

* Denotes Encore Poster

Clinical Pharmacy Services

Initiating culture callback in emergency department by clinical pharmacy services

Clark LM, Farley KM

Samaritan Hospital- Department of Pharmacy, Troy NY 12180

Service: It is standard practice in the Emergency Department (ED) for all positive culture reports to be reviewed daily and make sure appropriate treatment has been rendered. Pharmacy reviews outpatient antibiotics for their appropriateness through further investigation of the prescribed antibiotics susceptibility and known penetration. If deemed inappropriate, a recommendation is provided to the ED physician assistant for therapy intervention and patient follow-up.

Justification/Documentation: With implementation of pharmacy as the lead role, pharmacy will verify the patient was placed on the correct antibiotic based on the results of the culture and sensitivity. Pharmacy will provide the physician assistants with an appropriate antibiotic with proper dose, frequency and duration based on all patient factors. A pharmacy specific clinical intervention will then be input to document pharmacy interventions.

Adaptability: This service can be adapted to fit the needs of any emergency department whose physician assistants could benefit from a collaboration with pharmacy. The assessment of cultures for antibiotic appropriateness is necessary in preventing antibiotic resistance and proper patient treatment.

Significance: With pharmacy assuming the responsibility of assessing positive cultures in the ED, the physician assistants will have more time to see patients. Pharmacy also readily utilizes clinical knowledge and resources due to their specialized training in antibiotics and their mechanisms of action. This will enhance services provided in the ED, reduce the risk of multidrug-resistant organism infections and further strengthen the relationship between pharmacy and other healthcare professionals of the ED.

Enhanced recovery after surgery (ERAS) for colorectal surgery decreases opioid use postoperatively

DeMari, SR , Bulmer K, Farley KM

Samaritan Hospital- Department of Pharmacy, Troy, NY 12180

Service: One of the many benefits of initiating an ERAS protocol for colorectal surgery patients is the decreased use of opioids used to treat acute pain postoperatively. Although this protocol is very involved, the aspect of interest of ERAS for this service is the use of lidocaine and other non-opioid analgesics. This quality initiative service aims to assess how effective ERAS is in reducing patient need for opioids through the use of preemptive and multimodal analgesia with systemic lidocaine and other non-opioid analgesics. A retrospective review of patient charts was approved by the institutional review board.

Justification: Prescription opioids are often used to treat pain, however, the necessity of opioids following colorectal surgery is in question. In addition, patients are sent home on prescription opioids even when not administered postoperatively during hospital stays. Use of the ERAS protocol is justified for these reasons and furthermore this will help mitigate the overprescribing of opioids where they are not always necessary.

Adaptability: The implementation and results of the ERAS protocol has been extensively studied with colorectal patients, therefore allowing it to be available to hospitals everywhere. While the information is readily available, implementation will require buy-in from multiple different departments, including pharmacy. Despite the massive effort it requires to start, the results seen are quite beneficial to patients.

Significance: The use of ERAS is an opportunity to help mitigate the current opioid epidemic that our society faces by utilizing a multimodal analgesic approach. Learning how to successfully treat acute pain postoperatively without use of opioids is a major achievement; one where the inclusion of pharmacy is integral to the success of the program. This success can also extend to pharmacy regarding the unlikely need for prescription opioids upon discharge.

Evaluating appropriate prescribing of fluoroquinolone antibiotics in two acute community care hospitals

LaPlante R, Bennett J, Farley KM

Samaritan Hospital- Department of Pharmacy, Troy, NY 12180

Service/Program: The quality improvement program initiated at Samaritan and Albany Memorial Hospital was to improve fluoroquinolone prescribing through assessing prescribing prior to and following provider education on appropriate prescribing. The program provided clinical decision support system alerts and clinical antibiotic stewardship rounds for fluoroquinolones warnings and risks. The specific goal was to limit fluoroquinolone use in patients with hypertension, age ≥ 65 , vascular disease, or a history of an aortic aneurysm.

Justification/Documentation: Fluoroquinolone antibiotics have fallen out of favor for reasons including antibiotic resistance, tendon rupture, QT prolongation, blood glucose fluctuations, and aortic dissection. With risks surrounding usage, a prospective audit should be completed weighing the risks versus benefits of therapy. Retrospective data was reviewed from January 2019 to June 2019 before the addition of the alert and the review of fluoroquinolones on infectious disease rounds. Following the retrospective data, clinical support was added focusing on appropriate prescribing practices including indications, appropriate patients, and alternative therapies. Data was reviewed from July 2019 to December 2019, after implementation, to see if these supports decreased inappropriate fluoroquinolone prescribing. Data collected and analyzed in both cohorts included days of therapy per 1000 patient days at risk, indication, provider specialty, number of stewardship interventions targeting fluoroquinolones, and their acceptance rate.

Adaptability: These warnings provoked St. Peter's Health Partners IRB to approve clinical pharmacy research for fluoroquinolone usage which could be transitioned to another institutional setting. Through this implementation, the institution will be more appropriately prescribing fluoroquinolones to the patient population studied through clinical pharmacist and provider communication and interventions.

