Alvimopan is a peripherally acting mu-opioid receptor antagonist that was approved by the Food & Drug Administration (FDA) in 2008. The labeled indication is to accelerate time to upper and lower gastrointestinal (GI) recovery following partial large or small bowel resection with primary anastomosis. The FDA recommends that alvimopan be discontinued after a patient is able to tolerate solid food, has had a bowel movement, or has experienced flatus.

Alvimopan was added to the UF Health Shands Hospital Formulary in October 2012 and restricted by the P&T Committee for use in patients who meet its FDA approved indication—to accelerate GI recovery following large or small bowel resection surgeries where a primary anastomosis is created. A medication use evaluation (MUE) performed in March 2014 discovered that only 76% of patients prescribed alvimopan at UF Health Shands met the FDA-approved indication, despite P&T restrictions.

The purpose of this evaluation is to assess how alvimopan was used and where opportunities for improvement exist and to evaluate the effectiveness of a recent P&T authorized change where pharmacists were permitted to discontinue alvimopan when the patient has a documented bowel movement or flatus.

Quality Improvement Initiative:
953-bed academic medical center

Patients who received alvimopan were identified through a pharmacy database from UF Health Shands Hospital computer physician order entry (CPOE) system, EPIC. A patient list was created based on patients who were administered alvimopan. All patients who were administered at least 1 dose of alvimopan were included for this evaluation. A manual chart review was performed on each of these patients.

The results of the March 2014 MUE were then compared to the February 2015 MUE after the data collection.

With the recent P&T authorized changes, there have been improvements in the proper prescribing of alvimopan at UF Health Shands Hospital. The February 2015 MUE showed an improvement in the number of patients prescribed alvimopan who met the FDA-approved criteria. Of note, this number may be a slightly inflated as ileal conduit surgeries were determined to have met FDA-approved criteria for this analysis, which was not the case in the prior MUE. Furthermore, the use of the EPIC order set for ordering alvimopan has increased dramatically since last evaluation. Only 35.8% of alvimopan orders were appropriately ordered and administered in the March 2014 MUE; compared to 68 patients (91.8%) met the P&T approved criteria in the February 2015 MUE. UF Health Shands can still make some significant changes and potentially reduce alvimopan drug costs by $18,000 per year.
Quality Improvement Initiative: 953-bed academic medical center
140-bed ICUs (medical, surgical, trauma, neurosurgical, cardiothoracic, and burn)

Process:
1. A retrospective chart review was conducted between August 2013 to November 2014 between 4E surgical ICU and 4W trauma ICU.
2. Inclusion criteria: critically ill patients who were age 18 years and older and had an intensive care unit (ICU) stay in 4E/4W of greater than 48 hours
3. Exclusion criteria: Severe agitation (RASS +3 or +4), traumatic brain injury located on 4W Trauma ICU, elevated intracranial pressure, status epilepticus, patient requiring aggressive modes of ventilation for refractory hypoxemia (i.e., ECMO, BiLevel, inhaled nitric oxide/epoprostenol), therapeutic/induced hypothermia, or patients receiving neuromuscular blockade, barbiturate coma, or nitric oxide.

BACKGROUND
Sedatives and analgesics are some of the most commonly administered medications in both surgical and medical intensive care units (ICU). Sedation is defined as a state of restfulness, while analgesia is defined as blunting or absence of sensation or pain or noxious stimuli. Failure to meet goals of proper sedation and analgesia is common and can lead to deleterious sequelae including adverse drug reactions, poor outcomes, longer ICU stays, and economic effects. In an attempt to improve patient distress, the Society of Critical Care Medicine Guidelines for the Management of Pain, Agitation, and Delirium (January 2013) were updated from the 2002 guidelines. Studies published subsequent to the 2002 Guidelines demonstrated improvement in outcomes with light sedation, and practices across the United States are changing based on the results.

OBJECTIVE
- To improve compliance to the updated sedation and analgesia ICU order set and result in shorter ventilator days in critically ill patients

METHODS

REFERENCE


RESULTS

Figure 1. Assessment Compliance
Pain and sedation scores are to be assessed every 2 hours; Sedation holidays are to be performed daily unless patient meets exclusion criteria; CAM-ICU assessment for delirium are to be assessed twice daily at shift change.

Figure 2. Fentanyl Use Compliance
Fentanyl infusion is to be initiated at 50 mcg/hr, titrated every 30 minutes to meet goal pain scores (Adult NonVerbal Pain Score or Defense Veterans Pain Rating Scale), downtitrated every 4 hours if pain is controlled and transitioned to intermittent dosing when appropriate.

Figure 3. Midazolam Use Compliance
Midazolam infusion is to be initiated at 2 mg/hr, titrated every 30 minutes to meet goal sedation score (Richmond Agitation Sedation Scale), downtitrated every 4 hours if sedation is controlled and transitioned to intermittent dosing when appropriate.

Figure 4. Ventilator Days in the ICU

CONCLUSION/DISCUSSION
The multidisciplinary effort to increase compliance with the newly revised order sets and to decrease ICU ventilator days was effective. This effort included education and support of nursing, physicians, respiratory therapists, and pharmacists. Propofol infusion were rarely used in the ICUs. Increased education and awareness to the multidisciplinary groups will improve compliance with use of propofol infusion and intermittent sedation and analgesia medications. Continued efforts are under way to further improve ICU ventilator days through the addition of a sedation holiday best practice alert (BPA) to Epic.
Optimization of medication access during overnight hours in an 84-bed community hospital

Alexis A. Berndt, James W. Valentine

Background and Objectives

- Due to fluctuations in staffing models, the pharmacy department was required to close during overnight hours resulting in limited access to new medications.
- Being part of a health system comprised of four hospitals, overnight pharmacists working in the other hospitals are able to review medication orders remotely and provide preparation and dispensing activities if necessary.
- With the closest hospital located 15 miles away, a program was created to support easy and safe access to emergency medications that were not accessible after hours via the automated dispensing cabinets.

Methods

- A structured medication kit system was implemented for use during hours of pharmacy closure.
- Kits consist of standard components including:
  - Medication (and diluent when applicable)
  - Appropriate IV bag
  - Syringe(s)
  - Needle(s)
  - Alcohol pads
  - Supply list and instructional label adhered to the outside of the bag
  - Product assembly instructions (when applicable)
  - Medication label consistent with current institutional format.

Example supply list/instruction label and medication label:

<table>
<thead>
<tr>
<th>Vitamin K</th>
<th>IV/IVD</th>
<th>Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10mg/1mL</td>
<td>100mL</td>
<td>100mL</td>
</tr>
</tbody>
</table>

\[ \text{Vitamin K IV/IVD Kit} \]

<table>
<thead>
<tr>
<th>Intravenous</th>
<th>Onset of Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>10mg/1mL</td>
<td>5 minutes</td>
<td>4 hours</td>
</tr>
</tbody>
</table>

Discussion

- Only items considered urgent or emergent are evaluated for kit formulation.
- Through ongoing review of items sent overnight, need for new kits are identified and those kits created.
- Over 30 kits are available including:
  - Vasopressors
  - Antibiotics
  - Miscellaneous critical care agents.

Conclusions

- Implementation of a standard medication kit program during the overnight hours when the pharmacy department is closed has resulted in increased access to emergency medications and a reduction in the transportation of patient specific medications from the tertiary hospital to the facility.

Disclosure

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:

Alexis A. Berndt, PharmD, BCPS: Nothing to disclose
James Valentine, PharmD: Nothing to disclose
Development of a measure of patients perception of cultural sensitivity of their health care providers

Akesha Edwards, Pharm D1, Silvia Rabionet EdD1,2
1-Novia Southeastern University, College of Pharmacy (ae485@nova.edu)
2-University of Puerto Rico, School of Public Health

Background
It has become necessary for all health care providers to be increasingly culturally sensitive because of the growth of ethnic minority populations in the United States.1 A recurring theme amongst HIV/AIDS patients of Caribbean descent is the lack of cultural sensitivity of their providers.2 This insensitivity encourages them to be non adherent to their therapy and health care.

