHODS: Due to the significant cost savings available for both members and payers through the use of a specialty pharmacy, a consumer program was developed to inform members of potential out of pocket savings and/or enhanced convenience available with specialty pharmacy utilization. Members received informative letters after maintenance therapy was initiated with any of 30 targeted medications. Letters educated members on either the ability to reduce out of pocket expenses while enhancing convenience or simply the ability to access convenient delivery options and disease education services. Members not converting target medications to a specialty pharmacy within six months were recontacted with educational letters.
RESULTS: Over seven percent of members have switched targeted medications from non-specialty pharmacies to a specialty pharmacy thus far. Estimated average payer savings in 2003 exceeds $200 per member per month for those members switching to a specialty pharmacy. Member out of pocket savings are less than payer savings, however still producing a significant difference.
CONCLUSIONS: This program clearly demonstrates the ability to realize significant payer and member savings while enhancing member satisfaction through a consumer directed program detailing the benefits of specialty pharmacy utilization for injectable medication refill services.

Learning Objectives:

Understand the benefits of increased specialty pharmacy utilization within a health benefits organization.

Recognize the process involved with implementing a consumer directed program aimed at encouraging specialty pharmacy utilization.

Self Assessment Questions:

What is the main advantage for payers to increase specialty pharmacy utilization?

What incentives encourage a member to utilize a specialty pharmacy?

PHYSICIAN COMPLIANCE COMPARED TO PHARMACIST COMPLIANCE AT A UNIVERSITY HOSPITAL GENERAL MEDICINE CLINIC WITH CURRENT ADA GUIDELINES

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Purpose: The American Diabetes Association (ADA) Clinical Practice Guidelines were developed to provide the clinical practitioner a framework for the standards of medical care for patients with diabetes mellitus (DM). These guidelines include management strategies for glycemic control, as well as recommendations for screening and treating complications associated with DM, such as nephropathy, neuropathy, retinopathy, and cardiovascular complications. The General Medicine Clinic at The University Hospital in Cincinnati, Ohio is a resident-directed, appointment-based clinic providing care to indigent patients. The Pharmacotherapy Clinic, located within the General Medicine Clinic, is a pharmacist-directed, appointment-based clinic that provides individualized care to patients referred by their Primary Care Physician. The purpose of this study was to compare physician and pharmacist compliance with the current ADA guidelines.

Methods: Identification of Type 2 diabetic patients in the General Medicine and Pharmacotherapy Clinics that were seen for a minimum of 1 year between July 1, 2001 and June 30, 2003. A retrospective chart review was completed to determine the frequency of hemoglobin A1c (HgA1c), nephropathy, retinopathy, neuropathy, and lipid screenings, concomitant drug use, and blood pressure control. Physicians' compliance with the ADA guidelines was then compared to the compliance of the Pharmacotherapy Clinic. The primary outcome of the study was glycemic control using HgA1c. The secondary outcomes were achievement of therapeutic goals for blood pressure and lipids, as well as frequency of monitoring HgA1c, blood pressure, lipid, microalbuminuria, ophthalmology, and foot screenings.

Results/Conclusion: Of the charts reviewed it is apparent that the physicians are currently non-compliant with the ADA guidelines. Final analysis of data will be completed once all charts are reviewed.

Learning Objectives:

Assess glycemic control of patients in the General Medicine Clinic.

Assess and Compare physician's compliance with the ADA guidelines as compared to the compliance of the Pharmacotherapy Clinic in the screening, prevention and treatment of nephropathy, retinopathy, neuropathy, and cardiovascular complications in patients with DM Type 2.

Self Assessment Questions:

T or F - Pharmacist involvement helps to improve glycemic control in Type 2 diabetic patients.

A HgA1c should be obtained:
a.Once a month
b.Once every 3 months
c.Once every 6 months
d.Once every 12 months

ACCURACY OF VERBAL ORDERS: A NATIONAL SURVEY

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Background: Hospital pharmacies receive a number of verbally transmitted prescription orders. The ability to understand and transcribe the prescription accurately depends on environmental, communication, technical and professional factors. Although these factors may be controlled to some extent when prescriptions are transmitted via facsimile, electronically supported platforms, and dedicated answering machines, little is known about the importance of these factors regarding direct person-to-person communication of prescription orders. Reducing medical errors is a strategic priority for US health care organizations as a result of highly publicized adverse medical events. The Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) recommends minimizing the use of verbal orders and defining the process for validating the accuracy of verbally transmitted medication orders. There is a perception that verbal orders have a greater potential for error because of reliance on short-term memory, hearing and communication skills. Objectives: The purpose of this study was to: (1) develop a self-administered questionnaire to assess perceived environmental, communication, technical, and professional barriers that interfere with accurate transcribing and interpretation of prescription orders received via telephone, and (2) determine whether the barriers correlate positively to dispensing errors when orders are received verbally by telephone. Methods: A questionnaire consisting of thirty-seven items was used for the study. Prior to inclusion, items were evaluated for both content and face validity to ensure that they adequately represented the domain under investigation. The sample consisted of 250 hospital pharmacy directors or managers randomly selected from a national address database. The cross-sectional study employed two mailings consisting of a cover letter including the purpose of the survey, respondent anonymity, data collection instruments and a return postage paid envelope. Directors were asked to respond to one of the surveys and disseminate the other four surveys to clinical and staff pharmacists. Results: Exploratory factor analysis results to be presented.

Learning Objectives:

To identify the barriers that interfere with accurate trannscrbing and interpretation of verbal orders.

To determine whether the barriers correlate positively to dispensing errors when orders are received vebally by telephone.

Self Assessment Questions:

What are the perceived barriers in the pharmacy that can interfere with the accurate transcription of verbal orders?

Which of the JCAHO national patient safety goals addresses the issue of verbal orders?

EVALUATION OF ASPIRIN AND NON-STEROIDAL ANTI-INFLAMMATORY AGENTS IN VA DIABETIC PATIENTS IN AMBULATORY PRIMARY CARE AND DIABETES CLINICS

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Diabetes mellitus is a known risk factor for the development of coronary artery disease (CAD). Patients with diabetes have a two to four-fold increase in the risk of development of cardiovascular disease compared to patients without diabetes. Aspirin therapy as a CAD prevention strategy is recommended for many diabetic patients by the American Diabetes Association (ADA). Reported adherence to ADA prophylactic aspirin recommendations varies widely in the medical literature; rates for aspirin use range from 22 to 82 percent of patients surveyed. To date, an assessment of prophylactic aspirin use has not been performed at the William S. Middleton Memorial VA Hospital. This project will evaluate the use of aspirin in VA diabetic patients who receive care in either Diabetes or Primary Care Clinics.

In addition, this study is designed to identify patients who concurrently use aspirin and non-steroidal anti-inflammatory agents (NSAIDs). Research indicates that when aspirin and certain NSAIDs are taken in combination, the cardioprotective effects of aspirin therapy may be reduced. This drug interaction appears to be dependent on the timing and duration of use of both medications. Evaluation of patients taking aspirin and NSAIDs may provide further insight into this drug interaction.

Purpose:
a) To determine the extent that ambulatory patients with diabetes receive prophylactic aspirin therapy according to the ADA guidelines.
b) To determine the extent that ambulatory patients with diabetes receiving prophylactic aspirin therapy concurrently use NSAIDs.

Methods:
A telephone survey of 180 diabetic subjects receiving medical care at the William S. Middleton Memorial VA Hospital in either Primary Care or Diabetes Clinics will be conducted. The following data will be collected: aspirin use, dose, and timing, source for obtaining aspirin, NSAID use, dose, and timing, and screening for aspirin indications and contraindications.

Learning Objectives:

To determine adherence rates with ADA guidelines for diabetic patients receiving prophylactic aspirin therapy in Primary Care and Diabetes Clinics at the William S. Middleton Memorial VA Hospital.

To identify the proportion of patients who may be affected by a potential drug interaction between aspirin and NSAIDs.

Self Assessment Questions:

True or False: A greater number of patients who receive care in Diabetes Clinic rather than Primary Care Clinic are taking recommended daily prophylactic aspirin.

True or False: Fifty percent of study subjects may be affected by a potential drug interaction between aspirin and NSAIDs.

A RETROSPECTIVE ANALYSIS OF ITRACONAZOLE PROPHYLAXIS FOR THE PREVENTION OF INVASIVE FUNGAL INFECTIONS IN ACUTE LEUKEMIC PATIENTS

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Purpose: Invasive fungal infections (IFI) represent a major cause of morbidity and mortality in patients with hematogenous malignancies. Prophylaxis with antifungal agents has been utilized in attempt to minimize the incidence of infection; however, definitive benefits have yet to be proven. In early 2002, routine use of itraconazole 200 mg/day as antifungal prophylaxis was adopted by most physicians of The Cleveland Clinic Foundation (CCF) leukemia service. The goal of this study is to evaluate the incidence of IFI in acute leukemic patients at CCF who received and did not receive itraconazole prophylaxis.

Methods: A retrospective analysis of all adult acute leukemic patients admitted to CCF between July 1, 2001 and June 30, 2003 will be conducted. The primary endpoint is the incidence and type of IFI. Definite IFI will be identified by one or more of the following: a positive fungal culture of a normally sterile site or of tissue obtained from an invasive procedure, positive tissue histopathological finding(s), CT finding(s) consistent with hepatosplenic candidiasis, and/or radiological evidence of a pulmonary lesion(s) in the presence of a positive bronchoalveolar lavage (BAL) fluid culture. Probable IFI will be identifed by radiological evidence of a pulmonary lesion(s) without a positive BAL fluid culture and/or a positive CT/MRI of the sinus area with either histopathological evidence or a positive Aspergillus culture. Secondary endpoints include: mean duration of neutropenia, mean number of days between onset of neutropenia and the development of an IFI, mean duration of itraconazole prophylaxis, and mean number of patients initiated on an amphotericin B product as well as the duration of therapy. Statistical analysis will include logistic regression to compare the incidence of IFI between study groups. A student's t-test and Mann-Whitney U test will be used to evaluate secondary endpoints.

Results/Conclusions: To be presented.

Learning Objectives:

To describe the incidence of invasive fungal infections in acute leukemic patients following chemotherapy.

To understand the role of itraconazole prophylaxis in the prevention of invasive fungal infections in acute leukemic patients following chemotherapy.

Self Assessment Questions:

Invasive fungal infections represent the most common type of infection affecting the leukemic population.
(a) True
(b) False

Current data supports the use of oral itraconazole (capsule formulation) for the prevention of invasive fungal infections in leukemic patients undergoing chemotherapy.
(a) True
(b) False

ACCIDENTAL FALLS IN AN INSTITUTIONAL SETTING: MEDICATION-CONTRIBUTING EFFECTS

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Accidental falls contribute to increased morbidity and mortality in elderly and institutionalized patients. Within the hospital setting, falls contribute to an increase in the length and cost of hospitalization. Reports in the literature document that fall evaluation programs decrease the incidence of falls. These programs incorporate a multidisciplinary approach to detect underlying risk factors. This project was undertaken to evaluate the association between exposures to certain medications and falls within our setting, a 600 bed acute care community hospital, and the accuracy of our risk assessment tool as it relates to medication use as a risk factor. The goal of this project is to provide information to clinicians about possible fall-related adverse effects of certain medications to aid in prevention of falls and their sequelae.

Accidental falls reported to the risk management department at the institution over a period of 8 months were collected. A retrospective review of patients' medical records was done to access medication profiles at the time of admission and within 24 hours of the fall event. In addition, nursing notes were used to determine the fall risk factor assessment of the patient before the event. Medical diagnoses were obtained from the patient's history and physical assessment and discharge assessment.

Data collection is ongoing at this time but will be done by the conference. The information collected will be presented to the Patient Safety Committee, a physician-led hospital group. Following presentation of the material, appropriate steps will be taken to enhance clinician awareness of medications that contribute to falls and strategies to minimize the risk associated.

Learning Objectives:

State potential risk factors that contribute to falls within an institution.

Identify medications that may contribute to falls within certain patient populations.

Self Assessment Questions:

What are some common risk factors that may contribute to falls?

What medication classes are strongly associated with falls?

EVALUATION OF THE USE OF ANTIEMETICS IN THE ADULT, NON-ONCOLOGY PATIENT

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Nausea and vomiting are common adverse reactions to medications as well as symptoms associated with infection, gastrointestinal obstruction, increased intracranial pressure, motion sickness, and surgery. Usually, nausea and vomiting are self-limiting; therefore, no treatment is needed. If nausea and vomiting become severe or chronic, patient related complications such as dehydration, malnutrition, and metabolic abnormalities can develop. These complications contribute to increased hospital admissions, length of hospital stay, and health care costs. Therefore, the goal in treating a patient with nausea and vomiting is to determine the etiology and eliminate it if possible. If the cause of the nausea and vomiting cannot be eliminated, appropriate antiemetic therapy may be warranted. The purpose of this project was to evaluate the use of IV antiemetics for the prevention and treatment of nausea and vomiting in the adult, non-oncology setting at a large, tertiary care, teaching hospital.

The medication evaluation was conducted over a two-month period on four adult general medicine units. A pharmacy database report was generated identifying patients on IV ondansetron, droperidol, promethazine, dexamethasone, or metoclopramide, and a prospective chart review was performed. Data collected was used to evaluate the appropriateness of current prescribing habits and use of antiemetics. In addition, hospital acquisition costs of antiemetic therapy were calculated. Appropriate use of antiemetics was defined based on published guidelines and literature and compared to current antiemetic prescribing habits and administration. Results from this evaluation will be used to develop antiemetic guidelines in order to improve patient care and minimize cost.

Results/Conclusion: Data analysis in progress.

Learning Objectives:

Review guidelines and literature for the appropriate indication and dosing of antiemetics in the general medicine patient.

Evaluate risk factors for nausea and vomiting in the medical patient.

Self Assessment Questions:

Ondansetron dosed PRN is appropriate in treating post-operative and opiate-induced nausea and vomiting. T or F

What are the risk factors associated with PONV?
a. Female gender
b. Duration of surgery
c. Use of opiate analgesics
d. b and c
e. All of the above

EFFECTS OF DROTRECOGIN ALFA ON PATIENTS WITH STREPTOCOCCUS PNEUMONIAE INFECTIONS: A RETROSPECTIVE CASE CONTROL COMPARISON

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The PROWESS trial demonstrated a 19.4% reduction in the relative risk of mortality and an absolute reduction of 6.1% in patients diagnosed with severe sepsis. A sub-group analysis was conducted, which discovered that the greatest reduction in mortality was seen in patients infected with streptococcus pneumoniae. Additionally, a recent observational, randomized, controlled trial in patients with pneumococcal bacteremia, concluded that the high mortality rate in critically ill patients was irrespective of therapy. This study was conducted to examine the potential benefit of administering drotrecogin alfa to patients infected with streptococcus pneumoniae.

A retrospective, case-controlled study was preformed. Study population was identified through the generation of an electronic microbiology report of patients from January 2001 to December 2002 with either sputum or blood cultures positive for streptococcus pneumoniae. Data was collected in all patients over the age of 18, which included: age, gender, admission service, APACHE II score, organ dysfunction(s), antibiotics administered, intravenous fluids administered, vasopressor therapy, corticosteroid use, nutrition, appropriateness of drotrecogin alfa therapy, chemistry and hematological data, vital signs, length of stay, and mortality.

One hundred eighty nine patients met inclusion criteria, in which nine received drotrecogin alfa. Patients will be separated into two groups, those who received drotrecogin alfa and those who did not. Study outcomes will be used to guide in the improvement of therapy for critically ill patients infected with streptococcus pneumoniae.

Learning Objectives:

List appropriate empiric antibiotic therapy options for streptococcus pneumoniae bacteremia.

Understand the mechanism of action of drotrecogin alfa.

Self Assessment Questions:

Benzathane penicillin G is appropriate therapy for treatment of streptococcus pneumoniae bacteremia. True / False

Drotrecogin alfa inactivates factors Va and VIIIa in the coagulation cascade. True / False

PATIENT ADHERENCE WITH LONG-TERM PROTON PUMP INHIBITOR THERAPY IN A VETERAN POPULATION

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Background: Prescribing of proton pump inhibitors (PPIs) has increased dramatically since their advent and is a major contributor to ever increasing medication expenditures. Attempts to decrease medication expenditures have resulted in the development of novel methods of PPI use, which may prove to be the most efficacious and cost-effective in a subset of patients. Other studies that have assessed patient adherence with long-term PPI have been conducted in the U.K. within the general practice setting. The VA provides a unique setting with a unique population and thus previous data from these other regions cannot be extrapolated to the VA healthcare system. The high use and cost of PPIs at VAAAHS necessitates the assessment of adherence in this patient population.

Objectives: The primary objective of this study is to assess patient adherence with long-term PPI therapy at the VA Ann Arbor Healthcare System (VAAAHS). Secondary objectives are to determine indications for long-term PPI therapy and factors predictive of adherence.

Methods: All patients with a PPI prescription for greater than eight weeks at the VAAAHS between August 1, 2001 and July 31, 2003 will be identified from computerized prescription databases. A subset of 1500 patients will be randomly selected from this list for inclusion in the study. Prescription information gathered from the computerized pharmacy database will include prescription number, drug, dose, directions, quantity, refills, start date, last fill date, and stop date. Following this, electronic patient charts will be reviewed in CPRS/DHCP to gather information on demographics, indications, prescribing physician specialty, and active concurrent medications. The data will then be analyzed to assess adherence, determine indications, and ascertain factors predictive of adherence.

Results/Conclusions: In progress

Learning Objectives:

Assess patient adherence with long-term proton pump inhibitor therapy.

Determine indications for long-term PPI therapy and factors predictive of adherence.

Self Assessment Questions:

The majority (>50%) of VAAAHS patients use on-demand PPI therapy. T or F

Demographic characteristics (age/gender/ethnicity/marital status) are not good predictors of adherence. T or F

IMPACT OF COST REIMBURSEMENT ON A PHARMACIST-MANAGED ANTICOAGULATION CLINIC

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Background: An anticoagulation clinic managed by a pharmacist has been found to reduce thromboembolic and hemorrhagic events when compared to a family practice setting. It also has been shown to reduce the number of hospitalizations while providing a high level of patient and physician satisfaction. For these reasons, a pharmacist-managed anticoagulation clinic is of interest at The Ohio State University Medical Center (OSUMC) within the setting of our new cardiac hospital. Currently the clinic is operating in an outpatient setting and may be relocated to serve patients discharged from the Medical Center.

Statement of Problem: The outpatient anticoagulation clinic currently provides services to a limited number of patients based on physician referrals. Unfortunately, the 3rd party reimbursement structure within The Ohio State University (OSU) Managed Care Contracts combined with the patients' copayments do not cover the operational costs of the clinic. Therefore, the director of the clinic is faced with three options: to continue operating the clinic despite the financial loss, to close the clinic, or to develop a consultant agreement with physicians to permit Medicare billing based on Ambulatory Patient Classification (APC) codes.

Methods: Cost reimbursement will be analyzed utilizing different reimbursement structures. In addition, potential consult agreements between the physician(s) and pharmacist(s) will be analyzed with regard to the Ohio laws governing pharmacy practice. Thirdly, a patient satisfaction survey will be developed and administered to contractual patients who currently participate in the clinic and have OSU Managed Care

Results/Conclusions: Will be presented.

Learning Objectives:

Understand the impact of cost reimbursement based on the three options presented.

Determine the regulatory and practical impact of establishing a consult agreement with a physician for anticoagulation services.

Determine the patient satisfaction with services provided by the anticoagulation clinic based on location and pharmacist therapy. management.

Self Assessment Questions:

How does patient satisfaction change based on the clinic location?

Do the board of pharmacy regulations enable ambulatory clinical practice?

BIVALIRUDIN FOR PERCUTANEOUS CORONARY INTERVENTION-EFFECT ON BLEEDING-RELATED ADVERSE EVENTS

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Purpose: Controlled clinical trials have shown bivalirudin to be equivalent to heparin with GP2b3a inhibitors and superior to heparin alone when used as anticoagulant therapy in non-emergent percutaneous coronary intervention (PCI). The likelihood of major and minor bleeds was also shown to be less with bivalirudin, which resulted in overall cost savings for patients treated with this drug over standard therapy.

Objective: The objective of this project is to assess the impact of a change in standard therapy for non-emergent PCI from heparin +/- GP2b3a inhibitor to bivalirudin on bleeding-related adverse events.

Methods: Charts of post-PCI patients admitted to the cardiac units between October and December 2003 were retrospectively reviewed and will serve as the historical control group. Data collected included type(s) of anticoagulant used, classification of the PCI (emergent vs. non-emergent), and the incidence and severity of bleeding events (major vs. minor). Similar information will be collected for patients undergoing PCI in early 2004, after the change to bivalirudin has been implemented.

Results to Date: Of the 109 historical cases, 85 (78%) were non-emergent and therefore would have been eligible for bivalirudin therapy during catheterization. Of the 85 cases, five major bleeds (6%) as defined by REPLACE-2 occurred at Meriter Hospital, as well as 26 episodes (31%) of minor bleeding and/or hematoma. Twenty-six of 59 (44%) of patients who received heparin with a GP2b3a inhibitor for PCI experienced some degree of bleeding. We anticipate that the implementation of bivalirudin as standard therapy for PCI will reduce bleeding-related adverse events after PCI at Meriter Hospital by at least one-third.

Learning Objectives:

Describe the unique mechanism of action of bivalirudin, and how it impacts efficacy and safety when compared to heparin +/- GP2b3a inhibitors.

Understand the differences in the pharmacokinetic profiles of heparin and bivalirudin.

Self Assessment Questions:

T or F Heparin and bivalirudin are active inhibitors of both soluble and clot-bound thrombin.

T or F The pharmacokinetic profile of bivalirudin is highly predictable with a half-life of approximately twenty-five minutes.

DOES CLINICIAL DOCUMENTATION REVEAL CLINICAL OPPORTUNITY?

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Purpose: Grant Medical Center [GMC] pharmacists are active members of the health care team. They perform numerous clinical activities, including action on P&T-approved policies (e.g., IV to PO conversions, pharmacokinetics); education of nursing, medical, and pharmacy staffs, patients, and students; adverse drug event surveillance and reporting; and provision of drug information. Goals of the clinical pharmacy services program include promoting rationale, safe drug use and positive patient outcomes, with responsible use of resources. Pharmacists independently perform clinical activities, with limited guidance for prioritizing daily tasks. Results of a recent employee opinion survey indicated a need for evaluating the clinical pharmacy services program to identify potential inefficiencies. The current project attempts to define opportunities for designing the clinical pharmacy program such that pharmacists make the
best use of their time, and maximize their contributions of value-added services to the institution.

Methods: A focus group of pharmacists will evaluate and adapt an existing clinical documentation tool, emphasizing practicalities of use. Pharmacists will use the refined documentation tool to record daily clinical activities, including the amount of time devoted to these activities. Non-clinical activities, such as meeting attendance, will be recorded separately. Pharmacists' documentation will be compiled and categorized according to clinical activity.

Results: The distribution of clinical activity categories comprising the clinical pharmacy services program will be presented.

Conclusion: Clinical documentation objectively quantifies the clinical pharmacy services provided at GMC. Critical analysis of the project results will reveal categories of clinical activities deserving more or less emphasis within the program. The relative importance of clinical activities will depend on the extent to which an activity is aligned with the goals of the clinical program stated above and best practices for the pharmacy profession.

Learning Objectives:

The audience will learn the importance of involving pharmacists in designing a clinical documentation tool.

The audience will learn how to use clinical documentation as one approach to critically evaluate a clinical pharmacy services program.

Self Assessment Questions:

True/False Involving pharmacists in designing a clinical documentation tool may affect the usefulness of the tool.

True/False Clinical documentation may be used to critically evaluate the make-up of a clinical pharmacy services program.

ACCURACY OF PEDIATRIC MEDICATION ADMINISTRATION RECORDS

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Purpose: To evaluate the accuracy of the medication administration record (MAR) at Toledo Children's Hospital and to assess ways to improve its accuracy.

Methods: A prospective chart review was conducted from November through December 2003. Patient MAR's were reviewed from all areas of our 151-bed children's hospital. Data was collected from the pharmacy's BDM computer database, the physician's medication orders found in the patient's chart, and the patient's MAR. This project was approved by the Institutional Review Board. Data analysis was performed using a Microsoft Excel database.

Results: Data was collected on 184 patients. The majority of problems seen were associated with the actual administration time for medications not matching the times entered into the BDM computer system. The next most common problem was the pharmacy missing medication discontinuation orders, followed by the pharmacy missing new medication orders, and then by suppositories being ordered and entered in strengths that are not commercially available or easily modified to be given.

Conclusions: The majority of the problems seen can be attributed to a lack of communication between the nursing and pharmacy staff. Suggestion has been made for the reinstitution of a nursing to pharmacy communication form and reeducation of the nursing staff in this regard.

Learning Objectives:

Identify possible causes of MAR inaccuracy.

Evaluate measures that may improve MAR accuracy.

Self Assessment Questions:

All of the following are example of MAR inaccuracy except:
a. Administration times in pharmacy computer system (printed on the MAR) don't match times medications are actually given (handwritten on the MAR).
b. The wrong dose of a medication was entered by pharmacy.
c. A discontinuation order was never written, but per verbal communication with the doctor, the nurses are no longer giving the medication.
d. The wrong drug was entered by pharmacy.
e. All of the above are examples of MAR inaccuracy.

The use of laser-generated MAR's and computerized MAR's hold possibilities for improving legibility and accuracy of the MAR. T or F

DEVELOPMENT AND UTILIZATION OF A COMPUTERIZED RISK ASSESSMENT TOOL TO PROVIDE APPROPRIATE VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOR HOSPITALIZED PATIENTS

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Venous thromboembolism (VTE), such as deep vein thrombosis and pulmonary embolism, is a preventable complication of hospital stay and a major cause of prolonged hospital stay and death. Factors such as age, previous medical history, and clinical status have been shown to increase a patient's risk for development of VTE. An internal evaluation showed that VTE complications currently exceed desired rates. With the recent implementation of computerized physician order entry (CPOE), there are many opportunities to develop computerized tools to assist clinicians in the decision making process. The objective of this study is to develop and utilize a computerized risk assessment tool to identify patients at moderate to high risk of VTE development and provide recommendations for prophylaxis based on calculated risk assessment score.

A computerized tool is in development to calculate a risk assessment score based on selected VTE risk factors available in the electronic medical record on admission including age, BMI, and admitting diagnosis. VTE risk factors were defined and assigned a numerical value based on a risk assessment form previously developed and approved by the institution. A subsequent score will be calculated and a level of risk will be assigned. The tool was designed to assess patients admitted to a general medicine floor within 24 hours after admission.

A risk assessment tool identifying VTE risk factors will assist clinicians in evaluation of moderate to high-risk patients. By standardizing the assessment of patients, VTE rates and current trends should improve. Future development of the tool should include all identifiable risk factors, and should be updated when new guidelines and treatment options are available.

Learning Objectives:

Explain the importance of appropriate VTE prophylaxis in hospitalized patients

Describe the different treatment options approved for VTE prophylaxis and rationale for use

Self Assessment Questions:

True/False: Heparin 5000 units SQ Q12 has been clinically proven to show benefit as VTE prophylaxis in low risk patients

A 75 y.o. patient is admitted for community acquired pneumonia. Past medical history is significant for previous history of DVT and there are currently no contraindications to anticoagulation. What would be the appropriate VTE prophylactic regimen?
a) TED hose and sequential compression device (SCD)
b) Lovenox 40mg SQ daily
c) Heparin 5000 units SQ Q8H
d) A and B
e) More information is needed to recommend prophylaxis

THE UTILITY OF A COMPUTER BASED ALERT SYSTEM FOR CLINICAL PRACTITIONERS

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Community Health Network uses an alerting system to inform clinical practitioners of pertinent patient information such as lab results, cultures and sensitivities, and drug interactions. The alerting system used is Misys Insightä. A two-phase study was implemented to evaluate practitioners' attitude toward the system, its use, and patient outcomes related to alerts sent. Initially, a survey was conducted of subscribers from different user groups including, nurses, pharmacists, case managers, and dietitians. This survey evaluated the system's utility as well as the attitude of the users toward the system. Those surveyed were asked to rank alerts, on a scale from 1 to 5, on the utility and value to their practice. Space to include written feedback was also provided to elicit new alerts clinicians would like to see added as well as the overall attitude toward the system. After the survey was conducted, a retrospective chart review was performed of five selected alerts to help determine patient outcomes from the alerts sent to clinicians over a four month time period.
Upon analysis of the survey results, 70% of the alerts surveyed were considered useful to practitioners, and a list of new alerts to be added to the system was generated. In analysis of the outcome data, enactment due to alerts sent varied greatly between the alerts evaluated. The survey results also indicated that practitioners utilize the information sent to them via alerts in their daily practice and place value on the entire alerting system. The clinicians surveyed felt that the impact on patient care is great due to added awareness and information the alerting system provides to them. This assessment will allow for continuous improvement in order to elevate the standard of care for all patients.

Learning Objectives:

Become familiar with how a clinical alerting system works.

Be able to identify at least three different types of clinical practitioners that benefit from receiving the alerts.

Self Assessment Questions:

Did the presenter cover each of the objectives indicated for the presention?

Did the presenter allow for an appropriate amount of time for questions at the end of the presentation?

THE EFFECTS OF THIAZOLIDINEDIONES ON WEIGHT IN TYPE 2 DIABETES MELLITUS PATIENTS AND THE TZDS IMPACT ON HEART FAILURE.

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Thiazolidinediones (TZD) are one of the common classes of medications used to treat type 2 diabetes mellitus (DM). The TZDs improve insulin resistance and have been shown to decrease macrovascular risks associated with type 2 DM. Significant adverse effects associated with TZD use include weight gain through a potential mechanism of an increase in subcutaneous fat or an increase in peripheral edema. Due to potential risks of edema in patients with heart failure, TZD use in patients with New York Heart Association (NYHA) class III or IV is not recommended. The purpose of this study is to evaluate the effects of pioglitazone and rosiglitazone on weight in patients with type 2 DM and to determine their impact on edema and exacerbations of heart failure in patients with documented left ventricular dysfunction.

A retrospective chart review will be conducted on 60 patients at the IU-Methodist Family Practice Center who had been prescribed rosiglitazone or pioglitazone from January 2001 to January 2004 and taking the medication for at least 6 months. Patients who had impaired liver or kidney function, diagnosis of cancer, psychiatric condition effecting compliance, or taking an antidepressant medication were excluded. Patient data to be collected include: patient age, weights, co-morbid conditions, TZD prescribed and dose, concomitant medications, documentation of edema, and documentation of heart failure exacerbations, and patient report of change in appetite or eating habits. The primary outcome of this study is to evaluate the changes in each patient's weight in accordance with TZD use. The secondary outcome is to evaluate the effects of TZDs on exacerbations of heart failure or edema in patients with documented heart failure.

Learning Objectives:

Describe the mechanism behind the weight gain of patients taking TZDs.

Discuss the influence a TZD has on patients with heart failure with respect to their fluid status.

Self Assessment Questions:

Fat redistribution may occur in patients taking a TZD with accumulation of visceral adipose tissue, rather than subcutaneous adipose tissue. T or F

Some patients weight gain may be attributed also to increase fluid retention which may cause problems for heart failure patients. T or F

AN EVALUATION OF A MICROALBUMINURIA SCREENING AND EDUCATION PROGRAM IN PATIENTS WITH DIABETES IN A COMMUNITY CHAIN PHARMACY

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Background: Nephropathy occurs in approximately 20 - 40% of patients with diabetes and is the leading cause of renal failure in the United States. The first sign of damage to the kidneys, due to diabetes, is the excretion of small amounts of albumin which is termed microalbuminuria. In many cases, microalbuminuria goes undiagnosed in patients until significant renal damage is present.

Purpose: To screen patients with diabetes for microalbuminuria and to provide education about the risks of diabetic nephropathy. One goal of this study is to determine how many patients in a community pharmacy setting are at elevated risk of developing diabetic nephropathy (i.e. positive microalbumin test). The other goal of this study is to evaluate the education program by conducting patient surveys which will measure knowledge gained, suggestions for improvement, and satisfaction.

Methods: Microalbuminuria screenings and education will be conducted in Osco Drug pharmacy locations. The educational component and the microalbumin protocol were developed from the American Diabetes Association Guidelines and medical literature. Study patients will be recruited by asking patients on diabetic medications to fill out a survey-test. The survey will evaluate the patient's knowledge about diabetic nephropathy and determine interest in joining the study. The education component will include such topics as a definition of diabetic nephropathy, what is microalbuminuria, and how to prevent progression into diabetic nephropathy. The microalbumin protocol will consist of 3 separate screenings over a 12 week period with educational components during the first and last screenings. All patients enrolled in the microalbuminuria screening and education program will be asked to complete a pre and post knowledge test (the original recruitment survey will serve as the pretest) as well as a satisfaction survey.

Results/Conclusion Pending

Learning Objectives:

Determine if pharmacists can effectively monitor for microalbuminuria in an outpatient setting.

Determine if pharmacists can enhance patients knowledge about diabetic nephropathy.

Self Assessment Questions:

Microalbuminuria is an early indication of kidney dysfunction. T or F

Diabetic nephropathy is the leading cause of renal failure in the United States. T or F

A RETROSPECTIVE, CASE COHORT STUDY TO EVALUATE EFFICACY, SAFETY, AND PHARMACOECONOMICS OF ORAL LINEZOLID VERSUS INTRAVENOUS ANTIBIOTICS FOR THE TREATMENT OF OSTEOMYELITIS

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BACKGROUND:
Osteomyelitis is a bone infection with a reported annual incidence of 4.5 per 100,000 people. Currently, the most common causative organism for osteomyelitis is Staphylococcus aureus, however multiple organisms causing the infection may be isolated. Literature recommends 4 to 6 weeks of therapy for treatment of osteomyelitis. However, at the VA setting, due to the patient population with numerous underlying co-morbidities, extended duration of therapy is often required.

PURPOSE:
Intravenous (IV) vancomycin is currently the treatment of choice for patients with methicillin-resistant Staphylococcus aureus. Concern with vancomycin therapy is that IV therapy would require a patient to either be hospitalized or enroll in a home antibiotic therapy program, which could limit the patient's quality of life and increase healthcare costs. Linezolid (Zyvox®) is a synthetic antibacterial agent which may be an effective alternative in the treatment of osteomyelitis. Cost of linezolid itself may me more expensive then some IV antibiotics used in the treatment of osteomyelitis, but it could potentially save health care costs when home IV therapy expenses are factored. The purpose of this study is to evaluate the efficacy, safety, and costs of oral linezolid versus IV antibiotics in the treatment of osteomyelitis. It is hypothesized that therapy with linezolid is as effective and safe compared to IV antibiotics when treating osteomyelitis and can potentially result in substantial healthcare cost savings.

METHODS:
The study is a retrospective matched cohort analysis comparing one case patient with osteomyelitis who received oral linezolid therapy to two cohort patients with osteomyelitis who received home IV antibiotic therapy. Linezolid and non-linezolid patients will be matched based on organism, site of infection, and time period in which the infection occurred.

RESULTS/CONCLUSION:
To date, data are in the process of being collected for 300 patients. Results and conclusions will be presented at the Great Lakes Conference.

Learning Objectives:

Compare the efficacy and safety of oral linezolid to IV antibiotics in the treatment of osteomyelitis.

Discuss the financial impact of prescribing oral linezolid therapy versus IV antibiotic therapy for the treatment of osteomyelitis.

Self Assessment Questions:

What is the most common causative organism of osteomyelitis?

IV Vancomycin is the only option for treatment of MRSA osteomyelitis. T/F

NESIRITIDE USE IN DECOMPENSATED HEART FAILURE

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Nesiritide is a new intravenous treatment available for decompensated heart failure. There is limited information available in the clinical literature to support its use as a first line agent. Traditional approach to the acutely decompensated heart failure patient may include aggressive use of IV diuretics along with vasoactive drugs. We performed a concurrent study of each patient prescribed nesiritide to evaluate the utilization and outcomes of nesiritide for decompensated heart failure in our institution and to determine a need for amending the appropriate guidelines for use of nesiritide previously established at St. Elizabeth's Hospital.

The methods used for this study include following patients for whom nesiritide is being ordered as identified via physician orders. All patients receiving nesiritide will be included. Data is to be gathered on pharmacy nesiritide monitoring flowsheets utilized for IV nesiritide therapy. Data analyzed includes adherence to the already established P&T approved criteria for usage by identifying process indicators such as SOB, dyspnea, pulmonary congestion, peripheral edema, evidence of fluid overload, JVD, as well as pre-treatment BNP levels, S.Cr., SBP, LOS, prior treatment with first line agents, length of stay, mortality rates, and duration of nesiritide therapy.

This study is currently ongoing, and there are no results to report at this time. Results will be presented at the residency conference.

Learning Objectives:

To identify appropriate utilization of nesiritide in decompensated heart failure.

To identify outcomes associated with nesiritide use in the heart failure patient.

Self Assessment Questions:

Nesiritide is similar to the phosphodiesterase inhibitors in its mechanism of action? T or F [Answer = False]

Nesiritide is indicated for use in acute decompensated heart failure with SBP >90? T or F [Answer = True]

COMPARISON OF THE HEMODYNAMIC EFFECTS OF FENTANYL AND MORPHINE IN CRITICALLY ILL ADULT PATIENTS

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Many critically ill patients receive continuous intravenous infusions of opioid analgesic agents for pain management during their stay in the intensive care unit (ICU). The 2002 SCCM Clinical Practice Guidelines for the Sustained Use of Sedatives and Analgesics in the Critically Ill Adult recommend morphine, fentanyl, or hydromorphone as first line agents for intravenous analgesia. Fentanyl and hydromorphone are recommended for patients with hemodynamic instability; morphine is thought to cause additional hypotension due to its effects on histamine release. In addition, morphine may be used cautiously in asthmatics due to a possible histamine-mediated bronchospastic effect. Currently, there are no randomized comparative clinical trials comparing the effects of continuous infusions of these medications on critically ill patients.

The primary purpose of this study is to compare the hemodynamic effects of continuous intravenous infusions of morphine and fentanyl in 100 critically ill patients. In addition, we will evaluate the effects on bronchospasm of both opioids in this patient population.

This is a prospective, observational, comparative study comparing the effects of continuous intravenous infusions of morphine and fentanyl during the first 48 hours of the infusion. Variables to be evaluated include blood pressure, heart rate, and peak airway pressures. Inclusion criteria for the study are patient age >18 years, admission to a medical or surgical intensive care unit, requirement of mechanical ventilation, and physician order for continuous intravenous infusion of morphine or fentanyl. Exclusion criteria include patients with known hypersensitivity or sensitivity to any opioid analgesic, pregnancy, neurosurgical patients, patients with prior outpatient use of scheduled morphine sulfate or a fentanyl patch, and patients previously receiving methadone or H1-antagonists such as diphenhydramine or hydroxyzine.

To date, 50 patients have been enrolled in the study. Preliminary results will be presented.

Learning Objectives:

Discuss the roles of morphine and fentanyl in pain control for critically ill patients.

Compare the effects of morphine and fentanyl on blood pressure, heart rate, and peak airway pressure in critically ill patients.

Self Assessment Questions:

True or false. The mechanism of morphine-induced hypotension is thought to be secondary to histamine release.

True or false. According to the SCCM guidelines, fentanyl and hydromorphone are first-line agents for pain control in hemodynamically unstable patients.

THE IMPACT OF PHARMACY STUDENT EMPLOYMENT AND PERCEPTIONS ON ACADEMIC AND LICENSURE EXAMINATION PERFORMANCE

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Background: Throughout history, apprenticeship experience has played an intricate role in the education and training of pharmacists. Even today, all states currently require completion of internship hours prior to licensure. Surprisingly, studies have shown that working during pharmacy school essentially has no effect on a student's academic and licensure examination performance. Caution must be taken when considering these findings, as the data on this subject is limited and has not been updated in a decade. Objectives: The objectives of this study are to determine whether academically relevant or related work impacts a student's academic performance and/or performance on the NAPLEX, and whether student perceptions of academically relevant or related work impacts academic performance and/or performance on the NAPLEX. Methods and Design: A sixteen objective question survey will be administered to third professional year pharmacy students at Midwestern University College of Pharmacy to assess student's work history and personal perceptions of the impact of working in a pharmacy setting during pharmacy school. The Pre-NAPLEX, produced by the National Association of Boards of Pharmacy (NABP), will be administered to a random sampling of student participants stratified by work experience. The primary outcomes of academic and NAPLEX performance will be measured based on grade point average (GPA) and Pre-NAPLEX scores. The secondary outcome of student's personal perception of impact will be measured by analysis of select survey items. All outcomes data will be analyzed utilizing multivariate statistics. Implications: Results from this study can be used in the advancement of pharmaceutical education by providing educators with insight on issues that impact the development of pharmacy students to pharmacists.

Learning Objectives:

To discuss the impact of student employment during pharmacy school on academic and NAPLEX performance.

To outline student perceptions of the impact of pharmacy-related work experiences on academic and NAPLEX performance.

Self Assessment Questions:

Apprenticeship experience has played an intricate role in the training and education of pharmacists throughout history. T or F

There is an abundance of data on the impact of working during pharmacy school on academic and NAPLEX performance. T or F

DEVELOPMENT AND COST-EFFECTIVE EVALUATION OF TRANSITIONAL INPATIENT TO OUTPATIENT DEEP VEIN THROMBOSIS (DVT) MANAGEMENT PROGRAM IN A COMMUNITY HOSPITAL

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Introduction: Historically, patients suspected of DVT were admitted to an acute medical care unit for assessment and management. Prior to this study, the length of hospital stay for DVT management was 5.7 days at St. Margaret Mercy Healthcare Centers. With the clinical data available on low molecular weight heparins and warfarin, the combined use of warfarin and enoxaparin as bridge therapy has been shown to have similar efficacy and safety with decreased hospital cost compared to heparin and warfarin therapy.

Objective: To develop and establish an inpatient deep vein thrombosis (DVT) management program and evaluate the cost-effectiveness associated with decreased length of stay in the community hospital setting.

Methods: A multidisciplinary medical team involving physicians, pharmacists, and nurse case managers will be established to develop a DVT Bridge Therapy Pathway. Once the pathway is completed and approved, the program will be piloted for six months on the medical and surgical units. Nursing staff will be inserviced on the DVT Bridge Therapy Pathway. Patient education will be provided by nurses and pharmacists and a post-discharge quality assurance procedures will be included in the pathway to ensure that patients are appropriately followed by primary care physicians.

Results: Multidisciplinary team including physicians, pharmacist, and nurse case manager was formed. Pharmacy and Therapeutic Committee approved DVT bridge pathway protocol and the pilot phase of the study is in process. Post-discharge quality assessment form has been developed. After 6 months, cost-effectiveness of the DVT program will be evaluated.

Conclusion: Currently, length of stay for patients admitted with DVT is 5.7 days. The goal of DVT Management Protocol is to decrease inpatient length of stay for patients admitted with DVT to 4 days. Conclusion will be made once the study is completed.

Learning Objectives:

Discuss the process of developing inpatient DVT management program in a community hospital setting

Understand the use of enoxaparin in DVT treatment.

Self Assessment Questions:

True or False
To achieve a successful outcome of a pharmacy initiated DVT pathway in a community hospital; other health professionals must be involved in the development of the treatment plan.

True or False
The recommended DVT treatment dose of enoxaparin for a patient with normal renal function is 30mg SC q12h.

A RETROSPECTIVE ANALYSIS OF ARGATROBAN DOSING USING THE CHILD-PUGH SCORE

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Argatroban is a direct thrombin inhibitor indicated for the treatment and prevention of thrombosis in Heparin-Induced Thrombocytopenia (HIT) and for anticoagulation in patients with a history of HIT. Argatroban is hepatically excreted which is unique when compared to the other medications used in HIT. However, this causes a problem in patients with liver dysfunction in which a significant increase in the half-life of argatroban has been published. The Child-Pugh score has become a useful tool for the evaluation of liver dysfunction.

Purpose:
The primary purpose was to determine the correlation between Child-Pugh score, argatroban dose, and time to therapeutic activated pro-thrombin time (aPTT). Secondarily, data will be collected regarding aspartate transaminase (AST), alanine aminotransferase (ALT), and time to therapeutic international normalized ratio (INR).

