Resident Research
2008–09

University of Pittsburgh
School of Pharmacy

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Valuing Our Partners

The University Pittsburgh School of Pharmacy values our partnerships with the University of Pittsburgh Medical Center (UPMC), the UPMC Health Plan, the VA Pittsburgh Healthcare System (VAPHS), 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 fourteen of "America's Best Hospitals" according to the 2008 U.S. News and World Report rankings and is one of the leading integrated healthcare delivery systems in western Pennsylvania. UPMC Presbyterian Shadyside, UPMC Mercy and UPMC St. Margaret hospitals participate in our residency programs.

UPMC Health Plan is the second largest insurer in western Pennsylvania and is ranked by U.S. News and World Report as the top-ranked health plan in Pennsylvania.

The VA Pittsburgh Healthcare System has a 128-bed tertiary care facility that serves as the referral center for other VA hospitals in Pennsylvania and West Virginia, and provides a wide range of inpatient and outpatient services.

Rite Aid Corporation is the third largest drugstore chain in the United States. It has annual revenues of more than $27 billion, more than 5,000 stores in 31 states and the District of Columbia, with a strong presence on both the East and West coasts, and approximately 116,000 associates.

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, research, patient care, and service.

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.

Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2009,

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, UMPC Health Plan, the VA Pittsburgh Healthcare System, Rite Aid, and CVS Caremark—have provided the rich environments for your residency experiences and learning. You have enriched each other with pharmacy backgrounds from Pennsylvania, Ohio, Florida, New York, Georgia, Michigan, Texas, Kansas, Missouri, Louisiana, Minnesota, and Rhode Island.

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 have each 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

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 a longitudinal research working group. This approach provides a foundation for performing research, gives appropriate mentorship, fosters interactive discussions, and 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 this year included prospective and retrospective study designs ranging from laboratory-based evaluations to patient-centered outcome assessments. Once again, this year's residents responded in outstanding fashion, demonstrating a true sense of personal ownership in their work.

The Residency Research Program requires residents to be certified in research fundamentals through the University of Pittsburgh, participate in valuable 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 School of Pharmacy, which ultimately results in well-rounded candidates eligible for a wide range of career opportunities.

The success of this program would not be possible without the working group facilitators and other major contributors: Kim Coley, Shelby Corman, Amy Donihi, Robert Simonelli, Susan Skledar, Amy Seybert and Lauren Trilli. Robert Weber, chair of the Department of Pharmacy and Therapeutics, must also be recognized for his continued dedication to the program. We greatly appreciate the continued support of Dean Patricia Kroboth and Senior Associate Dean Randall Smith. The data management skills of Melissa Saul were invaluable, and we thank her for her efforts. We would be remiss not to mention the fine administrative support of Susan Parnell and Kathleen Woodburn. Most importantly, this program would not be successful if it were not for the commitment of our outstanding residents and faculty advisors.

Determining Workflow Impact from the Implementation of a Second Medication Dispensing Robot

Anderson BJ, Kirschling TE, Saenz R, Culley CM, Skledar SJ, Mark SM

PURPOSE

The University of Pittsburgh Medical Center (UPMC) Presbyterian campus has utilized medication dispensing robotics as part of daily cart fill activities since September 2001, providing service to UPMC Presbyterian and Western Psychiatric Institute and Clinic. Of the 11,000 cart fill doses are required each day, and the existing automation could dispense 7,500 doses. A second medication dispensing robot was introduced October 20, 2008. This study will look to determine the workload impact on the pharmacy department.

METHODS

Data from May 2008 to March 2009 was collected. Time motion studies were utilized to identify the amount of time spent per dose on manual cart fill activities, pulling from stock and checking of medications not dispensed by automation. Information from the automation server was gathered to determine the number of doses packaged, used on the robot and restocked on the robot, as well as a per-dose time for each task. A two-tailed T-test assuming equal variance was used to compare the times from before and after second robot implementation.

RESULTS

The per dose times in seconds(s) required for repacking, restocking, pulling and checking were 7.5s, 2.1s, 21s, and 15s, respectively. Time pulling stock decreased from 19.88 hours to 14.17 hours ($p=0.004$) post implementation and time checking doses decreased from 13.85 hours to 9.87 hours ($p=0.004$). Conversely time repacking and restocking increased from 17.52 hours and 4.43 hours to 24.06 hours and 6.08 hours, respectivel ($p < 0.001$). The overall time spent on manual processes decreased from 55.67 hours to 54.18 hours, but was not statistically significant.

CONCLUSIONS

The addition of a second medication dispensing robot did decrease overall manual work in the pharmacy but not significantly. The individual decrease of the checking process has reduced the number of pharmacist hours spend on the process each day.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Benjamin J. Anderson, PharmD, MPH

Benjamin graduated from the University of Minnesota College of Pharmacy, Duluth Campus in 2007 and received his MPH from the University of Pittsburgh School of Public Health in December of 2008. After completing the 2-year residency in pharmacy practice management at UPMC, he will join the HealthEast System as pharmacy operation manager at Saint John's Hospital in Maplewood, Minn.

Faculty Mentor: Dr. Scott Mark, PharmD, M.S., M.Ed., FASHP, FACHE

Pharmacist Evaluation of Patient-Specific Factors Related to Unplanned Frequent Readmissions to an Urban Hospital

Andrzejewski C, Funkhouser JW

PURPOSE

Pharmacist involvement in medication discharge counseling can improve patient care. In addition to improvements in patient care, it is financially beneficial to avoid readmissions under these circumstances. Many insurance providers, particularly Medicaid and Medicare, have reimbursement penalties associated with recent readmissions for the same diagnosis. Our primary objective was to determine factors that influence an unplanned readmission to the hospital, whether medication-related or secondary to other causes.

METHODS

Following IRB approval, UPMC Mercy's Information Systems (IS) department generated a daily list of patients greater than 18 years of age admitted with a recent discharge date of less than or equal to 14 days. Patients were excluded if they had cognitive/decisional impairment, admission to the Behavioral Health Unit (BHU), Trauma/Burn Unit (TBU) or Labor and Delivery, planned surgical procedures, and patients who refused to provide consent. After obtaining informed consent, patient background information was recorded and each patient was interviewed to collect subjective data such as reported adverse medication events, as well as financial, behavioral and professional limitations to medication compliance. Each patient-specific factor was assessed for a potential association with readmission.

RESULTS

Interim results for 30 patients that participated in the study are reported. The average age of this population is 68 years, and the majority of patients are Caucasian females. Out of this patient population, 70% of patients have Medicare and 73% of these readmissions have been non-medication related. Although the majority of patient readmissions have not been medication-related, 11 drug-related problems were identified and include therapeutic duplications, drug-drug interactions, medication reconciliation discrepancies, and adverse drug events.

CONCLUSIONS

It is anticipated that further study will justify dedicated pharmacist time to provide a discharge counseling service targeted toward the patients identified by the study as being at highest risk for unplanned readmission to the hospital.

Presented at the 43rd ASHP Midyear Clinical Meeting and Exhibition in Orlando, Fla., 2008 and at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Christina Andrzejewski, PharmD

Christina received her PharmD from Duquesne University in 2008. After completing a PGY1 pharmacy practice residency at UPMC Mercy, she will be joining UPMC Mercy as a 50/50 clinical pharmacist.

Faculty Mentor: Jeremy W. Funkhouser, PharmD

The Addition of Oral Antibiotics to Incision and Drainage for Outpatient Management of Bacterial Skin and Soft Tissue Abscesses: A Systematic Review

Ballard S, Saleh A, Busby R, Harinstein L, Narumoto K, Shelesky G

PURPOSE

The Infectious Diseases Society of America recommends incision and drainage (I&D) as monotherapy for uncomplicated cutaneous abscesses. In 2005, 87% of surveyed family practitioners regularly prescribed antibiotics following drainage of a cutaneous abscess. Our objective was to systematically review the evidence for empiric treatment with antibiotics after adequate drainage of outpatient abscesses.

METHODS

We performed a sensitive search of 12 databases of published and gray literature. Database searches were supplemented with citation tracking and targeted handsearching. Included studies were randomized, controlled trials comparing I&D plus oral antibiotic therapy to I&D alone in outpatients with skin and soft tissue abscesses completed in 1990 or later. The outcome of interest was clinical cure, defined as resolution of signs and symptoms of infection, or treatment failure. Included studies were reviewed for quality. All study selection, quality analysis and data abstraction was performed by at least two investigators.

RESULTS

12,332 citations were screened for relevance, 17 articles reviewed for inclusion, and 2 studies met inclusion criteria. Meta-analysis was not possible due to heterogeneity of populations. In the first trial, 166 adults with cutaneous abscesses underwent I&D, followed by randomization to cephalexin or placebo. Clinical cure was achieved in 84% of patients receiving cephalexin (95% CI 0.74-0.91), and in 90.5% of those receiving placebo (95% CI 0.82-0.96). The second study is a currently-unpublished noninferiority trial in 161 pediatric emergency department patients. Children with cutaneous abscesses underwent I&D and were randomized to trimethoprim/sulfamethoxazole (TMP/SMX) or placebo. Noninferiority was defined as <7% difference of treatment failure between groups. In the TMP/SMX arm, 4.11% experienced treatment failure, versus 5.26% of the placebo group, with a difference of 1.15% (95% CI 1.15-6.8).

CONCLUSIONS

There is currently no high-level evidence to support the use of antibiotics to incision and drainage for uncomplicated abscesses after incision and drainage.

