GSHP Virtual Poster Session 2020

RESIDENT POSTERS

A Comparison of Antifactor Xa and Activated Partial Thrombin Time Monitoring as Part of Unfractionated Heparin Protocols

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Background

Antifactor Xa (Anti-Xa) monitoring vs activated prothrombin time (aPTT) monitoring[1-3]

- Fewer lab tests and dose adjustments
- Faster time to therapeutic range
- Similar incidence of bleeding

- Guidelines have not preferentially recommended one monitoring modality over the other for:[4-5]
  - Antithrombotic therapy
  - Prevention of thrombosis

Purpose

To compare target attainment, maintenance within therapeutic range, as well as other outcomes of UFH drip protocols monitored by anti-Xa to those monitored by aPTT

Methods

Inclusion

- Adult patients
- High-dose or low-dose heparin drip protocol

Exclusion

- Heparin drip <24 hours
- Arterial clot
- Transfer from outside hospital
- Off protocol

- Retrospective chart review
- Two groups
  - Anti-Xa monitoring
  - aPTT monitoring
- t-test for continuous data
- Chi-squared test for nominal data

Results

Baseline Characteristics	anti-Xa (N=66)	aPTT (n=66)
Age (yrs)	61.6	63.1
Male (%)	58	53
Actual Body Weight (kg)	94.1	85.5
BMI (kg/m^2)	32.2	29
Concomitant Medications:		
Warfarin	10	15
P2Y12 Inhibitor	5	10
Aspirin	0	0
Alteplase	6	2
Xa Inhibitor	0	1
GIIb/IIIa Inhibitor	1	0

Primary Outcome	anti-Xa (N=66)	aPTT (N=66)	P value
Time within therapeutic range (%)	60	38	0.006

Secondary Outcomes	anti-Xa (N=66)	aPTT (n=66)	P value
Time to therapeutic goal (hrs)	14.61	17.64	0.33
Supratherapeutic levels (%)	17	33	0.017
Subtherapeutic levels (%)	25	31	0.218
Patients on Xa inhibitors at baseline (%)	18	12	-
Incidence of bleeding (%)	3	5	-
Incidence of thromboembolism (%)	0	0	-
Cost ($/day)	569.35	335.60	-

Discussion/Conclusions

When monitored by anti-Xa levels, UFH drips remained within therapeutic range to a greater extent than when monitored by aPTT levels

- Time to therapeutic goal did not differ significantly between either group
- aPTT levels were increasingly supratherapeutic or subtherapeutic compared to anti-Xa levels
- Incidence of bleeding was similar between groups with no thromboembolic events seen in either
- Anti-Xa levels cost more per day compared to aPTT levels

- Future directions
  - Determination of time-savings with anti-Xa monitoring vs aPTT monitoring
- Limitations
  - Low and high-dose heparin drips analyzed together
  - Potential batching with anti-Xa or aPTT levels within the laboratory

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Desmopressin administration and impact on hypertonic saline effectiveness in intracranial hemorrhage

Emily Bowers, PharmD; Eric Shaw, PhD; Audrey Johnson, PharmD, BCPS | HCA Healthcare

Background

- Desmopressin (DDAVP) is a synthetic analogue of vasopressin that binds to the V2 receptor in the collecting ducts of the kidney and increases water reabsorption [1]
- Improves hemostasis through release of factor VIII (FVIII), von Willebrand factor (vWF), tissue plasminogen activator (tPA), and increases platelet adhesion [1]
- DDAVP used in hemophiliacs (FVIII) and von Willebrand's disease (VWD) to prevent and treat bleeding [2,3]
- Clinical use expanded to bleeding disorders not involving deficiency or dysfunction of FVIII and VWD [2,3]
  - Abnormalities of hemostasis in CKD and liver disease
  - Intracranial hemorrhage (ICH)
- Neurocritical Care guidelines recommend administration of desmopressin in ICH [1]
- Limited data that exists assessing the use of desmopressin ICH and studies that support its use have not evaluated the potential impact of desmopressin on serum sodium levels

Objective

To assess the impact of desmopressin administration on sodium levels and hypertonic saline (HTS) effectiveness in intracranial hemorrhage

Methods

- Prospective chart review approved by MHUMC IRB
- Patient Population
  - Inclusion
    - Diagnosed with ICH
    - HTS administered within 12 hours of DDAVP dose
  - Exclusion
    - < 18 years old
    - Pregnant
    - Incarcerated
    - Hyponatremic at baseline
    - Brain death within 24 hours
    - Oral and intranasal DDAVP
- Patients in HTS alone group were matched 1:1 to DDAVP + HTS group
- Primary Outcome
  - Reaching a sodium goal of 145 to 155 mEq/L
- Secondary Outcomes
  - ICU length of stay (LOS)
  - Hospital LOS
  - Net change in sodium
  - Time to reach sodium goal
  - Thrombotic events
  - Mortality
  - Composite
    - Cerebral edema, hematoma expansion, emergent neurosurgical intervention, neurologic decompensation
- Subgroup Analysis
  - Goal sodium of 145 to 150 mEq/L or 150 to 155 mEq/L as specified by the medical team

Results

Table 1. Baseline demographics

	DDAVP + HTS n = 25	HTS alone n = 25	p-value
Age, years	65 (10)	65 (11)	1
Weight, kg	88 (20)	91.7 (18)	0.5
Male, n (%)	20 (80)	20 (80)	1
Baseline serum sodium, mEq/L	138 (3.2)	139 (4)	0.33
Desmopressin, mcg	31 (9)	-	-
Desmopressin, mcg/kg	0.34 (0.05)	-	-
Net fluid balance, L	4.5 (1.9)	4.1 (1.6)	0.42
HTS infusion, mL/hr	37 (14)	43 (10)	0.13
HTS boluses	4 (3)	5 (3)	0.24
0.9% sodium chloride use, n (%)	20 (80)	17 (70)	0.52
Dextrose 5% in water use, n (%)	9 (40)	7 (30)	0.76

All values presented as mean (± SD), unless otherwise noted

Table 2. Primary Outcome: Met goal serum sodium 145-155 mEq/L

	DDAVP + HTS n = 25	HTS alone n = 25	p-value
Sodium 145-155, mEq/L	20 (80)	22 (88)	0.7

All values presented as n (%)

Table 3. Secondary Outcomes

	DDAVP + HTS n = 25	HTS alone n = 25	p-value
ICU LOS, days	8 (6)	10 (7)	0.28
Hospital LOS, days	15 (12)	14 (9)	0.74
Mortality, n (%)	12 (48)	10 (44)	0.78
Thrombotic events, n (%)	0 (0)	2 (8)	0.49
Time to goal Na, hr	19.7 (12)	17.5 (10)	0.52
Net change in Na, mEq/L	12 (6)	12 (5)	1
Composite, n (%)	15 (60)	19 (76)	0.36
Cerebral edema	4 (26)	7 (36)	0.7
Hematoma expansion	4 (26)	4 (21)	1
Emergent neurosurgical intervention	5 (33)	2 (10)	0.2
EVD	3 (20)	1 (5)	0.3
Craniotomy	2 (13)	1 (5)	0.6
Neurologic decompensation	8 (53)	9 (47)	1
Decreased GCS	5 (33)	7 (36)	0.8
Increased ICP	3 (20)	2 (19)	0.6

All values presented as mean (± SD), unless otherwise noted

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Results

Subgroup Analysis

Table 4. Goal sodium 145-150

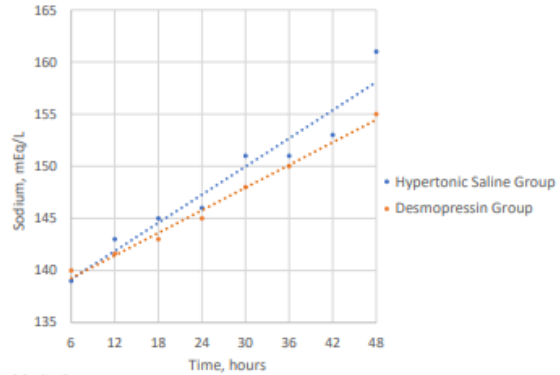
	DDAVP + HTS n = 5	HTS alone n = 3	p-value
Sodium 140-155 mEq/L, n (%)	3 (60)	3 (100)	0.46
Time to goal Na, hr	32 (12)	18 (14)	0.2
Net change in Na, mEq/L	8 (4.4)	8 (3.8)	1

Table 5. Goal sodium 150-155

	DDAVP + HTS n = 10	HTS alone n = 17	p-value
Sodium 150-155 mEq/L, n (%)	6 (60)	14 (82)	0.042
Net change in Na, mEq/L	15 (2)	12 (5)	0.08
Time to goal Na, hr	28 (12)	23 (14)	0.33