Significance: This program further integrated the institution's infectious disease clinical pharmacist into the stewardship team to advance patient care when prescribing fluoroquinolones. This ensured quality care in specific patient populations. With the addition of the clinical decision support system, the pharmacy department will further reach providers on appropriately prescribing fluoroquinolones.

Evaluating efficacy of fixed dose four-factor prothrombin complex concentrate in emergent vitamin K antagonist associated bleeding

Melero BL, Farley KM

Samaritan Hospital Department of Pharmacy, Troy, NY 12180

Service: An unfortunate adverse effect of anticoagulation is excessive bleeding. Often, these patients present to the Emergency Department (ED) and require immediate reversal treatment. The standard of reversal for acute major bleeds in the ED is Four-factor Prothrombin Complex Concentrate (4F-PCC). Due to a short-term product release, a shortage of 4F-PCC deterred the use of weight-based dosing and forced the study of fixed 4F-PCC dosing. Samaritan Hospital has initiated a 1,500 IU fixed dose of 4F-PCC protocol, leading to the opportunity to review the efficacy and safety of fixed-dose 4F-PCC compared to weight-based dosing. A retrospective review of medical records to determine if the fixed-dose protocol of 1,500 IU is efficacious in emergent anticoagulation associated bleeding was approved by the Institutional Review Board.

Justification: 4F-PCC has been the treatment option of choice when treating anticoagulant associated bleeding. Due to shortage, it is important to limit the number of units used but maintain the efficacy of bleeding reversal. This quality improvement project evaluated the use of a fixed 1,500 IU dose of 4F-PCC in patients with warfarin associated bleeding over a one-year time frame. The patients' INR pre-4F-PCC and INR post-4F-PCC dose were evaluated for efficacy.

Adaptability: Fixed dosing of 4F-PCC has shown to effectively lower INR in warfarin associated bleeding compared with weight-based dosing. Implementation of a fixed 1,500 IU dose can reduce medication supply use in hospitals and ensure appropriate treatment efficacy. A standardized order of a fixed-dose can be implemented according to a hospital's electronic medical record for providers to initiate.

Significance: This program requires the collaboration of ED providers and clinical pharmacists to ensure patients with warfarin associated bleeding receive effective bleeding reversal when prescribed 4F-PCC. Fixed-dose 4F-PCC has been shown to be effective when compared to weight-based dosing and will help to maintain medication supply.

Pharmacist-led multidisciplinary approach to opioid tapering in a large private rheumatology*

Miller M, Hennig K, Farrell J

Albany College of Pharmacy and Health Sciences

Service/Program: With the evolution of disease modifying anti-rheumatic drugs and targeted medications, the need for opioids in the treatment of rheumatic diseases has significantly decreased. Current guidelines suggest considering opioid tapering in patients with chronic noncancer pain on ≥ 90 mg morphine equivalent dose daily; however, limited evidence-based guidelines on opioid tapering exist. The program aims to 1) identify provider perspective and baseline knowledge on opioid tapering, 2) provide education and support to practice-wide procedures and protocols related to chronic opioid therapy and opioid tapering, and 3) provide evidence of improved patient outcomes when a pharmacist is part of the multidisciplinary team in a rheumatology practice.

Justification/Documentation: A baseline survey was administered to rheumatologists in a private practice to characterize current practices and perspectives including the number of patients on opioids, barriers to opioid tapering, level of comfort in management of opioids or opioid tapering, current practices for assessment of pain or risks associated with opioid therapy, and level of interest in education on opioid tapering.

Adaptability: All providers (n=10) reported having patients on chronic opioids and 70% of providers felt they had one or more patients that would benefit from opioid tapering. The reported barriers to opioid tapering included time, comfort, and lack of confidence in managing withdrawal symptoms. Eighty percent of providers rated their comfort level a 5 or lower in tapering or discontinuing an opioid, on a scale of zero to ten, with zero being not comfortable at all and ten being very comfortable. Most providers (n=9) stated they were hesitant or very hesitant in developing an opioid tapering plan.

Significance: Despite the small sample size of this survey, the results show there is an opportunity for pharmacists to play an essential role as part of a team-based approach to opioid tapering or discontinuation.

Evaluating the use of IV lidocaine for renal colic in the emergency department (ED)

Reynolds IE, Farley KM

Samaritan Hospital Department of Pharmacy, Troy, NY 12180

Service: Managing pain in the emergency setting has become more complex given we are in the midst of an opioid crisis. Overuse of opioids has led to dependence and death rates that continue to rise. Trinity Health has adopted the Alternatives to Opioid Use in Emergency Care (ALTO) guidelines to treat common causes of ED visits using non-opioid options. The ALTO pathway for renal colic includes using lidocaine, ketorolac, IV fluids and/or acetaminophen as first line treatment. A retrospective review of patient charts was approved by the institutional review board.