Objective: To develop The Provider Acceptance Of Culture Scale and The Provider Discrimination Scale for the measurement of cultural sensitivity in PLWHA of Caribbean Descent in South Florida.

Methods
Articles extracted (Case Reports, Reviews, Relevant to research questions) 116
Articles excluded 60
Cultural Sensitivity Measurement/Intervention study 3

Concept

Cultural Sensitivity

Acceptance of a person’s culture/beliefs

Discrimination

Resulting Scales

Provider Discrimination Scale

If YES, thinking about all of the experiences you have had with your past and current providers since your HIV diagnosis how often the following things have happened to you because of your cultural background? Would you say they have always happened, happened most of the time, sometimes happened, rarely happened or never happened?

Objective: To develop The Provider Acceptance Of Culture Scale and The Provider Discrimination Scale for the measurement of cultural sensitivity in PLWHA of Caribbean Descent in South Florida.

Conclusion
Initial observations from the launch of pilot testing of this measure reveals there is adequate flow to the items in this instrument. This supports sampling from the literature and having several rounds of expert opinions in different settings when creating a novel instrument.

References

Provider Acceptance of Culture Scale

Do you have an interest in including family members in your therapy for your HIV? YES NO

Do you have an interest in alternative forms of therapy for HIV? YES NO

Do you have an interest in including family members in your therapy for your HIV? YES NO

Do you have an interest in alternative forms of therapy for HIV? YES NO

Do you have an interest in including family members in your therapy for your HIV? YES NO

Do you have an interest in alternative forms of therapy for HIV? YES NO

Do you have an interest in including family members in your therapy for your HIV? YES NO

Do you have an interest in alternative forms of therapy for HIV? YES NO

The Procedures

Sampling

- Items sampled from isolated instruments

- 5 rounds

- Physicians, statisticians, clinicians, researchers, professors, graduate students, HIV specialists

- Hospitals, universities, private consultancy groups

- Instrument refined after every round

- Spanish

- Creole

- Akesha Edwards, Pharm D1, Silvia Rabionet EdD1,2

1-Novia Southeastern University, College of Pharmacy (ae485@nova.edu)
2-University of Puerto Rico, School of Public Health

References
Vancomycin is an antibiotic used primarily in the treatment of suspected and confirmed methicillin-resistant S. aureus (MRSA) infections. Over time vancomycin dosing strategies and concerns over toxicity, specifically nephrotoxicity, have changed. Currently, vancomycin dosing strategies differ from institution to institution. As of July 21, 2014, Lee Memorial Health System implemented a new vancomycin protocol that differed from the old protocol in its recommendations for maintenance dose, dosing weight, and interval in patients on dialysis.

**Methods**

- **Study Design**: Retrospective chart review
- **Phase 1**: August 2013- January 2014 (n=160)
- **Phase 2**: August 2014- January 2015 (n=160)
- **Inclusion Criteria**: Patients ≥ 18 years old who received vancomycin dosed and monitored per appropriate protocol (old vs. new)
- **Old protocol**: Protocol used prior to July 21, 2014
- **New protocol**: Protocol used on and after July 21, 2014
- **Exclusion Criteria**: Inpatient with a 18 years old who received vancomycin discontinued prior to first trough, patients who received vancomycin that were not treated according to either the old or the new protocol.
- **Outcome Definition**: Nephrotoxicity: creatinine rise of 0.5 mg/dl above baseline or ≥50% increase above baseline (whichever is greater)
- **Goal trough**: 10-15 mg/ml or 15-20 mg/dl depending on indication

**Background**

- Vancomycin is an antibiotic used primarily in the treatment of suspected and confirmed methicillin-resistant S. aureus (MRSA) infections.
- Over time vancomycin dosing strategies and concerns over toxicity, specifically nephrotoxicity, have changed.
- Currently, vancomycin dosing strategies differ from institution to institution.
- As of July 21, 2014, Lee Memorial Health System implemented a new vancomycin protocol that differed from the old protocol in its recommendations for maintenance dose, dosing weight, and interval in patients on dialysis.

**Results**

- **Figure 1**: Percent of all patients who achieved goal trough at first draw
- **Figure 2**: Percent of patients who experienced nephrotoxicity
- **Figure 3**: Percent of obese patients who achieved goal trough at first draw

**Evaluation of an updated vancomycin dosing protocol in a community health system**

Julie Katz, Pharm.D., Jonathan Cho, Pharm.D., BCPS, Sandy Estrada, Pharm.D., BCPS (AQ-ID)

Lee Memorial Health System, Fort Myers and Cape Coral, FL

- **Outcome Definition**: Nephrotoxicity: creatinine rise of 0.5 mg/dl above baseline or ≥50% increase above baseline (whichever is greater)
- **Goal trough**: 10-15 mg/ml or 15-20 mg/dl depending on indication

**Discussion**

- Both protocols resulted in similar outcomes
  - Percent of patients who attained the goal trough by the first lab draw increased by 7.5% (p=0.146) in new protocol
  - New protocol nephrotoxicity rate: 5.6% (p=0.157)
- Using adjusted body weight instead of actual body weight to dose obese patients improved goal trough attainment by 5.2% (p=0.509) while decreasing nephrotoxicity by 2.8% (p=0.348)
- All trough levels reported as <5 mcg/ml were estimated to be 5 mcg/ml
- The study limitations included:
  - Inability to establish cause and effect relationship due to the retrospective nature of the study
  - High exclusion rate due to strict inclusion criteria
  - Data regarding nephrotoxicity following drug discontinuation or alternative causes of nephrotoxicity was not collected
  - Trough levels below 5 mcg/ml were reported as "<5"

**References**

Comparison between Nanosphere Verigene® BC-GP and PNA-FISH testing on the treatment of Staphylococcus-related blood stream infections

Jonathan C. Cho, Pharm.D.1, Beverly McKee, MT (ASCP)2, Sandy J. Estrada, Pharm.D., BCPS (AQ-ID)1
1Department of Pharmacy; 2Department of Microbiology

Background
• Rapid diagnostic testing is rapidly evolving and plays an essential role in performing antimicrobial stewardship. Our institution recently adopted the Nanosphere Verigene® BC-GP test.
• Prior to implementation of Nanosphere Verigene® BC-GP, our institution utilized peptide nucleic acid fluorescence in situ hybridization (PNA-FISH) for identification of gram-positive organisms. Our methods

Methods
A two phase retrospective study comparing PNA-FISH and Nanosphere Verigene® BC-GP testing

Phase I: January – March 2014 (PNA-FISH)
Phase II: August – Sep. 2014 (Nanosphere Verigene® BC-GP)

Microbiology laboratory reports were used to identify patients with positive blood cultures secondary to Staphylococcus spp.

Nanosphere Verigene® BC-GP test results were provided to pharmacists via electronic notification vs fax with PNA-FISH

PNA-FISH testing was done in two batches daily vs. Nanosphere Verigene® BC-GP done on first positive blood culture per patient

Immediate notification of results via EPIC and antimicrobial stewardship recommendations made by pharmacists decreased the time to initiation of appropriate antimicrobial therapy

Length of stay was ~3 days shorter for MRSA infected patients in the Nanosphere group and ~2 days shorter in the non-MRSA group (Assumed hospital cost of $1500/day)

Rapid diagnostic testing is rapidly evolving and plays an essential role in performing antimicrobial stewardship. Our institution recently adopted the Nanosphere Verigene® BC-GP test.

Inclusion Criteria:
• Patients ≥18 years of age
• Admitted to any of the four LMHS facilities
• Positive blood culture for a Staphylococcus spp.

Exclusion criteria:
• Polymicrobial infections
• Not started on empiric antibiotics for bacteremia

Purpose
To evaluate the impact Nanosphere Verigene® BC-GP has, compared to PNA-FISH, on Staphylococcus-related blood stream infections in regards to timing of pathogen identification, length of stay, and timing of initiation or de-escalation to appropriate antibiotics.