Methods:
A retrospective review of patients receiving argatroban for one to two years was done. The primary data points collected included patient demographics, calculated Child-Pugh score, and argatroban dose. The aPTT 2 hours after initiation, every 4 hours until 2 consecutive aPTTs in therapeutic range (45-60 seconds) and then every 12 hours once therapeutic will be collected. The Child-Pugh score will be calculated with baseline serum albumin, serum bilirubin, prothrombin time, encephalopathy, and ascites.

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

Learning Objectives:

Recognize the potential dosing difficulty with argatroban and hepatically impaired patients.

Understand the Child-Pugh score and its possible use in dosing of argatroban.

Self Assessment Questions:

In hepatically impaired patients, the half-life of argatroban:
a. Increases.
b. Decreases.
c. Does not change.

The Child-Pugh score is calculated from all of the following except:
a. Serum albumin
b. Serum bilirubin
c. Activated prothrombin time
d. Prothrombin time

UIC MEDICAL EMPLOYEE ASSESSMENT OF OUTPATIENT PHARMACY SERVICES

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In the highly competitive world of outpatient pharmacy, a university medical center outpatient pharmacy must meet the needs of its customers, including patients, employees, and students. As a means to maintain and/or gain a competitive edge, university medical center outpatient pharmacies must identify which services are of value to its customers. Adapting to the needs can be accomplished by understanding their motives for choosing a type of pharmacy and by providing the services they desire. This would enable University of Illinois (UIC) outpatient pharmacies to retain current and capture future customers, thus increasing the likelihood of survival.

This study is designed to determine medical center employees' attitudes and experiences regarding the five outpatient pharmacies affiliated with UIC. These pharmacies are intended to serve UIC employees, students and patients; however, employees are underutilizing these services. It's unclear if employee underutilization is due to lack of products and services, cost, pharmacy location, hours of service, or employees' lack of awareness of the pharmacies. The goal of this study is to recognize the needs of UIC medical center employees and to identify pharmacy services that would help improve their retention and capture rates.

The online survey engine, Surveymonkey will be used to administer the survey. Every UIC medical center employee will receive an email which will provide instructions and a direct link to the survey. Demographic information will be anonymously collected to help identify attitudes within different demographic groups. Attitudes about specific pharmacy services will be determined by asking the employee to rank how important specific pharmacy services are in their selection of a pharmacy on a 5 point scale. Questions will include current and potential products and services at UIC outpatient pharmacies.

Learning Objectives:

Identify the key factors that influence the choice of a pharmacy among medical center employees.

Identify pharmacy services desired by current/potential UIC medical center employees to improve capture and retention rates.

Self Assessment Questions:

Name three key factors that influence pharmacy choice among employees.

Name three pharmacy services that would increase employees' likelihood of using a medical center outpatient pharmacy.

EFFECTIVENESS AND SAFETY OF EZETIMIBE IN THE VETERAN AFFAIRS (VA) CHICAGO HEALTHCARE SYSTEM

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Coronary heart disease (CHD) kills 500,000 Americans, making it the most common cause of death in the U.S. Low density lipoprotein (LDL) cholesterol makes the greatest contribution to the development of arteriosclerosis. Hence, LDL-cholesterol is the primary target of cholesterol lowering therapy. Adult treatment panel III emphasizes therapeutic lifestyle changes to reduce risk of CHD. First line therapy after failure of lifestyle modifications is HMG-CoA reductase inhibitors (statins).

Ezetimibe is a new lipid-lowering agent that prevents the intestinal absorption of both dietary and biliary cholesterol by reducing transport of cholesterol through the intestinal wall. Studies have shown that ezetimibe can significantly reduce LDL-cholesterol, triglycerides and increase HDL cholesterol compared to placebo. Clinical studies showed that ezetimibe was well tolerated, but it may cause liver enzymes elevation when used in combination with statins. However, liver enzymes returned to normal levels after discontinuation of the medications. At the VA Chicago Health Care System, ezetimibe has a non-formulary status as a consequence of uncertain long-term effectiveness and safety.

PURPOSE:
To determine how well ezetimibe controls lipid levels in patients with hyperlipidemia, and to assess how safe these agents are in this patient population.

METHODS:
Patients with a documented hyperlipidemia diagnosis code, and who have been prescribed ezetimibe during a one year period are included in this retrospective study. The following parameters were collected from patient's electronic charts and analyzed for trends: 1) demographics, 2) weight, height, history of liver disease, 3) comorbid conditions and risk factors, 4) lipid profile with previous agents, 5) adverse reactions or therapy failure with previous agents, 6) adverse effects and the mechanism by which they are handled will be investigated, 7) liver function tests, creatine phosphokinase before starting ezetimibe.

Learning Objectives:

Discuss the effectiveness of ezetimibe in reducing lipid levels.

Identify the toxicities associated with ezetimibe use.

Self Assessment Questions:

What is the mechanism of action of ezetimibe?

Ezetimibe reduces LDL-cholesterol by ____ when used as monotherapy.
a)<50%
b)>50%

EVALUATION OF SUCCESS RATES OF SMOKING CESSATION IN A VETERAN POPULATION

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Background: The link between medical illness and tobacco use is well established. The causes of morbidity from nicotine use are heart disease, peripheral vascular disease, coronary artery disease, cerebrovascular disease, lung disease, chronic obstructive pulmonary disease, and complications during pregnancy. Over 450,000 annual deaths are attributable to tobacco use in the US. Tobacco is also the leading cause of preventable morbidity, mortality, and health expense. However, tobacco products are among the most addicting products known. Less than ten percent of the twenty million people who quit smoking for a day remain abstinent one year later. Medications that contain nicotine improve a patient's ability to maintain abstinence. To date, smoking cessation therapy includes pharmacological and behavioral modification therapy. The Louis Stokes Cleveland Veterans Affairs Medical Center currently has on formulary the nicotine patch and the nicotine polacrilex gum. Buproprion is restricted to psychiatry, but is often prescribed concurrently with the Nicoderm patch. A behavioral group smoking cessation program is also offered to patients.

Purpose: The goal of the study is to investigate the success rates and cost effectiveness of subjects having been prescribed the nicotine patch, with or without buproprion, along with group or individual cognitive-behavioral counseling.

Methods: Patients will be identified through a computer search of all prescriptions for nicotine patches in a 12 month period. A questionnaire was mailed to 562 patients on October 31,2003 asking about compliance, counseling, whether the patient stopped smoking, and how long it has been since their last cigarette. The prescription refill history and participation in behavioral classes will also be analyzed through chart review. Data will be analyzed through a Microsoft Excel spreadsheet. Cost-effectiveness analysis will be completed to determine the cost of the intervention per outcome.

Results/Conclusion: As of January 25,2004 156 patients have responded. Data analysis is ongoing.

Learning Objectives:

Describe the types of nicotine replacement therapy offered to the veteran population.

List 3 disease states that smoking has been associated as a risk factor for morbidity or mortality.

Self Assessment Questions:

The majority of patients who quit smoking will remain smoke free. True/False

Tobacco is the leading cause of preventable morbidity and mortality.
True/False

DETERMINATION OF BEST PHARMACOECONOMIC APPROACH TO UTILIZATION OF HEMATOPOIETIC AGENTS

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BACKGROUND: Three hematopoietic products have been approved for treatment of anemia in pre-hemodialysis, hemodialysis, HIV, and oncology patients; these include epoetin alfa (Epogen and Procrit) and darbepoetin alfa (Aranesp). All three agents have identical mechanisms of action and differ only with respect to half-life and FDA-approved indications. Third party payers reimburse providers based on chemical name only, eliminating the need for more than one agent on formulary. Darbepoetin has a longer half-life that allows for less frequent dosing. If dosed per approved labeling, it represents the most cost-effective agent. However, anecdotal evidence suggests darbepoetin is dosed off-label. The purpose of this project is to implement an institution-specific drug use policy for darbepoetin based on national and institutional prescribing patterns.
METHODS: A survey was distributed to 168 University Health Consortium pharmacies to collect national data. Information requested included hematopoietic agents on formulary, reasons for or against switching to an all darbepoetin system, darbepoetin dosing, and cost-effectiveness of darbepoetin. Institutional data was collected through a retrospective chart review of patients who received at least one darbepoetin dose in April and May 2003. Charts were examined for indication, dosing, monitoring, response, adverse events, and adjustments in darbepoetin therapy. Attitudes of prescribing nephrologists regarding darbepoetin use were assessed through a Likert scale questionnaire.
RESULTS: Only eight of the thirty-four University Health Consortium pharmacies that responded to the survey have switched to an all darbepoetin formulary. Seventy-five percent of hospitals that have implemented an interchange have P&T-approved doses consistent with darbepoetin's labeling. Charts of thirty-two patients receiving darbepoetin therapy revealed 53% and 58% of epoetin-experienced and -naïve patients, respectively, received a darbepoetin dose exceeding the manufacturer's suggested guidelines. Five charts noted dose escalation. The majority of surveyed nephrologists strongly agreed that darbepoetin was difficult to dose in stressed, hospitalized patients due to limited experience.

Learning Objectives:

Understand the differences between the hematopoietic agents, epoetin alfa and darbepoetin alfa

Analyze both national and institution specific utilization and prescribing patterns of darbepoetin alfa

Self Assessment Questions:

True or False: Darbepoetin alfa differs from epoetin alfa in its mechanism of action, FDA approved indications, half-life, and frequency of dosing

True or False: Darbepoetin alfa is consistently dosed as recommended by manufacturer's guidelines

THE ROLE OF IMMUNONUTRITION IN CRITICALLY ILL TRAUMA PATIENTS

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Immune-enhanced enteral nutrition can have favorable effects on clinical outcomes in select populations, however data in trauma patients is limited. We conducted a retrospective chart review comparing the effect of immune-enhanced enteral nutrition (IEN) with standard enteral nutrition (SEN) on the incidence of infection, length of mechanical ventilation, and ICU and hospital lengths of stay in critically ill trauma patients. Patients were identified using the ICU admissions logbook and those with the diagnosis of trauma were retained. All patients >/=18 years of age receiving enteral nutrition were stratified according to whether they received IEN or SEN. Patients were excluded if they did not receive at least 3 days of enteral nutrition at >/=75% of their goal rate. Demographics, nutritional parameters, APACHE II score, amount of nutrition provided and clinical outcomes were compared between groups. Appropriate statistical tests were used. To date, 18 patients (IEN=9, SEN=9) have been evaluated. Demographics were similar between groups. Equal amounts of calories were administered to the IEN and SEN groups (26 +/- 4 kcal/kg/day vs. 24 +/- 6 kcal/kg/day, p=0.399), however the IEN group received more protein (1.7 +/- 0.2 gm/kg/day vs. 1.4 +/- 0.3 gm/kg/day, p=0.034). Duration of enteral nutrition was similar between the IEN and SEN groups [13 (5-35) days vs. 13 (7-36) days, p=0.535]. No significant differences were noted in the incidence of infection (6/9 vs. 6/9, p=1.00], ICU length of stay (26 +/- 11 days vs. 24 +/- 11 days, p=0.621), and hospital length of stay (33 +/- 14 days vs. 27 +/- 10 days, p=0.319) for the IEN and SEN groups, respectively. Duration of mechanical ventilation was longer in the IEN group [20 (14-39) days vs. 12 (5-36) days, p=0.047]. Preliminary results show that IEN is not associated with significant benefits in clinical outcomes in critically ill trauma patients.

Learning Objectives:

List the populations who may benefit from immune-enhanced enteral nutrition.

Determine the Potential role of IEN formulations in trauma patients.

Self Assessment Questions:

Immune-enhanced enteral nutrition are supplemented with: a) Omega-3 fatty acids b) Arginine c) Nucleotides d) All of the above

T or F Immune-enhaced enteral nutrition may decrease the incidence of infection in select populations.

COMPARISON OF THE INCIDENCE OF CLOSTRIDIUM DIFFICILE IN PATIENTS TREATED WITH PIPERACILLIN/TAZOBACTAM AND CEFEPIME

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Background: Two of the most commonly used medications for the empiric treatment of possible Gram negative bacterial infections at the Arthur G. James Cancer Hospital are piperacillin/tazobactam (PT) and cefepime. The use of antibiotics, especially broader-spectrum penicillins, clindamycin, and cephalosporins may alter the normal intestinal flora and increase the risk of developing Clostridium difficile (C. difficile) diarrhea. C. difficile is a Gram-positive, anaerobic, toxin–producing bacillus with an ability to form spores that allow it to survive in the gastrointestinal environment for extended periods of time. C. difficile is the major cause of pseudomembranous colitis and antibiotic associated diarrhea. The rate of acquisition has been reported by the Journal of Infectious Disease to be 13% for individuals hospitalized one to two weeks, increasing to as high as 50% for those hospitalized more than four weeks. Pseudomembranous colitis can range in severity from mild to life threatening and requires the immediate addition of appropriate antibiotic therapy.

Objective: The objective of this study is to compare the incidence of C. difficile in patients treated with piperacillin/tazobactam (PT) and cefepime in a tertiary academic medical center and affiliated cancer hospital.

Methods: The study is a retrospective, randomized chart review of patients initiated on PT or cefepime at the Ohio State University Hospitals or the Arthur G. James Cancer Hospital between July 1, 2003 and December 31, 2003. Baseline demographic data was collected in addition to indication for broad-spectrum antibiotic therapy. The length of antibiotic therapy, time from hospital admission until C. difficile-positive toxin assessment, time from initiation of broad-spectrum antibiotics until C. difficile-positive toxin assessment, and length of hospital stay were also evaluated.

Results/Conclusion: Data collection is currently in progress and the results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Understand new patterns of C. difficile incidence in patients on broad-spectrum antibiotics

Determine if C. difficile colonization can be controlled with proper antibiotic selection

Self Assessment Questions:

There is a difference in the incidence of C. difficile in patients treated with PT and cefepime. T or F

The gold standard of C. difficile diagnosis is:
a) stool enzyme immunoassays for toxin A
b) watery stool > 1 liter per day
c) tissue culture assay

AN OUTCOME ANALYSIS OF INFECTIONS CAUSED BY STAPHYLOCOCCUS AUREUS AND ESCHERICHIA COLI

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Introduction: During a longitudinal susceptibility study, known as the Sentry Program, hospitals in North America analyzed more than 28,000 bloodstream isolates from hospitalized patients from January 1997 though December 2000. Staphylococcus aureus (S aureus) was the most prevalent blood stream isolate in four years, making up 25% of isolates. The next most common bloodstream pathogen was Escherichia coli (E coli), which accounted for approximately 17% of isolates.
This project was undertaken to determine the outcomes of patients with S aureus and E coli infections, because first, these are the two most common pathogens, and second their emergence of resistance has been a consistent problem, making them very difficult to treat.
Objectives: The primary objective was to compare infections caused by S aureus and E Coli with respect to length of stay (LOS), cost and patient outcomes. The secondary objective was to compare infections caused by methicillin-susceptible S aureus (MSSA) with methicillin-resistant S aureus (MRSA), as well as the infections caused by Ciprofloxacin and Sulfamethoxazole/Trimethoprim susceptible E coli with Ciprofloxacin and Sulfamethoxazole/Trimethoprim resistant E coli.
Methods: Development of a prospective study for patients with E coli and S.aureus infections. Using a data collection form, recording demographic, culture, laboratory, clinical and financial data and patient antimicrobial medications.
Results: Sixty-three patients reviewed to date. Data continues to be collected.Outcome analysis is ongoing.

Learning Objectives:

Discuss the appropriate antibiotic therapy to improve patient outcomes, decrease LOS and cost.

Determine outcomes among patients with S aureus and E coli infections.

Self Assessment Questions:

What is the average LOS for patients with resistant strains compared to the susceptible strains?

What is the mortality rate for patients with a resistant strain compared with the susceptible strain, and is there any difference in each group (S aureus and E coli)?

RETROSPECTIVE REVIEW OF THE EFFICACY AND SAFETY OF SPIRONOLACTONE TREATMENT FOR RESISTENT HYPERTENSION

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BACKGROUND:
Despite the various antihypertensive therapies available, providers still find it difficult to achieve recommended blood pressure goals in many of their patients. Spironolactone has been shown to be an effective antihypertensive and has been available for clinical use for many years, however, it is not widely used for the treatment of hypertension. The goal of this study is to determine if spironolactone can be safely and effectively used for the treatment of resistant hypertension.

METHODS:
This study will be a restrospective chart review of all patients at the William S. Middleton Veterans Affairs Medical Center with an active prescription for spironolactone for hypertension between January 1, 1998 and July 31, 2002. Information on patient demographics, blood pressure, concomitant antihypertensive therapy, and serum chemistries will be collected at baseline, at the first follow-up visit, and after 6 months of therapy. Baseline systolic and diastolic blood pressure measurements will be compared separately with the blood pressure measurements both at the first follow-up visit, and again after 6 months of therapy. A paired t-test will be used to detect any differences between measurements at baseline and at follow-up. The group will then be divided into responders and non-responders based on those able to achieve a blood pressure of less than 140/90. The two groups will be compared in an attempt to identify characteristics that predict response to spironolactone therapy. Information on both adverse effects and withdrawal of therapy will be collected.

RESULTS:
To date, 913 total subjects on spironolactone have been identified and 333 of these charts have been reviewed. Of the 333 patients whose charts have been reviewed, only 22 subjects have met inclusion criteria. Out of those 22 remaining subjects, most have achieved a significant decrease in systolic blood pressure at six months of therapy. Data collection continues.

Learning Objectives:

Understand the role spironolactone may have in the treatment of resistant hypertension.

Identify monitoring parameters of both efficacy and toxicity that should be assessed in a patient started on spironolactone therapy.

Self Assessment Questions:

Is spironlactone likely to be an effective adjunct therapy in the treatment of resistant hypertension?

What adverse effects could we expect in a patient started on spironolactone and at what point do we decide to discontinue therapy?

EPIDEMIOLOGY OF SCEDOSPORIUM AT A UNIVERSITY HOSPITAL

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Abstract

Scedosporium is a genus of fungi that is a rare cause of systemic infections. The actual prevalence of Scedosporium is difficult to determine, however the literature indicates that the pathogen may be playing an increasing role in invasive infections, particularly in the immunocompromised host. Data for treatment of Scedosporium is sparse but mortality with invasive disease is reported to exceed 75%. In addition, there are a few reports in the literature describing an allergic bronchopulmonary reaction, similar to that caused by Aspergiulus in patients with cystic fibrosis.

This study will be a retrospective chart review of all patients identified by the microbiology lab with history of a culture positive for Scedosporium between January 01, 1997 and September 30, 2003. The study will focus on two components. The first component will try to determine what percentage of patients with cystic fibrosis and a documented Scedosporium isolate develop either an allergic bronchopulmonary reaction or a systemic infection. The second component of the project will try to access therapies for patients with systemic Scedosporium infections. This will include a review of drugs used, duration of therapy, and an evaluation of clinical response.

Learning Objectives:

Identify the patient populations in whom Scedosporium infections are common.

Describe strategies used to treat patients with Scedosporium infections.

Self Assessment Questions:

The use of voriconazole for treatment of invasive Scedosporium infections has not been studied. True or False

Only immunocompromised patients develop Scedosporium infections? True or False.

VORICONAZOLE: CLINICAL USE AND COST EFFECTIVENESS

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Treatment strategies and drug therapy are constantly changing, including antifungal therapy. Paralleling these therapies is an emergence of an increasing number of resistant fungal strains. Onus for preventing this resistance falls upon the practitioner to select patient-specific therapy. The introduction of voriconazole has provided practitioners with yet another treatment options for serious and increasingly resistant fungal infections. A new drug, combined with the ability to perform fungal MICs, has improved the ability to optimize antifungal therapy. Use of voriconazole has significantly impacted antifungal expenditure at Froedtert Hospital (FH) since its introduction in May 2002. A drug use evaluation will be conducted to assess the clinical use and financial impact of voriconazole at this 400 bed academic medical center. A hospital-wide data collection will be initiated on all new-start voriconazole treatment regimes during a consecutive four-month period. Collected data will include the doses and duration of therapy. Reason for initiation of therapy will be classified as either prophylactic, empiric, or therapeutic. Therapy will be classified as monotherapy or combination therapy. Previous treatment failures will be noted. Organisms cultured will be quantified and documented. Outcomes will be defined as resolution of infection. Patient specific therapy will be compared to current guidelines. Data will be subjected to pharmacoeconomic analysis to estimate cost impact of unnecessary use. Preliminary data shows that voriconazole is most often prescribed by the BMT team and was categorized as therapeutic. Candida glabrata was the most frequently treated fungi, followed by Aspergillus fumaitagus. Only the ID consult service prescribed combination therapy. The majority of voriconazole use is in accordance with both FH guidelines and FDA approved indications. Preliminary data indicated that effective voriconazole guidelines, including IV to PO switch, has minimized unnecessary expenditure. Revisions to current voriconazole guidelines will be recommended to the PNT Committee to maximize cost savings.

Learning Objectives:

Understand the spectrum of activity and therapeutic indications of voriconazole.

Be familiar with therapeutic alternatives to voriconazole and their relative costs.

Self Assessment Questions:

What activity does voriconazole have against Aspergillus? And Zygomycosis?

When is it appropriate to switch voriconazole from IV to PO?

EVALUATING THE IMPACT OF SMART INTRAVENOUS (IV) INFUSION PUMP TECHNOLOGY ON MEDICATION ERROR RATES

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A multidisciplinary team commissioned by a hospital Performance Improvement Coordinating Committee, recommended the implementation of smart intravenous (IV) infusion technology throughout the institution. The smart IV infusion pump technology provides methods for setting appropriate limits for medication rates, doses, and volumes for a given patient care area . The purpose of this research is to evaluate the impact of this new system on IV medication error rates in a hospital setting.

In phase 1 of this study, a multidisciplinary team completed a failure modes effects analysis (FMEA) before implementation of the new technology. Baseline data were collected via direct observation methods and a retrospective review of hospital occurrence reports. A comparison of ordered IV drug, concentration and infusion rates versus the actual IV drug, concentration and programmed infusion rate were used to determine the accuracy of IV medication administration. Hospital occurrence (medication errors) reports in combination with the data collected via the observations were used to determine type of IV administration errors, medications involved, and when most errors occurred.

The second phase of this research will include an analysis of the error log within the smart pump infusion system to determine the severity and risk of all potential errors avoided through the use of this technology. Post-implementation data will be collected via the same methods used in phase 1 of the study.

Major failure modes identified in the current IV infusion system included inaccurate dose calculation, incorrect key punches, and misreading the display.

Preliminary analysis of the observational data revealed that 18% of medications delivered intravenously were delivered in error, and 12% of these involved “high alert” medications.

Learning Objectives:

Describe the impact of smart intravenous infusion technology on intravenous medication errors.

Identify potential failures and challenges in the implementation process of a new intravenous infusion technology in a hospital setting.

Self Assessment Questions:

True or False. Sixty percent of serious and life threatening errors are associated with intravenously administered medication therapies.

True or False. Smart pump infusion system is a safety technology that offers an institution the ability to set appropriate limits for medication rates, doses, and volumes for a given patient care area.

PROVISION OF DIABETES MANAGEMENT SERVICES IN A COMMUNITY PHARMACY SETTING

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Introduction: Diabetes and pre-diabetes affect approximately 6% and 24% of the US population, respectively. As such, diabetes poses a significant and growing health care concern. Several organizations have developed standards of care for the management of diabetes. As patients routinely visit their pharmacy more frequently than their physicians, community pharmacists play a key role in ensuring that these standards of care are met. Pharmacist provision of diabetes management services can help improve patients' health and quality of life, as well as their satisfaction with pharmacy services.

Objectives: The goal of this project is to develop and implement a diabetes management program. Specific objectives include:
- Improve pharmacists' knowledge of diabetes management issues
- Train pharmacists in the implementation of the program
- Facilitate pharmacist interventions by providing patient education material and clinical guideline resources
- Facilitate pharmacist interventions by efficiently integrating the program into the workflow
- Develop a standard documentation system

Methods: A list of 12 questions regarding key areas of diabetes management was developed and integrated into the dispensing software. Each month when a patient fills a prescription, a new question is displayed, reminding the pharmacist to address this issue and document any findings or interventions. To support this program, pharmacist-directed and patient-directed material was obtained and developed, and training was provided to the pharmacists. Follow-up will be performed to ensure pharmacists participation and to resolve any barriers encountered.

Results: The final results and evaluation of this project will be presented at the conference.

Conclusions: We anticipate that diabetes management services can be successfully provided in a community pharmacy setting. We hope to identify and minimize any barriers to the provision of these services. In the future, this program may be expanded to include additional services, such as hemoglobin A1c and cholesterol testing, and additional disease states.

Learning Objectives:

List at least 6 key issues that community pharmacists can address with their diabetic patients

Identify at least 3 barriers (and possible solutions) to the implementation of a community pharmacy-based diabetes management program

Self Assessment Questions:

True or False. All diabetics should receive an ACE-inhibitor (or ARB) and aspirin.

True or False. Community pharmacists are limited to focusing on drug-related issues.

ASSESSMENT OF MEDICATION RENAL DOSING IN AN ACADEMIC MEDICAL CENTER

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Several medications, especially antibiotics, require dose or frequency adjustments based on renal function. Often times, these adjustments are inadvertently overlooked by prescribers and a standard dose and/or regimen is ordered for a patient with kidney dysfunction. This is one of the many interventions a pharmacist can make that has a direct impact, not only on patient care, but also on cost containment. Determining patients' renal function and making recommendations on dose and/or frequency when a medication requiring renal adjustment is ordered, as well as when function improves or declines, will help to ensure that patients receive optimal therapy.

The first phase of implementation consists of a retrospective review of pre-identified medications, including the collection of patient-specific data (e.g. serum creatinine, age, height, weight, etc.). Based on renal function and indication, appropriate dosing will be assessed. The second phase of the program will be an evaluation of dose/frequency changes as recommended by a pharmacist. After the data collection is complete, the following parameters will be analyzed: drugs most frequently prescribed incorrectly, physician service that most often prescribes incorrectly, and cost savings associated with dose and/or frequency change.

Data is currently being collected and analyzed. If a large number of renally eliminated drugs are not dosed adjusted appropriately, a renal dosing program will be designed and implemented.

Learning Objectives:

To evaluate whether selected medications at Rush University Medical Center (RUMC) are appropriately dosed by the medical and pharmacy staff for renal function.

To assess if a renal dosing program needs to be implemented at RUMC.

Self Assessment Questions:

The medication most often prescribed incorrectly for renal function at RUMC is:
a. enoxaparin
b. levofloxacin
c. imipenem
d. fluconazole

True or False
Before ordering a drug that requires dose/frequency adjustments based on renal function, physicians at RUMC always calculate an estimated creatinine clearance.

IMPROVING CARE OF THE HEART FAILURE PATIENT: A PERFORMANCE IMPROVEMENT INITIATIVE

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More than 3 million people in the US are affected by congestive heart failure (CHF). More than 400,000 new cases of CHF are diagnosed each year. Of the 1-2% of the total population suffering from CHF, up to 30-40% are hospitalized each year. The most common cause of death in these patients is progressive heart failure. Heart failure is currently the number one diagnosis related group at our institution. Due to the increasing prevalence, healthcare needs to focus on the appropriate treatment for CHF acutely and chronically. Angiotensin converting enzyme inhibitors (ACE-I) and beta-blockers (BB) are two very important medications in the treatment of heart failure. They have been shown to decrease mortality and hospitalizations in these patients.

This was initially a retrospective chart review for the first three quarters of 2003. Charts for patients over the age of 18 with a principle diagnosis of heart failure were reviewed and data was abstracted into a computer software system. Data recorded included whether or not the patient's ejection fraction was below 40% and if it was below 40%, if they were discharged home on and ACE-I and BB. Based on this retrospective analysis, performance improvement initiatives including education to pharmacists, physicians, nurses, new heart failure order sets, and new heart failure patient discharge forms were identified and implemented.

Patient charts from the fourth quarter of 2003 and the first quarter of 2004 will be evaluated to determine the impact of implemented performance improvement initiatives. Results and summary will be presented.

Learning Objectives:

Define the importance of ACE-I and BB therapy for heart failure patients.

Explain the contraindications and reasons for not using ACE-I and BB therapy in heart failure patients.

Self Assessment Questions:

ACE-I and BB should only be used for a short period of time after the diagnosis of heart failure. T or F

Asymptomatic heart failure patients do not need to be placed on ACE-I and BB. T or F

DETERMINING THE RELATIONSHIP BETWEEN HIGH DOSE ORAL LANSOPRAZOLE AND GASTRIC PH IN CRITICALLY ILL PATIENTS

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Low gastric pH is significant in the etiology of both stress ulcer formation and gastrointestinal bleeding (GIB) in critically ill patients. A pH of > 4 is sufficient in preventing stress ulcer formation; however a pH of > 6 is required for preventing re-bleeding after endoscopic treatment in selected patients. Intravenous omeprazole is the only acid suppressive therapy shown to be effective in the prevention of rebleeding post-endoscopic treatment in high-risk patients. However, continuous intravenous pantoprazole infusions are effective in elevating the pH to > 6. It has not been determined whether high dose oral proton pump inhibitors (PPIs) can increase the pH to > 6. Therefore, the objective of this 18-month retrospective trial was to determine whether high dose oral PPIs are effective in reducing gastric acidity to a pH of > 4 to prevent stress ulcer formation and a pH of > 6 to prevent re-bleeding. Methods: All patients admitted to the University Hospital who had a gastric pH drawn while on acid suppressive therapy were analyzed. Data collection included patient demographics, acid suppressive regimen, gastric pH levels, endoscopic studies, and number of episodes of GIB/re-bleeding. Results: Six patients and 44 gastric pH levels were found for patients on high-dose-oral-lansoprazole (HDOL) therapy. HDOL was defined as lansoprazole doses >= 60mg daily. Gastric pH levels >= 4 were achieved in >= 85% of patients on all HDOL regimens. The goal gastric pH levels were achieved in >= 95% of patients on HDOL regimens dosed >= every 8 hours. Conclusions: HDOL therapy appears to achieve and maintain the desired gastric pH levels in critically ill patients. Further prospective studies in critically ill patients are warranted to determine the most appropriate acid suppressive therapy, including HDOL, to elevate gastric pH levels and obtain optimal patient outcomes.

Learning Objectives:

To be familiar with goal gastric pH levels for different indications in critically ill patients

To determine how high dose oral lansoprazole treatment affects gastric pH in the critically ill patient

Self Assessment Questions:

The goal pH level is > 6 for preventing gastrointestinal re-bleeding post-endoscopic treatment in high-risk patients
True False

High dose oral lansoprazole therapy may be an effective alternative to continuous intravenous proton pump inhibitors infusion in raising the gastric pH levels to > 6
True False

EVALUATION OF THE UTILIZATION OF MICROBIOLOGICAL CULTURES IN TRAUMA PATIENTS WITH EARLY FEVER

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Fever is a common event among hospitalized patients. Additionally, fever is known to be a normal physiologic response in trauma patients, but data describing the incidence of fever after trauma is scarce. There are many potential causes for fever in the critically ill patient, both infectious and non-infectious. The assessment of new-onset fever can involve utilization of multiple diagnostic tests, including cultures, and add significant treatment costs. The purpose of the study was the documentation and analysis of microbial culture utilization in the evaluation of early fever in trauma patients.

A retrospective chart review was performed for adult patients admitted to the trauma service for 2002. Patients were excluded if presenting from an outside hospital greater than 24 hours post-injury or if they were chronically immunosuppressed. Eligible patients were evaluated to determine if cultures were drawn within the first five days of admission. Additional data included age, trauma mechanism, acute surgical procedure, timing of temperature elevations, and results of cultures. Culture times will be related to time since injury or procedures. Also the percentage of positive cultures and distribution of organisms in the early, positive cultures will be described.

There were 2582 patients admitted to the trauma service during 2002 that met study criteria. Of these patients, 2027 were admitted to a general ward and 555 were admitted to the ICU. In the ICU population 206 (41.4%) had cultures during the first five days, while 210 (10.4 %) ward patients had cultures drawn. Further analysis of the data will look for trends relating temperature elevations and cultures to time of injury and surgical procedures.

Learning Objectives:

Describe potential sources of fever in the trauma population.

Differentiate between infection and SIRS.

Self Assessment Questions:

In trauma patients, infection is the most common cause of early fever. T or F

All patients that exhibit the symptoms of SIRS are infected. T or F

EVALUATION OF A PAIN MANAGEMENT ASSESSMENT TOOL AT A COMMUNITY BASED MEDICAL CENTER

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Background: It is important for healthcare organizations to monitor their pain management systematically to ensure patients' pain is treated appropriately. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards on pain management mandate pain assessment in all patients. The standards imply that patients with pain should be properly managed, which includes recording pain assessments and interventions in ways that facilitate regular reassessment and follow-up. At Borgess Medical Center (BMC) pain management is monitored by the Pain Management Committee using an internally developed tool known as the pain management-monitoring tool (PMMT). Another pain management assessment tool, the Pain Assessment and Therapy Outcomes System (PATHOS) licensed by Ortho-McNeil, was recently acquired to supplement the PMMT.
Objectives: The primary objectives are to evaluate pain management throughout Borgess Medical Center to ensure JCAHO compliance with respect to pain management and to compare and contrast the data obtained utilizing the two pain management assessment tools.
Methods: This is a retrospective, observational study of pain management data from 50 randomly selected patients throughout the hospital collected over six months using the PATHOS monitoring tool. Patients were selected from a list of randomized hospital beds. Inclusion criteria consisted of any patient on a pain medication. Exclusion criteria consisted of any patient on an analgesic for purposes other than the treatment of pain. Data collected from the PATHOS tool will be compared to data collected from the PMMT.
Results: The strengths and weaknesses of the PMMT and PATHOS will be evaluated. Actual data collected using PATHOS will be compared to data collected using the PMMT to examine consistency, comprehensiveness, and ability to measure true pain management practice at BMC. Future implications may include changing how pain management is evaluated and identifying areas of improvement in pain management.

Learning Objectives:

Interpret the JCAHO standards on pain management and how they apply to PATHOS.

Critique the utilization of both pain management tools.

Self Assessment Questions:

JCAHO standards mandate that pain assessment is necessary only in patients who appear to be in pain.
T or F

The PATHOS tool is designed to measure outcomes of pain management such as sleep quality, mood, physical function, and lifestyle changes.
T or F

MEDICATION USE EVALUATION OF BIVALRUDIN AT THE HEALTH ALLIANCE OF GREATER CINCINNATI

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Introduction: Bivalrudin is a specific and reversible direct thrombin inhibitor, which binds both to the catalytic site and the anion-binding exosite of circulating and bound thrombin. Unlike heparin, bivalrudin is able to bind to bound thrombin preventing further thrombotic growth for formed clots. Bivalrudin was initially studied and used in patients receiving anti-thrombotic therapy during coronary angioplasty for unstable or post-infarction angina (NEJM 1995;333:764-769). Bivalrudin was compared with heparin showing no difference between the primary end points for death, myocardial infarction, emergency bypass surgery, the combined end point of death, MI, and emergent bypass. However, a statistically significant decrease in red-cell transfusion and major hemorrhage was found with bivalrudin. Additional research has shown efficacy in treating patients: with unstable angina, in combination with streptokinase and aspirin in patients with myocardial infarction, and in combination with glycoprotein IIb/IIIa inhibitor in percutaneous coronary revascularization procedures. However, the only FDA approved indication for bivalrudin is for use in patients with unstable angina undergoing percutaneous translumenal coronary angioplasty.
Objectives: This is a retrospective medication use evaluation of bivalrudin (Angiomax) at the six Health Alliance of Greater Cincinnati hospitals. Goals of the project are: 1) to determine current usage of bivalrudin at each hospital, and 2) to evaluate treatment, monitoring, and number of bleeding events with bivalrudin.
Hypotheses: The first hypothesis is that there is an uneven distribution of the use of bivalrudin within the Health Alliance. Hospitals with strict adherence to their Pharmacy and Therapeutics committees' formularies will use bivalrudin at least 50% less than hospitals without strict adherence. The second hypothesis is that bleeding risks with bivalrudin are equivalent to studies comparing bivalrudin versus heparin.
Methods: Subjects will be identified through drug coding searches of patient's given bivalrudin within each of the six Health Alliance institutions.
Results: Results are currently ongoing.

Learning Objectives:

To understand the use of bivalrudin based in six different hospitals within a health alliance.

Identify bleeding risks with the use of bivalrudin.

Self Assessment Questions:

True or False The six hospitals within the Health Alliance of Greater Cincinnati used bivalrudin equivalently.

True or False Bleeding complications were equivalent between bivalrudin use at the Health Alliance Hospitals and what was has been evidenced in previous published studies.

PROPOFOL FOR CONSCIOUS SEDATION IN THE INTENSIVE CARE UNIT

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Purpose: In our institution, physicians have shown an interest in propofol use for conscious sedation in the intensive care unit. Propofol is being investigated in order to familiarize the staff with propofol and its implications for use in the ICU setting. The improper use of propofol may result in serious complications. Thus, a standard protocol will reduce possible complications and improve patient outcome. Midazolam and lorazepam are sedative agents currently being used in our institution. Midazolam and propofol have some similiar properties. The purpose of this study is to: 1) develop propofol guidelines for conscious sedation in the ICU 2) assess the impact that propofol will have on our institution through a chart review 3) determine if there were patients who were placed on midazolam that would have also been candidates for propofol according to the criteria stated in the guidelines.

Conclusion: Data still pending

Learning Objectives:

Recognize the importance of implementing a propofol protocol for conscious sedation in the Intensive Care Unit

Understand the importance of propofol monitoring

Self Assessment Questions:

What are the advantages and disadvantages of propofol use in the Intensive Care Unit?

How can propofol be safely and effectively used for conscious sedation in the Intensive Care Unit?

OPTIMIZATION OF GABAPENTIN USAGE AT THE VA CHICAGO HEALTH CARE SYSTEM

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Gabapentin is FDA approved for partial seizures and postherpetic neuralgias. The anticonvulsant has gained popularity among physicians and is being prescribed for off-label indications, including those with minimal data to support its use. Previous evaluations at the VA Chicago Health Care System (VACHCS) indicated a need for a change in prescribing patterns and usage of gabapentin due to lack of documentation, incorrect dosing, patient safety concern, inappropriate use, and unnecessary drug cost. Consequently, an electronic order entry template for gabapentin was designed and implemented within the VACHCS, which prompts prescribers to indicate usage and appropriately dose. The purpose of the study is to assess post-implementation effectiveness of the gabapentin template in terms of optimizing gabapentin usage at the VACHCS.

A retrospective chart review of approximately 200 patients will be assessed. The evaluation of the template will address two major improvement areas: optimization of the quick order entry template via computerized patient record system and the prescription label. Data collection will entail determining the indication of gabapentin (FDA approved vs. non-FDA approved) and examining if gabapentin was being used as monotherapy or as adjunctive therapy. Data collection will also include age and serum creatinine to review if gabapentin was renally adjusted in warranted patients. Information will be collected to evaluate dose titration, maximum dose, and efficacy. Gabapentin prescriptions will be reviewed for day supply and number of refills in order to assess refill limitations and follow-up for effectiveness. Finally, the last part of the data collection will determine if an indication is listed on the prescription label. Data collected post-implementation will be compared to pre-implementation data.

In theory, post-implementation of the gabapentin template will lead to optimization of gabapentin usage at the VACHCS by promoting documentation, assessing effectiveness of the drug, increasing patient safety, and ultimately eliminating unnecessary drug expenditures.

Learning Objectives:

To recognize FDA approved indications vs. off-label indications for gabapentin.

To determine if modification in the ordering process can improve the usage of gabapentin.

Self Assessment Questions:

Gabapentin is currently FDA approved for bipolar disorder. T or F?

The dose of gabapentin should be titrated for maximal effect. T or F?

PROVISION OF WEIGHT MANAGEMENT SERVICES BY A PHARMACIST IN A GROCERY STORE COMMUNITY PHARMACY

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Purpose: The primary purpose of the study is to evaluate patients' ability to safely lose weight, maintain the lower body weight, and reduce the risk of obesity related disorders under the weight management program. The secondary purpose is to evaluate patients' satisfaction with the program, the pharmacist, and the pharmacy and their likelihood of returning for other clinical services and prescription needs.
Methods: Inclusion criteria: men and women between the ages of 18 and 64 with a BMI of 25 to 34.9 kg/m². Exclusion criteria: pregnancy, lactation, untreated psychiatric illness, bulimia, anorexia nervosa, substance abuse, cancer, severe gastrointestinal disease, renal or hepatic dysfunction, and recent start or dosage change of a thyroid hormone. A medical release form authorizing the start of the program and physical activity regimen will be obtained from the physician. The program will involve an initial weight screening session; an introductory, individualized consult; follow up group meetings; and follow up individual sessions. During the introductory consultation, the pharmacist will provide counseling on a low calorie diet, physical activity, and behavior therapy and jointly develop a practical treatment plan with the patient. The treatment strategy will be adjusted, when needed, at the follow up individual sessions. NIH guidelines will be followed when considering and recommending pharmacotherapy. Outcome measures to be examined: weight, BMI, waist circumference, blood pressure, fasting or two hour post prandial blood glucose, and lipid profile. In addition, patients will be surveyed concerning secondary purpose variables three months from their commencement of the program.
Results/Conclusions: Intention to treat analysis and paired t test will be utilized to compare baseline with last visit values and determine if a statistically significant improvement in outcome measures occurred. Descriptive analysis will be performed for the results of the satisfaction survey.

Learning Objectives:

Discuss the potential benefits of a weight management pharmaceutical care program in improving health outcomes.

Describe the level of patient satisfaction with weight management services in a grocery store community pharmacy setting.

Self Assessment Questions:

By offering optimal weight management services, grocery store community pharmacists can favorably impact patient health outcomes. T or F

Are patients satisfied with the pharmacist's intervention in their efforts to lose weight?

APPLICATION OF THE JCAHO TRACER METHODOLOGY TO ASSESS MEDICATION USE PRACTICES IN AN ACADEMIC MEDICAL CENTER

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Background: The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has revised its survey methods to increase focus on practices that improve the safety and quality of medical care. Standards have been changed, and “elements of performance” are used to describe requirements for compliance. The scoring process has also been altered.

Surveyors will now focus on the actual delivery of care in healthcare organizations, with an emphasis on risk reduction and continuous process improvement. In order to assess the experiences of patients, the survey will utilize a “tracer” methodology. Rather than evaluating standards in isolation, surveyors will request information as it relates to the care of an individual patient. A selected patient's record will be used to evaluate compliance with standards.

The new tracer methodology will have significant impact on the evaluation of medication management standards. Because tracers are generally performed on complex patients, complex medication regimens will be reviewed. Additionally, surveyors are required to perform separate system tracers on medication management standards. An organization's policies and procedures will be evaluated as an element of the medication use process.

Purpose: The purpose of this project is to define the components and processes involved in a medication tracer. The project will provide a roadmap for conducting medication tracers as a process improvement and continual survey readiness method.

Methods: We plan to apply the JCAHO medication tracer methodology to evaluate the use of high-risk medications in our institution. We will use the new medication management standards as a tool for the evaluation.

Learning Objectives:

Understand the JCAHO “tracer” methodology as it relates to medication use in a hospital setting.

Develop an understanding of how to apply this methodology to prepare for reaccredidation.

Self Assessment Questions:

The medication management system will be assessed by tracking the performance of which of these processes:
A) Selection and procurement
B) Storage
C) Prescribing, ordering and transcribing
D) Preparation and Dispensing
E) All of the above
Answer: E

True or false: The surveyor may ask to see a pharmacy department policy on verbal orders.
Answer: True

EVALUATION OF STREPTOCOCCUS PNEUMONIAE ISOLATES IN PNEUMONIA PATIENTS IN THE GREATER KALAMAZOO AREA: SUSCEPTIBILITY PATTERNS, PATIENT CHARACTERISTICS, AND CLINCAL OUTCOMES.

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Streptococcus pneumoniae is the most common pathogen found in patients stricken with community-acquired pneumonia (CAP). There are numerous antibiotics used to treat CAP but prudent drug selection is desired to prevent the development of bacterial resistance. Over the years, S. pneumoniae has become increasingly resistant to penicillins and macrolides as evident from national surveillance studies; however local community resistance traits need to be evaluated since resistance traits are not parallel across communities. Local surveillance can be used as guide in judicious antimicrobial selection.