Justification: The ED is the frontline in decreasing opioid dependence. It is important to assess new initiatives for adherence and effectiveness after implementation. This quality improvement project reviewed IV lidocaine orders for patients with renal colic over a one-year period. ED clinical pharmacy services evaluated if the ALTO pathway was followed and whether patients received opioids either in conjunction with IV lidocaine or as rescue analgesia. Concomitant use of acetaminophen, ketorolac and IV fluids was also assessed to determine complete pathway use.

Adaptability: Use of the ALTO guidelines can easily be adopted and implemented in any ED. Decreasing the use of opioids for acute pain has become an important initiative in emergency departments across the country. All medications are easily available and already utilized by most providers. Depending on each site's electronic health record, this pathway can be set up for providers to order.

Significance: Assessment of the efficacy and appropriateness of medication pathways instituted through the collaboration of pharmacy and the ED will help to advance clinical pharmacy practice and improve patient care. Providers will be held accountable to their department's goals through assessment of adherence to protocols. Reviewing pathway usage will allow providers to decrease opioid use and access. Evaluation of pathway utilization is necessary to ensure the best patient outcomes.

Original Research

Improving the process to timely administration of inpatient chemotherapy

Chin J, Asuncion A

NYU Winthrop Hospital

Background: A new NYU Winthrop Hospital's inpatient hematology-oncology team, assembled in September 2017, cares for patients with cancer consisting of oncology providers, pharmacists, and nurses. Intended goals include improving patient care, performing quality improvement projects, and reporting to medication safety meetings. The team found a median time of 10 hours from a patient's admission to chemotherapy administration. This quality improvement was performed to eliminate waste and improve patient care and satisfaction.

Objective: To reduce the time from admission to chemotherapy administration by 25% within 10 months.

Methods: This project was approved by the institutional review board. The inpatient hematology-oncology team developed a process map to identify areas of delays and identify key roles outside of the service to create interventions for the plan-do-study-act (PDSA) cycles. Key roles included provider ordering, admitting/bed board, and nursing assistants. After the first 3 PDSA cycles, a survey was conducted to develop an optimized flow providing time goals for each step of the value stream map.

Results: The retrospective baseline data showed 10 hours from admission to chemotherapy administration. The first intervention engaged bed-board in our weekly emails indicating planned admissions. Bed-board would respond if necessary, paperwork was missing. The pharmacist educated attending physicians and fellows about the requirements to order inpatient chemotherapy. The median time to chemotherapy was reduced to 5.5 hours. In the second intervention, the pharmacist collaborated with admitting residents about required admitting orders. In the third intervention, the pharmacist educated nursing assistants to submit heights/weights within 30 minutes of patient arrival for chemotherapy orders. These interventions sustained the time to chemotherapy at 5.5 hours.

Conclusions: interdisciplinary team collaboration led to the successes. A process map highlighted key steps and identified personnel. Time goals achieved and sustained a 55% reduction in time to chemotherapy administration (from 10 hours) to optimized communication and improve patient care/satisfaction.

***Development of a novel educational tool to promote antimicrobial stewardship on a college campus* Acosta C, Ni G, Lee Y, Bradley N
St. John's University (Jamaica, NY)***

Introduction: Antibiotic resistance persists as a growing threat to public health. A previous survey conducted at St. John's University revealed a knowledge deficit and inappropriate perception of proper antibiotic use among college students.

Objective: The objective of this study is to develop a novel peer educational tool to promote antimicrobial stewardship among college students.

Methods: A taskforce, consisting of two infectious diseases faculty members and two pharmacy students, established teaching objectives and developed an educational tool and protocol to teach antimicrobial stewardship at a university wellness fair. IRB approval was granted. APPE students served as peer educators. A training session explained the goals of the tool and protocol. Peer educators completed an anonymous survey to assess their experience. Four questions utilized a 5-point Likert scale. The fifth question was open-ended. Collected data was analyzed using descriptive statistics.

Results: An origami fortune teller was created as the tool to facilitate peer-to-peer education. Baseline comfort levels for the peer educators were 3.25/5, on a Likert scale with 1=not comfortable and 5=very comfortable. After training, this average increased to 5/5. The peer educators viewed training as 5/5, with 1=not adequate and 5=very adequate. Peer educators found the tool's ease of use to be 4.5/5, with 1=not easy and 5=very easy. When asked about the tool's reception by participants, peer-educators rated it at 4.5/5, with 1=not well received and 5=very well received.

Conclusion: The origami fortune teller provided a visual, interactive, and nostalgic means for peer educators to teach through situational learning and guided discussion. The utility of our tool stems from "learning by doing" by providing patient cases to work up. This novel educational tool may be used for future peer education events on antibiotic stewardship, such as the promotion of immunizations.