Results

Staphylococcus spp. identified

<p>| Table 1. Baseline patient demographics and impact of rapid diagnostic testing on Identification of organism |</p>
<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Nanosphere Verigene®</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>67.2 ± 18.9</td>
<td>65.1 ± 19.25</td>
<td>0.402</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>48 (51.6)</td>
<td>48 (55.2)</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>8.77 ± 7.14</td>
<td>8.95 ± 10.11</td>
</tr>
<tr>
<td>ICU admission, n (%)</td>
<td>26 (28.3)</td>
<td>26 (32.2)</td>
</tr>
<tr>
<td>Positive blood culture, n (%)</td>
<td>41.6 ± 3.61</td>
<td>43.8 ± 3.54</td>
</tr>
<tr>
<td>P-lactate, n (%)</td>
<td>14 (14.9)</td>
<td>17 (19.0)</td>
</tr>
</tbody>
</table>

Received in [micro]/L | 3.1 ± 2.87 | 3.79 ± 4.1 | 0.502

Time of gram stain [micro]/L | 19.9 ± 10.76 | 25.54 ± 8.61 | 0.178

Time to organization [micro]/L | 36.18 ± 15.45 | 25.96 ± 17.35 | 0.017

Time to susceptibility result [hours] | 54.21 ± 11.47 | 49.71 ± 14.31 | 0.008

Time to initiation of appropriate antibiotics

Time to de-escalation of appropriate antibiotics

Extrapolated to 1 year:

<table>
<thead>
<tr>
<th>PNA-Fish</th>
<th>Nanosphere</th>
<th>P-value</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>9.78 ± 6.12</td>
<td>6.4 ± 4.04</td>
<td>0.293</td>
</tr>
<tr>
<td>Non-MRSA</td>
<td>10.9 ± 6.11</td>
<td>8.97 ± 7.56</td>
<td>0.272</td>
</tr>
</tbody>
</table>

Extrapolated to 1 year:

<table>
<thead>
<tr>
<th>PNA-Fish</th>
<th>Nanosphere</th>
<th>P-value</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>9.78 ± 5.85</td>
<td>6.4 ± 3.7</td>
<td>0.024</td>
</tr>
<tr>
<td>Non-MRSA</td>
<td>10.9 ± 6.03</td>
<td>8.97 ± 7.47</td>
<td>0.026</td>
</tr>
</tbody>
</table>

Discussion
• Nanosphere Verigene® BC-GP test results were provided to pharmacists via electronic notification vs fax with PNA-FISH
• PNA-FISH testing was done in two batches daily vs. Nanosphere Verigene® BC-GP done on first positive blood culture per patient
• Immediate notification of results via EPIC and antimicrobial stewardship recommendations made by pharmacists decreased the time to initiation of appropriate antimicrobial therapy
• Length of stay was ~3 days shorter for MRSA infected patients in the Nanosphere group and ~2 days shorter in the non-MRSA group (Assumed hospital cost of $1500/day)

Conclusion
• Implementation of Nanosphere Verigene BC-GP led to improved patient care via faster implementation of appropriate antibiotics/de-escalation of antibiotics

References

Disclosure
The authors of this presentation have nothing to disclose concerning possible financial or personal relationships with companies/manufacturers that may have a direct or indirect interest in the subject matter of this presentation.
Experience with Oritavancin as a method to decrease hospitalization for ABSSSI

Sandy Estrada, PharmD / Megan Patch, Pharm.D. / Elena Gatskevich, MD
Lee Memorial Health System (LMHS)

Purpose

• Oritavancin is a novel, one-dose lipoglycopeptide antibiotic approved by the FDA in 2014 for the treatment of patients with acute bacterial skin and skin structure infections (ABSSSI) caused by gram-positive organisms.

• Oritavancin is a single 1200 mg dose administered IV over three hours. This unique dosing strategy allows the potential to treat patients without hospital admission or placement of a central catheter.

• The antimicrobial stewardship committee at our institution approved the addition of oritavancin to our formulary for outpatient usage by infectious diseases physicians, as a possible strategy to avoid admissions or reduce length of stay.

• The purpose of our study was to describe the experience with oritavancin at our institution.

Methods

• LMHS IRB approved descriptive report
• All patients receiving oritavancin since addition to formulary in December 2014 were reviewed for
  • demographic information
  • indication for oritavancin usage
  • adverse events
  • antimicrobial utilization before and after oritavancin
  • readmission rate.

Results

• 35 patients analyzed
  • 30 included in analysis
  • 4 excluded for off-label usage
  • 1 excluded for non compliance
  • 1 readmission reported
  • No adverse reactions reported including two patients with history of vancomycin allergy

Patient Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, n (%)</td>
<td>12 (40%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>63 (26-85)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>88 (46-200)</td>
</tr>
<tr>
<td>BMI</td>
<td>29.5 (17-64)</td>
</tr>
<tr>
<td>Diabetic, n (%)</td>
<td>8 (27%)</td>
</tr>
<tr>
<td>IVDU, n (%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>Hospitalized First, n (%)</td>
<td>15 (50%)</td>
</tr>
<tr>
<td>Referred from MD Office</td>
<td></td>
</tr>
<tr>
<td>Referred from ED</td>
<td></td>
</tr>
<tr>
<td>Inpatient LOS (n=15)</td>
<td>3.7 (1-11)</td>
</tr>
</tbody>
</table>

Reimbursement

• No adverse reactions reported

Antimicrobials Used Prior to Oritavancin

- 5
  - Vancomycin
  - Ceftaroline
  - Linezolid
  - Clindamycin
  - Daptomycin

Antimicrobials Used After Oritavancin

7 patients received antibiotics within 30 days of oritavancin
  • 1 required coverage for pseudomonal infection
  • 1 required clindamycin for separate abscess one month later
  • 1 patient readmitted (see readmission discussion)
  • 1 patient received a second oritavancin dose 10 days later
  • 3 were given suppressive oral antibiotics after oritavancin

Readmissions

- One patient was readmitted within 30 days
  - 60 y/o female with history of recurrent LLE cellulitis since achilies tendon repair in 2011
- Oritavancin 1200 mg IV x 1 given on 4/18/2015
  - Completed 2 weeks of oral clindamycin in March 2015
- Patient reported improvement after oritavancin dose, followed by recurrence of symptoms one week after dose
- Patient readmitted on 5/7/15 for cellulitis/abscess of ankle
  - Osteomyelitis ruled out and 3 weeks completed of vancocycin and cefepime followed by 3 weeks of oral trimethoprim/sulfamethoxazole and ciprofloxacin
- Chronic, recurrent abscess/cellulitis is ongoing

Conclusion

• Oritavancin is a novel antimicrobial option for the treatment of patients in the outpatient setting. Oritavancin has allowed a safe alternative for the treatment of select patients with ABSSSI at our institution allowing for avoidance of hospital admission in some cases

• Future work will identify the best way to divert appropriate patients directly from the Emergency Department.

Discussion

• Oritavancin utilization at our institution is restricted to Infectious Diseases physicians and can only be used in the outpatient infusion center

• Intravenous drug using patients have not been common in our experience, although we initially thought this would be an area of large utilization

• Oritavancin has been well tolerated in our patients to date with no adverse events reported including two patients with vancomycin allergies reported

• The interaction between oritavancin and coagulation testing is manageable with awareness and patient education.