S. pneumoniae isolates were obtain from two local hospitals in Kalamazoo, MI, between October, 2002 and May, 2003. In addition, demographics, laboratory values and outcomes were collected from the medical records for each isolate. To be included in the study, each patient had to be treated for pneumonia for a minimum of two days on an inpatient basis. For each isolate, the minimum inhibitiory concentration (MIC) was determined for the following antibiotics: clarithromycin, azithromycin, erythromycin, penicillin, ceftriaxone, levofloxacin, clindamycin, and doxycycline. All MIC's were determined using broth microdilution techniques as proscribed by the NCCLS.

An evaluation of the macrolides was conducted to see the prevalence of the two mechanisms of macrolide resistance: production of rRNA methylase that modifies 23S ribosomal RNA resulting in an MLSB phenotype, and development of an active efflux system resulting in a M-phentotype. These mechanisms are mediated by the erm (B) and mef (A) gene, respectively. Regression analysis on patient demographics and clinical outcomes will examine if any macrolide-resistant relationships existed.

Learning Objectives:

Describe the two mechanisms of macrolide resistance in Streptococcus pneumoniae.

Examine potential association between patient demographics and macrolide resistance

Self Assessment Questions:

Base on surveillance results, macrolide resistance was more common in all the following except: (a) children younger than 5 years (b) Caucasian race (c) state of Georgia (d) New York state

Streptococcus pneumoniae that has an MLSB phenotype can be treated with clindamycin. T F

POTENTIAL DRUG INTERACTION BETWEEN TACROLIMUS AND OCTREOTIDE IN PANCREAS TRANSPLANT PATIENTS

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Introduction: Approximately 30% of diabetic patients require daily insulin injections. However, no exogenous insulin administration can compare to the physiologic delivery of insulin by an intact pancreas. For this reason, pancreas transplantations are conducted in humans. To prevent acute rejection seen in transplanted patients, tacrolimus (TAC) is used for immunosuppression. Despite immunosuppressant therapy, technical complications still contribute to high morbidity and mortality rates. The majority of the complications are related to the management of exocrine secretions. Currently the most common operative procedure in managing exocrine secretions is to use the bladder drainage technique by the duodenal segment. Unfortunately, complications related to this procedure often require a revision of the bladder drainage to enteric drainage. Another method in managing exocrine secretions that has been proven to be efficacious is the use of the drug octreotide. However, we have observed in several pancreas transplantation patients that when octreotide is added to their tacrolimus drug regimen, TAC concentrations have increased which can lead to TAC induced toxicities and loss of graft function.

Statement of Purpose: To determine the incidence of increased TAC concentrations when given concurrently with octreotide and identify the patient characteristics that may be associated with this drug-drug interaction.

Methods: This is a retrospective chart review study evaluating the incidence and patient characteristics that cause increased TAC concentrations when given concurrently with octreotide at the University of Illinois Medical Center at Chicago for patients who have received pancreas transplants from November 1999-November 2003. Subjects were identified via electronic transplantation records that followed the protocol for cadaveric or living related pancreas transplants and underwent bladder to enteric conversion drainage.

Results: Data collection presently ongoing. Final conclusions on the potential tacrolimus and octreotide drug-drug interaction will be presented at Great Lakes Residency Conference.

Learning Objectives:

To be able to discuss the incidence of the drug-drug interaction between TAC and octreotide.

Identify patient characteristics that may be associated with this drug-drug interaction.

Self Assessment Questions:

Octreotide when added to TAC drug regimen causes increased TAC concentrations. T/F

Octreotide should not be given to patients on TAC because of toxic concentrations seen when given concurrently. T/F

IMPLEMENTATION OF PHARMACIST CONDUCTED MEDICATION HISTORIES IN THE COMMUNITY HOSPITAL SETTING

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Background: The current trend in pharmacy practice is to involve the pharmacist in activities of patient care. This past year Theda Care hospitals instituted a medication history form that acts as an order for continuing home medications. Upon admission to the hospital, the nursing staff is responsible for completing these forms. The majority of these forms are either incomplete or contain errors. The implementation of pharmacist conducted medication histories could be quite beneficial to these hospitals. The benefit being enhanced patient safety. This requires the redesign of the practice model. It will allow nursing staff more time for direct patient care and allow the pharmacist more involvement with patient care. Under the current process, the pharmacist spends a great deal of time clarifying errors on the form. The new model will simplify the process by removing the nurse from the cycle.

Purpose: The purpose of this study was to analyze and evaluate the accuracy of nursing conducted medication histories, then contrast that with pharmacist obtained histories. The main emphasis of the project is patient safety. The data analysis should provide enough data to support changing the current process to include the pharmacist.

Methods: Data from nursing conducted medication histories was randomly collected from both hospitals from October to December. The nursing staff was unaware of this collection period, thus allowing for consistency. In February, the pharmacist conducted medication histories will be initiated on a limited basis. The data will be analyzed and comparisons between the nurse and pharmacist conducted medication histories will be made.

Preliminary Results: There were approximately 500 forms collected. The data analyzed shows that the majority of medication history forms are incomplete or contain errors. The results and summary will be presented at the Residency Conference.

Learning Objectives:

Understand the importance of pharmacist conducted medication histories for patient safety.

Understand the development process for changing the current clinical model to include pharmacist-conducted medication histories and the barriers encountered upon implementation.

Self Assessment Questions:

Discuss common errors incurred with nursing-conducted medication histories.

Discuss the barriers encountered by the pharmacist upon implementation of a pharmacist-conducted medication history program.

REDUCTION OF ADVERSE DRUG EVENTS THROUGH HOSPITAL PHARMACIST DOSING OF ANTICOAGULANTS

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The identification of adverse drug events is a challenge that all hospitals face. Current methods of reporting are inadequate and underutilized. Use of computer technology to assist in the identification of potential adverse events is an exciting development in patient safety. It has been estimated that as many as 30% of patients who are hospitalized experience an adverse drug event (ADE). Traditional reporting methods for ADEs produce a very small number of events and chart reviews, although most effective, are labor intensive. Utilizing computer databases to identify potential adverse drug events has been shown to be an effective way to reduce patient harm.

Based on prior studies using computerized methodology for identification of ADEs we adapted the "trigger" method for use in our institution. "Triggers" are the computer identified signals indicating that an adverse event may occur or has occurred. Our institution utilizes "triggers" for high risk anticoagulation medications. These "triggers" include, elevated INR, aPTT, and use of vitamin K.

Our baseline data was collected between September and November 2002. During the following year, an action plan for ADE reduction was presented and accepted by the medical staff. The plan involved pharmacy monitoring all patients receiving heparin or warfarin, the development of a Pharmacy Dosing and Monitoring Service, and extensive education of the pharmacists during 2003. The baseline period identified a total of 104 "triggers". Of these "triggers", 15 were concluded to be adverse drug events identified through chart review. The goal is to reduce this number by ten percent through utilization of hospital pharmacists to manage anticoagulation therapy.

Learning Objectives:

Understand how computerized identification of events can better identify events then traditional reporting methods.

Learn the impact of an inpatient anticoagulation pharmacy dosing service.

Self Assessment Questions:

True or False: The use of the trigger tool will identify adverse events that may not otherwise be reported through voluntary reporting

True or False: Pharmacy managed dosing and monitoring of anticoagulants for hospitalized patients decreases adverse events compared to traditional methods.

A PILOT PROJECT TO DETERMINE THE FEASIBILITY OF A MEDICATION STARTER KIT FOR PATIENTS REQUIRING MUSCULOSKELETAL AND OSTEOARTHRITIS PAIN MANAGEMENT.

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The process of selecting a tolerable and effective analgesic drug for the treatment of chronic musculoskeletal or osteoarthritis pain can be frustrating for both patients and providers. Patients have different responses to medications and often require an individualized treatment plan. In the traditional treatment approach for a patient needing treatment for musculoskeletal or osteoarthritis pain, a provider selects one medication for a therapeutic trial. The patient tries the therapy for >=4 weeks and then returns to clinic to evaluate the success. If the treatment is unsuccessful, the provider selects a different drug and the process repeats. This approach to treatment can potentially lead to long periods of time before a patient experiences adequate pain relief.

The purpose of this pilot project is to determine if an analgesic starter kit consisting of different medications is a feasible alternative to expedite the selection of an appropriate medication for patients needing relief of musculoskeletal or osteoarthritis pain.

Any person seen in either the rheumatology clinic or a primary care clinic and in need of pain relief for muscle or joint pain will be eligible. If patients meet study criteria, a prescription for an analgesic starter kit will be provided. The starter kit will consist of a two-week supply of each of the following medications: salsalate, rofecoxib, naproxen, and tramadol. Subjects will take a medication twice daily for two weeks before moving onto the next medication in the pack. On a weekly basis, subjects will complete a questionnaire evaluating function, side effects, and pain. Once the subject has finished the starter kit, he or she will return to clinic for evaluation of the questionnaire responses. Investigators will discuss responses with subjects to determine what medication was most effective.

Results/Conclusions: Research in Progress.

Learning Objectives:

Identify different treatment strategies for chronic musculoskeletal or osteoarthritis pain.

Discuss rationale behind the implementation of starter kits to expedite the process of choosing an analgesic medication.

Self Assessment Questions:

What is the prevalence of chronic musculoskeletal or osteoarthritis pain requiring chronic analgesic therapy?

What medications are commonly used for the treatment of musculoskeletal or osteoarthritis pain?

DEVELOPMENT AND IMPLEMENTATION OF A CARDIOVASCULAR RISK REDUCTION PROTOCOL IN A CARDIOLOGY CLINIC AT A VETERANS AFFAIR MEDICAL CENTER

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Background: A recent study performed at the Roudebush VA Medical Center examined patients currently taking simvastatin 80mg. The study assessed LDL goal achievement at a maximum statin dose, the number of titrations and time to reach simvastatin 80mg, proper monitoring of lipid and liver function tests, and the incidence of cardiovascular complications in patients not achieving LDL goal. The study concluded that 65.7% of patients achieved their LDL goal. Liver function tests were not conducted in 64.8% of patients within three months of simvastatin 80mg initiation, and the average number of titrations and time to reach simvastatin 80mg was 2.3 titrations and 2.6 years, respectively. A total of 47 patients experienced 80 cardiovascular-related outcomes while not at their LDL goal. Based on these results, it was determined that a protocol for overall cardiovascular risk reduction management was needed to help improve patient outcomes and maintain consistent management between providers.

Objectives: The purpose of this study was to develop a cardiovascular risk reduction protocol, emphasizing blood pressure and cholesterol management, and to compare patient management and outcomes before and after protocol implementation. The protocol will be used by a clinical pharmacist in a cardiology clinic.

Methods: NCEP and JNC-7 guidelines were used to develop a protocol to attain goal blood pressures and cholesterol levels. The cardiology clinic staff approved the protocol, and a clinical pharmacist was assigned to implement the protocol. Data will be collected to assess the benefits of the protocol and the impact of a clinical pharmacist working within the clinic. Data collection will include: patient demographics, NCEP risk factor assessment, current medications, laboratory parameters, blood pressure readings, adverse events, and cardiovascular-related outcomes.

Results: The protocol is currently being implemented in the cardiology clinic and preliminary results will be presented at the Great Lakes Conference.

Learning Objectives:

Identify key monitoring parameters and titration schedules for patients prescribed simvastatin.

Understand what information needs to be included when developing a cardiovascular risk reduction protocol.

Self Assessment Questions:

HMG-CoA Reductase Inhibitors can be titrated every six weeks with appropriate monitoring. T/F

List 3 potential problems in developing a cardiovascular risk reduction protocol.

EVALUATION OF PHARMACIST MEDICATION ORDER REVIEW

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Literature evaluation of safety in the medication process has primarily focused on administration errors. Methods for reporting medication errors include anonymous self-reports, incident reports, critical incident techniques, and direct observation. Incident reports are often used to report medication errors in the hospital setting, however this method of reporting requires an awareness of the error and staff participation may be low due to fear of disciplinary action. Without an understanding of the safety of the medication process within the pharmacy department, it is difficult to know if a specific incident report is reflective of the medication process or simply an isolated event. The purpose of this study is to create a method to identify and quantify errors associated with pharmacist medication order review, then use the method to conduct an assessment of the medication order review process, and finally to make recommendations for ongoing use of the method within the department.

The study is a retrospective, disguised-observation design. All medication orders written for patients on a general medical unit were collected from a ten-day period in January. Each written medication order was compared to the order input into the pharmacy computer system and evaluated for correctness. The components of the medication order that were evaluated included patient name, drug name, dose, route, frequency, time, start/stop date, instructions for use, renal dose adjustments, duplicate therapy, significant drug interactions, and allergy information. It is expected that 2500 medication orders will be reviewed. The results will be used to calculate a departmental error rate. Sub-group analyses will be used to identify trends and determine if the discrepancies can be associated with centralized services, technician order entry, weekend shifts, or specific times of day. Recommendations will be made for routine implementation of the review process.

Data analysis is currently in progress and the conclusions will be presented at the Great Lakes Conference.

Learning Objectives:

Summarize the various medication error reporting methods used in the hospital setting.

Perform an error rate calculation.

Self Assessment Questions:

An advantage of the disguised-observation study design is that it is independent of a subject's willingness to report a medication error. [T / F]

Medication order entry discrepancies were associated with centralized pharmacy services. [T / F]

A RETROSPECTIVE, CASE-CONTROLLED EVALUATION OF A CLOSTRIDIUM DIFFICILE OUTBREAK WITHIN A VA HOSPITAL

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Background: Clostridium difficile-associated diarrhea is the most commonly diagnosed infectious hospital-acquired diarrhea in developed countries. Antibiotic administration is the most significant and most reported predisposing factor for C. difficile infection. C difficile infection primarily occurs in hospitalized patients, causing as many as 3 million cases of diarrhea and colitis per year.

Objectives: To evaluate the incidence and risk factors associated with an outbreak of C. difficile from August 2002 to December 2002 at the Louis Stokes Cleveland Veterans Affairs Medical Center (LS-VAMC).

Methods: A retrospective, case-controlled study will be performed to evaluate an outbreak of C. difficile at the LS-VAMC. Patients with a positive C. difficile toxin from August 2002 to December 2002 will be identified by a computerized search utilizing the hospital database. Each case patient will be matched with two control patients who were C. difficile toxin negative. Control patients will also be matched for age (+/- 5 years) and for length of hospital stay (+/- 5 days). Patients will be excluded if they had been C. difficile toxin positive within two months of case date or if they were transferred from an outside hospital. Data collection from computerized chart review will include age, days from admission until positive C. difficile toxin, length of stay, co-morbid disease states, and antibiotic use one month prior to positive C. difficile toxin date through length of hospital stay if appropriate. A Charleson Weighted Index of Co-morbidity score will be calculated for each case and control patient. All data will be entered into an Excel spreadsheet for statistical analysis. Pending results, an intervention may be implemented to reduce future outbreaks of C. difficile within the institution.

Results: pending

Learning Objectives:

List risk factors for the development of C. difficile-associated diarrhea.

Identify mechanisms to control outbreaks of C. difficile.

Self Assessment Questions:

True/ False Antibiotics are the most common cause for C. difficile-associated diarrhea.

True/False Any household disinfectant can eliminate C. difficile spores from the environment.

PROPOFOL CONVERSION TO LORAZEPAM FOR LONG-TERM SEDATION

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Purpose: Design and implement a protocol to achieve predictable conversion from propofol to lorazepam for long-term ventilated patients requiring sedation.

Methods: A protocol was created to convert patients from propofol to lorazepam. The protocol is based on the kinetics of both drugs and on the estimated effective serum concentration of lorazepam.

Results: The protocol has been approved by the intensive care work group at St. Luke's Medical Center. It will be piloted in the intensive care units and data will be collected to assess its effectiveness.

Conclusions: This protocol will assist health care providers in dosing adequate and evidence-based sedation for ventilated patients. Simplifying the process of converting patients to lorazepam is hoped to encourage use of the protocol, in this way decreasing the adverse events and costs associated with long-term propofol use.

Learning Objectives:

Explain the reasons why lorazepam is preferred as the agent for sedation in long-term ventilated patients.

Understand the reasons for failures in converting patients from propofol to lorazepam.

Self Assessment Questions:

The most common reason for failure to convert patients from propofol to lorazepam is:
A) Oversedation during conversion
B) Undersedation during conversion

The duration of action of lorazepam is usually:
A) 30 minutes
B) one hour
C) four hours
D) eight hours

IMPLEMENTATION OF A LIPID MANAGEMENT PROGRAM IN A COMMUNITY PHARMACY

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Approximately 1 in 5 Americans have one or more types of cardiovascular disease (CVD). High blood cholesterol is strongly related to the risk of CVD. The recommendations for screening of CVD include a fasting lipid profile consisting of high-density lipoproteins (HDL), low-density lipoprotein (LDL), total cholesterol (TC), and triglycerides (TG). Many patients are not at goal cholesterol levels based on ATP III (Adult Treatment Panel) guidelines. Some challenges of getting patients to goal include: lack of patient education, lack of communication between healthcare providers and patients, lack of medication adherence, and lack of lipid-lowering drug therapy.

This study investigates the impact of a community pharmacy lipid management program (LMP) on the clinical outcomes associated with lipid management. The LMP will be offered January 1st and July 1st of each year and completed over a six-month timeframe. An initial screening will be conducted during which time the following baseline data will be collected for enrolled patients: full lipid profile, self-knowledge survey, self-reported medication adherence assessment, and cardiac risk assessment. Monthly group sessions to provide the patient with intense education about cardiovascular disease will be conducted by a pharmacist, physician and dietician. Topics discussed at these sessions will include risk factors for cardiovascular disease, diet, therapeutic lifestyle changes, and lipid-lowering drug therapy. The pharmacist will assess medication adherence during refill visits to the pharmacy. The patient will be allowed individualized visits with the pharmacist to discuss issues in private. The LMP will be individualized based on pharmacist assessment and patient specific needs. The patient's physician will be notified of the patient's progress via letter or phone calls from the pharmacist at the patient's request.

The following will be assessed over the six-month period: LDL-C and non-HDL-C goal attainment, self-knowledge of cholesterol and cardiovascular disease, and medication adherence. Data collection is in progress.

Learning Objectives:

Describe the impact that a lipid management program directed by a community pharmacist can have on LDL-C and non-HDL-C goal attainment.

Describe how communication links between community pharmacists, patients, and primacy care physicians improve patient care.

Self Assessment Questions:

True or False. It is important to establish communication links between the community pharmacist, primary care physician, and patient to improve patient care.

True or False. A large number of patients are not at their goal cholesterol levels based on ATP III guidelines.

MEDICATION-RELATED FALLS IN AN ELDERLY INPATIENT SETTING

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Falls have a substantial impact on our health care system, especially among the geriatric population. Those over age 65 are at a greater risk of falls for a variety of reasons. The physiology of the aging body and certain medical conditions frequently seen in the elderly can both increase a patient's risk for a fall. Medications can also be implicated in increasing an older person's fall risk, either by an extension of the medication's intended effect or from a multiple medication regimen's additive effects. Certain medications have even been deemed “inappropriate” for use in the geriatric population because their potential risk outweighs their potential benefit. Therefore these medications have the potential to put an elderly patient at risk for an adverse drug event, such as a fall. Examples of such medications have been published by Mark Beers, a gerontologist, et al and have been coined Beers' List, first published in 1991 with the most recent recommendations published in 2003. Yet despite the increased risk to patients over 65 and those with certain disease states, these “inappropriate” medications continue to be prescribed to millions of elderly patients.
Therefore, the purpose of this research is to determine if there is a correlation between falls within the Milwaukee VA Medical Center and the use of Beers' List medications in those patients.

Using Beers' List as a guide to those medications that are inappropriate for prescribing to the elderly, a retrospective chart review is being conducted for falls in the inpatient setting. The prevalence of falls occurring in patients prescribed a Beers' List medication will be determined.

Results will be presented at the conference.

Learning Objectives:

Understand the impact of medications on increasing an elderly patient's fall risk

Realize the economic impact that falls have on our medical system

Self Assessment Questions:

1 out of every ___ elderly people who breaks a hip will die within 6 months.

As we age, the physiology of our body changes. Which of the choices below is NOT a change typically seen in an elderly body (when compared with a 25 year old body)?

a. Slowing of metabolism
b. Kidneys filter less efficiently
c. Visual acuity increases

EVALUATION OF ADHERENCE TO HEART FAILURE GUIDELINES AND THE IMPACT OF AN EDUCATIONAL PROGRAM IN A COMMUNITY HOSPITAL SETTING

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Nearly 5 million Americans have heart failure. It is estimated that 1 out of every 10 Americans over the age of 65 will develop heart failure, accounting for 20% of hospital admissions amongst this patient population. Proper treatment and patient education are essential to reducing mortality, increasing functional status, decreasing unnecessary resource utilization, and decreasing health care costs related to heart failure.

The study is a retrospective, single-center, non-randomized study evaluating adherence to CHF guidelines established by the ACC/AHA and the impact of implementing educational initiatives designed to improve adherence. All patients with the diagnosis of CHF are included.

The primary outcomes are documentation of discharge instructions, LVF assessment, Ace Inhibitor use for LVSD, and documentation of adult smoking cessation advice/counseling. Baseline information was evaluated using the 2nd quarter of 2003.

Baseline information obtained shows non-adherence to current ACC/AHA guidelines. Currently, educational initiatives are being implemented. Data collection is ongoing.

Learning Objectives:

To review the epidemiology of heart failure

To familiarize audience with current ACC/AHA guidelines for the management of chronic heart failure

Self Assessment Questions:

Unless contraindications exist, what drugs should be prescribed for heart failure patients?

True or False. Nearly 500,000 patients are diagnosed each year with heart failure in the US.

CRITICAL APPRAISAL OF PRESCRIBING PATTERNS USED IN THE MANAGEMENT OF SEVERE SEPSIS IN ADULT PATIENTS AT THE UNIVERSITY OF MICHIGAN HOSPITAL

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Sepsis is the leading cause of death among critically ill patients and represents a substantial healthcare burden. The management of severe sepsis is complex and constantly evolving. The acuity of illness requires timely use of various treatment modalities which optimize clinical outcome when implemented.

This is a retrospective chart review study. All adult patients admitted to the University of Michigan Hospital who have received dopamine or norepinephrine and antimicrobial therapy will be identified using the University of Michigan Hospital Pharmacy database for possible enrollment. Patients who met the criteria for severe sepsis within 48 hours of initiation of a vasopressor will be enrolled in the study excluding those with severe neutropenia (defined as ANC < 500 per mm3). Based on preliminary estimation, a total of 150 patients will be enrolled. However, the first 25 patients enrolled in the study will be used to assess variance in prescribing patterns to determine the final sample size. Data to be collected includes patient demographic information, antimicrobial therapy, laboratory data, and relevant clinical information necessary to assess patient outcomes.

This study aims to define the current management of severe sepsis at our institution and evaluate its appropriateness based on the predefined criteria. Results will be analyzed to identify areas that could be improved in order to enhance patient care and overall outcomes.

Learning Objectives:

To describe briefly the significance, pathophysiology, definitions and current treatment modalities for severe sepsis

To describe the study design which will aim to define the current practice of severe sepsis management at University of Michigan Hospital and evaluate its appropriateness based on the predefined criteria

Self Assessment Questions:

Severe sepsis is a major healthcare concern causing profound morbidity and mortality for many individuals. True or False

Treatment options for severe sepsis include fluid resuscitation, vasopressor agents, antimicrobial agents, Activated Protein C (Xigris®), and steroids. True or False

THE USE OF ENOXAPARIN IN PEDIATRIC PATIENTS

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The purpose of this drug use evaluation is to assess the prophylactic and therapeutic use of enoxaparin in pediatric patients.

This evaluation is a concurrent monitor of hospitalized patients started on enoxaparin during their inpatient stay. The original prescription order, and any modifications, are reviewed and documented throughout the treatment period. Antifactor Xa levels are obtained from the hospital's lab system interface and documented. Dose administration time is collected from the Medication Administration Record. All data gathered is recorded on a patient specific data collection form. Descriptive statistical analysis will be performed.

The results will include mg/kg dosing for initial dose, schedule, route, and location of administration either subcutaneous in the abdomen or in the anterolateral thigh. Length of therapy in days and the total number of doses will be recorded. The reason for use will be recorded. Antifactor Xa levels will be reported along with timing relative to dose administration. Interacting medications will be noted.

Statistical evaluation of weight based dosing, dosing interval, number of order modifications, number of doses, length of therapy, and antifactor Xa levels will be performed. The data above will be evaluated based on hematology service involvement and prescribing medical service. Antifactor Xa levels will be evaluated relative to serum drug level timing of the enoxaparin and the number of doses before and between levels.

The conclusion will describe the range of enoxaparin dosing regimens utilized in pediatric patients for prophylaxis and treatment. The dosing ranges will be reviewed in regards to the current literature recommendations.

Learning Objectives:

To understand the reasons for use of enoxaparin in pediatric patients.

To understand the current literature-based dosing recommendations for enoxaparin in pediatric patients.

Self Assessment Questions:

List the reasons for use of enoxaparin in pediatric patients and the advantages enoxaparin has over heparain.

List the literature-supported doses of enoxaparin for both treatment and prophylaxis indications.

THE EVALUATION OF THE IMPACT OF CLINICAL PHARMACY PRIMARY CARE CLINICS ON CARDIOVASCULAR HEALTH

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It is known that achieving therapeutic goals in hypertension, hyperlipidemia, and diabetes lowers the morbidity and mortality associated with each. This retrospective chart review was performed to evaluate the achievement of therapeutic goals in patients with the above disease states who attend primary care pharmacy clinics at the Cincinnati VAMC.

Methods: The primary outcome is the percent of patients with hypertension, hyperlipidemia, and diabetes mellitus who achieve their therapeutic goals. For hypertension, goal blood pressure is defined as </ =140mmHg/90mmHg unless they have diabetes or renal disease, and the goal will then be </=130/80. Goal HbA1c is defined as </=7%. Goal LDL values will be determined according to the NCEP III guidelines.

Patients have been selected from appointment lists for pharmacy clinics from August 2002-July 31, 2003.

Summary of Preliminary Results:
Currently, 31 charts were reviewed. Of these, 27 had hypertension, 8 had diabetes, and 11 had hyperlipidemia. Of the 27 patients with hypertension, 11 reached their specific goal blood pressure during the review time period. Of the 16 who did not meet their blood pressure goal, 6 patients were trending towards goal.

None of the patients with diabetes achieved the goal HbA1c during the time period of the review. Three of the eight patients did have HbA1c values that were trending towards goal.

Of the patients with hyperlipidemia, 1 achieved goal LDL while 10 patients did not achieve goal LDL. Six of the ten patients who did not achieve goal LDL did have LDL values trending towards goal.

Conclusions:
Of the hypertension patients, 41% achieved goal blood pressure. Of the patients who did not achieve goal blood pressure, 37.5% had blood pressures that were trending towards goal.

Since there were so few patients with diabetes and hyperlipidemia evaluated thus far, no conclusions about the efficacy of achieving therapeutic goals can be made.

Learning Objectives:

To review the purpose, methodology, results, and limitations of this retrospective review of the effect of clinical pharmacy primary care clinics on cardiovascular health as measured by the surrogate endpoints of hypertension, diabetes mellitus, and hyperlipidemia.

From the results, to be able to make conclusions about the efficacy of primary care pharmacy clinics on cardiovascular health and to apply this information to enhance patient care in the future.

Self Assessment Questions:

Hypertension, hyperlipidemia, and diabetes all impact cardiovascular health. True/False.

Describe how you feel this study may apply to you as a pharmacist.

USE, EFFICACY, AND SAFETY OF NOVEL ANTIFUNGALS IN THE CLINICAL SETTING: A RETROSPECTIVE ANALYSIS

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Background: Due to an expanding immunocompromised population, treatment of invasive mycoses has become a challenge for clinicians. As a result, novel antifungal agents have been developed. However, clinicians are still in the early stages of determining how these agents fit into the antifungal armamentarium.

Purpose: The purpose of this study is to characterize the patient population and clinical settings in which novel antifungals are being used at a metropolitan teaching hospital. The secondary objective is to describe the outcomes (i.e. efficacy, morbidity and mortality) and the tolerability of these agents.

Methods: Data will be collected retrospectively from patients' medical records. Patients who received voriconazole or caspofungin between January 2001 and December 2003 will be included. Patients will be identified through antimicrobial use data collected by the University of Illinois at Chicago Medical Center (UICMC) department of pharmacy. Data to be collected includes: demographics, primary diagnosis, concomitant disease states, site of infection, microbiology culture results, pertinent medications (anti-infective and immunosuppressive agents, dose, route, and duration), laboratory values, diagnostic tests (MRI, CT, and CXR), possible drug interactions, adverse drug reactions, and clinical outcomes. Data will then be entered into a database and analyzed for statistical significance.

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

Learning Objectives:

To characterize both the population and clinical settings in which both caspofungin and voriconazole are being used at a metropolitan teaching hospital.

To describe the efficacy and the tolerability of the use of these agents in the clinical setting.

Self Assessment Questions:

Caspofungin and voriconazole are two new novel antifungalS. According to the presented data these agents are currently being used in what clinical setting?

These new antifungal agents are well tolerated by most patients.
True or False

THE DEVELOPMENT AND IMPLEMENTATION OF A PHARMACIST COMPETENCY PROGRAM

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Health care is a rapidly changing field that requires constant education and a commitment to learn. There is a clear connection between education and training in meeting patient needs and delivering high-quality health care. JCAHO has a standard that requires that the competence of staff members is assessed, maintained, demonstrated, and improved continually. Hospitals should use a combination of ongoing competence assessment and educational activities to maintain staff competence.
Competencies have been offered for pharmacy staff education at Spectrum Health in a variety of formats. The primary goal of this project is to develop and implement a standardized competency template, using community-acquired pneumonia (CAP) as the pilot. Secondary goals include determining which form of media and what time periods best serve our pharmacists and enhancing pharmacist knowledge base on CAP.
Educational development surveys on CAP knowledge and on the preference of competency format were distributed. The decision to offer a competency both as a CE presentation (requested by 58%) and a web- based packet (requested by 21%) for home study was made due to pharmacist preference. Final surveys will be distributed after completing the survey. The effectiveness of the competency will be evaluated by comparing survey results before and after the competency and by evaluating the scores of continuing education questions. Conclusions will be drawn from survey data on the effectiveness of the competency and alterations that may need to be made to best serve our pharmacists.
As part of the template, a method of documentation of competencies was developed. The documentation includes a form to be kept in each pharmacist file, a form for management to track completed competencies, and action plans to correct deficiencies detected from competency results.
Results of the effectiveness of the competency template will be reported.

Learning Objectives:

Identify which format pharmacists prefer as education tools.

Identify key components of a competency program for staff development.

Self Assessment Questions:

T or F A standardized competency program increases pharmacist knowledge on specific subjects.

T or F A competency template must include a method of documentation.

REDESIGN OF A UNIT DOSE CASSETTE DRAWER DISTRIBUTION SYSTEM TO IMPROVE THE EFFICIENCY AND ACCURACY OF MEDICATION DISTRIBUTION

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The redesign of a unit dose medication cassette drawer distribution and exchange system will be described. The first phase includes the coordination of a performance improvement team to develop idealized designs that maximize safety and efficiency within the cassette filling, checking and exchange processes. The second phase is to implement the idealized design system house-wide, with pharmacists checking robot- and technician-filled medication cassette drawers. The third phase involves pharmacy technician training and competency assessments on skills needed for checking unit dose medication cassette drawers. The fourth phase includes obtaining a variance from the state board of pharmacy for implementing technician checking of cassette drawers, also known as Tech-Check-Tech. This phase will also involve initial and ongoing quality assurance and performance measures of the system's impact on pharmacist efficiency and medication dispensing accuracy, including the development of an ongoing competency assessment for pharmacy technicians performing this function.

An evaluation is ongoing on the impact of the changes and whether the work redesign achieves the goals of increased efficiency and accuracy in filling and checking unit dose medication cassette drawers.

Learning Objectives:

Discuss the safety and efficiency features of an ideal cartfill system.

Identify barriers to the development and implementation of a new cartfill system.

Self Assessment Questions:

True or False. Technicians can check medication carts as accurately as pharmacists.

True or False. The distribution of medications is more accurate when the cart check occurs on decentral units instead of in the central pharmacy.

EVALUATION OF THE USE AND EFFICACY OF HORMONE WITHDRAWAL THERAPY FOR THE MANAGEMENT OF ADVANCED PROSTATE CANCER

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Background: Advanced prostate cancer may be treated initially by one antiandrogen agent and a luteinizing hormone releasing hormone. The combination of these agents work together by inhibiting the release of testosterone, blocking its receptors, and preventing the progression of the disease. Past studies have proven the mutation of testosterone receptors render antiandrogen agents ineffective. Once these agents are discontinued, there can be a period of disease regression. If the prostate specific antigen level (PSA) increases again, a second antiandrogen agent can be started to slow disease regression. This type of treatment is called hormone withdrawal therapy. Since there are no set guidelines for using hormone withdrawal therapy, the aim and significance of the proposed research is to evaluate when to start hormone withdrawal therapy, the duration of withdrawal and efficacy of hormone withdrawal therapy in our veteran population with advanced prostate cancer.

Methods: The proposed research is a retrospective chart review of data that has already been documented in the patients' medical records during standard medical care. A computerized clinical report will be run to include all patients at VA Chicago that were on at least two antiandrogen agents (bicalutamide, flutamide or nilutamide) from October 1999 to September 2003.

Results/Conclusion: Data is currently being collected.

Learning Objectives:

Discuss when to start hormone withdrawal therapy, the duration of withdrawal and the efficacy of this treatment option.

Describe which patients would benefit most from hormone withdrawal therapy.

Self Assessment Questions:

Antiandrogen agents bind to androgen receptors on target tissues and thus prevent stimulating effects of endogenous or exogenous androgens. T/F

What percentage of all diagnosed prostate cancers are found in men aged 65 years or older?
[a] 25% [b] 40% [c] 60% [d] 70%

WARFARIN MEDICATION SAFETY EVALUATION AND EDUCATION INITIATIVE: ANALYSIS OF ELEVATED INTERNATIONAL NORMALIZED RATIOS AND BLEEDING EVENTS

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Statement of Purpose: At St. Vincent Hospitals and Health Services we observed an increase in the number of patients with elevated INRs. The primary outcome of this evaluation is to determine the reasons for these elevated INRs. Secondary outcomes are to increase prescriber awareness of potential mechanisms for elevated INRs and to provide suggestions for warfarin management.

Methods: Patients from St. Vincent Hospitals and Health Services who received vitamin K in 2002 served as a proxy to identify the patient population. Exclusion criteria included: patients < 18 years of age, ER patients who were not admitted to the hospital, and patients who received vitamin K prior to a procedure for warfarin reversal. A retrospective chart review will be performed to determine the following: the setting where the patients' elevated INR was first observed (home, ECF, inpatient), drug and disease state interactions which could have resulted in the elevated INR, frequency of INR monitoring, vitamin K route of administration and dose, bleeding events, completion of an adverse medication reaction form, and if the prescriber of warfarin treatment was notified of the elevated INR. Once these factors are identified, an education initiative will be developed to communicate to physicians findings of this evaluation and potential mechanisms to reduce the risks of bleeding events.

Results: Data are currently being collected and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify concurrent medications and disease states that could elevate INRs.

Identify the factors that determine the course of treatment for elevated INRs.

Self Assessment Questions:

Name potential factors that may elevate INRs.

What factors determine the course of treatment for elevated INRs?

AUTOMATED DISPENSING TECHNOLOGY FOR PATIENTS ON WARFARIN.

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Warfarin has been used for the treatment of many conditions including venous thrombosis, pulmonary embolisms, and atrial fibrillation. There are many studies demonstrating its effectiveness and the consequences of sub- or supra-therapeutic therapy. Patients are frequently on alternating daily dosage regimens and doses can be adjusted at each clinic visit based on many factors, including non-compliance, the addition of other medications, and other co-morbidities.

An in-home dispensing device was developed to improve the compliance/adherence of patients on warfarin. This device has three unit-dose cartridges of warfarin tablets in the strengths of 1, 2, and 2.5 mg, with a fourth cartridge slot used once the patient has a stable dose. It is connected via radio frequency to the pharmacist run anticoagulation clinic and allows the pharmacist to remotely program the unit on a daily, weekly, or monthly basis. The patient must respond to questions from the device daily (bleeding events, new medications, etc.) that are fed back to the clinic before the dose is dispensed, to allow for pharmacist review. The pilot test of this technology will be performed in the homes of six patients (three complex and three new patients to warfarin.)

The purposes of the study are to implement the technology and determine its effectiveness, to assess compliance with therapy through evaluations of International Normalized Ratios (INR's) pre- and post-implementation, and to assess acceptance of the new technology by the patients and pharmacists through scheduled questionnaires. Based on the results of the study, the patient base will be expanded to include other chronic disease states such as tuberculosis, diabetes, and HIV/AIDS.

Results and conclusions will be presented at the conference.

Learning Objectives:

Evaluate the impact of new technology on patient outcomes.

Evaluate the impact of this new technology on pharmacist-run anticoagulation clinics.

Self Assessment Questions:

Most anticoagulation patients are on a single, stable dose of warfarin. T/F

This dispensing technology is limited in use to patients on warfarin. T/F

USING A SIX-SIGMA MODEL TO IMPROVE THE SAFETY AND SATISFACTION ASSOCIATED WITH AN ESTABLISHED THERAPEUTIC INTERCHANGE PROGRAM

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Background and Purpose: With health care costs skyrocketing, many health care systems and managed care organizations are utilizing Therapeutic Interchange (TI) programs to decrease costs. In reviewing the literature concerning TI, there are numerous studies that identify the financial gain and efficacy associated with TI programs. However, very few studies have evaluated the safety of such programs.

The Health Alliance, a six-hospital system in Greater Cincinnati, has instituted a TI program in efforts to increase efficiency, improve medication education, and decrease costs. The cost reduction of this program has been proven. However, safety issues that may be associated with this program have not been explored. Physicians involved with the Health Alliance Drug Policy and Development Committee voiced concern over the TI system leading to an increased potential for duplication of medication therapy upon discharge from an Alliance hospital. Health Alliance nurses concurred with this complaint, and voiced concern over lack of consistent communication of TIs from the pharmacy.

Methodology: The safety issues associated with the TI process will be examined using a three-phase plan. The first phase is preliminary data collection from patients, nurses, pharmacists, and physicians to determine at what steps of the TI process a safety breakdown occurs. The second phase will be to identify problems leading to decreased patient safety, to determine the causes of this decrease in safety, to identify possible solutions to remedy such problems, and to implement these solutions. The final phase will be post-intervention data collection from the patients, nurses, pharmacists, and physicians and an evaluation of error reduction.

Conclusions: Preliminary findings suggest that a break down in communication between departments may be the main factor in decreased safety of the TI system. Data collection is ongoing. Final results and conclusions to be presented at Great Lakes Regional Conference.

Learning Objectives:

To identify the steps of a Therapeutic Interchange process in which a breakdown in the safety of the process may occur.

To explore options that may be utilized to maximize the safety of a Therapeutic Interchange process.

Self Assessment Questions:

The safety associated with a Therapeutic Interchange program has been evaluated in many large studies. T or F

What step of a Therapeutic Interchange process offers the biggest potential for a breakdown in the safety of the process?

EVALUATION OF USE AND DEVELOPMENT OF PRESCRIBING GUIDELINES OF 5-HT3 ANTAGONISTS IN A COUNTY/TEACHING HOSPITAL

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Wishard Health Services (WHS) is a 250 bed county hospital with increasing cost pressures on the pharmacy department secondary to reductions in funding. Of the 5-HT3 antagonists, ondansetron accounts for the majority of usage of this class at WHS. In the second and third quarters of 2003, ondansetron was the sixth and eleventh most expensive inpatient drug for WHS. Given the expense of this drug class and its unrestricted inpatient use, we sought to determine the appropriateness of use of these drugs based on several published guidelines for chemotherapy-induced nausea and vomiting (CINV) and post-op nausea and vomiting (PONV) prophylaxis. Special attention was paid to off-label use of these drugs for nausea and vomiting due to other etiologies.

Through the inpatient pharmacy computer system, a report was generated listing all inpatients and infusion center (outpatient chemotherapy) patients that were prescribed a 5-HT3 antagonist during October and November 2003, with 197 patients involved in the final analysis. Inpatient use was divided by indication into five categories: prevention of CINV, PONV prophylaxis, obstetrics, neurosurgery patients, and "other prn". "Other prn" use was further broken down into categories according to when and if another antiemetic had been ordered. Outpatient 5-HT3 antagonist use at the infusion center was analyzed separately. Primary literature, national, and institutional guidelines were then examined to determine if a more cost-effective means of 5-HT3 antagonist use was possible.

Two main areas of 5-HT3 antagonist use were identified that could be targeted for institutional cost savings: preventative CINV and "other prn" doses of intravenous ondansetron. In summary, making dolasetron the preferred WHS agent, promoting the oral dosing form for CINV, and decreasing prn use of 5-HT3 antagonists is estimated to save $93,000 per year in drug costs alone.

The emergent WHS 5-HT3 antagonist prescribing guidelines and cost-savings analysis will be presented.

Learning Objectives:

To identify appropriate and inappropriate uses of 5-HT3 antagonists in an inpatient setting.

To examine the use of 5-HT3 antagonists in an outpatient chemotherapy infusion center and determine a clinically sound way to reduce cost.

Self Assessment Questions:

5-HT3 antagonists are approved for the following indications (choose all that apply):

a. Prevention of postoperative nausea and/or vomiting.
b. To treat nausea and vomiting on a "prn" basis
c. Treatment of delayed nausea and vomiting associated with emetogenic cancer chemotherapy.
d. Prevention of nausea and vomiting associated with initial and repeat courses of emetogenic cancer chemotherapy

Review articles comparing 5-HT3 antagonists have found significant differences in safety and efficacy between the three FDA approved agents. T or F

WARFARIN DOSE REQUIRMENTS IN CANCER AND NON-CANCER PATIENTS.

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Background: Active cancer patients may have different warfarin dose requirements compared to patients with or without a history of cancer. Active cancer patients may have a decreased ability to metabolize warfarin due to an increased production of cytokines. These cytokines decrease the production of cytochrome P450 (CYP) 2C9, the main enzyme responsible for the metabolism of S-warfarin. Other factors such as weight fluctuation, treatment cycles and adverse events, may also cause active cancer patients to spend a greater percentage of time outside their target international normalized ratio (INR) range, therefore, influencing maintenance dose requirements, as compared with patients with or without a history of cancer.

Purpose: The purpose of this study is to determine if there is a difference in weekly warfarin dose requirements, the percentage of time within goal INR, and the incidence of bleeding and thromboembolism between patients with active cancer and patients with and without a history of cancer.

Methods: The medical records for patients receiving warfarin at the University of Illinois at Chicago Medical Center (UICMC) Antithrombosis Clinic between June 1, 1999 and November 30, 2003 were evaluated. The data being collected includes the following: age, gender, race/ethnicity, weight, past medical history (including cancer status, type of cancer, stage of cancer), medication history, indication for warfarin, weekly warfarin dose, the percentage of time the INR is within the target range, incidence and severity of bleeding, and the incidence of thromboembolic complications.

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

Learning Objectives:

Understand the mechanisms responsible for cancer patients to be predisposed to thrombosis.

Identify factors that may be responsible for patients with active cancer to spend a greater percentage of time outside their target international normalized ratio (INR) range compared with patients with or without a history of cancer.

Self Assessment Questions:

Warfarin is a 50:50 racemic mixture of S-warfarin and R warfarin. R-warfarin is about five times more potent than S-warfarin. T or F

Cancer patients are hypercoagulable, therefore, are at risk for thrombosis and may require anticoagulation. T or F

EVALUATION OF ARGATROBAN DOSING IN CRITICALLY ILL PATIENTS

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Purpose
Argatroban is a direct thrombin inhibitor approved for heparin induced thrombocytopenia with or without thrombosis. The pharmacokinetics of argatroban has only been studied in healthy volunteers and in patients with liver disease. The current dosing recommendation is to start a continuous infusion at 2mcg/kg/min to maintain an activated partial thromboplastin time (APTT) at 1.5 to 3 times that of baseline, not to exceed 100 seconds or a rate of 10mcg/kg/min. A recent case series has reported excessive anticoagulation with argatroban with the recommended dose in critically ill patients. The primary purpose of this study is to determine if critically ill patients require lower doses of argatroban to maintain a therapeutic APTT than non-critically ill patients.