Intravenous iron sucrose appropriateness based on a hospital guidance document

Ciriello D, Seyse S

Kaleida Health/Buffalo General Medical Center

Introduction/Background: A yearly review process is conducted by the request of the Pharmacy and Therapeutics committee of selected restricted medications, including intravenous (IV) iron. An IV iron guidance document was approved through the committee in March of 2018 to limit inappropriate use. The guidance document includes two algorithms to determine appropriateness of use. One algorithm is for patients with chronic kidney disease (CKD), while the other is for patients with normal renal function. IV iron is not only costly, but inappropriate use can increase the risk for iron overload, hypotension and other adverse reactions.

Objective: The primary objective was to assess the appropriateness of IV iron based on the approved guidance document.

Methods: A medication administration report was generated which identified all patients who received IV iron from July 1, 2019 to September 30, 2019. History of chronic kidney disease, iron studies, and transfusion requirements were used to determine appropriateness based on the specified algorithm. Descriptive statistics were used to describe the results.

Results: During July 1, 2019 to September 30, 2019, 102 patients received IV iron. Thirty-seven had CKD. Use was appropriate in 33 patients (89.2%) based on the algorithm. Nine of the 37 patients (24.3%) were on hemodialysis and 15 patients (40.5%) received epoetin alfa. Sixty-five patients did not have CKD. Use was appropriate in 43 patients (66.2%). Appropriateness was unclear for nine patients due to a lack of iron studies. Use was inappropriate in 17 patients because they had received packed red blood cell transfusions (PRBCs) within 72 hours prior to administration of IV iron.

Conclusions: IV iron was used more appropriately in patients with CKD than in patients without CKD (89.2% vs. 66.2%, respectively). Education to pharmacists to recommend iron studies and limiting use in patients who received PRBCs within 72 hours can increase appropriateness in patients without CKD.

Assessing the impact of the meningitis/encephalitis diagnostic panel on antimicrobial stewardship

***Doan TL, Garellek J, Varghese S, Rasul R, Schwartz R, Donaghy H
Northwell Health System - Long Island Jewish Medical Center***

Introduction/Objective: The multiplex polymerase chain reaction (PCR) test for meningitis/encephalitis (ME) is an assay that is available to detect 14 organisms in 2 hours from the cerebral spinal fluid. The primary objective of this study was to assess the clinical impact of this assay on antimicrobial stewardship.

Methods: This is an IRB-approved, retrospective cohort study of a random sample of patients admitted between 7/2015 - 12/2018, stratified by season. A chart review was performed. Information collected included: demographics, microbiology and treatment data, adverse events, length of stay, hospital readmissions, and mortality. Appropriate statistical analysis was performed.

Results: The study included 242 patients, of whom 67% had ME PCR testing performed. The etiology of meningitis was greater in the PCR compared to the non-PCR group (10.5% vs. 2.5% in PCR and non-PCR respectively). Time to de-escalation of therapy was shorter in the PCR period compared to the standard period (median 8 vs. 26 hours, $P < 0.001$). Total days of therapy was longer among the PCR group, but not statistically significant (median = 4 vs. 2, $P = \text{NS}$). Median length of stay was higher in the PCR period (median: 9 vs. 5.5, $P < 0.001$). Readmission rates did not differ (PCR 14.2% vs. non-PCR 16.3%, $P = \text{NS}$). Mortality rates were not statistically significant (8.6% vs. 3.8%, $P = \text{NS}$).

Conclusion: The ME PCR was associated with an earlier time to de-escalation of antibiotics. The PCR group had more days of therapy and longer length of stay, but this is likely due to a higher rate pathogen diagnosis. There was no association in readmissions. Although the study had a small sample size, this demonstrates that the ME PCR has the potential to improve patient outcomes and may help antimicrobial stewardship by shortening the time to de-escalating antimicrobials and offering more appropriate targeted therapy.

Evaluation of utilization of a sedation protocol in mechanically ventilated patients within a community hospital intensive care unit

Gregoire K, Zammit K, Zack B

Buffalo General Medical Center

Introduction: Utilization of a nurse driven protocol has been demonstrated to achieve appropriate sedation targets in mechanically ventilated patients. The Richmond Agitation-Sedation Score (RASS) is a validated assessment of sedation depth and should be incorporated into sedation protocols to achieved proper levels of sedation.

Objective: The primary objective was to compare compliance of nursing driven targeted sedation utilizing RASS to achieve the desired level of sedation. Secondary objectives included appropriate use of the institution's ICU sedation order-set, time on mechanical ventilation, and choice of sedation medications.

Methods: This is a single-center, retrospective medication use evaluation within a community hospital ICU. Education on the institution's ICU sedation policy with an emphasis on the proper use of sedation targets was completed throughout July 2019. Documented RASS goals were compared to prescribed RASS goals for the 3 months prior to and after policy education was completed. Patients admitted to the medical or surgical ICU on mechanical ventilation where a RASS goal was ordered were included. Patients on neuromuscular blockers, diagnosed dementia, or admitted for alcohol withdrawal were excluded. This study was approved by the hospital's Pharmacy and Therapeutics Committee. Descriptive statistics were used to interpret results.