• Limitations: retrospective review, unknown admissions could have occurred outside the system

References


Disclosure

The authors of this presentation have nothing to disclose concerning possible financial or personal relationships of the commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

Fort Myers and Cape Coral, FL
Comparison of histidine-ketoglutarate-trytophan (HTK) cardioplegia solution and standard crystalloid cardioplegia on cross clamp time and length of stay for patients undergoing coronary artery bypass graft procedures at a 515-bed tertiary hospital

Holmes Regional Medical Center, Melbourne, Florida

Background

- Ischemia-reperfusion injury during coronary artery bypass graft (CABG) procedures related to insufficient myocardial protection has been associated with increased morbidity and mortality.
- Prolonged aortic cross-clamp time during CABG procedures has been significantly correlated with major post-operative morbidity and mortality.
- Cardioplegic solutions are used during CABG procedures for myocardial protection during aortic cross-clamping.
- Use of histidine-ketoglutarate-trytophan (HTK) solution during CABG procedure has been shown to decrease ICU length of stay.
- HTK protects coronary vasculature during preservation, which together with reperfusion might lead to improved functional cardiac recovery following preservation.
- In this study we compare the impact of HTK cardioplegia solution versus standard crystalloid cardioplegia on aortic cross-clamp time and total length of stay for patients undergoing coronary artery bypass graft procedures at a 515-bed tertiary hospital.

Objective(s)

- Decrease aortic cross-clamp time
- Decrease overall length of stay
- Decrease overall health care cost per CABG procedure

Methods

- Retrospective chart review for 2 groups of CABG patients:
  - Use of Plegisol cardioplegia solution (October 2013 to August 2014) compared to use of Custodial (HTK) cardioplegia solution (October 2014 to June 2015)
- Inclusion and exclusion criteria
  - Inclusion: Patients who received cardioplegia solution in 1 of 4 DRGs:
    - 233 coronary bypass w cardiac cath w MCC
    - 234 coronary bypass w cardiac cath w/o MCC
    - 235 coronary bypass w/o cardiac cath w MCC
    - 236 coronary bypass w/o cardiac cath w/o MCC
  - Exclusion: Patients who received cardioplegia solution in all other cardiac procedures.
- Charts Reviewed:
  - 108 patients who received Plegisol
  - 106 patients who received Custodial (HTK)
- Charts were reviewed for length of stay, aortic cross-clamp time, major complications and comorbidities (MCC).
- Endpoints:
  - Reduction in length of stay and aortic cross-clamp time during surgery.

Results

- Aortic Cross-Clamp time (minutes)
  - Plegisol (Oct 2013 - July 2014)

- DRG 233 Coronary bypass with cardiac cath w MCC
- DRG 234 Coronary bypass with cardiac cath w/o MCC
- DRG 235 Coronary bypass without cardiac cath w MCC
- DRG 236 Coronary bypass without cardiac cath w/o MCC

- CC: Complications and Comorbidities
- MCC: Major Complications and Comorbidities

Discussion

- A reduction in aortic cross-clamp time of 3.8 minutes was found in the HTK group.
- A sub analysis of DRG 234 (CABG w/ cardiac cath w/o MCC) and DRG 236 (CABG w/o cardiac cath w MCC ) trended towards a significant decrease in length of stay. Larger studies of these groups are warranted to further investigate this finding:
  - A decrease in LOS of 1.45 was observed in the CABG patients without complications and who received cardiac catheterization.
  - A decrease in LOS of 0.8 was observed in the CABG patients without complications and who did not receive cardiac catheterization.
- In the aggregate, there was no appreciable change in LOS.
- Larger studies are currently ongoing.

Conclusion

- No appreciable decrease in length of stay was found in the patient populations studied during the specified observation times.
- A decrease in aortic cross-clamp time of 3.8 minutes was found in the Custodial group, which can demonstrate a significant clinical benefit.
- Larger studies are needed to determine if length of stay can be reduced by using the HTK solutions instead of a crystalloid-based cardioplegia solution.
- Studies including other DRGs in which the HTK solution is used may also provide insight into whether HTK solution provides a significant benefit over alternative cardioplegia solutions.

References

5. Plegisol (Package Insert) Lake Forest, IL: Hospira, Inc.; 2007

Disclosures

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:

Multi-dose Medication Dispensing at Discharge (MMDD)
Jonathan P. Girnys, Pharm.D., Ryan R. Hire, Pharm.D., BCPS, John A. Armitstead, MS, RPh, FASHP

Purpose
- Opportunities for pharmacy improvements in transitions of care services exist within the current health-care environment. At patient discharge multi-dose medication usage within the inpatient environment is discarded even though medication remains in these products.
- In the high readmission risk Chronic Obstructive Pulmonary Disease (COPD) patient population, allowing their inhaler to be used as a therapy bridge instead of disposing of the inhaler upon discharge extends the time period for the patient to fill their outpatient maintenance inhaler.
- The purpose of this initiative was to improve transitions of care and prevent readmission by allowing patients to take inhalers used while inpatient home with them at discharge.

Methods
- A multicenter system transition of care initiative of COPD patients began when patients started receiving their multi-dose inhalers on December 16, 2015.
- Information was collected prior to the implementation date (Fiscal Year 14) and four months after implementation. (December 2014 - March 2015)
- Data collected included patient outcomes in the form of patient to fill their outpatient maintenance inhaler.
- In the high readmission risk Chronic Obstructive Pulmonary Disease (COPD) patient population, allowing their inhaler to be used as a therapy bridge instead of disposing of the inhaler upon discharge extends the time period for the patient to fill their outpatient maintenance inhaler.
- Data collected included patient outcomes in the form of patient to fill their outpatient maintenance inhaler.
- The MMDD initiative went live on December 16th during the time of the year when possibly Lee Memorial Health-System sees the largest increase in patient volume. Although more COPD patients were treated and discharged during this time frame, the COPD readmission rate decreased from an average of 24% (FY14) to 19% two months post go live.
- There were noticeable differences in patient satisfaction via verbalization to decentralized pharmacists on patient units which were evident in the HCAHPS survey results. Scores increased an average of 20% for communication about medications and 21% for how often hospital staff described possible side effects.
- Pharmacist to patient educational encounters increased by 250% post MMDD implementation. Front line staff were engaged through an extensive training and education campaign. Inhaler education made up for 64% of the total medications educated in January.

Results
- Prior to the MMDD initiative pharmacists averaged 400 patient educations per month
- The MMDD initiative went live on December 16th during the time of the year when possibly Lee Memorial Health-System sees the largest increase in patient volume. Although more COPD patients were treated and discharged during this time frame, the COPD readmission rate decreased from an average of 24% (FY14) to 19% two months post go live.
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- Pharmacist to patient educational encounters increased by 250% post MMDD implementation. Front line staff were engaged through an extensive training and education campaign. Inhaler education made up for 64% of the total medications educated in January.

Discussion
- • The MMDD initiative went live on December 16th during the time of the year when possibly Lee Memorial Health-System sees the largest increase in patient volume. Although more COPD patients were treated and discharged during this time frame, the COPD readmission rate decreased from an average of 24% (FY14) to 19% two months post go live.
- • There were noticeable differences in patient satisfaction via verbalization to decentralized pharmacists on patient units which were evident in the HCAHPS survey results. Scores increased an average of 20% for communication about medications and 21% for how often hospital staff described possible side effects.
- • Pharmacist to patient educational encounters increased by 250% post MMDD implementation. Front line staff were engaged through an extensive training and education campaign. Inhaler education made up for 64% of the total medications educated in January.

Conclusion
- • Following the implementation of this project the COPD readmission rate decreased by 5%.
- • This successful transition of care improvement opportunity required multidisciplinary team alignment and a health-system cultural transformation united with a common goal to improve the care of patients.
- • MMDD is a process transformation that allows the patient to take their medication home, leading to improvements in patient care, cost reduction, and increased patient satisfaction.
Expansion of a pharmacist provided outpatient anticoagulation clinic results in more than double increase in revenue

Guth, J., Lighston, D., Minnich-Barnes, M., Roch, A.
Palm Bay Hospital, Palm Bay, Florida

Background

- The anticoagulation clinic at Palm Bay Hospital was started in June 2013 with an initial census of 30 patients and with Dr. David Norris, MD as its Medical Director.
- The clinic was initially located in Dr. Norris’ office in the Physician Office Building using an exam room and was operated on Monday and Thursday from 8am to 4pm.
- In August 2014 a new clinic office was created and relocated to an area in the hospital with the days expanded to 4 days per week.
- Palm Bay Hospital is a 152 bed community hospital located in the fastest growing area of Brevard County, Florida.
- It is part of Health-First, Inc. which is the only Integrated Delivery Network (IDN) in Brevard County, Florida. The IDN consists of 3 community hospitals, a level 1 trauma center (tertiary hospital), Wellness and Prevention Care, Community Based Care, as well as Health First Health Plans.