Methods
Patients who received argatroban at Akron General Medical Center were identified and a retrospective chart analysis was preformed for assessment. All subjects who achieved a therapeutic steady state dose were included. The therapeutic steady state dose was prospectively defined as the dose of argatroban that resulted in two therapeutic APTT values at least 4 hours apart and at least 4 hours from the initial dose. Subjects were excluded from analysis if they did not achieve a therapeutic steady state dose, or if they had known liver dysfunction. Critically ill patients were defined as patients in the surgical, medical, or cardiac intensive care units. All other patient locations were considered to be non-critical care units. The mean therapeutic steady state doses of critically ill patients will be compared to that of non-critically ill patients.

Results
Still in progress and will be presented at Great Lakes

Conclusion
The present study will comment on differences in dosing between critically ill patients and non-critically ill patients, and make a call for further research.

Learning Objectives:

To discuss the current dosing recommendation of argatroban and its limitations

To discuss argatroban dosing in critically ill patients

Self Assessment Questions:

True or False: The pharmacodynamics and pharmacokinetics of argatroban have been well described and studied in the critically ill population?

True or False: Excessive anticoagulation has been reported at argatroban doses of 2mcg/kg/min?

ADVERSE EVENT REVIEW OF ALTEPLASE AND UROKINASE

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In January of 2003 urokinase (Uk) was added to MetroHealth formulary. This addition was based on the experience of the interventional radiology department that it caused less bleeding events compared to the current formulary agent alteplase (t-Pa). t-Pa has a faster onset and provides for quicker clot dissolution when compared to Uk. Many of the interventional radiologists at our institution stated in their experience t-Pa caused more bleeding events due to its propensity to directly deplete fibrinogen levels, specifically in cases of incomplete clot lysis requiring prolonged infusions of therapy. The association of fibrin depletion has not been extensively examined in clinical trials. Studies have shown comparable efficacy with t-Pa and Uk, but have reported different major and minor bleeding rates.

An observational study has been undertaken to track patients retrospectively and prospectively to determine the rate of bleeding events in patients treated with alteplase or urokinase for peripheral arterial or venous occlusions. Records of these patients will be reviewed for the following: drug received, dose, indication, length of treatment and adverse events. All patients having received urokinase or alteplase since June 2002 to date and all patients who receive urokinase or alteplase through April 2004 will be included in this data collection. Patients will be evaluated for a primary outcome of major bleeding, classified as bleeding requiring cessation of therapy, transfusion, or surgical intervention, and minor bleeding, localized to injection site. Secondary outcomes will include the effect of bleeding events on hospital stay and mortality as well as a comparison of cost for fibrinolytic drug therapy.

Results are pending final evaluation of prospective arm.

Learning Objectives:

To discuss fibrinolytic characteristics and their potential to cause adverse drug event

To review the risk of major and minor bleeding events with t-Pa and Uk therapy for peripheral arterial or venous occlusions.

Self Assessment Questions:

Clinical trials have shown superior clot lysis with Uk therapy when compared to t-Pa?
T or F

There is a higher risk of bleeding associated with t-Pa use when compared to Uk? T or F

ANTIFUNGAL PRESCRIBING PATTERNS: HOW DO THEY MEASURE UP?

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Background: The number of invasive mycoses has continued to grow despite the introduction of new antifungal agents over the last few decades. This increase can be attributed to variables that predispose a patient to such an infection including: intensive chemotherapy regimens, broad-spectrum antimicrobials or immunosuppressive agents, bone marrow or solid organ transplants, and disease states that suppress the immune system. Evidence-based treatment algorithms for systemic mould or yeast infections were developed to help educate and guide prescribing within The Ohio State University Medical Center because of the variable spectrums of activity and toxicity profiles for each antifungal agent.

Objective: The objective of this study is to determine the antifungal utilization within the medical center and to compare the current prescribing patterns to the evidence-based algorithms. Secondary objectives will focus on correlating microbiologic culture data with the prescribed agent.

Methods: This evaluation was limited to the top seven prescribing services of these agents. For each antifungal agent, the first thirty consecutive patients or five percent of the population (whichever was greater) were captured for evaluation. Evaluation of amphotericin B lipid complex, caspofungin, fluconazole, itraconazole, and voriconazole was conducted from November 2003 to February 2004. Conventional amphotericin was not evaluated due to the national shortage of this product. Physicians were interviewed to capture the prescribing intent as prophylaxis or treatment and if a mould or yeast infection was suspected. Data collection included patient demographics, risk factors, underlying diseases, microbiologic culture results, and mortality. Data collection was conducted independent of treatment decisions.

Results: Data collection and analysis are ongoing.

Learning Objectives:

Understand the differences between the currently available antifungal agents.

Discuss the current antifungal practices within an academic medical center.

Self Assessment Questions:

Fluconazole, itraconazole, and voriconazole all are effective against an invasive aspergillus fumigatus infection. T or F

Combining antifungal agents can be advantageous in some patients. T or F

CONTROLLING THE UTILIZATION AND COST OF ERYTHROPOIETIC AGENTS IN THE MANAGEMENT OF ANEMIA

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Prior to 2001, epoetin alfa was the only erythropoietic agent available. Recently, darbepoetin alfa has entered the market as a competitor. Darbepoetin is a longer acting erythropoietic agent that allows for less frequent dosing. Extensive clinical study trial data has shown that treatment with epoetin alfa or darbepoetin alfa has safely and effectively treated anemia in patients with chronic kidney disease and cancer. When used appropriately, these agents can increase hemoglobin levels, decrease transfusion rates and increase quality of life.

The purpose of this project is to determine the most cost-effective erythropoietic agent to utilize and include on the hospital formulary for the management of anemia, taking reimbursement into consideration. Once a formulary decision has been made, a protocol will be developed and implemented to maximize the appropriate usage of the formulary agent.

Methods: A retrospective review of charts was performed to determine patient indications, payor mix, dose administered, appropriateness of use and monitoring for all patients managed on epoetin alfa from March 2003 to August 2003. A cost analysis was then performed to determine financial outcomes taking into account several factors such as the acquisition cost of the different erythropoietic agents, reimbursement, payor mix, and dosage conversion.

Results: Epoetin alfa will remain on the hospital formulary for the management of anemia and darbepoetin will not be added. An epoetin alfa protocol was developed based on a review of current literature. The primary components of the protocol were appropriate indications, baseline iron studies, iron supplementation, determining the need for dose escalation/reduction, and therapeutic dose interchange based on the dose ordered. Data will be collected from patient charts by a pharmacist and maintained to determine patient and financial outcomes. Data collection is still currently in progress and the final results will be presented at Great Lakes Conference.

Learning Objectives:

Learn how the selection of an erythropoietic agent for a hospital formulary is based on the institutions individual characteristics.

To discuss the guidelines developed and implemented for the utilization of epoetin alfa.

Self Assessment Questions:

Epoetin alfa has shown to reduce the severity and duration of anemia in cancer and chronic kidney disease patients? T or F

When examining formulary considerations of pharmacologic agents, product comparisons need to be measured in terms of:

a. Efficacy and safety
b. Features and benefits
c. Cost
d. All of the above

PREDICTORS OF MEDICATION COMPLIANCE IN PATIENTS TAKING SELECTIVE SEROTONIN REUPTAKE INHIBITORS (SSRIS)

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The purpose of this study is to identify predictors of medication compliance in patients taking Serotonin Selective Reuptake Inhibitors (SSRIs).

This study was based on a retrospective cohort study design using Walgreens Health Initiatives (WHI) pharmacy claims database. Patients who received a new prescription for an SSRI between January 1, 2003 and July 1, 2003, and did not have the same medication filled in the previous six months were included in the study. In addition, patients needed to be enrolled continuously for at least 6 months prior and 6 months after the new SSRI prescription was adjudicated. Compliance rates were calculated by use of the Medication Possession Ratio (MPR) from prescription records. Compliance rates were further investigated by using the Chi-square test of association. Multiple logistic regression models were used to study the association between the history and the current medication utilization patterns, adjusting for the effects of confounding factors, such as patient demographics.

Patient enrollment and data collection are currently ongoing. The pharmacy claims analysis will be presented.

Results will indicate how demographic and medication history, including factors such as age, gender and total number of medications will influence the compliance of patients taking SSRIs.

Learning Objectives:

Understand the importance of medication compliance in patients taking SSRIs

Identify predictors of compliance in patients taking SSRIs.

Self Assessment Questions:

Describe the potential predicators of medication compliance in patients taking Selective Serotonin Reuptake Inhibitors (SSRIs)

Describe the cost associated with non-compliance to the treatment of depression

IMPACT OF FIXED-DOSE DARBEPOETIN ALFA IN PATIENTS WITH CHEMOTHERAPY-INDUCED ANEMIA

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Darbepoetin alfa is an erythropoetic-stimulating agent approved for the treatment of chemotherapy-induced anemia (CIA) in patients with non-myeloid malignancies. The primary advantage of this agent is its longer half-life that permits extended dosing intervals. Additionally, evidence based literature suggests that darbepoetin alfa may be administered as a fixed-dose 200 mcg every two week (Q2W) regimen. Therefore, the primary objective of this investigation is to evaluate the impact of this regimen on hemoglobin (Hgb) response. The secondary objective is to predict patients who may require a dosage adjustment based on pre-treatment characteristics.

This prospective, open-label investigation will evaluate the impact of fixed-dose darbepoetin alfa on CIA in females 18 years of age or older with gynecologic malignancies. All patients who meet inclusion criteria will be initiated on a fixed 200 mcg Q2W dosage regimen of darbepoetin alfa. Endpoints to be evaluated will include the mean change in Hgb from baseline at 6 weeks and the number of dosage regimen adjustments.

Since August 2003, 14 patients have been evaluated for inclusion into the study with only 7 patients meeting criteria. Four out of seven patients (57%) were epoetin alfa naïve and 3 patients (43%) were converted from epoetin alfa to darbepoetin alfa. Six out of seven patients (85.7%) were increased to a 300 mcg Q2W dosing regimen, while only 1 patient (14.3%) was maintained on the 200 mcg Q2W dosing regimen. The mean Hgb overall was 10.4 g/dL at baseline and 10.2 g/dl at 6 weeks with a mean change in Hgb at -0.2 g/dL.

In conclusion, it does not appear that a fixed-dose regimen achieves adequate Hgb targets. However, this preliminary data is not statistically powered, as data for 144 patients is necessary to determine the significance of this dosage regimen. Therefore, further patient enrollment is necessary in this on-going investigation.

Learning Objectives:

To describe the pathophysiology of chemotherapy-induced anemia and the role of erythropoietic agents.

To appreciate the role of longer-acting erythropoietin stimulating agents and implications for patient's quality of life.

Self Assessment Questions:

Darbepoetin alfa has an approximate three-fold increase in half-life compared to epoetin alfa. T or F

Packed red blood cell (PRBC) transfusions do not play a significant role in evaluating hemoglobin response with the use of erythropoietic-stimulating agents. T or F

EVALUATING THE APPROPRIATENESS OF DISCHARGE PRESCRIPTIONS OR INSTRUCTIONS FOR ACETAMINOPHEN AND ACETAMINOPHEN-CONTAINING ANALGESIC PRODUCTS FOR PEDIATRIC PATIENTS

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Aim of Study: To evaluate the appropriateness of dose and frequency of acetaminophen and/or acetaminophen-containing analgesic products in the instructions and/or prescriptions given to patients at the time of hospital discharge.

Background: Inpatient orders for acetaminophen and acetaminophen-containing products are routinely screened by pharmacists at Children's Hospital of Michigan (CHM) for appropriateness of dose and frequency. In addition, comments appear on the patient medication administration record alerting nurses to a maximum of five doses of acetaminophen per day and a limit of 75 mg/kg/day or 4000 mg/day, whichever is lower. A review of pharmacist interventions at CHM during a three month period in 2003 showed that 4% of inpatient orders for acetaminophen or acetaminophen-containing analgesics needed to be changed due to inappropriate dose or frequency of administration. However, this may not reflect the true incidence, since not all medication order changes are documented.

Currently, there is no routine pharmacist review of discharge prescriptions or instructions at CHM. By identifying the presence of inappropriate discharge orders for acetaminophen, pharmacists can increase physician awareness of this issue and possibly decrease adverse drug events related to acetaminophen in pediatric patients. Results of this project may identify the need for prescriber education as well as the benefit of expanding pharmacists' practice to include review of discharge orders and patient instructions.

Methods: Medical records of patients discharged home during 2003 from inpatient units at CHM will be reviewed for discharge prescriptions, orders, and/or instructions for acetaminophen and/or acetaminophen-containing analgesics. Data collection will include: patient age, weight, primary diagnosis, gender, and ethnicity; dose, route, and frequency of acetaminophen order; indication for acetaminophen (analgesia or antipyresis); other discharge medications; primary medical service; and level of training of person writing discharge instructions and prescriptions. Medical records will be randomly and retrospectively reviewed for an initial sample of 100 patients.

Results: Data collection in progress.

Learning Objectives:

Identify the maximum daily dosage of acetaminophen in pediatric patients.

Discuss factors contributing to inappropriate acetaminophen dosing.

Self Assessment Questions:

An appropriate dose of acetaminophen is 75 mg/kg/day or 4000 mg/day, whichever is lower. T/F

Unintentional acetaminophen overdose is not a common occurrence in children. T/F

VALGANCICLOVIR HEMATOLOGIC TOXICITY DURING CMV PROPHYLAXIS IN HEART AND RENAL TRANSPLANT RECIPIENTS

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Purpose: Valganciclovir is the oral prodrug of ganciclovir, developed to improve the bioavailability of oral ganciclovir. Medical literature supports intravenous and oral ganciclovir for the prevention of CMV in solid organ transplant recipients, yet clinical data for valganciclovir use in this area is limited. However, valganciclovir use has increased at transplant centers secondary to the intravenous ganciclovir shortage, its improved oral bioavailability and low pill burden, compared to oral ganciclovir. Pharmacokinetic studies have demonstrated nearly equivalent area under the curves for valganciclovir 900 mg and ganciclovir IV 5 mg/kg in addition to the need for appropriate renal dosage adjustment. Valganciclovir is available in 450 mg tablets, which cannot be crushed, thus limiting accurate dosing conversions and potentially leading to increased drug exposure and toxicity, especially hematological toxicity. Currently heart and renal transplant programs at the Cleveland Clinic Foundation (CCF) utilize valganciclovir for the prevention of CMV in D+/R-, D+/R+, and D-/R+ patients. Heart transplant recipients receive 900 mg twice daily for one month. Renal transplant recipients receive 900 mg once daily for three months. The incidence of hematological toxicity from valganciclovir in our population of heart and renal transplant recipients, at these doses has not yet been determined.

Methods: A retrospective, observational analysis will be conducted to determine the incidence of hematological toxicity associated with valganciclovir in CMV prophylaxis of heart and renal transplant recipients at CCF. Medical records of patients who received heart and renal transplants from September 2002-September 2003 will be reviewed to determine the incidence of hematological toxicity attributed to valganciclovir. Patients will be assessed during their follow-up period for toxicity, renal dose adjustments, immunosuppressive regimen, and interventions made to correct for hematological toxicity.

Learning Objectives:

Describe the limitations of valganciclovir in the prevention of CMV in heart and renal transplant recipients.

Explain the rate of hematological toxicity associated with valganciclovir use for CMV prophylaxis in heart and renal transplant recipients at the Cleveland Clinic Foundation.

Self Assessment Questions:

Two limitations of using valganciclovir in the prevention of CMV in heart and renal transplant recipients include the inability to crush tablets and minimal long-term clinical data supporting its use.

The hematological toxicity caused by valganciclovir during CMV prophylaxis in heart and renal transplant recipients is clinically significant.

AN EVALUATION OF THE ACCURACY IN CONFIRMING CATHETER TIP LOCATION BY NURSES UTILIZING AN ELECTROMAGNETIC POSITION SENSING DEVICE AND ITS IMPACT ON THERAPEUTIC PLANS

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Background: A peripherally inserted central catheter (PICC) has been proven to be safe and effective for providing long term intravenous (IV) therapy. A well-accepted practice for PICC placement is to insert PICCs at the bedside by specially trained and certified nurses (success rate variable from 59% to 99%), followed by the radiographic verification of the catheter's tip location before initiating therapy to avoid potential adverse events associated with tip malposition. Adjustment of the catheter tip would be necessary for malpositioned tips; however, which may delay planned IV therapy and prolong the length of stay.
Statement of purpose: At University of Michigan Health System (UMHS) approximately 12% of the over 2000 PICC's placed annually underwent post-insertion adjustment. An electromagnetic position sensing device (EPSD) navigation system which assists in guiding the PICC tip to its target location has recently been introduced in the market. A prospective, randomized, evaluator-blinded, experimental-control study is designed to determine if this EPSD could accurately confirm the PICC tip location thus eliminating the need for post-insertion adjustment.
Methods: A total of 400 patient-lines will be randomized into 2 groups. The primary aim is to evaluate the accuracy in confirming catheter tip location by comparing nurses utilizing EPSD to traditional radiographic confirmation. Second aims include evaluation of the actual time savings from eliminating secondary procedures, documentation of drug administration delay and all interim interventions due to the delay of PICC use when a secondary procedure is indicated, and implementation of cost-benefit analysis. Rates of mechanical and infectious complications will be monitored up to a week post PICC placement.

Learning Objectives:

Explain the impact of the electromagnetic position sensing device (EPSD) navigation system used in confirming PICC tip location by nurses compared to traditional radiographic confirmation.

Describe the differences in planned medication administration delay and cost-benefit effects between experimental group and control group.

Self Assessment Questions:

PICC can be used before a chest x-ray verification of tip location to facilitate IV medication administration.
(a) True
(b) False

The electromagnetic position sensing device (EPSD) navigation system assists in guiding the PICC tip to its target location thus eliminating the need for post-insertion adjustment and potential delay of therapeutic plans.
(a) True
(b) False

THE IMPACT OF PHARMACIST CONSULTATION FOR LIFESTYLE MODIFICATION IN PREHYPERTENSIVE SUBJECTS IN A COMMUNITY PHARMACY

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Purpose: This pilot study will assess the impact of monthly educational visits of subjects identified as prehypertensive according to JNC VII by community pharmacists. Subjects will be encouraged by the pharmacist to make lifestyle modifications such as weight loss, healthy weight maintenance, and increased activity in order to decrease their blood pressure to normal as defined by JNC VII.

Methods: Subjects will be selected from a convenience sample through blood pressure screening in the pharmacy. Subjects will be eligible if two blood pressure readings on two separate occasions fall between 120-138/80-89 mmHg. Subjects will be excluded if they are less than 18 years old, are taking anti-hypertensive medications, or have been diagnosed as hypertensive according to JNC VII. Subjects will receive monthly pharmacist counseling on lifestyle modification and written educational information on hypertension and lifestyle modification to supplement the pharmacists education. Monitoring will occur over a 12 week period. Monthly consultations will include blood pressure measurement, weight measurement and lifestyle assessment. Dependent variables included in analysis will be blood pressure, weight and self-reported activity level. Independent variables included will be race, age, gender and pre-existing conditions. The dependent Student t-test will be used to compare group means for continuous variables. Rasch analysis will be used to measure attitudinal components of a retrospective pre-test/post-test survey.

Results/Conclusion: The designation of a new category of prehypertension is an opportunity to expand the role of the pharmacist in the prevention of hypertension. It is anticipated that patients receiving pharmacist consultation for lifestyle modifications will experience a reduction in blood pressure by the end of the 12 week study.

Learning Objectives:

Identify patients as prehypertensive according to JNC VII

Determine if pharmacist consultation on lifestyle modification can positively influence blood pressure measurements in prehypertensive patients

Self Assessment Questions:

What range of blood pressure would categorize a patient as prehypertensive according to JNC VII?

a. <120/<80 mmHg
b. 120-139/80-89 mmHg
c. 140-159/90-99 mmHg

Pharmacist counseling on lifestyle modification can prevent progression to stage one hypertension in prehypertensive patients.
a. true
b. false

HYPERKALEMIA PROTOCOL QUALITY REVIEW AND EDUCATION INITIATIVE

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Introduction: Hyperkalemia is a condition that if left untreated can lead to cardiac arrhythmias and/or death. Although hyperkalemia is generally seen in older patients or renal patients this condition can manifest itself at any time and in any patient. If hyperkalemia is discovered in it's early stages before serum levels become greatly elevated the treatment may require only a gradual lowering of serum potassium levels. If hyperkalemia is discovered once levels are highly elevated or cardiac arrhythmias are present then the treatment should be more aggressive. Since the complications of hyperkalemia can be severe our institution decided to put in place a hyperkalemia protocol which would allow the nurse to implement treatment regardless of when it occurs especially if the physician is not readily avaliable.

Purpose: The purpose of this project is to review hospital cases of hyperkalemia and to ascertain if the timeliness of hyperkalemia treatment relating to lab draws and medication administration meets or exceeds current protocol standards. If it is found that the protocol has not been followed regarding potassium lab re-draw times and treatment initiation times, then a second part to this project would be warranted. The second phase of this project would involve a nursing education initiative aimed at increasing hyperkalemia protocol awareness.

Methods: This study contains two components. The first component is a retrospective chart analysis of lab verified hyperkalemia cases(defined as a serum potassium of 6.0 mmol/L or greater), which occured in an inpatient setting. The second part of this project would consist of a nurse education program.

Learning Objectives:

To discuss the timeliness and treatment course of hyperkalemia cases and compare the results to an active hospital wide hyperkalemia protocol.

To gain an understanding of how a hyperkalemia protocol initiative could be implemented in an efficient manor while requiring only minimal staffing.

Self Assessment Questions:

Hyperkalemia can be treated without ECG support in all instances.T/F

Nurse confidence does not play a role in the effective treatment of hyperkalemia. T/F

ORIENTING PHARMACEUTICAL SALES REPRESENTATIVES TO A LARGE, MULTICENTER TERTIARY CARE CENTER

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As the number of pharmaceutical sales representatives has expanded in recent years, competition for healthcare practitioner attention has intensified. Unfortunately, this has resulted in problems in some healthcare institutions (e.g. unethical visitations, misleading sales techniques compromising credibility of information). Policies have been formulated, but violations of these guidelines continue to occur. The aim of this project is to develop and implement a standardized and effective orientation program for pharmaceutical sales representatives new to Clarian Health Partners, a large, multicenter tertiary care center. In 2001, local concern with representatives interfering with patient care and providing primary product information to medical students and residents was identified. A policy was created and distributed to representatives during an informal orientation. However, policy violations are ongoing, and healthcare professionals within this tertiary care center have been missing opportunities to obtain product information due to several pharmaceutical company suspensions.

A preliminary survey of the orientation process was distributed to current representatives in the center's database who have completed the informal orientation. The same survey is now being distributed to representatives as they complete the formal orientation program. This evaluates representatives' institution and policy comprehension. The orientation program consists of a standard checklist to discuss pertinent policy information (i.e. appointments, samples, displays, infraction consequences, etc.), as well as a question and answer session. Quantitative results from the surveys will be compared to preliminary survey responses, expecting score improvement since implementation of the formal orientation. Qualitative results are measured by comments and suggestions.

Preliminary survey results reveal responders agreeing with institution and policy understanding (median score of 4 on a 5-point scale). Survey responses will assess the value of the orientation program to participants and provide subjective data as to whether the program should continue and how it should evolve.

Learning Objectives:

Justify the need for pharmaceutical sales representative orientation to a tertiary care center.

Brainstorm beneficical discussion topics for representative orientation.

Self Assessment Questions:

The Clarian Health Partners pharmaceutical sales representative orientation includes
I. A checklist
II. A question and answer session
III. A follow-up visit
A. I only
B. III only
C. I and II
D. II and III
E. I, II, and III

The Clarian representative orientation can be modified according to
I. The number of representatives completing orientation
II. Survey responses
III. Reasons for representative product suspensions
A. I only
B. III only
C. I and II
D. II and III
E. I, II, and III

DEVELOPMENT AND IMPLEMENTATION OF AN ARGATROBAN TREATMENT PROTOCOL

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Heparin-induced thrombocytopenia (HIT) and HIT with thrombosis (HITTS) are immune-mediated conditions characterized by thrombocytopenia and thrombotic events that may be life or limb-threatening for up to 50% of patients with these diagnoses. Argatroban, a direct thrombin inhibitor, is used for systemic anti-coagulation in this setting, however its use is not without challenge; dosage adjustments and monitoring are not clearly defined. The purpose of this study is to develop, implement, and evaluate the effectiveness of an argatroban treatment protocol.

An analysis performed on previously collected data at our institution suggested a high incidence of bleeding and little consistency in initial argatroban infusion rates. Rates of administration often were lower at end of infusion than at start of infusion, suggesting that initial doses may need to be lower than indicated in the manufacturer's product information. Frequently, therapy was discontinued due to elevations in aPTT and INR. Based on this data, a treatment protocol was developed; it will be trialed in thirty consecutive patients receiving argatroban. Safety and effectiveness of the protocol will be monitored throughout each patient's course of therapy. Outcomes will be evaluated globally and will include time to therapeutic range, time within therapeutic range, incidence of major and minor bleeding, degree of INR elevation, treatment for elevated INR, and incidence of new thrombosis.

Data collection and analysis are ongoing. Upon completion, the effectiveness of the argatroban treatment protocol will be assessed. Recommendations will be made regarding initial infusion rates, dose titration, monitoring, and response to elevated INR.

Learning Objectives:

Identify the need for an argatroban treatment protocol.

Evaluate the effectiveness of an argatroban treatment protocol at The Ohio State University Medical Center.

Self Assessment Questions:

Argatroban causes the INR to be elevated, but never higher than 6. T or F

Argatroban is eliminated hepatically and the dose should be adjusted for patients with hepatic impairment. T or F

STATIN THERAPY IN PATIENTS POST-CORONARY ARTERY BYPASS GRAFT SURGERY

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Purpose: Statins have been shown to delay the progression of atherosclerosis in saphenous vein grafts, reduce cardiac deaths, non-fatal MI, and decrease the need for revascularization after coronary artery bypass graft surgery (CABG). Despite the evidence, many patients treated with CABG do not receive lipid-lowering therapy. The purpose of this project is to promote statin use in post-CABG patients.

Methods: The study comprises three phases: retrospective review to assess current statin usage in post-CABG patients at Harper University Hospital; physician and nurse education and addition of statin to an existing post-CABG order sheet; re-evaluation after implementation of the process improvement. Data collection included demographic characteristics, medications prior to and post-CABG, medical history, serum cholesterol levels and liver function test (LFT). The primary study outcomes are the percentages of patients receiving statins before and after the implementation. The estimated sample size is 80-100 patients. Descriptive statistic and X2 test will be used for data analysis.

Results: A total of 81 patients undergoing CABG from July 2002 to December 2002 were randomly selected for retrospective review. Fifty percent of the patients had documented history of hyperlipidemia when admitted for CABG. Forty-three percent of these patients were on statin therapy on admission. At discharge, statin therapy was prescribed in 40% of the patients. No allergy or contraindications to statin therapy were noted. Baseline LFT and lipid panel were performed at admission or within 3 months prior to CABG in 55.5% and 33% of the patients respectively based on the Detroit Medical Center database.

Conclusion: The retrospective study confirmed that statin was underutilized in patients undergoing CABG at Harper University Hospital. New order set and education sessions will be implemented in February 2004. Follow-up study will be conducted to evaluate the impact of this intervention.

Learning Objectives:

Discuss the current standard of care in patients post-coronary artery bypass surgery

Describe the rationale of using statins in patients post-coronary artery bypass surgery

Self Assessment Questions:

Statin does not have any effects on saphenous vein grafts
True or False

Statin is underutilized in patients post-coronary artery bypass surgery
True or False

OUTCOMES ANALYSIS OF BACTEREMIC STAPHYLOCOCCUS AUREUS PNEUMONIA AND THE IMPACT OF DELAYED ANTIBIOTIC TREATMENT

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The rates of nosocomial pneumonia specifically due to Staphylococcus aureus (SA) have increased steadily over the past two decades. Recently, evidence has become available showing that initial inappropriate antibiotic treatment is an important independent risk factor for excess mortality in patients with nosocomial pneumonia. In previous work at our institution assessing Staphylococcus aureus bacteremia (SAB), the mortality rate in patients with a respiratory source of infection exceeded 60%. Crude morality was found to be higher for patients with infection due to MRSA.
In this study, a retrospective cohort analysis was performed to describe outcomes associated with nosocomial bacteremic S. aureus pneumonia (NBSAP) and to determine if delay in adequate antimicrobial treatment is a risk factor for negative clinical and microbiological outcomes. Medical charts of patients with SAB and a diagnosis of nosocomial pneumonia from the years 1999-2002 were retrospectively reviewed. Patients were assessed to verify that they met criteria for a clinical diagnosis of pneumonia and that it could be determined to be caused by S. aureus. Classification and regression tree analysis (CART) will be used to select the mortality breakpoint between early and delayed treatment. Documentation of mortality based on the presence of methicillin-resistant (MRSA) and methicillin-sensitive (MSSA) S. aureus and mortality as it relates to the empiric use of beta-lactams versus vancomycin will also analyzed.

Learning Objectives:

To understand that initial empiric antibiotic therapy is a critical factor determining mortality in patients with nosocomial pneumonia

To appreciate that S. aureus is a common cause of ventilator-associated pneumonia and should be covered empirically when a patient has received previous antibiotic therapy

Self Assessment Questions:

In a patient undergoing a diagnostic broncoscopy for nosocomial pneumonia, at what time point is there a mortality benefit of providing adequate empiric antibiotics?
a. At the time of diagnosis, before culture results are obtained
b. After the culture is drawn, but before sensitivities are reported
c. After culture and sensitivity data is available

If a patient is diagnosed with nosocomial pneumonia, which risk factor leads to the highest suspicion of MRSA as the potential pathogen?
a. Previous hospitalization
b. Hospital-acquired (versus community-acquired) infection
c. Previous antibiotic therapy
d. Presence of decubitus ulcers
e. Intravenous drug use

THE IMPACT OF A PHARMACIST-MANAGED ANTICOAGULATION CLINIC ON PATIENT OUTCOMES IN A PEDIATRIC CARDIAC POPULATION

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Purpose:
Thromboembolic events can occur following a Fontan procedure, the third step of surgical repair for children with single ventricle cardiac malformations. Although prophylactic warfarin therapy is effective in preventing thromboembolic complications in these patients, therapy is complicated by factors such as diet, concurrent medications, other disease states, and age. While literature exists on adult anticoagulation clinics, little information is available on the effectiveness of these programs in children. This study proposes a focused assessment of the effects of an anticoagulation clinic on pediatric cardiac patients following a Fontan procedure.

The primary endpoint of this study is to evaluate the length of time and number of dose changes necessary to achieve target INR. The secondary endpoint is to evaluate the frequency of adverse effects associated with warfarin.

Methods:
This retrospective/prospective study compared the effects of a pharmacist-managed anticoagulation clinic versus usual medical care on warfarin therapy during the first three months after a Fontan procedure. The retrospective group included patients managed through usual medical care at CCHMC. The prospective group included patients managed through the pharmacist-managed anticoagulation clinic at CCHMC. Children receiving follow-up care at other institutions were excluded from the study.

Results:
Preliminary results from the retrospective group (n=16) showed an average of 5 INR measurements in the first three months of therapy. The number of dose changes ranged from 0 to 7. Average time to achievement of target INR was 33 days. Within the retrospective group, 46% of INRs were within target range, 47% were below and 7% were above. The average number of blood draws per month decreased over time: month one = 3, month two = 1, and month three = 1.
Data collection of the prospective group and comparative analysis of the two groups is currently ongoing.

Learning Objectives:

Identify the benefits of a pharmacist-managed anticoagulation clinic.

List factors that would aid in validating the need for a pediatric anticoagulation clinic.

Self Assessment Questions:

Pharmacist managed anticoagulation care is similar to usual managed care. T F

Younger children need higher doses and take longer to get to a target INR than older children or adults. T F

PROMOTING EVIDENCE-BASED USE OF PN AND EN

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Background: Specialized nutritional support is indicated for multiple disease states. The use of parenteral nutrition (PN) is associated with infection, overfeeding, gut atrophy, and poor glycemic control. In comparison, enteral nutrition (EN) has fewer complications and is more cost effective than PN. The current literature supports reserving PN for patients requiring specialized nutritional support wherein EN is contraindicated.

Purpose: The objective for this project is to assess current utilization of PN within the Metro Region of Aurora Health Care and to promote evidence-based criteria for EN and PN use.

Methods: Retrospective chart reviews were performed over a 5-week period in September and October 2003 at three hospital-campuses in the Aurora Health Care-Metro Region. Randomly selected PN orders were reviewed for indication, duration, and prescriber subspecialty. Concomitant administration of PN and EN or oral diet was also assessed.

Preliminary Results: Surgeons or internists prescribed the majority of PN orders evaluated. Only one-third had a concise indication for PN. The average duration for PN was 8 days with a mean concomitant overlap of 3 days.

Future Plans: Revised PN and EN preprinted physician ordersets are to contain an algorithm for initiating nutritional support. These ordersets are to assist physicians in appropriate prescribing of nutritional support. Education to enhance GI motility and transition patients to safer, lower cost nutritional therapies will also be provided.

Final Results and Conclusions: Pending

Learning Objectives:

Review indications for PN and EN.

Identify barriers for proper prescribing of nutritional support.

Self Assessment Questions:

Identify contraindications to EN.

True or False? EN is the preferred route of nutritional support for patients with pancreatitis.

IMPROVING INDIGENT PATIENT MEDICATION ADHERENCE THROUGH PHARMACIST INTERVENTIONS USING MANUFACTURER PATIENT ASSISTANCE PROGRAMS (MAPS)

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Statement of Purpose: To determine if medication adherence improves by decreasing the cost of medications through MAPs for the patient.

Methods: Participants for the study are recruited from Columbus Neighborhood Health Centers Inc. (CNHC) which provides care for the underserved indigent population of Franklin County. If a patient is deemed unable to pay their designated co-pay for medications, health centers and providers can “waive” (CNHC pays) the patients reduced co-pay. Patients are recruited by signs posted in the health centers and referrals for co-pay waived patients. At the pharmacist appointment, medications are assessed to determine if the patient has medications that would qualify for MAPs. The MAP process is reviewed and the necessary paperwork is provided for the patient to fill out and bring back to their provider to sign and submit. Adherence is assessed through pre and post Morisky adherence surveys. The medication regimen is also reviewed to assess if there are simpler regimens, drug interactions, duplicate therapies, and other potential interventions. Because most MAPs require paperwork redone every three months, a chart review will be done at this time to reassess if the patient has independently refilled his/her next order in a timely manner. Also, at three to four months after the initial appointment, a questionnaire to assess patient satisfaction and adherence will be distributed.

Results: To date, 6 patients have enrolled in the study and recruitment will continue for the next two months. Data will be analyzed to assess pre and post intervention: number of MAPs, total number of medications, Morisky adherence surveys, and cost to the patient/month and CNHC/month. Evaluation will be done on the number of pharmacist interventions approved by the provider, cost savings to CNHC through use of this program, and patient satisfaction of the new service.

Learning Objectives:

To understand the definition of adherence, the barriers of adherence that effect the indigent population, and an appropriate adherence tool to use in practice.

To identify why a pharmacist is the most appropriate health care professional to connect patients with assistance programs and to address medication adherence issues.

Self Assessment Questions:

Adherence is defined as the extent to which the patient continues a negotiated treatment under limited supervision in the face of conflicting demands. T/F

Which one of the following is not one of the questions in the Morisky Adherence Survey?
a. Do you ever forget to take your medications?
b. When you are taking too many medicines do you stop taking them?
c. When you feel better, do you sometimes stop taking your medications?
d. Sometimes, if you feel worse when you take a medicine, do you stop taking it?

RECOMBINANT ERYTHROPOIETIN (RHUEPO) UTILIZATION IN ICU ANEMIA

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Statement of Purpose: The University of Louisville Hospital uses rHuEPO in intensive care unit patients to increase Hgb and Hct. Currently, the hospital does not have a standard protocol for the treatment of ICU anemia. Based on the results of a retrospective analysis a protocol was developed to ensure appropriate use of rHuEPO in the ICU patient.

Methods: Phase 1 of the study consisted of a baseline retrospective chart review of 51 rHuEPO ICU patients that met inclusion criteria for appropriate use. Based on the results of this retrospective analysis, a protocol for rHuEPO utilization in ICU anemia was developed. Phase 2 of the study will evaluate rHuEPO use after the implementation of the protocol. Data is currently being collected.

Results: All patients receiving rHuEPO had an indication of anemia, but only 41% of patients met Hgb/Hct criteria for appropriate use. Of the patients on rHuEPO, 58% had appropriate dose, frequency, and duration. Assessment of monitoring parameters showed 98% of patients had at least one Hgb/Hct measured. There were no patients with a documented ADR in the medical record yet upon review 14% had an increase in platelets that decreased to baseline upon discontinuation of rHuEPO, indicating a possible ADR. Concurrent iron supplementation was administered to 37% of the patients and only 6% of patients had a ferritin and /or transferrin saturation level assessed.

Conclusion: This retrospective analysis showed that although all patients had a diagnosis of anemia, only 41% of patients had a Hgb and/or a Hct that met the criteria for use of rHuEPO. The data showed that the average percent change in Hgb and Hct was better for patients who received an appropriate dose, frequency, and duration of therapy. Therefore, development and implementation of the protocol is needed at our institution to improve utilization of rHuEPO leading to better outcomes.

Learning Objectives:

Describe the use of erythropoietin in the ICU patient and the importance of using a protocol.

Discuss the process of developing and implementing a protocol.

Self Assessment Questions:

True or False rHuEPO should be used in all ICU patients with an indication of anemia.

True or False Concurrent iron therapy is administered due to poor iron availability in critical care patients.

DEVELOPMENT OF AN ANEMIA MANAGEMENT PROGRAM TO SUPPORT CLINICAL PHARMACY SERVICES IN AN OUTPATIENT ONCOLOGY CLINIC

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Background: Anemia is an important problem in cancer patients, and often results from the malignancy itself or cancer therapies and resultant decreases in erythropoietin production or bone marrow responsiveness to erythropoietin. The availability of erythropoietic therapy in the past decade, epoetin (Procrit, Ortho Biotech) and most recently darbepoetin (Aranesp, Amgen), has resulted in significant advancements in anemia management and patient outcomes. Important issues in management of these agents are related to close monitoring of patients to ensure efficacious, safe, and cost-effective treatment. A pharmacist-driven anemia management service that assists prescribers in evaluating indication for erythropoietin, dose and schedule, hemoglobin levels, iron status, adverse effects, and overall response to therapy may facilitate better assessment and optimal management of the anemic cancer patient.

Purpose: To assess the effect of a clinical pharmacist-directed anemia management program on anemia management practice and patient outcomes in an outpatient oncology clinic.

Methods: To establish a baseline of current epoetin/darbepoetin prescribing and monitoring practices, a retrospective review will be conducted of 60 random patients who have received either epoetin alfa or darbepoetin from November 2002 through October 2003 as outpatients at Gundersen Lutheran Cancer Center. The following quality indicators will be analyzed: appropriateness of indicated use, initial dose and treatment schedule, trends in hemoglobin levels and iron status, dosing modifications, duration of use, use of iron supplementation, and patients' response to treatment. An anemia management tool will be developed to assist the clinical pharmacist in monitoring patients on erythropoietic therapy. To assess the impact of the tool on management of anemic patients treated with epoetin or darbepoetin, a prospective review of all patients managed under the service will be conducted.

Results: Data is currently being collected.

Learning Objectives:

Discuss appropriate monitoring parameters for patients on erythropoietic therapy.

Describe the impact of a pharmacist-driven anemia management service on epoetin and darbepoetin use.

Self Assessment Questions:

When should iron stores be monitored for a patient receiving erythropoietic therapy:
(a) At initiation of therapy
(b) If the patient becomes hyporesponsive
(c) With each epoetin or darbepoetin dose
(d) a and b
(e) All of the above

A patient not responding to appropriate titration of erythropoietic therapy after 8 - 12 weeks is not likely to respond to further treatment. True/False

ASSESSMENT OF HEALTHCARE PROFESSIONALS-PERCEPTIONS IN IMPLEMENTING A "DO NOT USE" ABBREVIATIONS LIST

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Dangerous abbreviations cause errors in prescribing, dispensing, and administering medications to patients. In response, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) revised requirements for one of its National Patient Safety goals to standardize abbreviations, acronyms, and symbols used within healthcare organizations, effective January 1, 2004. All JCAHO-accredited healthcare organizations will now be surveyed for implementation of the new goals and requirements, including use of a "Do Not Use" Abbreviations List with acceptable alternatives.

At Clarian Health Partners, a 1,334-bed health-system organization, the Medication Safety Committee and the Pharmacy and Therapeutics Committee, in a joint effort, approved a Clarian "Do Not Use" Abbreviations List. The list was compiled based on recommendations from the Institute for Safe Medication Practices (ISMP) and JCAHO. An educational campaign was also initiated to train Clarian healthcare professionals. As part of the educational initiative, a survey was distributed to the following healthcare professionals: physicians, registered nurses, respiratory technicians, dietary personnel, and pharmacy personnel. In the dietary and pharmacy services, both registered professionals and certified technicians were included in data collection.

Information from the baseline and follow-up surveys will be used to determine how various healthcare professionals at Clarian perceive the "Do Not Use" Abbreviations List and assess effectiveness of the educational initiatives. In addition, compliance with the "Do Not Use" Abbreviations List will be monitored prior to and following implementation of educational initiatives to determine where additional effort is needed. The results of this survey will determine if and how educational initiatives change healthcare professionals' usage and perceptions of a "Do Not Use" Abbreviations List.

Learning Objectives:

To describe perceptions of healthcare professionals in initiating a "Do Not Use" Abbreviations List.

To determine the efficacy of educational initiatives to achieve compliance of using approved alternatives to dangerous abbreviations.

Self Assessment Questions:

The purpose of the baseline survey was to:
a. identify problem areas in educating healthcare professionals
b. determine acceptance of using a "Do Not Use" Abbreviations List
c. collect general opinions of medication errors
d. all of the above

T/F The "Do Not Use" Abbreviations List was compiled by looking only at reported errors that have been published in Institute for Safe Medication Practices (ISMP) Alerts.

THE INCIDENCE OF NEPHROPATHY ASSOCIATED WITH IODIXANOL (VISIPAQUE®) IN PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION (PCI)

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Background: The use of iodinated contrast media can result in nephropathy when used in PCI. Iodixanol, a non-ionic, iso-osmolar contrast media is reserved at the Indiana Heart Hospital (TIHH) in Indianapolis, Indiana for patients at increased risk of radio contrast-induced nephropathy (RCIN). The incidence of RCIN associated with iodixanol at TIHH is not well characterized. Based upon the literature, 3-3.7% of patients undergoing angiography with iodixanol are expected to experience an increase of either 25% or 0.5 mg/dL in serum creatinine (SCr).

Methods: A retrospective, longitudinal chart review was conducted to assess the occurrence of RCIN in PCI patients receiving iodixanol from June 1, 2003 to August 31, 2003 at TIHH. All patients who received iodixanol during the study period were included in the study. Radio contrast-induced nephropathy was defined as an increase in SCr of at least 25% within 48 hours following the procedure. Patient data collected included: demographics, concurrent disease states, current medications, acetylcysteine use, baseline SCr, SCr following procedure, dose of contrast media, and hydration status. The primary endpoint of the study is to assess the incidence and clinical characteristics of RCIN in a PCI population at TIHH as compared to the literature.

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

Learning Objectives:

Assess the incidence of RCIN at TIHH

Determine the patient population to receive acetylcysteine prior to procedure

Self Assessment Questions:

Which contrast media are more likely to cause RCIN?
a) high-osmolar
b) low-osmolar
c) iso-osmolar

Patients with pre-existing renal insufficiency and/or diabetes mellitus are more at risk for RCIN. True or False

CLINICAL PHARMACY TECHNICIAN: A NEW PATIENT CARE MODEL

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Currently, an established and ongoing nursing shortage is affecting hospitals nation wide. Recent reports predict that more than one million new and replacement nurses will be needed by the year 2010. This drastic shortage is due to multiple factors such as decreased job satisfaction caused by mandatory overtime and increasing workloads, and a reduction in nursing program enrollment. To compensate for the projected nursing shortage the government, college institutions, and health care facilities are taking a variety of approaches to resolve the issue.

