Resident Research
2011–12

University of Pittsburgh
School of Pharmacy

Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2012,

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 Shadyside, UPMC St. Margaret, UPMC Mercy, UPMC Hamot, UMPC Health Plan, Rite Aid, and CVS Caremark—have provided the rich environments for your residency experiences and learning. You have enriched each other with your pharmacy backgrounds from California, Florida, Georgia, Illinois, Indiana, Maryland, Massachusetts, Michigan, Missouri, Montana, New Jersey, New York, North Carolina, Ohio Pennsylvania, South Carolina, and West Virginia as well as Canada, Cuba and Japan.

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, 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 twelve of "America's Best Hospitals" according to the 2011 U.S. News and World Report rankings and is one of the leading integrated health care delivery systems in Western Pennsylvania. UPMC Presbyterian Shadyside, UPMC Mercy and UPMC St. Margaret, Western Psychiatric Institute and Clinic and Children's Hospital of Pittsburgh participate in our residency programs.

UPMC Health Plan is the second largest insurer in Western Pennsylvania and in 2009 was ranked as the best in customer service in the region by J.D. Power and Associates. *U.S. News & World Report* ranked UPMC Health Plan in the top 10 percent of all commercial plans across America.

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.

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 resident research program requires residents to be certified in research fundamentals through the University of Pittsburgh, participate in valuable 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 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: Kim Coley, Brad Cooper, Shelby Corman, Amy Donihi, Kerry Empey, Phil Empey, Tanya Fabian, Trish Klatt, Jason Markuss, James Natale, Jan Pringle, Robert Simonelli, Sue Skledar, Pam Smithburger and Melissa Somma McGivney. 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 Kroboth and Senior Associate Dean Randall Smith. We would like to thank Melissa Saul and Mary Beth Ducar for Their contributions to data management for several of the retrospective database projects. We would be remiss not to mention the fine administrative support of Kathleen Woodburn. Most importantly, this program is successful because of the commitment of our outstanding residents and faculty advisors.

Teaching and Education Achieving Collaboration among Health Professionals: The TEACH Study

Russo-Alvarez G, Yonas M

PURPOSE

The patient-centered medical home is an evolving model for clinical practice. Key to the success of this model is interdisciplinary collaboration; however, there are no published reports of faculty development fellowships that formally cultivate the development of physician-pharmacist collaboration. The purpose of this study is to explore and assess the effect of unique relationships developed between the physician and pharmacist graduates of the University of Pittsburgh Medical Center (UPMC) St. Margaret Faculty Development Fellowship and how that translates into clinical practice.

METHODS

A qualitative research study involving twenty to thirty minute, one-on-one interviews with physician and pharmacist graduates of the interdisciplinary faculty development fellowship were conducted. From 2003-2011, the interdisciplinary fellowship has graduated 27 physicians and 14 pharmacists. The interviews were led by one pharmacist who is a previous graduate of the interdisciplinary fellowship. All interviews were audio-recorded and transcribed verbatim. A thematic analysis based in Grounded Theory was conducted. Two reviewers developed thematic codes consistent with the study objective and field guide and results were organized into overall themes and physician and pharmacist themes.

RESULTS

A total of 22 interviews were conducted: 12 physicians and 10 pharmacists. Due to geographic location of graduates, 12 interviews were conducted via telephone. Three overall emerging themes resulted from the interdisciplinary fellowship, including increased insight into physician and pharmacist training and perspective; perceived improvement in performance as a clinician-educator; and perceived improvement in performance as a clinician. Specific physician themes included increased awareness of the capabilities and assets of working with clinical pharmacists and increased likelihood of engaging and collaborating with pharmacists. Emerging pharmacist themes included increased ability to build collaborative relationships with physicians and increased marketability.

CONCLUSION

Participants felt the interdisciplinary faculty development fellowship was a positive experience. Understanding the benefits of interdisciplinary fellowship training may help to support further physician-pharmacist collaborative training. Additionally, physician-pharmacist collaborative training may improve clinical outcomes.

Presented at the Annual Society of Teachers of Family Medicine Conference, Seattle, Wash., 2012 and the Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Giavanna Russo-Alvarez, PharmD

Giavanna received her PharmD from the Duquesne University Mylan School of Pharmacy in 2010. After completing a PGY1 pharmacy practice residency at UPMC St. Margaret, Giavanna remained at the same institution and completed a PGY2 family medicine specialty residency. Upon graduation, Giavanna will join the Cleveland Clinic Main Campus as an outpatient clinical pharmacist. During her free time, Giavanna enjoys singing, salsa dancing, learning foreign languages, and spending time with family and friends.

Faculty Mentor: Roberta Farrah, PharmD, BCPS
Research Mentor: Michael Yonas, DrPH

Implementation of Brief Medication Adherence Interventions Within a Community Chain Pharmacy Practice: A Qualitative Analysis

Bacci JL, McGrath SH, Pringle J, Maguire MA, McGivney MA

PURPOSE

To (1) identify facilitators and barriers to implementing brief medication adherence interventions and (2) describe adaptations of the intervention and organizational structure within each individual pharmacy practice.

METHODS

A community pharmacy chain, school of pharmacy, managed care organization, and quality improvement technology company have partnered to implement brief medication adherence interventions and evaluate the quality of care provided to patients in community pharmacies based on the Pharmacy Quality Alliance portion of days covered (PDC) measure. Brief interventions are two minute or less two- way conversations at the point of dispensing between a pharmacist and patient based on an identified gap in adherence with the goal to improve patient adherence. This qualitative study, a subset of the larger project, seeks to better understand the "behind-the-scenes" implementation of patient screening and brief medication adherence interventions within the pharmacy workflow**.** "Early adopter" practices, or those who are among the first to implement new innovations, and "laggard" practices, or those who are last to implement new innovations, will be identified based on their medication adherence metrics. Key informant interviews will be conducted with pharmacists from "early adopter" practices and "laggard" practices until data saturation is reached. The key informant interview transcripts will be analyzed using the principles of Grounded Theory. The transcripts will be coded to elicit themes regarding the implementation of pharmacist- led brief medication adherence interventions.

PRELIMINARY RESULTS

There were thirty-nine "early adopter" practices and seven "laggard" practices. Preliminary themes expressed from both "early adopter" and "laggard" practices include the desire for more contact with and support from management and difficulty implementing the project because of the number of programs being pushed by the community pharmacy chain.

CONCLUSIONS

The elicited themes will assist in understanding how individual community pharmacists are implementing brief medication adherence interventions as well as the challenges faced. This information will allow for a better understanding of how to implement similar innovations within community pharmacy workflow and may be a template for future innovations.

Presented at the American Pharmacists Association Annual Meeting, New Orleans, La., 2012.

Jennifer L. Bacci, PharmD

Jennifer received her PharmD from the University of Pittsburgh School of Pharmacy in 2011. She chose to complete her residency with the University of Pittsburgh and Rite Aid because of the multitude of opportunities to gain experience in all aspects of community pharmacy including practice and management, the teaching and precepting opportunities, and the strong support provided to residents. Her professional interests include advancing community pharmacy practice, building and expanding outpatient clinical services, and teaching and precepting.

Faculty Mentors: Melissa Somma McGivney, PharmD, FCCP and Stephanie Harriman McGrath, PharmD

Effect of Pre-Scheduled Pharmacist Counseling in an Outpatient Oncology Clinic

Baker AD, McAleer ML

PURPOSE

A study commissioned by The American Society of Clinical Oncology projected an oncologist deficit of 9.4 to 15.1 million visits by the year 2020.

The Board of Pharmaceutical Specialties recognizes oncology as an advanced practice specialty with 1,083 pharmacists holding the designation of Board Certified Oncology Pharmacist. Oncology pharmacists directly manage oncology patients through teaching, supportive care, and drug-specific interventions thus are a resource to bridge this anticipated gap in care.

By assessing patient satisfaction and quality of information, our aim was to determine if scheduling pharmacist education would enhance oncology patient care. We also aimed to provide a workforce model implementing scheduled appointments for pharmacist-based counseling.

METHODS

This prospective, randomized controlled trial conducted at UPMC Cancer Center at St. Margaret Hospital (SMH) included adult patients scheduled to receive outpatient chemotherapy.

Exclusion criteria included hearing/visual impairment, learning disabilities prohibiting ability to respond to counseling materials/questionnaires, and expected treatment duration <1 month. Twenty-five patients were consented and randomized to receive standard of care counseling with or without pre-scheduled pharmacist counseling.

Pharmacy staff administered questionnaires assessing baseline quality of life and satisfaction with information. The treatment group received counseling performed by an SMH pharmacist. After two treatments or one month, pharmacy staff administered follow-up surveys.

RESULTS

Results are pending. Assessment tools included the European Organization for Research and Treatment of Cancer (EORTC) information module (INFO25) and the EORTC Quality of Life Instrument (QLQ-C30). Global scores will be recorded and presented.

CONCLUSIONS

This study outlines the potential role of the clinical pharmacist in the increasingly growing population of oncology patients treated in outpatient clinics. It is expected to demonstrate an effective model for the provision of patient education in outpatient oncology to improve patient satisfaction and quality of life.

Presented at the Hematology/Oncology Pharmacist Association 8th Annual Conference in Orlando, Fla. and Society of Teachers of Family Medicine Annual Spring Conference in Seattle, Wash.

Amber D. Baker, PharmD

Amber received her PharmD from Creighton University in 2011. Upon completion of her pharmacy practice residency at UPMC St. Margaret she will embark on a PGY2 Oncology Residency at University of California, San Diego.

Faculty Mentors: Molly L. McAleer, PharmD

Erythropoiesis Stimulating Agents: Darbepoetin Alfa and Epoetin Alfa Drug Use Evaluation at a Teaching Community Hospital

Bragg SW, Campbell RJ

PURPOSE

Erythropoiesis stimulating agents (ESAs) have had recent changes in their FDA labeling due to safety concerns of death, serious adverse cardiovascular reactions, and stroke when targeting a hemoglobin value > 11 g/dL. Moreover, the labeling was changed to advise that the lowest dose possible be used for transfusion prevention. Due to the possible risks from inappropriate use, a drug use evaluation was identified as an important strategy to minimize these risks at UPMC St. Margaret.

METHODS

A retrospective review of ESA use in patients took place between July 1, 2011 and March 14, 2012. Subjects were included in the analysis if at least one dose of an ESA was given within the study period. Records such as patient demographics, hemoglobin and hematocrit levels, ESA dosage, ESA indication, and use of iron panels were collected. Use at our institution was compared to recommended dosing from the package inserts of epoetin alfa (Procrit®) and darbepoetin alfa (Aranesp®) and for compliance to the dosage adjustments for hemoglobin values >11 g/dL.

RESULTS

Variability from the package inserts and FDA warnings occurred in justifications for use, initial empiric dosing, and appropriate dosing intervals. Appropriate use measures such as collecting iron panels before starting therapy and dosage adjustments for hemoglobin values >11 g/dL showed less variability. Appropriate compliance was seen for obtaining hemoglobin values (100% compliance), initiating therapy when hemoglobin values were <10 g/dL (97.3% compliance), and the dosing intervals used with darbepoetin alfa (100% compliance). The greatest variability from the package insert occurred in the initial dose started for new ESA patients.

CONCLUSIONS

Significant variances were seen from recommended standards for ESAs at our institution. As a result, several strategies will be attempted to ensure appropriate, safe use including new order set development, Discern Rules for hemoglobin values >11 g/dL, and educational programs.

Presented at the Society of Teachers of Family Medicine Annual Spring Conference, Seattle, Wash., 2012; and the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Scott W. Bragg, PharmD

Scott is from Cross Lanes, West Virginia, and received his PharmD from West Virginia University in 2011. While at UPMC St. Margaret, he hopes to gain experience in pharmacy practice and participate in various teaching opportunities. His professional interests include family medicine, oncology, and ambulatory care. Outside of pharmacy, Scott enjoys being outdoors, cooking, and cheering on the West Virginia University Mountaineers.

