Resident Research
2013–14

University of Pittsburgh
School of Pharmacy

Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2014,

Congratulations! As individuals, you have distinguished yourselves among pharmacy practitioners by choosing residency training … and completing it. Further, you have placed yourselves among an elite few who have completed a school of pharmacy-based residency program. You have learned not only the basics of practice but also elements of teaching and research to prepare you for your careers. You have had the best of the academic and practice worlds because the School and its partners—UPMC Presbyterian, UPMC Shadyside, Western Psychiatric Institute and Clinic of UPMC, UPMC St. Margaret, UPMC McKeesport, UPMC Mercy, UPMC Hamot, UMPC Health Plan, Childrens' Hospital of Pittsburgh of UPMC, Rite Aid, Giant Eagle, and CVS Caremark—have provided the rich environments for your residency experiences and learning. You have enriched each other with your pharmacy backgrounds from Florida, Georgia, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, and Virginia.

You also have another distinction: as a class of residents, you made a commitment to learning clinical research skills through the Pharmacy Residency Research Program. The commitment is an investment that has already reaped benefits for you and that will continue to bring you distinction. During your career, you will be faced again and again with clinically important questions. The skills you learned created a foundation on which to build answers—and to become tomorrow's leaders in pharmacy.

Your final distinction? You each have just become an alumnus of our University of Pittsburgh School of Pharmacy Residency Program and will forever be a part of our community.

Congratulations, good luck, and keep in touch!

Patricia D. Kroboth, PhD

Valuing Our Partners

The University Pittsburgh School of Pharmacy values our partnerships with the University of Pittsburgh Medical Center (UPMC), the UPMC Health Plan, Rite Aid, Giant Eagle, and CVS Caremark. It is through these partnerships that the Residency Program has grown in national reputation.

The University of Pittsburgh Medical Center is ranked among the top 10 of "America's Best Hospitals" according to the 2013 *U.S. News and World Report* rankings and is one of the leading integrated health care delivery systems in Western Pennsylvania. UPMC Presbyterian, UPMC Shadyside, UPMC Mercy, UPMC St. Margaret, UPMC McKeesport, Childrens' Hospital of Pittsburgh of UPMC, and Western Psychiatric Institute and Clinic of UPMC participate in our residency programs.

UPMC Health Plan, the second-largest health insurer in Western Pennsylvania, insures nearly 2.2 million members through the partner companies of the UPMC Insurance Services Division—UPMC Health Plan, UPMC WorkPartners, *Life*Solutions (EAP), UPMC *for You* (Medical Assistance), and Community Care Behavioral Health—offer a full range of group health insurance, Medicare, Special Needs, CHIP, Medical Assistance, behavioral health, employee assistance, and workers' compensation.

Rite Aid Corporation is one of the nation's leading drugstore chains with nearly 4,800 stores in 31 states and the District of Columbia, with a strong presence on both the East Coast and West Coast, and 97,000 associates. Rite Aid is the largest drugstore chain on the East Coast and the third-largest drugstore chain in the United States.

Giant Eagle Pharmacy is a leading regional pharmacy with departments in 216 Giant Eagle locations across four states. Customers with qualifying prescriptions benefit from programs including the Giant Eagle $4/$10 generic prescription program, free prenatal vitamins, and high-quality service from expertly trained pharmacists. Additional unique services include Specialty Pharmacy offerings, in-store immunizations, and more.

CVS Caremark is the nation's premier integrated pharmacy services provider, combining one of the nation's leading pharmaceutical services companies with the country's largest pharmacy chain. CVS Caremark drives value for pharmacy services customers by effectively managing pharmaceutical costs and improving health care outcomes through its retail stores, pharmacy benefit management division, and mail service and specialty pharmacy division.

School Mission and Vision

The School of Pharmacy is committed to improving health through excellence, innovation, and leadership in education of pharmacists and pharmaceutical scientists, in research and scholarship, in care of patients, and in service to our communities.

Our vision is to be an outstanding school of pharmacy, renowned for excellence in discovery and advancement of science-based use of medicines and other interventions to enhance the vitality and quality of life.

Pharmacy Residency Research Program

Sandra L. Kane-Gill, PharmD, MSc, FCCM, FCCP
Director, Resident Research Series

The Residency Research Program at the University of Pittsburgh School of Pharmacy incorporates a structured educational series with longitudinal research working groups. This approach provides a foundation for performing research, gives appropriate mentorship, fosters interactive discussions, allows peer critiques, and individual accountability for each resident project. Within the framework of the Residency Research Program, residents are responsible for the completion of all aspects of their project, from conceptualization to final manuscript preparation, with strict emphasis on personal accountability for the progress of their projects. The projects completed this year were highly patient centered including topics such as medication safety, education, quality of care, process evaluations, and clinical outcome assessments. Once again this year's residents responded in outstanding fashion, demonstrating a true sense of personal ownership in their work.

The Residency Research Program requires residents to be certified in research fundamentals through the University of Pittsburgh, participate in valuable interactive lectures geared toward the scientific development and management of their projects, and learn to effectively communicate their project in both verbal and written formats. Overall, our Residency Research Program contributes to the diversity of residency training at the University of Pittsburgh Medical Center in collaboration with the University of Pittsburgh School of Pharmacy, which ultimately results in well-rounded candidates eligible for a wide range of career opportunities.

The success of this program is a result of the efforts of the working group facilitators and other major contributors: Neal Benedict, Stephanie Ballard, Kim Coley, Jim Coons, Amy Donihi, Tanya Fabian, Deanne Hall, Jerad Heintz, Trish Klatt, Louise Oleksiuk, Micha Safranyos, Robert Simonelli, Pamela Smithburger, Melissa Somma McGivney, and Laura Wilson. The efforts of the program directors and research mentors are greatly appreciated. Amy Seybert, chair of the Department of Pharmacy and Therapeutics, must also be recognized for her dedication to the program. We greatly appreciate the continued support of Dean Patricia D. Kroboth and Senior Associate Dean Randall Smith. We would like to thank Melissa Saul for her contributions to data management for several of the retrospective database projects. We would be remiss not to mention the fine administrative support of Samantha Martin and Kathy Woodburn. Most importantly, this program is successful because of the commitment of our outstanding residents.

Amikacin is Rapidly Bactericidal Against KPC-producing *Klebseilla pneumoniae* that are Resistant to Other Aminoglycosides and Harbor AAC(6')-Ib

Bremmer DN, Press EG, Almaghrabi RS, Nguyen MH, Clancy CJ, Shields RK

PURPOSE

Aminoglycosides are used as last line agents against KPC-producing *Klebsiella pneumoniae* isolates that are resistant to all other antibiotics. Amikacin has retained activity against strains that are resistant to other aminoglycosides; however, the influence of isolates possessing gene AAC(6')-Ib is unknown. As such, EUCAST has lowered the amikacin susceptibility breakpoint (BP) to ≤ 8µg/mL, but CLSI (used in US) has not (BP ≤ 16µg/mL). The goal of this study was to determine amikacin's activity against KPC-producing isolates with AAC(6')-Ib alone and in combination.

METHODS

Twenty isolates were selected. Minimum inhibitory concentrations (MICs) were determined by standard methods in triplicate. The bactericidal activity of amikacin at concentrations of 0.25x, 1x, and 4x MIC was assessed by time-kill assays. Synergistic activity of amikacin in combination with trimethoprim/sulfamethoxazole (TMP/SMX), colistin, doripenem, and tigecycline was evaluated by checkerboard methods.

RESULTS

Amikacin, gentamicin, and tobramycin median MICs were 32 (range: 4, 32), 2 (0.5, >64), and 32 (8, >64), respectively. Amikacin susceptibility rates varied by EUCAST and CLSI breakpoints (5% *vs* 45%, *P*=0.008) and 95% of MICs ranged from 16 – 32µg/mL. Amikacin MICs did not correlate with gentamicin or tobramycin MICs (r^2=0.068; *P*=0.266 and r^2=0.102; *P*=0.171). By time-kill, amikacin was bactericidal against 35% and 85% at 1x and 4x MIC, respectively. There was no difference in the 24h log kill of isolates classified as susceptible or non-susceptible by CLSI (-5.59 log *vs* -4.60 log; *P*=0.447) or isolates classified as susceptible by CLSI and non-susceptible by EUCAST (-5.59 log *vs* -5.02 log; *P*=0.694). Rates of synergy with amikacin were 75%, 20%, 10%, and 0% for TMP/SMX, colistin, doripenem, and tigecycline, respectively.

CONCLUSIONS

Amikacin is rapidly bactericidal against KPC-producing *K. pneumoniae* isolates that harbor AAC(6')-Ib. In combination, amikacin and TMP/SMX are synergistic and may be an appealing combination for future studies.

Derek Bremmer, PharmD

Derek received his PharmD from the South Carolina College of Pharmacy in 2013. Upon completion of his PGY-1 pharmacy practice residency at UPMC Presbyterian Shadyside, he plans to complete a PGY-2 infectious diseases residency at The Ohio State University Wexner Medical Center.

Faculty Mentor: Ryan K. Shields, PharmD

Effect of Standardized Order Sets on Outcomes in Older Adults with Hip Fractures

Breslin TM, Corbo JM

PURPOSE

Older adults admitted with a hip fracture are at risk for many complications, from delirium to increased mortality. These complications can be prevented through judicious medication use and prompt surgical intervention, among others. In 2011, UPMC St. Margaret implemented an electronic order set for geriatric hip fracture admissions designed to assist in the reduction of complications by streamlining the admission process and ensuring proper medication orders. The objective of this study is to assess the effects of this order set on outcomes in older adults presenting to the UPMC St. Margaret emergency department (ED) with a hip fracture.

METHODS

A retrospective cohort study was performed of older adults (≥ 65 years) admitted through the UPMC St. Margaret ED with a hip fracture in 2013. Four comparison groups were constructed: patients admitted with no order sets, with the general medicine admission order set (MedOS), with the ED geriatric hip fracture order set (EDOS), or with both order sets. Secondary outcomes assessed were time from ED presentation to radiology and surgery, and 30-day readmission rates.

RESULTS

There was no statistically significant difference in length of stay, time from ED presentation to radiology, or 30-day readmission rates among the groups. Patients who were admitted with the EDOS alone (22 hours) or in combination with the MedOS (22 hours) had shorter ED to OR time compared to those admitted with the MedOS alone (40 hours, $p < 0.05$). There was no statistically significant difference between the no-order set group (29 hours) and any other group.

CONCLUSIONS

Use of the emergency department geriatric hip fracture admission order set resulted in decreased time from emergency room presentation to surgery when compared with the use of the general medicine admission order set alone and will therefore be promoted for use in all geriatric hip fracture patients.

Presented at the 47th Annual Society of Teachers of Family Medicine Conference, San Antonio, Texas, 2014.

Teresa Breslin, PharmD

Teresa received her PharmD from Wayne State University in 2013 and is currently completing a pharmacy practice residency at UPMC St. Margaret. Upon completion of this residency, she will continue on at UPMC St. Margaret as a PGY-2 in geriatrics, after which she plans to persue a shared faculty/clinical position in geriatrics.

Faculty Mentor: Jason M. Corbo, PharmD, BCPS

Epidemiology of *Staphylococcus aureus* Bacteremia

Buehrle DJ, Freedy H, Wilson LM, Bonilla H

PURPOSE

Available observational data reveals evidence that appropriate empirical antibiotic selection is correlated with better outcomes in *Staphylococcus aureus* bacteremia (SA-B). Specifically, the empiric use of vancomycin monotherapy for methicillin-susceptible *Staphylococcus aureus* bacteremia (MSSA-B) carries an increased risk of mortality even if treatment is de-escalated to beta-lactam antimicrobial agents with known MSSA activity. This is thought to be due to the more rapid bactericidal nature of β-lactam antimicrobials. Although combination therapy may be preferred in suspected staphylococcal bacteremia, there is no currently available clinical trial supporting empiric combination therapy of vancomycin and a β-lactam for staphylococcal bacteremia, which we deemed as appropriate for our study. The purpose of this study was to compare clinical outcomes and mortality between patients who were determined to have received appropriate empiric antibiotic therapy versus those who received inappropriate therapy in the setting of MSSA-B infection.

METHODS

This single-center study of 293 patients utilized a retrospective observational design to evaluate the efficacy and outcomes of appropriate empiric antimicrobial selection for SA-B. Appropriate empiric selection for MSSA-B was defined as a B-lactam monotherapy or combination therapy of a B-lactam and vancomycin or a regimen with similar microbiological and pharmacokinetic properties. Index hospitalization was the first admission for the MSSA-B. In this study, we collected the following data for each patient selected for MSSA-B: demographic characteristics, comorbid conditions, clinical manifestations, microbiology data, surgical and antibiotic treatment, and outcomes. The primary outcomes were 30-day and 90-day mortality, length of hospital stay, and length of intensive care unit (ICU) stay. The secondary outcomes were rates of defined complications from MSSA-B.

RESULTS AND CONCLUSIONS

Data collection has been completed and analysis is in process.

Presented at the ASHP Midyear for Pharmacy Residents and Preceptors, Orlando, Fla., 2013.

Deanna Buehrle, PharmD

Deanna received her PharmD from Duquesne University in 2012 and is completing a pharmacy practice residency at UPMC Mercy in 2014. After completion of her PGY-1 residency, she plans to complete a PGY-2 pharmacy practice residency in infectious diseases at UPMC Presbyterian.

Faculty Mentor: Henry Freedy Jr., PharmD

Development and Evaluation of a Sedation, Analgesia, and Delirium Protocol in a Community Hospital Intensive Care Unit (ICU)

Butala JN, Heintz JA

PURPOSE

Critically ill patients requiring mechanical ventilation are at risk for negative outcomes associated with pain, agitation, and delirium. The clinical benefit of minimizing the depth and duration of sedation through daily sedation interruptions and appropriate medication selection in this patient population is shown to reduce total ventilator dependent days and length of stay in the ICU in addition to in-hospital mortality. Using the evidence from randomized controlled trials, a guideline-based protocol was developed to provide a consistent standard of care for all ventilated ICU patients. This retrospective analysis examines the effect of implementing a sedation, analgesia, and delirium protocol on the total duration of mechanical ventilation, length of stay in the ICU, and hospital length of stay in a community hospital setting.