Objective(s)

- To expand service provided to patients for whom physicians have deemed “difficult to manage” concerning their anticoagulation therapy after discharge.
- To conduct a complete review of the patient’s medication history in order to provide patients with education concerning concurrent medication and dietary implications.

Methods

- Through access to inpatient medical records and INR results, pharmacists are able to review and streamline the patient’s current medication regimen to achieve stabilization.
- A CoaguChek device is used to increase patient safety and avoid phlebotomy to increase patient satisfaction.
- INR results are obtained immediately and dosing schedule is confirmed or revised based upon the results.
- Patients are given written instructions and their next appointment is scheduled prior to leaving the clinic. Prescriptions are eScribed to the patient’s Pharmacy as needed.
- Marketing department created a flyer regarding the Anticoagulation Clinic that was presented to the physicians.

Results

- By May 2014, the population served by the clinic had more than doubled. From 30 patients initially to approximately 80 patients.
- The number of clinic patients continued to increase and therefore required the expansion of services from 2 days per week to 4 days per week.
- As of June 2015, the anticoagulation clinic referral volume has now increased to 212 patients.
- This reflects an increase of 450% from opening volumes and a more than doubling of patient volume from the previous year.
- The expansion of clinic days was projected to produce a revenue of $218,454 for the last 12 months.
- The actual revenue performance totaled $487,518 for the same period.
- This reflects a revenue surplus of more than 120% of projected budget.

Conclusion

- Successful pharmacist management of the anticoagulation therapy for outpatients deemed “difficult to manage” by the physicians results in a rapid increase in physician referrals due to demonstrated competence of the pharmacist anticoagulation team.
- This also results in a rapid increase in revenue for the facility.
- In the future the clinic will be expanded to offer services Monday thru Friday as well as the addition of another pharmacist to accomplish the appropriate patient coverage.

Disclosures

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:

Jeffrey Guth: Nothing to disclose
David Lighston, Marcia Minnich-Barnes, and Andrew Roch: Nothing to disclose
BACKGROUND

- Malnutrition occurs in up to 60% of patients hospitalized and is associated with complications such as infection, poor wound healing, higher rate of readmission, increased length of stay, increased morbidity and mortality.

- Nutrition support is a vital part of the management of malnutrition in hospitalized patients.

- Clinical studies have demonstrated that the enteral route is preferred over the parenteral route.
  - Enteral nutrition (EN), when compared to parenteral nutrition (PN), is associated with decreased infectious and noninfectious complications.
  - EN is more cost effective than PN.

- Parenteral nutrition therapy, when utilized appropriately, can provide benefits and improved outcomes to some patients.

NUTRITION PROTOCOL

- Appropriate Indications for PN
  - Massive small bowel resection leaving less than 5 feet of small bowel beyond the ligament of Treitz.
  - Short gut syndrome.
  - Patient requires bowel rest for at least 7 days.
  - Unable to meet at least 60% of needs enterally by ICU day 7.
  - Unable to meet at least 85% of needs enterally by ICU day 10.
  - Complete mechanical small bowel obstruction with no surgical option.
  - Patient is significantly malnourished.

- Unapproved Indications
  - Evidence of malnourishment.
  - Other.

METHODS

- A retrospective chart review was conducted at University of Florida Health between July 14, 2013 and November 30, 2013.

- University of Florida Health is a 939-bed tertiary academic medical center with 140 adult ICU beds.

- Inclusion criteria: All adult patients age 18 years and older who had received PN.

- The primary goal of this study was to assess hospital-wide adherence to Pharmacy and Therapeutics approved criteria for PN use.

- The secondary endpoints include time to initiation of PN, length of PN therapy, and improved outcomes to some patients.

MATERIALS AND METHODS

- Objective
  - To evaluate the appropriateness of PN therapy subsequent to the initiation of the physician approved protocol.

RESULTS

- A total of 152 patients with 183 admissions were included in this study.

- Covered indications:
  - Requires bowel rest for greater than 7 days.
  - Unable to meet 60% of needs by day 7.
  - Short bowel syndrome.
  - Massive small bowel resection.
  - Unable to meet 85% of needs by day 10.
  - Evidence of malnourishment.
  - Small bowel obstruction (no surgical option).

- Unapproved indications:
  - Unconfirmed fistula.
  - Patient refused EN.
  - Postoperative ileus.
  - Immunomodulating effects of PN.
  - Abdominal wall drainage.
  - Partial small bowel obstruction.
  - Increase visceral proteins prior to surgery while tolerating PO diet.
  - Omentectomy.
  - Hirschsprung’s Syndrome.

<table>
<thead>
<tr>
<th>Secondary endpoints</th>
<th>All Admissions n=183 (%)</th>
<th>Index Admission n=152 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Hospital Length of Stay, days (IQR)</td>
<td>15 (9-30)</td>
<td>17 (10-32)</td>
</tr>
<tr>
<td>ICU Admissions, n (%)</td>
<td>90 (49.1)</td>
<td>81 (53.3)</td>
</tr>
<tr>
<td>Median ICU Length of Stay, days (IQR)</td>
<td>13 (3-28)</td>
<td>17 (4-30)</td>
</tr>
<tr>
<td>Median Length of PN Therapy, days (IQR)</td>
<td>7 (4-10)</td>
<td>7 (4-11)</td>
</tr>
<tr>
<td>Median Time Between Admission and PN Therapy Initiation, days (IQR)</td>
<td>5 (2-9)</td>
<td>6 (2-10)</td>
</tr>
<tr>
<td>Inpatient mortality Rate (%)</td>
<td>23 (13)</td>
<td>22 (14.5)</td>
</tr>
</tbody>
</table>

DISCUSSION

- Overall, there was a 94% compliance with with PN criteria for use.

- The most common approved indication for PN among study patients was the requirement of bowel rest for greater than 7 days.

- The most common unapproved indication for PN among study patients was for the treatment of a suspected fistula that was not confirmed by radiographic evidence.

- Will continue to reinforce current criteria for use.

LIMITATIONS

- Single center, retrospective chart review.

- Incomplete or missing data and documentation within the electronic medical record.

- Inconsistent and/or incomplete documentation of indication for PN.

- Inconsistency with documentation of EN.

- EN infusion rates.

- Percentage of goal caloric needs received.

CONCLUSIONS

- A small percentage (6%) of patients in this analysis did not meet criteria for appropriate use of PN therapy.

- Studies have shown the use of enteral nutrition protocol is associated with closer-to-calories goal delivery and improved outcome.

- Increased adherence to the appropriate criteria for use of PN therapy should be considered to improve patient outcomes and decrease health care expenditures.

REFERENCES


Disclosure: The authors of this presentation have nothing to disclose.
Implementation of a pharmacist productivity tool and optimizing inventory management of the automated dispensing cabinets to support expansion of pharmacy presence into three intensive care units in a 515-bed tertiary hospital

Norwood-Williams C*, Behl C, Kirshon, B, Miodek T, Valentine, J.
Holmes Regional Medical Center, Melbourne, Florida

Background

- Holmes Regional Medical Center Pharmacy Services was tasked with expanding pharmacist presence in the hospital. Based upon the critical status of the patient and the intensive care team approach required, the decision was made to decentralize pharmacists to the cardiovascular, surgical, and medical intensive care units, if possible, with current staffing.

- Multiple medication inventory depletions in the automated dispensing cabinets required multiple interruptions of pharmacists performing order entry activities, which contributed to delays in nursing access to ordered medications and resultant delays in care.

- Variance in pharmacist productivity resulted in issues with timely nursing access to ordered medications.

- Relocating pharmacists outside of the main pharmacy department would not be a sustainable venture without adding staff.