All values presented as mean (± SD), unless otherwise noted

Figure 1. Net change in sodium over time



- Limitations
  - Single center, chart review
  - Small sample size
  - Anticoagulant/antiplatelet use not consistent
  - Fluid administration

Conclusion

- Desmopressin use in ICH does not appear to negatively impact the ability for patients to reach goal sodium of 145 to 155 mEq/L
- In patients who have higher sodium goals, desmopressin may decrease hypertonic saline effectiveness
- Larger, randomized clinical trial needed to confirm results

References

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Implementation of Evidence-based Ketamine Protocols in the Emergency Department and Intensive Care Unit at a Community Hospital

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Northside Hospital Department of Pharmacy

BACKGROUND

- Ketamine is a rapid acting, dissociative anesthetic agent with analgesic properties
- Ketamine preserves respiratory efforts, protects airway reflexes, and maintains cardiac stability
- Due to its unique pharmacologic profile, ketamine has gained attention for various indications including:
  - Analgesia
  - Anxiety and agitation
  - Maintenance sedation

OBJECTIVES

Identify trends with the current use of ketamine in the emergency department and intensive care unit

Determine best practices and address areas of improvement compared to current practices

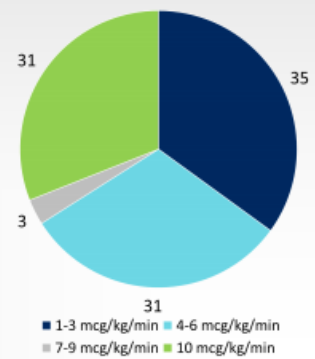
Evaluate compliance with protocol recommendations after approval and initiation

METHODS

- A retrospective chart review was performed on patients receiving ketamine for analgesia, anxiety, or agitation in the ED or as a continuous infusion in the ICU
- Data was analyzed for trends in:
  - Frequency of use
  - Dosing patterns
  - Days of therapy
  - Concurrent sedative and analgesic infusions
- Current use of ketamine in the ED and ICU will be evaluated to identify areas of improvement and guide the most effective implementation of evidence-based protocols
- Evidence-based protocols will be evaluated for adherence, patient safety, and clinical efficacy

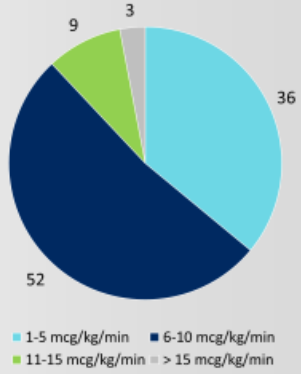
RESULTS

Starting Rate of Ketamine Infusions

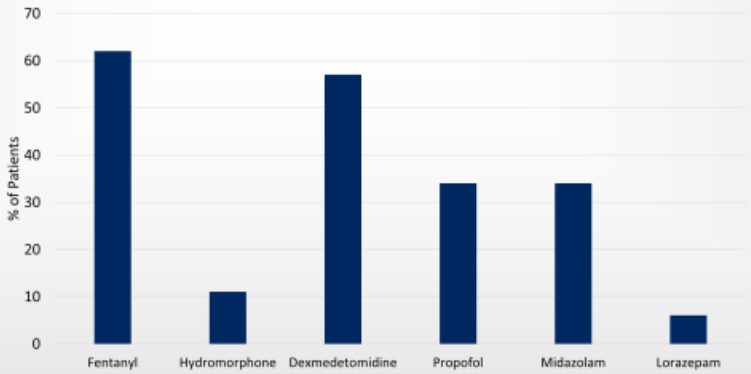


Analgesic & Sedative Infusions when Ketamine Initiated	Patients (%) n = 35	Rate Range	Median Rate
Fentanyl (mcg/hr)	54	50-400	225
Hydromorphone (mg/hr)	3	2	2
Dexmedetomidine (mcg/kg/hr)	57	0.4-1.8	1.2
Propofol (mcg/kg/min)	26	15-50	50
Midazolam (mg/hr)	20	2-18	5

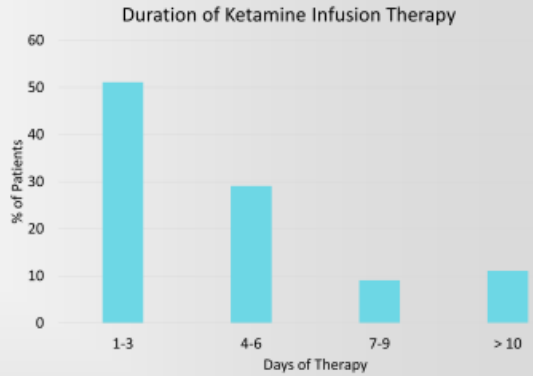
Normalized Rate of Ketamine Infusions



Concurrent Analgosedation During Ketamine Therapy



Duration of Ketamine Infusion Therapy



DISCUSSION

- Pre-implementation data reveals little to no use of ketamine for analgesia, anxiety, and agitation in the ED and relatively low use of ketamine in the ICU
- All patients were started at an infusion rate of 10 mcg/kg/min or less and maintained at a rate from 1-10 mcg/kg/min 88% of the time
- All patients were receiving another analgesic or sedative infusion at the time that ketamine was initiated

FUTURE DIRECTIONS

- An evidence-based protocol will be established for the use of nurse-titrated ketamine infusions in the ICU with expertise from multiple medical disciplines
- Ketamine use is expected to increase upon implementation of evidence-based protocols with expansion of appropriate indications and the ability for nurses to titrate ketamine infusions in the ICU
- Post-implementation data will be collected to evaluate the effectiveness of the evidence-based guidelines

The authors of this study have nothing to disclose.

Evaluation of hepatitis B screening and prophylactic antiretroviral therapy initiation in patients started on rituximab

Betsy Gillenwater, PharmD; Ryan Hoffman, PharmD | HCA Healthcare

Introduction

- Rituximab is a monoclonal antibody directed against the CD20 antigen on the surface of B-lymphocytes. Rituximab binds to the cell surface antigen, activating complement-dependent B-cell cytotoxicity, thus mediating cell killing.[1]
- Rituximab can lead to the reactivation of various viral infections, including hepatitis B virus.[2]
- Due to the potential for hepatitis B virus (HBV) reactivation, HBV screening in all patients at least one year prior to the initiation of rituximab is recommended per the National Comprehensive Cancer Network (NCCN) guidelines.[3]
- Currently, management for antiretroviral therapy initiation in patients who test positive for both the HepB SAg and HepB CAb or for those who test positive for the HepB CAb alone is not standardized at Memorial Health University Medical Center.

Objective

- Evaluate the use of hepatitis B screening and initiation of prophylactic antiretroviral therapy in patients started on rituximab who test positive for both the HepB SAg and HepB CAb or for those who test positive for the HepB CAb alone
- Data will be used to refine our protocol to deliver a more standardized approach to hepatitis B screening and antiretroviral therapy initiation

Methods

- Retrospective chart review approved by the Institutional Review Board
- Patients admitted from May 1, 2015 to July 31, 2019 initiated on rituximab
- Patient Population
  - Inclusion
    - Patients 18 years old or greater
    - Rituximab administration
  - Exclusion
    - Pregnancy
    - Incarcerated patients

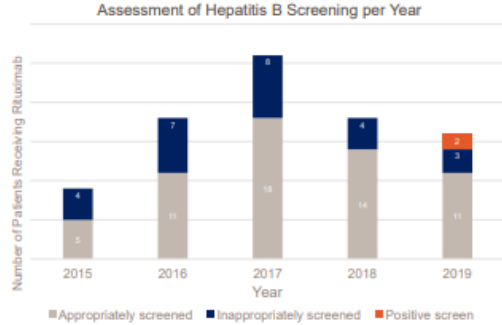
Methods

- Rituximab drug therapy including dose and dates of dose were recorded
- Hepatitis B screening (HepB sAG, HepB CAb) dates and results were recorded
- The date of rituximab initiation was compared to the date of hepatitis B screening to determine if screening was done prior to initiation
- Patients who tested positive for the HepB SAg and the HepB CAb or those who tested positive for the HepB CAb alone were assessed for the initiation of antiretroviral therapy

Results

Patient characteristics (N=85)	
Average age (yrs) + SD	58 ± 17.38
Percent females, n(%)	48 (57.6)
Average weight (kg) + SD	93 + 30.47
Deceased, n(%)	17 (20)