Results: Sixty-eight patients were included; 36 between April-June 2019 and 32 between August-November 2019. The mean RASS goal achieved within the first 48 hours did not differ between April-June and August-November (33% vs 31% respectively, $P = 0.395$). After education, the utilization of the sedation order set increased, however this was not statistically significant (33% from April-June vs 47% from August-November, $P = 0.157$). There was no difference in time on mechanical ventilation or choice of sedation.

Conclusion: Education alone was not effective for appropriate sedation management practices. Additional support such as pharmacist involvement may help achieve sedation targets for mechanically ventilated patients.

Comprehensive transition of care education program to improve medication adherence and compliance following orthopedic surgery*

Kasbekar R, Cronin MA, Dengler N, Krauss E, Segal A

St. John's University, Northwell Health Syosset Hospital

Introduction/Objective: The purpose of this study is to assess patients' utilization of discharge educational tools after orthopedic surgery. Following total hip and knee replacement, patients are provided with a Transition of Care booklet and medication calendar. Polymedication and greater dosing frequency can negatively impact a patient's use of therapy. It is imperative for patients to receive comprehensive education of medications prescribed to ensure that patients are adherent and compliant after orthopedic surgery.

Methods: Patients aged 18 and older undergoing total hip or knee replacement at Syosset Hospital in the past 6 weeks were contacted postoperatively via phone. All patients watched a Transition of Care video and were given a Transition of Care booklet and medication calendar. Patients were asked if they read the booklet, used the calendar, how often they used the calendar, if the calendar was easy to use, and if they found the calendar and booklet beneficial. Subgroup analyses such as gender, age, discharge disposition, and type of surgery were performed to identify any significant adherence patterns.

Results: The study group included 62 patients while 69% were knee replacement patients and 31% were hip replacements. Sixty-six percent were discharged home while 34% were discharged to subacute rehabilitation. Forty-seven percent read the Transition of Care booklet, and 87% used the medication calendar. Of the patients who went directly home, 98% used the calendar. Fifty-two patients found the calendar easy to use, and 38 patients used the calendar every day.

Conclusions: This retrospective study was conducted to evaluate the utilization of Transition of Care materials after postoperative surgery. Overall, 87% of study patients used the calendar to guide medication management. Of those discharged directly home, 98% used the calendar and considered the calendar a useful tool. Patient counseling is important upon discharge to prevent discrepancies in regimen and prevent further hospital readmissions.

A retrospective review of the effect of metformin in metastatic prostate cancer*

Lam SY, Lee CS, Liu W, Sison C, Zhu X

Monter Cancer Center, Northwell Health; St. John's University

Background: Prostate cancer is the third most common cancer in the United States in 2019. Current treatments of metastatic prostate cancer are mainly hormone therapy and chemotherapy. The anticancer potential of metformin on metastatic prostate cancer remains obscure.

Objective: In this study, we aim to investigate the significance of patients with prostate cancer taking metformin in addition to their current treatment.

Methods: An IRB approved retrospective review of metastatic prostate cancer patients between 2014 and 2017 at the Monter Cancer Center, Northwell Health was conducted. Patients were categorized into either metastatic castration resistant prostate cancer (mCRPC) or hormone- sensitive prostate cancer (mHSPC). Within both of these groups, patients were further stratified to those who received metformin versus those who did not. Radiological progression free survival (PFS) was evaluated based on PCWG3 and RECIST criteria. 6-month PSA response and overall survival (OS) were also evaluated in this study.

Results: A total of 281 subjects with a minimum of 3 months follow-up were included for analysis. Patients were known to have either mHSPC (n=205, 73.2%) or mCRPC (n=75, 26.8%) and taking metformin (n=66, 23.5%) or not (n=215, 76.5%). Among those with a recorded 6-month PSA response, 70.4% (38/54) had a response in the metformin group and 72.9% (140/192) had a response in the non-metformin group. Overall median progression-free survival was estimated to be 17 months. There was no significant difference in PFS between metformin groups (16.6 vs. 17.3; p<0.88). Median overall survival was estimated to be 81.5 months. There was a significant difference in survival time between metformin groups (148.5 vs. 69.4; p<0.02).

Conclusions: No significant differences were found in 6-month PSA response or PFS; however, there was a significant difference in OS amongst patient who were in the metformin group and those who were not.

Review of peripheral administration of hypertonic saline
Lewandowski E,
Buffalo General Medical Center

Introduction: Sodium chloride 3% has been traditionally administered via a central venous line because of perceived risk of infiltration and tissue injury due to its high osmolarity. However, patients requiring 3% NaCl often require timely administration, predominantly for reduction of elevated intracranial pressure. Kaleida Health's Pharmacy and Therapeutics Committee approved peripheral administration of sodium chloride 3% in December 2017, with a maximum duration of 72 hours. This policy was approved with the contingency of periodic assessment for incidence of adverse events. There are currently no large trials assessing the safety of this practice.

Objective: The primary objective is to determine the incidence of adverse events from administering sodium chloride 3% peripherally.