At Evanston Northwestern Healthcare, a new patient-care model was developed to address the nursing shortage problem. The design is intended to allow the nurses to focus more on clinical responsibilities. The model distributes some of the nurse's activities to patient care technicians and clinical pharmacy technicians. The clinical pharmacy technician is assigned to a nursing unit and is responsible for various medication-related activities that a nurse would encounter on a daily basis. Some of the daily activities include pulling patient medications from unit-based cabinets (UBC), finding missing medications, and resolving discrepancies. Candidates for the clinical pharmacy technician position underwent an interview process and took part in a training program designed to focus on the clinical aspects of their job responsibilities. All clinical pharmacy technicians were required to pass a comprehensive exam after each area of training.

The new patient care model is currently in a three-month trial period on pre-selected nursing units at Evanston, Glenbrook, and Highland Park hospitals. During this pilot, data is being collected in the following areas: number of phone calls to central pharmacy, pages to unit pharmacist, and reported missing medications. Following the pilot, the patient care model will be modified and expanded to the remaining nursing units.

Learning Objectives:

Describe the clinical pharmacy technician role in the new patient care. Model

Discuss the need for a new patient care model.

Self Assessment Questions:

Increased workloads, wages, and mandatory overtime are all factors contributing to the nursing shortage. T/F

The clinical pharmacy technician's responsibilities include locating missing medications, solving discrepancies, and answering all medication-related questions on their assigned nursing unit. T/F

THE USE OF METFORMIN IN LIVER TRANSPLANT RECIPIENTS

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Posttransplant diabetes mellitus (PTDM) is a significant complication of immunosuppressive treatment that may contribute to graft loss and posttransplant morbidity and mortality. Given that, prompt and intensive control of blood glucose levels with lifestyle modifications and appropriate drug treatment is essential. Due to the relative insulin deficiency and/or insulin resistance that is caused by immunosuppression, both insulin and oral hypoglycemic dugs have been shown to be effective in transplant recipients. To date, there has been no data on the use of metformin, an oral insulin-sensitizing biguanide, in this patient population.

PURPOSE:
To determine the safety and efficacy of metformin in liver transplant recipients who developed PTDM.

METHODS:
This will be a retrospective analysis of all liver transplant recipients transplanted at Henry Ford hospital from July 1998 to July 2003. Patients who develop PTDM and were prescribed metformin posttransplantation will be assessed. Patient's in-hospital charts, flow sheets and electronic charts will be reviewed. The following parameters will be collected at baseline (before initiation of metformin), 3, 6, and 12 months post initiation of metformin: patient's age, gender, sex, and body mass index, etiology of liver disease, doses of metformin, other hypoglycemic agents, immunosuppressants (tacrolimus, cyclosporine, sirolimus and corticosteroids) fasting blood glucose concentrations, glycosylated hemoglobin, and total cholesterol. Safety parameters such as serum creatinine, carbon dioxide, liver function tests will also be collected for the same time periods.

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

Learning Objectives:

To assess the safety of metformin in liver transplant recipients

To assess the efficacy of metformin in liver transplant recipients

Self Assessment Questions:

Metformin has been shown to be effective as an oral hypoglycemic agent in liver transplant recipients.
True or false

Which of these immunosuppressants is least likely to cause PTDM?
a) Tacrolimus
b) Corticosteroids
c) Azathioprine
d) Sirolimus

AN ASSESSMENT OF CONSISTENCY IN FACULTY RECOMMENDATIONS TO STUDENTS APPLYING TO PHARMACY PRACTICE RESIDENCIES

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In the continuous evolution of pharmacy and its practice, post-graduate training is becoming more necessary for pharmacist to perform their clinical duties in various settings. The basis for post-graduate training for pharmacists is a pharmacy practice residency, or “general” practice residencies, in which the resident has an opportunity to broaden their clinical database through exposure to a variety of practice areas. Historically, prospective pharmacy students preparing to pursue residencies consult their faculty for recommendations. Often, these recommendations vary from individual to individual, from institution to institution. This study is designed to determine the consistency in faculty recommendations to students applying for pharmacy practice residencies. The study will be conducted through surveys sent via e-mail (with attachments) to all program directors of accredited pharmacy practice residencies in the U.S. Survey data will be compiled and compared to assess frequencies in faculty recommendations for each survey category which include: constructing a Curriculum Vitae (CV), appropriate networking before, during, and after the annual Mid-year ASHP Clinical Meeting, the application process, conducting the interview, and appropriate follow-up. Identifying any consistencies in faculty recommendation to prospective students may help to establish a “standard” criteria for future applicants.

Learning Objectives:

Recognize possible predictive factors that may influence a student's candidacy for a residency position.

Develop appropriate networking techniques for implementation before, during and after the annual ASHP Mid-year Clinical meeting.

Self Assessment Questions:

The interview is a positive predictive factor that may influence a student's candidacy.
a. True
b. False

Variations exist in faculty recommendations regarding appropriate follow-up communication.
a. True
b. False

EVALUATION OF THE AVAILABILITY OF OPIOID ANALGESICS FOR OUTPATIENT ONCOLOGY PATIENTS

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Goal of Study: To determine difficulties oncology patients have obtaining opioids, to assess opioid availability and identify pharmacy-related barriers that limit the stocking of opioids in community pharmacies that service Beaumont patients.

Methods: This descriptive study will be conducted in two parts. Part one consists of a survey of 50 outpatient oncology patients to reveal difficulties in obtaining opioid analgesics. Inclusion criteria include any patient over the age of 18 years and currently receiving schedule II opioids. Patients or caregivers unable to communicate by telephone will be excluded. The nursing staff of two private oncology practices and the outpatient radiation oncology department will identify patients. The nurses will obtain consent by telephone or during an office visit for the survey. Patient surveys will be conducted via the telephone. Part two consists of a survey of 50 pharmacies to determine which schedule II opioids are / are not stocked, as well as the reasons for not stocking certain products. A list of zip codes will be obtained from the Beaumont Corporate Planning Department to determine the neighborhoods in which 60% of our patients live. A list of pharmacies in these zip codes was obtained from the Michigan Pharmacist Association and selection was randomized via a randomization table. The selected pharmacies will be surveyed on-site to determine which schedule II opioids are not routinely stocked and the reasons for not stocking.

Results / Conclusions: The data is currently being analyzed. Results will be available at the time of presentation.

Learning Objectives:

Identify difficulties cancer patients have in obtaining opioids.

Identify pharmacy-related barriers that limit the stocking of opioids.

Self Assessment Questions:

List 3 common reasons why pharmacists are reluctant to stock opioids.

List 3 common difficulties patients have trying to obtain opioids.

CONTINUOUS MAGNESIUM INFUSION IN ACUTE ASTHMA EXACERBATIONS

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Purpose: To evaluate the effect of adding a continuous magnesium infusion, to the standard treatment regimen, on the length of PICU length of stay in patients with acute asthma exacerbations. Secondary outcomes assessed will be ketamine use, terbutaline use, number of patients transferred from the PICU while on study medication, the need for escalating respiratory support (i.e. intubations, inhaled anesthetics), and extracorpreal membrane oxygenation (ECMO).

Methods: Patients aged 2 to 18 years of age with known reactive airway disease (RAD) admitted to the PICU with an acute asthma exacerbation. All patients will receive standard of care while enrolled in the study. After informed consent is obtained, each study patient will be randomly assigned to receive either the study medication (magnesium sulfate) or placebo (equivalent volumes of normal saline). Physicians will be blinded, and the continuous infusion will infuse for at least 24 hours. Primary endpoint is length of stay in the PICU. The magnesium infusion, or placebo infusion, will be adjusted according to the patients magnesium blood concentrations that will be taken during the course of study enrollement. Blood pressure and pulse will be monitored continuously. Serum electrolytes will be monitored daily and any adverse effects (i.e. lethargy, muscle weakness, arrhythmias, hypotension, hypermagnesemia, flushing, diarrhea and abdominal cramping) will be noted.

Learning Objectives:

Understand the mechanism of action of magnesium in bronchial smooth muscle relaxation.

Identify the blood concentrations of magnesium that have correlated with efficacy of magnesium in acute asthma exacerbations.

Self Assessment Questions:

The mechanism of action of magnesium in bronchial smooth muscle relaxation is known at this time. T or F

What magnesium blood concentrations has been shown to correlate with efficacy of magnesium in acute asthma exacerbations:

A. 1-3 mg/dL
b. 3-5 mg/dL
c. 5-7 mg/dL
d. 7-9 mg/dL

OUTPATIENT DALTEPARIN USE IN VETERAN PATIENTS WITH MECHANICAL HEART VALVES: AN INSTITUTIONAL REVIEW

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Dalteparin is the preferred low molecular weight heparin (LMWH) product used at the VA Ann Arbor Healthcare System (VAAAHS). It is employed as thromboprophylaxis in outpatients chronically anticoagulated with warfarin for two main indications, referred to as “bridge therapy”:
1. To maintain adequate anticoagulation in patients with a high thromboembolic risk when warfarin must be held due to an invasive medical procedure,
2. To achieve adequate anticoagulation when the INR is discovered to be subtherapeutic, putting patients at increased risk for thromboembolism (TE).
Although a few small, prospective trials have suggested its safety, large randomized controlled trials have not been conducted for either of the above indications in patients with mechanical heart valves.

Purpose: The primary objective of this study is to determine the rate of bleeding and TE events within one month of outpatient dalteparin use in veterans with mechanical heart valves. Secondary objectives are to report potential risk factors and circumstances associated with bleeding or TE events in veterans with mechanical heart valves using dalteparin and to examine the prescribing patterns of dalteparin in veterans with mechanical heart valves at VAAAHS.

Methods:
The study is a retrospective, single-center chart review. All patients with mechanical heart valves, identified by ICD-9 codes, who received dalteparin between October 1, 1998 and June 30, 2003, will be evaluated for inclusion. Electronic charts will be individually reviewed for TE and bleeding events occurring up to one month after receiving dalteparin. Demographic, laboratory and drug utilization variables will be analyzed for statistically significant correlations with bleeding and TE events. Finally, prescribed dosing regimens of dalteparin will be examined.

Results and Conclusions: in progress

Learning Objectives:

To examine the safety and effectiveness of anticoagulation “bridge” therapy with dalteparin in ambulatory patients with mechanical heart valves.

To evaluate prescribing patterns of dalteparin in veterans with mechanical heart valves at VAAAHS.

Self Assessment Questions:

Prophylactic doses (non-weight based) of LMWH are preferred for thromboprophylaxis in patients with mechanical heart valves. T or F

Additional risk factors for TE in patients with mechanical heart valves include hypertension, diabetes and recent stroke. T or F

EVALUATING THE USE OF SPIRONOLACTONE IN PATIENTS WITH HEART FAILURE

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Heart failure (HF) management is undergoing rapid evolution, as clinicians better understand the pathophysiology. According to practice guidelines for HF, spironolactone initiation is recommended for symptomatic treatment of left ventricular systolic dysfunction in patients with recent or current New York Heart Association (NYHA) class IV symptoms, preserved renal function, and normal potassium concentration. As spironolactone use is becoming more widespread, the possibility of hyperkalemia increases. Hyperkalemia may result from a lack of close monitoring, coexisting renal dysfunction, or increased baseline potassium levels prior to the initiation of spironolactone. Research of spironolactone prescribing patterns in HF is needed to determine not only compliance with current practice guidelines, but also the incidence of hyperkalemia in this patient population.

The primary objective is to identify the practice patterns at the North Chicago VA Medical Center in the utilization of spironolactone in patients diagnosed with chronic heart failure. Secondary objectives include: 1) determine the patient's NYHA classification, 2) determine the incidence of hyperkalemia and/or other adverse effects reported due to the use of spironolactone, 3) determine the average dose utilized and compare to guidelines, and 4) compare the appropriateness of other HF therapies based on the guidelines.

This retrospective study will consist of a review of the electronic medical record at North Chicago VA Medical Center. Fifty patients who were admitted with the diagnosis of HF and receiving spironolactone will be included in the study. Data collection is currently in progress and the final results will be presented at the Great Lakes Conference.

Learning Objectives:

Summarize the factors that increase the incidence of hyperkalemia associated with spironolactone use in HF patients.

Identify when to initiate spironolactone therapy according to current American College of Cardiology/American Heart Association (ACC/AHA) practice guidelines for HF.

Self Assessment Questions:

Hyperkalemia may result from a lack of close monitoring, coexisting renal dysfunction, or increased baseline potassium levels prior to the initiation of spironolactone. (T/F)

Spironolactone initiation is recommended for symptomatic treatment of left ventricular systolic dysfunction in patients with recent or current NYHA class IV symptoms, preserved renal function, and normal potassium concentration. (T/F)

THE EFFECT OF FLUOROQUINOLONE RESISTANCE ON MORTALITY IN PATIENTS WITH PSEUDOMONAS AERUGINOSA BACTEREMIA.

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Antibiotic resistance has become ubiquitous in modern medicine, and resistant bacteria may cause more adverse outcomes when compared to their susceptible counterparts. The increase in pathogenicity may occur for two reasons: 1) increased virulence of the resistant pathogen, and/or 2) the difficulty of treating an organism with limited antibiotic susceptibility. Recent literature shows that fluoroquinolone resistance has risen dramatically with the ever-expanding utilization of fluoroquinolones. Additionally, fluoroquinolones share bacterial efflux pump resistance mechanisms with other antibiotics and may confer resistance to these agents.

Despite the well documented increase in fluoroquinolone resistance, the effect on pathogenicity is unknown. This study will attempt to determine if there is a relationship between fluoroquinolone resistance and increased pathogenicity. This will be assessed in a retrospective, observational, cross-sectional, case-control study. Patients with a microbiologically documented, fluoroquinolone-resistant, Pseudomonas aeruginosa bacteremia will be compared to patients with a microbiologically documented, fluoroquinolone-sensitive, Pseudomonas aeruginosa bacteremia. Death prior to discharge will be evaluated as the primary outcome. Secondary outcome indicators such as time to discharge and time to eradication of the organism from the blood will be assessed for the two groups. The study will employ the Charlson Morbidity Score, a validated comorbidity index, to quantify the effect of the baseline confounding variables. Other potential confounding variables will be addressed through logistic regression and will include: gender, age, concurrent pneumonia, concurrent neutropenia, cancer, diabetes, solid organ transplant, chronic lung disease, renal dysfunction, nosocomial cause of infection, and inappropriate antibiotic treatment.

It is anticipated that the results of this study will show fluoroquinolone-resistant Pseudomonas aeruginosa to be more pathogenic than its fluoroquinolone-sensitive counterpart. Confirmation would support the need for a prospective trial. Findings will hopefully provide additional insight on the dangers of resistant organisms and the need for judicious antibiotic utilization.

Learning Objectives:

Pharmacists should be able to state the resistance mechanisms bacteria employ for the drug class of fluoroquinolones.

Pharmacists should be able to explain factors associated with increasing resistance of fluoroquinolones.

Self Assessment Questions:

Which mechanism(s) of resistance is/are frequently employed by bacteria to circumvent killing?

a. Efflux pumps
b. Alteration of enzyme binding to DNA gyrase
c. Plasmid-mediated
d. Two of the above
e. All of the above

True or False: Since Fluoroquinolones are time dependant antibiotic killers; the amount of time greater than the minimum inhibitory concentration has an inverse relationship with the likelihood to develop resistance.

EFFECTS OF CONVERSION FROM EPOETIN ALFA TO DARBEPOETIN ALFA

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Introduction:
Epoetin alfa and darbepoetin alfa are glycoproteins that stimulate red blood cell production. Both drugs stimulate the division and differentiation of committed erythroid progenitors in the bone marrow thus increasing red blood cell creation. Darbepoetin alfa is closely related to erythropoietin, but with two additional N-glycosylation sites. This change increases the half-life and results in decreased injections compared to epoetin alfa.
Purpose:
The purpose of this study is to determine differences in anemia resolution and incidence of drug related adverse effects for patients converted. If differences exist, the study will address clinical variations that may account for these differences.
Research Design / Methodology:
The study will be conducted by retrospective analysis of patients who had previously received epoetin alfa, then converted to darbepoetin alfa. Clinical resolution of anemia will be analyzed based on laboratory data including hemoglobin and hematocrit. Adverse effects of darbepoetin alfa and clinical resolution of anemic symptoms will also be analyzed. Economic evaluation will be performed on a cost per case basis. This protocol has been approved by the Internal Review Board of the Zablocki VA Medical Center. Laboratory, medication administration, and progress notes from the computerized patient record system will be used to collect information. Drug and lab data will be recorded at baseline and at 7-10 weeks post-conversion. This study will include all patients converted to darbepoetin alfa within the medical center.
Results:
To date 56 patients have been enrolled, and data collection is complete for 21 patients at this time. Results for 21 patients have shown that changes in hemoglobin and hematocrit have not been statistically different for patients converted . Darbepoetin alfa patients received fewer injections. Darbepoetin alfa has decreased cost associated with therapy. Results thus far have demonstrated that darbepoetin can effectively control anemia with fewer injections, and decreased drug associated costs. Full results to be presented.

Learning Objectives:

To describe the chemical and structural differences between epoetin alfa and darbepoetin alfa that allow for differences in frequency of drug administration.

To understand the therapeutic and laboratory markers that signify equivalence of anemia resolution related to conversion from epoetin alfa to darbepoetin alfa.

Self Assessment Questions:

The primary laboratory marker used to monitor efficacy of epoetin alfa or darbepoetin alfa is:
(a) Serum iron concentration
(b) Iron-binding capacity
(c) Hemoglobin
(d) Serum creatinine

For a patient previously receiving 3000 Units of epoetin alfa three times a week, the appropriate most appropriate initial dose of darbepoetin alfa would be:
(a) 25 micrograms IM every week
(b) 6.25 micrograms IV every week
(c) 25 micrograms SC every week
(d) 25 milligrams SC every week

REVIEW OF METFORMIN USE IN AMBULATORY AND INPATIENT SETTINGS AT THE UNIVERSITY OF MICHIGAN HEALTH SYSTEM

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Metformin is currently the only biguanide antidiabetic agent available in the US. It is approved as monotherapy or combination therapy for treatment of type 2 diabetes mellitus. Studies have shown that metformin is effective in improving glycemic control and delaying macrovascular complications of diabetes. The biguanide predecessor to metformin, phenformin, was removed from the US market in the 1970s due to its association with lactic acidosis. Metformin has a lower risk for lactic acidosis, approximately 1 in every 30,000 person-years, one hundred times less than that for phenformin. Nevertheless, warnings and contraindications are in place to prevent this adverse effect. Metformin must be avoided in those who are at increased risk for lactic acidosis, such as those with renal impairment, hepatic dysfunction, heart failure, chronic obstructive pulmonary disease, metabolic acidosis, dehydration, and alcoholism. In addition, it should be temporarily withheld in those undergoing surgery or radiocontrast studies, or have an acute infection.

Descriptive studies have indicated that metformin is frequently used in patients with precautionary or contraindicating conditions. The frequency of this has ranged anywhere from 25 to 73 percent.

A retrospective chart review is being conducted of ambulatory and inpatient type 2 diabetic patients at the University of Michigan Health System who have received metformin therapy. The percentage of patients who have contraindications to metformin therapy but continue to receive it and the occurrence of patients thus developing lactic acidosis will be determined. Clinical and demographic data for 300 outpatients and inpatients on metformin therapy have been compiled, and data synthesis is ongoing. Results and final outcomes are pending.

Learning Objectives:

List the contraindications and precautionary measures to metformin therapy

Cite the incidence of inappropriate metformin use

Self Assessment Questions:

1. The most common side effect of metformin is lactic acidosis
(a) True
(b) False

2. Which of the following are contraindications for the use of metformin?
(a) Serum creatinine = 1.5 mg/dL for males
(b) Age > 65 years
(c) Left bundle branch block
(d) Concurrent use of warfarin

EVALUATION OF A NEWLY INITIATATED INTERDISCIPLINARY PAIN CLINIC AT THE VA CHICAGO HEATLH CARE SYSTEMS

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Purpose: Chronic non-malignant pain (CNMP) is a leading complaint amongst elderly patients and a primary reason for medical consultation. CNMP results in substantial direct and indirect societal costs including escalating health care expenditures, depression, anxiety, decreased socialization, impaired ambulation and sleep disturbances. Inadequate training of health care providers, opioid analgesic prescribing controversies as well as comorbid disease states all contribute to the problem of insufficient pain relief. A multidisciplinary approach utilizing WHO treatment recommendations and standards of care is thought to improve the recognition and evaluation of pain resulting in treatment optimization and pain management improvement, which subsequently improves patients' quality of life, overall health, and reduces health care costs and utilization.

This research project will retrospectively evaluate VA Chicago Health Care Systems' (VACHCS) pain initiative in order to better understand specific patient needs with respect to pain management in an effort to improve patient outcomes.

Methods: This trial will be designed as a retrospective, electronic chart review, evaluating patients seen at the VACHCS Pain Clinic from June 1 to December 31, 2003. Data will be collected from VACHCS electronic records. The information collected to characterize these patients will consist of: age, gender, height, weight, body mass index, and pertinent past medical history. Electronic consults submitted to the Pain Clinic during this time period will also be evaluated. The referring service and reason for referral will be investigated. This study will also describe and evaluate the ultimate course of treatment and management of pain. It will document initial diagnoses, pain score trends, previous therapies and interventions, current therapies and interventions, number of visits, and other services utilized. This study will then recapitulate resource utilization, staffing and hours of operation of VACHCS' Pain Clinic during the stated period.

Learning Objectives:

Identify the necessary components of a multidisciplinary pain clinic.

Identify barriers to adequate pain management.

Self Assessment Questions:

True or False - Methadone is an appropriate pharmacologic treatment option for management of chronic non-malignant pain.

What is the first line therapy for pain management based on the WHO pain ladder?

OPTIMIZING THE USE OF ERYTHROPOIETIN IN HOSPITALIZED PATIENTS

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Purpose: Recombinant human erythropoietin (rHuEPO) is a mainstay of therapy for the treatment of anemia in patients who cannot produce enough endogenous erythropoietin secondary to certain disease states such as renal failure and cancer. Currently, rHuEPO ranks as one of the top drug expenditures for the Aurora Health Care - Metro Region. Due to the costs of rHuEPO, finding methods to ensure its proper utilization is necessary to maximize efficacy and avoid waste.

Methods: A medication use evaluation was performed over a period of one week on all patients at St. Luke's Medical Center who were prescribed rHuEPO. Baseline data was obtained to assess prescribing practices. A comparison was then done to compare the prescribing practices to current evidence-based medicine practice recommendations.

Preliminary Results: rHuEPO is prescribed frequently by physicians associated with the Departments of Nephrology and Oncology. We found that not all of the prescribing is consistent with the evidence-based ASCO and DOQI guidelines. Analyzing the data, we found that approximately 40% of rHuEPO was administered intravenously and then determined that by changing to once weekly subcutaneous administration would result in substantial cost savings for the hospital.

Future Plans: A proposal for an automatic pharmacist-driven IV to SQ conversion based on specific criteria is planned to go before the Pharmacy & Therapeutics Committee in March.

Final Results and Conclusions: Pending

Learning Objectives:

Compare the clinical efficacy of intravenous rHuEPO versus subcutaneous rHuEPO.

Evaluate the financial impact of administering rHuEPO intravenously versus subcutaneously.

Self Assessment Questions:

True or False?
Recombinant human erythropoietin (rHuEPO) is the standard of therapy for the treatment of anemia in patients who cannot produce enough endogenous erythropoietin.

True or False?
Administering rHuEPO intravenously is the only effective method to achieve target hemoglobin and hematocrit levels.

DRUG UTILIZATION EVALUATION OF ANTIFUNGAL AGENTS AT INDIANA UNIVERSITY HOSPITAL

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The appropriate use of antifungal agents depends on several factors including their spectrum of activity, indications for use, side effects, resistance patterns, and costs. For these reasons and to optimize patient care, Indiana University Hospital utilizes an Antimicrobial Prescribing Improvement Program (APIP) to control the use of antimicrobial agents. The purpose of this study is to evaluate if the antifungal agents voriconazole, caspofungin, amphotericin B lipid complex, and liposomal amphotericin B are being prescribed appropriately according to the APIP criteria for use at Indiana University Hospital and to determine if there is a difference in the rates of appropriate use between the four agents. Secondary objectives include analysis of the occurrence of adverse effects, duration of therapy, drug costs, types of infections being treated, and pre-medications being used for each of the antifungal agents.

A retrospective chart review will be conducted on approximately 150-200 patients who have received these agents between January 1st, 2003 and December 31st, 2003. This study will only include patients 18 years of age and older. Data to be collected include: patient demographics, antifungal utilized, dose, duration of therapy, type of infection, cultures, criteria for use, adverse effects, pre-medications utilized, other concurrent medications, authorizing physician, serum creatinine, and blood urea nitrogen. The results of this study will be presented to the Antimicrobial Prescribing Improvement Subcommittee (APIS) to decide if changes to the APIP policies and procedures may be necessary.

Learning Objectives:

Identify appropriate criteria for use of antifungal agents used in this study.

Identify common adverse effects associated with antifungal agents used in this study.

Self Assessment Questions:

Candida albicans isolated from a blood culture is sufficient to meet criteria for appropriate use of caspofungin. True or False.

Liposomal amphotericin B may be beneficial in patients experiencing intolerable infusion related reactions with amphotericin B lipid complex. True or False.

EMPIRIC GENTAMICIN DOSING IN NEONATES DURING THE FIRST SEVEN DAYS OF LIFE

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Many newborns admitted to the intensive care units receive antibiotics for the treatment of possible sepsis during the first days of life. Gentamicin has been widely used as one of the initial antibiotics to treat suspected sepsis in neonates, often in combination with ampicillin. This combination of antimicrobial agents provides good coverage against the common organisms of the maternal vaginal flora. Empiric dosing of gentamicin in the neonatal population remains controversial. Many variables, such as post-conceptional age, day of life, gestational age, renal function, fluid status, and severity of infection, can affect gentamicin pharmacokinetics. However, during the weeks after birth, many physiologic changes take place that affect the volume of distribution and renal function of the neonate. Therefore, it is necessary to closely monitor gentamicin levels and change doses and regimens as appropriate. The purpose of the study was to analyze serum gentamicin concentrations achieved with the current Bronson Methodist Hospital protocol and determine if there is a need to develop and study a new empiric gentamicin dosing protocol for neonates.

A retrospective analysis of peak and trough serum gentamicin concentrations, volume of distribution, half-life, and clearance was conducted on data collected from 134 patients in the neonatal intensive care unit (NICU) at Bronson Methodist Hospital in 2000 and 2001. Patients included in the study were admitted to the NICU at Bronson Methodist Hospital during the first seven days of life, and were dosed with gentamicin based upon the current Bronson Methodist Hospital neonatal gentamicin protocol.

Preliminary results indicate that the current Bronson Methodist Hospital empiric gentamicin dosing protocol for neonates during the first seven days of life does not produce safe and therapeutic serum gentamicin concentrations in a large number of patients. A new protocol should be developed, implemented, and analyzed.

Learning Objectives:

Understand the importance of empiric gentamicin dosing in neonates.

Become familiar with the physiologic and pharmacokinetic aspects of dosing gentamicin in neonates.

Self Assessment Questions:

Gestational age is a major factor when empirically dosing gentamicin in neonates? T or F.

Volume of distribution for gentamicin in neonates is often smaller than that in an adult? T or F.

DECREASING ADVERSE DRUG EVENTS ASSOCIATED WITH LEPIRUDIN AND ARGATROBAN.

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Heparin induced thrombocytopenia (HIT) is a serious adverse drug reaction from heparin. Although the first step to treating HIT is to discontinue heparin therapy, this often leaves the patient in a hypercoaguable state that may lead to severe or thromboembolic complications. Direct thrombin inhibitors (lepirudin March 1998 and argatroban June 2000) are the only available agents with FDA approval for the management of HIT. These specific agents have not yet been identified by the Institute of Safe Medication Practices (ISMP) or the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) as "high alert" medications. Due to the characteristics of these medications, the risk for adverse drug events (ADEs) exists if these agents are prescribed or monitored inappropriately. At our institution, we have found activated partial thromboplastin time (aPTT) levels elevated to critical ranges in patients receiving lepirudin and argatroban, which has led us to inquire if the recommended dosing is too aggressive. Another problem is an absence of specific titrating recommendations for these medications are available, making it very difficult for clinicians to confidently dose adjust for a safe and effective therapy. We propose to perform a comprehensive study, through retrospective chart review with approximately 100 medical records, of the dosing and monitoring variations as well as the frequency and nature of ADEs related to lepirudin and argatroban therapy at our institution. Results from this study will help to identify major dosing and monitoring concerns with these agents and will aid in allowing us to provide clear recommendations on how health systems can decrease the risk of ADEs associated with the use of lepirudin and argatroban.

Learning Objectives:

Pharmacists should be able to describe the role of direct thrombin inhibitors in current practice.

Pharmacists should be able to understand the patient safety concerns of dosing and monitoring lepirudin and argatorban and how to minimize potential risks with these agents.

Self Assessment Questions:

What lab value is used to evaluate effectiveness of lepirudin and argatroban? a. INR b. aPTT c. PT d. Hgb

Which agent would need to be dose adjusted in a patient with renal impariment and which agent would need to be dose adjusted in a patient with hepatic impairment? _____lepirudin _____argatroban a. hepatic adjustment b. renal impairment

USING A PROBIOTIC PREPARATION FOR THE PREVENTION OF CLOSTRIDIUM DIFFICILE DIARRHEA

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Background: Clostridium difficile is a major cause of nosocomial infectious disease. The organism can cause a spectrum of gastrointestinal illnesses ranging from mild, self-limiting diarrhea to life threatening pseudomembranous colitis and toxic megacolon. It is found widely in hospital environments, produces spores that can survive for prolonged periods on surfaces, and is easily transmitted from patient to patient. Patients with comorbidities and the elderly have the highest risk of acquiring Clostridium difficile during hospitalization. Once C. difficile-associated diarrhea develops, it has been shown to be associated with prolonged hospitalization and increased hospital costs. The veteran population is a group at high risk not only for the development of C. difficile diarrhea, but also for adverse outcomes following the illness. The major risk factor for acquiring C. difficile-associated diarrhea is antimicrobial use. Although good infection control practices (handwashing, glove use, etc.) reduce the risk of patients at risk of getting C. difficile-associated diarrhea, no preventive strategy has been universally shown to be effective. Probiotic therapy is an attractive approach to prevention because it aims to restore the balance of normal colonic flora that is disrupted by antibiotic use.

Purpose: To determine the efficacy of an OTC probiotic preparation with placebo for prevention of Clostridium difficile-associated diarrhea in patients receiving antibiotics.

Methods: A prospective, double blind, placebo-controlled randomized trial. Adult patients hospitalized at the VA hospital who are receiving antimicrobials for an expected duration of > 48 hours and do not have diarrhea at baseline will be randomized to receive probiotic or placebo throughout the duration of antimicrobial therapy and for a duration of 15 days after antimicrobial is stopped. The primary outcome is Clostridium difficile-associated diarrhea, defined as diarrhea associated with a positive stool toxin.

Learning Objectives:

Describe the sequence of events leading to C. difficile colitis in susceptible patients.

Describe the role of probiotics in the prevention of C. difficile-associated diarrhea

Self Assessment Questions:

What percentage of normal adults carry Clostridium difficile in their gastrointestinal tract
a. 1%
b. 3%
c. 10%
d. 30%

One-third of patients relapse after being treated for C. difficile diarrhea. (T/F)

APREPITANT FOR MULTI-DAY MODERATELY-HIGH TO HIGHLY EMETOGENIC CHEMOTHERAPY REGIMENS

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The most appropriate Emend (aprepitant) treatment regimen for patients receiving multiple days of moderately-high to highly emetogenic chemotherapy is unclear. We hypothesize that combination therapy with aprepitant from day one to two days after chemotherapy will reduce the severity of nausea and vomiting compared to aprepitant solely from the last day of chemotherapy to two days after chemotherapy in patients receiving multiple days of treatment with moderately-high to highly emetogenic chemotherapy. The primary outcome studied will be chemotherapy induced nausea and emesis. Other outcome measures will include complete control, complete response, chemotherapy induced retching, adverse events, number of rescue doses of antiemetic medications, and quality of life measured using the FLIE (functional living index-emesis).

The patients included in this study will be receiving multiple days of highly or moderately-high emetogenic chemotherapy regimens based on the guidelines from an article by Hesketh et al. Patients will be randomized into one of two groups. The first group will receive aprepitant from day 1 of chemotherapy to two days after chemotherapy. The second group will receive aprepitant starting on the last day of chemotherapy administration to 2 days after chemotherapy. Both groups will receive oral aprepitant 125mg on the first day followed by 80mg for the duration of treatment. Patients will all also receive oral dexamethasone 20mg (10mg on days with aprepitant), oral ondansetron 24mg, and as needed rescue medications such as metoclopramide, prochlorperazine, or dexamethasone during chemotherapy.

General patient demographic information will be collected prior to the study by interviewing the patient and reviewing the medical record after obtaining written informed consent and authorization. Beginning on day 1 and continuing for 2 days after completing chemotherapy, patients will complete a diary daily with the assistance of study personnel. The patients will also fill out a FLIE on the last day of treatment.

Learning Objectives:

Assess the efficacy of Emend (aprepitant) in patients receiving multiple days of moderately-high and highly emetogenic chemotherapy regimens.

Identify the most appropriate dosing regimen for Emend (aprepitant) in patients receiving multiple days of highly or moderately-high emetogenic chemotherapy.

Self Assessment Questions:

True or false, does Emend (aprepitant) decrease the incidence of chemotherapy induced nausea and vomiting in patients receiving multiple days of moderately-high or highly emetogenic chemotherapy regimens?

Is the early or late regimen of administering Emend (aprepitant) more effective in the treatment of chemotherapy induced nausea and vomiting associated with multiple days of moderately-high or highly emetogenic chemotherapy regimens?

MOTIVATION AND JOB SATISFACTION OF COMMUNITY PHARMACISTS INVOLVED WITH PHARMACEUTICAL CARE

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Statement of Purpose: To assist Kroger corporate management in identifying what motivational factors contribute to the decision of Central Ohio Kroger pharmacists to become involved in or abstain from pharmaceutical care services. Also, to identify what Central Ohio Kroger pharmacists not currently participating in pharmaceutical care services perceive as barriers to becoming involved in pharmaceutical care.

Methods: Surveys will be mailed to two groups of Central Ohio Kroger pharmacists, those actively providing patient care services and those involved solely in dispensing activities. Factors motivating both groups of pharmacists to perform pharmaceutical care services will be compared and contrasted. Job satisfaction will also be assessed in both groups of pharmacists. The data collected from the survey will be utilized to implement new recruitment and advancement strategies to increase Kroger community pharmacist involvement in pharmaceutical care services. In addition, the information will be disseminated to other community pharmacies for use in increasing pharmacist involvement with pharmaceutical care.

Results: One hundred surveys will be sent to Central Ohio Kroger pharmacists. Data will be collected.

Conclusion: It is anticipated that this project will enable corporate management of community pharmacy establishments to identify motivational forces that contribute to a pharmacist's decision to perform pharmaceutical care services. Also, it is expected that this project will provide information regarding how best to reward pharmacists for their participation in pharmaceutical care services.

Learning Objectives:

Understand what factors contribute to job satisfaction and job dissatisfaction according to Herzberg's Hygiene Theory.

Explain the importance of community pharmacists' perceived barriers to becoming involved in pharmaceutical care services.

Self Assessment Questions:

True or False Job satisfaction of community pharmacists can only be improved by increasing their salary, bettering their working conditions, or enhancing their benefits package.

Which of the following is a potential perceived barrier to performing pharmaceutical care services of community pharmacists?
a) The pharmacy workload is too high
b) The pharmacy is not adequately staffed to accommodate pharmaceutical care services
c) Inadequate training or skills to perform pharmaceutical care services
d) All of the above

EVALUATION OF TREATMENT PATTERNS FOR PATIENTS WITH ACUTELY DECOMPENSATED HEART FAILURE

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Heart failure (HF) is associated with substantial morbidity and mortality and has become a major health care problem in the United States. The University of Wisconsin Hospital & Clinics (UWHC) is a participant in the Acutely Decompensated National Registry (ADHERE). Reports generated from the ADHERE database provide insights into current practice that can be used to develop guidelines and protocols and improve the standard of care among HF patients. The reports include patient demographics, compliance to the 4 “core measures” developed by JCAHO to assess quality of care in HF patients and medication use patterns.

The purpose of this project is review the ADHERE data reports to identify opportunities for improving the medication management of patients with HF in order to optimize patient outcomes and improve the effectiveness of care delivered to HF patients at this institution.

This project will be a retrospective medical record review of 61 charts of patients participating in the ADHERE registry. Data collected will include the prescribing of angiotensin converting enzyme inhibitors (ACEi) and beta-blockers, drug allergies, contraindications, admitting medical service, and time of arrival to administration of first intravenous diuretic treatment. Data collected will be analyzed for trends using descriptive statistics.

Data are currently being collected. Preliminary review of the ADHERE reports has identified several areas which can be explored in more detail. Additionally, prescribing patterns of ACEi and beta-blockers in patients with HF among different medical services at UWHC will be reviewed. Future interventions that impact prescribing upon hospital admission and/or discharge may be warranted pending the results of the analysis.

Learning Objectives:

To understand the types of information the ADHERE reports can provide a participating institution

List the 4 “core measures” developed by JCAHO to assess quality of care in HF patients

Self Assessment Questions:

The ADHERE reports have assisted UWHC in identifying:
a. Compliance to JHACO indicators is less than 50% for all measures
b. UWHC is compliant in all measures
c. Beta-blocker and ACEi prescribing is less than the national average
d. Patient arrival time to administration of IV diuretic time can be reduced

True or False “Beta-blockers at discharge” is one of the JCAHO “core measures”

RELATIONSHIP BETWEEN QUANTITY OF ENTERAL NUTRITION AND OUTCOMES IN CRITICALLY ILL TRAUMA PATIENTS: A RETROSPECTIVE REVIEW

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The quantity of nutrition that is associated with optimal outcomes in the critically ill patient remains uncertain. Some experts recommend feeding at metabolic expenditure (ie. 25 Kcal/Kg/day and 1.5 grams protein/Kg/day) while others recommend lesser amounts (ie. approximately 50% of metabolic expenditure). Prospective randomized animal trials have shown overfeeding to have detrimental effects, while moderate underfeeding improves survival. Studies evaluating hypocaloric nutrition in the critically ill obese patient have also shown benefit. However, there are no studies evaluating the relationship between the quantity of enteral nutrition and outcomes in the critically ill trauma patient.

This study is a retrospective chart review, which assessed the quantity of enteral nutrition administered to trauma patients during their initial stay in the ICU. The effect of varying amounts of nutrition upon renal, hepatic, pulmonary, cardiovascular and central nervous system organ functions were evaluated. In addition, the effect of varying amounts of nutrition upon hyperglycemia, ventilator days, intensive care unit (ICU) length of stay (LOS), hospital LOS, number of infections, and survival were evaluated. Patients were divided into quartiles based upon both caloric and protein intake. Organ function and outcomes were compared across the quartiles.

Interim Analysis: Results from 60 patient charts were analyzed. There were no significant differences in demographics, admission injury severity, or site of feeding. We found no statistically significant differences in outcomes with respect to number of infections, incidence of organ failure, ventilator days, hospital LOS, ICU LOS, or status at 28 days when comparing quartiles based upon mean daily caloric or protein intake.

Conclusion: The amount of enteral nutrition within the first week of feeding does not appear to affect the outcome of critically ill trauma patients in the ICU.

Learning Objectives:

Identify the risks of overfeeding patients.

Recognize the proposed advantages to hypocaloric nutrition support.

Self Assessment Questions:

Hypocaloric nutrition has been shown to improve survival in animal trials.
a. True
b. False

Overfeeding is associated with hyperglycemia.
a. True
b. False

EVALUATION OF THE QUALITY OF DRUG USE IN ELDERLY PATIENTS

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Elderly patients tend to have multiple medical conditions, polypharmacy, and alterations in pharmacokinetics and pharmacodynamics in comparison to a younger population. These factors make elderly patients more likely to experience drug interactions and adverse drug events that may lead to hospital admission. Because elderly patients are more likely to experience adverse drug events, the Beers criteria outline medications and doses that may be inappropriate for elderly patients.

Purpose: In a cohort of patients age 65 or older, to determine the cause for hospital admission, to record inappropriate medications prescribed according to the Beers criteria, and to assess rate of readmission within 30 days of discharge. A secondary outcome is to compare the status of living situation (independent living, community based residential living, and skilled nursing facility) before and after hospital admission.

Methods: One-hundred randomly chosen charts of patients 65 years of age and older admitted to the University of Wisconsin Hospital and Clinics between January and June of 2003 will be reviewed. Data to be recorded and evaluated include: primary diagnosis, presence of re-admission within 30 days (if applicable), medications, doses, and living situation on admission and discharge.

Results: To be presented.

Conclusions: This evaluation will identify the major causes of hospital admissions in the elderly, as well as the prevalence of inappropriate medications prescribed to elderly patients admitted to the hospital.

Learning Objectives:

Understand reasons why elderly patients are more likely to experience drug interactions and adverse drug events as compared to the younger population.

Identify medications, according to the Beers criteria, that may be inappropriate for elderly patients.

Self Assessment Questions:

T F Multiple disease states and multiple medications contribute to an increased likelihood of adverse drug events and drug interactions in elderly patients.

T F The Beers criteria define medications that are safe and appropriate for elderly patients.

SERUM CONCENTRATIONS OF ANTIRETROVIRAL AGENTS IN HIV-INFECTED PATIENTS WITH LIVER DISEASE.

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Patients with liver dysfunction are ideal candidates for therapeutic drug monitoring (TDM) of antiretrovirals based on their wide inter-patient variability, lack of dosing algorithms for hepatic impairment, and risk of severe toxicity and additional liver damage secondary to overexposure. Despite the high incidence of liver disease in HIV patients, presently there is very little pharmacokinetic data to guide practitioners in appropriate dosing of antiretrovirals in light of changing liver function.

The primary objective is to determine the relationship between decreased liver function and serum concentrations of antiretrovirals in HIV patients with liver disease. A secondary objective is to evaluate the relationship between serum concentration reporting of antiretrovirals and changes in dosage made by HIV care providers. The goal is to provide a basis for future studies directed at quantifying the magnitude of changing antiretroviral pharmacokinetics in the face of progressive liver dysfunction, as well as to provide support for TDM as standard of practice in patients with liver disease.

This prospective open-label cohort study enrolled HIV-positive patients from approximately 100 clinic patients with liver disease. Patients with varying degrees of hepatic dysfunction were enrolled. Serum concentrations of protease inhibitors (PIs), nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs), and non-nucleoside reverse transcriptase inhibitors (NNRTIs) are compared based on the degree of patient liver dysfunction.

Intuitively, plasma concentrations of the antiretrovirals should be elevated in Child-Pugh Classes B and C when compared to those patients in Class A. The results of the study will show if there is a relationship between plasma concentrations of PIs, NRTIs, and NNRTIs and Child-Pugh scores. In addition, concentration reporting is expected to positively impact dosage adjustments made by the HIV care providers. Potential conclusions may support the practice of TDM in HIV patients with liver disease.

Learning Objectives:

Knowledge of the current status and obstacles to therapeutic drug monitoring in HIV infection.

Understanding the relationship between liver disease (particularly HCV infection) and HIV.

Self Assessment Questions:

Which of the following drug characteristics are NOT ideal for therapeutic drug monitoring?
a. High inter-patient variability of concentrations
b. High intra-patient variability
c. Correlation between plasma concentration and pharmacologic effect or toxicity
d. Evidence that manipulation of drug to target level improves response to therapy

Which of the following is NOT a case in which monitoring of antiretroviral plasma concentrations may be helpful?
a. Women who are pregnant
b. Treatment-naïve patients who respond to therapy
c. Treatment-experience patients
d. Patients with renal or hepatic impairment

NEONATAL AND MATERNAL OUTCOMES WITH GLYBURIDE IN THE TREATMENT OF GESTATIONAL DIABETES

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Diet and exercise and/or insulin are the treatments of choice for gestational diabetes. However, oral hypoglycemic agents have also been studied in the treatment of gestational diabetes. Fetal hypoglycemia and congenital anomalies are associated with select first generation sulfonylureas. However, glyburide, a second generation sulfonylurea, has been safely studied in gestational diabetes and laboratory studies have shown that an appreciable amount of glyburide does not cross the human placenta.