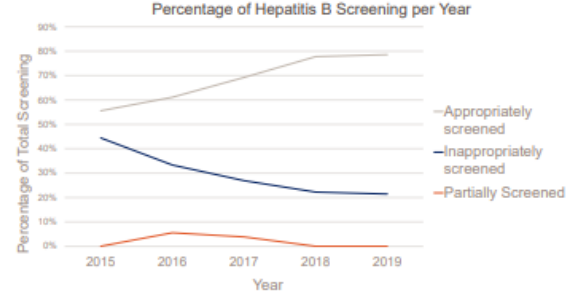
Assessment of Hepatitis B Screening per Year



- Appropriately screened includes those patients who received hepatitis B screening in accordance with NCCN guidelines[3]
- Inappropriately screened includes those patients not tested, those partially tested, and those tested after the initiation of rituximab
- Partially screened includes those patients who received screening for either the HepB CAb or the HepB SAg alone
- Patients who had positive screening results were appropriately screened

Results

Percentage of Hepatitis B Screening per Year



Positive Screening Results

	Patient 1	Patient 2
Hepatitis B CAb	+	+
Hepatitis B SAg	+	-

- Both patients who had positive screening results were treated with tenofovir disoproxil fumarate based on the current hospital formulary
- Limitations
  - Small sample size for total population
  - Lack of hospital protocol

Conclusion

- The total percent of appropriate hepatitis B screening in patients initiated on rituximab has increased over the past five years after the implementation of the rituximab order set in July of 2016.
- Patients who had positive screening results were appropriately started on an antiretroviral medication prior to the initiation of rituximab.
- Based on the results of this chart review, there will be discussions with the oncologists and pharmacists to determine the need to update and create protocols to ensure 100% compliance with hepatitis B screening and antiretroviral therapy initiation.

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Evaluation of adjunctive intermittent pneumatic compression with enoxaparin in preventing venous thromboembolic events in critically ill patients

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Background

- Critically ill patients are at increased risk for developing a venous thromboembolism (VTE)
  - Decreased mobility
  - Mechanical ventilation
  - Use of central catheters[1]
- VTE prophylaxis
  - Pharmacologic with an anticoagulant, such as enoxaparin[2,3]
  - Mechanical prophylaxis, such as intermittent pneumatic compression (IPC)[3,4]
- Evidence
  - The Surviving Sepsis Campaign Guidelines suggest the combination of pharmacologic and mechanical prophylaxis (weak recommendation)[5]

Purpose

- To determine if adjunctive IPC with pharmacologic prophylaxis decreases the incidence of VTE compared with pharmacologic prophylaxis alone

Methods

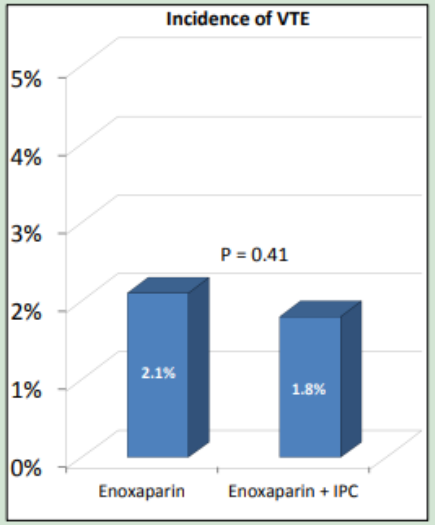
- Inclusion
  - Adult patients taking enoxaparin 30 mg or 40 mg while in the ICU, NICU, or CCU for ≥ 48 hours
- Exclusion
  - ICU stay < 48 hours
  - Enoxaparin use < 50% of stay
  - Patients for whom 30 mg or 40 mg of enoxaparin is treatment dose
- Retrospective chart review
- Two groups
  - Enoxaparin vs. enoxaparin with ICP

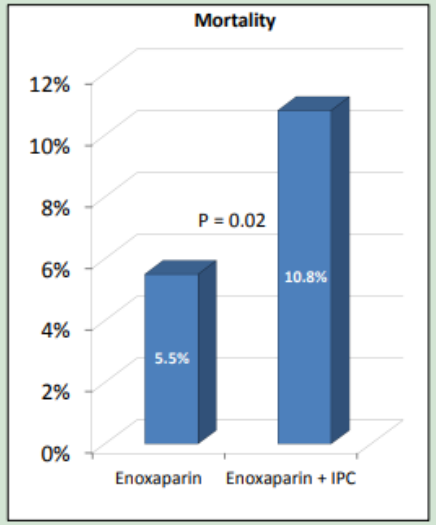
Analysis

- Z-test of proportions
- T-test

Results

Demographics	Enoxaparin (n=330)	Enoxaparin + IPC (n=165)	P-value
Age in years	62	64	-
Sex (%male)	55	51	-
White (%)	63	70	-
African American (%)	32	27	-
Other (%)	5	3	-
Average length of ICU stay (days)	7.5	8.2	0.16
Average days on mechanical ventilation	1.7	2.6	0.04
Average days of vasopressor use	0.9	1.2	0.18





Discussion

- There was not a statistically significant difference in incidence of VTE, length of ICU stay, or days of vasopressor use between patients on enoxaparin alone in comparison to enoxaparin with adjunctive IPC
- There were more days on mechanical ventilation and a higher rate of mortality in the patients with adjunctive IPC, which is likely indicative of this group being a more acutely ill population
- The main limitation of this study was the small sample size relative to the rare incidence of VTE that occurs while patients are on VTE prophylaxis
- Another limitation of this study was the retrospective nature of the data collection

Conclusion

- Adjunctive IPC in addition to enoxaparin does not have a significant impact on the incidence of VTE when used for VTE prophylaxis
- Although not statistically significant, overall, there was lower incidence of VTE in the adjunctive IPC group
- Larger sample size studies may be beneficial in the future

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Evaluation of vancomycin dosing in a pediatric population

Melissa Holy, PharmD; Karyn Taylor, PharmD, BCPPS | HCA Healthcare

Background

- Vancomycin is a glycopeptide antibiotic that inhibits bacterial cell wall synthesis by binding to D-alanyl-D-alanine portion of the cell wall precursor.[1]
- This antibiotic covers Gram-positive bacteria and is commonly used to treat *Staphylococcal, Streptococcal*, and *Enterococcal* infections.[1]
- Vancomycin therapy can be optimized through monitoring serum levels to ensure the vancomycin concentration is sufficient to treat the infection and discourage resistance without incurring toxicity.[1]
- Guidelines and studies have laid out explicit adult vancomycin dosing; however, the optimal vancomycin dosing strategy in pediatrics is unknown.[2]
- Memorial Health University Medical Center (MHUMC) aims for a trough concentration between 10 mcg/mL and 20 mcg/mL, depending on the indication. The exact dose (mg/kg/day) is up to the discretion of the prescriber for pediatric patients.

Objective

Evaluate the current vancomycin dosing in pediatric patients with the goal of improving practice and updating MHUMC guidance.

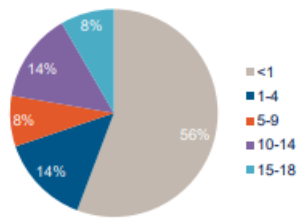
Methods

- Retrospective chart review approved by the MHUMC Institutional Review Board.
- Pediatric patients admitted from January 1, 2017 to July 1, 2019 initiated on vancomycin with an initial trough were assessed.
- Patient Population
  - Inclusion
    - Patients < 18 years old
    - Received vancomycin intravenously
    - Obtained an initial vancomycin trough
  - Exclusion
    - Only a random level obtained
    - Only a one-time dose given

Results

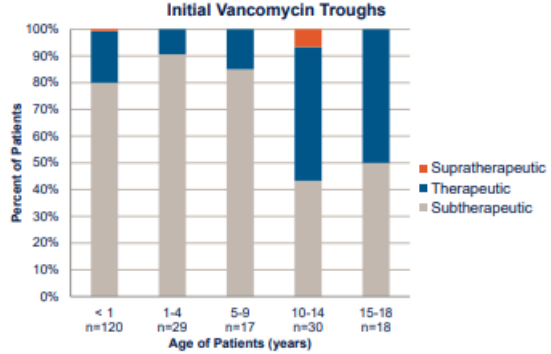
Table 1: Baseline Characteristics (N=214)	
Gender – male, n (%)	119 (56%)
Race	
White, n (%)	37 (17%)
Black, n (%)	73 (34%)
Other, n (%)	103 (48%)
Average weight, (kg) + SD	19.4 ± 26

Age of Patients



- Vancomycin dose (mg/kg/day) and initial level were recorded.
- Vancomycin troughs were defined as:
  - Subtherapeutic < 10 mcg/mL
  - Therapeutic 10 mcg/mL – 20 mcg/mL
  - Supratherapeutic ≥ 20 mcg/mL