Methods: This retrospective chart review was approved by Kaleida Health's Pharmacy and Therapeutics Committee. A query of medical records was generated to identify all patients who received 3% NaCl from December 2017 to October 2019, for a sample of 150 orders. Data was collected on: type of line access, protocol compliance, and adverse reaction. There were no exclusion criteria. Analysis was conducted utilizing descriptive statistics.

Results: After identifying and reviewing 150 orders between the prespecified dates, 80 were of unique patients administered 3% NaCl. Majority of patients had a central line placed on initiation of infusion, as only 30 patients (37.5%) had peripheral access. Patients with only peripheral access had 1 (3%) adverse reaction noted, which consistent with infiltration.

Conclusion: Although the institution now allows for peripheral administration of sodium chloride 3%, providers at Kaleida Health appear to preferentially place central lines prior to initiation. Of those administered 3% NaCl peripherally, adverse reaction rates are low and of low clinical impact. Though larger, prospective studies are required to more definitively determine the safety of peripheral administration of 3% NaCl, it is reasonable to continue this practice.

Medication use evaluation of tigecycline at a public teaching safety net hospital

Thomas J, Dejesus K, Lee Y, Kim J

St. John's University College of Pharmacy and Health Sciences

Background: Regardless of its broad spectrum activity against extended-spectrum beta-lactamases (ESBLs), Acinetobacter, methicillin resistant Staphylococcus aureus (MRSA), and vancomycin resistant Enterococcus (VRE), tigecycline is a last line antibiotic due to the Food and Drug Administration (FDA) warnings for increased mortality. At Nassau University Medical Center (NUMC), tigecycline is a tier 1 restricted antibiotic requiring infectious disease (ID) approval at all times.

Objectives: In response to loosen tigecycline restrictions to allow for intensive care unit (ICU), emergency department (ED), and overnight use without ID approval, the Antimicrobial Stewardship Team (AST) conducted a medication use evaluation (MUE) to assess tigecycline use at the institution.

Methods: This study is an institutional review board-approved, retrospective chart review on patients 18 years of age and over who received tigecycline from January 2018 to December 2018. Patients were identified from antibiotic usage data monitored by the AST. Patient baseline demographics were collected, which included age, height, weight, sex, location, length of stay (LOS), comorbidities, antibiotic allergies, tigecycline indication, dosing and duration, concomitant antibiotics, microbiological results, and 30-day all cause mortality.

Results: The MUE included a review of 25 episodes of tigecycline use in 23 patients at NUMC in 2018. The mean duration of tigecycline therapy was 5 days. 17 (68.0 percent) patients received the standard dose, 3 (12.0 percent) patients received a load of 200mg, and 5 (20.0 percent) patients did not receive a loading dose. Sources of infection included pneumonia (13), urinary tract infections (UTI) (11), wound infections (2), and intra-abdominal infections (1). Tigecycline was associated with a high 30-day mortality rate (56.5 percent).

Conclusion: Based on the results of this MUE, the AST decided not to loosen restrictions for tigecycline and will develop criteria for use, including dosing recommendations for tigecycline.

An evaluation of inpatient ceftaroline use between two hospitals in the same health system

Webb N, Danek M

Buffalo General Medical Center

Introduction/Objective: Current FDA approved uses for ceftaroline include community acquired pneumonia and skin and soft tissue infections. Several promising off-label uses are described in the literature, including complicated gram-positive infections. Within the healthcare system, ceftaroline is available on formulary for patient use, following approval by an infectious disease physician. The purpose of the medication use evaluation is to evaluate the current use of ceftaroline in both on and off-label indications at Buffalo General Medical Center (BGMC) and Millard Fillmore Suburban Hospital (MFSH). Cost was also be assessed.

Methods: Retrospective, observational study from July 2018 to July 2019. An electronic report of patient encounters was generated, including patients at least 18 years old with documentation of at least two administered doses of ceftaroline. Patients admitted for cystic fibrosis exacerbation were excluded.

Results: 1569 doses of ceftaroline, representing 83 individual patient encounters, were reviewed for inclusion into the medication use evaluation. Ultimately, 80 patient encounters (1489 doses) were included for evaluation and 3 patient encounters (80 doses) were excluded due to indication for cystic fibrosis exacerbation. Indications for use varied greatly between the two sites. At BGMC, the use was primarily in patients with persistent MRSA bacteremia without or without infective endocarditis (30/38, 78.9%) and as a second or third line agent. In contrast, the use at MFSH was spread across several indications including: empiric for cellulitis/SSTI (21/42, 50%), osteomyelitis (9/42, 21.5%), and empiric for pneumonia (5/42, 11.9%).

Conclusion: The use of ceftaroline between sites varied greatly in the period of July 2018 and July 2019. Due to the associated higher cost of the antibiotic and wide-availability of effective alternative medications, use in practice should be limited and reserved for therapy that is more definitive rather than empiric.