Faculty Mentor: Ronald J. Campbell Jr., PharmD, BCPS

Evaluation of the Transition Fill Process on Chronic Medication Use in Newly Enrolled Medicare Part D Members

Burnheimer SA, Markuss J, Safranyos M, Raskind J, Weitzman J

PURPOSE

The Centers for Medicare and Medicaid Services (CMS) require Medicare Part D plan sponsors to provide a transition process for newly enrolled members affected by formulary changes so beneficiaries do not experience an interruption in medication therapy. Typically these members receive up to a 30 day supply of the nonformulary medication and a notification letter. In 2011, a reasonable effort to notify prescribers of affected members was required so prescribers received a notification letter. An evaluation was conducted to describe outcomes of the transition fill process and determine if addition of a prescriber notification letter in 2011 compared to 2010 impacted outcomes by increasing meaningful transitions.

METHODS

Pharmacy claims were classified by the member's first action taken after adjudication of a nonformulary transition fill. Outcomes were subclassified as (1) request for formulary exception, (2) change to formulary alternative, (3) change to nonformulary alternative, (4) rejected claim for the medication, or (5) lost to follow up. These outcomes were further classified as meaningful transition (1-3) or nonmeaningful transition (4-5). A subgroup analysis was performed to determine outcomes after a rejected claim during the study period.

RESULTS

In 2010 and 2011, a rejected claim was the most prevalent outcome (39%; 53%). The majority of members were not initially meaningfully transitioned in 2010 (52.3%) or 2011 (65.0%). In the subgroup analysis, 69% of members with an initial rejected claim in 2010 and 2011 were eventually meaningfully transition in the study period; this suggests the overall percentage of meaningful transitions was 74.6% in 2010 and 71.5% in 2011.

CONCLUSIONS

The majority of members were not initially meaningfully transitioned in 2010 or 2011, and the prescriber notification letter did not increase the number of meaningful transitions in 2011. However, the subgroup analysis demonstrated that the majority of members were eventually meaningfully transitioned, so as a result fewer members may have experienced long term interruptions in medication therapy.

Presented at Academy of Managed Care Pharmacy 24th Annual Meeting, San Francisco, Ca., 2012.

Sara Burnheimer, PharmD

Sara received her PharmD from Duquesne University's Mylan School of Pharmacy in 2011. Upon completion of a post-graduate year one managed care residency, she plans to practice in a managed care setting at a pharmacy benefit manager or health plan.

Faculty Mentor: Shelby L. Corman, PharmD, BCPS

Conversion from Insulin Infusion to Insulin Glargine in Critical Care Patients

Campbell NE, Ganchuk SR

PURPOSE

Data suggesting an appropriate protocol for insulin dosing in critical care patients when converting from intravenous insulin infusions to subcutaneous basal insulin is limited. The objective of this study was to determine the most appropriate conversion technique when interchanging insulin infusions to basal insulin in ICU patients while maintaining adequate glycemic control without hypoglycemic events.

METHODS

The institution's electronic medical record was used to retrospectively identify patients in the medical intensive care unit that were placed on an intravenous insulin infusion and then later converted to insulin glargine. Patients less than 18 years of age, patients that received intravenous and basal insulin for less than 24 hours, and patients admitted for diabetic ketoacidosis (DKA) will be excluded from the study. Data compiled and documented from the electronic record include age, gender, daily requirement of intravenous insulin prior to conversion for at least 24 hours, percentage of IV requirement dosed as insulin glargine after conversion, and fasting blood glucose values after conversion for at least 24 hours. From this patient data, blood glucose values after the conversion to insulin glargine will be compiled to assess which values were considered euglycemic (blood glucose 140-180 mg/dL) and if any hypoglycemic events (blood glucose ≤70 mg/dL) occurred.

RESULTS

9 patients were eligible for inclusion in the study. Only 1 patient had a blood glucose reading within the euglycemic goal range after conversion. 2 patients experienced hypoglycemic events after conversion to insulin glargine. The remaining patients remained hyperglycemic after conversion. Due to the small sample size and future plans for the data, no statistical analysis was performed.

CONCLUSION

No apparent correlation was seen between the percentage of 24 hour insulin requirement dosed as insulin glargine and fasting blood glucose after direct conversion from IV to subcutaneous basal insulin.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Nicholas E. Campbell, PharmD

Nicholas received his PharmD from the Duquesne University Mylan School of Pharmacy in 2011 and is completing a pharmacy practice residency at UPMC Mercy. Upon completion, he will be completing a PGY-2 pharmacy residency in critical care at Allegheny General Hospital.

Faculty Mentor: Steven R. Ganchuk, PharmD

Evaluation of Hypoglycemic Events; Basal-Bolus Versus Sliding Scale Insulin

Dalton JD, Brundige ML

PURPOSE

The current standard of care recommended for diabetics by the American Diabetes Association (ADA) in hospitalized patients with hyperglycemia is basal-bolus insulin. Basal-bolus and sliding scale insulin are used to treat diabetic as well as non-diabetic patients with hyperglycemia. Increased rates of hypoglycemia in patients being treated with insulin have been observed at our institution. The objective of this study is to explore a possible association between patients with hypoglycemic events and the administration of either basal-bolus or sliding scale insulin.

METHODS

A retrospective study will be conducted on patients who were identified as having a hypoglycemic event following administration of either basal-bolus or sliding scale insulin. Adult male and female patients, ≥ 18 years of age, from multiple inpatient floors, and who developed a hypoglycemic event after day 0 (day 0 being first day of admission) will be included. Patients will be divided into two groups: a basal-bolus and a sliding scale group. The basal-bolus group is defined as any patient on long acting insulin, with or without pre-meal insulin or corrective insulin. The sliding scale group is defined as any patient solely on sliding scale insulin. A hypoglycemic event, defined as a blood glucose level ≤ 70 mg/dL, will be identified through a computerized report. Intensive care unit (ICU) patients, patients with an admitting diagnosis of hypoglycemia, patients on scheduled rapid/short acting insulin or insulin mixes with or without sliding scale insulin will be excluded. The primary outcome measure is the proportion of patients with a hypoglycemic event while receiving either basal-bolus or sliding scale insulin. Secondary outcome measures include: difference in length of stay secondary to hypoglycemia, direct cost of treatment, as well as occurrence of insulin dose changes surrounding the event.

RESULTS

The results are pending.

CONCLUSION

It is anticipated that this project will demonstrate which insulin treatment regimen results in a lower proportion of hypoglycemic events.

Presented at UPMC Hamot Research Day, Erie, Pa., 2012 and 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Jamie Dalton, PharmD

Jamie received her PharmD from Virginia Commonwealth University (VCU)/Medical College of Virginia (MCV) School of Pharmacy, and is completing her PGY1 pharmacy practice residency at UPMC Hamot, Erie, PA. Upon completion of the residency she plans on practicing in the hospital setting back in Richmond, VA.

Faculty Mentor: ML Brundige, PharmD

Evaluation of an Electronic Medical Record Warfarin Flowsheet Within a Family Medicine Residency Program

D'Antonio NN, Farrah RM

PURPOSE

Warfarin management is complex, requiring a systematic documentation process. Pharmacist-run anticoagulation clinics streamline this management in primary care; however, a family medicine residency program represents a unique environment where pharmacists facilitate education and physician independence regarding warfarin monitoring. In our academic outpatient facilities, accurate electronic warfarin documentation is challenging due to multiple providers, small number of patients receiving anticoagulation, limited electronic health record training, and many data entry points. Consequently, necessary information that guides anticoagulation decision-making can be absent, misinterpreted, and incompatible with clinic notes. This two-year research project evaluates the accuracy of an initial and alternative electronic warfarin documentation system in order to determine a best workflow for our facilities.

METHODS

A pre-survey was distributed to physicians, nurses and pharmacists to evaluate provider perspectives about documenting anticoagulation information using an initial workflow. A retrospective chart review was performed comparing the accuracy of an initial warfarin flowsheet to the corresponding clinic note. An alternative electronic workflow was then developed, implemented and retrospectively reviewed for accuracy of warfarin flowsheet documentation. A post-survey was distributed to the same providers to evaluate perspectives regarding the alternative workflow.

RESULTS

Chart review of the initial workflow included 52 patients and 435 flowsheets. The accuracy of all flowsheet entries was 19.5%. The average number of flowsheet entries per patient was six and the mean accuracy of these entries per patient was 1.63. Comfort with documentation significantly increased from 45.5% to 76.7% ($p=0.007$) after implementation of the alternative workflow. Providers responded that the alternative workflow was significantly less confusing (14.2% versus 52.8% ($p<0.01$)) and less time-consuming (14.3% versus 58.2% ($p<0.01$)). Completion of the second chart review (alternative documentation workflow) is May 2012.

CONCLUSIONS

Warfarin documentation can be improved in our outpatient facilities. Practice-specific workflows will be created to increase accurate documentation and facilitate effective management education.

Presented at the 45th Annual Society of Teachers of Family Medicine Conference, Seattle, Wash., 2012 and the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Nicole N. D'Antonio, PharmD, BCPS

Nicole is a graduate of the Duquesne University Mylan School of Pharmacy. She then completed her PGY1 training at UPMC St. Margaret. After completing her PGY2 family medicine residency at UPMC, she plans on pursuing a career in ambulatory/primary care. Outside of pharmacy, Nicole enjoys good food and wine, playing tennis, outdoor activities, traveling, and spending time with family and friends.

Faculty Mentors: Roberta Farrah, PharmD, BCPS; Heather Sakely, PharmD, BCPS

Justification of a Pharmacy Call Center

Edward HS, Skledar SJ, Corman SL, Culley CM

OUTCOME

Will implementation of pharmacy call center for better streamlining of phone calls reduce the number of abandoned phone calls, allowing pharmacists the time for more clinical interventions?

REVIEW

Presbyterian Department of Pharmacy has been experiencing an increased amount of phone calls the past few years as our pharmacy services have been expanded. With an average of 500 calls that come in to the pharmacy department on a daily basis, we will be able to extrapolate very meaningful data to see if justification is met to have extra pharmacy support staff to be utilized for a call center for better streamlining of phone calls. Having this streamline process better utilizes the pharmacists to do less technical work [by receiving phone calls] and allows the pharmacist to continue to do more verification with quicker turnaround time to the patient, including increased customer satisfaction.

METHODS

An initial two-week pilot was conducted for all employees that answer our main pharmacy line including both technicians and pharmacists. The pilot was composed of a phone log for incoming phone call requests. These compared findings will be used to determine if the percentage of calls are mainly technical questions versus clinical, and therefore justifying the need for technicians to be utilized better in this streamline process.

RESULTS

Initial call pilot data was summarized to show current reasons for all calls that were received. Categories were divided between dispensing/distribution and clinical knowledge. Dispensing/distribution is the divided amongst 'verify', 'restock', 'missing doses', or 'other' and clinical knowledge is divided amongst 'crushing/compatibility', 'drug shortages', 'interactions', or 'other'.

CONCLUSIONS

The implementation of a pharmacy call center does reduce the number of abandoned calls with both staffing structures from a baseline of 34% to 28% and 23%. This system, however, does require additional resources and justifications may or may not be warranted.

Hany S. Edward, PharmD, MS

Hany received his PharmD degree with a minor in Business Administration from Florida A&M University in 2010. Hany enjoys being with friends and family, traveling, and loves college sports. After completing his PGY2 in Health-System Pharmacy Administration, Hany will join Inova Fairfax Hospital in the Washington, DC area as a manager of pharmacy operations.

Faculty Mentor: Susan Skledar, RPh, MPH and Bryan Yourich, PharmD

Susceptibility of Community Uropathogens to Ciprofloxacin

Evans DJ, Freedy HR, Yassin MH

PURPOSE

The current IDSA guidelines for the treatment of acute, uncomplicated pyelonephritis do not support the use of fluoroquinolones as empiric therapy where the community resistance rate of uropathogens is known to exceed 10 percent. The UPMC Mercy antibiogram does not provide susceptibility data specific for isolates obtained from community acquired infections, but rather combines these with isolates from infections acquired in all health care settings. The objective of this study is to determine the rate of resistance of uropathogens to ciprofloxacin from community acquired urinary tract infections (UTIs) to aid prescribers at UMPC Mercy in selecting optimal empiric antimicrobial therapy.

METHODS

A retrospective review of UPMC Mercy's electronic medical record system was used to identify patients who were discharged from the emergency department with a diagnosis of UTI or pyelonephritis acquired in the community setting. Patients were excluded from the study if identified to have any of the following: male gender, health care acquired UTI, history of recurrent UTI's, urologic abnormality, indwelling catheter, or recent hospitalization, urologic procedure or antibiotic use within the past 30 days. Uropathogens with corresponding susceptibilities to commonly prescribed antimicrobials, including ciprofloxacin, will be documented and reported as susceptible, intermediate, or resistant.