Objective(s)

- Reduce medication inventory depletions, or stock-outs, in automated dispensing machines

- Standardize pharmacy order entry performance targets to improve timely nursing access to medication

- Expand pharmacy services to three intensive care units with existing pharmacist staff without negatively impacting standard pharmacy operations

Methods

- Pharmacists were provided a standardized medication verification target volume per shift to define and promote a fair and equitable distribution of work expectations specific to computerized physician order entry verification.

- Target order verification volumes were categorized as target, above target, high performance, and possible partnership challenges.

- Reports of automated dispensing cabinet inventory depletions were reviewed to determine volume of medication stock-outs per day and compared with previously approved par levels for each.

- At the beginning of the study period, adjustments were made to increase the par levels by fifty percent for each drug stock-out. Another report was generated after the end of the first week and par levels were modified to reflect actual utilization.

Results

- Initial reports reflecting stock-outs per machine showed 4.02 in January 2013 representing an average of 289 medication depletions that month.

- By May 2013, stock-outs per station had reduced to 1.30 or 94 depletions; representing a decrease of 68%.

- The number of stock-outs continues to decrease in 2015, with a current performance of 0.9 depletions per machine, representing an average of 2 stock-outs per day and a decrease of 78% overall from baseline.

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- The number of stock-outs continues to decrease in 2015, with a current performance of 0.9 depletions per machine, representing an average of 2 stock-outs per day and a decrease of 78% overall from baseline.

- Pharmacist medication order entry/verification volume per shift was introduced to identify opportunities for fair and equitable work volumes.

- Pharmacist productivity improved from the 2013 initiation baseline of 41% above target and 18% high performer productivity category to zero pharmacists in the above target realm and 56% in the high performer category in 2015.

- Decentralization into the three intensive care units was accomplished using current staff.

- Due to increased efficiency in both the implementation and communication of pharmacist productivity targets and automated dispensing cabinet inventory per utilization, standard operations of pharmacy services were only positively impacted by these changes.

Conclusion

- Decentralization into the three intensive care units was accomplished using current staff.

- Due to increased efficiency in both the implementation and communication of pharmacist productivity targets and automated dispensing cabinet inventory per utilization, standard operations of pharmacy services were only positively impacted by these changes.

Disclosures

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:

Norwood-Williams, C.: Nothing to disclose.
Antimicrobial resistance is an increasing threat to the health care environment. Judicial use of available antimicrobial agents is needed to provide optimal therapy while suppressing the development of antimicrobial resistance. Increasing rates of resistance and increasing virulence of resistant strains is emerging faster than we can produce new antimicrobials. Increasing rates of resistance and increasing virulence of resistant strains is emerging faster than we can produce new antimicrobials. Organisms containing ESBL are often harder to treat and may require broad spectrum antibiotics to clear the infection, exposing the patient to collateral damage and increased antimicrobial exposure.

Objective

Identify the appropriateness and usage patterns of antimicrobials against culture positive ESBL urinary tract infections (UTI) at Lee Memorial Health System (LMHS).

Methods

Study Design

- Prospective chart review: July 2013 – June 2014
- Lee Memorial Health System (LMHS), 4 hospitals, 1500 beds

Inclusion Criteria

- Adults with an ESBL UTI
- >100,000 CFU isolated from urinary source

Exclusion Criteria

- Patients not completing prescribed treatment regimen
- Duplicate cultures from the same patient (multiple admissions)

Data Collection

- Electronic health record

Outcome Definitions

- Appropriate use of antimicrobials will be defined in our study as using evidence-based empiric treatment followed by narrowing of therapy as sensitivities become available

Discussion

- Patients with a prior history of ESBL urinary tract infection were more likely to have susceptible empiric antibiotic treatment over patients with no history of ESBL urinary tract infection (25% vs 18%).
- Patients receiving susceptible empiric antibiotic therapy had a shorter median length of stay compared to patients receiving empiric therapy with an agent not susceptible to the ESBL producing organism (6 days vs 7 days, p<0.06), including both E. coli and K. pneumoniae.
- The median length of stay for patients across the health system was greater for patients with K. pneumoniae ESBL compared to patients with E. coli ESBL by 3 days (6 vs 9 days).

Conclusions

- Ensuring patients have appropriate empiric antibiotic therapy may reduce the length of stay for patients with ESBL positive urinary tract infections with E. coli or K. pneumoniae.
- Antimicrobial stewardship involvement in the care of patients with a history of ESBL-producing organism may assist in patients receiving an appropriate antibiotic earlier in the treatment course.
- Based on susceptibilities, use of ertapenem in patients with ESBL producing organism may assist in patients receiving an appropriate antibiotic earlier in the treatment course.

References


Disclosure

All authors of this presentation have nothing to disclose concerning possible financial/personal relationships with commercial entities that may have direct/indirect interest in the subject matter of this presentation.
Transitions of care: evaluation of pharmacists providing medication reconciliation after hospital discharge in an outpatient setting

Rakhi Patel, PharmD, BCPS, Isabelle Gallagher, PharmD Candidate
Lee Memorial Health System, Fort Myers, FL

Background
- Adverse drug events occur frequently during transitions of care, with an occurrence of 11-23% of all patients.
- Medication errors alone account for roughly $3.5 billion in healthcare costs and over 7,000 deaths annually in the US.
- Effective medication reconciliation is composed of multiple processes that together aim to reduce medication errors and support safe medication use by patients.
- Medication reconciliation can be efficiently, effectively, and consistently performed by pharmacists to optimize patient outcomes

Objective:
- Evaluate discrepancies that occur with patient medications following hospital discharge and assess the impact pharmacists have on the identification and correction of patients’ medication health records.

Methods
- Study Design
  - Retrospective chart review
  - March 2015- May 2015 (n=108)
  - Lee Memorial Health System’s Infusion Center
- Inclusion Criteria
  - Patients ≥18 years old discharged from LMHS hospitals
  - Requiring antibiotic or anticoagulation therapy
- Exclusion Criteria
  - Patient receiving wound care, port flushes and injections
  - Patient refusal
  - Language barriers present
- Outcome Definitions
  - Discrepancies to medication history included
    - Inactive medication listed
    - Incorrect frequency
    - Omission of medication
    - Incorrect dose
    - Omission of stop date

Results
- Over a 3 month period, 86 of 108 patients (80%) scheduled for antibiotic or anticoagulation treatment at the infusion center met the inclusion criteria. Of the 86 patients that received medication reconciliation services, 57 patients (66 %) required their health record to be updated.
- A total of 190 discrepancies were identified and resolved. The discrepancies occurred:
  - Failure to discontinue medication (41%)
  - Incorrect frequency (24.2%)
  - Omission of medication (17.4%)
  - Incorrect dose (14.2%)
  - Omission of stop date (3.2%)

The study limitations included:
- Inability to assure validity of medications verbally disclosed by patients
- Some patients were unwilling to review medications
- Only patients with infusion center referral had medications completed
- Small sample size

Conclusion
- Pharmacists providing medication reconciliation services can potentially improve patient outcomes during transitions of care by resolving medication errors. Potential errors include failure to receive a medication, adverse drug events, drug interactions, and medication use without proper indication.

Discussion
- Over a 3 month period, 86 of 108 patients (80%) scheduled for antibiotic or anticoagulation treatment at the infusion center met the inclusion criteria. Of the 86 patients that received medication reconciliation services, 57 patients (66 %) required their health record to be updated.

Acknowledgments

Pharmacist Facilitated Discharge Medication Reconciliation

Pharmacists can facilitate medication reconciliation by ensuring patients are aware of all medications they need to continue taking after hospital discharge. This can help prevent errors and improve patient outcomes.

References
Description of a Pharmacist-Directed Anti-Arrhythmic Monitoring Service in a VA Medical Center.