The primary purpose of this IRB-approved, retrospective study is to determine the safety and efficacy of glyburide in the treatment of gestational diabetes at the St. Vincent Family Life Center. Since currently all babies born to mothers with gestational diabetes at the St. Vincent Family Life center are admitted to the neonatal intensive care unit (NICU) for observation, a secondary purpose of this study is to establish a protocol that determines whether a baby will be admitted to the NICU or to the newborn nursery.

All women with gestational diabetes, who were treated with glyburide and presented to the St. Vincent Family Life Center for labor and delivery from April 2002 through October 2003, were included in the study. Maternal outcomes evaluated include incidence of cesarean delivery, preeclampsia, and serum glucose levels. Neonatal outcomes evaluated include respiratory support or intravenous fluid, lung complications or congenital anomalies, and serum glucose levels. The data will be collected and analyzed in spring 2004.

The next steps after data collection and analysis will be to present the information at the Great Lakes Pharmacy Residency Conference. The information will also be presented to the neonatologists at the St. Vincent Family Life Center, who will then aid in establishing and implementing the protocol.

Learning Objectives:

State potential fetal risks associated with the use of glyburide in the treatment of a mother with gestational diabetes.

State two parameters that should be monitored or evaluated in an infant born to a mother with gestational diabetes who was treated with glyburide.

Self Assessment Questions:

What are the risks associated with the use of glyburide in the treatment of a mother with gestational diabetes?

What are two parameters that should be monitored or evaluated in an infant born to a mother who was treated with glyburide for gestational diabetes?

IMPROVING THE EFFICIENCY OF CHEMOTHERAPY PREPARATION AND ADMINISTRATION AT ST. LUKE'S MEDICAL CENTER

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Purpose: St. Luke's Medical Center plans to expand the inpatient oncology unit from 28 to 48 beds in the spring of 2004 which presents a great challenge in optimizing preparation, delivery, and administration of chemotherapy and biotherapy products. It has been shown in the literature that assuring consistency of care reduces medication errors, decreases length of stay, and is a safer system for patients overall. Using a standard time of administration is an example of ensuring consistent patient care.

Methods: Pharmacists on the oncology unit of the hospital were asked to record the times they requisitioned chemotherapy doses for August, September, and October of 2003. The data was compared to pharmacy and nursing staffing models. Input was gathered from various disciplines in oncology including: pharmacists, technicians, nurses, clinical nurse specialist and patient care manager, medical oncologists and their nursing associates, quality management, and hospital administration. A policy and procedure was developed for the systematic time sequence for chemotherapy.

Preliminary Results: Unfortunately the collection of chemotherapy waste has not been attributed to the time or scheduling of chemotherapy. Most instances of chemotherapy waste have been attributed to: communication issues between pharmacy and nursing and line placement problems. Standardizing the chemotherapy administration times would have prevented none of these wastages.

A task force has since been formed to improve the overall chemotherapy process from ordering to administration. The standardized chemotherapy administration times are one key component to the entire system.

Future Plans: Implementation of the standard chemotherapy administration times is scheduled for the second week of February pending medical oncologist approval. Pre-implementation education is underway as well as a system for documenting quality improvement strategies during the pilot phase. An employee survey will be taken of the pharmacists, pharmacy technicians, and nursing personnel to ensure satisfaction.

Learning Objectives:

Identify four advantages of using standardized chemotherapy administration times.

List one chemotherapy regimen that does not qualify for chemotherapy standard times per this protocol.

Self Assessment Questions:

True or False. Standard chemotherapy administration times will prevent all medication errors.

True or False. The regimen of 5FU + Cisplatin does not qualify for standard chemotherapy administration times.

REVIEW OF CHOLINESTERASE INHIBITOR USE IN OUTPATIENT VETERANS

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Alzheimer's disease is the most common form of dementia in the elderly, accounting for 50% of all dementia cases. It has been estimated by 2050 13.2 million American's will have Alzheimer's disease. The most common cognitive effect of this disease is memory loss, which has been linked to cholinergic dysfunction. The first class of medications approved to reduce cognitive decline is cholinesterase inhibitors. The purpose of this study is to evaluate the use of cholinesterase inhibitors in an outpatient veteran population and compare that to published VA treatment guidelines. A retrospective chart review of patients that received outpatient prescriptions for a cholinesterase inhibitor during fiscal years 2001 and 2002 (10/1/00-9/30/02) at the Cincinnati VA Medical Center will be performed. The primary data that will be evaluated are indication for use, cholinesterase inhibitor (product selection), final dose, cognitive and function assessments, time to follow-up and adverse drug event assessment. Secondary data that will be assessed include age, gender, antipsychotic medications, antidepressant medications and medications with known anticholinergic side effects and co-morbid conditions. The data collection process in progress. This data will be used to help prescribers to provide optimal medication therapy to patients with Alzheimer's dementia.

Learning Objectives:

Review cholinesterase inhibitors and their role in Alzheimer's dementia

Compare the use of cholinesterase inhibitors at the Cincinnati, VAMC to accepted VA national published guidelines

Self Assessment Questions:

True or False, cholinesterase inhibitors were the first class of medications approved to reduce cognitive decline in Alzheimer's disease

True or False, the Mini-Mental State Examination (MMSE) is the best tool to evaluate cognitive function in patients with Alzheimer's disease

IMPROVING PATIENT SAFETY WITH A NOVEL CLINICAL ALERT SYSTEM

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Medication Errors and Adverse Drug Events (ADEs) increase costs and lengths of stay in 2-7% of all adult inpatient admissions. Most ADEs are related to medication ordering and are preventable. Technologies, including decision support and clinical alerting systems have been employed to help prevent ADEs. Success in preventing errors has been reported using 'homegrown' systems. However, questions regarding the efficacy of various components within these systems, barriers to adoption and implementation strategies remain.

The Department of Pharmacy Services at The University of Michigan Hospitals and Health Centers in Ann Arbor, MI is developing a custom rules-based alerting system for inclusion into a wireless, tablet-PC based clinical pharmacy monitoring and documentation application.

This controlled study will evaluate the ability of this alerting system to accurately identify potential adverse drug events and facilitate management by clinical pharmacists. Secondarily, we will use the alert delivery mechanism to quantify the incidence of warning messages that were 'overridden' at the time of order entry into the pharmacy information system that were in fact valid warnings when subsequently reviewed by clinical pharmacists. Alerts will be considered valid unless they are unacknowledged, dismissed as 'appropriate for this patient' or reported as an error with the alerting system. Clinical pharmacist actions resulting from valid alerts will be reported descriptively.

A pilot implementation of the tablet-PC platform with the alerting system will begin in March 2004. Calculations indicate that 3 months of routine, daily use of the system will be required to produce an adequate sample size for preliminary analysis.

Learning Objectives:

Define 'computerized decision support system'.

Describe the current state of peer-reviewed literature regarding the clinical outcomes demonstrated by computerized decision support systems.

Self Assessment Questions:

True or False. The major studies demonstrating a clinical benefit for computerized decision support systems use 'homegrown' systems that are not commercially available.

List 2 examples of how a computerized decision support system could lead to an increased risk for patient injury.

EVALUATION OF ADHERENCE TO IMMUNIZATION GUIDELINES WITHIN AN ADULT INTERNAL MEDICINE CLINIC AT UNIVERSITY HOSPITAL, HEALTH ALLIANCE.

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Each year, influenza and pneumonia account for 50,000 to 80,000 deaths and about 400,000 hospitalizations in the United States. The total economic impact of treating these vaccine-preventable diseases among adults is greater than $10 billion each year. Vaccination can prevent about 50% of deaths from pneumococcal disease and 80% of deaths from influenza-related complications in the elderly. Many pharmacoeconomic studies have demonstrated the value of influenza and pneumococcal vaccines, yet immunization rates for these diseases continue to be low in the populations of interest.

The purpose of this project is to evaluate adherence to the CDC immunization guidelines within an adult general medicine clinic. Adherence rates will be compared between patients seen in a pharmacist-managed clinic located within a general medicine clinic, to those patients seen solely in the medicine clinic. This project is also intended to increase awareness and education of physicians, medical residents, and pharmacists regarding immunization guidelines in hopes of improving the immunization process and ultimately increase the number of patients being immunized.

Methods for this project include: identification of patients requiring immunization according to the national guidelines, assessment and documentation of immunization status via chart review, presentation of immunization guidelines to resident and staff physicians within the medicine clinic, and identification of adherence rates and necessary areas of improvement.

Data collection for this project is ongoing to determine immunization adherence rates. Data will be collected on 100 patients, 50 of whom will be participants in a pharmacist-managed clinic, and 50 of whom will be from a medical resident clinic. Analysis of the data collected is anticipated to be completed by March 2004.

Learning Objectives:

Review CDC Adult Immunization guidelines

Identify pharmacists' role in adult immunizations

Self Assessment Questions:

What are the two most common vaccine-preventable diseases?

When should you re-vaccinate with the pneumovax? Are there any special indications for revaccination?

EVALUATION OF CARDIAC CATHETERIZATION COMPLICATIONS AT AN ACADEMIC MEDICAL CENTER

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Background: Over 1.5 million cardiac catheterizations are performed in the United States each year. Unfortunately, the procedure is associated with risks such as vascular access site complications, which may include bleeding and hematoma, cerebral vascular accidents, myocardial infarctions, and contrast agent nephropathy. Advances have occurred over the past decade with respect to the use of adjunctive therapy such as glycoprotein IIb/IIIa receptor antagonists, low molecular weight heparins, thienopyridine derivatives, and direct thrombin inhibitors. Aggressive anticoagulation with these agents, inadequate fluid administration prior to cardiac catheterization, and poor technique all contribute to complications associated with cardiac catheterization. The purpose of this study is to evaluate complications related to cardiac catheterization, and to determine if there is an association with pharmacological therapies.

Methods: A retrospective review of all reported catheterization complications over a six- month period from July through December 2003 was conducted. Patient demographics, history of present illness, significant past medical history, catheterization procedure details, type of complication, pertinent vitals and labs, medication history, and hydration history were collected from computerized patient profiles and pharmacy databases.

Results: Seventy-three patients with reported cardiac catheterization complications have been identified. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss and define complications associated with cardiac catheterization

Identify medications that may contribute to cardiac catheterization complications

Self Assessment Questions:

Common cardiac catheterization complications include myocardial infarction, cerebral vascular accident, vascular complications, and acute renal failure.
T or F

Which of the following medications are thought to contribute to vascular complications?

A. glycoprotein IIb/IIIa receptor blockers
B. low molecular weight heparins
C. thienopyridine derivatives
D. all of the above

STRATEGIES TO REDUCE THE USE OF UNACCEPTABLE ABBREVIATIONS AT DETROIT RECEIVING HOSPITAL (DRH)

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Recently, the use of abbreviations and dosage designations in prescribing has received much attention, as a major cause of medication errors. This is a long-standing habit among healthcare practitioners and often appear in order forms, policies and protocols. Unfortunately, this may lead to errors due to misinterpretation of their intended meaning. When handwritten, they are even riskier, since the writing may be unclear.

The goal of this project is to improve patient safety by reducing the use of unsafe abbreviations and evaluate the impact of interventions implemented to reduce their use. At DRH, a 340 bed Level I trauma center, the Medication Use and Patient Medical Safety Committees identified six abbreviations and dosage designations as unsafe. These included: "U" for units, µg for microgram, TIW for three times a week, the degree symbol (o) for hour, the unacceptable use of trailing zeros after a decimal point, and need for leading zeros before a decimal point.

Patient order sheets were used to collect the opportunities for use of these unsafe abbreviations and their incidence for three 24-hour periods in the month prior to the program. Following baseline data collection, healthcare professionals were educated on the need to avoid their use via in-services, email, memos, laminated pocket cards, medical chart dividers, stickers, and personal communication. Additionally, staff were informed that their use was not acceptable after November 3, 2003.

In each subsequent month, data was collected for three 24-hour periods and analyzed to determine the impact of the interventions.

Initial results show the use of all unsafe abbreviations has declined, including that of the most frequently used abbreviation, the degree symbol. The study results are shared with the medical staff, along with recommendations for additional interventions, when needed.

Learning Objectives:

Understand the new JCAHO Standards on unsafe abbreviations.

Identify strategies that may help to reduce the use of unsafe abbreviations.

Self Assessment Questions:

In the study, the most frequently used abbreviation was:
a) "U" for units
b) µg for microgram
c) The degree symbol (o) for hour
d) Needed for Leading zeros before a decimal point

Which of the following educational interventions were used in the study?
a) Laminated pocket cards
b) Personal communication
c) Healthcare professionals education
d) All of the above
e) None of the above

THE EFFECT OF ROSIGLITAZONE ON GLYCEMIC AND LIPID CONTROL IN TYPE 2 DIABETIC PATIENTS IN A VETERANS AFFAIRS HEALTH SYSTEM

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INTRODUCTION: Currently within our Veterans Hospital, rosiglitazone is restricted to diabetic patients who have been evaluated in Endocrine or Diabetes Clinics due to cost of the drug and significant adverse effects which can occur in patients with pre-existing medical conditions, such as congestive heart failure or liver dysfunction.

PURPOSE: To evaluate current use of rosiglitazone to determine whether type 2 diabetic patients taking rosiglitazone have superior glycemic control and fasting lipid panels than patients not treated with rosiglitazone. This information will be use to evaluate current formulary restrictions on rosiglitazone use in our institution.

METHODS: A retrospective chart review of all patients with type 2 diabetes who had at least 1 prescription for rosiglitazone between March 1, 2002 and February 28, 2003. The first analysis will compare these patients to a random sample of type 2 diabetic patients that did not have any prescriptions for rosiglitazone between March 1, 2002 and February 28, 2003, but are currently taking other antidiabetic agents, including metformin, sulfonylureas, or insulin. The second analysis will assess lipid control by comparing patients' fasting lipid panel (total cholesterol, LDL, HDL, triglycerides) before and after at least 3 months after rosiglitazone therapy. This will be done by using a subset of patients who are not on any lipid-lowering drug therapy (HMG-CoA reductase inhibitors, fibrates, bile acid sequestrants) or who's lipid-lowering drug therapy has been unchanged during the study period. The third analysis will assess the difference in glycemic control in type 2 diabetic patients before and after rosiglitazone initiation.

RESULTS: Data is currently being collected

Learning Objectives:

To discuss the rationale for restricted use of rosiglitazone in an elderly diabetic population.

Discuss the effects of rosiglitazone on a fasting lipid panel

Self Assessment Questions:

Do current formulary restrictions on rosiglitazone need to be modified in order to obtain optimal glucose or lipid control in type 2 diabetic patients?

What percentage of the type 2 diabetic patients enrolled in our study have reached goal HbA1c (<7%)?

FACTORS CONTRIBUTING TO POTASSIUM USE WITH SPIRONOLACTONE

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Background: Spironolactone is recommended for severe heart failure based on evidence that it improves clinical outcomes in heart failure patients. Spironolactone increases potassium concentrations, and guidelines recommend stopping or reducing potassium when spironolactone is started. However, we previously found that a large number of patients still require potassium with spironolactone therapy.

Purpose: This purpose of this study is to determine whether dietary factors or socioeconomic status contribute to the need for potassium supplementation with spironolactone in heart failure patients.

Methods: Heart failure patients taking spironolactone in addition to standard therapy are eligible for participation. Participation involves completing a survey designed to assess dietary potassium intake, socioeconomic status, and medication adherence. Demographic characteristics, medical history, medications, and laboratory measurements of serum potassium and creatinine are also obtained. Survey results and patient characteristics are compared between patients on and not on potassium supplements with spironolactone.

Results: Eight subjects have been recruited to date; 5 were taking potassium in addition to spironolactone and 3 were not. Age, vasodilator therapy, renal function, serum potassium, and socioeconomic status were similar between groups. However, subjects on potassium supplements were heavier [median (range) body mass index: 33.6 (28.7-43) kg/m2 vs. 26.4 (19.6-32.7) kg/m2], required smaller daily furosemide doses [median (range) 60 (0-80) mg vs. 80 (20-160) mg], and consumed more potassium in their diet [median (range): 6501 (4488-7623) mEq vs. 5148 (2541-7524) mEq] than subjects not on potassium.

Conclusion: Although our numbers are small, the data to date do not support a role for dietary potassium intake or socioeconomic status in determining the need for potassium with spironolactone in heart failure.

Learning Objectives:

Understand the mechanism contributing to changes in serum potassium concentrations with spironolactone use.

Identify patient specific factors that may contribute to the need for potassium supplementation with spironolactone.

Self Assessment Questions:

Current consensus guidelines recommend discontinuing potassium supplementation when spironolactone is initiated in patients with heart failure. T F

Dietary potassium intake is the only factor that may determine whether or not patients treated with spironolactone will require potassium supplementation. T F

THE EVALUATION OF PHARMACISTS' ATTITUDES TOWARDS PROVIDING SMOKING CESSATION COUNSELING IN A COMMUNITY PHARMACY SETTING

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The U.S. Public Health Service has published guidelines for treating tobacco use. A goal of these guidelines is to change the practice patterns of health care professionals in identifying and offering treatment to tobacco users. While numerous smoking cessation programs exist, barriers prevent pharmacists from implementing them. The primary objective of this study is to objectively evaluate pharmacists' knowledge and attitudes regarding the provision of smoking cessation counseling. Additionally, the frequency with which smokers are identified in the pharmacy and the quality of the interventions made will be evaluated.

Twenty-six pharmacists in the Chicago metropolitan area attended a smoking cessation training program. The program was developed using information obtained from medical literature and U.S. Public Health Service guidelines. Pharmacists were trained to identify smokers visiting the pharmacy and to use the transtheoretical model to individually tailor counseling based upon information about a patient's smoking behavior. Pharmacists were asked to provide brief counseling on health consequences of smoking, behavioral strategies in quitting, and the use of nicotine replacement therapy. Investigators will assess pharmacist perceived knowledge and attitudes regarding the provision of smoking cessation counseling using an 11-item retrospective pretest/posttest administered 12 weeks after the training program. Additionally, program effectiveness and the number of smoking cessation interventions by pharmacists will be evaluated

Responses to the assessment instrument will be used to measure pharmacists' knowledge and attitudes towards providing smoking cessation counseling. These data will be analyzed using the Rasch rating scale model.

It is expected that pharmacists who participated in this program gained skills and confidence in counseling patients on smoking cessation. It is predicted that attitudes towards providing smoking cessation interventions will have improved as a result of this educational strategy and the frequency of the interventions will have increased accordingly.

Learning Objectives:

To identify the level of self-efficacy of pharmacists in providing smoking cessation counseling in a community practice setting.

To determine whether participating in a smoking cessation training program increases the frequency of smoking cessation interventions made by pharmacists.

Self Assessment Questions:

Pharmacists generally do what is necessary to assist smokers in quitting in the community pharmacy setting. T or F

Pharmacists who receive continuing education in smoking cessation counseling are more likely to provide such a service in their practice setting. T or F

ANTIMICROBIAL USE IN THE VA CHICAGO HEALTH CARE SYSTEM EMERGENCY DEPARTMENT: DETERMINING APPROPRIATENESS, SAFETY AND COST

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Infections are among the most common problems encountered in emergency departments. Most emergency physicians practice in a setting in which antimicrobial therapy is empiric due to limited ability for immediate pathogen identification. For that reason, they often choose broad-spectrum agents to ensure optimal antimicrobial coverage. Excessive use of these agents promotes the development of resistance. Resistance to our available broad-spectrum antibiotics will decrease effectiveness against infections for which the antibiotics are indicated. Apart from public health issues, there are economic implications. Antimicrobials account for up to 30% of hospital drug budgets. Moreover, through persistent observations, studies and publications, it has been recognized for more than three decades that up to 50% of antimicrobial usage in U.S. hospitals is inappropriate.

PURPOSE:

To optimize usage of antimicrobials through physician education and implementation of treatment protocols for most commonly encountered infectious diseases in an effort to improve patient care, ensure patient safety, and decrease costs within the VA.

METHODS:

Two hundred patients with a documented ER visit who were prescribed antimicrobials from 02/01/03 - 08/31/03 were randomly selected for inclusion in this retrospective study. The following parameters were collected from patients' electronic charts and analyzed for trends: 1) demographics, 2) presenting complaint, 3) hospitalization within 30 days, 4) history of present illness, 5) objective findings (e.g. temp, BP, HR, RR), 6) relevant physical exam, 7) renal/liver function, 8) empiric therapy, 9) antimicrobial/dose/route/duration, 10) specimen collection before/after antimicrobial given, 11) discharge diagnosis, 12) other diagnosis, 13) treatment plan, 14) culture results, 15) follow up, 16) cost.

Learning Objectives:

Determine if antimicrobial prescribing practices by the emergency physician adhere to national guidelines.

Identify risks associated with the use of broad-spectrum antimicrobials.

Self Assessment Questions:

What is the most common infectious disease in VA Chicago Health Care System Emergency Department for which antimicrobials are prescribed?

Specimen collection for cultures should be done after the first dose of an antimicrobial. T or F

MEDICATION HISTORIES OBTAINED BY PHARMACISTS: A PILOT PROGRAM TO IMPROVE PATIENT SAFETY

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Background

Over 50% of all hospital medication errors occur at the interfaces of care including admission, transfer, and discharge. An accurate medication history may reduce errors and improve patient safety. Only 3% of hospitals use pharmacists to conduct medication histories. At our institution, nurses and physicians currently perform this role.

Objectives

To identify discrepancies occurring between medication histories obtained by nurses and admission medication orders written by physicians. To pilot a service in which pharmacists obtain medication histories and evaluate the impact on patient safety.

Methods

A retrospective review was conducted on records of all adults admitted to the General Medicine unit during January 2004. Medication history profiles created by nurses were assessed for completeness and compared to the initial physician medication orders. An incomplete medication history was defined as omission of either medication dose or frequency or documentation of an allergy without a reaction. A discrepancy was defined as variance between medication dose, frequency, or allergy information.

For one week, a pharmacist will obtain medication histories for patients who are > 65 yr old and any adult taking 6 or more medications. The admission history will be documented in the patient's chart and will assist the physician in determining which admission medications to continue. Data to be collected include discrepancies between the pharmacist medication list and physician medication orders, number of pharmacist initiated clarifications, and time required to perform the history and reconcile orders.

Results to date

Of the 36 records reviewed thus far, a nurse-generated medication list was available for 31 patients. The median number of medications per patient was 8 (range 1-16). Fifty-three discrepancies (average of 1.7 per patient, 53/31) were identified. An incomplete medication list was noted for 23/31 (72.2%) patients. Items omitted most often were dose (41.9%) and reaction to listed allergies (34.4%).

Learning Objectives:

Recognize the impact of pharmacist-obtained medication histories at hospital admission.

Identify barriers to implementation of a pharmacist-obtained medication history service.

Self Assessment Questions:

T or F Programs that involve pharmacists in obtaining medication histories improve patient safety.

T or F Emergency departments, units with decentralized pharmacy services, and units with more drug-related problems are ideal settings for pharmacists to conduct medication histories.

EXPERIENCE WITH 90Y-IBRITUMOMAB TIUXETAN IN A TERTIARY CARE INSTITUTION

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Introduction:
Approximately 50,000 patients per year are diagnosed with Non-
Hodgkin's Lymphoma (NHL). Until recently, the mainstays of treatment for NHL have been chemotherapy and radiotherapy. Although the initial response rate with chemotherapy and radiotherapy regimens has been positive, the majority of patients relapse. With the development of monoclonal antibodies, patients who are refractory to or who have relapsed after chemotherapy and immunotherapy may benefit from novel therapies including radioimmunotherapy. In February 2002, 90Y-ibritumomab tiuxetan was approved as the first radiolabeled antibody for cancer treatment. Use of 90Y-ibritumomab tiuxetan, however, has come with some challenges. The drug has significant opportunity for adverse events as evidenced by the black box warning. The process for obtaining the drug is challenging and administration of the drug requires significant coordination among departments within a healthcare institution. The drug is expensive (approximately $30,000/dose) causing concern among hospital fiscal officers in relation to billing and reimbursement.

Objectives:
To describe the process of obtaining 90Y-ibritumomab tiuxetan from the
manufacturer.
To describe the importance of coordinating 90Y-ibritumomab tiuxetan therapy within the health care institution.
To retrospectively analyze patient outcomes after receiving radioimmunotherapy with 90Y-ibritumomab tiuxetan.

Methods:
This was a retrospective chart review of patients that received 90Y-
ibritumomab tiuxetan therapy at The Ohio State University Medical Center between January 2002 through February 2004.

Learning Objectives:

To discuss the challenges associated with obtaining and using 90Y-ibritumomab tiuxetan.

To understand the black box warning and side effects associated with 90Y-ibritumomab tiuxetan. To describe the outcomes of patients who received 90Y-ibritumomab tiuxetan at OSUMC.

Self Assessment Questions:

True or False 90Y-ibritumomab tiuxetan is the first drug approved to provide radioimmunotherapy for one type of Non-Hodgkin's Lymphoma.
True or False 90Y-ibritumomab tiuxetan has a black box warning associated with it.

True or False 90Y-ibritumomab tiuxetan therapy requires coordination of many departments.

CENTRAL LINE BLOOD SAMPLES VERSUS PERIPHERAL VENIPUNCTURE IN THE THERAPEUTIC MONITORING OF GENTAMICIN AND TOBRAMYCIN SERUM CONCENTRATIONS IN A PEDIATRIC PULMONARY COHORT

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Purpose: The accuracy of blood samples obtained from a central line for monitoring aminoglycoside serum concentrations remains a topic of debate. There is potential for infused drug to remain in the central line, catheter port, or within the reservoir of the port system. This may falsely elevate the drug concentration and as a result, negate the validity of calculated pharmacokinetic parameters. In our institution (Mott Children's Hospital, University of Michigan Health System), there is considerable variability in the method of monitoring aminoglycoside serum concentrations in patients with indwelling central catheters. Due to concerns regarding the accuracy of central line draws, the pediatric pulmonary service requests that all blood samples for determination of aminoglycoside serum concentrations be obtained via peripheral venipuncture. This study has been designed to investigate the accuracy of central line blood draws for determination of gentamicin and tobramycin serum concentrations in our pediatric pulmonary patient population in an attempt to standardize our method of monitoring aminoglycoside concentrations. Methods: Our study is a non-randomized open-label prospective clinical trial. All patients admitted to the pediatric pulmonary service who have an indwelling central catheter and are prescribed either tobramycin or gentamicin will be recruited for entry into the study. We plan to enroll 35 patients age 1 to 21 years, 24 patients treated with tobramycin and 11 patients treated with gentamicin. A drug sample will be obtained peripherally per protocol and a second sample will simultaneously be drawn through the patient's central catheter. This procedure will be repeated if an aminoglycoside dosage adjustment is made and on days 7 and 14 if the patient's hospital stay is ongoing. Preliminary results: Study ongoing. Data at the time of abstract submission is inadequate for presentation. Preliminary conclusions: Study ongoing. Preliminary conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Compare the accuracy of central line blood samples compared to samples obtained by standard venipuncture for monitoring of aminoglycoside serum concentrations in our pediatric pulmonary population.

If a difference is found between central and peripherally obtained samples, evaluate the impact of contaminated central line draws on the validity of pharmacokinetic calculations. If no difference is found, propose potential plans to alter the method of monitoring gentamicin and tobramycin serum concentrations in our pediatric pulmonary population.

Self Assessment Questions:

Central line blood samples are accurate for the determination of gentamicin and tobramycin serum concentrations. T/F

The use of central line samples for monitoring gentamicin and tobramycin serum concentrations does not affect the validity of pharmacokinetic calculations. T/F

INTENSIVE INSULIN THERAPY IN TRAUMA PATIENTS

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Hyperglycemia is a common occurrence among ICU patients and is associated with an increased mortality rate. Numerous physiologic changes occur following trauma, including development of glucose intolerance and insulin resistance. Among trauma patients, hyperglycemia has been correlated with an increased risk of surgical infections and length of ICU stay.

Reductions in morbidity endpoints have been demonstrated following the use of intensive insulin therapy in critically ill patients. These include reductions in bloodstream infections, requirement for antibiotics for greater than 10 days, acute renal failure requiring dialysis, requirement for PRBC transfusions, critical illness polyneuropathy, length of ICU stay for patients with ICU length of stay greater than 5 days, and duration of mechanical ventilation.

Current studies examining intensive insulin therapy in critically ill patients typically under-represent the trauma population. In a trial by Van Den Berghe et al., only 4% of the patient population experienced neurologic disease, cerebral trauma, brain surgery, multiple trauma, or severe burns.

At our institution in September 2003, intensive insulin therapy was initiated. SICU patients who are mechanically ventilated and have a blood glucose greater than 110 mg/dl receive an insulin infusion titrated to maintain blood glucose between 80-110 mg/dl.

The purpose of this study is to describe the impact of intensive insulin therapy on morbidity and mortality in trauma patients.

Information extracted from the charts of trauma patients who have received intensive insulin therapy during their SICU stay will be retrospectively reviewed. Historical control patients will be matched based on injury type and injury severity score. Multiple endpoints of morbidity and mortality will be evaluated.

Data collection for this study is currently in progress. Conclusions from this study are pending following completion of data analysis.

Learning Objectives:

To develop an understanding regarding the physiologic changes which occur following trauma, including the development of glucose intolerance and insulin resistance.

To develop an understanding regarding the impact of intensive insulin therapy on specific endpoints of morbidity and mortality in trauma patients.

Self Assessment Questions:

Trauma patients are typically over-represented in current trials, which analyze the impact of intensive insulin therapy. TRUE FALSE

Physiologic changes that occur following trauma injuries include both the development of glucose intolerance and insulin resistance. TRUE FALSE

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF AN ERYTHROPOIETIC MONITORING SERVICE IN CHRONIC KIDNEY DISEASE PATIENTS

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To date, erythropoietin is one of the most expensive medications being utilized at Mercy General Health Partners; cost containment has been complicated by the frequent changes in the reimbursement structure. With the reimbursement structure continuing to change and the cost of erythropoietic agents rising, it is important to recognize K/DOQI guidelines in order to ensure the most effective management for chronic kidney disease patients in Muskegon, Michigan. Although the area nephrologists utilize the K/DOQI guidelines, pharmacy services were asked to assist in improving the monitoring process.

The purpose of the proposed project is to develop an effective model to monitor outpatient erythropoietic therapy in chronic kidney disease patients (CKD stage 3 and 4), which will provide for quality control on erythropoietic drug therapy while assisting community nephrologists with patient care.

Retrospective review from April 2003 until August 2003 included results that revealed that 33% of patients had hemoglobin values > 12 g/dL, which places reimbursement at risk; and 67% did not have documented iron labs within the previous 6 months (recognizing that guidelines call for quarterly). Together with one of the nephrologists, a monitoring plan was developed with initial focus on the aforementioned population. The services include patient monitoring, weekly communication with area nephrologists, and monthly CQI meetings. Pharmacy and nephrology office staff were trained on the program. Routine utilization evaluation will include assessment of the following parameters: hemoglobin, iron studies, dose, cost, missed doses, and lab frequency.

Preliminary results will be presented at the conference.

Learning Objectives:

Identify obstacles in a community hospital that may potentially be encountered while implementing a new process.

Explain the importance of K/DOQI guidelines in the management of CKD anemia patients.

Self Assessment Questions:

True or False. Staffing constrictions rarely play a role in development of new processes.

Which of the following are critical in evaluating anemia in CKD patients, as noted in the K/DOQI guidelines? (circle all that apply)
a. Iron
b. EPO serum levels
c. Hemoglobin
d. Quality of Life

A RETROSPECTIVE EVALUATION OF AMPHOTERICIN B LIPID COMPLEX AS PRIMARY THERAPY FOR INVASIVE FUNGAL INFECTIONS

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Background: The antifungal amphotericin B deoxycholate (ABD, Fungizone®) has long been the treatment of choice for invasive fungal infections, but caries the risk of potentially serious renal toxicities. At The Ohio State University Medical Center (OSUMC), amphotericin B lipid complex (ABLC, Abelcet®) is restricted to patients refractory or intolerant to ABD, or as primary therapy for bone marrow transplant (BMT) patients. In May 2003, a nation-wide shortage of ABD resulted in an unrestricted substitution of ABLC as primary therapy for invasive fungal infections in all patient populations.

Objective: The objective of this study was to determine which patient population(s) showed benefit from the renal sparing effects of ABLC when administered as primary therapy for invasive fungal infections.

Methods: A retrospective chart review of patients admitted to OSUMC who received ABD prior to the May 2003 shortage or ABLC between May and November 2003, were identified. Patients were excluded from the analysis if they were BMT recipients or received ABD by a non-parenteral route (i.e. bladder irrigation, intraocular, etc). Patients were divided into three groups based on treatment; ABD as primary therapy, ABD intolerant patients changed to ABLC, or ABLC as primary therapy. Patients were case matched based on age, sex, renal function, and underlying disease(s). The following demographic data parameters were collected: patient's age, gender, weight, underlying disease(s), and renal function. In addition, the date of initiation, dose and duration of antifungal therapy were assessed, as well as concomitant nephrotoxic medications and potential medication interactions. Culture and outcomes data including pathogen(s) isolated, culture site(s) and date(s), clinical and microbiological cure(s), length of stay, and mortality were also obtained.

Results: A final analysis and results will be presented at the Great Lakes Resident Conference.

Learning Objectives:

To determine which patient population(s) showed benefit from the renal sparing effects of ABLC when administered as primary therapy for invasive fungal infections

To determine if unrestrictive substitution of a more expensive amphotericin product with less nephrotoxicity (ABLC), is more cost effective than a less expensive agent with more nephrotoxicity (ABD)

Self Assessment Questions:

Which of the following lipid-based amphotericin B formulations have been shown to significantly decrease the frequency of nephrotoxicity compared to amphotericin B deoxycholate?
a)amphotericin B lipid complex (ABLC, Abelcet®)
b)amphotericin colloidal dispersion (ABCD, Amphotec®)
c)liposomal amphotericin B (L-AmB, AmBisome®)
d)all of the above

T or F: When renal failure develops in patients receiving conventional amphotericin B deoxycholate (ABD), there is a significantly longer length of stay and higher mortality rate?

EVALUATION AND COMPARISON OF THE USE OF THE GLYCOPROTEIN IIB/IIIA RECEPTOR INHIBITORS: 2000 TO 2001 VERSUS 2003

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The glycoprotein (GYP) IIb/IIIa receptor inhibitors play a major role in the treatment of acute coronary syndromes and in the setting of percutaneous coronary interventions (PCI). This role has evolved over time as a multitude of studies have evaluated their use in various settings. During fiscal year 2003, approximately $700,000 was spent on the GYP IIb/IIIa receptor inhibitors. The primary objective of this project is to evaluate prescribing patterns and usage of the GYP IIb/IIIa receptor inhibitors at UWHC, and secondarily, to determine if a formulary change can be made.

A retrospective chart review was conducted on patients who received a GYP IIb/IIIa receptor inhibitor in 2000 to 2001. This data had not been previously evaluated. One hundred charts of patients who received a GYP IIb/IIIa receptor inhibitor in 2003 will be reviewed. The data collected from both time periods will be analyzed for appropriate use according to the American College of Cardiology/American Heart Association guidelines and the approved label indications and dosing. The data from both time periods will also be compared.

One-hundred and forty-one charts of patients who received a GYP IIb/IIIa receptor inhibitor from February 2000 to November 2001 were reviewed. Seventy percent of the patients were male and the median age of all patients was 63 years. Abciximab accounted for 70% of the usage in 2000 to 2001, with tirofiban making up the remainder. All patients who received abciximab underwent PCI. Three patients (2.8%) who received abciximab had no documentation of a bolus dose being administered. Twelve patients (27%) who received tirofiban had no documentation of a loading dose infusion. Six patients (6%) who received abciximab had an infusion duration of less than twelve hours, compared to six patients (13%) who received tirofiban. Final results, with comparison to the 2003 data, will be presented.

Learning Objectives:

Differentiate the glycoprotein IIb/IIIa receptor inhibitors according to their approved indications.

Summarize the major clinical trials that have influenced how the glycoprotein IIb/IIIa receptor inhibitors are used.

Self Assessment Questions:

Which glycoprotein IIb/IIIa receptor inhibitors can be used in the medical management of unstable angina/non-ST-segment elevation myocardial infarction?

Which glycoprotein IIb/IIIa receptor inhibitors must be dose-adjusted in renal insufficiency?

ANALYSIS AND FEASIBILITY OF A PHARMACIST INTEGRATED DISCHARGE PROCESS

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Purpose: Analyze timesaving effects of new technology implementation, workflow redesign, and standardization of daily pharmacist activities to determine the feasibility of implementing pharmacist-initiated medication discharge teaching.

Methods: System analysis, through nursing and pharmacy surveys, was completed to identify barriers currently preventing pharmacist inclusion in the discharge process. Current pharmacist workflows will be compared to proposed workflows following computer technology, technician order entry, and other standardized workflow redesign changes to quantify daily time savings. Once completed, this time saving analysis will determine the feasibility of integrating pharmacists into the discharge-medication teaching process. The ability of pharmacists to counsel all discharged patients versus limiting counseling to high-risk medications will be identified within the time savings analysis. Hospital readmission and adverse drug event data from January-September 2003 was reviewed to identify these high-risk medications.

Results: Based upon survey data, 18% of nurses rarely/never provide verbal medication counseling, while 39% rarely/never provide written medication information for patients upon discharge. Eighty-three percent of patients receive no medication teaching from pharmacists and 9% only receive warfarin counseling. Heavy workload and lack of timely communication between staff were the two most commonly identified workflow limitations preventing pharmacist involvement in medication teaching. Severe adverse drug events prior to admission were found to occur most often with anticoagulants (47%), antihypertensives (11%), and anticonvulsants (8%). This data will help identify patients receiving high-risk medications requiring pharmacist teaching if time-constraints prohibit pharmacists from counseling all patients at discharge. Data reflecting the amount of time savings to be gained following process changes is being gathered and will be utilized to determine the feasibility and extent of implementing a pharmacist-initiated discharge counseling process.

Conclusions: Implementation of a new computer system and process changes including workflow redesign can facilitate new opportunities for pharmacists to become more involved in the discharge medication teaching process.

Learning Objectives:

Describe the potential impact of technology utilization, workflow redesign, and process standardization on clinical pharmacist daily activities.

Identify solutions to barriers limiting pharmacist involvement in the patient discharge process.

Self Assessment Questions:

True or False
Computer technology can aid in the development of workflow redesign and process standardization of clinical pharmacy practice.

True or False
Newly developed technological tools can serve as timesaving measures, allowing pharmacists to become more involved in patient care.

ASSESSMENT OF PHYSICIAN-PHARMACIST COLLABORATION AND PATIENT OUTCOMES IN A FAMILY PRACTICE CLINIC

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In recent years, pharmacists have increasingly collaborated with physicians to provide clinical services to patients in the ambulatory care setting. It is well documented that pharmacists in clinics can reduce the cost of drug therapy and improve patient outcomes. This study seeks to assess the level of collaboration between physicians and pharmacists in a family practice clinic and its impact on patient outcomes.
The family practice clinic is staffed by nurse practitioners, medical residents, and attending physicians with a clinical pharmacist available on-site. Pharmacists follow patients with prescribers and offer recommendations regarding drug therapy as appropriate. Recommendations are intended to achieve goals as established by treatment guidelines. Pharmacists also provided patient and prescriber education.
A Collaborative Practice Scale was used to evaluate the degree of collaboration between the pharmacist and prescribers. The Collaborative Practice Scale measured collaboration by asking questions about assertiveness in expressing opinions and willingness to discuss issues outside the practitioners' areas of expertise. Twenty prescribers and two pharmacists have completed the Collaborative Practice Scale. Preliminary results show a high degree of collaboration between pharmacists and physicians.
Patients with diabetes and hypertension were included in the study and measurements of glycosylated hemoglobin and blood pressure are used to assess patient outcomes. Glycosylated hemoglobin and blood pressure was measured three months after pharmacist collaboration began and will be compared to baseline data to assess outcomes.
This project will describe the relationships that exist between pharmacists and physicians in a family practice clinic. It will also evaluate whether this relationship is effective in improving patient outcomes in the patient population studied.

Learning Objectives:

Identify the benefits of collaboration between physicians and pharmacists in a family practice clinic.

Describe methods pharmacists use to collaborate with physicians.

Self Assessment Questions:

What are indicators of a high level of collaboration?

A full time clinical pharmacist in a family practice clinic can help improve patient outcomes. True/False

THE EFFICACY OF QUETIAPINE FOR DEPRESSIVE AND PSYCHOTIC SYMPTOMS IN ALZHEIMER'S DISEASE PATIENTS

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Introduction: Alzheimer's disease (AD) is commonly complicated by co-morbid depression and psychosis. The combination of dementia, psychosis, and depression leads to decreased quality of life, and the need for long-term care. These patients are managed with multiple medications including acetylcholinesterase inhibitors, antipsychotics, mood-stabilizers, and antidepressants. This results in complicated regimens, increased risk for drug-drug interactions, and adverse events. Quetiapine is an atypical antipsychotic currently used to treat psychosis in AD; however, its effect on mood has not been studied in this patient population.

Objective: To assess the efficacy of quetiapine in the treatment of depressive symptoms in patients with Alzheimer's disease and concurrent psychosis.

Methods: A prospective, open-label study of 20 Alzheimer's patients experiencing depression, evidenced by a score of 12 or greater on the Hamiliton Rating Scale for Depression (HAM-D), and psychotic features will be treated with quetiapine (25 mg QD, titrated to a maximum of 300 mg/day) for 12 weeks. The primary outcome measure will be reduction in depressive symptoms using the HAM-D. The Brief Psychiatric Rating Scale (BPRS) will be used to assess psychotic and behavioral symptoms. The Clinical Global Impressions scale (CGI) will be used to assess for general improvement in all symptoms. Involuntary movements will be assessed using the Abnormal Involuntary Movement Scale (AIMS), Simpson-Angus scale (SAS), and the Barnes Akathisia scale. All scales will be completed at baseline and at weeks 1, 2, 4, 6, and 12. Routine monitoring parameters for patients prescribed atypical antipsychotics will be completed in accordance with the Medical Center guidelines and includes weight, hemoglobin A1c, and fasting lipid panel with fractionated cholesterol.

Results: The differences in scores between baseline and last-observation carried forward (LOCF) for psychopathology will be evaluated. The abnormal movements will be evaluated using the t-test.

Learning Objectives:

To determine if quetiapine is efficacious in treating depressive symptoms in patients with Alzheimer's disease.

To illustrate the need for simplifying drug therapy regimens in patients with Alzheimer's disease, concurrent psychosis, and depression.

Self Assessment Questions:

T/F: Patients with Alzheimer's disease, depression, and psychosis are at higher risk for drug interactions due to complex drug therapy regimens.

List the common side effects of quetiapine.

STANDARDIZATION OF THROMBOEMBOLISM PROPHYLAXIS IN TRAUMA PATIENTS

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INTRODUCTION: The incidence of venous thromboembolism (VTE) in patients with multiple trauma can run as high as 40-60%. The Trauma Service at The University Hospital does not follow any formal guidelines for VTE prophylaxis, resulting in various methods being utilized including subcutaneous heparin, dalteparin, pneumoboots, AVI devices, combinations of methods or no prophylaxis at all.

OBJECTIVE: The objective of this study is to establish literature-based guidelines in order to standardize VTE prophylaxis for Trauma Service patients. It is hypothesized that this will reduce confusion, avoid unnecessary costs, and potentially improve patient outcomes. The goals are to attain physician compliance with guidelines, provide the most cost-effective method of prophylaxis, potentially decrease the incidence of VTE, and to eliminate unnecessary treatments and diagnostic tests in low-risk patients.

METHOD: The primary literature and consensus guidelines for the prevention of VTE in trauma patients were reviewed and guidelines in the form of an algorithm were developed. The guidelines divide the patient population into a low-risk and a high-risk group based on their risk assessment profile (RAP) score. Patients in the high-risk group will receive dalteparin whereas those in the low-risk group will receive unfractionated heparin. The patients having a contraindication to anticoagulation will receive mechanical prophylaxis only. Patients hospitalized greater than twenty-four hours will be identified for inclusion into the study by the trauma registry. Outcomes to be assessed include compliance with guidelines, time prophylaxis ordered, time initiated, the development of a DVT/PE, major bleeding events, injury pattern, and costs associated with the protocol.

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

Learning Objectives:

Identify trauma patients at high risk for developing VTE by utilizing the RAP score.