Initial Vancomycin Troughs



Results

Initial Trough Concentration to Total Daily Dose

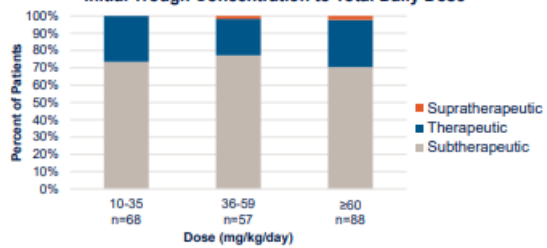


Table 2: Total Daily Dose Stratified by Age in Years	<1 n=120	1-4 n=29	5-9 n=17	10-14 n=30	15-18 n=18
10-35 mg/kg/day	94 (79%)	1 (3%)	0 (0%)	2 (7%)	3 (17%)
36-59 mg/kg/day	10 (8%)	2 (7%)	1 (6%)	7 (23%)	5 (28%)
≥60 mg/kg/day	16 (13%)	26 (90%)	16 (94%)	21 (70%)	10 (55%)

- Limitations
  - Small sample size for the total population
  - Large variability in patient demographics
  - Patients were not stratified by vancomycin indication
  - Neonates (<28 days old) were not excluded

Conclusion

- Vancomycin troughs obtained in the pediatric population were most commonly subtherapeutic. Patients <1 year old accounted for the majority of subtherapeutic initial levels.
- Patients less than or equal to 9 years old were less likely to achieve therapeutic levels than those greater than 9 years old.
- The most common dose to achieve a therapeutic trough was greater than or equal to 60 mg/kg/day.
- Based on these results, the current dosing strategy for vancomycin in the pediatric population should be evaluated to ensure initial vancomycin troughs are therapeutic.

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Evaluating Hospital Length of Stay in Adults with *Enterobacterales* Bacteremia Who Were Transitioned to Oral Antibiotics

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Background

- Treatment efficacy of deescalating to oral (PO) antibiotics has been evaluated in *Enterobacterales* bacteremia.[1]
- No difference seen in mortality or treatment failure between patients switched to PO antibiotics versus those who remained on intravenous (IV) antibiotics[2,3]
- Studies have also observed shorter length of stay in patients switched to PO antibiotics.[2,3]

Purpose

- To determine if hospital length of stay is shorter in adult patients who were switched to PO antibiotics versus those who were treated with IV antibiotics only

Methods

- Retrospective, observational, chart review of adult patients between January 2018-December 2019
- Inclusion Criteria
  - ≥18 years old
  - *Enterobacterales* bacteremia
  - Appropriate antibiotics within 24h of susceptibility results
  - Meets our institution's IV to PO protocol
- Exclusion Criteria
  - Inability to receive PO therapy
  - Hospice
  - Pregnant
  - Unobtainable source of infection
  - Polymicrobial infections
  - Death within 5 days of hospitalization
  - Complicated infections

Outcomes

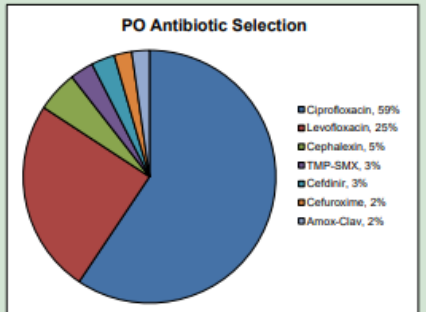
- Primary: hospital length of stay
- Secondary: recurrent infection or mortality within 30 days of discharge, worsening clinical status during hospitalization

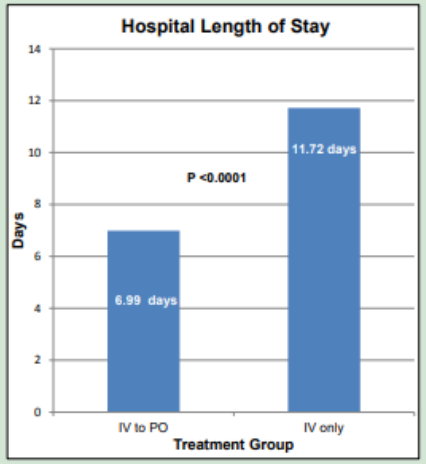
Results

Baseline Characteristics	IV Only (n = 71)	IV to PO (n = 133)
Heart failure	11 (15%)	13 (9.8%)
COPD	9 (13%)	19 (14%)
Diabetes	25 (35%)	46 (35%)
Immunocompromised	6 (8.5%)	7 (5.3%)
Temperature in °F (+/- SD)	99.7 (+/- 2)	99.8 (+/-1.8)

Infection and Treatment Characteristics

Treatment Group	ID physician consulted	Most common pathogen	Most common source	Average length of IV therapy
IV only	77%	*Escherichia coli* (65%)	Urinary tract (55%)	14 days
IV to PO	59%	*Escherichia coli* (64%)	Urinary tract (79%)	5 days





Secondary Outcomes

Treatment Group	Recurrent Infections	Worsening Clinical Status	Mortality
IV to PO (n = 133)	2 (1.5%)	4 (3.0%)	4 (3.0%)
IV only (n = 71)	1 (1.4%)	3 (4.2%)	2 (2.8%)

Analysis

- Multivariable regression model was used to adjust for potential confounding variables to evaluate length of stay between the two groups.

Discussion

- IV to PO group was associated with an average reduction of 4.8 days in hospital length of stay compared to IV only group.
- Similar occurrence of secondary outcomes between treatment groups although not enough events to determine statistical significance
- One limitation was the lack of a severity score to compare treatment groups.
- Another limitation was the difficulty in determining secondary outcomes due to retrospective nature of study.

Conclusions

- Potential benefits in reducing hospital length of stay include decreasing costs and minimizing clinical complications
- Future studies to determine adequate treatment duration

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Effect of Hydrocortisone Plus Fludrocortisone Compared to Hydrocortisone Alone in Septic Shock

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Background

- Surviving Sepsis Campaign guidelines weakly suggest use of IV hydrocortisone monotherapy.[1]
- Multiple studies have investigated potential benefit with varying consensus.[2,3,4,5]
- Consensus may be unclear, but these studies indicate benefit of steroids in this patient population.[2,3,4,5]
- Adverse effects of prolonged vasopressor therapy can be detrimental to patient outcomes.[6]
- Adverse effects with additional corticosteroid therapy could also be concerning.[7]
- Additional mineralocorticoid effect from fludrocortisone could help physiologic fluid regulation in septic shock.[7]

Purpose

- To determine potential hemodynamic benefit based on time spent on vasopressor therapy with hydrocortisone and fludrocortisone combination therapy compared to hydrocortisone monotherapy.

Methods

- Retrospective chart review
  - From January 1, 2016 to December 31, 2019
- Inclusion Criteria
  - Admission to ICU, CCU, or NICU
  - Septic shock diagnosis
  - Vasopressor therapy with concomitant corticosteroid therapy
- Exclusion Criteria
  - Age <18
  - Corticosteroids for other indication
  - Hypersensitivity to corticosteroids
- Two groups
  - Combination therapy
  - Hydrocortisone monotherapy
- Patients Included
  - Combination therapy
    - Of 36 patients identified at SJ, 25 were included
    - Of 4 patients identified at Candler, 0 were included
  - Monotherapy
    - Of 231 patients identified at SJ, 21 were included
    - Of 269 patients identified at Candler, 19 were included

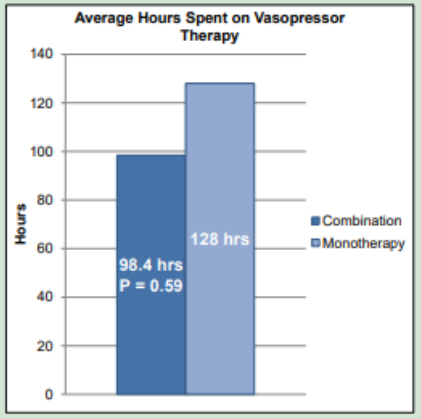
Results

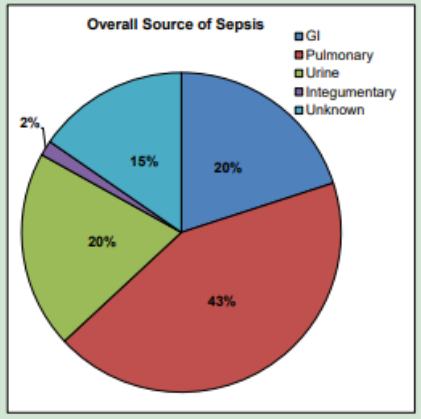
Patient Characteristic	Combination group (N=25)	Monotherapy Group (N=40)
Age (years)	67.2	67.5
Male Gender	10 (40%)	22 (55%)
Comorbidities		
Coronary Artery Disease	1 (4%)	9 (23%)
Congestive Heart Failure	4 (16 %)	8 (20%)
Chronic Kidney Disease	2 (8%)	8 (20%)
COPD	4 (16%)	11 (28%)
Diabetes	10 (40%)	16 (40%)
Hypertension	17 (68%)	20 (50%)
Smoking history	10 (40%)	16 (40%)
Apache Score	24.04	20.05