Quffa, LH\textsuperscript{a} and Franck, AJ\textsuperscript{a}

\textsuperscript{a} North Florida/South Georgia Veterans Health System, 1601 S.W. Archer Rd, Gainesville, FL, U.S.A

Introduction

Management of atrial and ventricular arrhythmias remains a clinical challenge in the veteran population due to multiple comorbidities, polypharmacy and lack of standardized monitoring parameters. Anti-arrhythmic therapies (AAT) are used to help with symptom management and maintenance of sinus rhythm. These medications have the potential for serious adverse drug reactions (ADRs), the most concerning of which is sudden cardiac death (SCD). Follow-up and safety evaluations remain a concern as they are typically performed by busy primary care physicians, with little experience in AAT management. Existing guidance for monitoring is limited and not well documented.\textsuperscript{1-4} This was seen as an important opportunity for clinical pharmacy services to establish a novel program to help improve safety. A program dedicated to monitor for safety and efficacy of AAT was created. The program started with dofetilide as the primary focus, but has since been expanded to include other AAT including flecainide, dronedarone and sotalol. The future goal is to also include amiodarone.

Objectives

Describe a pharmacy-directed cardiac AAT management program. The goal is to improve adherence with drug safety monitoring for patients on AAT and promote consistency of care within the North Florida/South Georgia Veterans Health System (NF/SG VHS).

Methods

A pilot program was developed to provide pharmacist-directed comprehensive AAT monitoring via face-to-face visits or phone appointments. The pharmacist may adjust current AAT, prescribe/optimize drug therapy, recommend alternative therapies, manage drug-drug interactions, manage comorbid conditions, and discontinue medications if ADRs are present. An attending cardiologist oversees the program and is available for clinical support. Monitoring is performed according to specific recommendations provided for dofetilide therapy.\textsuperscript{1,2} The clinical pharmacist’s evaluation includes:

1) Indication for therapy
2) Electrocardiogram (ECG)
3) Serum electrolytes
4) Renal function
5) Symptomatic improvement
6) Drug-drug interactions

A retrospective cohort study was performed on patients prescribed dofetilide within the NF/SG VHS over an 18 month period, beginning July 1, 2013 to December 1, 2014. Local IRB approval was attained. Patients were included if they were 18 years or older and had taken dofetilide consecutively for more than three months. Two cohorts were compared: patients who received dedicated clinical pharmacy services and patients who received standard care. Patient demographics and rate of compliance with the FDA REMS criteria were obtained. REMS criteria include: assessment of serum electrolytes, renal function, ECG and drug-drug interactions at routine intervals. The primary outcome was the proportion of patients with appropriate monitoring performed in each group. A chi-squared analysis was conducted on the primary outcome. All other characteristics were assessed using descriptive statistics.

Results

- 87 patients were identified as being prescribed dofetilide through the study period. 78 patients met inclusion criteria, 9 patients were excluded.
- 40 encounters were documented in the clinical pharmacy services group and 288 in the standard care group.
- 98% compliance with recommended monitoring parameters was seen in the clinical pharmacy service group vs. 79% in the standard care group. This difference was statistically significant (p = 0.05).

Table 1: Baseline characteristics for all dofetilide patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>% N (%)</th>
<th>Average ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>66 ± 6.4</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>95.4%</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>97 ± 18</td>
<td></td>
</tr>
<tr>
<td>CrCl</td>
<td>109 ± 30</td>
<td></td>
</tr>
<tr>
<td>Baseline ECG</td>
<td>426 ± 40</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Proportion of patients meeting parameters

Clinical pharmacy service (%)

- Monitoring, 96%
- No monitoring, 27%

Patient Groups

- Monitoring, 79%
- No monitoring, 23%

Standard of Care (%)

- Monitoring, 59%
- No monitoring, 37%

Figure 2: Missed monitoring parameters

18% ECG
18% Mg
27% Scr
37% No monitoring

Discussion

Before initiation of a dedicated clinical pharmacy service, monitoring of AAT was inconsistent and lacked a structured approach. Results of this evaluation show a statistically significant increase in adherence to the recommended monitoring for dofetilide in the dedicated clinical pharmacy service cohort. The most commonly missed monitoring parameter was serum magnesium in both groups. Limitations to the study include: (1) Only preliminary data of the potential applications of this clinic was evaluated, (2) Only one anti-arrhythmic agent was included in the study, (3) clinical outcomes such as morbidity, mortality or decrease in re-admission rates were not assessed, and (4) Due to the nature of the study design no causation can be inferred. The clinic is well-received by the Cardiology Service at NF/SG VHS. Additionally, this novel clinic has potential to improve access to care and decrease healthcare costs by reducing appointment burden for both the Cardiology Service and primary care clinics.

Conclusions

A pharmacist-directed cardiac AAT management program was associated with improved dofetilide monitoring, as seen by higher adherence to REMS criteria. This improvement could lead to enhanced patient safety outcomes realized by prevention of major ADRs and a decrease in hospitalizations. Expansion of clinical pharmacy AAT monitoring services is underway at our institution. Future studies to evaluate the effects of these findings on clinical outcomes will be conducted. In addition, evaluation of the effect of dedicated clinical pharmacy services on the monitoring of other AAT is needed to provide greater insight into this novel pharmacy practice.

These findings show great promise as a model for advanced pharmacy practice to improve compliance with high risk drug monitoring and thereby improve patient safety and clinical outcomes.

References

2) Soder M, Kallitchev B, Sanna CA. Initial experience with antiarrhythmic medications monitored by clinical pharmacist in an outpatient setting: a retrospective review. Cite Thi.

Acknowledgments

Nicolle Maltese, Pharm.D., BCPS
Den Reeder, Pharm.D., BCPS
Robert Svingos, Pharm.D., BCPS

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:

Leith H Quffa: Nothing to disclose; Andrew J Franck: Nothing to disclose.
Retrospective Pharmacist Review of High-Risk Medication Orders in the Emergency Department

Lauren Rios, Pharm.D., Amy Birch, Pharm.D., Russell McKelvey, Pharm.D., Joe Spillane, Pharm.D.
UF Health Jacksonville Medical Center

Background
- Inclusion of a pharmacist in the health care team can reduce medication errors and adverse drug events.1,2
- Most common errors in the emergency department (ED) include:
  - Antimicrobial agents
  - Central nervous system agents
  - Anticoagulant and thrombolytic agents
  - Cardiovascular drugs
- 45% of health-care practitioners surveyed favored review of only high-risk medications3
- Joint Commission Standards4,5
  - Pharmacist should review all medication orders unless:
    - Licensed independent practitioner present
    - Emergency medication
    - Emergency medications should be readily available
- ASHP Guidelines7
  - Order review most helpful when prospective
  - Order review should not delay therapy
  - Focus on high-risk medications and high-risk populations
  - Retrospective review for overrides

Objectives
- Rate of medication errors found in medication orders that did not undergo prospective pharmacist review in the ED
- Type of medication errors found in medication orders that did not undergo prospective pharmacist review in the ED
- Rate of physician overrides of warnings during the ordering process in medication orders that did not undergo prospective pharmacist review in the ED
- Risk factors associated with medication errors

Purpose
To evaluate the rate of medication errors with high-risk medication orders that were not prospectively reviewed by a pharmacist in the ED of an academic medical center

Study Enrollment
1,219 medication orders for 796 patients screened
- 161 orders for 68 patients excluded
- 1,058 orders for 728 patients included

Methods and Study Definitions
- IRB-approved, single-center retrospective chart review
- Inclusion criteria:
  - Medication orders autoverified in the ED in April 2014 for IV and oral anti-infectives, parenteral anticoagulants, metformin, ACE inhibitors, IV hydantoin, IV potassium, and alteplase
- Exclusion criteria:
  - orders entered or reviewed by a pharmacist, orders for azithromycin 1,000 mg or metronidazole 2,000 mg
- Type of Error (n = 161)

Results
- Total Errors (n = 161)
  - 15.2% of all orders evaluated
  - IV Hydantoin 1%
  - ACE Inhibitors 22%
  - Parenteral Anticoagulants 12%
  - Contraindication 5%
  - Therapeutic Duplications 23%

- Top 5 Drugs Associated with Medication Errors

Discussion and Conclusion
- Most errors did not reach the patient (54.7%)
- Physician warnings in electronic medical record not as sensitive as pharmacist warnings
- Duplication errors can increase cost and patient harm
- Wrong dose errors highlight potential for optimization of therapy
- Prospective pharmacist review of orders may be beneficial in optimization of therapy

References
4. The Joint Commission. Hospital: Medication Management. M06.01.01: A pharmacist reviews the appropriateness of medication orders for medications to be dispensed in the hospital. 2014
7. ASHP. Am J Health Syst Pharm. 2010;67:830–840

Disclosures
The authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities.
Background
- Venous thromboembolism (VTE) prophylaxis is well studied in patients of normal weight, but the obese patient population is under represented.
- Medically-ill patients may be at as much as an eight-fold risk of developing a VTE.
- The optimal dosing strategy in obese medical patients is unclear. Possible regimens may include 30 mg or 40 mg twice daily, or 0.5 mg/kg daily.