RESULTS

Among the uropathogens isolated, *Escherichia coli* was the most commonly identified organism from patients with cystitis (77.8%, n=70) and pyelonephritis (83.3%, n=98). With the exception of ampicillin (reported *E. coli* resistance: 37%, n=168), antimicrobial resistance among the community *E. coli* isolates remained low for the reported antimicrobials, including the quinolones (reported resistance: 2%, n=168) and trimethoprim-sulfamethoxazole (reported resistance: 10%, n=168).

CONCLUSIONS

Given the low prevalence of uropathogen resistance in the UPMC Mercy patient population, the empiric use of trimethoprim-sulfamethoxazole and a fluoroquinolone is appropriate for the treatment of cystitis and pyelonephritis, respectively. This is consistent with current IDSA guidelines.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Derek J. Evans, PharmD

Derek is originally from Rainelle, WV and received his PharmD from West Virginia University in 2011. Prior to pharmacy school, Derek received a B.S. in Chemistry from Concord University. His current areas of interest include infectious diseases and critical care medicine. Derek is currently pursuing a PGY-2 residency position in critical care medicine at UPMC Passavant.

Faculty Mentors: Henry R. Freedy, PharmD and Mohamed H. Yassin, MD, PhD

Impact of Cart Fill and Medication Delivery Optimization on Missing Doses Issued by Pharmacy

Garcia JJ, Corman S, Skledar S, Culley C

OBJECTIVE

The University of Pittsburgh Medical Center (UPMC) Presbyterian Hospital currently has a hybrid pharmacy medication distribution model consisting of a daily 24-hours cart fill and automated dispensing machines (ADMs) located in patient care units. Currently, the pharmacy is experiencing a high number of missing doses. The primary objective of this study is to reduce the total number of missing doses issued by pharmacy.

METHODS

Although there were multiple potential approaches to reducing the number of missing doses, pharmacy administration decided to focus on the cart fill and the medication distribution process. The interventions to optimize these processes include having a true daily exchange of medication envelopes, changing the medication delivery time from 2:00PM to 7:00AM, sending a full 24-hours supply of PRN medications, centralizing nursing carts at the time of delivery, and running two robot cart fill updates. The number of total missing doses was analyzed before and after implementation. Pre-implementation period was from January 7 to February 7. Post-implementation period was from February 8 to March 8 and from March 9 to April 9. In order to account for the potential fluctuations in the number of missing doses as a result of census, our analysis used the total number of doses dispensed by pharmacy as a control. Chi Square Test was used to analyze the proportion of missing doses pre and post implementation.

RESULTS

The proportion of missing doses for January was 0.1159658 whereas the proportion of missing doses for March was 0.1117050; $p<0.0001$. Therefore, missing doses in March were statistically significantly lower than in the month of January. This means that post implementation the pharmacy experienced on average a total of 1000 less missing doses per month.

CONCLUSION

This study suggests that cart fill and medication delivery optimization has the potential to reduce the total number of missing doses dispensed by inpatient pharmacies.

Presented at 2012 Annual Eastern States Conference, Hershey, Pa.

Jorge J. Garcia, PharmD, MBA, MS

Jorge was born and raised in Havana, Cuba. He moved to the United States with his family at age fifteen. Jorge received his doctor of pharmacy degree from Nova Southeastern University (NSU) in 2010. Later that year, Jorge also received a Master of Business Administration from NSU. After completing a PGY1/PGY2 Health-Systems Pharmacy Administration Residency, Jorge will join Broward General Medical Center in Fort Lauderdale, Florida as a Pharmacy Clinical Services Manager.

Faculty Mentor: Sue Skledar, RPh, MPH

Clinical and Microbiological Characteristics Associated with Colistin plus Doripenem Treatment Failure in *Acinetobacter baumannii* Infections

Gillis LM, Press EG, Nguygen MH, Clancy CJ, Shields RK

PURPOSE

The combination of colistin (COL) and doripenem (DOR) has become the frontline treatment of extensively drug-resistant (XDR) *Acinetobacter baumannii* (Ab) infections. Nevertheless, treatment failures and recurrences occur. The aims of this study were to identify clinical and microbiological factors associated with COL+DOR treatment failure.

METHODS

Retrospective study of patients treated with intravenous COL+DOR for Ab bacteremia or respiratory-tract infections (RTIs). Ab isolates were collected from patients before and after treatment with COL+DOR. Minimum inhibitory concentrations (MICs) were determined by broth microdilution. Time-kill analyses (TKA) were performed to assess *in vitro* killing effects.

RESULTS

52 patients were included; 46% (24/52) were transplant recipients. 58% (30/52) of patients experienced treatment success. On univariate analysis (p<0.20), factors associated with treatment failure included DOR MIC >64mcg/mL, obesity, non-transplant status, renal impairment (CrCl<70mL/min), bacteremia, and the absence of inhaled COL. By multivariable logistic regression, obesity (p=0.022) and DOR MIC >64mcg/mL (p=0.036) were independent predictors of treatment failure. 31% (16/52) of patients developed nephrotoxicity. 30% (9/30) of patients with initial success developed recurrent infections. 22% (2/9) and 89% (8/9) of initial and recurrent isolates were resistant to COL, respectively (p=0.02). COL+DOR was bactericidal (≥3log CFU/mL decrease from starting inoculum) against 100% and 67% (6/9) of initial and recurrent isolates, respectively. For recurrent isolates, COL+DOR+SUL resulted in 100% bactericidal activity and achieved greater median log-kill (5.52 logs versus 3.22; p=0.02) than COL+DOR alone.

CONCLUSIONS

DOR MIC and obesity are important determinants of patient response to COL+DOR. Exposure to COL+DOR leads to COL resistance and attenuates killing by the combination *in vitro*. Adding SUL to the combination provides additive killing and may be considered for patients with recurrent XDR-Ab infection.

Abstract submitted for presentation at the 2012 ICAAC meeting, San Francisco, Ca.

Louise-Marie Gillis, PharmD

Louise-Marie Gillis received her PharmD from the University of Pittsburgh School Of Pharmacy in 2010 and completed a pharmacy practice residency at Allegheny General Hospital in 2011. After completing her infectious diseases residence, Louise-Marie will join the UPMC Presbyterian Shadyside team serving as a clinical pharmacist in infectious diseases at the Shadyside campus.

Faculty Mentor: Ryan K Shields, PharmD

Immunosuppresive Effects of Fentanyl in Critically Ill Patients Who Develop Ventilator-Associated Pneumonia

Hibino M, Empey KM, Falcione BA

PURPOSE

Healthcare-associated infections are the most common complications affecting hospitalized patients, especially those in the intensive care unit (ICU). Mechanical ventilation (MV) is often needed in ICU patients. Ventilator-associated pneumonia (VAP) complicates the course in up to 28% of these MV patients. Due to their severity of medical conditions, many critically ill patients in the ICU receive high doses of opioids. In pre-clinical studies, fentanyl has shown suppression of natural killer cell activity, T-cell proliferation, interferon-γ, and interleukin-2 production. The increased infection risk in vulnerable MV, ICU patients remains unknown. The purpose of this study is to determine the extent to which high dose versus low dose fentanyl correlates with the incidence of VAP in the ICU.

METHODS

A retrospective matched case control study of patients admitted to the Surgical Trauma ICU (STICU) or Neurotrauma ICU (NTICU) was conducted between January 1, 2007 and December 31, 2011. All patients ≥18 years of age, intubated within 24 hours of admission, who received fentanyl were evaluated. Patients were excluded if they had any history of malignancy, chronic immunosuppression, opioid abuse, leukopenia, concurrent infection, and/or acute respiratory distress syndrome. Patients were matched on the basis of age, sex, admission time, unit, SAPS II score, and type of admission. Incidence of VAP was evaluated through five days post-MV. A conditional logistic regression will be performed with VAP status as the response variable, and dose as the independent variable. Mediation model will be used to determine the relationship between fentanyl, ANC, and VAP.

RESULTS

The incidence of VAP, cumulative exposure and peak rate of fentanyl, and ANC will be analyzed. The results are pending.

CONCLUSIONS

It is anticipated that a higher exposure of fentanyl will be associated with a greater incidence of VAP in the STICU and the NICU, due to dose dependent immunosuppression of fentanyl.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Maho Hibino, PharmD

Maho finished her pre-pharmacy requirements at Michigan State University and then went on to receive her PharmD from the University of Michigan College of Pharmacy in 2011. Upon completion of her PGY1 pharmacy practice residency at the University of Pittsburgh Medical Center Presbyterian-Shadyside, and she will be continuing her training as a PGY2 resident in hematology/oncology at the University of Washington Medical Center.

Faculty Mentors: Kerry M. Empey, PharmD, PhD and Bonnie A. Falcione, PharmD, BCPS

The Combination of Doripenem and Colistin is Bactericidal and Synergistic against Colistin-Resistant, Carbapenemase-Producing *Klebsiella pneumoniae*

Jernigan MG, Press EG, Nguyen MH, Clancy CJ, Shields RK

PURPOSE

Carbapenem-resistant *Klebsiella pneumoniae* (KPC) is a major cause of disease at our center. Salvage agents such as colistin (COL), doxycycline (DOX), and gentamicin (GEN) may have retained activity; however resistance to these agents is rapidly emerging and treatment failures are well recognized with each. Thus, we sought to evaluate the *in vitro* activity of two drug combinations against KPCs to identify a suitable treatment regimen.

METHODS

The *In vitro* activity of doripenem (DOR), COL, DOX, and GEN was evaluated alone and in combination against 12 unique KPC isolates using clinically achievable drug concentrations.

RESULTS

One-hundred percent (12/12), 83% (10/12), 83% (10/12) and 58% (7/12) of isolates were resistant to DOR, COL, GEN, and DOX, respectively; 50% (6/12) were resistant to all agents. The corresponding MIC_{90}s were >128, 16, 64, and 16µg/mL, respectively. Synergy (≥ 2 log cfu/mL greater kill in combination *vs* most active single drug) was identified with DOR+COL, GEN+DOX, DOR+GEN, DOR+DOX, COL+GEN, and COL+DOX against 6/12 (50%), 5/12 (42%), 1/12 (8%), 3/12 (25%), 3/12 (25%), and 1/12 (8%), respectively. Only DOR+COL resulted in a reduction of starting inocula for all isolates (log-kill range: 2.02-6.01cfu/mL) and was bactericidal (≥ 3 log cfu/mL kill) against 9/12 (75%). DOR+COL or DOR+GEN were associated with the lowest and highest mean area under the bactericidal curve (AUBC), respectively. The median AUBC for DOR+COL was lower than all other combinations (p=0.004). Antagonism (≥2 log_{10} lesser kill in combination *vs* the most active single agent) was identified with all combinations except DOR+COL. The *in vitro* data are consistent with our preliminary clinical experience in transplant recipients.

CONCLUSIONS

DOR+COL demonstrated excellent *in vitro* activity against pandrug-resistant KPC isolates. COL+GEN is rapidly bactericidal against some isolates, but antagonistic against others and clinically limited by additive toxicity. Following completion of this pilot study, DOR+COL has become the preferred treatment for KPC infections at our center.

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Presented at the 51st Interscience Conference on Antimicrobial Agents and Chemotherapy, Chicago, Ill. 2011.

Presented at the 2011 American College of Clinical Pharmacy Annual Meeting, Pittsburgh, Pa. 2011.

Meredith G. Jernigan, PharmD

Meredith received her BS in pharmaceutical sciences at the University of North Carolina at Chapel Hill before receiving her PharmD degree from the UNC Eshelman School of Pharmacy. She then completed her PGY1 training at UPMC Presbyterian. After finishing her PGY2 Infectious Diseases residency at UPMC Presbyterian, she will join the faculty at the Auburn University Harrison School of Pharmacy as an assistant professor and clinical pharmacist in infectious diseases and internal medicine.