Presented at the 42nd Annual Society of Teachers of Family Medicine (STFM) National Spring Meeting in Denver, Co., and the UPMC St. Margaret Clinical Research Forum 2009.

Stephanie Ballard, PharmD

Stephanie received her PharmD from the University of Florida. After completing a pharmacy practice residency at UPMC St. Margaret, she will be caring for outpatients at The Cleveland Clinic Florida Health and Wellness Center and teaching as an assistant professor of pharmacy practice in ambulatory care at Nova Southeastern University in West Palm Beach, Fla.

Faculty Mentors: Heather Sakely, Pharm.D., BCPS; Stacey Heberlig, Pharm.D., BCPP

A Description of Pharmacist-Run Medication Management of Polypharmacy Patients in a Collaborative Family Medicine Setting

Busby RM

PURPOSE

The mixed data on pharmacist-led interventions indicates a need for stronger prospective research in an interdisciplinary practice. Patient care setting may be a primary determinant in the success of pharmacist-led medication management. The purpose of this study is to describe pharmacist-run medication management visits with polypharmacy patients in a unique collaborative family medicine setting.

METHODS

This is a prospective study recruiting polypharmacy patients who are scheduled for a medication management visit at three community family health centers. Patients must be at least 18 years old, have at least nine medications listed on their medication profile, and be accessible by phone for one year after recruitment into the study.

RESULTS

Currently, 22 of an anticipated 50 polypharmacy patients have been enrolled with subsequent completion of a data collection form. The most common co-morbid disease states include hypertension (100%), dyslipidemia (68%), depression/anxiety (59%), gastro esophageal reflux disease (50%), and diabetes (45%). On average, five discrepancies (range 0-17) with the electronic health record were discovered per visit. The median number of drug-related problems identified per visit was 2 (range 0-5). On average, seven recommendations or interventions were made per visit (range 3-12). The most frequent interventions or recommendations and the number of times completed during 22 visits included: providing medication education (19), recommending a change to the primary care provider (15), implementing a medication use system (16), and providing lifestyle and disease education (13). Other interventions included adding, discontinuing, or changing prescription or over-the-counter medications (19) and educating on proper device technique (3).

CONCLUSION

The most common disease states encountered during our medication management visits are similar to those encountered in other pharmacist-led practices. Multiple discrepancies with the electronic health record were discovered at most visits. In addition, interventions or recommendations were made during every visit. The most frequent interventions included medication education and changes to drug therapy regimens.

Presented at the 42nd Annual Spring Conference of the Society of Teachers of Family Medicine Annual Spring Conference, Denver, Co.

Rachelle Busby, PharmD

Rachelle received her PharmD from the University of Pittsburgh in 2008. After completing a pharmacy residency at the UPMC St. Margaret, she will be advancing her training in a PGY2 family medicine pharmacy residency at UPMC St. Margaret, Pittsburgh, Pa.

Faculty Mentor: Roberta M. Farrah, PharmD, BCPS

Evaluation of Pharmacologic Venous Thromboembolism Prophylaxis in Obese Patients

Calhoun ML, Wilson Jr. GL

BACKGROUND

Venous thromboembolism (VTE) is the most common preventable cause of hospital-related death in the United States, with an estimated 450,000 diagnosed cases every year. However, there is a lack of consensus regarding the appropriate dose of VTE prophylaxis in obese patients due to the paucity of data.

METHODS

A list of patients with weight ≥ 125kg was generated electronically. Based on this list a retrospective chart review was performed. Information collected included admitting diagnosis, age, height, weight, serum creatinine, risk factors for VTE, pharmacologic agent used for VTE prophylaxis, dose and frequency of that agent and if the patient suffered from any VTE or bleeding complications. Subtherapeutic doses of VTE prophylaxis for obese patients were defined as enoxaparin ≤ 40mg subcutaneously per day, heparin ≤ 15,000 subcutaneously per day, and warfarin with a subtherapeutic INR. The evaluation also included patients who did not receive VTE prophylaxis to ensure physicians were assessing patients appropriately for the need of pharmacologic VTE prophylaxis.

RESULTS

There were 29 (74%) patients who received subtherapeutic doses of VTE prophylaxis, of which 5 (17%) suffered a VTE complication. There were 10 (26%) patients who received appropriate doses of VTE prophylaxis. There were 36 patients who did not receive pharmacologic VTE prophylaxis, none of whom suffered VTE complications. All patients who received pharmacologic VTE prophylaxis were also evaluated for bleeding complications. No patients who received pharmacologic VTE prophylaxis, either appropriate dose or subtherapeutic dose, suffered from any bleeding complications.

CONCLUSION

Physicians' assessment of need for VTE prophylaxis is adequate at our institution. However, a significant number of obese patients receive subtherapeutic doses. Modification of existing order sets to include options of VTE prophylaxis regimens for obese patients is planned.

Presented at the 43rd ASHP Midyear Clinical Meeting and Exhibition, Orlando, Fla., 2008 and the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Meaghan Calhoun, PharmD

Meaghan received her PharmD from Duquesne University in 2008. After completing her residency at UPMC Mercy, she will be joining the UPMC Mercy staff as a clinical pharmacist.

Faculty Mentor: Gregory Wilson, Jr., PharmD, BCPS

Analysis of Hospital Indicators to Predict Pharmacy Workload Drivers

Cerussi NL, Mark SM

PURPOSE

Hospital volume indicators such as patient census, expected admissions, and case mix index (CMI) have been used to predict the need for and adjust staffing in some hospital departments. Nursing departments have used staffing ratios and/or patient acuity in combination with patient census to determine the appropriate level of staff needed at any given time. The goal of this study is to determine which specific hospital indicators drive the workload of a pharmacy department in a tertiary care academic medical center with a Level I Regional Resource Trauma Center designation.

METHODS

Hospital indicators of patient census, acute admissions, CMI, and average length of stay (ALOS) were compared to the pharmacy workload at a tertiary care academic medical center over a one-year period. Pharmacy workload was measured by the number of medications that were dispensed from the pharmacy. A multiple regression analysis was used to determine the relationship between these different hospital indicators and the pharmacy workload.

RESULTS

The relationship between patient census, CMI, and ALOS and the number of medications dispensed were not statistically significant. The relationship between acute admissions and the number of medications dispensed was statistically significant with a p value of 0.01.

CONCLUSIONS

The number of acute admissions is the best predictor of the workload that can be expected in the pharmacy in terms of the number of medications dispensed.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Nicole Cerussi, PharmD, MPH

Nicole received a Bachelor of Science in chemistry from Penn State University and then went on to receive a PharmD from the University of Pittsburgh in 2007. She recently earned an MPH in Health Policy and Management of the University of Pittsburgh School of Public Health in conjunction with the 2-year pharmacy practice management residency. After residency training, Nicole will be staying in Pittsburgh to pursue opportunities in pharmacy management.

Faculty Mentor: Scott Mark, PharmD, MS, MEd, FASHP, FACHE

The Impact of Renin-Angiotensin Blockade on Graft Survival in Renal Transplantation

Chow PM, Schonder KS, Corman SL, Johnson HJ, Shah NA, Shapiro R

PURPOSE

Angiotensin-converting enzyme inhibitors (ACEI) and angiotensin II receptor blockers (ARB) delay progression of chronic kidney disease in diabetic and non-diabetic patients. Data show that these agents may be beneficial for prolonging allograft survival in renal transplant patients. However, adverse effects of these medications may limit their potential benefits. The purpose of this study is to compare graft survival among renal transplant recipients based on when ACEI/ARB therapy was initiated after transplantation.

METHODS

This was a retrospective cohort study of patients who received their first renal transplant from the University of Pittsburgh Medical Center between January 1, 1995, and June 30, 2001. Patients were stratified according to post-transplant initiation of ACEI/ARB therapy (0-6 months, 6-12 months, 12-36 months, or > 36 months, or never). The primary objective was time to graft failure and changes in serum potassium, serum creatinine, hemoglobin and hematocrit) were secondary outcomes used to evaluate adverse effects. Data for the primary outcome and doubling of serum creatinine were analyzed using Cox regression with time-dependent variables. Secondary outcomes were analyzed by ANOVA.

RESULTS

A total of 652 patients who met inclusion criteria and had all data available were included in the analysis. Patients starting ACEI/ARB therapy at least one year after transplantation had better graft survival versus control (p=0.001, p=0.003). Progression to renal failure was significantly delayed in patients staring therapy one year after transplant compared to the control group (p=0.001, p=0.03). There were no significant changes in serum potassium level or hematocrit percentage after initiation of therapy. There were no clinically significant changes in mean hemoglobin concentration or serum creatinine associated with the inititation of ACEI or ARB

CONCLUSIONS

ACEI/ARB therapy improved renal allograft survival when initiated at least one year after transplant and are safe in this population. There was no difference in graft survival between these patient starting an ACEI/ARB within one year of transplant and the control.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Phyllis Chow, PharmD

Phyllis received her Bachelor of Arts in biology from Baylor University and a then Master of Science in Healthcare Administration from the University of Texas at Arlington before earning a PharmD from the University of Texas in 2007. She completed a Pharmacy Practice Residency at Methodist Dallas Medical Center. After completing her residency, she will join the Seton Heart Specialty Care and Transplant Center in Austin, Texas as a clinical transplant specialist.