Become familiar with the primary literature and consensus guidelines for the prevention of VTE in trauma patients.

Self Assessment Questions:

A 60 yof s/p MVC is admitted with a pelvic fracture and underwent surgery for 3 hours. What is this patient's RAP score?

The ACCP recommends LMWH for the prevention of VTE in trauma patients with an identifiable risk factor? T or F

AN ANALYSIS OF "LIFESTYLE" MEDICATIONS: BENCHMARKING COVERAGE AND ASSESSING FINANCIAL IMPLICATIONS

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Objective: The objective of this study was to benchmark various coverage options for a list of drugs that may be classified as “lifestyle.” Upon understanding how different employers covered these medications, the second step was to evaluate the financial impact of the various coverage options. This would provide a rounded perspective on what the most popular coverage was for a certain drug/class and its relative cost impact.

Methods: A list of medications was put together based on actual experience within a pharmacy benefit manager. Drugs/classes typically considered “lifestyle” were added to the list. Pharmacy claims data on over 25 million covered lives was retrospectively analyzed to assess utilization and costs for the following: diet medications, hair loss medications, acne medications, smoking cessation aids, contraceptives, fertility medications, erectile dysfunction medications, migraine medications, growth hormone, non-sedating and low sedating antihistamines, proton pump inhibitors, cox-2 inhibitors, and diabetic supplies including insulin. Coverage options were separated into full coverage, no coverage, or restricted coverage. These options were studied at both the mail and retail delivery systems.

Results: Preliminary results showed that the majority of payors chose to exclude coverage for diet and hair loss medications at both the mail and retail delivery system. Full coverage at mail and retail was granted to some medications at different percentages based on plan classification. Fertility as well as acne medications were typically restricted at mail and retail. Assessing the financial impact to the payor revealed that there were significant differences in overall costs based not only on the coverage type but also the delivery system selected.

Conclusion: Final results will reflect which coverage option(s) for “lifestyle” drugs are the most popular among employers. The financial impact of each of these coverage options will be calculated to assist employers in making decisions about minimizing costs while maximizing participant satisfaction.

Learning Objectives:

Investigate the drug coverage options that clients can choose to implement in order to better manage their escalating drug costs

Evaluate the financial impact of each coverage option

Self Assessment Questions:

The majority of clients/plans will chose to restrict coverage for “lifestyle” drugs such as erectile dysfunction agents.
a) True
b) False

No coverage for a given agent/class of drugs will yield the lowest gross cost per eligible participant per year.
a) True
b) False

OSTEOPOROSIS PREVENTION AND TREATMENT IN BONE MARROW TRANSPLANT PATIENTS

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Bone marrow transplantation (BMT) is an established treatment modality for many types of malignancies. While the number of long-term survivors of BMT is increasing, late complications from transplant are also being seen. Transplantation osteoporosis is one such complication, and can lead to chronic morbidity and mortality. The pathogenesis of bone marrow transplantation osteoporosis is complex and not completely understood. Skeletal integrity may be compromised by several factors inherent in the transplantation process. Bone turnover may increase as a result of high-dose chemotherapy, marrow reinfusion, and G-CSF administration. In addition to general osteoporosis risk factors, transplant medications such as glucocorticoids and calcineurin inhibitors also decrease bone mineral density. Osteoporosis can significantly impair transplant patients' quality of life; preventative measures and screening should promptly be instituted in at-risk patients. The bone marrow transplant service at the University of Michigan Health System (UMHS) has established osteoporosis prevention and treatment guidelines. The goal of this retrospective analysis of UMHS allogeneic BMT patients is to determine the degree of adherence to these institutional guidelines. Information collected in this study will include demographic data, steroid and other immunosuppressive medication doses and length of therapy, tobacco use, etc. Records will be analyzed to determine if at-risk patients received bone mineral density scans and were begun on appropriate osteoporosis prevention/treatment therapy. In addition, radiological information will be gathered to elucidate the incidence of fractures in these patients. Results from this study will be used to improve the quality of care regarding osteoporosis prevention and treatment in UMHS bone marrow transplant patients.

Learning Objectives:

To list several osteoporosis risk factors in bone marrow transplant patients

To describe the pathogenesis of bone marrow transplantation osteoporosis

Self Assessment Questions:

What is the mechanism of action for glucocorticoid-induced osteoporosis?

What are some major osteoporosis risk factors in bone marrow transplant patients?

EVALUATION OF REIMBURSEMENT METHODS UTILIZED BY PHARMACISTS PERFORMING DISEASE STATE MANAGEMENT SERVICES

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Purpose: For pharmacists performing disease state management services: 1) determine billing and reimbursement techniques being utilized, 2) assess the amount pharmacists are reimbursed, 3) propose an effective billing and reimbursement technique.
Methods: After performing a literature review of pharmacist-based billing and reimbursement techniques, a comprehensive survey was created to determine geographic location, practice setting, disease state management services, billing techniques, and amount of reimbursement for various services. Following survey development, local pharmacists beta-tested the survey and adjustments were made. The survey was then incorporated into an online survey builder (www.formsite.com). Email addresses for all pharmacists belonging to one of the following groups were targeted: APhA Community Pharmacy Residency Preceptors, APhA Immunization Listserv, and ACCP Ambulatory Practice and Research Network for a total of 2,267. Data entry of email addresses into Microsoft Excel assured avoidance of duplicate emails. In December, all individuals of the compiled lists were sent an introductory email briefly describing the project and the survey to follow. An email with an attached link to the survey was distributed in January followed by a reminder two weeks later. All surveys were completed within four weeks. The survey responses were recorded in Microsoft Excel and sent to the OSU Center for Biostatistics for statistical analysis.
Results: 352 (15.5%) pharmacists completed the survey at time of submission. Data is currently being analyzed to assess study objectives. Preliminary data shows that 91 (25.8%) respondents reported physician offices' the most common practice site, and of all practice sites, 209 (59.3%) have an affiliation with a college or university. 194 (55.1%) respondents are currently billing/charging for disease state management services.
Conclusion: Survey results will provide an overall assessment of the billing techniques currently being utilized and the approximate amount of reimbursement being received by pharmacists performing disease state management services.

Learning Objectives:

Understand the different billing techniques currently available to pharmacists performing disease state management services.

Determine some of the barriers pharmacists face in obtaining reimbursement for disease state management services.

Self Assessment Questions:

Pharmacists can utilize an APC code to bill for services if they work for a chain pharmacy in a community setting. T or F

Employer-based contracts are required by law to reimburse pharmacists at the same rate as Medicare. T or F

EVALUATION OF MEDICATION STORAGE TEMPERATURES DURING TRANSPORTATION

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The current United States Pharmacopeia (USP) drug storage standards require many pharmaceutical preparations to be stored at “controlled room temperature,” which is generally defined as between 20 oC and 25 oC (68 oF to 77 oF). The World Health Organization's Guide to Good Storage Practices for Pharmaceuticals suggests that all pharmaceutical products should be stored in containers that do not adversely affect the quality of the materials and offer adequate protection from external influences. All materials should be transported in such a way that their integrity is not impaired and that storage conditions are maintained.

The purpose of this study is to determine whether potential storage conditions for medications in vehicles or when sent in the mail would meet USP's controlled room temperature standards. A computerized temperature monitor device was placed in the trunk of a vehicle in two geographically and meteorologically diverse cities. Temperatures and relative humidity were recorded every ten minutes for two-week periods during different climate conditions. Analysis included calculation of the average temperature, the occurrence of temperature readings below 8oC and above 30oC, and the duration of temperature spikes between 30oC and 40oC.

The results of similar studies recording temperatures in ambulances have shown that average daily temperatures were not in compliance with USP recommendations. In studies involving the mailing of medications, only a small percentage of the packages experienced temperature within the USP definition of controlled room temperature, while the majority of the temperatures exceeded 30 oC.

Data is currently being collected, and will be analyzed to determine the impact of transportation and storage of medications in various climates and temperatures.

Learning Objectives:

To identify the range of temperatures that medications could experience if stored or transported in the trunk of a vehicle.

To determine if the temperature variations for medications which are mailed or transported meet USP's standard for storage of medications.

Self Assessment Questions:

Temperatures in the trunk of a vehicle can exceed USP's recommended storage temperatures.
a. True
b. False

The WHO's controlled room temperature is acceptable for temperatures between 60 oF - 77 oF.
a. True
b. False

USAGE OF COMMONLY PRESCRIBED ANTIHYPERTENSIVE AGENTS IN MANAGEMENT OF HYPERTENSIVE EMERGENCY

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Introduction: Hypertensive crisis results from acute elevations in blood pressure, which can lead to target organ damage. The presence of organ damage differentiates hypertensive emergency from hypertensive urgency. The clinical situation dictates drug selection and time to blood pressure control. Management can be beneficial or harmful depending on comorbidities and specific organ damage.

The DMC has recently developed a clinical pathway for the management of hypertensive urgencies and emergencies. However, current practice and usage patterns of antihypertensive agents for treatment of hypertensive emergency at the DMC have not been evaluated. Assessment of current practice will help identify areas for potential improvement after implementation of the pathway, optimize medication use strategies and determine potential for cost savings.

Methods: Patients were identified through the pharmacy computer system. Patients at Harper University Hospital who received an intravenous infusion of esmolol, fenoldopam, labetalol, nicardipine or nitroprusside for the treatment of hypertensive emergency during July 2002 - June 2003 were included in the evaluation. Data collection will include patient demographics, past medical history, indications for intravenous antihypertensive agents, target organ damage, blood pressure on presentation, time to target blood pressure control, dose and duration of the medications, additional target organ damage during hospitalization, antihypertensive regimen at discharge, and length of ICU and hospital stay. Primary endpoints include usage patterns of antihypertensive agents for the treatment of hypertensive emergency and time to achieve target blood pressure control. Secondary endpoints include cost of intravenous antihypertensive agents and duration of ICU stay.

Results: The initial screening identified 392 patients who received an IV infusion of esmolol (n=66), fenoldopam (n=36), labetalol (n=25), nicardipine (n=3), or nitroprusside (n=300) during July 2002 - June 2003. Data collection is currently being conducted on those patients who received infusions for the treatment of hypertensive emergency. The final results and conclusions will be presented.

Learning Objectives:

Understand the difference between hypertensive urgency and hypertensive emergency.

List the antihypertensive medications of choice for different clinical situations and target organ damage.

Self Assessment Questions:

True or False. The difference between hypertensive urgency and hypertensive emergency is that patients with hypertensive emergency always have a blood pressure > 230/120 mm Hg.

True or False. Patients with hypertensive emergency should always have their blood pressure decreased to a normal range as quickly as possible.

COMBATIBILITY AND STABILITY OF INTRAVENOUS MYCOPHENOLATE MOFETIL WITH OTHER DRUGS DURING SIMULATED Y-SITE ADMINISTRATION AND HPLC

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Currently, there is a lack of drug-drug compatibility information available for intravenous (IV) mycophenolate mofetil (MMF). The manufacturing label states "mycophenolate mofetil should not be used with other intravenous solutions." To date, there are few published compatibility studies with this drug. MMF must be infused over a minimum of two hours, possibly overlapping with other IV medications needed at the same time, for which compatibility data are unknown. The purpose of this study is to determine compatibility and stability information for many drugs commonly used in patients after a bone marrow transplant (BMT) with IV MMF.

The drugs to be studied for in vitro stability with MMF will include cyclosporine, tacrolimus, dopamine, norepinephrine, insulin, and famotidine. Three identical samples will be used to determine compatibility information for each drug. The physical compatibility of MMF will be tested by visual appearance when mixed with individual drugs over a predetermined period of time. Visual incompatibility will be defined as any visible particulate matter, color change, or gas evolution. Chemical stability will be tested by a stability-indicating high performance liquid chromatography (HPLC) method. MMF will be defined as chemically stable if no less than 90% of the initial drug concentration remains in the admixtures.

The lack of compatibility data with MMF precludes concurrent administration of other commonly used agents in BMT and solid organ transplant. The potential for additional IV access increases infectious risk and overall cost to the patient. It is our hypothesis that some of the study drugs will be compatible with MMF at the tested concentrations and can be given through Y-site administration safely.

Learning Objectives:

Understand the role of mycophenolate mofetil (MMF) in bone marrow transplant (BMT) patients.

Describe the different methods used to determine chemical and physical stability of a compound.

Self Assessment Questions:

Mycophenolate mofetil (MMF) is a pro-drug that breaks down into mycophenolic acid rapidly upon administration. (T/F)

A stability-indicating assay is one that detects and separates the tested drug from its degradation products and other drugs. (T/F)

EVALUATION OF A FIVE-YEAR EXPERIENCE USING A VANCOMYCIN DOSING NOMOGRAM WITHOUT ROUTINE VANCOMYCIN SERUM CONCENTRATION MONITORING

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Considerable debate has arisen in the last decade on the necessity of routine vancomycin monitoring. For centers that continue to perform vancomycin therapeutic drug monitoring (TDM), the rationale is mainly for assurance of efficacy and avoidance of toxicity. Unfortunately, there is lack of definitive data in the literature to support that specific vancomycin concentrations are related to outcomes. In the first report of the use of the nomogram developed at our institution, Karam et al (1999) compared patients treated by a vancomycin nomogram with minimal trough level monitoring and patients who were dosed and monitored by traditional pharmacokinetics equations. The results with dosing by the nomogram and minimizing TDM identified no difference in clinical outcomes or toxicity, and cost savings for the institution. This validation of the nomogram provided the foundation for the current practice at our institution, which involves dosing based on the nomogram for all patients treated with vancomycin with creatinine clearance and weight within the nomogram guidelines. The present study is designed to evaluate the impact of the above practice on treatment and outcomes of patients receiving vancomycin over a five-year period using a previously-validated vancomycin dosing nomogram without routine vancomycin serum concentration monitoring. Patients will be identified by a computer-generated list from the pharmacy database of patients who received vancomycin from 2001-2003. Demographics, diagnosis, antibiotic therapy, and clinical outcome therapy will then be extracted from patient monitoring cards kept by clinical pharmacists monitoring all patients receiving vancomycin, and the patient's medical record. All outcome measures assessed for our present practice of not monitoring routine vancomycin levels will be compared (using standarized statistical tests) to the data (published previously) describing traditional pharmacokinetic monitoring and nomogram dosing with trough only monitoring.

Learning Objectives:

To discuss whether vancomycin therapeutic drug monitoring is necessary.

To evaluate the outcomes of patients in whom no routine vancomycin serum concentration monitoring is performed at a 320-bed, level-1 trauma center.

Self Assessment Questions:

Nephrotoxic and ototoxic effects related to vancomycin have been correlated to specific serum levels. T/F

AUC/MIC may be a more predictive pharmacodynamic parameter than T >MIC for correlating the therapeutic efficacy of vancomycin. T/F.

INHALED MEDICATION: AN OVERVIEW ON PHARMACOLOGY AND DRUG ADMINISTRATION

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Introduction:
Based on inquiries to members of the department of pharmacy by respiratory therapists, concern was raised about their level of knowledge of inhalation drugs, and calculations and conversions required to deliver proper therapy. Upon review of the material used to educate the therapists during their orientation, it was determined there was the need to revise and update that information.

Objectives and goals:
The objective of this project is to determine areas of strengths and weaknesses within the respiratory therapy program regarding pharmacology knowledge and use that as a guide for providing education to the therapists. The primary outcome measure will be pre-test and post-test scores to demonstrate improvement in the knowledge of pharmacology amongst the respiratory therapists.

Methods:
A pre-test was distributed to determine areas of strengths and weaknesses of the respiratory therapists (answers received anonymously). This test covered basic pharmacology information it was felt the therapists should know including matching drug to appropriate class, mechanisms of action, adverse events of respiratory medications and appropriate monitoring parameters, correct administration techniques, and conversion calculations. A supervisor in the respiratory department reviewed the test to assess appropriateness and difficulty. The results of the pretest showed a need for education in all five categories. A written information packet has been created and distributed to the respiratory therapists. This packet will serve as a guide for several verbal education sessions that will be given to improve competency in the department. After each session, a post test will be given to assess improvement.

Learning Objectives:

To assess and show improvement in the pharmacology knowledge of the respiratory therapists at Rush University Medical Center.

Develop an information packet that can be used during verbal education sessions and also as a reference for the therapists.

Self Assessment Questions:

T/F Testing of the respiratory therapists provided an opportunity for pharmacist run review sessions discussing the pharmacology and administration of respiatory medications.

T/F Based on pre-test and post-test results, providing review sessions for the respiratory therapists resulted improved pharmacology knowledge

DEVELOPMENT OF A PHARMACIST-MANAGED INPATIENT ANTICOAGULATION SERVICE

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Anticoagulants, which are not used properly, may not achieve therapeutic goals in a timely manner and are commonly associated with adverse events such as clotting or bleeding. Many hospitals have implemented anticoagulation services to improve outcomes and decrease adverse drug effects with anticoagulant medications. Bronson Methodist Hospital (BMH) currently has a pharmacist-run outpatient anticoagulation clinic, which manages warfarin and low molecular weight heparin therapy. Recently, the medical staff at BMH has supported the development of a pharmacist-managed inpatient anticoagulation service to dose heparin, low molecular weight heparin, and warfarin. The aim of this presentation is to describe implementation strategies, service protocols, and the clinical and economic benefits of an inpatient anticoagulation service.

Data will be collected to establish our baseline anticoagulation practices. The success of our service will be measured by looking at length of hospital stay, time to achieve aPTT and INR goal, and evaluation of any supratherapeutic aPTT or INR levels.

Learning Objectives:

Verbilize how dosing unfractionated heparin using a weight-based nomogram is superior to standard dosing.

To apply a flexible induction nomogram for the dosing of warfarin.

Self Assessment Questions:

Failure to achieve anticoagulation with unfractionated heparin within the first 24 hours may compromise care and put a patient at 5-15 times the relative risk of developing recurrent thrombi. T/F

Clinical evidence suggests that starting warfarin on the same day as unfractionated heparin is safe and effective. T/F

DETERMINATION OF THE RELATIONSHIP OF SODIUM NITROPRUSSIDE DOSAGE TO THIOCYANATE AND CYANIDE LEVEL IN CONGESTIVE HEART FAILURE

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Statement of Purpose: Nitroprusside is an essential and effective therapy in the acute care setting for a variety of cardiac indications. Unfortunately, the decision to use nitroprusside in an acutely ill patient is often done with apprehension and at times limited because of concerns of the toxicity profile of nitroprusside's metabolites, thiocyanate and cyanide. There is however, a limited amount of data available in the literature that investigated the actual incidence of thiocyanate and cyanide toxicity occurring from nitroprusside use, especially in congestive heart failure (CHF) patients.

Methods: This study is a prospective cohort study that will enroll adult, CHF patients who receive an infusion of nitroprusside for greater than 72 hours. The primary objective of the study is to determine the relationship of nitroprusside dosage to thiocyanate and cyanide level after 72 hours of infusion in patients with CHF. Additional objectives that will be investigated are determining the relationship between renal function to thiocyanate levels, and evaluating the occurrence of cyanide and thiocyanate toxicity. Thiocyanate and cyanide levels and signs and symptoms of toxicity will be obtained after 72 hours of treatment to determine the predictive ability of the cumulative 72-hour nitroprusside dose to thiocyanate and cyanide levels, using multiple linear regression. Twenty-four patients will be enrolled into the trial.

Results: To be presented.

Conclusion: The results of this study will be used to validate or reduce the concern for the development of thiocyanate and cyanide toxicity with nitroprusside use by the medical community.

Learning Objectives:

Recognize the common signs and symptoms associated with thiocyanate and cyanide toxicity

Identify patients who are at risk for the development of thiocyanate and cyanide toxicity with nitroprusside use

Self Assessment Questions:

The development of metabolic acidosis while a patient is receiving nitroprusside is most likely due to the accumulation of which nitroprusside metabolite?
(a) Thiocyanate
(b) Guanylate Cyclase
(c) Cyanide
(d) Nitric Oxide

True or False: Cyanide is metabolized in the liver and thiocyanate is eliminated renally.
(a) True
(b) False

EVALUATION OF AN INTENSIVE INSULIN PROTOCOL IN CRITICALLY ILL ADULTS

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Hyperglycemia associated with insulin resistance is common in critically ill patients, even those who have not previously had diabetes. This has been associated with an increased risk of infectious complications, impaired wound healing and increased mortality. A recent study has shown that intensive insulin therapy with a target glucose range of 80-110 mg/dl significantly reduced morbidity and mortality compared to a conventional regimen with a target glucose range of 180-200 mg/dl.

A new intensive insulin therapy protocol was recently initiated at Spectrum Health. The primary objective of this study will be to evaluate the safety and effectiveness of this protocol in critically ill patients in the MICU and SICU at Spectrum Health. Secondary objectives include nursing adherence to the protocol and identifying areas for protocol improvement. Data to be collected and analyzed includes: time to reach goal blood sugar, readings above, below and within target range, incidence of hypoglycemic episodes, APACHE II scores, length of ICU and hospital stay, and protocol violations.

The target blood glucose range for the protocol is 80-110 mg/dl. The protocol describes how to initiate the protocol, adjustments based on blood glucose results above and below desired range, monitoring frequency, parameters for holding insulin when enteral or parenteral nutrition is held, and parameters for contacting the physician. Data collection and evaluation is currently in progress. Preliminary results will be presented.

Learning Objectives:

Identify the benefits of an intensive insulin therapy protocol in critically ill patients.

Identify barriers or limitations in the use of an intensive therapy protocol in the ICU.

Self Assessment Questions:

T or F Patients in the intensive insulin therapy group in the Van den Berghe study had decreased rates of renal replacement therapy requirements and had increased mortality.

T or F The Van den Berghe trial defined hypoglycemia as a blood sugar of less than 40mg/dl.

PATIENT'S SATISFACTION WITH PHARMACEUTICAL CARE SERVICES IN AN AMBULATORY CARE SETTING

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Objective(s): The main objective of this study is to investigate patient satisfaction with pharmaceutical care in an ambulatory care clinical setting. It is important to evaluate patient satisfaction in this respect for three important reasons: 1) the rapidly changing face of healthcare leads to a continuous need to re-assess the ability of the provider to meet patients' needs; 2) it is important to assess patient satisfaction in various settings which serve a diverse group of individuals; 3) the study will use a unique survey which was created by asking patients what they perceive to be valuable about pharmaceutical care services. Methods: Design- A self-administered twenty-question print based survey that measures patient satisfaction with pharmaceutical care services after services are provided. Patients/Participants-The survey will be administered in person or mailed to all patients who have received pharmaceutical care services at two ambulatory care sites. Data will be collected from 80 patients. Setting- This study will take place at two ambulatory care sites in the Chicago metropolitan area. Results: Descriptive statistics using patient demographics and survey response will be used to evaluate satisfaction with pharmaceutical care services in an ambulatory care setting. Conclusion(s): It is anticipated that this study will help ambulatory care providers and practitioners in assessing the quality of care they are providing.

Learning Objectives:

Be able to assess quality of care with pharmaceutical care services in an ambulatory care setting

Be able to recognize areas for improvement in pharmaceutical care services provided to patients

Self Assessment Questions:

T or F It is important to continuously evaluate patient satisfaction with pharmacy services

T or F Patient satisfaction is not an important factor for pharmaceutical care providers

EVALUATION OF HOW A PHARMACY MANAGER CAN UTILIZE USER-DEFINED SOFTWARE TO MEET THE UNIQUE NEEDS OF A PHARMACY DEPARTMENT

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Introduction: Healthcare has notoriously lagged in utilizing evolving technology. Furthermore, public concerns over patient safety and technology's ability to reduce errors are pressuring health system Information Technology (IT) departments towards updating technology. Projects of this magnitude can be quite costly. However, health systems have another option with the use of User-Defined Software, (UDS), which can be more cost-conscious yet still able to meet the immediate and unique needs of a hospital.

Purpose: This report's intent is to demonstrate how one can utilize certain software packages readily available that allow users to create programs to address the individual needs of a department. By using an actual case-study, this report will also demonstrate how useful and successful a UDS program can be for a pharmacy department.

Methods: The hospital pharmacy standardized several concentration-dependent, weight-based IV solutions for the NICU, which resulted in outdated rate-calculation sheets. Thus, a pharmacy resident developed and implemented a NICU IV Rate Sheet program using Microsoft Access. Since implementation, the program has been frequently modified to continually meet the needs of the pharmacy department and the NICU nursing staff.

Results: Feedback from pharmacists and nurses has been very positive to date. Pharmacists appreciate the ease of inputting data and printing rate sheets for the nurses. Nurses enjoy receiving a patient-specific rate sheet with easy-to-read information stating the rate in mL/hr for each corresponding weight-based rate. The response has been so positive that nurses are increasing demand to expand the program's abilities by allowing users to access the program on patient-care floors.

Conclusion: Purchasing multi-million dollar software systems is not entirely necessary to increase the level of patient care within hospitals. This can be accomplished via User-Defined Software packages that allow an individual to create a unique program that addresses specific needs of a pharmacy department.

Learning Objectives:

To know what types of User-Defined Software packages exist.

To understand the advantages and disadvantages of User-Defined Software.

Self Assessment Questions:

True or False Microsoft Access is an example of a User-Defined Software package.

True or False The main advantage of User-Defined Software is the ease of creating and implementing unique programs.

A RETROSPECTIVE EVALUATION OF POTENTIAL DRUG INTERACTIONS BETWEEN LIPID-LOWERING AGENTS AND WARFARIN

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Introduction:
The current literature documents drug interactions between certain lipid-lowering agents and warfarin, mainly in the form of case reports. Different mechanisms for these drug interactions have been described, including metabolism inhibition, protein-binding displacement, and modification of coagulation factor synthesis. There is no established method for empirically adjusting warfarin doses in patients who may experience a drug interaction with lipid-lowering therapy. In addition, few published case reports have assessed more than one lipid-lowering agent regarding the interaction with warfarin.

Purpose:
The purpose of this retrospective evaluation is to determine the magnitude of the effect on both INR and warfarin dose when a lipid-lowering agent is added or removed from therapy.

Methods used:
Charts from a pharmacist and nurse managed anticoagulation clinic were reviewed for patients on warfarin who were started on a lipid-lowering agent during their anticoagulation therapy. Additionally, charts were reviewed for patients on both warfarin and a lipid-lowering agent and had the lipid-lowering agent discontinued during their anticoagulation therapy. Exclusion criteria included unstable warfarin doses or INR prior to the addition/deletion of lipid-lowering agent, patient compliance issues, and other potential causes of an INR or dosage change (e.g. illness, other drug interactions, dietary interactions, etc.). Changes in INR and warfarin dosages were analyzed for correlations with the addition or discontinuation of lipid-lowering agents.

Results/Conclusions: Forthcoming

Learning Objectives:

Review the possible mechanisms of drug interactions involving lipid-lowering agents and warfarin.

Assess the clinical significance of drug interactions between lipid-lowering agents and warfarin.

Self Assessment Questions:

Lipid-lowering agents have been suggested to interact with warfarin by which of the following mechanisms:
a. Metabolism inhibition
b. Protein-binding displacement
c. Modification of coagulation factor synthesis
d. All of the above

The use of lipid-lowering agents is contraindicated in patients taking warfarin.
a. True
b. False

A RANDOMIZED, OPEN-LABELED, ACTIVE-CONTROL PILOT STUDY OF FIXED DOSE SINGLE-ADMINISTRATION PEGFILGRASTIM VS. WEIGHT-BASED DAILY FILGRASTIM IN MULTIPLE MYELOMA PATIENTS RECEIVING TANDEM AUTOLOGOUS BONE MARROW TRANSPLANT

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Fixed-dose single-administration of pegfilgrastim (Neulasta®) has shown to be as safe and as effective as conventional weight-based daily administration of filgrastim (Neupogen®) in patients receiving chemotherapy. However, clinical evidence is lacking in bone marrow transplant (BMT) patients. In this study, ten multiple myeloma patients receiving tandem autologous BMT will be recruited to receive the two study medications (filgrastim and pegfilgrastim) for their neutrophil recovery. Eligible patients will be randomized to one of the two study arms. For Phase I (the first BMT), patients in Group A will receive filgrastim (Neupogen®) 5 mcg/kg SQ daily starting Day 5 until neutrophil recovery (ANC > 1000 for 2 consecutive days) and patients in Group B will receive pegfilgrastim (Neulasta®) 6 mg SQ once on Day 5. When they return for their second BMT (Phase II), patients in Group A will receive pegfilgrastim (Neulasta®), and patients in Group B will receive filgrastim (Neupogen®). The filgrastim phase will serve as active-control phase for each patient, and consequently compared to the pegfilgrastim phase. Filgrastim (standard treatment) will be offered to enhance patient's neutrophil recovery in patients not responding (i.e. ANC < 300) to pegfilgrastim (investigational treatment) by Day 13. Blood samples will be drawn through patient's existing IV access at 0.25, 0.5, 1, 2, 4, 6, 8, and 24 hours after the first dose, and at 24-hour intervals thereafter until the end of each phase for pharmacokinetics (PK) analysis. PK parameters will be determined using WinNonlin. In addition, daily ANC, Tmax, and use of antibiotics during study periods will be assessed to compare the efficacy of these two study drugs in BMT patients. The cost of therapy will also be evaluated based on the drug cost and the length of treatment for each phase.

Learning Objectives:

To study pharmacokinetics of Neulasta® (pegfilgrastim) in BMT patients

To evaluate and compare the efficacy of Neulasta® (pegfilgrastim) in neutrophil recovery to that of Neupogen® (filgrastim) in multiple myeloma patients receiving autologous bone marrow transplantation

Self Assessment Questions:

Pharmacokinetics of pegfilgrastim in BMT patients supports the use of pegfilgrastim in this population. T or F

Although a larger study is necessary to answer the question, results of this pilot study suggest that pegfilgrastim might be as effective as filgrastim in BMT patients. T or F

PREVALENCE AND SIGNIFICANCE OF CONCOMITANT RISK FACTORS FOR TORSADES DE POINTES IN PATIENTS RECEIVING DRUGS KNOWN TO CAUSE QTC INTERVAL PROLONGATION

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Torsades de pointes (TdP) is a potentially life-threatening polymorphic ventricular tachycardia. Multiple contributing factors, non-pharmacological and pharmacological, have been well-identified. Torsade de pointes may be acquired or associated with a genetic predisposition. Medications are one of the leading risk factors for TdP. More than fifty drugs documented to cause TdP are available. Medications can increase the risk of TdP through pharmacodynamic and/or pharmacokinetic interactions. Most published cases of drug-induced TdP involve patients with known pre-existing risk factors. Hospitalized patients are at higher risk for pre-existing risk factors for TdP. Contributing risk factors may also be classified as non-correctable or correctable. Pharmacists can provide an invaluable service by monitoring and identifying correctable risk factors, particularly those related to medications. In some cases, alternatives may be available. The purpose of this study is to determine the proportion of hospitalized patients with preexisting risk factors receiving medications known to cause TdP. This study will also identify the percentage of patients, in which alternative therapies were available.

Methods: The study will be a retrospective descriptive analysis of medical records. A list of QTc interval-prolonging medications on Methodist formulary will be established from a review of the literature. Using this list, a computerized query will be performed on these agents. Patients will be included if admitted on one of four randomly selected dates in 2003, receiving a predefined medication and 18-89 years of age. Medical records of patients meeting study criteria will be reviewed to determine percentage with concomitant nonpharmacological risk factors. Records will also be assessed for the presence of interacting drugs that may provoke TdP to determine incidence of pharmacokinetic (PK) or pharmacodynamic (PD) interactions. Indications for which QTc interval prolonging drugs are frequently prescribed will be reviewed to determine if non-QTc interval prolonging alternatives are available for treated indications.

Learning Objectives:

Identify correctable risk factors for Torsades de Pointes

List five commonly used medications associated with QT-prolongation

Self Assessment Questions:

True or False: Metoclopramide is a medication known to cause Torsades de Pointes.

Which of the following is an example of a pharmacodynamic interaction increasing the likelihood of Torsades de Pointes?
A.Prescribing sertraline to a patient receiving fluconazole
B.Failing to renally adjust the dose of levofloxacin
C.Prescribing droperidol in a patient with a known hereditary syndrome associated with QT prolongation
D.All of the above

LIMITED-DOSE DACLIZUMAB VS. BASILIXIMAB: A COMPARISON OF COST AND EFFICACY IN PREVENTING ACUTE REJECTION

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Background: Acute allograft rejection occurs primarily in the first six months after solid organ transplantation and is one of the most important causes of chronic rejection and late graft loss. The early nephrotoxic effects of immunosuppressive agents like calcineurin inhibitors can be reduced by induction therapy with monoclonal antibody preparations. Basiliximab is currently the IL-2R antibody used for induction at UIC Medical Center. The established two-dose regimen gives basiliximab both a logistic and economic advantage over five-dose daclizumab. Both regimens are similar in efficacy and toxicity profiles. Recent data has shown limited-dose daclizumab therapy to be at least equally efficacious as the original five-dose regimen. This study was designed to compare the efficacy, toxicity and cost of the limited-dose daclizumab regimen to that of the standard basiliximab regimen.

Methods: This study compares two antibody induction regimens for patients ages 18 years and up who had received renal transplants from January 2002-September 2003 and completed IL-2R antibody induction with standard dose basiliximab or limited-dose daclizumab. Data was collected from the time of transplantation through six months post-transplant. Demographic and transplant characteristics, laboratory values, and the incidence of graft rejection were compared between groups. The primary outcome of efficacy was the incidence of acute rejection. Secondary outcomes included changes in serum creatinine and delayed graft function as well as safety outcome measures.

Results: Statistical analysis is ongoing for patients who received renal transplantation from January 2002-September 2003. Complete results will be available at final presentation.

Conclusions: The results of this study will objectively compare the efficacy and cost of an abbreviated daclizumab and standard basiliximab regimen. If both regimens show equal efficacy and comparable cost, the pharmacoeconomic and pharmacotherapeutic implications of this study may provide a logistic alternative to the current basiliximab induction regimen at UIC Medical Center.

Learning Objectives:

Evaluate the efficacy of standard dose basiliximab and limited-dose daclizumab induction therapy in preventing acute rejection.

Compare the cost difference between limited-dose daclizumab therapy and standard dose basiliximab therapy.

Self Assessment Questions:

Limited-dose daclizumab induction therapy causes a higher incidence of acute rejection in renal transplantation than standard dose basiliximab therapy. T or F?

Limited-dose daclizumab induction therapy is cheaper than standard dose basiliximab therapy. T or F?

TRANSITION OF A PRIOR AUTHORIZATION DEPARTMENT TO A PHARMACY CONSUMER RESEARCH DEPARTMENT

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Purpose: The focus in managed care is beginning to shift from restrictive processes such as closed formularies and prior authorization to consumer engagement and choice. Currently, many consumers are shielded from actual prescription costs and the true benefit of their prescription drug coverage. This health-benefits management company developed a pharmacy consumer research department to engage consumers thus making drug costs and the actual pharmacy benefit more transparent.

Methods: A 4-week pilot project was implemented to evaluate the impact of an outbound call intervention. Due to an increase in member engagement from baseline, the pilot project was deemed successful and therefore complete transition of the prior authorization department began. In order to transition the prior authorization department into a new consumer research department, four key steps were executed. The first two steps involved assessing departmental and training needs and consulting experts in other departments such as human resources, HIPAA, and legal. The third step required organization of the department. This was accomplished by developing a project calendar, implementing a template for new project submissions, and developing a system to perpetually train staff on new projects. The final step, activating the department, requires obtaining IT software, maintaining accurate member contact information and documenting departmental and project successes.

Results: The consumer research department is fully developed and functional. Currently two projects have been completed and two additional projects are ongoing. The department has successfully engaged and educated consumers. Members will continue to be engaged through consumer driven initiatives from the consumer research department.

Conclusion: As the focus in managed care pharmacy shifts to the consumer, it is imperative that the pharmacy consumer research department continue to manage health care dollars, engage the consumer, and conduct research for the purpose of achieving optimal drug therapy outcomes.

Learning Objectives:

To understand the importance of consumer choice in managed care

Describe the process of transitioning or developing a new department

Self Assessment Questions:

In general, patients do not understand their pharmacy benefit and are unaware of prescription costs. - T or F

Implementing a pilot project is important in documenting a need to develop a new department or program. - T or F

A RETROSPECTIVE REVIEW OF INFECTIONS POST-RENAL TRANSPLANTATION.

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Background: Since Rubin (1981) characterized a time period for which infections occurred in renal transplant recipients at 1 month, 2-6 months and thereafter, multiple advances in the field of transplant along with new generations of immunosuppressive therapies have arisen. Intensified immunosuppressive regimens, however, increase the risk of immunosuppression-associated infectious complications. Formerly rare, opportunistic infections are emerging in the renal transplant population (e.g, BK virus nephropathy), along with the increased risk for malignancies. Finally, renal allograft survival, and patient survival is decreased in patients whose postoperative course is complicated by infection. Questions of validity arise concerning the timetable mentioned above leading to necessary reevaluation of the infections that are acquired post-renal transplantation.

Purpose: To determine infections acquired by patient's post-renal transplantation and to characterize a time course in which these infections occur.

Methods: A Retrospective analysis was performed on 378 patients who received a renal transplant through January 1, 1998 to December 31, 2002, at a single institution. Of the 378 patients, 294 were eligible for review pending continued monitoring for 6 months post-transplant by the institution. Eighty-four patients were excluded having undergone multiple organ transplants, pregnant or lactating, being followed by a different clinic, or dying within 6 months post-transplant. A medical record database was reviewed for each patient to determine date of transplantation, age, gender, etiology of renal failure, CMV status, hospitalization length of stay, number of acute rejections, days post transplant to acute rejections, type of acute rejection treatment (steroids vs. OKT3/thymo), immunosuppression used at time of infection (Tacrolimus vs. Cyclosporin, MMF vs. Azathioprine, Sirolimus, Steroids), and time to infection occurrence post-transplantation. Further data collected included, site of infection, and type of infection present bacterial, viral, or fungal.

Results and conclusions have not yet been determined.

Learning Objectives:

To develop an understanding of the time course for which infections occur post transplantation in renal recipients.

To describe factors associated with development of infections in renal transplant patients.

Self Assessment Questions:

Has the most common infection known to occur in the 1st month post transplant changed since that suspected back in 1981?

Which types of infection may be seen more often in renal transplant recipients?
a. Viral
b. Bacterial
c. Fungal
d. None of the above

EVALUATION OF GABAPENTIN DOSING AND TOXICITY IN PATIENTS WITH RENAL IMPAIRMENT

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Over 1,700 patients received gabapentin (GP) at The Ohio State University Medical Center (OSUMC) from October 2002 through October 2003. GP, a structural analog of gamma-aminobutyric acid (GABA), is commonly used for various types of neuropathic pain syndromes. Its lack of severe side effects and drug interactions make it an ideal analgesic for patients with complicated medical problems, which may include restless leg syndrome and neuropathy secondary to diabetes. Since GP is solely excreted by the kidneys, the elimination half-life of GP is significantly prolonged in patients with severe renal impairment leading to an increased potential for toxicity. There have been numerous published case reports about GP toxicity, particularly in patients with end stage renal disease on hemodialysis.

The purpose of this study was to assess the dosing and toxicity profile of renal patients on GP. All inpatients at The OSUMC and James Cancer Hospital from September 2003 to November 2003 were retrospectively evaluated. Patients were included in the study 1) if GP was included on their hospital medication profile and 2) their serum creatinine was greater or equal to 1.3 mg/dl. Data collected included patient demographics, past medical history, dialysis status, reported side effects, serum creatinine, reason for GP use and dose of GP (home dose or dose initiated in the hospital). Appropriate dosing was determined based on estimated creatinine clearance and renal dosing recommendations in the GP package insert. Available GP levels were reviewed for patients specifically hospitalized for suspected GP toxicity.

Preliminary results will be presented based on the data collected. Results of this study will be used to educate pharmacists, physicians and patients at The OSUMC about the importance of appropriate GP dosing in patients with renal impairment.

Learning Objectives:

To evaluate appropriate renal dosing of patients on gabapentin based on estimated creatinine clearance.

To assess the adverse profile of gabapentin in patients with renal insufficiency.

Self Assessment Questions:

Approximately 20% of gabapentin is excreted by the kidneys. True or False

Gabapentin doses may need to be significantly reduced for patients on hemodialysis. True or False

A RETROSPECTIVE ANALYSIS OF DENIED NON-FORMULARY DRUG OUTCOMES

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In 1997 the VA established a national drug formulary augmented by 22 Veterans Integrated Service Networks (VISN). Drug formularies are generally implemented to help control pharmacy costs and improve quality of care to patients. Although each VISN is required to analyze and monitor non-formulary utilization and denials, no studies, to our knowledge, have evaluated VA Chicago Health Care System's (VACHCS) denied non-formulary drug outcomes. This study is being undertaken to investigate the clinical outcomes for patients who were not approved a non-formulary drug. Additionally, the study will attempt to gain knowledge on prescribing habits and the information obtained may positively impact future prescribing practices. Furthermore, there are no data regarding economic benefit, if any, when non-formulary drugs are denied.

This study is a retrospective review of the medical record. VACHCS is a multi-site health care system with locations in Crown Point Indiana, near north side (Lakeside VA) and west side of Chicago (West Side VA). Patients can be seen at any site, and their medical records are contained in a single database with access at all sites. All patients from VACHCS who had non-formulary drug requests excluding supplies, topicals and transplant medications denied between May 1, 2002 to November 30, 2002 are eligible for the study. Patients seeking pharmacy benefits only will be excluded. Clinical outcomes from the denied requests will be evaluated for all subjects enrolled. Additionally, cost savings will be analyzed to determine if the outcomes present any economical benefit. Data collection, results and conclusions are currently in progress and will be presented at the Great Lakes Conference.

Learning Objectives:

To identify different types of clinical outcomes for patients denied a non-formulary drug

To assess whether there is an impact on cost savings within the VA Chicago Health Care System from the results of the study

Self Assessment Questions:

Drug formularies are established to help control pharmacy costs, improve quality of care to patients and reduce the acquisition cost of drugs.
True or False

List 3 possible clinical outcomes for patients denied a non-formulary drug

A RETROSPECTIVE REVIEW OF ACETYLCHOLINESTERASE INHIBITOR THERAPY FAILURE BY THE ADDITION OF MEDICATIONS WITH ANTICHOLINERGIC ACTIVITY

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Background:
Alzheimer's disease (AD) is the most common cause of dementia and can negatively impact memory, language, praxis, judgment and orientation. The Acetylcholinesterase inhibitors are currently approved by the FDA for the treatment of mild to moderate AD. These agents have been shown to increase the neurotransmitter acetylcholine by the inhibition of the enzyme acetylcholinesterase, which is responsible for the breakdown of acetylcholine. The addition of a medication with anticholinergic activity could have an antagonistic effect at the muscarinic receptor site and recent literature has shown that anticholinergic activity can decrease cognitive function in the elderly.

Purpose:
To determine if there is a decrease in the effectiveness of acetylcholinesterase inhibitor therapy by the addition of medications with anticholinergic activity. The primary objective is to identify if failure of acetylcholinesterase inhibitor therapy is the result of a drug-drug interaction of the addition of medications with anticholinergic activity. A secondary objective is to identify if any one class of medication with anticholinergic activity is associated with a higher rate of acetylcholinesterase inhibitor therapy failure.

Methods:
The study is a retrospective case-cohort analysis of 638 outpatients patients who received an acetylcholinesterase inhibitor from June 2000 to June 2003 at Hines VA Medical Center. Each subject who meets the defined criteria for treatment failure with an acetylcholinesterase inhibitor will be matched with subjects who were successfully maintained on therapy in a 2:1 or 3:1 ratio. The number of medications with high anticholinergic activity on each subject's medication profile will be recorded to analyze whether there is a difference in the total number of medications with anticholinergic activity between the groups and if any one class of medication with anticholinergic activity is associated with a higher rate of therapy failure.

Results/Conclusion:
Data are in the process of being collected. Analysis of data, results, and conclusions of the study will be presented at the conference.

Learning Objectives:

Describe and discuss the mechanism of action of acetylcholinesterase inhibitors in the treatment of mild to moderate AD.

Describe and discuss the potential therapeutic drug interaction of the addition of medications with anticholinergic activity to existing therapy with acetylcholinesterase inhibitors.