METHODS

A retrospective six-week sample of ventilated ICU patients administered care guided by the newly implemented protocol in 2014 was compared to a six-week sample of ventilated ICU patients during the same time of year in 2013. Validated and repeatable assessments were incorporated within the protocol to objectively measure a patient's level of sedation, analgesia, and delirium. Primary outcomes used to compare the protocol group to the non-protocol group include total ventilator dependent days, ICU days, and hospital length of stay reported as both mean and median values. Secondary outcomes including medication selection and compliance with the level of sedation were also included in the analysis.

RESULTS

Pending.

CONCLUSION

This study anticipates a reduction in the total number of ventilator dependent days, ICU days, and hospital length of stay as a result of implementing a sedation, analgesia, and delirium protocol in a community hospital ICU.

Jessica N. Butala, PharmD

Jessica is currently the PGY-1 pharmacy practice resident at UPMC McKeesport. She received her Bachelor of Science in Biology and PharmD from the University of Michigan. Upon completion of her residency program, she looks forward to practicing as a clinical pharmacist with interests in internal medicine and transitions of care.

Faculty Mentor: Jerad Heintz, PharmD, MBA

Asking the Right Questions: An Operational Evaluation of Patient Care at Hillman Cancer Center

Cadwalader J

INTRODUCTION

The Hillman Cancer Center utilizes Aria®MedOnc Software system to track patient information time-stamp transitions of care throughout the patients' daily experience. This study will create and analyze a database to quantify time-stamp data to assess pharmacy responsiveness after medication approval.

METHODS

Patient time-stamp data was extracted from the Aria® MedOnc between March 12 and March 21, 2014. Patients included were protocol patients (those enrolled in clinical trials) and non-protocol patients (those receiving evidence-based chemotherapy regimens) receiving full chemotherapy regimens on the day of service. Patients excluded were those receiving only adjunctive and those with incomplete time-stamps. The data was compiled and the average times during each point of service were plotted as an average and a distribution.

RESULTS

238 patients met eligibility criteria. The average time from patient arrival to the dispensing of their drug was 2 hours and 48 minutes for non-protocol patients and 3 hours and 24 minutes for non-protocol patients. The average time for pharmacy verification was 12 minutes for non-protocol patients and 14 minutes for protocol patients. The average medication preparation time was 30 minutes for non-protocol patients, 37 minutes for protocol patients. The average of total pharmacy time was 43 minutes for non-protocol patients and 52 minutes for protocol patients. Total pharmacy processing accounts for an average of 26.7% of the wait-time for non-protocol patients, and 27% of the protocol patients.

CONCLUSION

The average total pharmacy time per patient at Hillman Cancer Center is below one hour and only accounts for 26.79% of the total patient experience time. Note that the time study only recorded time until the drug was dispensed. Therefore the total time does not include the receipt of the medication by the nurse, the medication administration, or debriefing and discharge of patient. This likely means that total pharmacy time is less than 26.79%.

John Cadwalader, PharmD

John Cadwalader received his pharmacy degree from the Massachusetts College of Pharmacy and Health Sciences in 2012 and completed his pharmacy practice residency at UPMC Mercy in 2013. John is now completing his health-systems management residency at UPMC Presbyterian and intends to stay for another residency year focusing on patient safety and outcomes.

Research Mentors: Bryan Yourich, PharmD; Andrew Doedyns RPh, MHA

Evaluation of Pharmacists' Interventions in Nonacademic Family Medicine Practices

Castelli G, Difilippo A, Osborne M, Bacci J, McGivney M, Klatt T

PURPOSE

In August 2009, the Successful Collaborative Relationships to Improve Patient care (SCRIPT) project was started. Two community pharmacists with direct patient care experience were placed into four family medicine practices. These pharmacists track their daily patient encounters including drug therapy problems, interventions, and outcomes. This research project will look at these documented interventions and describe the impact pharmacists have made on patient care, quality measures, and cost. This information will give a better understanding of how to best utilize a pharmacist practicing within a PCMH and help pharmacists focus on the patients who are in most need of their specialized knowledge and skill set.

METHODS

This study is a retrospective, descriptive analysis of pharmacist-documented interventions from February 2010 to February 2014. The study is exempt by University of Pittsburgh/UPMC IRB. Pharmacist-patient encounters were recorded using a form created in Microsoft Access by SCRIPT pharmacists. All patients seen by a pharmacist were included in the analysis.

RESULTS

Pending. Preliminary results include 3,777 patients seen by a pharmacist and 11, 206 pharmacist-patient visits.

CONCLUSION

Pending.

Poster Presentation at STFM Annual Meeting 2014

Anticipated: Presentation at Teaching and Learning in Academic Medicine Conference UPMC St. Margaret

Gregory Castelli, PharmD

Gregory is from Archbald, Pa., and received his PharmD from the Wilkes University Nesbitt College of Pharmacy. His professional interests include ambulatory care and expanding pharmacists' roles in healthcare. He completed his PGY-1 residency at UPMC St. Margaret. After postgraduate training, Gregory plans to pursue a faculty position and work closely with a family medicine residency program.

Faculty Mentors: Trish Klatt, PharmD, BCPS; Melissa McGivney, PharmD, FCCP, FAPhA

Changes in Students' Performance and Confidence with a Standardized Patient and Standardized Colleague Interprofessional Activity

Davies ML, Schonder KS, Meyer SM, Hall DL

PURPOSE

P3 students are presented with a practice and final patient care interprofessional activity. This includes a standardized patient interaction, SOAP note preparation, and a standardized colleague interaction where students defend recommendations to a physician colleague. The purpose of this study was to assess the impact of a standardized patient and standardized colleague on changes in students' performance and perceived comfort and confidence in communicating with patients and physicians.

METHODS

Students' performance was measured by a standard rubric on each section of the practice and final activity. Students were given a pre-survey before the practice activity and a post-survey after the final activity to measure perceived comfort and confidence. Descriptive statistics and paired t-tests were used for statistical analysis.

RESULTS

Students performed significantly better from the practice to the final activity on communicating with patients, the SOAP note, and the overall activity with a mean difference (95% CI) of 9.2 (6.86-11.54), 3.56 (1.32-5.80), and 3.85 (2.01-5.69), respectively. There was a significantly positive change from the pre- to post-survey in students' attitudes towards comfort and confidence in talking to patients and physicians on a majority of the questions. More than 80% of the class felt that this activity strengthened their skills, recommended continuation of this activity, and indicated that interprofessional relationships were important to include in the curriculum.

CONCLUSION

By emphasizing interprofessional interactions, active learning, and communication, students' performance improved and their comfort level in communicating and making recommendations was stronger with this activity in the curriculum.

Poster will be presented in July at the AACP 115th Annual Meeting Pharmacy Education 2014 in Grapevine, Texas.

Marie Davies, PharmD

Marie completed a BS at University of California, Davis. She received her PharmD and MS in Clinical Research from Campbell University College of Pharmacy and Health Sciences in 2012 and then completed a PGY-1 pharmacy residency at the Durham VA Medical Center in North Carolina. Marie is currently the PGY-2 ambulatory care pharmacy resident at UPMC Presbyterian. Marie has accepted an assistant professor of pharmacy practice and administration with an emphasis in ambulatory care at Western University of Health Sciences in Pomona, Calif.

Faculty Mentor: Deanne Hall, PharmD, BCACP, CDE

Financial Models Utilized Throughout the United States by Non-academic Outpatient Primary Care Practices to Justify Incorporation of Pharmacists in Team-based Primary Care

Dombrowski SE, Klatt PM, Burns A, Bacci JB, Castelli GB, Osborne MA, Frankel EA, McGivney MA

PURPOSE

Interdisciplinary patient care teams have been shown to improve coordination of care, increase patient access to care, improve patient outcomes, and decrease health care costs. Lack of a consistent payment model for pharmacists is a barrier to wide scale incorporation of pharmacists into these teams, specifically in non-academic, outpatient primary care settings. The specific aims of this qualitative research project are to: (1) conduct key informant interviews to gather information regarding justification of pharmacists integrated in direct patient care, (2) describe the financial models currently utilized for integration of pharmacists into team-based care, (3) list documentation strategies and outcomes evaluated by health plans and health systems to assess quality and value of pharmacist interventions.

METHODS

Key informant interviews were performed by the primary investigator to identify the current financial model utilized in a variety of outpatient primary care settings to justify the pharmacist. Participants were asked about the current financial model of the practice, documentation strategies, and methods of quality assessment. The interview transcripts were coded to identify common themes using the principles of "Grounded Theory." The themes will be utilized to construct a summary of "best practice" financial models to support pharmacist integration into primary team-based care.

PRELIMINARY RESULTS

Research in progress. To date, 12 key informant interviews and demographic surveys have been completed. Themes will be established upon transcription of interviews and completion of data analysis.

POTENTIAL IMPACT

Consistent compensation for pharmacist services in non-academic settings has been a significant obstacle for widespread expansion of pharmacist services nationally. Identifying "best financial practices" for the pharmacist integration into non-academic primary care teams can serve as a template for the growth of the pharmacist in these settings.

Presented at the Society of Teachers of Family Medicine Annual Spring Conference, San Antonio, Texas, May 2014.

Presented at All Together Better Health VII, Pittsburgh, Pa., June 2014.

Sarah Krahe Dombrowski, PharmD

Sarah is a PGY-2 Family Medicine Pharmacy Resident at UPMC St. Margaret. She completed a PGY-1 community pharmacy residency with the University of Pittsburgh School of Pharmacy and Rite Aid in 2013. She received her PharmD from the University of Pittsburgh School of Pharmacy in 2012 and Bachelor of Science in Biochemistry and Molecular Biology from Pennsylvania State University in 2008. Upon completion of her residency, Sarah plans to continue to pursue opportunities for interprofessional education and practice.

Faculty Mentors: Melissa Somma McGivney, PharmD, FCCP, FAPhA; Patricia Klatt, PharmD, BCPS.

Use of a Multidisciplinary Sepsis Team to Optimize Time to Antimicrobial Administration in non-ICU Patients

Filip HR, Oleksiuk LM, Scheid ME, McComb JG, Stromoski DA

PURPOSE

In September 2012, UPMC Shadyside implemented a rapid response sepsis team (ST) program with a goal of decreasing the time to recognition of sepsis in the non-intensive care unit (ICU) inpatient population. The objective of this study was to evaluate if the use of a multidisciplinary ST resulted in faster appropriate antimicrobial administration from onset of severe sepsis or septic shock (SS) as compared with patients in whom the ST was not activated.

METHODS

A retrospective cohort study design was used to compare time to appropriate antimicrobial administration between groups. The experimental group included ST activations and the control group included ICU transfers and rapid response team activations. Antimicrobial appropriateness was determined based on microbiology results or institutional recommendations by source of infection for culture-negative patients. Secondary outcomes included ICU and hospital length of stay (LOS), and all-cause in-hospital between groups.

RESULTS

Of the 144 patients who screened positive for SS, 51 (35%) were ST activations and 93 (65%) were in the control group. Patients in the ST activation group were more likely to receive a new antimicrobial at the time of event than those in the control group, 71% (36/51) versus 48% (45/93) respectively ($p<0.05$). Fifty-eight percent (21/36) and 73% (33/45) of new antimicrobials administered were appropriate in the ST activation and control groups, respectively ($p=0.15$). The mean ($\pm$ SD) time to appropriate antimicrobial administration was 4.3 ± 4.5 hours in the ST activation group versus 9.0 ± 7.4 hours in the control group ($p<0.05$). No significant differences were found between groups for the secondary endpoints of hospital and ICU LOS, and in-hospital mortality.

CONCLUSIONS

The use of a multidisciplinary ST resulted in faster appropriate antimicrobial administration in patients with SS as compared to the control group.

Presented at the 48th Midyear Clinical Meeting and Exhibition of the American Society of Health-System Pharmacists, Orlando, Fla., 2013.

Holly Filip, PharmD

Holly completed her pre-pharmacy studies at the University of Pittsburgh and received her Doctor of Pharmacy degree with an area of concentration in Acute Care from Duquesne University in 2013. Her current professional areas of interest include cardiology and critical care medicine. Upon completion of her PGY-1 residency at UPMC Shadyside, she plans to practice within an academic medical center and pursue BCPS certification.

Faculty Mentors: Louise-Marie Oleksiuk, PharmD, BCPS; Megan Scheid, PharmD, BCPS

Perceptions of Care Among High-risk Geriatric Patients, Families, or Caregivers in a Patient-centered Medical Home

Gavini M, Gennari AS, Ruby CM

PURPOSE

UPMC Senior Care, a level 3 accredited Patient Centered Medical Home, is comprised of an interdisciplinary team of physicians, nurse practitioners, pharmacists, nurses, and support staff collaboratively managing the health of geriatric patients. This project was conducted to identify areas for improvement in the delivery of care to our high-risk patients by utilizing a survey. Our predefined criteria included those having ≥2 of the following in the past 12 months: congestive heart failure (≥1 hospitalization), moderate to severe dementia, ≥2 incidents of falls, recurrent hospitalizations defined as ≥2, any readmission within 30 days, or significant psycho-social issues.

METHODS

A survey was developed and the project was approved by our institutions' quality improvement review board. The survey categories included medication decisions, communications between providers, and goals of care; as these satisfied the 6B and 6C must-pass elements of our medical home renewal. The survey was conducted during October 2013. Qualitative analysis procedures were utilized to determine common themes in responses.