Faculty Mentors: Kristine S. Schonder, PharmD, Shelby L. Corman, PharmD, BCPS, and Heather J. Johnson, PharmD, BCPS

A Study of Order Verification Time after Implementation of Computerized Provider Order Entry (CPOE)

Davis SJ, Mark SM, McMillen K, Oriolo VA, Wasicek K, Weber RJ

PURPOSE

Administrators of pharmacy departments are required to evaluate several metric indicators of the department including key volume indicators (number of direct patient care activities of the department), standards (length of time required to complete activity), workload, performance, and productivity. These indicators monitor volume and guide the number of full-time equivalents (FTEs) necessary to meet volume demands in order to control associated expenses. This evaluation will measure the change in key volume indicators (KVIs) and changes in the workload that have occurred since the implementation of computerized provider order entry (CPOE) at UPMC Presbyterian.

METHODS

During the months of December 2008 through March 2009, the pharmacy department performed time-motion studies to determine the time required to complete order verification, dispensing, and clinical activities. Order verification activities were divided into two categories: oral medications and intravenous (IV) medications. Dispensing activities were divided into five categories: oral medications, intravenous medications, TPNs, controlled substances, and deliveries. Time-motion studies were performed to determine the time required to complete direct patient care activities. Each category was evaluated separately to account for the time required to complete each activity.

CONCLUSIONS

Order verification time for oral medications decreased from 1:30 to 1:24 (minutes:seconds). Order verification time for intravenous medications decreased from 2:50 to 2:07. Order verification time for modifying oral medication orders increased from 1:30 to 2:58. Order verification time for modifying intravenous medication orders increased from 2:50 to 4:00. The amount of time for dispensing activities did not have any significant changes. Clinical activity reports showed that CPOE has decreased the amount of time needed to prepare for clinical rounds, decreased the amount of time for order verification, and has increased the amount of time for patient rounding, special projects, student precepting, and other pertinent activities.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Stephen J. Davis, PharmD

Stephen received his PharmD from Auburn University in 2008. Stephen is completing the first of a two-year health-system pharmacy administration residency at UPMC Presbyterian. Upon completing his graduate coursework in the fall of 2009, he will receive a Master of Science in health-system pharmacy administration from the University of Pittsburgh School of Pharmacy.

Faculty Mentors: Scott Mark, PharmD, MS, MEd, FASHP, FACHE, and Katie McMillen, PharmD, MPH

Critical Success Factors of a Pharmacy-Based Patient Care Practice: An Observational Case Study

Elrod SS, Somma McGivney MA, Snyder ME, Smith RB, Hall DL

PURPOSE

To determine the critical success factors of a pharmacy-based patient care practice business model.

METHODS

An observational case study was used to identify the critical success factors of a business model in the transformation of a strictly dispensing pharmacy to one with dispensing functions and an independent profitable patient care practice. Critical success factors were defined in this study as those elements necessary for a pharmacy-based patient care practice to achieve sustainability and profitability. The patient care practice studied needed to have traditional dispensing services, established patient care services defined as seeing patients by appointment separate from the dispensing process, a willingness to participate in the research study, and an expectation that the patient care practice portion was a profitable portion of their business. Key informants such as patient care practice pharmacists and support staff, patients, health care professionals who have partnered with the practice, and payers were interviewed. Workflow, level of integration with dispensing functions, and operations of the practice were observed by the principal investigator, and field notes were utilized to record observations. Financial statements and marketing materials were gathered as made available by the pharmacy owner. Practice financial viability and marketing materials were also analyzed. Final analysis will compare interview responses, observations, and analysis with current literature in healthcare and business.

RESULTS

Several key points were apparent during the observation period. A clear vision from a thought leader is necessary to establish a practice and is a necessary driving force. Establishing patient care practice as a separate business from the dispensing practice fosters growth of the practice. Setting the expectation for all employees that 'change is a constant' assists the practice in meeting patient needs and grow. Physicians have a standard expectations of care. Finally, all relationships, both internal and external, are essential.

CONCLUSIONS

Final results will be available in late May or early June 2009.

Presented at the 2009 American Pharmacists Association Annual Meeting and Exposition in San Antonio, Texas.

Shara Elrod, PharmD

Shara received her PharmD from the University of Texas at Austin in May 2008. After completing a community pharmacy practice residency at the University of Pittsburgh, she will be advancing her training in a PGY2 specialty residency in ambulatory care at UPMC in Pittsburgh, Pa.

Faculty Mentors: Melissa Somma McGivney, PharmD, and Deanne Hall, PharmD, CDE

The Incidence and Type of Medication Errors Made During Medical Emergencies in a Large, Tertiary Care, Academic Medical Center

Gokhman R, Seybert AL, Kane-Gill SL

PURPOSE

Medical Emergency Teams (MET) are teams of healthcare professionals responding to clinically deteriorating in-hospital patients. Medical emergencies are fast-paced, requiring quick decisions and rapid administration of medications for critically ill patients. To date, there are no data evaluating the incidence of medication errors during medical emergencies. The aim of this project is to assess the incidence and type of medication errors made during medical emergencies.

METHODS

This is a prospective, pilot evaluation of patients requiring care from a MET at University of Pittsburgh Medical Center, Pittsburgh, Pa. Patients requiring care from a MET were evaluated for enrollment. All aspects of the medication ordering, preparation and administration were documented by the observer utilizing modified direct-observation method described by Barker and retrospectively reviewed by a team of three clinicians with extensive experience in critical care pharmacotherapy, patient safety, and emergency response to assess the incidence, severity, and type of medication errors consistent with the Unites States Pharmacopeia MEDMARX system. The observer did not interfere with the team's duties unless, in the professional opinion of the observer, a medication error is being made; the team would then be advised accordingly to avoid harm. Although these potential errors would be prevented, they will still be recorded as errors made for the purpose of this evaluation.

RESULTS

A convenient sample of 50 patients was selected for evaluation. The primary end point of this evaluation is the incidence of medication errors made during medical emergencies. This data will be measured based on the number of errors made per total number of drug doses administered. Descriptive statistics will be used to report the incidence.

CONCLUSIONS

To our knowledge, this is the first assessment of medication errors made during medical emergencies. This evaluation will provide insight into the potential areas for improvement. Potential study limitations include small sample size, absence of a control group, and the environment during medical emergencies, making direct observation difficult.

Roman Gokhman, PharmD

Roman is from Philadelphia, where he received a PharmD from Temple University in 2007. He completed a pharmacy residency at the University of Maryland Medical Center. After completing a cardiology pharmacy residency, Roman plans to pursue a clinical position in critical care with research and teaching responsibilities in an academic medical center.

Faculty Mentors: Amy Seybert, PharmD, and Sandra Kane-Gill, PharmD, MSC, FCCM

The Quality of Warfarin Use in Veterans Affairs Nursing Homes

Goodman DA, Aspinall SL, Roman RD, Hanlon JT, Handler SM, Stone RA, Jeffery S, Voisine J, Francis S, Kosmoski J, Bieber H, Libby E, Hepfinger C, Hagen D, Martin M

OBJECTIVE

Warfarin is commonly associated with preventable adverse drug events in the nursing home setting. Studies evaluating warfarin use in non-government nursing homes concluded there is opportunity to improve the management of this medication. The appropriateness of warfarin dosing and monitoring in VA nursing homes is not known. The objective of this study is to describe the quality of warfarin use in patients at five VA nursing homes. The specific objectives are to assess the point prevalence of warfarin use, to describe the frequency of International Normalized Ratio (INR) monitoring, to estimate the percentage of INR test results within the therapeutic range and the percent of time that a patient is in the therapeutic range. The factors associated with maintaining a therapeutic INR ≥ 50% of the time and the frequency, preventability, management and outcome of bleeds, thromboembolic events and INRs ≥ 4.5 without bleeding will also be described.

METHODS

All patients who received warfarin between January 1, 2008, and June 30, 2008, at five VA nursing homes will be reviewed. The electronic medical record will be used to record patient demographics, type of stay, date(s) of admission and discharge, type of provider managing warfarin, indication, duration of therapy, INR values, warfarin doses, risk factors for bleeding and clotting, drug interactions, and data on bleeds, thromboembolic events and INRs ≥ 4.5 without bleeding. Multivariable logistic regression will be used to examine the association between independent variables and maintaining a therapeutic INR ≥ 50% of the time.

RESULTS

Data collection is ongoing.

CONCLUSION

It is anticipated that there will be opportunities to improve the quality of warfarin management in VA nursing homes.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors. Hershey, Pa., 2009.

David Goodman, PharmD

David received his PharmD from Albany College of Pharmacy in New York and completed a PGY1 pharmacy residency at the Pittsburgh Healthcare System in Pittsburgh, Pa.

Faculty Mentors: Rebecca Roman, PharmD, BCPS, and Sherrie Aspinall, PharmD, MSc

Evaluation of the Use of Clindamycin at UPMC Mercy

Gradisek PA, Freedy HR, Curry SR

PURPOSE

Clindamycin is used for prophylaxis and treatment of infections caused by aerobic gram-positive and anaerobic organisms. There is a definite association between clindamycin use and *Clostridium difficile* infection. Limiting the use of clindamycin to indications where there are no similarly effective agents will decrease the number of patients exposed to a drug that could potentially cause *Clostridium difficile* infection.

METHODS

A retrospective chart review of 100 patients receiving at least one dose of clindamycin from January 2005 through December 2007 was performed. The study population was randomized using a proportionate random sample within year, controlling for gender and age. Drug allergies, allergic reaction and indication for clindamycin therapy were collected.