Outcome Measured	Combination group (N=25)	Monotherapy Group (N=40)
Time spent on Vasopressors (hours)	98.4	128.0
30-day mortality	11 (44%)	10 (25%)
Time spent on mechanical ventilation (hours)	145.9	196.5
Hospital length of stay (days)	11.5	15.1
ICU length of stay (hours)	234.4	292.4
Adverse Events		
Hyperglycemia	11 (44%)	27 (68%)
Hypernatremia	12 (48%)	16 (40%)
Hypokalemia	14 (56%)	22 (55%)
New infection	3 (12%)	2 (5%)

*No values compared were statistically significant, any comparison is only numerically different

Source of Sepsis					
	Gastrointestinal	Pulmonary	Urinary	Integumentary	Unknown
Combination Therapy	3 (12%)	11 (44%)	7 (28%)	0 (0%)	4 (16%)
Monotherapy	10 (25%)	17 (42.5%)	6 (15%)	1 (2.5%)	7 (15%)





Analysis

- For the primary endpoint analysis of time spent on vasopressor therapy, time in ICU, and time on ventilator, multiple regression analysis was used.
- For 30-day mortality, logistic regression analysis was used.
- For analysis of adverse events, chi square analysis with Yates Correction for small cell frequencies as indicated was used.
- Statistical significance was denoted as a $P < .05$ for all inferential tests.

Discussion

- Combination therapy showed no statistical difference to monotherapy in reducing amount of time spent on vasopressors.
  - While time spent on vasopressors was numerically less, this could be explained by physician preference for aggressive corticosteroid therapy in patients with poor prognosis while reserving monotherapy for those less critically ill.
- Secondary endpoints, including adverse drug events were not different between the groups.
- Limitations
  - Sample size
  - Retrospective
  - Morbidity confounders
    - Also affects detection of adverse drug events
  - Dose variability
  - Uneven prescribing of each therapy
  - Human error
- Future
  - Prospective, protocol driven data preferred
  - Equal severity of illness preferred

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Evaluation of factors associated with the misuse of antibiotics in the treatment of acute sinusitis in the outpatient setting

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Background

- The Center for Disease Control and Prevention estimates that 35% of all antibiotics prescribed in the outpatient setting are unnecessary[1]
  - 70% of which are for the treatment of acute respiratory conditions[1,2]
- Acute sinusitis is one of the most encountered respiratory infections seen in primary care

Purpose

- To evaluate the factors associated with the misuse of antibiotics for acute sinusitis in the outpatient setting

Methods

- Retrospective, observational analysis in adult patients with an ICD-10 code indicated acute sinusitis from October 1, 2018 to October 1, 2019
- Patients were excluded if they were seen in the previous month for similar symptoms and/or diagnosed concurrently with another upper respiratory tract infection
- Determination of treatment appropriateness was based on current treatment guidelines posted by the Infectious Disease Society of America

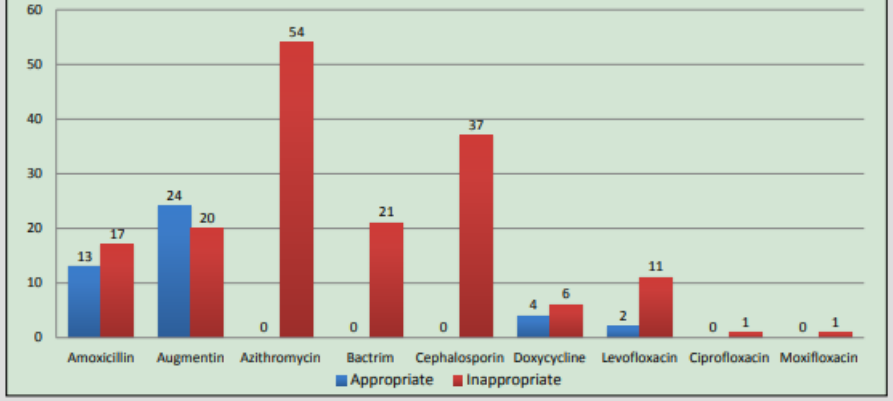
Indication for Antibiotics	Appropriate Antibiotic
○ Symptoms lasting for 10 days or more ○ Fever and symptoms lasting for at least 3 days ○ Symptom improvement with subsequent worsening	○ Amoxicillin +/- clavulanate ○ For penicillin allergic patients: doxycycline or levofloxacin

- A multivariate analysis was performed to determine which factors (both patient- and provider-specific) were predictive of inappropriate treatment

Results

Composite characteristics			
Parameter	Inappropriate Treatment (n=178)	Appropriate Treatment (n=48)	P-Value
Age	50 years	50 years	0.18
Male gender	56 (31%)	19 (40%)	0.49
Smoker	23 (13%)	4 (8%)	0.62
Asthma	29 (16%)	6 (13%)	0.50
Seasonal Allergies	71 (40%)	11 (23%)	0.01
PCN Allergy	33 (19%)	7 (15%)	0.26
Provider Type			
Medical Doctor (MD)	88 (49%)	21 (44%)	
Doctor of Osteopathy (DO)	25 (14%)	12 (25%)	
Nurse Practitioner (NP)	33 (19%)	11 (23%)	
Physician's Assistant (PA)	32 (18%)	4 (8%)	
Provider Years in Practice			
0-5 years	54 (30%)	12 (25%)	0.87
6-10 years	9 (5%)	8 (17%)	0.89
11-15 years	10 (6%)	2 (4%)	0.89
16-20 years	10 (6%)	11 (23%)	0.90
>20 years	95 (53%)	15 (31%)	0.88

Reason for inappropriate treatment			
Received an antibiotic when not indicated	Did not receive an antibiotic when indicated	Incorrect antibiotic prescribed	Incorrect duration of treatment
141	2	129	21



Analysis

- Of the 226 patients evaluated, 178 patients (79%) were treated inappropriately
- The most common reason for inappropriate treatment was that the patient was given an antibiotic when not indicated and/or the patient was given the incorrect antibiotic
- Azithromycin and cephalosporins were the most common inappropriately prescribed antibiotics
- Fluoroquinolones were prescribed less frequently than other antibiotics
- Patients that reported seasonal allergies were 2.6 times more likely to be treated inappropriately

Limitations

- Indication for antibiotic therapy was based on patients reporting and proper documentation in the patient chart

Discussion

- Antimicrobial resistance is a growing threat and can be attributable in part to the overprescribing of antibiotics in the outpatient setting
- This study highlights the need for expansion of stewardship programs into the outpatient setting

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Financial Comparison of a Self-Pay Population Discharged to Receive Dalbavancin versus Standard of Care for Acute Bacterial Skin and Skin Structure Infections

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Background

- Treatment of acute bacterial skin and skin structure infections (ABSSSI) in the self-pay population often results in uncompensated healthcare costs[1,2]
- Dalbavancin is a 1 dose, 30-minute intravenous (IV) infusion for the treatment of ABSSSI[1]
- Previously, our facility has shown a decreased length of stay and 30-day readmission rate for ABSSSI patients who discharge to receive dalbavancin at our infusion center[1]
- Dalbavancin has a vial replacement program from the manufacturer for self-pay patients that can recoup costs[3]

Purpose

- Determine cost differences in self-pay patients diagnosed with ABSSSI discharged to receive dalbavancin at an infusion center compared to those who receive standard of care (SOC)

Methods

- Retrospective cohort of self-pay inpatients diagnosed with ABSSSI from February 3, 2016 through August 5, 2019

Inclusion Criteria
- ≥ 18 years inpatients
- ICD-10 codes consistent with cellulitis, abscess, or post-operative wound infections
- Received IV antibiotics

Exclusion Criteria
- Pregnant
- ICD-10 codes not consistent with ABSSSI
- Infections associated with exclusively gram-negative bacteria or fungi

Outcomes	
Primary Outcome	**Secondary Outcomes**
Direct cost of length of stay	LOS 30-day readmission rates Adverse events (AE) Indirect hospital costs