RESULTS

Nineteen out of 24 surveys were conducted in-person and five were via phone. Three patients/caregivers declined and three were excluded as completion of the survey was not feasible. 87% were satisfied with the team's communication. 29% requested transparency in communication between the primary care providers and specialists. Medication reviews were provided for 96% of those surveyed leading to discrepancy resolution in 58%. Twenty-one patients expressed social and health-related goals. 75% of the patients requested education on medications and lifestyle modification. The survey results were presented to the interdisciplinary group for discussion.

CONCLUSION

The majority of patients benefited from pharmacists' interventions such as resolving medication discrepancies, updating medication profiles and providing patient education. Monthly meetings with the interdisciplinary high-risk team will address other areas of improvement and a follow-up survey is being conducted to determine if patients' self-identified goals were met.

Presented at the 8th Annual Aging Institute Research Day, on April 10, 2014; Pittsburgh, Pa.

Presented at the 2013 ASHP Midyear Clinical Meeting, on December 11, 2013; Orlando, Fla.

Madhavi Gavini, PharmD

Madhavi Gavini received her Bachelor of Pharmacy from India and PharmD from the University of Florida. Prior to residency, she worked as a pharmacist in both the hospital and community settings. She received her board certification in pharmacotherapy in 2012. Upon completion of the residency in geriatrics, she plans to pursue a clinical faculty position.

Faculty Mentor: Christine M. Ruby, PharmD, BCPS, FASCP

Assessment of Adherence and Outcomes Related to the Use of Post-tissue plasminogen activator (tPA) Monitoring Protocols for Acute Ischemic Stroke at a Primary Stroke Center

Gregg AJ, Wilson GL, Wilson LM

PURPOSE

Intravenous tissue plasminogen activator (tPA) is employed in the setting of acute ischemic stroke in the attempt to restore cerebral blood flow and neurological function. Three protocols detailing specific criteria for monitoring after tPA infusion have been in place at our Primary Stroke Center for several years. The objective of this study was to assess adherence to these post-tPA monitoring protocols to determine if non-adherence affects rates of in-hospital mortality, bleeding events, length of stay, ambulatory status at discharge, and discharge destination.

METHODS

A retrospective electronic chart review identified patients at our institution that were treated with tPA for acute ischemic stroke from September 1, 2012, to September 30, 2013. Rates of adherence to protocol-specific measurement of vital signs and National Institute of Health Stroke Scale (NIHSS) scores in the first 24 hours post-tPA infusion as well as patient outcomes at discharge were assessed.

RESULTS

This study included 67 patients who were treated with protocol #1 (n=40, 59.7%), #2 (n=23, 34.3%) or #3 (n=4, 6.0%). There was a significant difference in adherence to vital sign monitoring performed every 15 minutes for the first hour post-tPA infusion across the three protocols (X^2 (df = 2, n = 67) = 8.251, p = 0.016). Protocol #2 recorded the highest median adherence rate (75.0%) at this time point as compared to #1 (62.5%) and #3 (0%). Rates of adherence to other protocol-specific measurements were similar. No differences in in-hospital mortality, occurrence of intracranial hemorrhage, length of stay, ambulatory status at discharge, or discharge destination across the monitoring protocols were found.

CONCLUSION

Rates of adherence to the individual post-tPA monitoring protocols only differed for the measurement of vital signs every 15 minutes for the first hour post-tPA infusion. In this study, non-adherence to our institution's three monitoring protocols was not associated with differences in patient outcomes.

Presented at the Resident Poster Session at the 2013 ASHP Midyear Clinical Meeting, Orlando, Fla.

Abigail Gregg, PharmD

Abigail is from Loudonville, N.Y., and received her BS in biological sciences from Cornell University in 2005 and her PharmD from the University at Buffalo School of Pharmacy and Pharmaceutical Sciences in 2013. She will be staying in the Pittsburgh area upon completion of her PGY-1 residency.

Research Mentors: Gregory Wilson, PharmD; Laura Wilson, PharmD

An Evaluation of Adverse Drug Reactions Associated with Antipsychotic Treatment for ICU Delirium

Hale GM, Kane-Gill SL, Groetzinger L, Smithburger P

PURPOSE

To evaluate the incidence and severity of adverse drug reactions (ADRs) associated with atypical antipsychotic or haloperidol treatment of delirium in a medical intensive care unit.

METHODS

Patients were screened every six hours for development of delirium with the intensive care delirium screening checklist (ICDSC), as part of usual care. An ICDSC score of four or greater was considered delirious. Delirious patients treated with an antipsychotic were screened daily for development of ADRs. Suspected ADRs were evaluated for drug causality using three published, objective assessment tools. ADRs were considered when two of three instruments had an agreement rating of "possible" or greater. ADR severity was assessed using the National Cancer Institute's Common Terminology Criteria for Adverse Events (CTCAE) scale, and defined as "mild" (1), "moderate" (2 or 3), or "severe" (4 or 5). A modified National Coordinating Council Medication Error Reporting Index for Categorizing Errors (MEDMARx) categorized ADRs into "no harm" (A – D) or "harmful" (E – I).

RESULTS

Fifty-six of 90 delirious patients received antipsychotic treatment. Ten suspected ADRs occurred attributed to atypical antipsychotic (n=6) or haloperidol use (n=4). QTc prolongation was the most observed ADR (50%). Patients with ADRs had higher mean APACHE II scores ($p = 0.038$). Six ADRs were categorized as "harmful," and five as "severe." The number of "harmful" ($p = 0.238$) and "severe" ($p = 0.226$) ADRs did not differ between haloperidol and atypical antipsychotic use.

CONCLUSIONS

ADRs were observed in 18% of delirious patients treated with antipsychotics and about half were considered severe or harmful.

Presented at the ASHP Midyear Clinical Meeting and Exhibition, Orlando, Fla., 2013.

Genevieve Hale, PharmD

Genevieve received her PharmD from Nova Southeastern University School of Pharmacy in 2013 and completed a pharmacy practice residency at UPMC Presbyterian in 2014. Upon completion of a cardiology residency, she plans to practice in as a faculty member at a school of pharmacy and academic-affiliated hospital setting.

Faculty Mentors: Pamela Smithburger, PharmD, BCPS; Sandra L Kane-Gill, PharmD, MS, FCCM, FCCP

Optimal Low Density Lipoprotein Level To Prevent Cardiac Allograft Vasculopathy

Harris J, Coons JC, Teuteberg J, Shullo MA

PURPOSE

Currently, no studies have investigated the optimal low density lipoprotein (LDL) goal once cardiac allograft vasculopathy (CAV) is established. Furthermore, current Orthotopic Heart Transplant (OHT) guidelines provided by the International Society of Heart and Lung Transplantation (ISHLT) do not give a specific recommendation as to what LDL level should be achieved in this patient population. The aim of this study is to determine what effect, if any, reduction in LDL has on the CAV disease process.

METHODS

This is a retrospective cohort study designed to compare the risk of CAV development relative to different LDL levels. Data from these transplant patients were gathered from the Transplant Management Patient System (TPMS) at UPMC Presbyterian Hospital in Pittsburgh, Pa. Patients were placed into groups based on median LDL concentration over the study period. The primary endpoint was time to development of CAV as measured by a Kaplan Meier time to event analysis. Patients ≥ 18 years of age were included if they received a heart transplant at UPMC between September 2006 and October 2013. In addition, patients must have survived at least 365 days following transplant and have at least 2 post-transplant LDL measurements on file to be eligible for the primary endpoint analysis. Exclusion criteria included a transplant other than heart at any time or heart re-transplantation.

RESULTS

Data from 299 patients were identified over the 7 year study period. A total of 534 left heart catheterizations were performed. Demographics and results are pending.

CONCLUSIONS

Pending.

Justin Harris, PharmD

Justin Harris is currently a PGY-2 cardiology pharmacy resident. Justin received his PharmD from the University of the Sciences in Philadelphia in 2012 and completed a pharmacy practice residency at Temple University Hospital in 2013. Upon completion of this year's residency he hopes to practice in a critical care cardiology setting.

Faculty Mentors: Michael A. Shullo, PharmD; James C. Coons, PharmD, BCPS

Evaluation of Bleeding Risk with "EP/VAD/High Risk for Bleed" Unfractionated Heparin Nomogram

Harrison CM, Coons J, DiNella J, Sheth H, Smith R

PURPOSE

Unfractionated heparin (UFH) is the most commonly used parenteral anticoagulant, however its use is associated with significant risk of bleeding. To attenuate this risk, institutions often create dosing nomograms to prevent errors. Data is limited regarding use of such nomograms. UPMC Presbyterian currently uses four nomograms, with one for patients with high bleed risk. The project aims to assess the safety and effectiveness of an institution-specific high risk nomogram.

METHODS

A retrospective evaluation of patients treated with UFH according to the "EP/VAD/High Risk for Bleed" nomogram was conducted. Baseline demographics were collected to describe the population and bleed risk. The primary outcome was bleeding events to assess safety. Major bleeding was defined as intracranial, hemoglobin decrease >2g/L, reversal with protamine, any packed red cell transfusion, need for surgery or transfer to an ICU related to UFH. Minor bleeds were any other documented bleeding. Other outcomes assessed included thromboembolic events, time to reach therapeutic aPTT range, and length of stay.

RESULTS

50 patients were assessed. Patients had a mean HAS BLED score of three. 30% of patients (n = 15) experienced bleeding events. Seven of these events (46.7%) met criteria for major bleeds. There was one documented intracranial hemorrhage. This was one of two deaths that occurred. The median hospital length of stay was 12.7 days, and median time to reach therapeutic aPTT was 27.5 hours. Two thromboembolic events occurred.

CONCLUSIONS

The mean HAS BLED score demonstrates that the patients selected were at high risk of bleed, which is consistent with the observed high rate of bleeding events. Few thromboembolic events occurred in this population. The next step of the project will be to compare outcomes to other heparin nomograms in order to better define the relative safety and effectiveness profile of the "EP/VAD/High Risk for Bleed" nomogram.

Chelsea Harrison, PharmD

Chelsea received her PharmD from Duquesne University in 2013. She is currently employed in her pharmacy practice residency at UPMC Presbyterian, with expected completion in 2014. Upon completion, she will begin her second year of residency training in the specialty of Ambulatory Care at The Cleveland Clinic.

Faculty Mentor: James C. Coons, PharmD, BCPS

Provider and Staff Perceptions of a Pharmacist on a Geriatric Care Team Across Healthcare Settings

Haver A, Coley KC, McGivney MA, Thorpe C, Zaharoff J, Corbo J, Cox-Vance L, Klatt PM, Schleiden L, Balestrino V, Sakely H

PURPOSE

Considering the impact of pharmacists in patient-centered care and the obstacles of an aging population, a novel pharmacist practice has been developed. The practice includes pharmacists partnering with physicians to fill in gaps in care and provide safe hand-offs of older adults before, during, and after transitions. In this model, a geriatric specialized clinical pharmacist collaborates with the healthcare team and directly interacts with patients to make medication related decisions and communicate drug-therapy recommendations for inpatients, community dwelling outpatients, and skilled and personal nursing patients. This project's primary objective is to evaluate the impact of the practice on the healthcare team by collecting the provider and staff perceptions of the pharmacist in the care practice. It also plans to identify enhancements to the model.

METHODS

A qualitative analysis using three focus groups collected and elicited perceptions of the providers and staff regarding the pharmacist's actions and contributions to patient care. Participants with similar roles in the multidisciplinary team were grouped together as physicians, outpatient staff, or skilled/personal care nursing facility staff. Audio files were transcribed. Coding with grounded theory and coding *in vivo* using Atlas.ti software by two members of the research team is in progress. An expert panel will resolve discrepancies and final themes will be generated.

RESULTS

Data analysis is in progress. A total of 17 providers and staff participated in the focus groups. Preliminary themes include that the pharmacist: (1) decreases workload and improves productivity, (2) contributes to better care of patients and facilitates continuity between healthcare settings, (3) should expand pharmacy services among all settings, and (4) should improve methods to communicate patient information to the health care team.

CONCLUSION

These preliminary results highlight the physician and staff's common perceptions of the geriatric specialized clinical pharmacist working among the geriatric healthcare settings.

Presented at Society of Teachers of Family Medicine 47th Annual Spring Conference, San Antonio, Texas, May 2014.

Amy Haver, PharmD

Amy Haver is the PGY-2 Geriatric Pharmacy Resident at UPMC St. Margaret. She completed a PGY-1 pharmacy residency at Allegheny General Hospital and received her Doctor of Pharmacy degree from Duquesne University. Prior to entering her career in pharmacy, Amy received a Bachelor of Science degree in biology from Pennsylvania State University.

Faculty Mentor: Heather Sakely, PharmD, BCPS

Non-medication Ordering Activities of Pharmacists During Annual Wellness Visits in an Outpatient Family Medicine Practice

Hebda MF, Ballard SL

PURPOSE

The Affordable Care Act added the Annual Wellness Visit (AWV) benefit for Medicare beneficiaries January 2011. Required AWV health maintenance activities include reconciling medications, performing screenings, and ordering diagnostic testing and referrals. The AWV may be delegated to licensed health care professionals. The purpose of this project is to describe the non-medication ordering activities of a pharmacist within the context of a pharmacist-run AWV in a family medicine residency practice.

METHODS

Pharmacist-run AWVs were implemented January 2014. Initial clinic recruitment targeted patients eligible for an AWV who were identified on a recurring polypharmacy report (≥9 medications). Patients were excluded for physician preference or low practice contact (< 1 office visit in the past 6 months). Acute patient complaints outside the scope of the AWV were addressed and billed in a separate visit. A chart review of the service pilot January–April 2014 was approved by the institutional Quality Improvement Review Board. Data extracted included demographics, diagnoses, chronic medications, acute complaints and all visit orders. The primary outcome was the proportion of AWVs in which any non-medication order was placed by a pharmacist, as well as details by order type. Data was analyzed using descriptive statistics.