Appropriate indications for clindamycin in this study included necrotizing fasciitis or a history of life-threatening anaphylaxis to penicillin and either odontogenic infection, aspiration pneumonia, known anaerobic infection with patient intolerance to metronidazole, *Streptococcus* or *Staphylococcus* Toxic Shock Syndrome, community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) infection with documented sensitivity to clindamycin in a patient with a sulfonamide allergy and doxycycline intolerance or tetracycline-resistant MRSA.

Due to instances of inadequate physician documentation of the nature of the penicillin allergy, clindamycin use was categorized as: appropriate, potentially appropriate, likely inappropriate, and inappropriate.

RESULTS

Clindamycin use was appropriate in 7% of cases, potentially appropriate in 13% likely inappropriate in 15%, and inappropriate in 65% according to study definitions. The most frequently occuring inappropriate indications for clindamycin included: otolaryngology, orthopedic surgery, skin and soft tissue infection, obstetric procedures, and aspiration pneumonia.

CONCLUSIONS

The prescribing of clindamycin at UPMC Mercy is often outside of study guidelines; therefore, there are multiple opportunities for pharmacists to intervene. Our planned interventions include: to modify standing order sets that contain clindamycin, educate the staff on the importance of documentation of reported drug allergy reaction, and make targeted interventions of clindamycin orders with recommendations for alternative therapies where appropriate.

Presented at the 43rd ASHP Midyear Clinical Meeting and Exhibition, Orlando, Florida, 2008 and the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pennsylvania, 2009.

Pamela Gradisek, PharmD

Pamela is from Herminie, Pa., and received her PharmD from Duquesne University Mylan School of Pharmacy. She completed a PGY1 pharmacy practice residency at UPMC Mercy. Pam has accepted a position at UPMC Mercy as a clinical pharmacist in the Physical Medicine and Rehabilitation unit.

Faculty Mentor: Henry Freedy, PharmD

Risk Factors Associated with the Conversion of Methicillin-Resistant *Staphylococcus aureus* Colonization to Infection in Hospitalized Patients

Harinstein LM, Schafer JJ, D'Amico F

PURPOSE

To identify risk factors for healthcare-associated methicillin-resistant *Staphylococcus aureus* (MRSA) infections in patients with MRSA colonization.

METHODS

A non-matched case-control study was performed. Study patients were included if they were ≥18 years of age and had a positive nares culture for MRSA between January 1, 2005, and August 1, 2008, at UPMC St. Margaret. Patients with a documented MRSA infection in the year preceding colonization or those who received topical nares decolonization after identified as colonized were excluded. Data collection (chart review) began with a patient's index colonization and continued until the development of infection or for a maximum of 60 days. Data collected included: patient demographics, comorbid conditions, medication use, presence of invasive devices, presence of wounds or other infections, nutritional status, number of hospitalizations and time to infection development.

RESULTS

There were 41 case patients and 82 randomly selected control patients included in the study. In the univariate analysis, the presence of peripheral vascular disease, 3 or more comorbidities, a central venous catheter, a foley catheter, or 2 or more hospitalizations were significantly associated with increased risk for infection. Multivariate analysis yielded a model that included presence of a central venous catheter or 2 or more hospitalizations as independent risk factors for MRSA infection in those with MRSA colonization.

CONCLUSIONS

Presence of a central venous catheter and number of hospitalizations are both modifiable risk factors. Actions should be taken to reduce repeat hospitalizations and the number of central venous catheters placed in MRSA colonized patients. Decolonization strategies may also be considered in these patients in an effort to prevent subsequent infection, but more research is needed. Larger prospective studies are needed to determine the significance of these potential risk factors.

Presented at the 2009 ACCP/ESCP International Congress on Clinical Pharmacy, Orlando, Fla., and the 42nd Annual Spring Conference of the Society of Teachers of Family Medicine (STFM) in Denver Co.

Lisa M. Harinstein, PharmD

Lisa received her PharmD from the University of Michigan in 2008. After completing a PGY1 pharmacy practice residency at UPMC St. Margaret, she will be advancing her training in a PGY2 critical care specialty residency at UPMC Presbyterian Shadyside in Pittsburgh, Pa.

Faculty Mentor: Jason J. Schafer, PharmD

Significance of Drug-Drug Interactions in the Intensive Care Unit Including a Comparison of Assessment Mechanisms

Smithburger PL, Kane-Gill SL, Benedict NJ, Falcione BA, Seybert AL

PURPOSE

To identify the significance and frequency of drug-drug interactions (DDI) occurring in the cardiovascular (CCU) and the cardiothoracic intensive care unit (CTICU).

METHODS

The pharmacist identified and evaluated DDIs occuring during a one-month period in the CCU and CTICU. Patients were included if they were ≥18 years of age and were in the care of the clinical pharmacist in one of the units under observation. The pharmacist evaluated daily each of the patient's electronic medication records and medication orders during the observation period. Micromedex® and Lexi-Interact™ interaction databases were then used to screen each medication profile for the presence of DDIs. When a DDI was identified by at least one of the databases, the interacting drugs, doses, routes of administration, and the severity ratings were recorded. Additionally, the patient's sex and age were recorded.

RESULTS

Overall, 225 patients (57% male) were identified with one or more DDI, with a mean age of 62 years (±15.67). There were 1150 total DDIs identified, with 537 being unique. The most frequently occurring DDI for both units included anti-platelet agents,(ie clopidogrel) and anticoagulants (ie heparin). The most clinically significant interactions differed between the ICUs, and the majority of the DDIs produced a QTc prolongating effect, such as with amiodarone and azithromycin. Of the 537 unique DDIs identified, both databases agreed upon the severity rating in 109 interactions. For example, of the 75 interactions that Lexi-Interact™ considered to be "Contraindicated" or "Major", Micromedex® did not identify 19 of them.

CONCLUSION

The patients in the cardiac ICUs are at risk for bleeding due to specific procedures and surgeries and co-morbid disease states. The most frequently occurring DDIs involved anticoagulants and anti-platelet agents, which could increase bleeding risk. Although difficult to assess severity due to conflicting information from drug information resources, the most severe interactions varied between units and often involved a potential for QT prolongation. These data could assist in the development of computerized drug interaction surveillance systems for the ICU population, signaling only significant interactions and reducing the possibility of alert fatigue; the system should be developed specific to the type of ICU.

Pamela L. Havrilla Smithburger, PharmD

Pamela received her PharmD from the University of Pittsburgh School of Pharmacy and completed a PGY1 pharmacy practice residency at UPMC Presbyterian, where she is completing a critical care specialty residency. Pam will join the University of Pittsburgh School of Pharmacy as an assistant professor of pharmacy and therapeutics, with clinical practice in the medical intensive care unit at UPMC.

Faculty Mentors: Sandra L. Kane-Gill, PharmD, MSc, FCCM and Amy L. Seybert, PharmD

The Evaluation of a Fraud and Abuse Drug Utilization Review on Cost and Utilization of Controlled Substance Prescriptions in a Managed Care Organization

Hindman AS, Daw JR, Diehl JL, Rayburg RM

PURPOSE

The abuse of controlled substance prescriptions has increased significantly in recent years. The UPMC Health Plan initiated a Fraud and Abuse Drug Utilization Review (DUR) in the second quarter of 2007. The objective of this research is to determine the impact of this program on the utilization and cost of controlled substance prescription drugs.

METHODS

This was a retrospective analysis of pharmacy claims from April 1, 2007, to December 31, 2008. All members investigated in the DUR program were included in the analysis. Members with excessive utilization were investigated by a pharmacist to determine if an intervention was necessary. Excessive utilization was defined as a sum of controlled substance claims, unique pharmacies, and unique physicians greater than 26. The primary intervention letter included a claims profile to the members' controlled substances prescribers. Members with an intervention were followed for 6 months before and after investigation.

RESULTS

There were a total of 165 members investigated during the defined time period, 67 for whom an intervention was made. For members with an intervention, the mean utilization of controlled substance prescriptions was significantly reduced by 36.5% in the post-intervention period ($p<0.001$). There were also statistically significant reductions in the mean number of unique prescribers of controlled substances and unique pharmacies utilized, by 41.1% and 37.1% respectively ($p<0.001$ for both). Per member per month (PMPM) cost of controlled substances was significantly reduced by 17.9% in the post-intervention period in members receiving an intervention ($p=0.05$).

CONCLUSIONS

The number of controlled substance claims, prescribers, and pharmacies utilized were significantly reduced in the intervention group. The Fraud and Abuse DUR program also significantly reduced the PMPM cost of controlled substance prescriptions in members with an intervention.

Presented at the Academy of Managed Care Pharmacy 21st Annual Meeting and Showcase in Orlando, Fla., and the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, in Hershey, Pa., 2009.

Alexander Hindman, PharmD

Alexander received his PharmD from the University of Pittsburgh School of Pharmacy and will complete his managed care pharmacy residency at UPMC Health Plan in June 2009. He looks forward to continuing his career in the managed care field.

Faculty Mentor: Jessica Daw, PharmD

Evaluation of the Effect of Alvimopan (Entereg®) on Length of Stay in Post-Operative Surgical Patients Who Have Had Large or Small Bowel Resections with Primary Anastomoses

Imhoff AN

PURPOSE

Patients may develop a post-operative ileus following intra-abdominal surgery. Mu-opioid receptor agonists, often used for post-operative pain control, may exacerbate the effects of post-operative ileus. Alvimopan is an oral, peripherally acting, mu-opioid receptor antagonist indicated to accelerate the time to upper and lower GI recovery following partial large or small bowel resection surgery with primary anastomosis. This medication was recently admitted to the hospital's formulary.