Faculty Mentor: Ryan K. Shields, PharmD

Exploring the Value of Clinical Pharmacy Services for Patients with Diabetes in Underserved Settings

Kauffman YS, Jonkman LJ, Connor SE

PURPOSE

The role of a pharmacist in underserved settings has not been well studied; specifically in meeting unmet needs of vulnerable patients with diabetes. The purpose of this qualitative study was to identify unmet diabetes management and medication-related needs of patients with diabetes who are receiving care in two distinct underserved practices in Pittsburgh, PA.

METHODS

The investigator conducted semi-structured interviews with patients from a free clinic (FC) and a Federally Qualified Community Health Center (FQHC) in Pittsburgh. Inclusion criteria included: adults at least 18 years old with uncontrolled diabetes (A1C > 7%) who receive health care services from either the FC or the FQHC. Participants completed a short demographic survey and answered questions about their perceptions and attitudes in four thematic areas: (1) self-management of diabetes; (2) medication-related needs; (3) the role of the pharmacist in their care; and (4) how pharmacists can be better integrated in their diabetes management. Transcripts were analyzed using principles of grounded theory.

RESULTS

Twenty-nine interviews were conducted: 15 participants from the FC, and 14 from the FQHC. The majority of FC participants were male (73%); of FQHC participants, only 43% were male. Seven (47%) FC participants were African American, while the majority (93%) of FQHC participants were African American. Participants expressed several barriers to self-management of diabetes, including challenges with diet and exercise, cost of medications, and testing blood glucose levels. Participants at the FC were more likely to have had memorable interactions with a pharmacist. Those participants who had interacted with a pharmacist expressed satisfaction with services and felt their care was individualized to their needs; many felt they had a personal relationship with the pharmacist.

CONCLUSIONS

These results will help to provide guidance to pharmacists working in underserved settings who are interested in expanding clinical pharmacy services for patients with diabetes.

Presented at the 2012 ACCP Virtual Poster Symposium.

Yardlee Kauffman, PharmD, MPH

Yardlee received a PharmD at the University of Pittsburgh in 2010 and completed a community practice residency with the School of Pharmacy and UPMC Falk Pharmacy in 2011. Upon completion of an underserved care/global health residency, she will commence an outcomes research fellowship with Kaiser Permanente in Colorado. She became certified in public health and will also receive a Masters of Public Health at the Graduate School of Public Health in June 2012.

Faculty Mentor: Lauren Jonkman, PharmD, BCPS

Albuterol-Metered Dose Inhalers: Evaluation of a Free Medication Program

Kidd SA, Farrah RM

PURPOSE

Albuterol is a commonly prescribed medication for respiratory conditions. Guidelines exist that outline albuterol usage criteria for chronic pulmonary conditions, but current guidelines do not support albuterol use for most acute pulmonary conditions. This evaluation was conducted to determine appropriateness of albuterol metered-dose inhaler use dispensed as part of a free medication program in the family health center setting and overuse per national guidelines.

METHODS

Albuterol metered-dose inhalers are inventoried and hard copy prescriptions should be generated for medications dispensed from the free medication program at three UPMC Family Health Centers. An evaluation was done for two years (1/09-12/11) of albuterol inhaler usage. Prescriptions for each inhaler were matched to the inventory record to determine if current documentation practice is sufficient. From these records, patient electronic health records were utilized to determine reason for prescribing, appropriate usage of medication per current guidelines, and multiplicity of medication per monthly period indicating possible inadequate disease control.

RESULTS

Out of 485 total albuterol prescriptions dispensed through the free medication program, there were 258 hard copies obtainable. Of the 258 hard copy prescriptions, 199 of those were prescribed for appropriate reasons including asthma, COPD, and wheezing. The inappropriate reasons allergic rhinitis, bronchitis, cough, pneumonia, respiratory abnormalities/ reactive airway disease, shortness of breath, upper respiratory infection, refill known medication, and unknown accounted for 59 of the prescriptions. Overuse of more than one inhaler in a calendar month was discovered in 43 out of the 167 patients.

CONCLUSIONS

In the majority of cases, albuterol is being prescribed according to guidelines. Also, in the majority of cases, albuterol is not being overprescribed. However, there is room for educational intervention on use of albuterol in non-chronic conditions, prescribing process to limit lost orders, and patient education to ensure medication safety and economic stewardship of the free medication program.

Presented at the Society of Teachers of Family Medicine Annual Spring Conference, Seattle, Wa. 2012 and the 31st Eastern States Conference for Pharmacy Residents and Preceptors, Hershey Pa. 2012.

Susan A. Kidd, PharmD

Susan received her PharmD from NEOMED School of Pharmacy in 2011 and will complete a pharmacy practice residency at UPMC St. Margaret in 2012. Upon completion of the residency, she hopes to practice as a clinical pharmacist in palliative care and pain management.

Faculty Mentor: Roberta Farrah, PharmD, BCPS

Evaluation of Pharmacist Identified and Mitigated Drug-drug Interactions in Hepatitis C Virus Infected Patients Starting Boceprevir or Telaprevir

Kipp GM, Mohammad RA, Lin A, Johnson HJ

PURPOSE

Novel triple therapy regimens including peg-interferon and ribavirin with directing acting antivirals (DAAs), boceprevir and telaprevir, improve sustained virologic response rates in patients infected with genotype 1 hepatitis C virus (HCV). Boceprevir and telaprevir are also potent inhibitors of cytochrome P450 (CYP) 3A and p-glycoprotein (P-gp) transport enzymes and have many potential drug-drug interactions (DDI). The current project aimed to describe the DDIs identified by clinical pharmacists at the UPMC Center for Liver Diseases.

METHODS

Clinical pharmacists prospectively reviewed 238 candidates for HCV triple therapy for DDIs involving home medications and DAAs. Descriptive statistics were used to characterize the DDIs identified.

RESULTS

Clinical pharmacists reviewed 238 candidates for HCV triple therapy taking 1417 home medications. A total of 390 DDIs were identified of which 290 DDIs involved scheduled medications and 100 involved as needed medications. The majority of patients had at least one DDI identified (72% of patients). The most commonly involved medications were oxycodone, milk thistle, clonazepam, amlodipine and zolpidem. The most commonly involved medication classes were herbals, opioids, selective-serotonin reuptake inhibitors (SSRIs), benzodiazepines and corticosteroids. The majority of DDIs increased patient exposure to their home medication (64% of DDIs) and were thought to be mediated by DDA inhibition of CYP3A4 (58% of DDIs). The most common pharmacist recommendations were to increase monitoring of the patient (29%), to discontinue the home medication (27%), to decrease the dose of the home medication with increased monitoring (24%) or to switch the home medication to a therapeutic alternative (12%). The majority of the time, the recommendation was made directly to the patient (48%).

CONCLUSIONS

Clinical pharmacists identified a total of 390 DDIs in 238 patients. The majority of the DDIS had the potential to increase patient exposure to opioids, SSRIs, benzodiazepines and corticosteroids placing patients at higher risk of developing clinically significant side effects.

Presented at the 46th ASHP Midyear Clinical Meeting, New Orleans, La., 2011.

Gretchen Kipp, PharmD, BCPS

Gretchen Kipp received her PharmD from the University of Pittsburgh School of Pharmacy in 2010. She then completed a PGY1 Pharmacy Practice Residency at UPMC Presbyterian. Upon completion of her PGY2 Solid Organ Transplantation Pharmacy Residency, she will practice clinical pharmacy in the area liver transplantation at UPMC Presbyterian and serve as adjunct faculty at the University of Pittsburgh School of Pharmacy.

Faculty Mentor: Heather J Johnson, PharmD BCPS and Rima Mohammad, PharmD BCPS

Assessment of Inpatient Black Box Warning Compliance in the General Medicine Population

Kloet MA, Smithburger PL, Seybert AL, Kane-Gill, SL

PURPOSE

Black box warnings (BBWs) are the most serious type of safety warning mandated by the U.S. Food and Drug Administration. Prescriber compliance to BBWs was assessed to determine how often general medicine patients are prescribed a medication that is non-compliant to a BBW, to evaluate reasons for prescriber non-compliance, and to assess the possibility of a consequential adverse drug reaction (ADR).

METHODS

Approval was obtained for this evaluation as a quality improvement project by the Total Quality Council at our institution. For 10 weeks, general medicine patients were evaluated for medication orders with an actionable BBW, defined as a warning that allowed for intervention by a pharmacist. When BBW non-compliance occurred, the physician was contacted and a reason for non-compliance was determined. Patients that received a medication non-compliant to a BBW were monitored for an ADR until discharge, and causality analysis was performed to determine if a suspected reaction was related to the BBW non-compliance.

RESULTS

224 patients were evaluated for non-compliance of 145 actionable BBWs. There were 175 drugs with BBWs prescribed, of which 107/175 (61%) were medications restarted from home. A total of 23 BBW non-compliances occurred in 18 patients, and 13/23 (57%) occurred with home medications. Non-steroidal anti-inflammatories (NSAIDs) were the most common BBW medication involved (81%), and the reasons for non-compliance were equally split between knowledge deficit and risk-to-benefit ratio. One possible ADR occurred related to a drug-drug interaction with ritonavir and antiarrhythmic coadministration.

CONCLUSION

This project illustrates BBW non-compliance is a problem in the general medicine population, specifically in patients with high cardiovascular risk that are prescribed NSAIDs. Over half of BBW non-compliance occurred in medications restarted from home, which emphasizes the need for improved transitions of care.

Presented at the 31th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., May 3, 2012.

Megan A. Kloet, PharmD

Megan is originally from Wellington, Florida. She graduated Cum Laude from the University of Florida College of Pharmacy in May 2011. Prior to pharmacy school, she received her Bachelors of Science degree in Food Science and Human Nutrition from the University of Florida. Megan will be staying on with UPMC next year to complete a PGY2 in critical care. Following her residency training, Megan plans to pursue a clinical pharmacist position in critical care at an academic medical center where she plans to have an active role in teaching student pharmacists and residents.

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

Impact of Diabetes Education on Patient Understanding and Adherence to Discharge Insulin Instructions

Lin A, Mohammad RA, Coley KC, Donihi AC

PURPOSE

Our hospital recently implemented an organized interdisciplinary education process for teaching hospitalized patients about their diabetes. This Quality Improvement (QI) project was designed to evaluate how well patients understand and adhere to discharge insulin instructions following hospital discharge.

METHODS

A convenience sample of 25 adult medical inpatients with diabetes who were discharged to home with a prescription for scheduled insulin were included. A survey was administered via telephone 24 to 48 hours following hospital discharge to test patients knowledge and adherence to discharge insulin instructions.

RESULTS

Median age was 61 (range 38-89) years and 56% of patients were male. Nine (36%) of the 25 patients had diabetes teaching documented in the medical record by any healthcare professional during hospitalization, although 16 (64%) actually recalled being taught by a nurse, pharmacist or dietician. Overall, 20 (80%) patients correctly stated when they should administer their insulin(s), 19 (76%) knew how to dispose of their used syringes or pen needles, 16 (64%) knew their doses, and 21 (84%) were able to recognize the symptoms of hypoglycemia. There were no statistically significant differences in correctly answered questions between patients with documentation of teaching compared to those without documentation. Of the patients on multiple insulin products (n = 14), 85.7% could correctly identify the type of insulin (long-acting vs. short-acting insulin). Of the patients who were new to insulin (n=5), all (100%) had documentation of teaching and four (80%) were taught by a pharmacist.

CONCLUSION

This QI project shows that insulin education is not documented for most inpatients at our hospital. Although most patients had some knowledge of how to administer their insulin, there were still knowledge deficits, especially with respect to insulin dosing.

Presentation: submitted as an abstract to the 2012 ACCP Annual Meeting.

Amanda Lin, PharmD, BCPS

Amanda received her PharmD from The Arnold & Marie Schwartz College of Pharmacy in 2009. She completed her PGY1 pharmacy residency at Kingsbrook Jewish Medical Center. After completing her PGY2 Internal Medicine Pharmacy Residency at UPMC Presbyterian, Amanda plans to pursue a career as an internal medicine specialist.

Faculty Mentors: Amy C. Donihi PharmD, BCPS, Kim Coley PharmD, FCCP, Rima A. Mohammad, PharmD, BCPS

Assessment of Black Box Warning Compliance within Intensive Care Units

Lohr BR, Smithburger PL, Seybert AL, Kane-Gill SL

PURPOSE

Black box warnings (BBWs) are developed for medications that carry a significant risk of serious adverse drug reactions (ADRs). BBW compliance has been evaluated for outpatients, but inpatient compliance rates have not been determined. The goal of this quality improvement project was to improve patient safety by determining BBW compliance rates, assessing prescriber reasons for noncompliance, and evaluating ADRs as a result of noncompliance within the intensive care unit (ICU).