RESULTS

Out of 24 completed visits, 20 (83%) had at least one non-medication order placed by a pharmacist. Pharmacists placed 54 non-medication orders, including 21 referrals, 15 labs, 10 radiology orders, and 8 immunizations. Most common orders included colonoscopy, mammogram, ophthalmology, varicella zoster, and metabolic panels. Acute complaints were frequent (8/24) but resulted in only 1 separate billable service. One AWV was rescheduled to an acute visit for hypoglycemia.

CONCLUSIONS

Non-medication orders were common, including referrals and radiology orders which may fall outside usual primary care pharmacist activities. Future endeavors may describe how often patients completed health maintenance items, patient and provider satisfaction, and reimbursement.

Presented at the 2013 ASHP Midyear Clinical Meeting, Orlando, Fla.

Michele Hebda, PharmD

Originally from the Pittsburgh area, Michele received her PharmD from the School of Pharmacy and Health Professions at Creighton University in Omaha, Neb. Upon completion of her residency at UPMC Shadyside, she would like to pursue a clinical position focused on her professional interests of oncology, pediatrics, and ambulatory care.

Faculty Mentor: Stephanie L. Ballard, PharmD, BCPS

Evaluation of Prothrombin Complex Concentrates

Hedges A, Coons J, Smith R

PURPOSE

Prothrombin complex concentrates (PCCs) are indicated for urgent reversal of warfarin and novel oral anticoagulants in patients with acute major bleeding or need for an urgent procedure. The purpose of this project is to summarize current practices at our institution regarding the use of PCCs.

METHODS

A retrospective review of electronic medical records was conducted to identify patients who were ordered a PCC and were receiving warfarin or a novel oral anticoagulant at 12 UPMC institutions from July 1, 2013, to April 30, 2014. Clinical outcomes of interest included time to INR < 1.3, time to Hgb > 7 g/dL, and incidence of thromboembolism. Costs associated with the administration of PCCs, blood product transfusions, use of other targeted reversal strategies, and hospital days will be determined to characterize health care resource utilization. Costs and resource use will be compared to control data that summarized costs associated with other reversal strategies (vitamin K, dialysis, activated charcoal, fresh frozen plasma, FVIIa, or FEIBA) at UPMC prior to the availability of PCCs.

RESULTS

As of April 2014, a total of 193 patients have received a PCC product. Additional results are in progress.

CONCLUSION

In progress

Ashley Hedges, PharmD

Ashley received her BA in philosophy and biology from the University of North Carolina at Chapel Hill in 2009, followed by her PharmD from the UNC Eshelman School of Pharmacy in 2013. She is originally from Fayetteville, N.C. Her professional interests include critical care, infectious diseases, and global health.

Faculty Mentors: James Coons, PharmD, BCPS; Roy E. Smith, MD

Pharmacist-led Interventions on Transitions of Seniors (PIVOTS): A Survey of Patient Perceptions

Higbea A, Thorpe C, Coley K, McGivney M, Klatt P, Schleiden L, Zaharoff J, Corbo J, Cox-Vance L, Haver A, Balestrino V, Sakely H

PURPOSE

Older adults have the most complex medication regimens and experience the most transitions in care settings. (e.g., home to hospital, hospital to skilled nursing facility, etc.). A novel Geriatric Pharmacist Collaborative Practice (GPCP) was developed partnering pharmacists with physicians to address gaps in care and provide safer hand-offs of older adults within transitions of care. A geriatric clinical pharmacist collaborates with the health care team in real time and provides direct patient care to make medication related decisions and communicate drug-therapy problems. The primary objective is to explore the impact of the GPCP as it relates to patient's perceptions on their drug therapy problems and coordination of care.

METHODS

A quantitative and qualitative analysis was initiated utilizing a newly developed survey tool, including a series of open-ended questions. The analysis focuses on patients' interactions with pharmacists, and how the interaction affected the patients' medication use as well as perceptions of how well their health care team works together to care for them. Independently living patients are surveyed at baseline and again in 6 months at an outpatient geriatric care clinic.

RESULTS

Fifteen patients have been surveyed to date, including 8 patients who have interacted with the pharmacist. The preliminary results add to the body of literature supporting pharmacists in direct patient care. The preliminary findings suggest that most older adult patients feel that having a pharmacist in their doctor's office is important, and patients noted that the pharmacist can spend more time and help them with their medications.

CONCLUSIONS

The survey provides patient generated feedback on the GPCP as to how the pharmacist added to their understanding of their drug therapy problems and coordination of care. Data obtained from additional patients will provide more information on patients' perceptions and ways that the pharmacist can assist in their care.

Recently presented at the 47th Society of Teachers of Family Medicine (STFM) Annual Spring Conference, San Antonio, Texas 2014; and the 2014 Annual Scientific Meeting of the American Geriatrics Society (AGS), Orlando, Fla.

Ashley Higbea, PharmD

Ashley is from Suffolk, Virginia. She received a BS in chemistry from Virginia Commonwealth University (VCU) and her PharmD from VCU School of Pharmacy. Ashley will complete a PGY-2 in family medicine next year. Her professional interests include helping patients manage their chronic disease states while working in interdisciplinary teams.

Faculty Mentor: Heather Sakely, PharmD, BCPS

Impact of Integrated Behavioral Health Program on Diabetes Management in Patients with Comorbid Mental Illness

Hill LG, Koenig ME, D'Amico FJ, Mercuri JH, Han JK

PURPOSE

In January 2012, UPMC St. Margaret initiated the Integrated Behavioral Health Program (IBHP) to deliver collaborative, patient-centered care behavioral health (BH) care in 3 family health centers utilizing an interdisciplinary team of social workers, psychiatrists, family physicians, and pharmacists. Preliminary results demonstrated decreased emergency room utilization and hospital admissions. The objective of this study was to assess the effect of the IBHP on chronic disease management in patients with uncontrolled diabetes mellitus (DM).

METHODS

A retrospective chart review was undertaken to assess changes in glucose control and completion of health maintenance behaviors. Enrollment in the IBHP with at least one BH visit and a baseline glycosylated Hb_{A1c} (A1c) of 8.0% or higher was sufficient for study inclusion. The final analysis was conducted on data collected over a 2-year period, one year pre- and post-enrollment. The primary endpoint was change in A1c. Secondary endpoints included changes in body mass index (BMI), documentation of annual eye exams and influenza vaccinations, and frequency of clinical pharmacist referrals.

RESULTS

19 patients met inclusion criteria. Mean A1c was significantly reduced from 9.9% at baseline to 8.9% at the end of the study period representing a mean change of 0.9579% (p=0.0053). Mean BMI decreased from 31.9 kg/m^2 to 31.3 kg/m^2. Documentation of annual eye exams and influenza vaccines increased from 37% to 53% and 58% to 74% respectively. The proportion of patients referred to a clinical pharmacist decreased from 37% to 26%.

CONCLUSIONS

Participation in the IBHP was associated with significantly improved glucose control in patients with uncontrolled DM. Additional benefits included reduced BMI and increased documentation of health maintenance activities. Referral to a clinical pharmacist, a potential confound, was not a routine part of the intervention. The retrospective, non-randomized study design and small patient population limit the generalizability of these results.

Presented at the Society of Teachers of Family Medicine Annual Spring Conference, 2014 May, San Antonio, Texas.

Lucas Hill, PharmD

Lucas earned his PharmD from the University of Missouri–Kansas City School of Pharmacy in 2013. He is currently a PGY-1 pharmacy resident at UPMC St. Margaret and will be continuing as a PGY-2 ambulatory care resident this July. Lucas' primary professional interests include diabetes management and education and psychiatric pharmacotherapy in primary care.

Faculty Mentor: Marianne E. Koenig, PharmD, BCPS

Association between Patient-reported Outcomes of Sedation and Sedation Assessment Scores in Critically Ill Patients

Hogue AN, Benedict N, Smithburger PL, Kane-Gill SL

PURPOSE

Approximately 40-60% of patients receive sub-optimal sedation, despite use of validated sedation assessment scales; however, patient perception is understudied. This study evaluated the association between clinician-determined sedation assessments and patient reported outcomes (PRO).

METHODS

This was a prospective, observational study in adult, mechanically ventilated medical and surgical trauma ICU patients who received continuous sedation therapy for ≥ 24 hours. Patients were approached ≥ 24 hours after and within 96 hours of sedation cessation. Participants completed a modified Hewitt questionnaire evaluating patient satisfaction with sedation.

RESULTS

Forty patients were interviewed over five months. Mean age was 54 years, 47.5% were male, and the most common admission diagnosis was respiratory failure (27.5%). Sedation duration ranged from 1.1-25.2 days with a median of 3 days. Thirty-eight patients (95%) received propofol, with 10 (25%), 9 (22.5%), and 1 (2.5%) patients receiving dexmedetomidine, midazolam, and ketamine, respectively. Thirty-two patients (80%) received concomitant analgesia with fentanyl. Mean (SD) SAS score was 3.8 (0.94). Median (IQR) score for awareness was 5 (1.25-9) [1-aware all the time; 10-not aware at all]. Median (IQR) score for questions addressing perceptions of comfort (discomfort, frustration, panic, anxiety, pain; difficulty resting/sleeping; overall comfort and pain level) was 6 (1-10) on a 10 point scale [1=complete comfort, no pain at all, never bothersome, or did not upset and 10=not comfortable at all, worst pain ever, always bothersome, or upset all the time]. Slightly more than half of the patients reported wanting the same amount of sedation if they were to experience the situation again, with 37.5% and 7.5% wanting more and less sedation, respectively. Overall, 47.5% reported the ICU experience was pleasant.

CONCLUSIONS

Average sedation scores represent a calm/cooperative state. Despite this, one-third of patients wanted more sedation and only half reported a pleasant experience.

Ashleigh Hogue, PharmD

Ashleigh is currently a PGY-2 critical care pharmacy resident at UPMC Presbyterian. She received her Doctor of Pharmacy from the University of Pittsburgh in 2012 and completed her PGY-1 pharmacy practice residency at Hillcrest Hospital, a Cleveland Clinic hospital. Upon completion of her residency, Ashleigh will continue as a part of the pharmacy community at UPMC Presbyterian in the Unit Based ICU Float position.

Faculty Mentors: Neal Benedict, PharmD; Pamela Smithburger, PharmD, BCPS; Sandra L. Kane-Gill, PharmD, MS, FCCM, FCCP

Utilizing Simulation-based Learning to Establish Pharmacists' Competency Participating in Rapid Response Teams

Johnson AS, Burke A, Yourich B, Seybert AL

PURPOSE

As medication-use experts, pharmacists can serve a unique role as part of a rapid response team, including, but not limited to, proper drug indication, dose, administration, and timing. Several professional organizations have called for standardized pharmacist participation, but there is no standard competency to evaluate readiness. Simulation-based learning has been shown to be a more effective mode of education compared to traditional didactic learning. To the authors' knowledge, no program has been developed to create a comprehensive, standardized, simulation-based training program to establish pharmacist competency in rapid response team participation.

METHODS

Baseline data across the health-system regarding pharmacist staffing levels and current rapid response participation was collected. A subjective hospital-specific needs assessment was completed to develop standardized assessment rubrics. Physicians, advanced practice providers, and nursing staff working in critical care areas were asked to complete a brief survey on their perceptions of a pharmacist's responsibilities at a code.

Pharmacists will complete a pre-intervention validated assessment that evaluates their knowledge level, skills, and attitudes regarding participating as a member of a rapid response team. Pharmacists will then participate in two high-fidelity simulation cases. An evaluator will be present, and the session will be videotaped for study purposes only.

Immediately after simulation training, a post-test evaluation will be completed, which is to be identical to that taken before the simulation. Three months after completion of the post-test evaluation, participants will be retested using the same tool to assess retention of the information and change of pre-established confidence level.

HYPOTHESIS

High-fidelity simulation training will improve pharmacists' knowledge, skills, and attitudes about responding to a code situation. They will report higher levels of confidence, and an expected level of pharmacy services will be provided at each rapid response situation post-simulation.

Amanda will be continuing this project into her PGY-2 Critical Care residency.

Amanda Johnson, PharmD

Amanda received her PharmD from the University of Pittsburgh School of Pharmacy in 2012. She completed a pharmacy practice residency at UPMC Presbyterian in 2013. She will be staying at UPMC Presbyterian to complete a PGY-2 critical care residency. She is also completing her master's degree in health administration through the University of Pittsburgh Graduate School of Public Health.

Faculty Mentor: Amy L. Seybert, PharmD, FASHP, FCCP

UPMC St. Margaret COPD Free Medication: Impact on 30-Day Readmission Rates and Pharmacoeconomic Utility

Ko, PL; Broders, JK

PURPOSE

The average cost for a hospital stay due to Chronic Obstructive Pulmonary Disease (COPD) is approximately $8,400, with 17.6% of hospital admissions occurring within 30 days of discharge.[1,2,3] In October 2014, Medicare will be revising the Hospital Readmissions Reduction Program to COPD exacerbations.[1] To prepare for the upcoming changes, UPMC St. Margaret's COPD Task Force aims to create solutions to decrease readmissions through the COPD Free Medication Program.[4]

METHODS

A retrospective chart review was used to evaluate patients who were admitted into the hospital with suspected COPD exacerbation. After evaluation for reason of admission, a pharmacist would ask a series of questions to patients with the UPMC validated Medication Access and Adherence Tool (MAAT). If patients had a total score of >2, they were eligible for vouchers for free 30-day supply of maintenance inhalers to be picked up at our outpatient family health centers. The objective of the study was to evaluate 30-day hospital readmissions and cost savings.

RESULTS

30-day hospital readmissions was not statistically significant among groups who did not receive vouchers, who received vouchers but no inhalers, and those who received inhalers. The average MAAT score for all patients was 2.93 and the average days for inhalers pick-up was 4.53 days.