METHODS

This study was a retrospective, observational, case-controlled analysis. Data was collected from a total of 10 patients who had received alvimopan following a partial small or large bowel resection surgery with a primary anastomosis. Ten control patients from 2007-2008 were matched to the study group patients based on surgical procedure code, surgeon, and gender. Age, sex, race, BMI, surgery type, surgeon, anesthesia duration, intra-operative opiate use, daily post-operative opiate use, promotility agents, and post-operative length of stay were recorded for both groups.

RESULTS

Demographic and surgical information, as well as the use of promotility agents, was similar between groups. The average intra-operative and average daily post-operative opiate consumption was greater in the study group than the control group. The average post-operative length of stay was lower in the study group (6.2 days; range 4-9 days) than in the control group (9.8 days; range 7-23 days).

CONCLUSIONS

While the study had very few patients, a trend was detected toward a decreased length of post-operative hospital stay in patients who received alvimopan. We hope that this study will serve as a platform for future studies involving this medication at our institution.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Allison Imhoff, PharmD

Allison received her PharmD from the Duquesne University Mylan School of Pharmacy in May 2008. She completed a PGY1 pharmacy practice residency at UPMC Mercy Hospital in Pittsburgh, Pa.

Faculty Mentor: Jeremy Funkhouser, PharmD

Impact of a Generic-Focused Plan Design

Johnson AK, Markuss JM, Legal JD

PURPOSE

Payors of prescription medications utilize a variety of cost-controlling measures to increase the use of generic medications. The purpose of this study was to evaluate the impact of both the comprehensive and individual cost-controlling measures of a generic-focused plan design on the generic dispensing rate (GDR) and drug expenditure of HMG-CoA Reductase Inhibitors.

METHODS

A retrospective quasi-experimental study was conducted to assess the impact of a generic-focused plan design on the GDR and cost of generic HMG-CoA Reductase Inhibitors from July 2005 through March 2008. The study included enrollees of three health maintenance organizations (HMO): an intervention health plan, as well as a regional and national health plan, which served as control groups. The intervention health plan underwent a series of plan design changes in efforts to promote generic utilization which included: the addition of brand Zocor® to the formulary 6 months prior to the release of simvastatin, the modification of copay structure to encourage the use of generics, academic detailing, and the implementation of a step therapy protocol. The outcomes measured for both the intervention group and the comparator groups were the GDR and drug expenditure.

RESULTS

Substantial increase in the GDR occurred in the intervention health plan. The greatest percentage change in GDR resulted from tier changes and academic detailing (24.30%). The overall change in GDR for the intervention group (0.301) versus the regional (0.203) and the national (0.248) health plan throughout the study period was statistically significant ($p<.001$ and $p=.001$, respectively). An overall decrease occurred in the average monthly cost per claim of $117.42 (21.62%) for the intervention health plan, $115.11 (18.13%) for the regional health plan and $108.29 (12.64%) for the national health plan over the study period. No statistical significance was found in the percent cost change between the intervention health plan and both the regional and national health plans ($p=.601$ and $p=.610$, respectively).

CONCLUSIONS

Comprehensive cost-controlling measures of a generic-focused plan design are an effective way to increase the GDR while providing drug cost-savings for both health maintenance organizations and patients.

Presented at the 21st Annual Academy of Managed Care Pharmacy Conference, Orlando, Florida.

Avita K. Johnson, PharmD

After receiving a bachelor's degree in biology from Xavier University of Louisiana in 2003, Avita went on to receive a PharmD from Xavier in 2008. After completing her managed care residency at CVS Caremark, she will be moving to Chicago, Ill. and hopes to continue working in managed care.

Faculty Mentor: Sandra Kane-Gill, PharmD, MSc

Evaluation of the Appropriateness of Monitoring for Chronic Myeloid Leukemia (CML) Patients at the Veterans Affairs Pittsburgh Healthcare System (VAPHS)

Kennedy BN, Heron BB

PURPOSE

Imatinib is currently approved for use in adults with Philadelphia chromosome positive CML who are newly diagnosed in chronic phase for initial treatment, or who are in blast crisis, accelerated phase, or chronic phase after failure of interferon-alfa therapy. Although imatinib is an attractive agent for the treatment of CML, it is also an expensive agent that carries the risk of resistance. Recommended monitoring for patients with CML is well documented and is considered a major management strategy in CML. Even so, some practitioners do not currently follow the appropriate monitoring parameters. However, by adhering to the published monitoring parameters, it may be possible to detect disease relapse due to resistance at a time when a patient may benefit from a switch to a more effective therapy. Therefore, the objective of this project is to evaluate the compliance of physicians to published cytogenetic monitoring parameters in patients receiving imatinib for the treatment of CML.

METHODS

This will be a retrospective record review utilizing information from the VAPHS Data Warehouse and Computerized Patient Record System and was submitted for IRB approval. All veteran patients who have received imatinib for CML within the designated time period will be included. Patient sex, provider, location of primary oncology provider, date of prescription issuance, CML phase at diagnosis, documented occurrence of all monitoring, and date and reason for discontinuation of treatment will be recorded without patient identifiers. This information will be reviewed to determine if treatment with imatinib is being monitored in compliance with published guidelines.

RESULTS

The percentage of patients monitored according to published guidelines will be recorded, and the results will be presented.

CONCLUSION

It is anticipated that this project will demonstrate the level of adherence by practitioners to published monitoring guidelines at the VAPHS.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Brandi Kennedy, PharmD

Brandi received her PharmD from the University of Pittsburgh School of Pharmacy and completed a PGY1 pharmacy residency at the VA Pittsburgh Healthcare System in Pittsburgh, Pa.

Faculty Mentor: Bernadette B. Heron, PharmD, BCOP

Evaluation of Treatment Continuation Rates of Aripiprazole and Quetiapine in Bipolar Patients

Kreys T-J, Coley KC, Fabian TJ

PURPOSE

The purpose of the study is to assess treatment continuation rates of aripiprazole and quetiapine in bipolar patients hospitalized at Western Psychiatric Institute and Clinic. Patient and treatment variables that may impact treatment continuation rates were also assessed.

METHODS

This was a retrospective, cohort study conducted at Western Psychiatric Institute and Clinic. Patients were included in the study if they were ≥18 years of age, had an ICD-9 diagnosis code of Bipolar Affective Disorder, were admitted to WPIC between July 2005 and June 2008, and were treated with aripiprazole or quetiapine during the index hospitalization. Patients were excluded from the study if they had no documentation of admission and/or discharge medications, were receiving the index medication at time of admission, were treated with quetiapine doses less than or equal to 200 mg/day, and were treated with both aripiprazole and quetiapine during the index hospitalization. Descriptive statistics and a multivariate regression analysis were used to assess covariates which may impact treatment continuation rates.

RESULTS

A total of 392 patients were included in the study, with 209 patients in the aripiprazole cohort and 193 patients in the quetiapine cohort. 85% of patients in the aripiprazole cohort and 81% of patients in the quetiapine cohort continued treatment with the index medication at discharge. Aside from a significant difference in bipolar subtype and substance abuse history, there were no significant differences between cohorts in regard to baseline demographics,. Covariates, which significantly impacted treatment continuation rates, included inpatient treatment with valproic acid/divalproex or lithium, patient age, and the length of index hospitalization.

CONCLUSION

There was no significant difference in treatment continuation rates at discharge between patients treated with quetiapine or aripiprazole. Younger patients and patients with shorter inpatient length of stay had higher rates of treatment continuation, while patients who received valproic acid/divalproex or lithium as an inpatient had a higher rate of treatment discontinuation at discharge.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Tiffany-Jade Kreys, PharmD

Tiffany-Jade received her PharmD from the University of Michigan in 2007. After completing a pharmacy residency at the University of Pittsburgh Medical Center, she will continue to advance her training through a PGY2 psychiatry specialty residency at the Medical University of South Carolina.

Faculty Mentors: Kim Coley, PharmD, FCCP, and Tanya Fabian, PharmD, PhD, BCPP

Impact of Rifaximin in Combination with Lactulose Compared to Neomycin in Combination with Lactulose on Hospital Length of Stay in Treatment of Hepatic Encephalopathy

Lavsa SM, Corman SL

PURPOSE

Rifaximin is a non-absorbable rifamycin antibiotic known to be effective for the treatment of hepatic encephalopathy, but its place in therapy has not been clearly defined. Inpatient use of rifaximin as a second-line agent added to lactulose for the treatment of hepatic encephalopathy has not been previously assessed. This evaluation was conducted to determine the impact of combination rifaximin and lactulose compared to combination neomycin and lactulose on the length of stay in patients admitted for the treatment of hepatic encephalopathy.

METHODS

A retrospective, cohort study design was used to compare the length of stay in patients admitted for hepatic encephalopathy receiving either a combination of rifaximin and lactulose or a combination of neomycin and lactulose. All patients receiving both rifaximin and lactulose or neomycin and lactulose with a discharge diagnosis of hepatic encephalopathy were included in the study. Time to 25% and 50% reductions in ammonia concentrations were also assessed between treatment groups as a secondary outcome.