METHODS

A group of four pharmacists evaluated over 400 BBWs, with 150 actionable BBWs deemed appropriate for inclusion. "Actionable" BBWs were those that allowed for a pharmacist intervention. All medication orders for patients admitted to the medical and surgical ICUs were reviewed for BBWs for a total of 10 weeks. Once a violation of a BBW occurred, the prescriber or practitioner on duty was notified to address the violation. The pharmacist inquired as to the reason for noncompliance, and the prescriber's response was documented. ADR monitoring occurred if a patient received a medication in violation of a BBW. Causality analysis was performed to determine if a relationship existed between noncompliance and the development of an ADR.

RESULTS

Data was collected for 169 patients. Overall, 84 patients (49.7% of all patients) were exposed to 118 medications with BBWs. BBW noncompliance occurred 11 times for 10 patients (5.9% of all patients). Anti-infectives (27.3%) and immunosuppressants (27.3%) were the most common medication classes with BBW violations. Risk-to-benefit ratio was the most common reason cited for BBW violations (54.5%). One probable ADR of acute kidney injury occurred related to the coadministration of an aminoglycoside and vancomycin.

CONCLUSION

These findings indicate medications with BBWs are commonly prescribed within ICU settings, but noncompliance and resultant ADRs are infrequently encountered. Pharmacists and other health care providers should remain vigilant concerning BBW monitoring and the potential for serious ADRs.

Brian R. Lohr, PharmD

Brian received his Pharm.D. from Duquesne University in 2010 and completed a pharmacy practice residency at UPMC Mercy in 2011. Upon completion of his critical care residency, he will begin working as the critical care specialist at UPMC Passavant.

Faculty Mentor: Sandra Kane-Gill, Pharm.D., M.S., FCCM, FCCP

Pharmacy Student Actual and Perceived Knowledge of Issues Related to Underserved Populations across the Pharmacy Curriculum.

Lupu AM, Connor SE, Jonkman LJ

PURPOSE

Pharmacists are in an important position to eliminate health disparities. Recent accreditation standards and guidelines for pharmacy education reflect the significance of introducing students to effectively caring for underserved patients. The purpose of this study is to help faculty at the University of Pittsburgh School of Pharmacy identify gaps in student knowledge of medically underserved populations (MUPs) in order to guide future curricular improvements.

METHODS

All currently enrolled student pharmacists at the University of Pittsburgh School of Pharmacy were eligible to participate. Subjects were evaluated using the Underserved Knowledge Assessment, modified from Wieland et al. The survey included 10 demographic questions, 13 questions investigating perceived knowledge, and 20 multiple-choice knowledge questions.

RESULTS

A total of 208 surveys were completed with a response rate of 48%. Students generally felt only somewhat confident in their knowledge of MUPs (69% were somewhat confident and 18% not at all confident). Overall, students received an average score of 53.3% (10.7/20) on the knowledge questions. Actual knowledge scores improved across the first three years (P1 – 53.2%, P2 – 55.3%; P3 – 59.2%) but decreased in the fourth year (46.1%). Students in the third professional year scored significantly higher than students in the fourth professional year overall (59.2% vs. 46.1%, P=.003) and students in the fourth professional year performed worse overall (P4 – 44.7%; P1 – 52.1%, P=.17; P2 – 53.6%, P=.09; P3 – 58.9%, P=.001). Scores did not differ significantly by any demographic characteristics including sex, age, race, parental income, parental education level, or geographic area. Those students who wanted to be involved in caring for the underserved scored significantly higher (P=.001) than those who did not.

CONCLUSIONS

Student pharmacist actual and perceived knowledge about most topics was generally low. These findings suggest the need to improve student education regarding underserved patient populations through the didactic and experiential learning curriculum.

Presented at the 2012 ACCP Virtual Poster Symposium, May 23rd, 2012.

Ana M. Lupu, PharmD

Ana received her PharmD from the University of Pittsburgh School of Pharmacy in 2010. She completed an Academic Teaching and Research Fellowship at Duquesne University followed by a PGY2 Residency in Ambulatory and Underserved Care at the University of Pittsburgh. She plans to pursue an ambulatory care or clinical faculty position after completing her PGY2 residency and continue working with underserved patient populations.

Faculty Mentor: Sharon Connor, PharmD

Pharmacist-Provided Patient Care Services in an Outpatient Mental Health Setting: Multi-Stakeholder Qualitative Analysis.

Maguire M, McGivney M, Scharf D, Montgomery J, Bacci J, Fabian T.

PURPOSE

To determine patient and healthcare practitioner perceived opportunities and challenges to expanding pharmacist-provided patient care services in an ambulatory psychiatric clinic pharmacy.

METHODS

Patients with severe mental illness (SMI) require an interdisciplinary team of healthcare practitioners to meet their physical and mental healthcare needs. As medication therapy experts, pharmacists are well positioned to bridge the gap that exists between providers and patients through medication therapy management (MTM). Despite the clear need for coordinated care in this vulnerable population, little is known about the perceived value of pharmacist-provided services in the outpatient psychiatric setting. The aim of this qualitative study is to comprehensively understand the perceived medication-related needs of the SMI population and to gather feedback on the proposed expansion of pharmacist-provided patient care, particularly MTM. To accomplish this aim, focus groups with patients with SMI and key informant interviews with psychiatrists, primary care clinicians, therapists, and service coordinators were conducted. Interview transcripts were analyzed using the principles of Grounded Theory to generate themes related to patient medication-related needs and perceptions of pharmacist-provided patient care.

RESULTS

Two focus groups with 5-7 patients with SMI and 22 interviews with healthcare practitioners were conducted between February-March 2012. Reactions to the patient care services were overwhelmingly positive. Both patients and healthcare practitioners recognized pharmacists as medication experts. They especially trusted the clinic pharmacists due to their longstanding relationships with practitioners and patients at the clinic. Participants identified MTM as an ideal method to assist with meeting patient medication-related needs, including medication noncompliance, stigma associated with mental illness, and the need for individualized medication education.

CONCLUSION

The results of this qualitative analysis will inform the expansion of pharmacist-provided patient care services in an ambulatory psychiatric clinic pharmacy. This study provides an understanding of SMI patient's medication experiences and that pharmacists should become integral members of psychiatric treatment teams.

Michelle A. Maguire, PharmD

Michelle received her PharmD from The Ohio State University School of Pharmacy in 2011 and completed a PGY-1 Community Practice Residency at the University of Pittsburgh School of Pharmacy and Forbes Pharmacy, the outpatient pharmacy of Western Psychiatric Institute and Clinic of UPMC in 2012. She is the incoming PGY-2 Ambulatory Care and Academic Practice resident at The Ohio State University, and hopes to pursue a career in academia following completion of the residency.

Faculty Mentor: Melissa Somma McGivney, PharmD

Generic Tacrolimus Conversion at an Academic Medical Center

Martinez L, Ervin K, Culley C, Corman S, Stanley M, Joseph M, Skledar S

OBJECTIVE

A generic tacrolimus capsule was first approved by the Food and Drug Administration (FDA) in August 2009. At our facility, via collaboration with solid organ transplant physician experts, one generic product was added to inpatient and outpatient formulary to facilitate care transition from immediately post-transplant to home. The project describes measurement of prescribing compliance and economic impact of this generic conversion.

METHODS

The switch to generic tacrolimus was initiated on December 1, 2011. Patients on existing brand therapy were continued until they were discharged or were converted to generic tacrolimus after discussion with the prescriber. New transplant recipients received generic tacrolimus unless otherwise indicated by their physicians. Doses dispensed of brand and generic tacrolimus and purchase costs were compared from December 1, 2011 to February 29, 2012 to calculate the generic tacrolimus conversion rate and associated spending. A review of "do not substitute" prescribing practices was conducted during this time period. This quality improvement study was approved by our Total Quality and Patient Safety Council.

RESULTS

The generic conversion rate achieved was 78%, 95%, and 95% on December 2011, January 2012, and February 2012, respectively. During this time, 39 brand orders were verified, with 25/39 (64%) having a "do not substitute" comment on the order. Thirty-six percent (14/39) of brand tacrolimus orders dispensed were not interchanged initially by the pharmacists. Both prior and new transplants patients had order comments written with "do not substitute." Purchases of brand and generic products were $65,361, $14,526, and $21,279 for December 2011, January 2012, and February 2012, respectively, showing an average 25% reduction in spending.

CONCLUSION

Implementation of the generic tacrolimus was successful in achieving 95% brand to generic conversion rate. Significant savings has been seen with the switch from brand to generic tacrolimus.

Leyner Martinez, PharmD, MS

Leyner is originally from Cuba, but Miami is his hometown. He earned a BS in Family, Child, and Consumer Sciences from Florida State University in 2005. He received his PharmD from LECOM School of Pharmacy in 2009. After completing his PGY1/PGY2 in Health-Systems Pharmacy Administration at UPMC and receiving his MS in pharmacy administration from the University of Pittsburgh, Leyner will work as a Pharmacy Operations Coordinator at Arnold Palmer Hospital for Children/Winnie Palmer Hospital for Women and Babies in Orlando, Florida.

Faculty Mentors: Susan Skledar, RPh, MPH , Shelby Corman, PharmD, MS, BCPS, and Colleen Culley, PharmD BCPS

Antipsychotic Prescribing Trends in Elderly Psychiatric Inpatients: A Retrospective Review 2007 to 2010.

McGrane I, Fabian T

PURPOSE

Pharmacological treatment of behavioral and psychological symptoms of dementia (BPSD) in the elderly represents a significant clinical challenge. Antipsychotics are commonly prescribed "off-label" to treat BPSD, however, risk versus benefit must be weighed due to safety concerns and lack of efficacy data to support their use. The purpose of this project was to evaluate antipsychotic prescribing trends over time in elderly inpatients with and without dementia.

METHODS

Demographic, clinical and pharmacy data were extracted from the electronic medical record for psychiatric inpatients aged 65 years or older who were discharged between July 2007 and June 2010. Data were retrospectively reviewed to determine the prevalence of oral antipsychotic therapy in this population and to assess appropriateness of therapy including indication and dose in patients with and without dementia.

RESULTS

A total of 1136 patients met inclusion criteria and were discharged during the time period evaluated. Of these patients, 48% were prescribed a scheduled, oral antipsychotic at discharge. Prevalence of antipsychotic prescribing in this population was relatively stable over the time period assessed. Based on the criteria of approved indication and dose, 62.5% were discharged with an appropriately prescribed antipsychotic, while 37.5% were discharged with an inappropriately prescribed antipsychotic. The opposite trend was observed in the subset of patients with a diagnosis of dementia; antipsychotic therapy at discharge was deemed appropriate in 25.5% and inappropriate in 74.5%.

CONCLUSIONS

In this inpatient psychiatric setting, approximately half of elderly patients are prescribed oral antipsychotics. Overall, oral antipsychotic therapy was deemed appropriate in the majority of patients; however, further evaluation of antipsychotic prescribing practices in patients with a diagnosis of dementia is warranted. In particular, evaluation of safety and clinical outcomes data is needed to ensure safe and effective medication use in this at risk patient population.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2011.

Ian R. McGrane, PharmD

Ian received his PharmD from the University of Montana Skaggs School of Pharmacy in 2011. After completion of his PGY1 pharmacy practice residency at the Western Psychiatric Institute and Clinic of UPMC, he will begin a PGY2 psychiatric pharmacy residency with the U.S. Department of Veterans Affairs in North Chicago.

Faculty Mentors: Tanya Fabian, PharmD, PhD; Kim Coley, PharmD, FCCP; and Amy Donihi, PharmD, BCPS

Implementation of Health-System Practices for Ensuring Compliance with Resource Conservation Recovery Act (RCRA) Regulations for Hazardous Pharmaceutical Waste Disposal

Mebel E, Yourich B

PURPOSE

The environmental impact of pharmaceutical waste has prompted increased attention to compliance with drug disposal practices. RCRA regulations, enforced by the Environmental Protection Agency, were passed in 1976 to control the disposal, transport, and destruction of environmentally hazardous waste. Many hospitals do not have a process for disposing RCRA medications and cite compliance with RCRA regulations to be a major challenge. Currently, the University of Pittsburgh Medical Center Health System (UPMCHS) does not have a system in place to ensure compliance with RCRA disposal practices. The goals of this project are: (1) to characterize the medications on formulary that are classified as RCRA and (2) to develop procedures for compliance in areas where pharmaceutical waste is generated.