CONCLUSIONS

Although there was not a statistical significance in reducing 30-day readmission rates, there was a positive correlation with patients receiving 30-day inhalers and decrease of readmissions. However, based on the cost of inhalers versus cost of average hospital stay, there seems to be potential cost savings benefit with the COPD Free Medication program.

Presented at 47th Society of Teachers in Family Medicine Annual Spring Conference, San Antonio, Texas, 2014.

Priscilla Ko, PharmD

Priscilla hails from Texas and received her PharmD from Texas Tech University. Her passion for pharmacy and medicine involves underserved care and global health where she hopes to collaborate with developing countries to formulate a solution to deliver stronger medical access. She enjoys TED Talks, traveling, writing, exploring Pittsburgh, and spending time in good company.

Faculty Mentors: Jennie Broders, PharmD, BCPS; Frank D'Amico, PhD

Intrawound Vancomycin in Non-cervical Spinal Fusion

Kudla NA, D'Amico FJ, Dupuis KM

PURPOSE

Surgeons at UPMC St. Margaret are administering vancomycin powder into wounds of spinal surgery patients before closure to decrease surgical site infections; vancomycin is placed either intrawound, into the bone graft, or both. This study aims to assess the effectiveness in decreasing infection of this practice.

METHODS

A retrospective chart review was completed on patients undergoing non-cervical spinal fusion surgeries from November 2011 to November 2013. Infection rates were determined for the following groups: intrawound vancomycin only, bone graft vancomycin only, both intrawound and bone graft vancomycin, or no vancomycin use. Infections were compared to non-infected controls. The primary outcome was the effectiveness of intrawound vancomycin in decreasing post-surgical infections.

RESULTS

There were 12 infections in non-cervical spinal fusion patients from November 2011 to November 2013. Use of vancomycin varied by surgeon and by procedure. The rates of infection were 2/57 (3.5%) intrawound vancomycin only, 2/124 (1.6%) bone graft vancomycin only, 5/208 (2.4%) both intrawound and bone graft vancomycin, and 3/237 (1.3%) no vancomycin use.

CONCLUSIONS

Final results comparing 200 non-infected controls to infected patients will aid in determining why patients receiving intrawound vancomycin have a higher rate of infection. The practice may potentially be used in higher risk patients; or, the practice may itself increase infections and require reevaluation.

Presented at the 47th Annual Society for Teachers in Family Medicine (STFM) Conference, San Antonio, Texas, 2014.

Nadia Kudla, PharmD

Nadia received her PharmD from the University Of Pittsburgh School Of Pharmacy in 2013. She is currently a PGY-1 resident at UPMC St. Margaret.

Faculty Mentor: Kara Dupuis, PharmD

Tacrolimus Trough Concentrations in Intestinal Transplant Recipients During Episodes of Acute Cellular Rejection

Lichvar AB, Costa G, Venkataramanan R

PURPOSE

Tacrolimus is a narrow therapeutic index immunosuppressant to prevent rejection in transplantation with dose-limiting toxicities such as nephrotoxicity and neurotoxicity. In the setting of intestinal transplant acute cellular rejection (ACR), there is increased intestinal permeability, reduced intestinal CYP3A4/5 metabolism, and p-glycoprotein efflux. These ACR-mediated changes may potentiate higher tacrolimus concentrations. The purpose of this study is to evaluate the impact of ACR episodes on dose-normalized tacrolimus blood concentrations in intestinal transplant recipients.

METHODS

This study was a retrospective analysis of adult intestinal transplant recipients from February 1998 to July 2013 at a single-center tertiary institution. Daily tacrolimus doses and levels from 30 days before ACR diagnosis, during ACR, and up to 30 days after ACR resolution as evidenced by biopsy samples were gathered. Dose-normalized tacrolimus levels (trough concentration divided by the total tacrolimus dose of the previous day) were utilized to account for dose changes related to changes in tacrolimus levels over time. Median dose-normalized tacrolimus levels were compared in the presence and absence of ACR using the Wilcox rank sum test. Percent changes in dose-normalized tacrolimus trough levels were compared across rejection severity and between initial and recurrent ACR episodes.

RESULTS

A total of 113 intestinal transplant recipients experienced 285 episodes of ACR. Median dose-normalized levels were statistically significantly different in the presence and absence of ACR (4.03 ng/mL/mg vs. 1.99 ng/mL/mg, p=0.001). Median percent change of dose-normalized tacrolimus was 45.4% (IQR 2.9 – 78.2%). There was a trend towards statistical significance when percent change in dose-normalized tacrolimus concentrations were compared across rejection severity grades (p=0.077). Percent change in dose-normalized tacrolimus in the presence and absence of rejection was not different between initial and recurrent episodes of ACR (p=0.462).

CONCLUSIONS

Median dose-normalized tacrolimus concentrations were two-fold higher in the presence of ACR compared to the absence of ACR. This increase was not explained by ACR severity or recurrence of ACR. Lower doses may be required in the setting of ACR to compensate for this observed increase in tacrolimus bioavailability.

Alicia Lichvar, PharmD

Alicia received her PharmD from the University of Pittsburgh School of Pharmacy in 2013 and completed a pharmacy practice residency at UPMC Presbyterian in 2014. Upon completion of a solid organ transplantation residency and fellowship, she plans to practice at a large tertiary teaching hospital associated with a school of pharmacy.

Faculty Mentor: Raman Venkataramanan, PhD, FCP

Evaluation of an Electronic Screening Tool to Identify Potential Adverse Drug Reactions within ICU Discharge Summaries

MacLasco AM, Saul MI , Kim CH, Anthes AM, Smithburger PL, Kane-Gill SL

PURPOSE

Critically ill patients are at high risk for ADRs. Identification of ADRs is integral for prevention. A previous study using manual chart review demonstrated value in examining intensive care unit (ICU) discharge summaries for ADR detection. This manual approach was laborious and resource intensive. We aim to streamline the process using highly sensitive and specific trigger words.

METHODS

We conducted a retrospective electronic medical record review for medical ICU patients admitted from January 1, 2012, to April 30, 2012, whose length of stay was greater than 24 hours. This evaluation was conducted in 2 phases; phase 1 was the identification of all documented ADRs and phase 2 was the identification of documented ADRs using trigger words. For phase 1, de-identified discharge summaries, defined as notes on the last day of ICU stay, were manually annotated for documentation of ADRs by two independent pharmacist reviewers. The Harvard Medical Practice (HMP) Scale was used to classify potential ADRs. For phase 2, discharge summaries were then cross-referenced with a list of 155 trigger words and phrases by use of text word searching software. Two additional pharmacists independently reviewed the trigger words and categorized each as potentially related to an ADR through using the same HMP scale. The sensitivity and specificity for trigger words and association with ADR detection was then determined.

RESULTS

A cohort of 360 unique patient visits and 1,502 progress notes were evaluated. All patients and notes have been annotated to complete phase 1. Approximately 377 unique ADRs were identified in 230 (63.8%) unique patients. The most common ADRs were mental status change (n = 50), bleed (n = 31), and hypotension (n = 29). Evaluation of trigger words and related ADRs is ongoing.

CONCLUSIONS

Preliminary results indicate that certain triggers words, including “supratherapeutic”, “2/2” and “secondary to”, “related”, and “hypoglycemia”, may be highly predictive of ADRs.

Adam MacLasco, PharmD

Adam received his PharmD from Northeastern University in Boston, Mass., in 2013. After the completion of his PGY-1, Adam will continue his training as the PGY-2 in emergency medicine at the University of Illinois at Chicago in Chicago, Ill.

Faculty Mentor: Sandra Kane-Gill, PharmD, MSc, FCCM, FCCP

Impact of Clinical Pharmacy Services on Medication Adherence at a Psychiatric Primary Care Clinic

Mathis E, Lupu A, Montgomery J, Parthasarathy M, Castelnovo K, Fabian T

PURPOSE

This quality improvement project evaluated the impact of clinical pharmacy services (CPS) on medication adherence in a primary care clinic for patients with chronic mental illness.

METHODS

Medication adherence was measured at baseline and at each subsequent CPS encounter using patient self-reported adherence. Change in medication adherence over time was evaluated for all patients and for those identified as high risk for medication non-adherence. "High-risk" was defined as patients reporting missing >2 doses/week, and/or taking >5 medications, and/or filling prescriptions at >1 pharmacy. Additionally, pharmacy claims data were obtained from a behavioral health insurance provider for a subset of patients. Proportion of days covered (PDC) was calculated for five maintenance medication classes: antidepressant, antipsychotic, antihypertensive, antihyperlipidemic, and oral hypoglycemic agents.

RESULTS

A total of 175 patients who had at least two CPS encounters between October 2012 and December 2013 were included in the analysis. Improvement in self-reported adherence was observed in 33 of 175 patients (19%) overall. In those patients who reported missing > 2 doses per week at baseline, 22 of 29 (76%) showed improved adherence. In the subset of patients for whom claims data were available (n=36), improvements in PDC were observed for all targeted maintenance medication classes with adherence to antidepressant medications exhibiting the greatest improvement. After at least two encounters with a clinical pharmacist, the percentage of the patients with improved PDC were as follows: antidepressants (67%), antipsychotics (62%), antihypertensives (60%), antihyperlipidemic agents (67%), and oral hypoglycemic agents (50%).

CONCLUSION

Adherence to complex medications regimens can be challenging for all patients but is of particular concern for patients with chronic mental illness. Implementation of CPS in a primary care setting serving patients with mental illness improved medication adherence in patients with lowest reported baseline adherence. Similarly, pharmacy claims data demonstrated an increase in PDC for all medication classes included in the analysis.

Erin Mathis, PharmD

Erin received her PharmD from the University of Pittsburgh School of Pharmacy in 2013 and completed a PGY-1 pharmacy practice residency at Western Psychiatric Institute and Clinic of UPMC in 2014. She will be completing a PGY-2 psychiatric pharmacy residency at the William S. Middleton Memorial Veteran Hospital in Madison, Wis., in 2015. Upon completion of her PGY-2 residency, she intends to work as an outpatient clinical pharmacy specialist in the VA system.

Faculty Mentors: Tanya Fabian, PharmD, PhD, BCPP; Ana Lupu, PharmD; Jamie Montgomery, BCPP

Mobile Application Features Sought After by Patients of a Grocery Store Chain Pharmacy

McCartney EM, Bacci JL, Richardson RM, Ossman KL, DelPizzo DM, DeJames JR, McGivney MS

PURPOSE

Health technology is growing at a rapid rate. Many patients currently use mobile applications to manage their health care needs. A mobile application with novel features for pharmacy services could facilitate patient care in the community pharmacy setting and increase the accessibility of pharmacists to patients. The objective of this study is to determine the features of a pharmacy mobile application sought after by patients of a grocery store chain pharmacy.

METHODS

Key informant interviews were conducted at 5 Giant Eagle Pharmacy locations in the Pittsburgh area. Patients over 35 years of age who receive 1 prescription monthly from a Giant Eagle Pharmacy and use a smart phone daily were eligible to participate. Participants were asked about their current use of mobile applications, use of Giant Eagle's pharmacy services, and features of a mobile application that would make their pharmacy experience more convenient and their pharmacist more accessible. Interviews were conducted until saturation of data was achieved. The interviews were audio recorded and the recordings were transcribed by a third party. The transcripts will undergo a formal thematic analysis using Grounded Theory.

PRELIMINARY RESULTS

Twenty-five interviews were conducted. The average age of participants was 51. About half of participants (46%) currently used mobile applications to manage their health. Four preliminary themes emerged from the interviews: patients desire the ability to refill prescriptions via the mobile application, access an up-to-date medication profile and insurance information, communicate individually with the pharmacist, and request over-the-counter medications and supplies to be picked up with their prescriptions at will call.

CONCLUSION

The preliminary results suggest that patients intend to use a pharmacy mobile application for traditional functions but also desire novel functions not currently offered in other applications. The findings of this study help us understand how to align patients' health needs with the convenience of technology.

Presented at the American Pharmacists Association annual meeting, Orlando, Fla., 2014.

Elizabeth McCartney, PharmD

Elizabeth received her PharmD from the University of Pittsburgh School of Pharmacy in 2013. Upon completion of a community practice residency, she plans to provide direct patient care in the community setting and serve as a faculty member at an academic institution.

Faculty Mentor: Melissa Somma McGivney, PharmD, FCCP, FAPhA

Vancomycin concentrations in wound volume assisted closure (VAC) fluid as a predictor of wound healing in patients with diabetic foot infections

Nites EJ, Bonilla H, Freedy H, Wilson L, Wukich D

BACKGROUND

In 2012, there were more than 25.8 million patients with diabetes in the United States that accounted for medical costs exceeding $254 billion. Diabetes is also the current leading cause of non-traumatic amputation. Multiple past studies have highlighted that patients who follow up at a wound care clinic can decrease their likelihood of amputation by 45% to 85%. However, with decreased extremity perfusion in this population, information about the extent of which an antibiotic has penetrated the infection is pivotal yet usually unavailable. A study that evaluated the penetration of vancomycin in diabetic and non-diabetic patients post cardiac surgery found that tissue concentrations were significantly lower in patients with diabetes. We conducted a study to evaluate the use of vancomycin concentrations in the wound VAC fluid of patients with diabetic foot infections as a measure of tissue penetration and a marker for healing.

METHODS

In this single site, prospective observational study, we performed a medical record review of volunteer patients presenting to UPMC Mercy with diabetic foot infections on vancomycin therapy. After consent was obtained, a single serum vancomycin level was drawn within 4 hours of collecting a sample of the patient's wound VAC fluid. A "vancomycin index" was calculated from the two vancomycin levels to represent the extent of tissue penetration for each patient. In accordance with normal hospital care, these patients then followed up at the wound care clinic in 4 to 6 weeks. Their vancomycin index was compared to the primary clinical outcomes of a decrease in wound size, presence of granulation tissue, and decrease in wound drainage from baseline.