RESULTS

Length of stay was significantly reduced in the neomycin combination group at 12.6 ± 11.1 days compared to the rifaximin combination group at 14.5 ± 13.0 days ($p < 0.001$). Time to reaching a 25% reduction in baseline ammonia concentrations was 8.3 ± 0.65 days in the neomycin combination group and 9.8 ± 0.68 in the rifaximin combination group ($p = 0.005$). The time to reaching a 50% reduction in baseline ammonia concentrations was also significantly shorter in the neomycin combination group compared to the rifaximin combination group at 9.7 ± 0.79 days and 10.7 ± 1.1 days, respectively ($p < 0.001$)

CONCLUSIONS

Neomycin combination therapy reduces hospital length of stay and more rapidly reduces ammonia concentrations compared to rifaximin combination therapy in the treatment of patients hospitalized with hepatic encephalopathy.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Stacey Lavsa, PharmD

Stacey received her PharmD from the University of Pittsburgh School of Pharmacy in 2007 and completed a pharmacy practice residency at UPMC Presbyterian in 2008. Upon completion of a drug information residency, she plans to practice in a hospital setting and pursue graduate training in public health.

Faculty Mentor: Shelby L. Corman, PharmD, BCPS

The Impact of Immunosuppressant Regimens on the Onset of Hyperlipidemia in Kidney Transplant Patients

Le VA, Corman SL, Schonder KS

PURPOSE

At least 60% of patients develop dyslipidemia after kidney transplantation, and immunosuppressive medications such as cyclosporine, tacrolimus, sirolimus, and steroids increase total cholesterol (TC), triglyceride (TG), and low-density-lipoprotein (LDL) by as much as 20–40%. Combining immunosuppressive regimens may increase a patient's risk for developing hyperlipidemia. Alemtuzumab induction therapy may allows kidney transplant recipients to receive low dose tacrolimus monotherapy. The purpose of this study was to determine if tacrolimus monotherapy will delay the time to hyperlipidemia in kidney transplant patients compared to combination immunosuppressive regimens.

METHODS

This retrospective cohort study included patients who received kidney transplant at the University of Pittsburgh Medical Center from January 1, 1996 to September 30, 2007. Data were collected from inpatient and outpatient electronic medical records and were de-identified by an honest broker. Adults patients were stratified into three groups based on the immunosuppressive regimens they received: Group I – tacrolimus, prednisone and sirolimus, Group II – tacrolimus, prednisone and mycophenolate mofetil and Group III – alemtuzumab induction with tacrolimus monotherapy. The primary endpoint is time to hyperlipidemia defined as TC ≥ 200 mg/dL, TG ≥ 150 mg/dL or LDL ≥ 160 mg/dL [≥ 100 mg/dL in the setting of diabetes] and/or initiation of cholesterol-lowering agents.

RESULTS

Currently, three patients belong to Group I, 15 patients to Group II and 79 patients to Group III. Group I developed hyperlipidemia the fastest at 17 days and Group III took longer to developed hyperlipidemia at 266 days. All patients in Groups I and II developed hyperlipidemia, while only 89% of patients in Group III developed hyperlipidemia ($P = 0.667$).

CONCLUSIONS

In an interim analysis, 92% of patients developed hyperlipidemia, and patients on tacrolimus monotherapy seem to be developing hyperlipidemia later than patients on multi-immunosuppressive therapy. Clinicians should be vigilant at monitoring for hyperlipidemia in these patients.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Van-Anh Le, PharmD

Van-Anh received her PharmD from the University of Houston in 2008. After completion of her pharmacy practice residency at UPMC, she will be advancing her training in a PGY2 transplant pharmacy residency at the University of Utah Hospitals and Clinics in Salt Lake City.

Faculty Mentors: Kristine S. Schonder, PharmD, and Shelby Corman, PharmD, BCPS

Effectiveness of a Clinical Alert System in Adverse Drug Event Detection and Reporting

Little JD, Culley CM, Saenz R, Skledar SJ, Yourich BE, Mark SM

PURPOSE

In order to come into compliance with the Joint Commission's National Patient Safety Goal 3E, a pilot was implemented at the University of Pittsburgh Medical Center (UPMC) Shadyside Hospital involving pharmacist screening of patients receiving warfarin using a real-time clinical alert system (CAS) employed at UPMC. Pharmacist management of patients receiving warfarin has been associated with reduced bleeding complications and subsequent transfusions , decreased length of stay and mortality, but the use of a CAS for warfarin adverse drug events (ADE) detection has not been described. This study will measure the effectiveness of the CAS in detecting ADEs and increasing pharmacist interventions for patients receiving warfarin.

METHODS

Using the CAS, pharmacists performed daily screening of all patients currently receiving anticoagulation. This pharmacist evaluation of alerts included ensuring appropriateness of drug therapy and scheduled monitoring as well as recommending and validating appropriateness of dose adjustments with the prescriber. Any ADEs found will be documented in the CAS and reported in the hospital's risk management system. All pharmacist interventions will be documented in the CAS. The ADEs found by the pharmacists will be compared to ADEs found by a retrospective chart review of the same patient population to determine if the pharmacists using the CAS were able to detect all warfarin ADEs during the time period.

RESULTS

Interim results for 209 patients are reported. A total of 532 alerts were generated by the CAS. This led to a total of 223 documented pharmacist interventions. Additionally there were 38 documented pharmacist interventions that were not due to an alert. The alerts notified the pharmacist of potential drug interactions, elevated INR values, new warfarin orders and vitamin K use. Actions performed by the pharmacists included medication profile reviews and calling the prescriber to change the warfarin dose if necessary.

CONCLUSION

A clinical alert system can aid pharmacists in patient monitoring of high-risk medications such as warfarin. The system can also promote documentation of interventions.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Jeffrey Little, PharmD

Jeff received his PharmD from the University of Kansas in 2008 and is completing the first of two years in a health-system pharmacy administration residency at UPMC Presbyterian. Jeff will continue his residency this year and will complete his Master of Public Health at the University of Pittsburgh Graduate School of Public Health in December 2009.

Faculty Mentors: Colleen Culley, PharmD, BCPS, and Scott Mark, PharmD, MS, MEd, FASHP, FACHE

Prior Authorization of Low-Dose Quetiapine: Effects on Utilization and Behavioral Health Care Costs

Lopata EM, Daw JR, Diehl JL, Rayburg RM

PURPOSE

Quetiapine is approved for the treatment of schizophrenia and bipolar disorder; however, doses ≤ 200mg are used various off-label indications. The goal of this study was to determine the impact of prior authorization (PA) on utilization of quetiapine doses of ≤ 200mg and the medical cost associated with the denial of quetiapine for members not meeting criteria.

METHODS

A retrospective claims analysis was conducted using de-identified pharmacy and medical claims from UPMC Health Plan. Patients continuously enrolled in a Commercial or Medicaid plan with a paid claim for quetiapine were included. The study evaluated quetiapine use during a time period of nine months prior to and following implementation of the PA. Changes in behavioral health care costs were analyzed for a cohort of members who did not meet criteria for approval of low-dose quetiapine. The change in the number of patients with claims for low-dose quetiapine without a medical (ICD-9) code for an appropriate diagnosis was also analyzed.

RESULTS

Before and after PA implementation, respective 1754 versus 1192 unique patients had a claim for low-dose quetiapine. In the Commercial population, the number of prescriptions for low-dose quetiapine decreased from 1,743 to 1,330, a 7.1% decrease in the proportion of total quetiapine prescriptions attributed to low-dose use ($p<0.0001$). In the Medicaid population, the number of low-dose quetiapine claims decreased from 5,611 to 3,967, a 9.7% decrease ($p<0.0001$). PMPM costs for behavioral health care for members denied ongoing low-dose quetiapine (n=74), decreased from $78.44 to $65.97. The number of unique members with a claim for low-dose quetiapine, without an appropriate diagnosis decreased from 249 to 162 in Commercial ($p=0.233$) and from 790 to 479 in Medicaid ($p=0.007$).

CONCLUSIONS

The low-dose quetiapine PA was associated with a significant reduction in the utilization of low-dose quetiapine. Patients denied ongoing low-dose quetiapine due to off-label use did not experience an increase in behavioral health care costs. Off-label use of low-dose quetiapine was reduced and was significant in the Medicaid population.

Presented at the 21st Annual AMCP Meeting and Showcase in Orlando, Fla., and at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors in Hershey, Pa., 2009.

Erin Lopata, PharmD

Erin received her PharmD from the University of Pittsburgh School of Pharmacy and will complete her managed care pharmacy residency at UPMC Health Plan in June 2009. She looks forward to continuing her career in the managed care field.

Faculty Mentor: Jessica Daw, PharmD

A Cost-Minimization Analysis Comparing Enteral and Intravenous Acetylcysteine

Martello JL, Krenzelok EP, Pummer TL

PURPOSE

Acetaminophen overdose is the most common exposure reported to United States poison control centers, accounts for over 50% of all cases of acute liver failure, ans has costs exceeding $93 million annually. Antidotal treatment is available in the form of acetylcysteine, a glutathione analogue. Acetylcysteine comes in two formulations, an intravenous formulation (Acetadote®) and an enteral formulation (Mucomyst®), which are equally efficacious when used appropriately. However, due to differences in acquisition costs and duration of treatment, it is unknown which agent is less costly to utilize for treatment of acute acetaminophen overdose. Thus, a pharmacoeconomic analysis of costs was performed to evaluate the least expensive treatment modality.