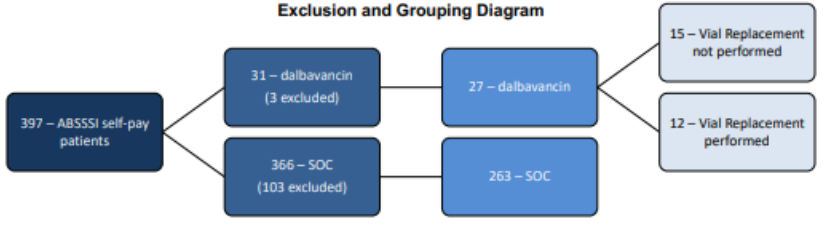
- A post-hoc analysis was performed to analyze the impact of performing vial replacement

Results

Patient Baseline Demographics

	Dalbavancin (n = 27)	SOC (n = 263)	p-value
Age (mean ± SD)	40.07 ± 8.28	41.71 ± 11.59	0.0353
Male Gender - no. (%)	23 (85.2)	159 (60.5)	0.012
Race - no. (%)			
Caucasian	21 (77.8)	163 (62.0)	0.141
African American	5 (18.5)	92 (35.0)	0.091
Other	1 (3.7)	8 (3.0)	0.590
Type of Infection - no. (%)			
Cellulitis	22 (81.5)	177 (67.3)	0.190
Abscess	5 (18.5)	79 (30.0)	0.268
Traumatic wound/Surgical Site	0 (0)	7 (2.7)	1.000
Vitals/comorbidities - no. (%)			
BMI initial (≥ 30 kg/m^2)	10 (37.0)	109 (41.4)	0.688
Tmax initial (> 100.4° F)	6 (22.2)	65 (24.7)	1.000
WBC ≥ 12,000/mm3	12 (44.4)	114 (43.4)	0.412
DM	6 (22.2)	53 (20.2)	0.803
HTN	5 (18.5)	73 (27.8)	0.368
ABSSSI history	11 (40.7)	59 (22.4)	0.056
Smoker	17 (63.0)	144 (54.8)	0.543
IV drug abuser	9 (33.3)	36 (13.7)	0.021
ID consult	16 (59.3)	126 (47.9)	0.314

Exclusion and Grouping Diagram



Primary Outcome

Significance of direct cost per group	Dalbavancin (n = 27)	SOC (n = 263)	P-value
Direct cost per patient	$5,892	$4,010	0.049
Direct cost per patient if vial replacement were done	$3,525	$4,010	0.311
Significance vial replacement in dalbavancin group	**With (n = 12)**	**Without (n = 15)**	**P-value**
Direct cost per patient	$3,525	$5,892	0.030

Secondary Outcomes

	Dalbavancin (n = 27)	SOC (n = 263)	p-value
Baseline SCr - median (interquartile range (IQR))	0.9 (0.7-1.1)	0.9 (0.7-1)	0.779
Median LOS - no. days (IQR)	3 (2-5.5)	4 (2-6)	0.479
30-day readmission rate - %	3.7	7.2	0.706
Adverse Event - no. (%)			
Hospital acquired infection	0 (0)	2 (0.8)	1.000
AKI	3 (11.1)	33 (12.6)	1.000
Document infusion reaction	0 (0)	4 (1.5)	0.479

Discussion

- There was a higher total direct cost in the dalbavancin group compared to the SOC group ($5,892 vs $4,010, p = 0.048)
- This difference was driven by vial replacement ($3,700 vs $5,892, p = 0.03)
- There was no statistical difference in secondary outcomes confirming dalbavancin as a viable option for ABSSSI treatment
- Limitations
  - Patients were not randomized
  - Inconsistent vial replacement reason was not observed
- Future analysis could include analyzing additional subgroups (e.g. intravenous drug-abuse patients)
- Additional studies should consider cost break down by ICD-10 codes and analyzing more abscess and post-op wound infections

Conclusion

- Dalbavancin is more expensive compared to inpatient standard of care in a self-pay patient population if vial replacement is not performed
- Dalbavancin vial replacement is an important factor to consider when treating self-pay ABSSSI patients

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Evaluation of the use of 4 factor-prothrombin complex concentrate for the emergent reversal of oral anticoagulants

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Introduction

- 4 factor-prothrombin complex concentrate (PCC) is a vitamin K antagonist (VKA) reversal agent. PCC contains vitamin K dependent coagulation factors (II, VII, IX, and X) as well as protein C and S. [1]
- PCC has an off-label use for life-threatening bleeding associated with direct-acting oral anticoagulants (DOACs). However, there is limited data regarding PCC efficacy in DOAC-associated bleeding and the use prior to emergent/urgent surgery. The American College of Cardiology guidelines currently recommend PCC for rapid reversal of direct factor Xa inhibitors based on observational studies. [2]
- Currently at Memorial Health University Medical Center (MHUMC) there is an order set and guidelines for the use of PCC in emergent situations when reversing warfarin and DOACs. However, there is limited guidance in non-emergent situations where PCC is appropriate.

Objective

- Assess the use of 4 factor- prothrombin complex concentrate in all adult patients with the goal of improving practice and updating MHUMC guidance.

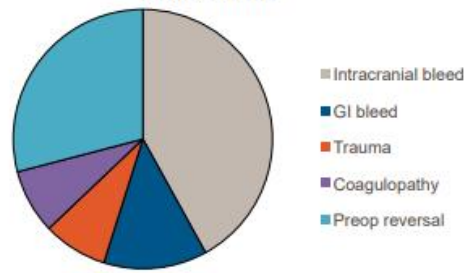
Methods

- Retrospective chart review approved by the Institutional Review Board
- Patients admitted from July 1, 2018 to June 30, 2019 that received PCC
- Patient Population:
  - Inclusion:
    - Patients 18 years old or greater
    - Received 4 factor-prothrombin complex concentrate
  - Exclusion:
    - Pregnancy
    - Incarcerated patients
- PCC therapy including indication, timing and dose
- INR at initiation and INR after PCC when used to reverse warfarin
- Vitamin K usage with warfarin reversal
- Thrombotic events within 7 days
- In hospital 28 day mortality

Results

Patient Demographics (N=124)	
Average Age (years)	71
Percent Males (n=75)	59.5%
Average Weight (kg)	87.3
Warfarin (n=45)	36.3%
Apixaban (n=55)	44.4%
Rivaroxaban (n=18)	14.5%
No oral anticoagulant (n= 6)	4.8%

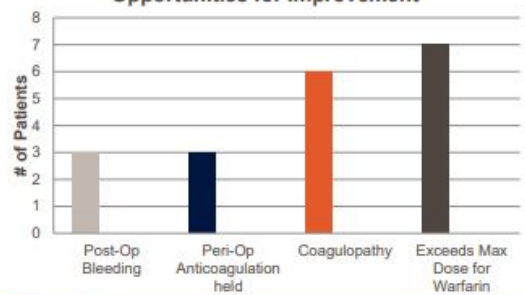
Indications



Warfarin	
Initial INR median, range	3.07 (1.09 -16.8)
Dose (units) median, range	
-25 units/kg (Max: 2500 units)	2000 (1500 -4000)
-35 units/kg (Max: 3500 units)	2500 (2000 -4500)
-50 units/kg (Max: 5000 units)	3500 (3500 -5000)
Repeat INR median, range	1.27 (0.97 -2.62)
Vitamin K use	91.1%
Apixaban	
Dose (units) median, range	4500 (1500 -5000)
Rivaroxaban	
Dose (units) median, range	4000 (2500 -5000)

Results

Opportunities for Improvement



Safety Events	
Thrombotic event within 7 days (n)	5
- VTE n (%)	4 (3.2%)
- CVA n (%)	1 (0.8%)
In hospital 28 day mortality	22.5%

- 3 patients who experienced a thrombotic event did not have therapeutic anticoagulation resumed post-operatively.

Conclusion

- Throughout a twelve month period, PCC was used appropriately 79.8% of the time. However, there are still areas for improvement with dosing and indication.
- On the order set for emergent warfarin reversal, doses are separated (25 u/kg, 35 u/kg and 50 u/kg) based on INR. However, there are no maximum doses associated with each unit/kg dose. The maximum doses will be added on the order set.
- Emergent reversal order set will be expanded to include non-emergent situations where PCC is appropriate.
- PCC orders that are not ordered through the emergent reversal order set will require an indication.
- Educate healthcare providers on new perioperative guidelines when to hold anticoagulation before surgery and when to restart full anticoagulation afterwards.