Self Assessment Questions:

Alzheimer's disease is the most common cause of dementia in elderly patients? T or F

Acetylcholinesterase inhibitors is the only class of medications currently approved for the treatment of mild to moderate AD? T or F

ISOMETRIC EXERCISE TRAINING TO LOWER RESTING BLOOD PRESSURE: A RANDOMIZED CONTROLLED TRIAL IN A V.A. CLINIC HYPERTENSIVE POPULATION

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Several recent studies have shown that isometric handgrip exercise training lowers resting blood pressure in normal as well as hypertensive patients. All of these studies involved similar isometric training protocols taking place in supervised laboratory environments. The current study intends to use a similar training protocol in strictly hypertensive patients and in an unsupervised environment to evaluate this type of exercise as a feasible alternative to medication titration.

Diagnosed hypertensive patients referred to medication management clinic at the VA hospital for medication titration to reach blood pressure goal will be eligible. At the initial visit, written informed consent will be obtained from the patient. Resting blood pressure will be obtained by electronic measurement, and eligible patients will perform maximal voluntary contraction (MVC) using a hand dynamometer. Patients will then be randomly assigned to either undergo a six-week isometric handgrip exercise program or serve as a control subject undergoing no intervention for a six-week period. Subjects in the treatment group will perform an isometric protocol involving hand contraction at 30% MVC lasting two minutes, followed by a two-minute rest period, and is repeated with alternate hands for a total of four efforts. This sequence will be repeated unsupervised outside the clinic three days per week over the subsequent six weeks. All drug therapy will continue unchanged and patients in both groups will be instructed to maintain their current lifestyle habits during the study period. After the sixth week of participation, all study participants will return for a follow up visit. Resting blood pressure and MVC will be obtained for comparison to baseline.

It is anticipated that thirty subjects will participate in this research study. The study protocol is currently awaiting approval from the Research and Development and Human Subjects Committees. All available results will be presented at the conference.

Learning Objectives:

Describe the potential role of isometric handgrip exercise in treating hypertension.

Compare the isometric handgrip exercise protocol used in the current study to those used in previous studies.

Self Assessment Questions:

Current literature has shown that isometric handgrip exercise training can reduce resting blood pressure. T or F

Exercise training is recommended for primary management of hypertension besides medication therapy by the World Health Organization (WHO) and the National Committee of High Blood Pressure. T or F

A DOSE-COMPARISON STUDY OF THE PHARMACOKINETICS OF ENOXAPARIN IN OBESE TRAUMA PATIENTS FOR VENOUS THROMBOEMBOLISM PROPHYLAXIS

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Venous thromboembolism (VTE), including deep vein thrombosis and pulmonary embolism, is a major cause of morbidity and mortality in hospitalized patients following major trauma. Major trauma is a risk factor for VTE development. Another risk factor for the development of VTE is obesity, defined as a body mass index (BMI) greater than 30 kg/m2. Risk factors from VTE are additive in nature. It has been shown that obese patients have an increased volume of distribution for enoxaparin when compared to non-obese patients. Increased volume of distribution may lead to suboptimal dosing of enoxaparin. There is very little published literature evaluating the pharmacokinetics of low molecular weight heparins in obese patients. The purpose of this study is to evaluate the pharmacokinetics of enoxaparin utilizing a weight-based dosing strategy in obese trauma patients for the prophylaxis of VTE.

Eligible patients will be randomly assigned in a 1:1 fashion, according to their weight stratum, to receive in an open-label fashion either the standard prophylactic enoxaparin dose (30 mg every 12 hours subcutaneous) or a weight-based enoxaparin dose (patients with BMI between 31-40 kg/m2 will receive enoxaparin 40 mg every 12 hours subcutaneous; patients with BMI between 41-50 kg/m2 will receive enoxaparin 50 mg every 12 hours subcutaneous; patients with BMI greater than 50 kg/m2 will receive enoxaparin 60 mg every 12 hours subcutaneous). The primary endpoint is to compare the level of anti-factor Xa activity between the standard dose and weight-based dose treatment groups. Secondary endpoints include the incidence of VTE (combined deep vein thrombosis and pulmonary embolism) and hemorrhage (major and minor). Anti Xa levels will be assessed after the administration of the third and sixth dose.

Preliminary results will be presented at the conference.

Learning Objectives:

Discuss available therapeutic options for the prevention of VTE.

Describe the pharmacokinetic profile of enoxaparin.

Self Assessment Questions:

Low molecular weight heparins have been shown to be superior in efficacy when compared to unfractionated heparin for the prevention of VTE in trauma patients. T or F

Maximum anti-Factor Xa activity occurs 3-5 hours after subcutaneous injection of enoxaparin. T or F

EVALUATION OF NESIRITIDE IN POSTOPERATIVE CORONARY ARTERY BYPASS PATIENTS

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Background. Standard therapy for acute heart failure exacerbation consists of diuretics, inotropes, and intravenous vasoactive medications. Nesiritide, a potent vasodilator that produces diuretic and natriuretic effects, has now been incorporated into this treatment armamentarium. Patients with pre-existing left ventricular dysfunction undergoing coronary artery bypass grafting (CABG) often require intensive post-operative hemodynamic support. During the intra-operative and post-operative setting, any one or combination of intravenous vasoactive agents can be used to target the underlying hemodynamic abnormality, a low cardiac output. Nesiritide may offer a therapeutic benefit in this patient population, however it has not yet been investigated.
Purpose. The objective of this study was to evaluate patients with pre-existing left ventricular dysfunction, defined as an ejection fraction (EF) <40%, receiving nesiritide plus standard care for improving hemodynamics and medical stabilization after CABG.
Methods. A retrospective analysis was conducted to evaluate patients receiving nesiritide plus standard care after CABG. Adult patients with an EF <40%, measured within the previous year, who have undergone planned CABG were included. Exclusion criteria consisted of: placement or presence of a ventricular assist device, congenital heart disease, and end stage renal disease. Primary endpoints evaluated were change in mean pulmonary artery pressure and duration of inotropic therapy. Hemodynamic data, standard laboratory values, and urine output were collected during the first 48 hours following initiation of nesiritide. Duration of other intravenous vasoactive medications, utilization of an intra-aortic balloon pump, duration of post-operative mechanical ventilation, incidence of arrhythmia, and intensive care unit length of stay were also recorded.
Results. Results to be presented at Great Lakes Resident Conference.

Learning Objectives:

Understand the mechanism of action and clinical effects of nesiritide.

Identify the current role of nesiritide in the treatment of acute heart failure after cardiac surgery.

Self Assessment Questions:

Nesiritide is an arterial and venous dilator. T/F

Nesiritide is currently indicated for:
a. The treatment of acutely decomponsated heart failure
b. Home infusion therapy for chronic heart failure
c. Acute heart failure exacerbation after cardiac surgery
d. All of the above

CLINICAL INFORMATION SYSTEM: MEASURING COMPLIANCE WITH EVANSTON NORTHWESTERN HEALTHCARE (ENH) DRUG USE GUIDELINES

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Efforts to reduce medication errors and preventable adverse drug events (ADEs) continue to be assessed among healthcare organizations due to heightened awareness of patient medication safety. The Evanston Northwestern Healthcare (ENH) pharmacy department recently performed an internal study measuring compliance with high-risk drug use guidelines. Medications were identified based on external medication safety data as well as internal ADE and sentinel event data and impact by clinical pharmacy interventions. The study incorporated guidelines for digoxin monitoring, warfarin education and appropriate renal dosing of digoxin, enoxaparin and ketorolac. The results indicated compliance could be improved and provided incentive to measure the impact of the recently implemented clinical information system (CIS) using identical indicators.
Following implementation of the CIS within ENH, compliance will be measured and compared at two different periods of time. The first will reflect a pre-Computer Physician Order Entry (CPOE) period, in which pharmacists are responsible for order entry and verification. The functionality of clinical decision support system (CDSS) tools will be explored to promote compliance with regard to the use of the medications under evaluation. The second measurable period will be post-CPOE and post-CDSS.
It is expected that the accessibility the CIS offers healthcare professionals in viewing patient records will improve compliance of ENH drug use guidelines. The responsibility of physicians entering orders and the capability of incorporating CDSS tools will further enhance compliance and overall patient care.

Learning Objectives:

Describe how CPOE impacts clinical pharmacy interventions

Explain how CDSS can further promote medication safety

Self Assessment Questions:

True or False: The majority of preventable ADEs occur at the point of prescribing?

True or False: CPOE can improve compliance of drug use guidelines?

EVALUATION OF PATIENT OUTCOMES BY PHARMACIST MONITORING ANTICOAGULATION THERAPY IN THE ACUTE CARE SETTING

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Purpose:
To evaluate patient outcomes by implementing a pharmacist monitoring program of anticoagulation clinical guidelines.

Methods:
A retrospective chart review of 100 patients admitted between December 2001-2002 and receiving anticoagulation therapy was conducted. The results of the review indicated multiple areas of improvement for anticoagulation, specifically warfarin. To help improve these areas, warfarin dosing guidelines from various institutions were evaluated and the Pharmacy and Therapeutics committee at our institution approved a guideline for use. An education session on anticoagulation was presented to the house staff and pocket cards containing the guidelines were distributed. Pharmacists were educated on anticoagulation monitoring and were required to pass a competency examination prior to participating in the monitoring program.

Results:
Fifty-three patients have been evaluated since implementation. Patients were placed into five treatment categories: arrhythmias, venous thromboembolism prophylaxis, thrombus, cardiac, and other. The majority of the patients had a goal INR between 2-3. Of the patients taking warfarin upon admission, 30% at baseline vs. 32% after implementation were therapeutic. Patients in the arrhythmia category were evaluated for appropriate bridging therapy. Only 26% of patients at baseline were bridged appropriately compared with 30% after implementation. Initiation doses for patients not previously on warfarin were also evaluated. Loading doses (10 mg) decreased after implementation by 8%, while recommended doses (2.5 or 5 mg) increased by 22%. Patients after implementation reached a therapeutic INR on average of 1.17 days sooner than patients at baseline. Patients discharged with therapeutic INRs (goal 2-3) increased by 12% after implementation of the guideline. Phytonadione use and bleeding rates were also monitored, but no differences were evaluated. Final results will be presented.

Learning Objectives:

Explain the impact of initiating pharmacists monitoring of anticoagulation clinical guidelines on patient outcomes.

Be able to recommend appropriate therapy dependent on diagnosis for patients receiving anticoagulation.

Self Assessment Questions:

True/False It is recommended to administer treatment doses of unfractionated heparin or low molecular weight heparin to a patient who has an arrhythmia and has a subtherapeutic INR.

True/False Implementation of an anticoagulation clinical guideline can improve patient outcomes and also expand pharmacy services.

PHARMACY CONSULTING OF SELECT HIGH-RISK PATIENTS

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Purpose: Develop a system to facilitate pharmacist-patient counseling in a select high-risk population to ultimately improve patient outcomes.

Background: Numerous studies have shown a positive effect on patient outcomes from formal pharmacist interventions and consultation. At our institution , pharmacy has been asked to take responsibility in the medication reconciliation aspect of the continuum of care. The goal is to provide the patient with the most appropriate professional for each of the patient's specific needs. Clinical Pharmacy Services has been unable to provide consulting services for all previously defined high-risk patients due to time and staffing restraints. Economically, Medicare reimbursement to hospitals is poor. Hospitals may not be reimbursed for readmissions within 72 hours for the same diagnosis.

Methods: There are numerous high-risk patient populations who are susceptible to serious adverse outcomes. Medicare readmission at our institution was analyzed to identify the patient population at highest risk for early readmission to the hospital by running a report of Medicare patients that were readmitted within 30 days of discharge over 6 months. Three admission categories were at the highest risk including mental health, pneumonia/infectious, and congestive heart failure/cardiology. By combining clinical information and readmission data, CHF was determined to be the group that would benefit the most from a pharmacy consultation program. Charts were reviewed to identify factors that could have lead to a readmission other than the diagnosis. Once select group is identified, design a comprehensive template to ensure consistent and complete patient education. Survey of patients and nurses on usefulness of pharmacy consulting service is planned. Re-evaluate Medicare readmission data of select population after program has been in place for 6 months to see if CHF readmission rate decreased.

Results: Pending

Learning Objectives:

Discuss ways to evaluate patients at high risk for hospital readmission

Discuss strategies to implement an effective pharmacy consultation of select groups

Self Assessment Questions:

What patient populations tend to have the highest readmission rate to the hospital?

What aspects of a formal pharmacy discharge consultation would be helpful to also provide to the community pharmacist?

HEPATOTOXICITY ASSOCIATED WITH TUBERCULOSIS TREATMENT IN CUYAHOGA COUNTY, OHIO.

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Current therapy for tuberculosis (TB) entails the use of multiple drug combinations. Combinations are necessary to maximize efficacy and minimize the potential for the development of drug resistance. While these combinations maximize the benefit of therapy in patients, they are also associated with toxicity. Toxicity can include hepatotoxicity, nephrotoxicity, ototoxicity, peripheral neuropathies, and hyperuricemia. Hepatotoxicity is a particularly severe adverse effect that may result in interruption of therapy, liver transplant, or death. An increased incidence of hepatotoxicity has been linked to several risk factors including abnormal baseline transanimases, alcohol use, and age. The primary objective of this study is to determine the incidence of hepatotoxicity associated with active TB treatment in our program. Secondary objectives include risk factors and antituberculosis regimens associated with the development of hepatotoxicity and the impact of hepatotoxicity on patient outcomes.

This project is a retrospective chart review of adults with active TB treated by the Cuyahoga County TB Program between 1995-2003. Data collection includes demographics, comorbid illnesses, initial TB regimen, hepatotoxic events, final regimens, duration of therapy, and patient outcomes. Hepatotoxicty will be defined as an asymptomatic patient with a five-fold elevation of aminotransferases or a symptomatic patient with a three-fold elevation in aminotransferases. Hepatotoxicity will be graded as mild, moderate, or severe based on severity of elevation of aminotransferases. Patient outcomes will include the number of days therapy was prolonged due to hepatotoxicity, final drug regimens completed, and whether or not the patient successfully completed a entire course of therapy.

Data collection is in progress and analysis of results are pending.

Learning Objectives:

Describe factors associated with the development of hepatotoxicity in patients receiving treatment for active TB.

Discuss options for the management of patients with active TB who develop hepatotoxicity.

Self Assessment Questions:

Age is a risk factor associated with development of hepatoxicity in patients being treated for active TB. T or F.

What are the clinical signs or symptoms associated with therapy-related toxicity in patients being treated for active TB?

EVALUATION OF EMERGENCY OVERRIDES IN A MEDICATION DELIVERY SYSTEM WITH PHARMACY-PYXIS INTERFACE

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OVERVIEW: In order to comply with JCAHO Standards, Parkview Health System recently implemented an interface between the pharmacy order entry system and the Pyxis automated dispensing machines located in nursing units throughout the hospital. With this interface, a pharmacist's review of the order is required before each medication can be removed from the Pyxis machine. However, certain clinical situations may arise in which this delay in medication administration may cause harm to the patient, or in which a physician is present and responsible for the preparation and administration of a medication. Emergency override procedures have been put in place to identify appropriate reasons for these overrides and ensure selection of the proper medication for each situation. The purpose of this study is to determine the safety and efficacy of the Pyxis override process, and to identify areas for future improvement.

METHODS: A random sample of Pyxis overrides reports from one week during each quarter was obtained and audited for appropriateness. Reasons for overrides reported were selected by the nurse removing the drug. The nurse could choose from a list of common emergency situations, select 'Prescriber Present', or enter another indication if applicable. Chart reviews were performed to identify presence of physician orders or prescriber at bedside. Witness signatures were collected to assess the rate of verification for those overrides requiring a witness.

RESULTS: Preliminary data indicates that approximately 80% of overrides are appropriate. 'Prescriber Present' is the most commonly selected reason for override, chosen 43% of the time. Further data collection is ongoing.

Learning Objectives:

Describe JCAHO requirements for the administration of medications without prior pharmacist review.

Identify advantages and disadvantages of the current Parkview Health System Pyxis override process.

Self Assessment Questions:

Which of the following is (are) acceptable reasons for administration of a medication without first being reviewed by a pharmacist?
(a) Prescriber present for ordering, preparation, and administration of medication
(b) Emergency situation by a nurse without a second individual for verification
(c) Emergency situation by a nurse with a second individual as witness
(d) One of the above
(e) Two of the above

Which of the following was the most commonly selected indication for Pyxis overrides at Parkview Health?
(a) Allergic reaction
(b) Severe pain
(c) Prescriber present
(d) Acute nausea/vomiting
(e) Other

DEVELOPMENT OF AN INPATIENT WARFARIN DOSING PROTOCOL FOR THE PREVENTION OF DEEP VEIN THROMBOSIS IN ORTHOPEDIC SURGERY PATIENTS

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Introduction: Orthopedic surgery patients comprise a subgroup of patients that require anticoagulation therapy. Patients that fit into this subgroup are those that have undergone total hip and total knee arthroplasty. Additionally, patients with a traumatic lower extremity fracture that will be restricted to bed rest for a prolonged period of time are included. Warfarin is the standard therapy for the long-term prevention of deep vein thrombosis (DVT). Despite the benefits of warfarin therapy there are also risks associated with its use. Thus, standardizing warfarin therapy for these patients can insure patient safety.
Objectives: This study was designed to determine the historical prescribing practices of warfarin for orthopedic surgery patients at the University of Louisville Hospital, and then to create a dosing protocol that would achieve a therapeutic international normalized ratio (INR) both safely and efficiently.
Methods: A six-month retrospective chart review of orthopedic surgery patients started on warfarin therapy for DVT prophylaxis was performed. A total of 66 potential patients were identified by pharmacy computer records and ICD-9 codes, with 43 patients satisfying the inclusion and exclusion criteria.
Results: Of the 43 patients 67% had undergone either a total hip or total knee arthroplasty procedure and 33% had experienced a traumatic lower extremity fracture. A majority of the patients (67%) received either 5 or 2.5 milligrams as their initial warfarin dose. A target INR was specified in the chart for only 44% of the patients. A baseline INR was drawn for 67% of the patients. Upon discharge only 31% of the patients achieved a therapeutic INR. There were 4 patients that experienced a supratherapeutic INR, defined as an INR greater than 3.0, during their hospital stay. Results of the initial retrospective chart review thus identified several problem areas. A standardized dosing protocol was designed to help address those problem areas.

Learning Objectives:

Explain the importance of DVT prophylaxis for orthopedic surgery patients.

Discuss potential problems that can be encountered during the implementation of a protocol.

Self Assessment Questions:

True or False All orthopedic surgery patients require DVT prophylaxis.

True or False It is good practice for a physician to document a target INR in the medical record.

USE OF ERYTHROPOIETIN FOR CHRONIC KIDNEY DISEASE PATIENTS IN A VETERANS AFFAIRS MEDICAL CENTER

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BACKGROUND: Chronic renal failure is associated with a normochromic and normocytic anemia due to reduced erythropoietin production in the failing kidney. Possible complications of chronic anemia include decreased oxygen delivery to tissues, angina, congestive heart failure, and reduced quality of life. Erythropoietin is effective in treating renal-related anemia and in delaying or preventing long-term complications. Over the past few years, the use of epoetin within our institution has grown to a total of 1450 prescriptions filled in fiscal year 2003, costing over $975,000. Due to this financial impact, it is important to ensure the appropriate use of epoetin with minimal drug wastage and postive patient outcomes.
OBJECTIVES: The objective of the initial phase of the project is to retrospectively evaluate the compliance of epoetin initiation and monitoring according to the National Kidney Foundation-Kidney/Disease Outcomes Quality Initiative (NKF-K-DOQI) clinical practice guidelines. Objectives during the second phase include establishing an epoetin dosing and monitoring protocol and a protocol for conversion to darbepoetin.
METHODS: A retrospective chart review was conducted on all patients enrolled in the chronic kidney disease clinic. Data collection included: past medical history, race, creatinine clearance, transfusion history, hemoglobin, transferrin saturation, serum ferritin levels, starting and maintenance epoetin dose, and refill history.
RESULTS: Twenty patients were evaluated at abstract submission. The average baseline hemoglobin was 10.5"1.08. Forty-five percent of patients had iron studies at baseline and of these patients 33% were within the NKF-K-DOQI recommended range. The average number of days to target hemoglobin was 105"71 days.
CONCLUSIONS: Variability exists among epoetin dosing and monitoring, and follow-up does not adhere to the NKF-K-DOQI guidelines resulting in delays in desired therapeutic outcomes. Based on the results of the first phase of the project, a protocol will be developed for use on all chronic kidney disease patients enrolled in the renal clinic.

Learning Objectives:

Describe the guidelines for epoetin therapy when treating anemia related to chronic renal insufficieny.

Identify monitoring parameters for the initiation and follow-up of epoetin therapy.

Self Assessment Questions:

According to the NKF-K-DOQI guidelines, what is the goal hemoglobin when treating anemia in patients with chronic renal insufficiency?

How should epoetin therapy be monitoried to ensure an adequate patient response?

PHARMACIST IMPACT ON PATIENT SERVICES IN THE EMERGENCY DEPARTMENT

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INTRODUCTION: Pharmacy practice has dramatically changed over the years. The practice of pharmacy has expanded to include determining optimal pharmacological therapy, preventing adverse drug reactions, educating patients on drug therapy and collaborating with both physicians and nursing in the management of chronic disease states. Since the development and recognition of specialty areas in the practice of pharmacy, there are an increasing number of demands placed on pharmacy. This holds true with many hospitals working towards the implementation of pharmaceutical services in their emergency departments.
OBJECTIVES: To gather interventions documented by a pharmacist in the emergency department and to evaluate the impact of the intervention with appropriate therapy, prevention of potential adverse interactions and the cost savings associated.
SETTING: A 320-bed hospital, university affiliated urban Level-I trauma center for adult patients in Detroit, MI with approximately 82,000 annual ED visits. ED pharmacy satellite operation hours are 24 hours/day 7 days/week.
METHODS: Prospectively collect interventions documented by pharmacists in the emergency department for a 4-month period and to extrapolate to a period of one year. Documented interventions will include; dosage adjustments, changes in route of administration, change to alternate drug therapies, change in therapy due to allergy, drug interactions, toxicology, compatibility issues, etc. Interventions will be documented and separated into 3 shifts (0700-14:59; 1500-2159; 2200-0659). Interventions made will have predetermined cost associated with type of intervention made. This cost will be reported as potential cost savings.
RESULTS: To be presented.

Learning Objectives:

Describe the pharmacologic areas of impact that an Emergency Medicine specialist can effect on a routine basis.

Explain how pharmacists can implement pharmaceutical care models in the Emergency Department.

Self Assessment Questions:

1. Which areas can be impacted on a regular basis in the ED?
a.Anticoagulation
b.Medication history
c.Antimicrobial surveillance
d.All of the above

What are optimal coverage schemes for a busy ED?

THE USE OF NESIRITIDE WITHIN 24 HOURS OF HOSPITALIZATION COMPARED TO STANDARD THERAPY IN ACUTE DECOMPENSATED HEART FAILURE

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Purpose: Congestive heart failure (CHF) is a common condition associated with significant morbidity and mortality. Intravenous vasodilators are the mainstay of treatment for acute decompensated CHF. Nesiritide improves hemodynamic and symptomatic effects through vasodilation, neurohormonal suppression, and enhanced natriuresis and diuresis. The safety and efficacy of nesiritide have been demonstrated in several randomized clinical trials. However, little data exists on outcome measures such as length of stay, cost effectiveness, and recidivism. The purpose of this study is to compare the use of nesiritide within 24 hours of admission and standard therapy in patients with acute decompensated CHF. The primary outcome is length of stay. Secondary outcomes include total cost, drug cost, in hospital events, thirty day readmission, and mortality. The hypothesis is that the use of nesiritide within 24 hours of hospital admission is not associated with a significant decrease in length of stay or cost savings compared to standard therapy.

Methods: This is a retrospective, multicenter, case-matched study. Patients were included if between 18-85 years old, had a history of NYHA Class II, III, or IV CHF, symptomatic, decompensated CHF, and a primary admitting diagnosis of CHF. Patients were excluded if nesiritide was given >24 hours from ED triage or on cardiac transplant list. The standard therapy group includes patients admitted to the hospital between January 1, 2000 and July 2002, before nesiritide was added to formulary. The nesiritide group includes patients admitted to the hospital between September 2002 and October 2003. Groups were case matched for age, race, gender, severity of CHF, and hospital. Data collection includes demographics; comorbidities; vital signs; ejection fraction; ED disposition; time until nesiritide administration; triage time; admission time; discharge time; hospital disposition; 30 day hospital readmissions; and death within 30 days of admission. Data collection is ongoing. Results will be presented at conference.

Learning Objectives:

Discuss the role of nesiritide in congestive heart failure.

Review proper administration and monitoring of CHF patients on nesiritide.

Self Assessment Questions:

The recommended dose of nesiritide is a 2 mcg/kg bolus followed by a 0.01 mcg/kg/min maintenance dose. T or F

Nesiritide works primarily by inhibiting the renin-angiotensin system. T or F

HEPATITIS C TREATMENT EFFICACY AT VA CHICAGO:A RETROSPECTIVE ANALYSIS

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Introduction:
Hepatitis C virus (HCV) is a leading cause of decompensated liver disease and hepatocellular carcinoma. Recent studies evaluating the pegylated interferons have shifted the standard of care from standard interferon in combination with ribavirin to pegylated interferon in combination with ribavirin. However, there is currently no direct comparison available between peginterferon a-2a in combination with ribavirin versus peginterferon a-2b in combination with ribavirin. Thus, the proposed analysis will set out to compare and contrast the two regimens in an effort to identify if either combination is more tolerable or effective.

Methods:
A retrospective analysis of patients treated with peginterferon a-2a and peginterferon a-2b in combination with ribivarin will be performed via computerized chart review. A computerized list of all patients on peginterferon a-2a and peginterferon a-2b from 1/01/00 to 12/31/03 will be generated from the outpatient pharmacy database. All retrospective data will be collected via the computerized electronic chart.

Data collection will include documentation of patient demographics, viral genotype, and co-morbidities. Analysis of duration of treatment and viral load at 12, 24, 48, and 72 weeks if appropriate will be performed. In addition, changes in body weight and biochemical markers (alanine transaminase) will also be documented. Lastly, the occasion of side effects including but not limited to blood dyscrasias, depression, flu-like, and gastrointestinal symptoms will be evaluated as well as needed interventions.

Conclusions:
Final conclusions regarding efficacy and tolerability between these two treatment regimens will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Compare and contrast efficacy rates between the combination of peginterferon a-2a/ribavirn and peginterferon a-2b/ribavirin.

Discuss any differences in tolerability between the two treatment regimens.

Self Assessment Questions:

(True or False) Treatment of Hepatitis C with the pegylated interferons is not equally effective in all genotypes?

(True or False) Treatment of Hepatitis C patients with pegylated interferon a-2a plus ribavirin is better tolerated than pegylated interferon a-2b in the Chicago VA population.

ENHANCING COST-EFFECTIVE AND CLINICALLY APPROPRIATE LINEZOLID USE

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Linezolid (Zyvox®) was the Food and Drug Administration's first approved member of the oxazolidinone class of antibacterials. It is indicated for gram-positive infections, most notably Vancomycin-Resistant Entercococcus faecium and E. faecalis (VRE) infections and nosocomial pneumonia, including methicillin-resistant Staphylococcus aureus (MRSA). Linezolid therapy has three distinct advantages: 1) an oral tablet with nearly 100 percent bioavailability, 2) coverage of both Enterococcus faecalis and faecium, and 3) no recommended dosage adjustments in renal insufficiency. Recently, literature reports VRE resistance to linezolid, presenting problems to practitioners since there are limited alternative therapy options.

Froedtert Hospital, a 400-bed tertiary care hospital, added linezolid to its formulary in 2000, with guidelines directed towards documented or suspected VRE or MRSA infections where vancomycin is contraindicated. Careful consideration needs to be used when prescribing linezolid because of its high cost and specific role to treat VRE and MRSA. Expenditures of linezolid have increased steadily since it was added to the hospital formulary. To evaluate why usage has increased, a concurrent medication use evaluation (MUE) is being compared to an MUE performed in 2000 in order to identify any problems with current prescribing of linezolid. The MUE evaluates appropriateness of the medication therapy and identifies infections needing other, more warranted antibiotic therapy. To date, more than thirty patients initiated on linezolid were monitored throughout their course of therapy, including clinical presentation, cultures and sensitivities, and ability to tolerate oral antibiotic therapy. Three problem areas have been identified, including inappropriate empiric use, inappropriate parenteral use, and inappropriate therapeutic use when other agents were not contraindicated.

This information will be used to identify areas for clinician education. The data will be presented to Froedtert Hospital's Antibiotic Subcommittee and Pharmacy and Therapeutics Committee for modification of existing hospital guidelines and ultimately, improvement in patient care.

Learning Objectives:

To review potential economic and therapeutic problems associated with overuse of linezolid.

To recognize opportunities to optimize empiric and therapeutic antibacterial therapy.

Self Assessment Questions:

What resistant pathogens is linezolid indicated to treat?

Name a therapeutic advantage linezolid has over vancomycin.

MEDICATION UTILIZATION AND EFFICACY FOR THE ACUTE TREATMENT OF MIGRAINE IN THE EMERGENCY DEPARTMENT

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Background: Migraines are a relatively common complaint in the US affecting about 17.2% of the adult female population and 6.0% of the adult male population. Approximately 2.7% of Emergency Department (ED) visits are attributed to a presenting complaint of headache. The International Headache Society (IHS) has different diagnostic criteria for migraine with and without aura including presence of nausea, vomiting, photophobia, phonophobia, pulsating quality and aggravation by routine physical activity. The goals of acute treatment of migraine are to safely and rapidly abort the migraine, eliminate the recurrence of the attacks, decrease use of acute treatment medication, and to improve quality of life in a cost effective way. Therapy should be individualized based on presence or absence of nausea, vomiting, comorbidities such as heart disease, and previous response to treatment. Migraine treatment may consist of migraine specific agents, such as triptans, or general symptomatic medication such as non-steroidal anti-inflammatory agents (NSAIDs). If NSAIDs fail or if the migraine is severe, migraine-specific agents such as the triptans, opioids, dihydroergotamine nasal spray, as well as dopamine-antagonist antiemetics should be considered. This study was designed to assess the utilization and efficacy of medication for the acute treatment of migraine in the emergency department at the University of Illinois.

Methods: A retrospective chart review of approximately 50 adult male and female subjects 18-50 years of age at the University of Illinois at Chicago treated in the emergency department with a final discharge diagnosis of migraine.

Results: The retrospective chart review is ongoing and results will be available at the final presentation.

Conclusions: The results of this study will objectively assess the utilization and efficacy of medication for the treatment of migraine in the emergency department at the University of Illinois.

Learning Objectives:

Assess the utilization of medication for the abortion of acute migraines in the emergency department.

Evaluate the efficacy of the medication that is being used in the emergency department.

Self Assessment Questions:

Non-steroidal anti-inflammatory drugs are used most frequently to abort migraine headaches in the emergency department at the University of Illinois. T or F?

Non-steroidal anti-inflammatory drugs are less efficacious at aborting acute migraine than migraine specific drugs, such as triptans, dihydroergotamine, or metoclopramide.
T or F?

EFFICACY AND TOXICITY ANALYSIS OF A CONTINUOUS RENAL REPLACEMENT THERAPY (CRRT) DOSING TABLE

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Background: Continuous renal replacement therapy (CRRT) is an established technique for the treatment of acute renal failure in critically ill patients. Due to the slower rate of fluid and solute removal, CRRT is more tolerable for patients who develop hypotension during conventional intermittent hemodialysis. Studies investigating the appropriate dosing of antimicrobials in patients receiving CRRT only include a limited number of drugs. These studies also have varying methodologies with respect to ultrafiltrate rate and mode used. To address these issues, an antimicrobial dosing table for patients on CRRT was developed at the University of Wisconsin Hospital and Clinics (UWHC) based on pharmacokinetic principles.

Purpose: To assess the efficacy and toxicity of the antibiotics dosed according to the table.

Methods: Patients in Trauma Life Support Center (TLC) at UWHC who undergo CRRT and who receive antibiotics are eligible for inclusion in the study. We will enroll all potential patients in TLC from December 2003 until April 2004. Since this is a descriptive study, there will be no control group in the study. Results will be reported as percentages of patients who have achieved a clinical and microbiological cure and the percentages of patients who have a toxicity that may be attributed to the antimicrobials used.

Data is currently being collected. If the table is found to work, it could be expanded to other classes of medications for better patient care in this critically ill population.

Learning Objectives:

To explain the indications of CRRT

To understand the importance of proper dosing of medications for patients on CRRT

Self Assessment Questions:

CRRT is used in non-ICU patients. T or F

CRRT is used in patients who develop hypotension during conventional intermittent hemodialysis due to its continuous and rapid removal of fluid and solute. T or F

EVALUATION OF POST-OPERATIVE NAUSEA AND VOMITING (PONV) AT A COMMUNITY HOSPITAL AND IMPLEMENTATION OF A TREATMENT PROTOCOL

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Statement of Purpose: To implement a rational protocol for prophylaxis and treatment of PONV and to assess its affect on treatment practices.

Introduction: The effective and predictable anti-emetic response of 5-HT3 blockers has resulted in increased utilization of these agents, necessitating a closer look at their efficacy and associated costs. Several comprehensive meta-analyses of prophylaxis and treatment for PONV have recently been published concluding that no single agent is effective for all cases of PONV. The most effective therapy consists of multiple agents with different mechanisms of action. Most patients have a low baseline risk for PONV, and do not warrant prophylactic treatment. Conversely, patients at high risk should receive adequate prophylaxis. Finally, patients who experience PONV should be treated with agents that they did not receive as prophylaxis.

Methods: A medication utilization evaluation was performed over a single designated collection period to determine the current trends in 5-HT3 blocker use. All adult patients receiving anti-emetics for PONV were included in the evaluation and were reviewed for appropriateness of dosing and therapeutic outcomes. In addition, other factors affecting PONV were evaluated (i.e. use of nitric oxide, sex of patient, prior history of PONV and type of surgery). A protocol designed to standardize and rationalize PONV treatment and prophylaxis was implemented and hospital staff educated regarding effective PONV treatment. A second medication use evaluation is planned to assess changes in practice and protocol use.

Results: Preliminary analysis of the initial chart review shows that ondansetron is the most common drug used for prophylaxis of PONV. Patients with minimal risk factors regularly receive ondansetron prophylaxis. This may be due to conservative practice. Alternatively, the physician may take into account real or perceived risk factors not captured in this analysis. Final conclusions will be presented.

Learning Objectives:

Explain the basic principles of effective prophylaxis and treatment of post-operative nausea and vomiting

Describe the process of implementing a cost-effective and rational PONV treatment protocol at a community hospital

Self Assessment Questions:

True or False: 5-HT3 blockers are always effective for prophylaxis of PONV.

True or False: If properly treated, all cases of PONV are preventable.

SURGICAL INFECTION PROPHYLAXIS IN HYSTERECTOMIES: A PROCESS IMPROVEMENT INITIATIVE

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According to the National Nosocomial Surveillance system, surgical infections are the third most frequently reported nosocomial infection. Forty to sixty percent of these infections are preventable with the appropriate use of antibiotics. Effective post-operative infection prevention can be achieved by:

1. Giving prophylactic antibiotics consistent with published guidelines
2. Initiating prophylactic antibiotics within 1 hour prior to incision
3. Discontinuing prophylactic antibiotics within 24 hours after surgery

The purpose of this study is to recognize inappropriate practices in surgical infection prophylaxis. Once recognized, processes will be initiated, and/or improved, in order to comply with national guidelines and to reduce the frequency of surgical infections.

Medical charts for all patients who underwent surgical procedures between January and June 2003 were reviewed. It was identified that patients with abdominal and vaginal hysterectomies were not being adequately prophylaxed. Working with the OB/GYN medical group, consensus in antibiotic selection, timing of administration, and post-op continuation was achieved in the form of standing orders. New guidelines were established and implemented. Results of this improvement project will be presented.

Learning Objectives:

Identify 3 important considerations to ensure optimal surgical infection prophylaxis.

Describe a method to improve compliance with national surgical infection prophylaxis guidelines

Self Assessment Questions:

T or F To be sure of decreasing the risk of infection, antibiotics should be started 48 hours before the first incision.

T or F Antibiotics should be continued for 2 days post-op to be sure to prevent infections.

NO MORE SICKNESS: STANDARDIZING INPATIENT ANTIEMETIC USE

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Patterns of antiemetic use in a 221-bed, non-teaching community hospital were studied retrospectively during a 3-month period for indications other than post-operative and chemotherapy-induced nausea & vomiting prophylaxis. Patient data was collected from electronic medical records and charts, and compiled in a comprehensive database. Patients with documented antiemetic use prior to, during, or immediately after a surgical procedure, as well as patients with cancer as the underlying diagnosis, were excluded from the analysis. Data was analyzed with regards to contributory diagnoses, documented incidence of nausea and vomiting, and quantity and type of agents used. Clinical trials involving antiemetics for gastrointestinal disturbances, diabetes, chronic renal failure, sepsis, MI, migraine, and pregnancy, as well as cost-effectiveness data, was reviewed and applied to guideline development for antiemetic utilization in our institution for non-postoperative, non-chemotherapy situations. These recommendations were presented to physicians during committee meetings, CMEs and distrubuted to mailboxes. Subsequently, data will be collected to evaluate the adherence to the protocol and suggestions for continuous process improvement.

Results: A total of 514 patients had received doses of Phenergan, Reglan, Tigan or Zofran. Most common indications consisted of diabetes, sepsis, and gastrointestinal disorders. Phenergan was often co-administered with opioids as adjunct antiemetic, and 84% of Zofran doses were given inappropriately, increasing the cost of therapy. Out of 4 medications, only Reglan utilization was consistent with recommendations obtained from literature. Implementation of antiemetic guidelines restricting the off-label use of Zofran to hyperemesis gravidarum, sepsis, and uremia will be monitored prospectively and results will be available at a later date.

Conclusions: Zofran is not cost-effective and should be avoided in patients with uncomplicated nausea and vomiting. Stratification of therapy based on evidence-based medicine is expected to improve therapeutic outcomes, decrease patient's length of stay, and promote awareness of cost-effective strategies to treat general medicine patients with nausea and vomiting.

Learning Objectives:

To understand the physiology of nausea and vomiting and receptor-specific actions of different antiemetics

To apply characteristics of antiemetics towards therapy decisions based upon contributory diagnoses

Self Assessment Questions:

Phenergan should be avoided in children due to increased incidence of side effects. T F

Zofran use should be reserved only for patients with postoperative, chemotherapy-induced nausea and vomiting, as well as patients with hyperemesis gravidarum, uremia, and sepsis. T F

CONTINUOUS INTERSTITIAL GLUCOSE MONITORING IN THE CRITICALLY ILL

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Background: Hyperglycemia is a common manifestation in critically ill patients. The benefits of intensive glycemic control (80 - 110 mg/dL) have been well established in this patient population. In order to achieve tight glucose control using intensive insulin therapy there is an inevitable increase in the risk of hypoglycemic events, which necessitates more frequent glucose monitoring. Continuous interstitial glucose monitoring (CIGM) has proven to be very beneficial in many ambulatory populations in order to identify fluctuations in glucose that may have otherwise gone unnoticed. Despite its use in the ambulatory population the literature on the use of interstitial glucose monitoring in the critically ill is limited.

Objectives: The purpose of this prospective observational study is to evaluate the accuracy and test-retest ability of interstitial glucose monitoring compared with capillary blood glucose measurements in critically ill patients. Secondary endpoints include the mean absolute difference in glucose measurements, agreement in glycemic control target categorization, Bland-Altman estimates and evaluation of the efficacy of the current intensive insulin drip protocol.

Methods: Patients who meet the inclusion and exclusion criteria are enrolled in the study after informed consent is obtained. The continuous interstitial glucose monitor is inserted into the abdominal wall for 72 hours of data collection while the patient is on an intensive insulin drip protocol. At least four times a day the obtained finger stick glucose values from the routine monitoring will be entered into the device monitor for calibration. A sample size of twenty patients has been determined to adequately power the study.

Results: At completion of the study the data will be analyzed. If a strong correlation, with consistently small bias, can be shown between CIGM and intermittent capillary blood glucose levels in critically ill patients, CIGM has the potential to become an important adjunct in this setting.

Learning Objectives:

Describe the impact of intensive glycemic control in critically ill patients.

Discuss the potential role of continuous interstitial glucose monitoring in critically ill patients.

Self Assessment Questions:

In the Van den Berghe trial the use of intensive insulin therapy decreased morbidity and mortality among critically ill patients. True or False

Interstitial glucose monitoring is accomplished by measuring the amount of glucose oxidation in the interstitial fluid and converting it to an electrical current, the strength of which is proportional to the amount of glucose present. True or False

REDUCTION OF EXTEMPORANEOUSLY PREPARED PRODUCTS

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The Department of Pharmacy at Riverside Methodist Hospital has prided itself in the effort to provide the maximum number of oral medications in a ready-to-use unit dose package. This minimizes the opportunity for error when dispensing and administering medications. We have a designated extemporaneous section in the main pharmacy where we repackage nonformulary medications, partial-dose tablets, and unit-of-use oral syringes for both adults and neonates. The old process was to repackage the first dose of medications when they are ordered and all projected doses would be packaged on a daily basis by the designated extemporaneous technician . The goal of this project is to reduce the number of extemporaneously prepared medications by 50%. The new process is designed to maximize our efficiency at preparing extemporaneous medications by enhancing the workflow of our technical staff.

When an order is entered into our pharmacy computer system for a nonformulary medication, partial-dose tablet, or oral syringe, the pharmacist categorizes the product as an extemporaneous medication. The label is generated with a symbol that alerts the technician that the product must be manually prepared. This immediate preparation requires a technician to stop their current activities and repackage the ordered dose in a sealed pouch with the correct identification information.

I have implemented the following procedures to improve our processes: the entire bottle of nonformulary medications are packaged in unit dose packages, the most commonly prescribed partial dosages of tablets are packaged in bulk quantities and placed on the shelf with the regular inventory, and only the desired number of doses are prepared for oral liquid medications at the time of dispensing.

I have minimized the different number of locations that medications are stored, substantially reduced the number of extemporaneous medications that require immediate preparation, and reorganized the inventory to reduce the possibility of dispensing the wrong dosage.

Learning Objectives:

The audience will learn the steps for improving process workflow projects.

The audience will learn specific techniques to improve the accuracy at which oral medications are dispensed.

Self Assessment Questions:

Nonformulary medications should not be included when evaluating process workflow by pharmacy personnel because they are so infrequently prescribed. T or F

In order to maximize the efficiency of the workforce, batching routinely dispensed products should always be performed. T or F

THE EVALUATION OF JNC VII ADHERENCE IN AN INTERDISCIPLINARY OUTPATIENT SETTING

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PURPOSE: To assess an outpatient interdisciplinary clinic's hypertension management and its adherence to JNC VII guidelines via a retrospective quality assurance analysis.

METHODS: Patients were first identified via ICD-9 codes (401.X) for hypertension. In addition to a hypertension diagnosis by the clinic's primary care physician (PCP), he/she must have been seen by the PCP since the implementation of JNC VII (05/14/03). Exclusion criteria include pregnancy, age less than 18 years, and/or if the patient is primarily managed by Nephrology at any surrounding medical centers. Medical charts were physically pulled on site and were reviewed in detail by the principal and/or co-investigators using JNC VII criteria. If the patient was not at goal, documented interventions (i.e. R.Ph. consult, smoking cessation, nutrition/exercise consult) were noted. Once data collection is complete, percentage of patients both at goal and not at goal will be presented to the clinic's healthcare team. Secondary discussions will involve interventions currently being implemented and also those in need of reinforcement.

RESULTS: After inclusion and exclusion criteria were applied, 75 charts were pulled for review. Currently, data collection is still in progress. Results are pending.

CONCLUSION: Besides providing feedback regarding how well the healthcare team is managing the clinic's primary care hypertensive population, the project will also highlight the importance of intraprofessional communication and involvement. Overall, the project was performed to increase awareness regarding specifics of JNC VII and interventions, which when implemented reinforce optimal hypertension management.

Learning Objectives:

Identify the pharmacist's role regarding hypertension management in various community/ambulatory settings.

Discuss key interventions needed to optimize hypertension management in various populations.

Self Assessment Questions:

What is the blood pressure goal for the diabetic population? _____

The Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) concluded the use of which antihypertensive class greatly prevented the cardiovascular complications associated with hypertension? _____