METHODS

Retrospective cohort study of patients receiving enteral acetylcysteine (1996-2000) or intravenous acetylcsteine (2004-2008). Patients at least 18 years old who received either route of administration of acetylcysteine, and who were identified via ICD-9 diagnosis codes for acetaminophen overdose, were included in this study. Patients were excluded if they received both routes of administration, received enteral acetylcysteine compounded into an intravenous formulation, received acetylcysteine for an indication other than acetaminophen overdose, were discharged on acetylcysteine treatment, had a prior history of transplant or were transplanted during admission, or had prior receipt of acetylcysteine prior to hospital admission. Total hospitalization costs and length of stay were recorded and calculated, using the consumer price index to convert all costs into 2008 dollars. The Mann-Whitney U test was utilized for descriptive statistical analysis.

RESULTS

Seventy patients in the enteral group and 191 patients in the intravenous group were included in the study. The average length of stay in the enteral group was three days, with an associated cost of $53,841.66. The average length of stay in the intravenous group was two days, with an associated cost of $33,742.40.

CONCLUSIONS

Institutions should consider using intravenous acetylcysteine to treat acetaminophen overdoses, due to a lower associated length of stay and cost relative to enteral acetylcsyteine.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

John (Jay) Martello, PharmD

John (Jay) received his PharmD from Duquesne University. After completing a pharmacy residency at UPMC, he will be advancing his training in a PGY2 pharmacy residency in internal medicine and teaching at West Virginia University Hospitals in Morgantown, W. Va.

Faculty Mentors: Dr. Edward Krenzelok, PharmD, FAACT, DABAT and Dr. Tara Pummer, PharmD

Development of a Pharmacist Erythropoietin Clinical Demonstration Project

Mittereder AM, Kreutzer JM

OBJECTIVE

Eythropoiesis-stimulating agents (ESAs) are costly medications that have a high potential for inappropriate use and monitoring. Due to recent warnings regarding increased mortality and thromboembolic events, the Food and Drug Administration (FDA) has mandated changes in labeling for ESAs. ESAs require close laboratory monitoring and dosage adjustments due to these risks. Previous drug use evaluations conducted at the Veteran's Administration Pittsburgh Healthcare System (VAPHS) have demonstrated poor compliance with national guidelines for initiation, dosage adjustments, and monitoring of ESAs. Failure to monitor and adjust ESAs appropriately can result in decreased efficacy and increased safety concerns.

METHODS

Because of these safety concerns, policies and procedures have been developed for the initiation of a "pilot" pharmacist-run erythropoietin clinic in addition to guidelines for the use of ESAs at the VAPHS. Primary care providers have been contacted to inform them of the clinic. In addition, an electronic consult has been placed for physicians to refer patients to the clinic. Patients will be seen for the follow-up and management of their ESA therapy including laboratory monitoring and dosage adjustments. The percentage of patients with an appropriate indication, appropriate laboratory monitoring and dosage adjustments, and percentage of patients at their goal hemoglobin will be collected.

RESULTS

Results after implementation of the clinic will be compared to aggregate data previously reported to the VAPHS Drug Use Evaluation Subcommittee.

CONCLUSIONS

It is anticipated that the implementation of a pharmacist-run erythropoietin clinic will demonstrate a higher percentage of patients meeting national guidelines for initiation, dosage adjustments, and monitoring of ESAs.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Alissa Mittereder, PharmD

Alissa received her PharmD from the University of Pittsburgh in 2008. After completing a PGY1 pharmacy residency at the VA Pittsburgh Healthcare System, she will be joining the pharmacy team at UPMC as a unit-based clinical pharmacist.

Faculty Mentor: Jeanette Kreutzer, PharmD

Analysis of Intravenous (IV) Medication Dispensing Robot on Cost and Product Preparation Efficiency in the Hospital Pharmacy Clean Room Setting

Mulvanity ML, Kirschling TE, Eberts MW, Oriolo VA, Skledar SJ, Culley CM, Mark SM

PURPOSE

Two specialized IV medication dispensing robots are currently available on the market, with different syringe and solution capabilities. Implementation of IV dispensing robotics can be expected to reduce medication costs by replacing purchased premixed solutions with automation-produced products and improve workflow efficiency by shifting manual product preparation to automation. The objective of this analysis is to compare return on investment (ROI) of available systems.

METHODS

A cost-analysis was performed comparing charge and purchase data from fiscal year 2008 (FY08) for premixed and manually prepared IV products with the cost to produce these products using IV robot automation. The efficiency of IV robot automation was estimated based on our current dispensing quantities and available manufacturer product preparation time specifications. Return on investment modeling was conducted for lease and purchase options for each system.

RESULTS

Annual targeted product preparation cost-savings for an IV solution and syringe robot is expected to be $501,337.92. Annual savings for a syringe-capable robot has been calculated to be $179,155.10. The IV syringe dispensing system would allow for these current syringe doses to be prepared in approximately 4.4 hours per week, whereas the dually capable IV robot, would be able to produce all syringe doses and an additional 20% of our IV bag solutions, operating for approximately 117.8 hours per week or 16.8 hours per day. Total ROI for the dually capable system is $120,000 and $750,000 based on a 12 month lease option and 5 year purchase model respectively. Total ROI for the syringe-capable system would result in a loss of $120,000 and $252,915 based on a 12 month lease option and 5 year purchase model respectively.

CONCLUSION

Based on current dispensing trends and projected costs savings opportunities, the dually capable IV bag solution and IV syringe dispensing robot provides for a more favorable ROI.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pennsylvania, 2009.

Meredith L. Mulvanity, PharmD

Meredith received her PharmD from the University of Pittsburgh in 2008. She is completing the first of a two-year health-system pharmacy administration residency at UPMC Presbyterian. Upon completing her graduate coursework in the fall of 2009, she will earn a Master of Science degree in health-system pharmacy administration at the University of Pittsburgh School of Pharmacy.

Faculty Mentors: Thomas E. Kirschling, PharmD, MS and Scott M. Mark, PharmD, MS, Med, FASHP, FACHE

Recruiting Pharmacists in Pennsylvania to Provide Community-Based Patient Care Services as Part of a Statewide Network: The Network Project

Osborne MA, Snyder ME, Hall DL, Somma McGivney MA

PURPOSE

Most of the financially viable pharmacist practices are located within states that have successfully partnered key stakeholders—schools of pharmacy, state pharmacy organizations, and networks of pharmacists.

The purpose of this study is to identify pharmacists licensed in Pennsylvania who currently provide or are interested in providing community-based patient care services and are interested in joining a statewide practice network coordinated by the Pennsylvania Pharmacists Association (PPA).

METHODS

A survey inquiring about patient care services, documentation, physical space, patient appointments, barriers, training, and willingness to join a statewide practice network was created. A letter of support from the experiential learning directors of the seven schools of pharmacy in Pennsylvania accompanies the survey.

The survey was distributed on paper at select pharmacist meetings and e-mailed to faculty, preceptors, and alumni of all the schools of pharmacy in Pennsylvania. Two reminders were sent following the initial e-mail.

RESULTS

Of the estimated 4188 e-mail and paper contacts, 923 pharmacists responded resulting in a 22% response rate. Of these 40% (n=369) are currently providing patient care services to community-based patients and 38% (n=348) are willing to join a statewide practice network.

Of respondents, 23% (n=215) practice in a hospital environment, 50% (n=459) are preceptors and 74% (n=685) work ≥31 hours per week.

Of those currently providing patient care services, 70% (n=258) provide as part of the workflow while 52% (n=191) provide separately during scheduled patient appointments and/or office hours. Medication Therapy Management was the most represented service both during workflow (61%, n=158) and at separate appointments (69%, n=132).

CONCLUSIONS

Pennsylvania pharmacists are currently providing patient care services and are interested in joining a statewide practice network. These results will be presented to the PPA Executive Board to consider formation of a network.

Maria Osborne, PharmD

Maria received her PharmD from Duquesne University. After completing a community pharmacy practice residency at the UPMC/Rite Aid, she plans to continue providing patient care in an outpatient setting in the Pittsburgh area.

Faculty Mentor: Melissa Somma McGivney, PharmD

Evaluation of the Use and Continuation of Pantoprazole for Stress Ulcer Prophylaxis in Critical Care Patients Transferred to Non-Critical Care Floors

Perry MW, Wilson Jr GL

PURPOSE

The use of stress ulcer prophylaxis is not recommended once a patient is transferred out of a critical care unit, and continuation of these unnecessary therapies leads to an overall increase in hospital costs. Recent literature has implicated chronic acid suppression therapy as a potential risk factor for the development of pneumonia, C. *difficile* infection, and osteoporosis. The purpose of this drug use evaluation is to elucidate the rate of inappropriate continuation of stress ulcer prophylaxis with pantoprazole in patients transferred from critical care units to regular floors.

METHODS

This drug use evaluation was conducted using a retrospective chart review of patients transferred from a critical care unit to a general medicine floor. Patients continued on pantoprazole were evaluated to determine if therapy was a continuation of stress ulcer prophylaxis or if there was an appropriate indication. The cost of inappropriate therapy was calculated based on the acquisition cost of pantoprazole.