References

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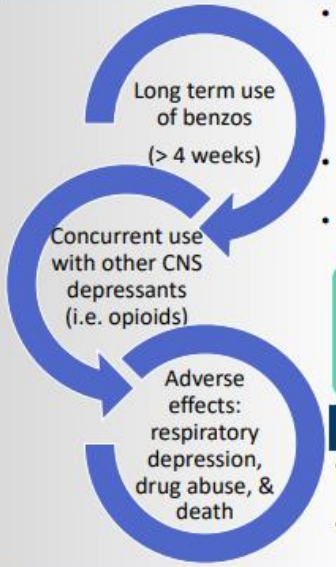
Improving the Appropriate Use of Benzodiazepines in Adults at Community Hospital

Kelli Travis, PharmD; Sarah Murphy, PharmD, BCPS; Megan Freeman, PharmD, BCPS
Northside Hospital Department of Pharmaceutical Services

NORTHSIDE HOSPITAL

BACKGROUND



- Use of benzodiazepines:
  - Between 1996 and 2013, the number of filled prescriptions increased 67%
  - CDC reports 29.4% of pharmaceutical-related overdose deaths in 2010 were associated with benzo use, second only to opioids
- Indicated for the short-term management of severe and disabling disorders
- Guidelines recommend the lowest effective dose for shortest duration possible

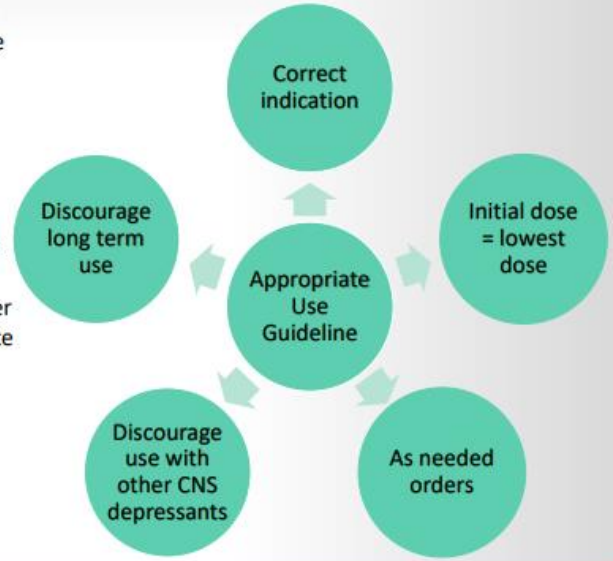
Benzodiazepines work by inhibiting brain activity → Produces a drowsy or calming effect → Useful for anxiety, sleep disorders, & seizures in the acute phase

OBJECTIVE

- Identify benzodiazepine prescribing trends at a community hospital system
- Compare rate of appropriate benzodiazepine prescribing before and after the implementation of the appropriate use guideline

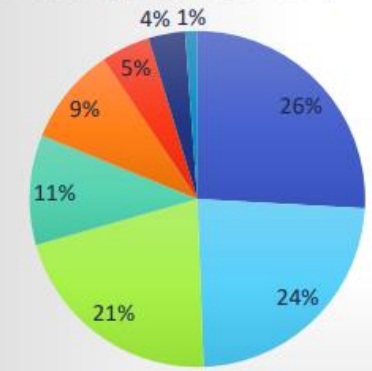
METHODS

- Retrospective review of patients who received ≥ 1 benzodiazepine between June 2019 and December 2019
- Analyzed benzodiazepine orders
  - For appropriateness
  - Investigated adverse outcomes (falls, over-sedation) correlated with use
- Compare data to subjects prescribed a benzodiazepine after implementation of an appropriate use guideline
- Appropriate use guideline provides guidance on benzodiazepine
  - Indications
  - Dosing
  - Frequency



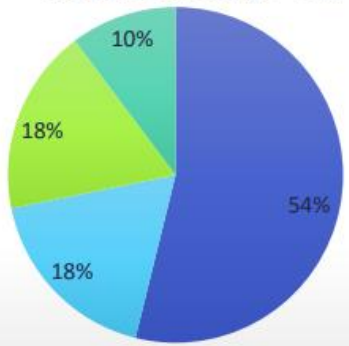
RESULTS

Benzodiazepines Prescribed (n = 85)



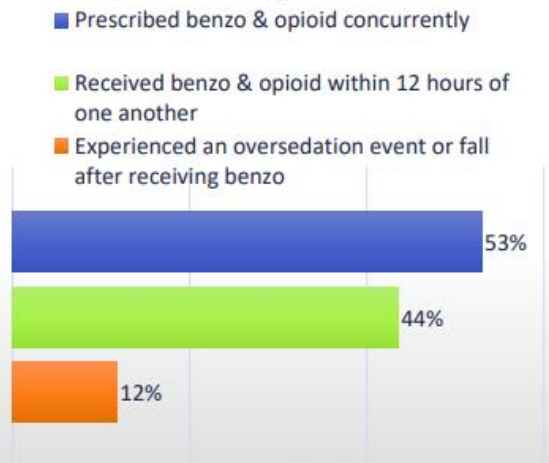
Lorazepam (IV) · Alprazolam · Temazepam · Lorazepam (oral) · Midazolam · Clonazepam · Diazepam (oral) · Diazepam (IV)

Benzodiazepines Prescribed Inappropriately (n = 31)



Initial dose too high · New start scheduled benzo · Unnecessary prescription at discharge · Incorrect indication

Concurrent Use of Benzodiazepines and Opioids



DISCUSSION

- Data demonstrates that there are many areas that benzodiazepine use can be improved throughout the health system
- Plan to implement a pharmacy driven protocol to provide education and lead prescribers to optimal usage of benzodiazepines
- Encourage use of small initial doses and limit benzodiazepine use to "as needed" indication
- Post-implementation results are pending

Evaluation of Untoward Effects of Parenteral Glucocorticoid Use in COPD Exacerbations in an Acute Inpatient Setting

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Background

- Chronic Obstructive Pulmonary Disease (COPD) is a debilitating respiratory ailment marked by frequent exacerbations
- Systemic steroids can improve lung function (FEV1), oxygenation and shorten recovery time and hospitalization duration[1]
- Consensus guidelines recommend 40 mg of oral steroids with consideration for parenteral steroids in those unable to take medications by mouth[2,3]
- Previous studies have found no difference in outcomes between parenteral and oral steroids use but more frequent adverse effects with high dose parenteral steroids[4,5]

Purpose

- Examine adverse effects attributable to parenteral glucocorticoids in patients hospitalized for acute exacerbations of COPD

Methods

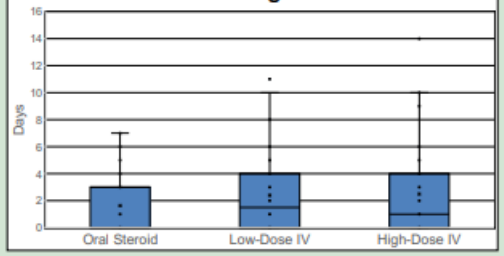
- A retrospective, observational, chart review and analysis evaluating records with ICD-10 codes consistent with COPD exacerbation
- Steroid use was divided into 3 groups
  - Oral prednisone group
  - Low-dose parenteral (< 100 mg of methylprednisolone daily)
  - High-dose (> 100 mg of methylprednisolone daily)
- Inclusion criteria
  - Received steroids within 48 hours after admission
  - Age > 40
- Exclusion criteria
  - Radiologic evidence of pneumonia within 48 hours of admission
  - Vasopressor use within 48 hours of admission
  - Hospital stay < 48 hours in duration
  - Patients taking systemic steroids upon admission
  - Patients transferred from outside hospital

Outcomes

Table 1. Patient Baseline Characteristics

Characteristic	Oral (N=25)	Low-Dose (N=50)	High-Dose (N=50)
Age in years			
Mean (Interquartile Range)	73.6 (69-80)	70.4 (61-79.8)	68.6 (61-77)
Gender			
Female sex – no (%)	16 (64)	29 (58)	30 (60)
Home insulin use			
no (%)	5 (20)	8 (16)	7 (14)

Graph 1. Days of Hyperglycemia > 180mg/dL



Graph 2. New or Increased Insulin Use

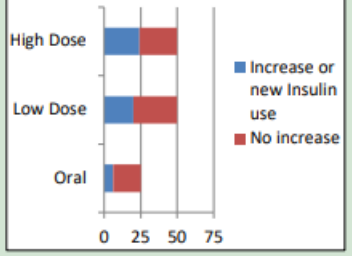


Table 2. Group Characteristics

Characteristic	Oral (N=25)	Low-Dose (N=50)	High-Dose (N=50)
Patients with hyperglycemia			
Blood glucose > 150mg/dL - no (%)	11 (44)	23 (46)	32 (64)
Blood glucose > 180mg/dL - no (%)	11 (44)	32 (64)	34 (68)
Patients experiencing either – no (%)	18 (72)	40 (80)	45 (90)
Patients receiving new or increased insulin with blood glucose > 180mg/dL			
Number with event (%)	6 (24)	20 (40)	24 (48)
Readmissions			
Number with event (%)	5 (20)	7 (14)	8 (16)
Hypoglycemic event with new or increased insulin use			
Number with event (%)	1 (4)	5 (10)	3 (6)
Hospital acquired infection			
Number with event (%)	0	0	3 (6)