Purpose
- Gain insight into dosing strategies currently used to prevent VTE in obese patients while admitted to the hospital.
- Guide prophylactic dosing strategies of enoxaparin in obese (defined by body mass index- BMI) hospitalized patients.

Methods
- IRB approved retrospective chart review of patients who developed a VTE while admitted to a LMHS hospital between August 2012 - August 2014 was conducted.
- Inclusion criteria:
  - > 18 years old
  - BMI > 30 kg/m²
  - Hospital-acquired VTE
  - Receiving prophylactic enoxaparin within 24 hours of admission
- Exclusion criteria:
  - CrCl < 15 mL/min
  - Admission diagnosis of VTE
  - Pregnant
- Patients were analyzed for prophylactic enoxaparin dosing strategy based on patient type and BMI
- The first 100 patients to meet the criteria were analyzed.

Results
- 583 patients with hospital-acquired VTE
- 218 obese patients
- 43 patients received enoxaparin within 24 hours

Discussion
- The majority of obese patients did not receive an increase in prophylactic enoxaparin dosing above standard dosing recommendations.
- Most medical/other patients received 40 mg daily, regardless of BMI.
- To address the concern for increased risk of VTE in obese patients, LMHS updated recommendations in August 2014 to use 40 mg bid in patients with a BMI ≥ 40.
- Prior to this update, only one such patient with a hospital-acquired VTE received the increased dosing based on this study.
- To address the concern for increased risk of VTE in obese patients, LMHS updated recommendations in August 2014 to use 40 mg bid in patients with a BMI ≥ 40.
- Prior to this update, only one such patient with a hospital-acquired VTE received the increased dosing based on this study.

Conclusion
- VYE are medically preventable conditions, in which diligent prophylaxis is needed.
- While the cutoff in unclear, patients with an elevated BMI may need more aggressive VTE prophylaxis.
- Future studies are needed to determine the optimal regimen for VTE prophylaxis in the obese, particularly orthopedic surgery patients as their risk is increased.
- Pharmacists must play an integral role in evaluating patients for VTE risk and making appropriate recommendations.

References
Evaluation of the duration of levetiracetam for anti-seizure prophylaxis in traumatic and spontaneous brain injuries

Jennifer Greenup, PharmD; Amy West, PharmD; Mallory Fiorenza, PharmD, BCPS

Background
- Seizures can occur in patients following traumatic and spontaneous brain injuries.
- The traumatic brain injury guidelines recommend anticonvulsants to decrease the incidence of early posttraumatic seizures, within seven days of injury; however, they are not indicated to prevent late posttraumatic seizures.
- The stroke guidelines recommend considering anti-seizure prophylaxis during the immediate post-hemorrhagic period.
- The prolonged use of anti-seizure prophylaxis in patients with traumatic and spontaneous brain injuries is not recommended.

Objectives
- Determine the duration of anti-seizure prophylaxis and to assess if anti-seizure prophylaxis is being adequately discontinued for patients with traumatic and spontaneous brain injuries.
- Evaluate that long-term (greater than 7 days) anti-seizure prophylaxis is not being prescribed unless warranted.

Methods
- Study Design:
  - Retrospective chart review
  - Approved by institutional review committee
  - Lee Memorial Hospital and Gulf Coast Medical Center intensive care units
- Inclusion Criteria:
  - Adults diagnosed with traumatic or spontaneous brain injury
  - Admitted between January 1, 2014 – July 31, 2014
- Exclusion Criteria:
  - Preexisting seizure disorder
  - Taking anticonvulsants at home prior to admission
- Data Collection:
  - Electronic health record
- Outcome Definitions:
  - Appropriate duration: ≤ 7 days or documented seizure
  - Inappropriate duration: >7 days

Results

<table>
<thead>
<tr>
<th>Baseline Characteristics (n=179)</th>
<th>Variable</th>
<th>Traumatic</th>
<th>Spontaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Patients</td>
<td>129</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Age (years), mean ±SD</td>
<td>60 ± 22</td>
<td>68 ± 16</td>
<td></td>
</tr>
<tr>
<td>Type of Injury*, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subarachnoid Hemorrhage</td>
<td>64 (30%)</td>
<td>9 (18%)</td>
<td></td>
</tr>
<tr>
<td>Subdural Hematoma</td>
<td>76 (39%)</td>
<td>15 (30%)</td>
<td></td>
</tr>
<tr>
<td>Intracranial Hemorrhage</td>
<td>25 (19%)</td>
<td>36 (72%)</td>
<td></td>
</tr>
<tr>
<td>Cerebral Edema</td>
<td>9 (7%)</td>
<td>4 (8%)</td>
<td></td>
</tr>
<tr>
<td>Cortical Contusion</td>
<td>21 (16%)</td>
<td>2 (4%)</td>
<td></td>
</tr>
<tr>
<td>Depressed Skull Fracture</td>
<td>14 (11%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Epidural Hematoma</td>
<td>3 (2%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Intracerebral Hematoma</td>
<td>1 (1%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Penetrating Head Wound</td>
<td>2 (2%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Admission GCS, mean ±SD</td>
<td>11 ± 5</td>
<td>11 ± 5</td>
<td></td>
</tr>
<tr>
<td>Seizure Risk Factors, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>122 (90%)</td>
<td>36 (72%)</td>
<td></td>
</tr>
<tr>
<td>Intracerebral hematoma</td>
<td>1 (1%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Intratable Hypertension</td>
<td>0</td>
<td>7 (14%)</td>
<td></td>
</tr>
<tr>
<td>Infarction</td>
<td>5 (4%)</td>
<td>4 (8%)</td>
<td></td>
</tr>
<tr>
<td>Cerebral Artery Aneurysm</td>
<td>1 (1%)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

* Patients may have been diagnosed with more than one type of injury.

Discussion
- Overall, the duration of levetiracetam for anti-seizure prophylaxis was considered inappropriate in 59% of patients with either traumatic or spontaneous brain injuries.
- The median total duration for all patients was 10 days, and for the traumatic and spontaneous subgroups the median was 9 and 26 days, respectively.
- The total percent of patients (both traumatic and spontaneous) who experienced a seizure:
  - ≤ 7 days duration = 11%
  - >7 days duration = 12%
- A total of 45 patients expired, 29 in the traumatic subgroup and 16 in the spontaneous group.

Limitations
- Due to the retrospective nature of this study the past medical history was not available for patients that arrived unconscious.
- There may be an overestimation of appropriate duration of therapy due to patients who died within 7 days of hospital admission.
- There was difficulty in classifying some of the injuries as traumatic or spontaneous because of the unclear sequence of events leading to the initial injury.

Conclusion
- The duration of levetiracetam for anti-seizure prophylaxis following traumatic and spontaneous brain injuries was found to be inappropriate in 59% of patients included in this study.
- The prolonged use of levetiracetam is not currently supported by guidelines and increases patients’ cost and unnecessary medication exposure.
- This data will be presented to prescribers and education will be provided.

References