Characterization and impact of pharmacy student participation on hematology/oncology APPE Rotations in varied practice settings*

Yacobucci M, Lombardi C, Briceland LL, Zeszotarski P

Albany College of Pharmacy and Health Sciences; St. Peter's Health Partners, Albany, NY

Introduction/Background: The scope/impact of student contributions in hematology/oncology (h/o) settings, and impact of student participation on professionalization has yet to be characterized.

Objective(s): Study aims were to characterize and evaluate the impact of APPE student participation in h/o APPEs on the practice site, and on student professionalization.

Methods: From student evaluations of h/o APPEs during cycles 2016-2019, student self-reported rotation activities and 300-500 word post-APPE self-reflections describing meaningful impact were reviewed; rotation activities were categorized into like groupings and sub-categorized into direct and indirect patient care. From each self-reflection, 3 reflection themes of impact were extracted. To assess the impact of student contributions on the practice site, an electronic survey was disseminated to 33 preceptors of h/o APPE cohort. APPE grades served as evidence of student aptitude.

Results: 171 students completed h/o APPE in private or hospital-affiliated ambulatory care (133) and/or inpatient (38) settings; 11 were NCI cancer centers. All but seven students (0.04%) earned a grade of \geq B+. Of 932 self-reported student activities, five most common were: evaluating patient pharmacotherapy (209); in-services to medical staff (132); non-chemotherapy patient counseling; answering drug information questions (96) and chemotherapy patient counseling (82). A majority of activities (64.6%) involved direct patient care. Survey results from 16 preceptors identified top five most impactful student activities: evaluating pharmacotherapy; providing pharmacotherapy recommendations during inpatient rounds; medication education/adherence resources; non-chemotherapy patient counseling and in-service presentations. 400 reflection themes were extracted and thematically categorized: Practice/Research Skills/Curricular Immersion (88); Self-awareness (75); Communication Skills/Teaching/Counseling (59); Patient Interaction/care (50); Interprofessional education/team-based collaboration (49); Professionalization (40); Career Development/Pharmacists' Roles (39).

Conclusions/Discussion: Pharmacy students make significant direct patient care contributions to h/o practice settings by evaluating pharmacotherapy and providing education to patients and healthcare personnel. Participation in h/o APPEs is highly influential to the professionalization of students, particularly in developing skills in oncology practice, patient interactions/communications, and empathy.

Cost analysis of recombinant activated factor VII versus 4-factor prothrombin complex for bleeding after cardiothoracic surgery

Gozelski R, Guarino M, Vink T, Larson D

Mercy Hospital of Buffalo

Background: Nearly one third of cardiac patients experience substantial bleeding following cardiothoracic surgery. Off-label use of recombinant activated factor VII (rFVIIa) or 4-factor prothrombin complex concentrate (4PCC) are options to treat major post-operative bleeding. Use of these products is becoming more favorable to decrease the need for fresh frozen plasma (FFP), given its risks with administration. 4PCC may have some advantages over rFVIIa such as decreased cost and decreased risk of thromboembolism.

Objective: The primary objective is to compare the acquisition cost of rFVIIa, dosed at 90 mcg/kg, to an equivalent dose of 4PCC, determined to be 25 units/kg, for first dose factor replacement in patients with bleeding after cardiothoracic surgery over the past two years. The secondary objective is to assess current outcomes of patients receiving rFVIIa at this institution which are chest tube output 24 hours post-operatively, rates of thromboembolic events, rate of acute kidney injury, hospital length of stay, and units of FFP administered.

Methods: This study was approved by the Catholic Health Institutional Review Board. A retrospective chart review was conducted using the electronic medical record at a 360-bed tertiary care hospital in Buffalo, New York. Non-pregnant patients ≥ 18 years of age who received at least one dose of rFVIIa for bleeding after any type of cardiothoracic surgery between October 2017 and October 2019 were included.

Results: Thirty-three patients were reviewed for this study with twenty-nine patients meeting inclusion criteria. The average cost of rFVIIa, per patient, was \$14,648. The cost of an equivalent dose of 4PCC, at 25 units/kg, was calculated to be \$3,806. Projected annual savings determined to be \$157,223.

Conclusion: Off-label use of 4PCC to treat major bleeding following cardiothoracic surgery offers significant cost savings in comparison to rFVIIa.

Efficacy and use of push-dose epinephrine for peri-intubation hypotension

Harklerode J, Ciaramella C, Adebayo A

The Brooklyn Hospital Center

Introduction/Background: The efficacy of push-dose vasopressors has been well described in anesthesia literature as a temporizing agent for hypotension in the operating room (OR); however, there is currently limited research available for use outside the OR.

Objective: The purpose was to describe the effect of and current practice patterns for the use of PDE for peri-intubation hypotension.

Methods: This was a retrospective, descriptive, Institutional Review Board-approved study over a three-month period from October 30, 2019 to January 31, 2020. Inclusion criteria were patients greater than or equal to 18 years of age, underwent intubation, had hypotension defined as systolic blood pressure (SBP) less than 90 mmHg, and received at least one dose of PDE during the peri-intubation period defined as 30 minutes before and after intubation. The primary endpoint was change in hemodynamic parameters such as SBP, diastolic blood pressure (DBP), heart rate (HR), and mean arterial pressure (MAP) before and after administration of PDE. Statistical analysis was performed using a paired t-test for the primary endpoint and descriptive statistics for all other endpoints.