METHODS

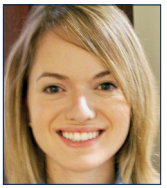
An interdisciplinary taskforce was convened to develop procedures for RCRA compliance across UPMCHS. The team based its recommendations on the RCRA regulations and followed a model in which RCRA waste is disposed in a labeled bags which were placed into designated black containers, strategically placed in patient care and pharmacy areas. Site-specific pilot processes and staff education were conducted for 14-28 days prior to the start of implementation. A 60-day pilot occurred at two health-system hospitals and a staff survey was conducted at the conclusion of the 60-day pilot period. The following metrics were collected: (1) volume of RCRA waste, (2) number of bins used per area, (3) occurrences of non-compliance, and (4) staff feedback on education and project implementation.

RESULTS

The volume of RCRA waste collected, the number of bins used per area, non-compliance events, and nursing and pharmacy staff feedback during the pilot period will be analyzed.

CONCLUSIONS

This project will demonstrate the volume of RCRA waste generated and will result in the implementation of compliant practices for disposal of RCRA pharmaceutical waste across the UPMC Health System.



Elaine R. Mebel, PharmD, MS

Elaine is originally from Marietta, Ga., and received her Doctor of Pharmacy from the University of Georgia in 2010 and recently received a Master of Science in Health System Pharmacy Administration from the University of Pittsburgh School of Pharmacy as part of the 2-year combined PGY1/PGY2 Health System Pharmacy Administration Residency. Elaine is actively involved in ASHP serving as the resident representative on the Commission on Credentialing and is an Advisory Group member of the New Practitioners Forum Public Affairs and Advocacy Advisory Group. Elaine has accepted a position as the Manager of Clinical Pharmacy Services at West Penn Allegheny Health System.

Faculty Mentors: Bryan Yourich, PharmD, Sue Skledar, RPh, MPH, Shelby Corman PharmD, MS BCPS, Colleen Culley, BCPS

Effect of Ketamine Use on Opiate Requirements in Critically Ill Adult Burn Patients

Miller TJ, Funkhouser JW

PURPOSE

Ketamine is an anesthetic, N-Methyl-D-Aspartate (NMDA) receptor antagonist that has demonstrated analgesic effects at subanesthetic doses. Its use has been shown to decrease opiate medication requirements in the peri-operative as well as peri-procedural settings. The opiate-sparing effect of ketamine is reported to be related to modulation of central opiate receptors, which re-sensitizes the receptors to the effects of opiate medications. Burn patients experience a significant amount of pain secondary to damage to cutaneous and subcutaneous tissues, frequent dressing changes, and frequent procedures for skin excision and grafting, and as a result, require significant amount of opiates for pain management. Opiate use in burn patients is associated with adverse drug effects including respiratory depression, ileus, and dependence, however, the use of ketamine in critically ill burn patients remains largely untested. We sought to quantify the effect of ketamine on opiate requirements in a small cohort receiving low-dose, continuous infusion ketamine.

METHODS

A retrospective cohort design was used to identify patients admitted to the UPMC Mercy trauma-burn ICU between July 2010 and July 2011. Patients were eligible for inclusion if they had a diagnosis of burn based on ICD-9 code (940 – 949.xx) and received continuous infusion ketamine. Patients who received paravertebral blocks were excluded. Total daily opiate requirements in IV morphine equivalents were recorded for 48 hours pre-ketamine infusion and then at 24, 48 and 72 hours after infusion start.

RESULTS

In patients receiving continuous infusion ketamine, opiate requirements were decreased in 6 of 8 patients (75%). The median duration of ketamine infusion was 4 days. Reduction in morphine requirements from baseline to 48 hours ranged from 13% to 97%.

CONCLUSION

The results suggest ketamine may decrease the opiate requirements of critically ill adult burn patients. The results of this evaluation will be used to conduct a case-control study to further substantiate ketamine's effect.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Taylor J. Miller, PharmD

Taylor is from Altoona, PA, and received his PharmD from the University of Pittsburgh in 2011. Upon completion of his PGY1 residency at UPMC Mercy, Taylor will join UPMC Presbyterian as a PGY2 resident in Cardiology/Critical Care.

Research Mentor: Jeremy W. Funkhouser, PharmD, BCPS

Evaluation of a Polypharmacy Drug Utilization Review on Cost and Utilization of Psychotropic Medications

Patel A, Hain J, Corman S, Bizich L, Daw J

PURPOSE

Polypharmacy with psychotropic medications is concerning due to its impact on medication adherence, clinical outcomes, and adverse drug events. UPMC Health Plan implemented a quarterly polypharmacy drug utilization review (DUR) program in September 2010, targeting adult members filling five or more psychotropic medications and pediatric members filling three or more psychotropic medications for at least a 90-day supply within a three month period.

METHODS

This retrospective analysis included adult and pediatric members that met DUR criteria at one of two intervention dates. In order to determine the effectiveness of the DUR, the study compared the median number of psychotropic medications filled pre-intervention versus post-intervention. The percentage of members with a change in the number of medications post-intervention was examined. Cost analyses compared the change in the median psychotropic pharmacy spend and the change in the median medical spend, from the pre-intervention to post-intervention periods. Furthermore, the study compared the prevalence of psychotropic polypharmacy, before and one year after the implementation of the DUR.

RESULTS

There was a significant reduction in the median number of psychotropic medications filled pre-intervention versus post-intervention for the adult (n=526) and pediatric (n=432) populations ($p<0.001$). Of all members, 40.1% discontinued at least one medication, 37.5% had no change, and 22.4% had an addition of at least one medication post-intervention. The median pharmacy spend did not significantly differ for both populations ($p=0.096$, $p=0.628$), while the median medical spend slightly increased for the adult population and decreased for the pediatric population. The prevalence of psychotropic polypharmacy significantly decreased between the pre-DUR and post-DUR periods ($p<0.0001$).

CONCLUSION

The polypharmacy DUR program showed a beneficial decrease in utilization of psychotropic medications within the adult and pediatric populations. In addition, the DUR program did not have a negative financial effect on the Health Plan and its members.

Presented at the 24th Annual Academy of Managed Care Pharmacy (AMCP) Meeting and Expo in San Francisco, Ca. on April 20, 2012.

Amy Patel, PharmD

Amy received her PharmD from the Ernest Mario School of Pharmacy, Rutgers University in 2011. Upon completion of her managed care pharmacy residency, she looks forward to continuing her career at UPMC Health Plan as a Clinical Pharmacy Specialist.

Faculty Mentor: Jocelyn Hain, PharmD

Prevalence of and Factors Associated with Therapeutic Failure-Related Hospitalizations in the Elderly

Patel RS, Marcum ZA, Peron EP, Ruby CM

PURPOSE

A therapeutic failure (TF) is defined as a failure to accomplish the goals of treatment attributable to inadequate therapy, a drug-drug interaction that results in a sub-therapeutic level for a drug, or medication non-adherence. There is limited literature focusing specifically on TF-related hospitalizations and the factors associated with these hospitalizations in older adults. Importantly, there is a validated and reliable instrument called the Therapeutic Failure Questionnaire (TFQ) that can be used to measure TFs. The purpose of this study was to evaluate the prevalence of and factors associated with TF-related hospitalizations in older adults in a university-based hospital setting.

METHODS

This investigation was a retrospective cohort study that included patients with a primary care physician from the University of Pittsburgh Medical Center (UPMC) Senior Care Institute admitted to any UPMC hospital between September 1, 2011 and December 1, 2011. Chart abstracts of inpatient and outpatient records of eligible patients were screened for a TF by using the TFQ. Covariate data were obtained and grouped into three categories: demographics, health status, and access to care. Descriptive statistics and bivariate analyses using Fisher's exact tests were conducted to assess the association between the covariates and the primary outcome (TF).

RESULTS

Of the 93 hospitalizations screened, 57 met inclusion criteria, and 18% (10/57) of hospitalizations were due to possible/probable TFs, involving 14 medications. All therapeutic failures were classified as preventable. On bivariate analyses, both congestive heart failure ($p = .028$) and dependency for medication management ($p = .036$) were significantly associated with TF occurrence. Omission of therapy was the most common cause for a preventable TF-related hospitalization.

CONCLUSIONS

Therapeutic failures are a potentially preventable cause of hospitalization in the elderly population and are commonly caused by omission of therapy.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Roshni S. Patel, PharmD

Roshni received her PharmD from the University of Pittsburgh School of Pharmacy in 2011 and completed her PGY1 Pharmacy Practice Residency with UPMC Shadyside this year. Dr. Patel plans to complete a second year of residency training with the University of Maryland, specializing in Ambulatory Care.

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

Impact of a Pharmacist Driven Sulfonylurea Intervention Program

Phipps, KM, Wilson, GL

PURPOSE

The American Diabetes Association and the American Association of Clinical Endocrinologists recognize that insulin is the preferred treatment of diabetes in hospitalized patients. Despite insulin being the standard of diabetes care in the acute care setting, sulfonylureas are still being prescribed. Efforts have been made among UPMC institutions to minimize the use of sulfonylureas; however, these efforts have been unsuccessful.

METHODS

Prior to initiation, an in-service on rationale and study design was provided to staff pharmacists. Over a four-week period, pharmacists intercepted orders for glimepiride, glyburide, and glipize and made recommendations to prescribers to hold the sulfonylurea and use an alternative insulin regimen if necessary while the patient was being hospitalized. Inclusion criteria were patient age>65 years, CrCl <50 mL/min, or basal insulin ordered. Patients were excluded if they were admitted to rehab, had an anticipated length of stay <24 hours, or had an endocrine consult. Data collection included age, gender, type of diabetes, admission diagnosis, blood glucose range, number of hypoglycemic events, defined as blood glucose <70 mg/dL, length of stay, creatinine clearance, concomitant antidiabetic orders, and physician response to pharmacist recommendation. All information was maintained confidentially.

RESULTS

Average length of stay was increased among patients who experienced a hypoglycemic event at 11.2 days versus 3.9 days among patients who did not have a blood glucose <70 mg/dL during admission. Prescribers accepted pharmacist recommendations 90% of the time. Where intervention was appropriate, pharmacists failed to intervene 60% of the time. Rate of experiencing a hypoglycemic event was 37.5% among patients receiving a sulfonylurea.

CONCLUSIONS

Factors associated with hypoglycemia were age>65 years, CrCl <50 mL/min, basal insulin, and >2 antidiabetic medications. Patients who had hypoglycemia while hospitalized had, on average, a longer length of stay. Physicians were accepting of pharmacist recommendations regarding glycemic management in the acute care setting.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Kelli M. Phipps, PharmD

Kelli received her PharmD from Duquesne University Mylan School of Pharmacy in 2011 and completed a pharmacy practice residency at UPMC Mercy in 2012. She plans to practice in a hospital setting and pursue a BCPS certification.

Faculty Mentor: Gregory Wilson, PharmD, BCPS

Evaluation of an Adjusted Vancomycin Dosing Regimen in Pediatric Hospitalized Patients

Polischuk E, Howrie DL

PURPOSE

As a result of 2009 consensus guidelines for therapeutic monitoring of vancomycin, new "escalated dose" guidelines were implemented for patients at the Children's Hospital of Pittsburgh of UPMC. This project prospectively evaluated 1) initial serum trough concentrations achieved in patients aged 1 month to 18 years, 2) doses subsequently required to achieve target troughs and 3) troughs achieved and doses required in pediatric cancer patients.

METHODS

Automated daily reports from the institution's Clinical Data Warehouse identified vancomycin-treated patients. Exclusion criteria included patients not treated with recommended initial dosing regimen; renal dysfunction; extracorporeal membrane oxygenation; drug use less than 24 hours; and age less than one month or greater than 18 years. Data collection during hospitalization included patient demographics, renal function, vancomycin regimen(s) (mg/kg/day), trough concentration(s), culture and sensitivity, and treatment outcomes. Therapeutic troughs were defined as 15-20 mg/L (serious invasive infections), 8-15 mg/L (all others).