RESULTS/CONCLUSIONS

Results and any conclusions that can be made are currently under continued collection and analysis at this time. An update on the findings of this study will be provided at a later date.

Presented at the 2013 ASHP Midyear Meeting in Orlando, Fla.

Emanuel Nites, PharmD

Emanuel received his PharmD from the University of Pittsburgh School of Pharmacy in 2013 and immediately after graduation began a PGY-1 pharmacy practice residency at UPMC Mercy. He has since accepted a PGY-2 position with Greenville Health System in Greenville, S.C. for critical care. After completion of his PGY-2, he plans to practice in an ICU hospital setting with a focus on teaching and precepting students.

Research Mentors: Henry Freedy, PharmD; Hector Bonilla, MD

New Pharmacist Practitioner Readiness to Provide Patient Care in a Community Chain Pharmacy Setting

Ossman K, McGrath SH, Bacci JL, Hazel DJ, McCartney E, McGivney MS

PURPOSE

Community pharmacists are taking on more primary care responsibilities through the provision of Medication Therapy Management (MTM) and other patient care services to improve medication-related outcomes. It is critical that community chain pharmacies hire and train pharmacists who are most capable of providing these services. The objective of this study is to assess new pharmacist practitioner readiness to provide direct patient care services.

METHODS

A survey was developed from the 2013 CAPE Educational Outcomes and the 2012 NACDS-NCPA-ACPE Entry-level Competencies Needed for Community Pharmacy Practice. Pharmacists, in one community pharmacy chain, with up to 3 years of practice experience were asked to rate their readiness to perform patient care, public health, communication, management, and leadership related functions using a 5-point Likert Scale (1 = strongly disagree, 5 = strongly agree). Surveys were distributed in 5 waves via fax to Rite Aid pharmacies in New York, Ohio, West Virginia, and Pennsylvania. Preliminary survey results were analyzed using descriptive statistics.

PRELIMINARY RESULTS

Two faxing waves have been completed and 21 pharmacists have completed the survey to date. New pharmacist practitioners indicated that they felt most confident in their abilities to demonstrate professional behavior (5.00 ± 0.00), immunize (4.90 ± 0.30), and recommend generic substitutions (4.81 ± 0.51). They indicated least confidence in their readiness to develop a business plan (3.00 ± 0.95), comprehend a collaborative practice agreement (3.48 ± 0.81), and help patients apply for medication assistance programs (3.62 ± 1.12).

CONCLUSION

Preliminary results indicate that new pharmacist practitioners feel most confident in their abilities to perform leadership- and public health-related functions. They are less confident in their abilities to carry out management-related responsibilities. Perceived gaps in patient care skills, knowledge, or experience by new practitioners can be utilized by community pharmacies for hiring and training new practitioners.

Presented at the American Pharmacists Association Annual Meeting. Orlando, Fla. March 2014.

Kristine Ossman, PharmD

Kristine received her PharmD from the Wegmans School of Pharmacy at St. John Fisher College in Rochester, N.Y., in 2013. Upon completion of a PGY-1 community pharmacy practice residency, she plans to work as a community pharmacist with a professional focus in medication therapy management, immunizations, and diabetes education.

Faculty Mentor: Melissa Somma McGivney, PharmD, FCCP, FAPhA

Risk factors for carbapenem-resistant *Enterobacteriaceae* infections

Pickering AJ, Shutt K, Potoski BA

PURPOSE

Carbapenem-resistant *Enterobacteriaceae* (CRE) infections are increasing worldwide and mortality of CRE bacteremia remains high, especially in comparison to non-CRE bacteremias. With the growing incidence and the high mortality in bacteremic patients, risk factor studies are needed. Therefore, this study was conducted to investigate risk factors for CRE bacteremia in adult, hospitalized patients at our institution.

METHODS

A single-center retrospective study was designed and patients with CRE bloodstream infections from January 1, 2007 to December 1, 2013, where reviewed and matched (1:1 ratio) to 3 sets of controls. Matching criteria included, (1) bacteria type, (2) hospital unit type, (3) year, and (4) time at risk (i.e. from admission to culture). Matched multivariable analyses were conducted between uninfected controls and patients with CRE, ESBL, and non-ESBL *Enterobacteriaceae,* respectively. Models were also designed to compare the CRE group with other case groups individually as well as all 3 non-CRE groups combined.

RESULTS

A total of 24 unique patients with CRE bloodstream infections were identified and 6 matched models were created. Risks for CRE bacteremia by univariate analysis were any antibiotic use; cefepime use; ampicillin/sulbactam use; piperacillin/tazobactam use; liver disease; and liver transplant ($P<0.05$). Antibiotic use was a significant risk factor for both CRE and ESBL bacteremia when these groups were compared to the control group. Multivariate risks for CRE bacteremia not shared with ESBL or non-ESBL groups were invasive procedure (O.R. 16.82, 95% CI; 3.53 to ∞) $p<0.001$, and liver transplant (O.R. 9.61, 95% CI;1.87 to ∞) $p=0.016$.

CONCLUSION

Prior antibiotic exposure does not appear to be a unique risk for CRE bacteremia. The findings of this study suggest risks may be associated with infection control practices. Given the high mortality rate in patients with CRE bacteremia, further investigation is warranted.

Aaron Pickering, PharmD

Aaron received his PharmD from the Duquesne University Mylan School of Pharmacy in 2012. He completed his pharmacy practice residency at UPMC Mercy in 2013. Upon completion of a infectious diseases pharmacy residency at UPMC Presbyterian, he plans to practice as a clinical infectious diseases pharmacist.

Faculty Mentor: Brian A. Potoski, PharmD, BCPS

Evaluation of Medication Associated Hypotension in Critically Ill Pediatric Patients

Riedy M, Aneja R, Crowley K, Kane-Gill S, Vetterly C

PURPOSE

Adverse drug reactions (ADRs) are estimated to occur in 17% of all hospitalized patients and estimated to be 2.5 times more frequent in children. A multicenter evaluation indicated that 62% of pediatric intensive care unit (PICU) patients experienced at least one adverse event and 17% were identified as ADRs. Medication-associated hypotension accounts for 5-6% of ADRs in pediatrics. The purpose of this study is to evaluate hypotensive episodes in PICU patients for individual drug-induced causes.

METHODS

This IRB approved study was a prospective observational analysis of hypotensive episodes in the PICU. Patients < 18 years of age who experienced a hypotensive event, as defined by PALS, during their PICU stay were included. Analyses of medication administration within 2 hours prior to the episode were assessed. Causality of medication-related hypotension was determined using three validated scales (Jones, Kramer, and Naranjo). Possible or greater on two out of three causality scales was defined as a "positive ADR."

RESULTS

Daily blood pressure screening of 899 PICU patient days identified 215 episodes of hypotension according to the PALS definition. The preliminary data presented represents analysis of the first 101 episodes in 45 patients. Fifty of 83 episodes (60.2%) included were associated with at least one "positive ADR" medication. Within the 50 episodes, 110 drug causes were identified including 29 different medications. Twenty-four episodes had only one drug cause identified. Twelve of the 29 medications were positive in more than one patient.

CONCLUSIONS

Drug-induced hypotension is a common occurrence among pediatric ICU patients. This study utilized the electronic health record to evaluate hypotensive episodes. Identification of medications associated with drug induced hypotension will help in managing these patients. Further analysis in a large, controlled sample size is needed to make strong conclusions on specific agents and incidence of hypotension in PICU patients.

Accepted for oral Presentation at the 23rd Annual PPAG meeting; 2014 Pediatric Pharmacy Conference; Nashville, Tenn., May 3, 2014.

Mary Riedy, PharmD

Mary received her PharmD from Duquesne University Mylan School of Pharmacy in 2013 and is currently the PGY-1 pharmacy resident at the Children's Hospital of Pittsburgh of UPMC. Upon completion of this residency year, she will be completing a PGY-2 in pediatrics at Boston Children's Hospital. Mary plans to become a pediatric clinical pharmacy specialist with a special interest in critical care and academia.

Research Mentor: Carol Vetterly, PharmD, BCPS

An Evaluation of Risk Factors for Supratherapeutic INR Values: A Case-control Study

Rindfuss SL, Cassidy EA, D'Amico F

PURPOSE

The narrow therapeutic index of warfarin requires frequent dose adjustments to maintain a target international normalized ratio (INR), and supratherapeutic INR levels increase a patient's risk of hemorrhagic complications. This evaluation was conducted to assess warfarin management and identify risk factors leading to supratherapeutic INR values in hospitalized patients receiving warfarin.

METHODS

A retrospective matched case-control study design was used to compare the incidence of risk factors suspected to cause supratherapeutic INR values in hospitalized patients receiving warfarin who had INR values ≥ 4.0 (cases) compared to those with INR values < 4.0 (controls). Between February and September 2013, case patients were identified using charge data for warfarin administration and Theradoc™ alerts for INR values ≥ 4.0. These patients were matched to control patients with INR values < 4.0 in a 1:2 fashion on age, length of stay, sex, and admission reason.

RESULTS

A total of 207 patients were evaluated: 69 cases and 138 controls. Statistically significant differences were seen in the percentage of patients with supratherapeutic INR values with hepatic insufficiency ($p<0.0001$, OR=5.00), decompensated heart failure ($p=0.0034$, OR=2.82), advanced malignancies ($p=0.0059$, OR=5.33), or poor nutritional states ($p=0.026$, OR=2.40). The only medication found to have significant differences on INR effects was amiodarone ($p=0.006$, OR=7.00); no statistical significance was detected for any antibiotic evaluated. There was a statistically significant difference in the incidence of bleeds ($p=0.0093$, OR=3.14), need to use reversal agents ($p<0.0001$, OR=8.33), and death ($p=0.043$, OR=5.00) between the group with supratherapeutic INR values versus the group with INR values below 4.0.

CONCLUSIONS

Hepatic insufficiency, decompensated heart failure, advanced malignancies, poor nutritional states, and use of amiodarone were identified as risk factors leading to excessive anticoagulation in hospitalized patients receiving warfarin. The presence of these risk factors places patients at greater risk for complications, including bleeds, need for reversal agents, and death.

Presented at the Society of Teachers in Family Medicine (STFM) 47th Annual Spring Conference, San Antonio, Texas, May 2014.

Sarah Rindfuss, PharmD

Sarah received her PharmD from the University of Pittsburgh School of Pharmacy in 2013 and is completing her pharmacy practice residency at UPMC St. Margaret. Next year, she will be staying at UPMC St. Margaret to complete a PGY-2 in family medicine. Following residency, Sarah hopes to pursue a position with a balance of teaching and clinical responsibilities.

Research Mentor: Elizabeth Forsberg Cassidy, PharmD, BCPS

Giving your patients MORE: The implementation of a non-pharmacologic protocol to prevent intensive care delirium

Rivosecchi RM, Kane-Gill SL, Svec S, Smithburger PL

PURPOSE

The development of delirium has a substantial economic and clinical impact, with an estimated cost between $4 billion and $16 billion dollars annually in the United States. No medications carry FDA approval for either the treatment or prevention of delirium, therefore non-pharmacologic management is the recommended preventative modality. The primary objective of this evaluation was to determine if the implementation of a non-pharmacologic protocol reduced the percentage of time patients spent delirious in the medical-intensive care unit (MICU).

METHODS

This was a pre-post investigation that evaluated a non-pharmacologic protocol for patients admitted to the MICU for six months between September 2013 and March 2014. Data were collected in the three months prior to protocol implementation when usual care occurred including a sedation and mobility protocol. Subsequently, an evidence-based non-pharmacologic protocol was implemented through nursing education. The protocol included Music, Opening and closing of blinds, Reorientation and cognitive stimulation, and Eye and ear care (MORE). After one month of use with the MORE protocol, post-implementation data were collected for three months. Descriptive statistics, chi-square and Mann Whitney-U, were used to compare the pre- and post-populations. Logistic regression was used to determine if the protocol reduced the odds of delirium while controlling for APACHE II, mechanical ventilation, and baseline dementia.

RESULTS

A total of 729 patients were evaluated, with 230 and 253 patients being included in the pre- and post-phases, respectively. There was a 40.4% reduction (16.1% vs. 9.6%, $p < 0.001$) in of MICU length of stay spent delirious or a 5 hour reduction (21 vs. 16 hours, $p = 0.00$). Mechanical ventilation (OR 2.45, $p = 0.002$), APACHEII (OR 1.07, $p < 0.001$, and dementia (OR 4.18, $p = 0.002$) were shown to be independent predictors of delirium development. The protocol was found to reduce the odds of developing delirium by 57% (OR 0.43 $p = 0.005$) after controlling for age, APACHE II, mechanical ventilation, and baseline dementia.

CONCLUSION

The implementation of a non-pharmacologic delirium prevention protocol resulted in a significant decrease in the percentage of time spent delirious in the MICU and reduced the risk of delirium development.

Research presented: Portions of the project were presented at the 48th ASHP Midyear Clinical Meeting, Orlando Fla., 2013.

Ryan Rivosecchi, PharmD

Ryan received his PharmD from the University of Pittsburgh School of Pharmacy in 2013. After the completion of his PGY-1 residency, he plans to remain at UPMC Presbyterian to complete a PGY-2 in critical care.

Research Mentors: Pamela Smithburger, PharmD, MS, BCPS; Sandra Kane-Gill, PharmD, MS

Vitamin D Deficiency and Incidence of Infection in Adult Renal Transplant Recipients

Sacha LM, Kalluri HV, Ingemi AI, Johnson HJ, Shullo MA, Venkataramanan R

PURPOSE

Vitamin D is a steroid hormone, which has multiple vital functions within the immune system, including cell mediated and innate immunity. Deficiency of vitamin D has been associated with increased rates of infection in individuals with impaired immune function, including transplant recipients. This study aims to assess the relationship between vitamin D status and the incidence of infection in adult renal transplant recipients.