RESULTS

During the 7-week study period, 109 patients were transferred from a critical care unit to a general medicine floor. Of those patients, 87 were continued on pantoprazole therapy. Of these, 57 patients had an appropriate indication for pantoprazole. A total of 35 patients were inappropriately continued on pantoprazole for stress ulcer prophylaxis for an average of 5 days. Of the patients inappropriately continued on stress ulcer prophylaxis, 14 were discharged with a prescription for pantoprazole with no indication. The total cost of inappropriate therapy over the 7-week study period was approximately $460. The estimated a yearly cost savings from stopping inappropriate pantoprazole therapy is approximately $3500.

CONCLUSIONS

Inappropriate continuation of pantoprazole for stress ulcer prophylaxis is associated with an increased cost to the institution. The cost savings alone may not be sufficient enough to warrant allocation of significant resources to curtail inappropriate use. More information on the costs associated with the adverse effects of chronic acid suppressive therapy will help dictate prescribing practices in the future.

Presented at the 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors. Hershey, Pa., 2009.

Michael W. Perry, PharmD

Michael received his PharmD from Ohio Northern University and completed a pharmacy residency at the UPMC Mercy Hospital. He will be continuing his training in a critical care PGY2 residency at Palmetto Health Richland Memorial Hospital in Columbia, S.C.

Faculty Mentor: Gregory Wilson Jr., PharmD, BCPS

Microbiologic and Clinical Evidence Supporting the Combination of Doripenem and Colistin for the Treatment of Pan-resistant Acinetobacter

Shields RK, Potoski BA, Clancy CJ, Adams-Haduch JM, Doi Y, Kwak EJ, Nguyen MH

PURPOSE

We recently demonstrated by Etest that the combination of doripenem (DOR) and colistin (COL) was synergistic *in vitro* against pan-drug resistant *Acinetobacter* from our center (PDR-AB, resistant to all agents except COL or tigecycline (TGC)). For all isolates, the combination reduced DOR MICs to levels achievable in human serum.

METHODS

To further study this combination, we performed checkerboard microdilution synergy testing (DOR and COL concentrations: 0.25-128 and 0.03-2 µg/ml, respectively) and time-kill assays against five genetically distinct, PDR-AB isolates. We also describe the outcome of four patients infected with PDR-AB who were treated with DOR + COL.

RESULTS

MICs ranged from 32-64 and 0.5-2 µg/mL for DOR and COL, respectively. By checkerboard microdilution method, DOR + COL was synergistic against four isolates and additive against the fifth. By time-kill assays, DOR at 64 µg/mL failed to inhibit the growth of any of the five isolates. COL at the MIC was static, inhibiting further growth but not reducing the starting inocula. In combination, however, DOR + COL was cidal (≥ 3 $\log_{10}$ decrease in CFU/mL) against all five isolates. Moreover, synergy was demonstrated at concentrations far below the MIC and easily achievable in human serum for both agents (DOR: 1-16 µg/mL, and COL: 0.25-0.5 µg/mL). DOR + COL resulted in complete eradication of 4 isolates with no regrowth after 6 hours. Based on these data and poor outcomes with alternative regimens in patients treated at our center, we used DOR + COL to treat four solid organ transplant recipients with PDR-AB pneumonia. Three survived with resolution of the infection. All three had no recurrence (follow-up time $\geq$ 1 month), but one was superinfected with *Pseudomonas aeruginosa* 1 week after therapy was stopped.

CONCLUSIONS

The combination of COL + DOR may be a valuable therapeutic option for PDR-AB. Further *in vitro* and clinical studies are needed to explore the value of this combination.

Abstract submitted to the 49th annual Interscience Conference on Antimicrobial Agents and Chemotherapy.

Ryan K. Shields, PharmD

Ryan received his PharmD from Ferris State University and completed a PGY1 pharmacy residency at Saint Louis University in Saint Louis, Mo. After completing an infectious diseases residency at the UPMC, he will be joining the University of Pittsburgh as a clinical researcher and specialist in transplant infectious diseases.

Faculty Mentor: Brian Potoski, Pharm.D., BCPS (AQ-ID)

Medication Management to Improve Patient Safety: Assessments and Interventions of the UPMC St. Margaret Multidisciplinary Team

Sullivan KM, Farrah R, Klatt PM, Sauereisen S

PURPOSE

The purpose of this quality improvement project is to review and describe the UPMC St. Margaret Family Health Center Interdisciplinary Medication Management visits, including patient demographics, assessments and interventions.

METHODS

Review of electronic medical records of patients seen by the Medication Management Team from January 2007 through June 2008 were completed by three pharmacists and one physician. Data from these patient encounters were categorized: 1) identification and assessment of medication problems (unnecessary drug therapy, inappropriate dose), and 2) recommendation/intervention made. Information collected was compiled and evaluated for a complete overview of assessments performed and recommendations made by the Medication Management Team.

RESULTS

A total of 160 patients were seen during 610 visits over the 18-month period. The number of prescribed medications per patient ranged from 1 to 33 (mean 10.6). Documented past medical history included hypertension (74%), diabetes (48.5%), depression (41.6%) and coronary artery disease (27.6%). Patients were assessed on indication, disease state and how to take/administer their medication (44.7% of visits, 40.8% and 47.9% respectively). Nonadherance was identified during 202 of 610 visits, with the leading cause of nonadherance being a lack of understanding (36.6%). Throughout the visits, medications were added (18.8% of visits), discontinued (8%), or modified (35%) by the medication management team. Patients were educated on the medications (59.1%), disease states (49.5%) and on diet/lifestyle modifications (45%). Medication Monitoring plans were established in 106 visits, and primary care physician follow-up was recommended at 46.1% of patient visits.

CONCLUSIONS

Patients in our Medication Management service had a high number of prescribed medications, little variation in disease states, and lower than expected documented patient education. Endeavors to standardize documentation have been introduced and a Polypharmacy and Hospitalization Discharge program has been initiated to increase availability of medication management services to patients and strengthen the services provided to the patients of the UPMC St. Margaret Family Health Centers.

Presented at Society of Teachers of Family Medicine Conference on Practice Improvement, Savannah, Ga., 2008.

Katherine Sullivan, PharmD, BCPS

Katherine received her PharmD from the University of Rhode Island in 2007 and completed a PGY1 pharmacy practice residency at UPMC St. Margaret, where she is currently finishing a PGY2 family medicine pharmacy residency. Upon graduation she will join the Dovetail Health team outside of Boston, Mass., as a clinical pharmacist providing in-home medication management services.

Faculty Mentors: Roberta Farrah, PharmD, BCPS, and Patricia Klatt, PharmD, BCPS

The Use of HMG-CoA Reductase Inhibitors in Liver Transplant Patients with Recurrent Hepatitis C Virus

Yost SE, Johnson HJ, Schonder KS, Corman SL, Chopra KB, DeVera ME

PURPOSE

To evaluate the safety and efficacy of statins in patients with recurrent Hepatitis C Virus (HCV) after liver transplantation. To evaluate the HCV viral suppressing activity of statins in patients with recurrent Hepatitis C Virus after liver transplantation.

METHODS

A retrospective cohort study of patients with HCV that received a first liver transplant between January 1, 1995, and December 31, 2005, at the University of Pittsburgh Medical Center. All patients 18 year of age or older were included in the study. Exclusion criteria included HIV or HBV co-infection, death during the index admission, and receipt of a previous transplant or non-liver transplant. The lipid profile was obtained at baseline and 1 year post statin initiation. The aminotransaminases were obtained at baseline, 3 months, 6 months, and 12 months post statin initiation. The paired t test was used for statistical analysis. Area under the viral load curve before and after statin initiation was compared.

RESULTS

682 adult patients received liver transplants secondary to HCV, and 372 patients were identified after exclusion criteria were applied and who had HCV recurrence. However, only 29 patients receiving statin therapy after HCV recurrence were identified. The mean atorvastatin dose equivalent was 15.4 mg ± 9.2 mg with a median time from transplant to initiation of statin of 38 months (1-125). The mean total cholesterol and LDL lowering was found to be statistically not significant. The transaminases were statistically not significant compared to baseline at 3, 6, and 12 months post statin initiation. The HCV viral AUC/time before and after statin initiation remained at baseline or was decreased in a few patients.

CONCLUSIONS

Statins at modest doses are efficacious in lowering total cholesterol and LDL. Statins appear to be safe in liver transplant patients with HCV recurrence. Statins did not negatively affect the HCV viral load.

Presented at 28th Annual Eastern States Conference for Pharmacy Residents and Preceptors, Hershey, Pa., 2009.

Sarah Yost, PharmD

Sarah received her Bachelor of Science in biochemistry and molecular biology in 2004 from Trinity University in San Antonio, Texas, and received her PharmD from the University of Houston in 2008. After completing a PGY1 pharmacy residency at the University of Pittsburgh Medical Center, she will be advancing her training in a PGY2 solid organ transplantation residency at Tampa General Hospital in Tampa, Fla.

Faculty Mentors: Heather J. Johnson, PharmD, BCPS, Kristine S. Schonder, PharmD, Shelby L. Corman, 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

Pharmacy Residency at VA Pittsburgh Healthcare System
Director: Lauren Trilli, PharmD, BCPS

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

Community Pharmacy
Rite Aid Corporation
Director: Melissa Somma McGiveny, PharmD

Managed Care at CVS Caremark
Director: Julie Legal, 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

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

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

Oncology at UPMC Cancer Centers
Director: James Natale, PharmD

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

Pharmacy Management at UPMC Presbyterian Shadyside
Director: Scott Mark, PharmD, MS, Med

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

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