RESULTS

121 patients met inclusion criteria. Initial troughs were therapeutic in 65 patients (54%), supratherapeutic in 11 (9%) and subtherapeutic in 45 (37%). Therapeutic troughs were subsequently achieved after one (10 patients, 56%), two (6 patients, 33%), or three (2 patients, 11%) dose adjustments. Therapeutic troughs were not documented in 32 patients prior to drug discontinuation. Patients ages 1-12 years with initial subtherapeutic troughs required 74 mg/kg/day (median) to achieve targets; patients age 13-18 years required 62 mg/kg/day (median). Only 4 of 15 (27%) oncology patients achieved target troughs with initial doses. Highest supratherapeutic levels were observed in adolescents on PICU and Cardiology Services.

CONCLUSIONS

Approximately 40% of children did not achieve optimal vancomycin troughs despite implementation of "escalated dose" guidelines. Therapeutic monitoring is required for all ages due to the wide range of troughs achieved and the doses required. Oncology patients appear to require significantly higher initial vancomycin doses to achieve targets.

Presented at the 21st Annual PPAG Meeting and 2012 Pediatric Pharmacy Conference, Houston, Tex., 2012; and the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Emily M. Polischuk, PharmD

Emily received her PharmD from the Duquesne University Mylan School of Pharmacy in 2009, and after working for two years as a staff pharmacist at the Children's Hospital of Pittsburgh of UPMC, she became the hospital's first PGY1 pharmacy practice resident. Upon completion of her residency, she will practice as the clinical pharmacy specialist in the neonatal intensive care unit at the Children's Hospital of Pittsburgh.

Faculty Mentor: Denise L. Howrie, PharmD

Evaluation of Trauma Patient's Eligibility for Tranexamic Acid Administration at a Level 1 Trauma Center

Portman DB, Funkhouser JW

PURPOSE

The clinical randomization of an antifibrinolytic in significant hemorrhage (CRASH-2) trial demonstrated tranexamic acid administered to patients with, or at risk of, significant bleeding reduces the risk of death from hemorrhage with no apparent increase in fatal or non-fatal occlusive events. The objective of this study was to determine the extent to which eligible patients at University of Pittsburgh Medical Center Mercy may have benefited from administration of tranexamic acid.

METHODS

The health system's trauma database was used to perform a retrospective chart review to identify patients who, over the last year, had presented to the emergency department within eight hours of the injury and received at least one unit of packed red blood cells. Patients younger than 18 years of age and those with head trauma were excluded from the study. Pre-planned secondary analysis was performed by identifying patients who presented to the hospital within three hours and within one hour from the time of injury who met the primary objective.

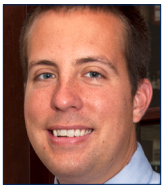
RESULTS

Twenty five patients received blood in the emergency department and met inclusion criteria. The study sample was predominantly male with an average age of forty. Mortality rate was forty percent. The average time elapsed from injury to presentation at the emergency department was 57.9 minutes. Four patients presented greater than one hour after injury and two additional presented greater than three hours.

CONCLUSION

Application of the treatment benefits seen in the CRASH-2 trial to our trauma patient population cohort suggests that up to three lives may have been saved if tranexamic acid were administered. Our data suggest that the majority of patients present to the emergency department within the study's beneficial three hour window, and many within the ideal one hour window. Further studies could evaluate the time elapsed from presentation to the emergency department and administration of tranexamic acid.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012 and at the UPMC Mercy Research Day, Pittsburgh, Pa., 2012.



David B. Portman, PharmD

David is from Cincinnati, Oh., and received his Pharm.D. degree from Ohio Northern University in 2011. After completing his pharmacy practice residency at UPMC Mercy, David will be joining The Western Pennsylvania Hospital as part of the critical care team. Areas of focus will include the Cardiovascular Intensive Care Unit and the Emergency Department.

Faculty Mentor: Jeremy W. Funkhouser, Pharm.D., BCPS

Optimizing the Time to First Dose of Antibiotics in Neonates

Reeve AR, Moffett SM

PURPOSE

Neonatal sepsis continues to be a major cause of morbidity and mortality in newborns. As a result, the time to administration of the first dose of antibiotics in neonates is critical to the patient's outcome. The objective of this study is to determine if neonates admitted to the neonatal intensive care unit (NICU) receive their first dose of antibiotics within four hours and to optimize the time to treatment.

METHODS

Patients were included in the study if they were less than or equal to seven days old when admitted to the NICU and had orders for both ampicillin and gentamicin. A pre-implementation study was conducted to determine the time to the first dose of antibiotics. New processes were then implemented in an attempt to decrease the time to the first dose. The time to the first dose of antibiotics was then evaluated for the post-implementation group.

RESULTS

The percent of patients who received ampicillin in less than four hours was 100% (15/15) in the pre-group vs. 93% (14/15) in the post-group (p=1.00). The percent of patients who received gentamicin in less than four hours was 93% (14/15) in the pre-group vs. 87% (13/15) in the post-group (p=1.00). The mean time to ampicillin administration was 125.53 minutes in the pre-group vs. 126.67 minutes in the post-group (-1.13, 95% CI -41.0-38.73; p=0.954). The mean time to gentamicin administration was 163.07 minutes in the pre-group vs. 157.27 minutes in the post-group (5.80, 95% CI -37.62-49.22; p=0.786). Excluding the outlier, the mean time to ampicillin administration was 125.53 minutes in the pre-group vs. 113.71 minutes in the post-group (11.82, 95% CI -19.07-42.71; p=0.4393). The mean time to gentamicin administration was 163.07 minutes in the pre-group vs. 144.07 minutes in the post-group (19.00, 95% CI -16.28-54.27; p=0.2789).

CONCLUSION

Overall, the time to administration of ampicillin was similar in both groups. The time to administration of gentamicin was decreased in the post-group, but areas of improvement still exist.

Presented at Research Days, UPMC Hamot, Erie, Pa., 2012

Presented at 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Amanda Reeve, PharmD

Amanda received her PharmD. from the University of Montana in 2011 and completed a PGY1 pharmacy practice residency at UPMC Hamot in 2012. Upon completion of a PGY2 residency in geriatrics and academia she plans to practice in a hospital setting.

Faculty Mentor: Sarah M. Moffett, PharmD., BCPS

A Comparison of Educational Interventions to Enhance Cultural Competency in Pharmacy Students

Sales IA, Jonkman LJ, Hall DL, Connor SE

PURPOSE

The purpose of this study was to compare three educational interventions to determine which will enhance cultural competency to the greatest extent in pharmacy students.

METHODS

Second year pharmacy students (108 total) were invited to take a pre-intervention self-assessment survey measuring cultural encounters, awareness, knowledge, skills, desire, and empathy on a Likert scale. The class was then divided into three equal groups. Each group received the same content, but using one of the following teaching strategies: a simulated patient activity (SP), written case scenarios (CS), or a formal lecture (FL). The self-assessment survey was repeated following the intervention. Mean change in scores for each question was compared within and among all three groups.

RESULTS

A total of 84 students completed both the pre and post survey (28 SP, 30 CS, 26 FL). There were no differences in age, sex, or ethnicity between groups. Comparing pre and post responses within the SP group, there were significant changes in the cultural skills questions on modifying one's approach (p=0.001) and asking offending questions (p=0.033) during cultural encounters, and also an increase in the desire to learn about different cultures (p=0.037). Within the CS group, there was a significant change in cultural awareness regarding mastery of cultural competency (p=0.041). Within the FL group, there were significant changes in the cultural skills questions on modifying one's approach (p=0.001) and in the cultural empathy question about viewing the encounter from the patient's perspective (p=0.032).

Comparing between groups, the SP and FL groups improved significantly more than the CS group in response to the cultural skills question regarding modifying one's approach (p=0.008).

CONCLUSIONS

There were significant changes within each group indicating that certain ideologies and behaviors may be enhanced based on the activity received; however, a one-hour practicum may not be sufficient to enhance cultural competency.

Ibrahim Sales, PharmD

Ibrahim received his Pharm.D. from the University of South Carolina College of Pharmacy in 2006 and completed a pharmacy practice residency at UPMC Presbyterian in 2011. Upon completion of his ambulatory residency, he plans to pursue a clinical faculty position.

Faculty Mentors: Lauren Jonkman, Pharm.D., MPH, BCPS, Sharon Connor, Pharm.D., and Deanne Hall, Pharm.D., CDE, BCACP

Evaluating the Impact of a Dose Range Checking Alert for Opioids in Elderly Patients Requiring Acute Pain Management

Seaton SM, Smithburger PL, Titus A, Ambrosino R, Kane-Gill SL

PURPOSE

Opioid analgesics have been identified by the Institute for Safe Medication Practices and the Joint Commission as "high-alert" medications, meaning that opioids have a high propensity for causing harm when used inappropriately. The purpose of this quality improvement project was to evaluate the impact of a dose range checking alert on opioid prescribing practices in the acute pain management of elderly patients.

METHODS

A retrospective cohort of patients was identified to include patients 70 years and older who were hospitalized on general medical/surgical units or medical/surgical intensive care units between January 1, 2009 and August 20, 2009, and had an order for an injectable administration of fentanyl, hydromorphone, and/or morphine. This quasi-experimental study design evaluated 500 randomly selected patients with 250 patients 16-weeks before the dosing range checking alert was implemented (Group 1) and 250 patients 16-weeks after the dose range checking alert was implemented (Group 2). Only intravenous (IV) opioids were selected for evaluation as IV medication orders create the highest risk for error and patient harm based on single or total daily doses. Demographic data obtained from both groups included date of birth, sex, height, weight, race, ethnicity, dates of admission and discharge, location of the patient when the opioid order was entered, liver enzymes and serum creatinine within 24 hours of when the order was placed, and comorbidity data (ICD-9 codes). Opioid prescription information obtained for Group 2 was also collected for Group 1; information that would have triggered the alert (drug, dose, route, frequency, date, and time) and all drug and dosing information up to two hours after the opioid prescription was initiated.

RESULTS

The results of this project are pending.

CONCLUSIONS

It is expected this project will provide a better evaluation of pre- and post-implementation of an active medication monitoring system to determine if appropriate opioid prescribing was improved with the alert system prescribing recommendations.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors Hershey, Pa., 2012.

Stephanie M. Seaton, PharmD

Stephanie M. Seaton received her Pharm.D. from the St. Louis College of Pharmacy in Saint Louis, Missouri in 2011. After completing her PGY1 Pharmacy Practice Residency at UPMC Presbyterian, she will complete a PGY2 Geriatric Residency at UPMC Presbyterian-Shadyside and Magee hospitals.

Faculty Mentor: Sandra L. Kane-Gill, Pharm.D., MSc, FCCM, FCCP

A Retrospective Review of the Impact of Provider Outreach on Antipsychotic Polypharmacy Utilization and Heathcare Costs

Anokhi Shah, Jocelyn Hain, Shelby Corman, Lynn Bizich, Jessica Daw.

PURPOSE

Clinical guidelines recommend antipsychotic monotherapy whenever possible except in very treatment-resistant patients. However, studies show an increasing trend of combination antipsychotic prescribing in clinical practice at rates of 5-18%. To address this issue, UPMC Health Plan implemented a Drug Utilization Review (DUR) program centered on contacting prescribers of patients who have filled at least 60 days of ≥2 antipsychotics concurrently in the previous four months, requesting a reassessment of the regimen to achieve monotherapy. The objective of this study was to determine the impact of the DUR on the utilization of antipsychotic medications and associated pharmacy and medical costs.

METHODS

A retrospective analysis of UPMC Health Plan pharmacy and medical claims was conducted in all continuously enrolled members in all product lines who met DUR criteria from February 2010 through September 2011. Primary outcomes were effectiveness of DUR as measured by reduction in polypharmacy claims six months after communication, and long term prevalence of combination prescribing. Secondary outcomes included changes in pharmacy and medical utilization costs. Analyses used descriptive statistics, Pearson Chi-square for prevalence, and Friedman test for costs, quantified as per member per month (PMPM).