METHODS

This is a retrospective cohort study of adult renal transplant patients with at least one total 25-hydroxyvitamin D (vitamin D) level at any point post transplant or within 30 days prior to the date of transplant. The primary endpoint was the incidence of infection within 90 days before and after the date of each vitamin D level. A multivariate logistic regression analysis was performed comparing patients who were vitamin D deficient to those who were vitamin D sufficient. Vitamin D deficiency was defined as total 25-hydroxyvitamin D level <30 ng/mL.

RESULTS

Data collection is complete, and data analysis is ongoing. In preliminary analysis, a total of 552 patients with at least one vitamin D level were identified; there were 1,577 individual vitamin D levels during the study period. Of all vitamin D levels, 10% were obtained between day -30 and day +180 from the date of transplant. Vitamin D deficiency was more common in the first 180 days post-transplant (74.7% of vitamin D levels) than after 180 days post-transplant (52.9% of vitamin D levels). Full results will be available pending completion of statistical analysis of the data set.

CONCLUSIONS

Of renal transplant patients who had at least one vitamin D level, most were drawn past the 6 month post-transplant mark. Vitamin D levels obtained within 6 months of transplant were more commonly below the threshold for vitamin D sufficiency than greater than 6 months post-transplant.

Lauren M. Sacha, PharmD

Lauren received her PharmD in 2012 from St. John Fisher College Wegmans School of Pharmacy. She completed her PGY-1 pharmacy practice residency in 2013 at UPMC St. Margaret and will be completing her PGY-2 solid organ transplant pharmacy resident at UPMC Presbyterian Shadyside in June 2014. Upon graduation, she will pursue a position as a solid organ transplant clinical pharmacy specialist at an academic medical center and hopes to continue precepting pharmacy students and residents and participate in quality improvement and clinical outcomes research.

Faculty Mentor: Michael Shullo, PharmD, BS

Implications of Kidney Function Estimates on Dofetilide Dosing

Schwier NC, Coons JC, Henry BL, Jain SK, Nolin TD

PURPOSE

Dofetilide is a class III anti-arrhythmic agent used in the treatment of atrial fibrillation and atrial flutter. Recommended dosing of dofetilide is dependent on estimated kidney function using Cockcroft-Gault (C-G) equation with actual body weight (ABW). Specific creatinine clearance ranges for dose adjustment in patients with impaired kidney function are also provided. However, it is unknown if using C-G is the optimal estimate of kidney function to determine dose in patients that receive dofetilide. The need for accurate dosing and monitoring of dofetilide is based on the potential for significant adverse effects, including QTc prolongation and torsades de pointes. Therefore, the purpose of this study was to compare various methods of estimating renal function to the prescribed dofetilide dose and patient outcome.

METHODS

A retrospective analysis was conducted of patients initiated (or re-initiated) on dofetilide at UPMC-Presbyterian Hospital from 2002 to 2010. Patients were stratified based on the presence or absence of an adverse drug reaction during dofetilide treatment. Each patient group's kidney function was estimated using: C-G [actual body weight (ABW), adjusted body weight (AdjBW) 30%, and 40%], Modification of Diet in Renal Disease (MDRD-4), and Chronic Kidney Disease–Epidemiology (CKD-EPI) equations. C-G using ABW was the control group and was compared to the other body weights and alternative methods of estimating kidney function. Estimates of kidney function were correlated with the ordered dose of dofetilide and patient outcome.

RESULTS

In a pilot analysis of 20/362 patients, using AdjBW (30%) to estimate kidney function in C-G, resulted in a lower dose of dofetilide recommended compared to using ABW. Furthermore, more adverse effects were associated with using ABW compared to AdjBW (30%). Interestingly, there was a trend towards no difference in adverse effects when using AdjBW (40%) compared to C-G.

CONCLUSIONS

Discordance in the estimation of kidney function may lead to discrepancies in dofetilide dosing, which can potentially cause adverse drug events.

Nicholas C. Schwier, PharmD

Nicholas is from the south shore of Long Island, N.Y. He received his PharmD from the Wegmans School of Pharmacy at St. John Fisher College in Rochester, N.Y., and completed his PGY-1 pharmacy practice residency at UPMC-Presbyterian. Nicholas' practice interests include heart failure, resistant hypertension, and pericarditis. After his PGY-2, Nicholas will join the faculty at the University of Oklahoma College of Pharmacy as an assistant professor and clinical specialist in cardiology at the University of Oklahoma Health Sciences Center.

Faculty Mentors: James C. Coons, PharmD, BCPS; Thomas D. Nolin, PharmD, PhD

Toxicity and Tolerability of Gemcitabine and Docetaxel in Advanced Soft Tissue Sarcomas: The University of Pittsburgh Experience

Shigle TL, Burgess M, Brenner TL, and Tawbi H

PURPOSE

Soft tissue sarcomas (STS) are rare malignancies of mesenchymal origin. Overall survival is poor for patients with recurrent and metastatic disease, with few chemotherapeutic regimens available. Gemcitabine (Gem) and docetaxel (Doc) have shown efficacy in advanced STS in randomized Phase II trials. This study was the first step in a multi-stage project to help predict treatment resistance patterns in STS. The primary objective is to determine the toxicity and tolerability of Gem/Doc in patients with advanced STS treated at Hillman Cancer Center (HCC).

METHODS

This retrospective, translational research project evaluated the treatment of advanced STS with Gem/Doc at our institution to determine toxicity and tolerability between July 1, 2007, and October 1, 2013. Patients who were ≤ 18 years old, received treatment at a non-HCC location, or had insufficient documentation were excluded. Tolerability was assessed by reviewing baseline characteristics, dosing frequency, total treatment cycles, prior therapy, and reason for discontinuation. Adverse events were evaluated using the NCI CTCAE v 4.

RESULTS

A total of 35 patients were analyzed, from 45 patients identified. The mean age was 54.3 years old with a baseline performance status ≤ 1. The median number of cycles received was three. The Gem/Doc regimen studied used a lower dose of Doc compared to literature (75 mg/m^2 vs 100 mg/m^2) and was well tolerated with few dose reductions (66.7% and 71.4% required no dose reduction of Gem and Doc, respectively) and delays. Two main reasons for discontinuation of therapy included treatment failure (57%) and tolerability (31%). The most common reported adverse events were fatigue, edema, infection, dyspnea, and anemia.

CONCLUSION

This study found Gem/Doc was well tolerated, with few serious adverse events. This data, in conjunction with the outcomes data, will be utilized to help develop a molecular response profile, and complement an ongoing Phase I/II trial utilizing Gem/Doc ± Vorinostat.

Presented at the 10th Annual HOPA Conference, New Orleans, La., 2014.

Terri Lynn Shigle, PharmD

Terri Lynn Shigle is from Irwin, Pa., and attended Ohio Northern University, where she obtained a dual degree in pharmacy and biology. Her first year residency was completed at UPMC Mercy and she is finishing up her oncology residency at UPMC Shadyside.

Faculty Mentor: Tim Brenner, PharmD, BCOP

Retrospective Analysis of the Effects of a Prior Authorization Requirement for Stimulant Medications

Shutzberg GL, Patel AA, Daw JR

PURPOSE

With stimulant medication use becoming more prevalent there is a concern for increased misuse and abuse. UPMC Health Plan implemented a prior authorization (PA) policy for stimulant medications to verify appropriate use based on FDA approved indications and clinical guidelines. This study assessed the effects of implementing the PA policy by evaluating utilization, prevalence, and pharmacy and medical spend associated with stimulant medication use.

METHODS

The analysis was a retrospective claims review for Commercial and Medicaid members ≥ 18 years of age who were continuously enrolled for nine months before and after the implementation of the policy with at least one recent paid claim for a stimulant medication. The study evaluated change in percentage of members using a stimulant medication and assessed the change in the median per-member-per-month (PMPM) pharmacy cost for these medications. Medical spend was also reviewed. Change in prevalence of stimulant medication use was evaluated in the overall population by comparing two cross-sectional time points six months before and after PA implementation.

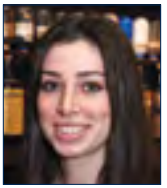
RESULTS

A total of 3,211 members were included in the study population. For members impacted by the PA, the study found a decrease in percentage of members using stimulant medications in the post-PA period and a significant decrease in median pharmacy cost PMPM for both Commercial (n=2081, $p<0.01$) and Medicaid (n=1130, $p<0.01$) members. Additionally, the change in median medical spend PMPM for Commercial members who did not continue on a stimulant medication post-PA (n=296) was not significant. Overall, there was a significant increase in prevalence of stimulant medication use ($p<0.05$).

CONCLUSION

While there was an increase in the prevalence of stimulant medication use, there was a decrease in utilization for members who were impacted by the PA implementation. It is unknown what the change in prevalence would have been without the PA policy.

Presented at the Academy of Managed Care Pharmacy 26th Annual Meeting, Tampa, Fla., April 2014.



Glenna Shutzberg, PharmD

Glenna received her PharmD from the University of Pittsburgh, School of Pharmacy in 2013. After completion of her managed care residency at UPMC Health Plan she plans to continue to work in a managed care setting in the Pittsburgh area.

Faculty Mentors: Jessica Daw, PharmD, MBA; Amy Patel, PharmD

Uptake of Health Insurance by the Uninsured in Response to the Patient Protection and Affordable Care Act

Sochacki MC, Jonkman LJ, Connor SE, Van Horn AH

PURPOSE

The Patient Protection and Affordable Care Act (PPACA) aims to improve access to health insurance for the more than 47 million uninsured nonelderly Americans. However, the true impact of the PPACA remains unknown and is dependent upon uptake by the uninsured population. This study was conducted to examine what factors influence uninsured patients' decisions to enroll in health insurance through the PPACA.

METHODS

We conducted semi-structured interviews with uninsured adults at both a free clinic and a federally qualified health center in Pittsburgh. The interviews focused on patient feelings and beliefs in regards to six domains: knowledge of the PPACA, value of health insurance, motivating factors for enrolling in insurance, barriers to enrolling in insurance, assistance navigating the marketplace, and the role of safety net sites. Transcripts were analyzed using the principles of Grounded Theory. Patients also completed a short demographic survey to evaluate eligibility for the PPACA.

RESULTS

Thirty patients were interviewed. Twenty-four (86%) would meet requirements for coverage through Medicaid expansion, and 11 (39%) were eligible for lower premiums/subsidies based on income limits. Seven themes emerged: (1) a belief that health insurance is important for health, (2) costs are the main barriers to enrollment, (3) a selective desire for insurance, (4) an unawareness of the provisions of the PPACA but a desire to understand the personal implications, (5) strong criticisms of the individual mandate and penalty provisions, (6) a high level of skepticism towards the government and insurance companies, and (7) a belief that being uninsured leads to stigmatization and decreased quality of care.

CONCLUSIONS

Providers should recognize that the majority of the uninsured desire insurance but cost and misconceptions are significant barriers to enrollment. Expansion of Medicaid in Pennsylvania would increase access to health insurance for patients currently utilizing safety net sites.

Marisa Sochacki, PharmD

Marisa received her PharmD from the University of Toledo College of Pharmacy in 2012 and completed her PGY-1 residency at the Battle Creek Veterans Affairs Medical Center in 2013. Upon completion of her PGY-2 in underserved care and global health, she will await an international field placement as a humanitarian aid worker with Doctors Without Borders.

Faculty Mentors: Lauren Jonkman, PharmD, BCPS, MPH; Sharon Connor, PharmD; Kim Coley, PharmD, FCCP

Measuring the Success of Trained Pharmacists to Stimulate Medication Adherence in a Medicare D Population

Tauber M, Holowka J, Legal P, Williams A, Safranyos M

PURPOSE

CVS Caremark created the Pharmacy Advisor program in 2011 to combat the growing problem of medication nonadherence. Medication nonadherence encompasses the largest portion of avoidable medical costs incurred annually in the United States. Little is known about the direct affects on Medicare D members that arise from Pharmacy Advisor's use of behavior modification strategies to influence medication adherence and health outcomes.

METHODS

A retrospective study was performed utilizing Pharmacy Advisor documentation software targeting data from a managed care organization covering more than 120,000 Medicare D members annually. During the study period, the pharmacists grouped potentially nonadherent members into one of 16 pre-determined categories, dependent on the member's reported barrier to adherence. Data from the documentation software was utilized to determine which barrier was seen most often and which was resolved most frequently following a pharmacist consultation. After the initial review of the documentation software, a literature search was performed to identify the most effective behavior modification strategies for reoccurring adherence barriers.

RESULTS

Pharmacy Advisor pharmacists spoke with 4,602 members determined to be nonadherent to a specific medication. Of the 4,602 members, 436 had to be recalled within the allotted study period, due to reoccurring nonadherence for the same medication. The top four medication adherence barriers in the study population were forgot doses, unwilling to discuss, lack of health literacy, and forgot to reorder. The most common reoccurring adherence barriers in the same member population included forgot doses, unwilling to discuss, lack of health literacy, and forgot to reorder. A literature search suggested utilizing a member letter to combat reoccurring adherence barriers.

CONCLUSIONS

The current behavior modification strategies being utilized by pharmacists resulted in less than 10% of nonadherence calls reoccurring. A literature search supports the use of a post-encounter member communication via written letter to decrease the frequency of adherence barriers.

Presented at the Academy of Managed Care Pharmacy's 26th Annual Meeting and Expo, Tampa, Fla., 2014.

Meghan N. Tauber, PharmD

Meghan received her PharmD from the University Of Minnesota College of Pharmacy and completed a PGY-1 Managed Care Residency with CVS Caremark in Monroeville, Pa. She plans to practice in managed care, focusing on sales and account management, while continuing to engage current residents and pharmacy students through precepting.