Results: Administration of PDE resulted in a statistically significant increase in SBP (80 mmHg vs 135 mmHg, $p = 0.02$) and MAP (60 vs 90 mmHg, $p = 0.03$). There was no statistically significant change in DBP and HR. Of the 8 patients who received PDE, 5 (63%) achieved resolution of hypotension. After PDE administration, 6 patients (75%) were initiated on a norepinephrine infusion.

Conclusion: PDE used during the peri-intubation period showed temporary stabilization of blood pressure until CVI was initiated. PDE may be useful as a bridge to CVI in practice settings where CVI is not readily available or as a quicker means to stabilization of blood pressure in a critically ill patient.

Time to administration of anticonvulsant medications in status epilepticus and seizures

Li J, Zhang T, Der Nigoghossian C, Berger, K

NewYork-Presbyterian Hospital/Weill Cornell Medical Center

Introduction/Background: Treatment guidelines for status epilepticus (SE) recommend administration of an anticonvulsant within the first 5 minutes of seizure onset. Delay in the treatment of seizures and SE can predispose patients to increased morbidity and mortality. The timing needed to compound intravenous piggyback (IVPB) formulations of anticonvulsants can delay their administration. Previous studies have shown that intravenous (IV) push administration of anticonvulsants was safe and associated with a shorter time to administration than IVPB.

Objectives: The purpose of this study was to quantify the time from order entry to administration of the first IVPB anticonvulsant for the treatment of SE or seizures.

Methods: Adult patients who received IV levetiracetam or fosphenytoin in the intensive care unit at Weill Cornell Medical Center between January 1, 2017 and December 31, 2019 were screened for inclusion. Patients were excluded if they received an IV anticonvulsant for seizure prophylaxis or the first dose prior to hospital admission. The primary outcome was the time from order entry to administration of the IVPB anticonvulsant. The study was approved by the institutional review board, and a waiver of consent was granted.

Results: A total of 27 patients were included (15 SE, 12 seizure). The median time from order entry to administration of IVPB anticonvulsants was 44 minutes (24.5 min in SE, 69 min in seizure group). Forty-eight percent of patients (10 SE, 3 seizure) received the first dose of IVPB anticonvulsant within 30 minutes of order entry.

Conclusions: Overall, it took greater than 30 minutes for most patients to receive the first dose of IVPB anticonvulsant for the treatment of SE or seizures. The time to administration was shorter in the SE group, which may be due to the urgency in treating SE. Future studies should evaluate the difference in time to administration with the use of IV push.

Case Reports

Severe hypoglycemia secondary to hydroxychloroquine: A case report

Studlack E, Olson S, Scott J

D'Youville School of Pharmacy

Introduction: Hydroxychloroquine is an aminoquinoline antimalarial agent used to treat various autoimmune diseases. Typical adverse reactions include retinopathy, blood dyscrasias, and dermatitis. Cases of hydroxychloroquine-induced hypoglycemia have been reported after weeks to years of treatment. We describe a probable case of hydroxychloroquine-induced severe hypoglycemia presenting as a seizure in a non-diabetic patient after two doses.

Case: A 38-year-old Caucasian female was brought to the emergency department (ED) via emergency medical services (EMS) for a witnessed seizure event. Pertinent past medical history included end-stage renal disease (ESRD) on hemodialysis (HD) secondary to polycystic kidney disease, seizure disorder controlled for the last 10 years, and recently diagnosed systemic sclerosis. Pertinent home medications included levetiracetam, and hydroxychloroquine that was started the day prior to admission. Pertinent labs upon EMS arrival include an undetectable blood glucose (BG) reading x four on two separate devices. Laboratory studies on arrival to the ED were significant for hyperkalemia (7.7 mmol/L) and anemia (hemoglobin 5.9 mg/dL). A repeat fingerstick BG was checked on arrival and was < 40 mg/dL. Toxicologic studies were negative. A levetiracetam level was checked and was 16.6 mcg/mL indicating compliance which the patient endorsed. An ampule of dextrose 50% was administered and repeat BG was 116 mg/dL. Head computed tomography (CT) was negative for abnormalities. Hydroxychloroquine was discontinued and the patient was discharged on hospital day three with normal glucose studies for the duration of her hospitalization.

Discussion: In this patient, the temporal relationship of hydroxychloroquine initiation and presentation, extensive objective evidence of severe hypoglycemia, and seizure upon presentation make this a unique case. The Naranjo Adverse Drug Reaction Probability Scale indicated a probable reaction with a score of 7. Conclusion: Although rare, hypoglycemia should be monitored for in patients at risk of developing or having signs and symptoms of hypoglycemia taking hydroxychloroquine.