RESULTS

Prescriber communication resulted in a meaningful decrease in combination antipsychotic utilization, with an average of approximately 42% of members not meeting DUR criteria again. Prevalence of combination prescribing in July 2010 compared to July 2011 showed a significant increase ($p<0.001$); however, it was driven by an increase only in the Special Needs Plan population. Significant decreases in pharmacy spend were noted for all patients whose regimen was reduced to monotherapy ($p<0.001$). Conversely, significant increases were found in pharmacy spend for patients who continued on >1 antipsychotic ($p<0.001$). For the full population, the DUR did not adversely increase behavioral health medical costs.

CONCLUSION

The data support continued benefit and financial value of the DUR for the Health Plan.

Presented at the Annual Spring Meeting of the Academy of Managed Care Pharmacists in San Francisco, Ca., on April 20, 2012.

Anokhi Shah, PharmD

Anokhi received her PharmD from the Philadelphia College of Pharmacy. After completing her residency, Anokhi plans to pursue a career in managed care with an emphasis on formulary management.

Faculty Mentor: Jocelyn Hain, PharmD

Immunosuppressive Effects of Fentanyl and Dexmedetomidine in Critically Ill Patients who Develop Ventilator-Associated Pneumonia

Smith MA, Hibino M, Falcione BA, Reynolds RB, Empey KM

PURPOSE

Ventilator-associated pneumonia (VAP) is a common complication among mechanically ventilated (MV) patients in the intensive care unit (ICU). Numerous reports have been published describing the immunosuppressive effects of analgesic and sedative agents. Fentanyl has been shown to suppress T-cell proliferation, interferon-γ, and interleukin-2 production among other immunomodulatory effects. In contrast, dexmedetomidine has little to no immunosuppressive properties. Historical data from our institution indicates highest and lowest rates of VAP and use of analgesic and sedative agents in the Surgical/Trauma (ST) ICU and the Neurotrauma (NT) ICU, respectively. The objective of this study is to correlate incidence of VAP in the STICU and NTICU to the use of fentanyl and dexmedetomidine.

METHODS

In this retrospective matched cohort study of patients admitted to the STICU and NTICU at our hospital between January 1, 2007 and December 31, 2011, use of fentanyl and dexmedetomidine was compared using medical record data. Inclusion criteria required MV within 24 hours of admission, ≥ 18 years of age, and administration of dexmedetomidine and fentanyl. Exclusion criteria included history of malignancy, chronic immunosuppression, chronic use or history of abuse of opioids, concurrent infection, and/or acute respiratory distress syndrome. VAP was defined using the CDC definition. Patients were matched on predefined criteria: age, gender, admission date, STICU or NTICU, SAPS II, and type of admission. Power calculations and minimum detectable differences were defined based on matching cases:controls for ratios 1:1, 1:2, and 1:3. An unadjusted bivariate analysis, a conditional logistic regression, and a mediation model will be performed for statistical analyses.

RESULTS

VAP rates and cumulative dose normalized to ventilation hours will be recorded. Results are pending.

CONCLUSION

It is anticipated that fentanyl, due to its immunosuppressive properties, will have a stronger correlation to VAP, in comparison to dexmedetomidine in MV patients in the NTICU and STICU.

Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Michael A. Smith, PharmD

Michael received his B.S. in Chemistry with a Bioscience Option in 2007 and his PharmD in 2011, both from the University of Pittsburgh. He will be completing a second year residency in Internal Medicine at the University of Pittsburgh Medical Center. After completion of his second year residency, Michael plans to pursue a career in academia at a university affiliated with an academic medical center.

Faculty Mentors: Kerry Empey, PharmD, PhD and Bonnie Falcione, PharmD, BCPS

Use of the MASCC Risk Stratification Criteria for Hospitalized Patients with Febrile Neutropenia

Stebbings AE, Brenner TL, Friedland DM

PURPOSE

Febrile neutropenia is a serious consequence of chemotherapy, affecting 10-50% of patients with solid tumors and over 80% of patients with hematologic malignancies. Current IDSA guidelines for the treatment of febrile neutropenia recommend that high-risk patients, MASCC criteria score < 21, receive treatment with broad-spectrum intravenous antibiotics. Low-risk patients, MASCC criteria score ≥ 21, can receive outpatient therapy with oral antibiotics such as amoxicillin-clavulanic acid and ciprofloxacin, with physician follow-up. This study's primary aim was to determine whether low-risk patients admitted to UPMC Shadyside for febrile neutropenia were appropriately discharged within 48 hours on oral antibiotics.

METHODS

This study was a retrospective, electronic chart review of hospitalized cancer patients admitted to UPMC Shadyside between January 1, 2009 and September 30, 2011. All data was obtained electronically and de-identified by a certified honest broker prior to investigator review. Patients with a first admission for febrile neutropenia were included if they were over 18 years of age, had an ANC ≤ 500 cells/mm^3 on admission and had a documented fever (temperature ≥ 38.0˚C).

RESULTS

A total of 48 patients were included in the analysis, 45.8% (22/48) with MASCC scores ≥ 21 and 54.2% (26/48) with MASCC scores < 21. Admissions for febrile neutropenia were more frequent in patients with hematologic malignancies (66.7%) vs. solid tumors (33.3%). Complications such as readmissions within seven days occurred less frequently in patients with MASCC scores ≥ 21 vs. MASCC scores < 21 (4.5% vs. 11.5%). The two deaths from febrile neutropenia in this study occurred in patients with MASCC scores of 16 and 18 (both < 21).

CONCLUSION

Only 22.7% (5/22) of patients with MASCC scores ≥ 21 were discharged within 48 hours vs. 44% reported in the literature. Increased utilization of the MASCC criteria may help to select appropriate low-risk patients for earlier discharge on oral antibiotics.

Presented at HOPA's 8th Annual Conference, Orlando, Fla., 2012.

Alison E. Stebbings, PharmD

Alison received her PharmD from Northeastern University in 2010 and completed a PGY1 pharmacy practice residency at Tufts Medical Center in 2011. Upon completion of her PGY2 hematology/oncology pharmacy residency at UPMC Shadyside, she will practice as a hematology/oncology clinical pharmacy specialist at UPMC Shadyside and the Hillman Cancer Center.

Faculty Mentor: Timothy Brenner, PharmD, BCOP

Evaluation of the Safety of Insulin Infusions in the Intermediate Care Nursing Unit Versus the Intensive Care Unit in Cardiothoracic Surgery Patients

Wasielewski JP, Saber S

INTRODUCTION

Few studies are available evaluating the safety and efficacy of insulin infusions in the non-intensive care setting. The objective of this study is to evaluate the safety of insulin infusions in post-operative cardiothoracic patients in the intermediate unit (IU) as compared to the intensive care unit (ICU).

METHODS

The electronic medical record was used to identify cardiothoracic surgery patients on an insulin infusion in the ICU and IU. Patients younger than 18 years of age were excluded from the study. The following data was collected: age, gender, blood glucose values, insulin infusion rates, documented incidence of seizures, hypoglycemia-induced coma, cardiac arrest, and death. The primary endpoints of this study included the incidence of hypoglycemia (blood glucose less than70 mg/dL), the incidence of severe hypoglycemia (blood glucose less than 40 mg/dL), and the appropriateness of infusion rate adjustments based on blood glucose values and the insulin infusion protocol. In addition to the standard insulin infusion protocol, a modified insulin infusion protocol was also utilized.

RESULTS

The incidence of hypoglycemia was statistically significantly higher in the IU versus the ICU (50% versus 16.7%, p=0.006). More than 96% of incidences of hypoglycemia occurred in patients treated with modified insulin infusion protocol. Severe hypoglycemia or severe clinical effects of hypoglycemia did not occur in the study subjects. Statistically significantly higher rates of appropriate insulin infusion rate adjustments were present in the IU. There was no difference in the length of hospital stay between patients with one or more incidence of hypoglycemia versus those without hypoglycemia.

CONCLUSION

Study results showed significantly higher incidence of hypoglycemia in the IU however, no documented incidences of symptomatic hypoglycemia were present in the study subjects. Over 95% of hypoglycemia occurred in patients on modified insulin infusion protocol. Incidence of hypoglycemia was not associated with increased length of hospital stay.

Presented at UPMC Hamot Research Days and the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Justyna Wasielewski, PharmD

Justyna received PharmD from the LECOM School of Pharmacy in 2011. Upon completion of pharmacy practice residency, she plans to practice in a hospital setting.

Faculty Mentors: Sandra Kane-Gill, PharmD, M.S., FCCM, FCCP; Amy L. Seybert, PharmD, FASHP

Evaluation of a Pharmacokinetic Service for Appropriateness of Dosing and Monitoring of Vancomycin

Winter SE, Gingo LL, D'Amico F

PURPOSE

Vancomycin is an antibiotic utilized for the treatment of gram positive bacterial infection. The antimicrobial activity is time dependent. Monitoring vancomycin trough levels is necessary to ensure adequate serum concentrations and to avoid potential adverse effects. At UPMC St. Margaret Hospital, the Department of Pharmacy is responsible for dosing, monitoring and making appropriate adjustments to vancomycin therapy.

METHODS

A retrospective, QA-QI approved study of the pharmacokinetic service was performed including adult patients receiving intravenous vancomycin with at least one trough level drawn during the 6 month period. Hemodialysis and acute kidney injury patients were excluded. The primary outcome was to evaluate the prevalence of the pharmacist –dosed vancomycin treatment achieving target trough levels. The secondary outcome was to determine characteristics that correlate to subtherapeutic trough levels.

RESULTS

A total of 190 patients were evaluated. At first trough, 38.4% (73) (95% confidence interval (CI) = 31.4%-45.3%) were therapeutic, 9.5% (18) (95% CI = 5.4%-13.6%) were supratherapeutic, 52.1% (99) (95% CI = 45.0%-59.2%) were subtherapeutic. Of the patients who were subtherapeutic, 75.8% (75) were being treated with the goal range of 15-20mcg/mL. Mean time to therapeutic trough level for patients who were therapeutic or supratherapeutic > 20mcg/mL at first trough was 2.5 ±SD 0.9 days. The mean time to therapeutic trough for the patients who were subtherapeutic at first trough (n=20) was 6.0 ±SD 1.4 days. Of patients with an estimated creatinine clearance >100 milliliters/minute (n=41), 78% (32) were ultimately dosed every 8 hours.

CONCLUSIONS

The majority of patients were subtherapeutic after empiric dosing. Patients with a higher vancomycin trough goal were less likely to be therapeutic. The majority of patients with a creatinine clearance > 100mL/min were ultimately dosed every 8 hours. To improve outcomes, a modification should be made to the pharmacist process for empirically dosing patients.

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Presented at the 31st Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2012.

Sarah E. Winter, PharmD

Sarah received her PharmD from Duquesne University School of Pharmacy in 2011 and will complete a pharmacy practice residency at UPMC St. Margaret in 2012. Upon completion, she plans to continue at UPMC St. Margaret for a PGY2 in Family Medicine.

Faculty Mentor: Leslie L. Gingo, PharmD, BCPS

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
Asst. Director: Roberta Farrah, PharmD, BCPS

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

Community Pharmacy
Rite Aid Corporation, Falk Pharmacy, Forbes Pharmacy
Director: Melissa Somma McGivney, PharmD, FCCP

Managed Care at CVS Caremark
Director: Mike Safranyos, PharmD

Post Graduate Year 2 (PGY2)

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

Cardiology at UPMC Presbyterian Shadyside
Director: Amy Seybert, PharmD

Critical Care at UPMC Presbyterian Shadyside
Director: Amy Seybert, PharmD

Internal Medicine at UPMC Presbyterian Shadyside
Director: Rima Mohammad, PharmD, BCPS

Drug Information at UPMC Presbyterian Shadyside
Director: Shelby Corman, PharmD, BCPS

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Director: James Natale, PharmD, BCOP

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

Pharmacy Management at UPMC Presbyterian Shadyside
Director: Bryan Yourich, PharmD

Transplantation at UPMC Presbyterian Shadyside
Director: Heather Johnson, PharmD, BCPS
Asst. Director: Michael Shullo, PharmD

Pharmacy Residency Programs

Residency Program Contact Information

University of Pittsburgh School of Pharmacy
Department of Pharmacy and Therapeutics
Pharmacy Residency Program

Kathleen Woodburn
Department of Pharmacy and Therapeutics
3705 Victoria Street Building
Pittsburgh, PA 15213

www.pharmacy.pitt.edu/programs/rxresidency
woodburnkm@upmc.edu