Faculty Mentors: Jamie Holowka, PharmD; Patrick Legal, PharmD; Mike Safranyos, PharmD

Evaluation of Hospitalized Patients Receiving QTc-prolonging Medications with High Risk for Torsades de Pointes (TdP)

Tunney RK, Wilson LM

PURPOSE

This clinical investigation sought to identify the combination(s) of medications associated with absolute QTc-prolongation based on established clinical parameters. Retrospective analyses were conducted to determine the incidence of clinically-significant QTc–prolongation and if at-risk patients were appropriately managed while receiving medications identified in the literature as causing the greatest risk of QTc-prolongation.

METHODS

This retrospective medical chart review will examine patient baseline demographic information in addition to age, gender, ethnicity, co-morbidities (e.g. electrolyte abnormalities, bradycardia, and coronary heart disease), baseline and subsequent QTc values, concomitant therapy with medications with known risk for QTc-prolongation, and development of TdP. Outcomes will include the development of clinically-significant QTc-prolongation, appropriate management and monitoring of high-risk patients, incidence of TdP, and the drug combination(s) which most commonly caused QTc-prolongation. Outcome evaluation will be reconciled with currently accepted, evidence-based guidelines to assess appropriateness of care.

RESULTS

A total of 22 of the 66 patients who met inclusion criteria were not managed appropriately according to pre-established criteria of electrolyte repletion, medication dose reduction or elimination, and/or presence of continuous cardiac monitoring. Results suggest that patients in whom QTc intervals lengthened $\geq$ 30 or 60 milliseconds (ms) above baseline were less likely to be appropriately managed ($p = 0.002$). No significant correlation could be established between specific medications or medication combinations and the incidence of QTc-prolongation. A single incidence of clinically identifiable TdP occurred in a patient receiving sotalol 120 mg daily and was managed appropriately.

CONCLUSIONS

These results suggest the need for improved monitoring and management of prolonged QTc-intervals in patients receiving two or more high-risk medications. Furthermore, a need for prescriber education has been identified related to the appropriate monitoring of patients receiving QTc-prolonging medications.

Presented at the ASHP Midyear Clinical Meeting, Orlando, Fla., December 8-12, 2013.

Robert Tunney, PharmD

Robert received his PharmD and BSPS degrees from Duquesne University Mylan School of Pharmacy in 2013 and completed a PGY-1 pharmacy practice residency at UPMC Mercy Hospital in 2013-14. Robert will be a PGY-2 cardiology resident at Vanderbilt University Medical Center in Nashville, Tenn., this upcoming year.

Faculty Mentor: Laura M. Wilson, PharmD, BCPS

Assessment of the Impact of Pharmacist-provided Heart Failure Education on Readmission Rates for Heart Failure

Whitman A, Simonelli R, Wilson L

OBJECTIVES

Under the Affordable Care Act, Medicare has begun to financially penalize hospitals with high 30-day readmission rates for certain conditions, such as heart failure. Heart failure is one of the most costly illnesses in the United States because of high rates of hospitalization. Non-adherence with evidence-based medications and other instructions is often multifactorial and may be related to inadequate patient education. Some studies have shown that pharmacist interventions, such as discharge counseling, can improve adherence and optimize heart failure medication therapy and result in a reduction in hospitalizations. Therefore, the purpose of this project is to determine the impact of pharmacist-provided heart failure education on hospital readmission rates for patients diagnosed with new onset or an exacerbation of heart failure.

METHODS

Monthly readmission rates for patients with a heart failure diagnosis was collected from our institution's Steps to Success Heart Failure Initiative. The institution's electronic medical record system was used to complete retrospective chart reviews to collect individual patient data (n=160). The primary endpoint will be the difference in 30 day readmission rates between patients who received pharmacist-provided heart failure education and heart failure patients who were not counseled by a pharmacist prior to discharge from the hospital. Secondary outcomes include absence of standard heart failure medications, prevention of adverse reactions, and pharmacist interventions recorded for patients who were counseled by a pharmacist in comparison to patients that did not receive counseling prior to discharge.

RESULTS

Data analysis is in process.

CONCLUSION

Pending data analysis.

Presented at ASHP Midyear December 2013.

Arin Whitman, PharmD

Arin received her PharmD from Duquesne University in 2013. Upon completion of a pharmacy practice residency at UPMC Mercy, she plans to complete a PGY-2 residency in oncology at Allegheny General Hospital.

Faculty Mentors: Laura M. Wilson, PharmD, BCPS; Robert Simonelli, PharmD

Gabapentin Prescribing Patterns: Impact of a Pharmacist-developed Educational Intervention

Wilkening GL, Brennan JL, Ross C, Fabian T

PURPOSE

This project assessed the impact of a pharmacist-developed educational intervention on evidence-based prescribing of gabapentin in an academic inpatient psychiatric hospital.

METHODS

Electronic medical records (EMRs) were reviewed to determine the most common indications for prescribing gabapentin at our institution. A subsequent literature search was conducted to review the evidence for use of gabapentin for these indications. These data were used to create a mandatory online education session for prescribers regarding evidence-based use of gabapentin. Data were extracted from the EMR to characterize gabapentin prescribing patterns at baseline (6/2013 to 8/2013) and following (3/2014 to 5/2014) the educational intervention.

RESULTS

A total of 153 discharge orders for gabapentin were written for 186 indications at baseline. Pain/chronic pain was the most common indication (33.9%; n=63), followed by neuropathic pain (16.7%; n=31), anxiety (16.1%; n=30) and mood stabilization (13.4%; n=25). Nine articles met inclusion criteria for literature review of the above four indications. The authors concluded that evidence did not support use of gabapentin for mood stabilization; anxiety disorders; or generalized, non-neuropathic, chronic pain; however, evidence did support use of gabapentin for neuropathic pain. Gabapentin prescribing patterns for the month (03/2014) following the educational intervention showed decrease in the percentage of orders for mood stabilization (6.3%; n=2), no orders for anxiety (0%; n=0), similar percentage of orders for neuropathic pain (15.6%; n=5), and increased percentage of orders for pain/chronic pain (56.3%; n=18). Anecdotally, the descriptions of pain/chronic pain being treated were more detailed in the clinical notes as compared to the baseline observation period.

CONCLUSION

Pharmacist-developed education may improve gabapentin prescribing patterns by reducing use of gabapentin for indications that have inadequate evidence to support use.

Presented at the 17th Annual Meeting of the College of Psychiatric and Neurologic Pharmacists. Phoenix, Ariz. April 28, 2014.

Gwendolyn Lucy Wilkening, PharmD

Gwendolyn received her PharmD from Southwestern Oklahoma State University College of Pharmacy. She is a current PGY-1 pharmacy practice resident at Western Psychiatric Institute and Clinic (WPIC), and will begin a PGY-2 in psychiatric pharmacy at WPIC in July 2014. At the conclusion of her residency training, she plans to practice as a psychiatric clinical faculty member for a college of pharmacy.

Faculty Mentor: Jessica L. Brennan, PharmD, BCPP

Call Me Maybe? A Pharmacist-led, Outpatient-driven Transitions-of-care Initiative

Wojtusik A, Broders J, D'Amico F

PURPOSE

In March 2012, UPMC St. Margaret began a transitions-of-care initiative. As part of the initiative, outpatient pharmacists within the family health centers (FHCs) contact patients via telephone following hospital discharge. A pilot evaluation of the initiative in the Spring of 2013 found that only 36% of eligible patients received a post-discharge telephone call. Additionally, the evaluation found that all-cause 30-day hospital readmission was significantly less in the group of patients who received a post-discharge telephone call (12% vs. 21%, p=0.5). Starting in July of 2013, a number of process improvements were implemented to increase the number of patients reached following hospital discharge. We aim to continually evaluate the transitions-of-care initiative and validate its impact on all-cause 30-day hospital readmission.

METHODS

Non-randomized, prospective follow-up including all adults (>18) discharged from the UPMC St. Margaret inpatient FHC service between July 2013 and January 2014. Patients were excluded if they had not followed with a primary care provider (PCP) from one of the three UPMC St. Margaret FHCs within the previous 2 years, died during the index hospitalization, left against medical advice, were transferred to another hospital, or discharged to a medical living facility or hospice service. The primary outcome is all-cause 30-day hospital readmission. Secondary outcomes include PCP follow-up and emergency department visits.

RESULTS

Pending.

CONCLUSION

Pending.

Presented at the 47th Annual Society of Teachers of Family Medicine (STFM) Annual Spring Conference, San Antonio, Texas, 2014.

Amanda Wojtusik, PharmD

Amanda Wojtusik earned her PharmD from the University of Rhode Island College of Pharmacy in 2012. She is currently a PGY-2 pharmacy resident at UPMC St. Margaret. Her primary areas of interest include chronic disease state management, medication adherence, and medication safety during transitions of care. In her free time Amanda enjoys running, reading, and experiencing all of the new adventures Pittsburgh has to offer.

Faculty Mentor: Jennie Broders, PharmD, BCPS

Pharmacologic Therapy Following Benzodiazepine-resistant Alcohol Withdrawal

Wong A, Benedict NJ, Kane-Gill SL

PURPOSE

Benzodiazepines (BZDs) are commonly used as first-line agents for the management of alcohol withdrawal syndrome (AWS). A subset of patients do not respond to treatment despite escalating doses of BZDs. Resistant alcohol withdrawal (RAW) is defined as the requirement of greater than a benzodiazepine-equivalent of 40 mg of diazepam in one hour. The objective of this study is to characterize the pharmacological management of RAW to help formalize a protocol for the management of these patients.

METHODS

Adult patients were identified retrospectively via ICD-9 codes for severe alcohol withdrawal from January 2009 to March 2012 at a tertiary care medical center and two community medical centers. At the time of RAW designation, patients must have actively received benzodiazepines for management of AWS. Data collected included time to resolution of symptoms, clinical outcomes, and medication characteristics.

RESULTS

A total of 184 patients met inclusion for this study. Seventeen individual medications and 76 unique combinations of medications were used for management, varying from BZDs to antipsychotics. BZDs were utilized to treat 100% of patients for AWS and lorazepam was the most commonly used (n = 156). Propofol was the most common adjunct agent (n = 104) with a median duration of therapy of 49.3 hours. Dexmedetomidine was utilized in 25 patients with a median duration of therapy of 30.0 hours. The addition of phenobarbital (n = 10) was generally considered only with toxicology consultation. Antipsychotics were utilized in 50 patients for symptom management. The median time to resolution of RAW was 6.0 days. A total of 169 patients survived until hospital discharge.

CONCLUSIONS

The management of patients meeting RAW criteria indicates that prescribing patterns are quite variable. The introduction of a formalized protocol for the management of RAW patients may be beneficial for streamlined management. Future directions include the comparison of different medications, including propofol and dexmedetomidine, on clinical outcomes.

Presented at the Society of Critical Care Medicine's 43rd Annual Congress, San Francisco, Calif. in January 2014.

Adrian Wong, PharmD

Adrian completed his Doctor of Pharmacy at the Northeastern University School of Pharmacy in Boston, Mass., in 2012 and completed a pharmacy practice residency at the Johns Hopkins Hospital in Baltimore, Md., in 2013. Upon completion of his critical care residency, he plans to pursue a career in academia with a focus on clinical research.

Faculty Mentors: Neal Benedict, PharmD; Sandra Kane-Gill, PharmD, MS, FCCP, FCCM

Pharmacy Residency Programs

Post Graduate Year 1 (PGY1)

Pharmacy at UPMC Presbyterian Shadyside
Director: Heather Johnson, PharmD, BCPS

Pharmacy at UPMC Mercy
Director: Robert Simonelli, PharmD

Pharmacy at UPMC St. Margaret
Director: Patricia Klatt, PharmD, BCPS
Assistant Director: Roberta Farrah, PharmD, BCPS

Pharmacy at UPMC McKeesport
Director: Jerad Heintz, PharmD, MBA

Pharmacy at UPMC Shadyside
Director: Stephanie Ballard, PharmD, BCPS

Pharmacy at Children's Hospital of Pittsburgh of UPMC
Director: Kelli L. Crowley, PharmD, BCPS

Pharmacy at UPMC Hamot
Director: Brad Cooper, PharmD

Managed Care at UPMC Health Plan
Director: Jessica Daw, PharmD, MBA

Managed Care at CVS Caremark
Director: Patrick Legal, PharmD

Community Pharmacy
Gatti Pharmacy, Giant Eagle Pharmacy, Rite Aid Corporation, University Pharmacy
Director: Melissa Somma McGivney, PharmD, FCCP, FAPhA

Post Graduate Year 2 (PGY2)

Ambulatory Care at UPMC Presbyterian Shadyside
Director: Deanne Hall, PharmD, CDE, BCACP

Cardiology at UPMC Presbyterian Shadyside
Director: James Coons, PharmD, BCPS-AQ (CV)

Critical Care at UPMC Presbyterian Shadyside
Director: Pamela Smithburger, PharmD, MS, BCPS

Family Medicine at UPMC St. Margaret
Director: Patricia Klatt, PharmD, BCPS
Asst. Director: Roberta Farrah, PharmD, BCPS

Geriatrics at UPMC Presbyterian Shadyside
Director: Christine Ruby-Scelsi, PharmD, BCPS, FASCP

Geriatrics at UPMC St. Margaret
Director: Heather Sakely, PharmD, BCPS

Health-System Pharmacy Administration at UPMC Presbyterian Shadyside
Director: Jon Horton, PharmD

Infectious Diseases at UPMC Presbyterian Shadyside
Director: Brian Potoski, PharmD, BCPS-AQ (ID)

Pharmacy Residency Programs

Medication Use Safety at UPMC Presbyterian Shadyside
Director: Sandra Kane-Gill, PharmD, MSc, FCCM, FCCP

Oncology at UPMC Cancer Centers
Director: James Natale, PharmD, BCOP

Solid Organ Transplant at UPMC Presbyterian Shadyside
Director: Michael Shullo, PharmD

Underserved Care and Global Health
Director: Sharon Connor, PharmD
Assistant Director: Lauren Jonkman, PharmD, BCPS

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