Analysis

- Patients receiving parenteral steroids were more likely than those who received oral steroids to experience blood glucose levels > 180mg/dL (44% vs 66%; p=0.043)
- Patients with blood glucose levels > 180mg/dL in the high-dose group were more likely to receive an increased or novel insulin dose compared to the oral steroid group (48% vs 24%; p=0.045)

Discussion

- Patients receiving parenteral steroids had a significantly increased risk of hyperglycemia (> 180 mg/dL) compared to those receiving oral steroids
- Adverse events did not differ statistically between steroid groups
- Use of high-dose parenteral steroids resulted in a significantly greater use of insulin compared to oral steroids while low-dose parenteral steroid use did not
- Limitations included the small sample size, retrospective nature of the review, and a small population of patients available for the oral steroid cohort

Conclusion

- IV steroids place patients at a higher risk of hyperglycemia and possibly increased insulin use
- Daily methylprednisolone doses less than 100 mg do not appear to increase patient exposure to insulin

References

1. Rodriguez-Roisin R. Toward a consensus definition for COPD exacerbations. Chest. 2000;117(5):398S-401S.
2. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease RATEGY FOR THE DIAGNOSIS, MANAGEMENT, AND PREVENTION OF CHRONIC OBSTRUCTIVE PULMONARY DIS. https://goldcopd.org/gold-reports/: Global Initiative of Chronic Obstructive Lung Disease; 2019.
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2. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease RATEGY FOR THE DIAGNOSIS, MANAGEMENT, AND PREVENTION OF CHRONIC OBSTRUCTIVE PULMONARY DIS. https://goldcopd.org/gold-reports/: Global Initiative of Chronic Obstructive Lung Disease; 2019.
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Evaluation of the use of enoxaparin for thromboprophylaxis in patients with end-stage renal disease on hemodialysis

Chelsea Wamsley, PharmD; Joseph Morris, PharmD | HCA Healthcare

Introduction

- Enoxaparin is a low molecular weight heparin (LMWH) that inhibits factor Xa to prevent blood clots[1]
- Commonly used for the prophylaxis of deep vein thrombosis (DVT) in patients with restricted mobility due to acute illness
- LMWH may be 30% more effective for DVT prevention compared to unfractionated heparin (UFH)[2]
- Theoretical accumulation in end-stage renal disease (ESRD) may lead to increased bleeding risk[2]
- Insufficient data to conclude that prophylactic enoxaparin accumulation translates to increased bleeding rates in dialysis patients[3,4]

Objective

- Assess the safety and efficacy of enoxaparin for DVT prophylaxis in hemodialysis (HD) patients
- Evaluate the prescribing practices of enoxaparin for DVT prophylaxis in patients with ESRD on HD at a large, academic medical institution

Methods

- Retrospective chart review approved by the Institutional Review Board
- Patients admitted from June 15, 2015 to July 15, 2019 initiated on enoxaparin 30 mg for DVT prophylaxis
  - Inclusion criteria:
    - Patients 18 years old or greater
    - ESRD on HD
  - Exclusion criteria:
    - Pregnancy
    - Incarcerated patients
    - Patients on enoxaparin treatment dosing (1 mg/kg) daily
    - < 2 doses of enoxaparin
    - Continuous renal replacement therapy or peritoneal dialysis

Results

Table 1. Baseline characteristics (N=71)

Age, years, median [IQR]	63 [56-74]
Male, n (%)	35 (49.3)
Race, n (%):	
White	23 (32.4)
Black or African American	46 (64.8)
Unknown/Decline to specify	2 (2.8)
TBW, kg, median [IQR]	79.6 [65.9-90.6]
BMI, median [IQR]	28 [24-33]
Baseline platelets, median [IQR]	189 [130-280]

TBW = total body weight; BMI = body mass index

Table 2. Enoxaparin safety and efficacy outcomes (N=71)

Safety, n (%)	
Major bleed	5 (7)
Efficacy, n (%)	
Deep vein thrombosis	2 (2.8)
Pulmonary embolism	0
In-hospital mortality, n (%)	
Deaths	7 (9.9)
Deaths due to major bleed	1 (1.4)

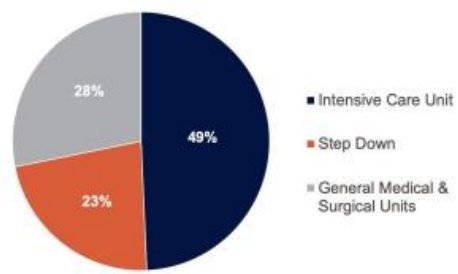

Figure 1. Prescribing practices by department at order initiation

Results

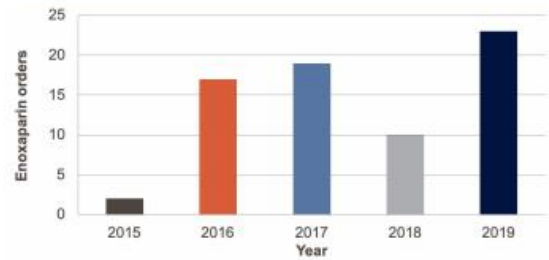

Figure 2. Prescribing practices by year

- **Duration:** median duration of therapy was 15 days [IQR, 9-33]
- **Monitoring**: anti-Xa levels were monitored in 7 (9.9%) patients

Discussion

- Event rates similar to other studies, with regard to both enoxaparin and UFH in ESRD patient population[2,3]
- Majority of bleeds were gastrointestinal (80%)
- One of 5 deaths (7%) attributed to major bleed
- Majority prescribed by critical care with prescribing trends increasing
- Future studies comparing enoxaparin to UFH in ESRD patients on HD are necessary
- **Study limitations:**
  - Discharge summaries used to capture events
  - Doses > 30 mg not captured
  - Small, non-comparative study

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This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

GSHP Virtual Poster Session 2020

STUDENT POSTERS

Cervical cancer screening before and after the implementation of the Affordable Care Act in the United States

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UNIVERSITY OF GEORGIA
College of Pharmacy

Background

- Cancer continues to be the second leading cause of death in the United States; the reported death rate attributed to cervical cancer is 1.3 per 100,000 women.[1]
- The United States Preventive Services Task Force (USPSTF) recommends that women ages 21 through 65 receive preventive cervical cancer screenings with cytology (Papanicolaou (Pap) smear) every 3 to 5 years.[2]
- To date, studies continue to show that cervical cancer screening (CCS) with Pap smear lowers cancer incidence and mortality.[3]
- A decrease of 75% in cervical cancer incidence and mortality has been attributed to preventative screening with Pap smear, such utilization is of the upmost importance in preventative cancer measures for women.[4]
- In March 2010, the Affordable Care Act (ACA) was signed eliminating cost-sharing (i.e. co-payment or deductible) for preventative services by private health insurances.[1]
- The implementation of the ACA provides an opportunity to assess the association between cost-sharing elimination and CCS utilization.

Objectives

The objectives of this study were to describe and compare the utilization of cervical cancer screenings in 2009 versus 2015 among women ages 21 to 65 years in the United States.

Methods

- A cross-sectional, retrospective study was designed utilizing the data from 2009 and 2015 Medical Expenditure Panel Survey (MEPS).
- Women ages 21 through 65 years, the age group recommended for pap smear by the USPSTF, were included in the sample.
- Women were asked "How long since last pap smear test?". Responses were dichotomized; cervical cancer screening (pap smear test) within the past 5 years (yes/no).
- The Andersen Behavioral Model of Health Care was used to select independent variables.
- Multivariate logistic regression was used to examine differences in CCS before and after the ACA.
- Data was analyzed using SAS version 9.4.

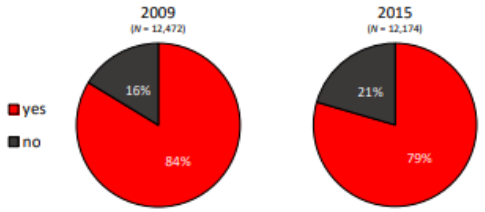
Results

Table 1: Descriptive statistics of the sample population

Patient Demographics, Medical Expenditure Panel Survey 2009 and 2015.

Variable	2009 (Weighted %)	2015 (Weighted %)
Race/Ethnicity		
Asian	4.63	5.56
Black	12.28	12.85
Hispanic	0.79	16.32
White	80.45	62.19
Other	1.85	3.09
Marital Status		
No partner	41.91	44.17
With partner	58.09	55.83
Education		
Less than high school	10.03	9.30
High school graduate	49.46	25.33
More than high school	40.52	65.38
Family income		
High	39.67	41.76
Middle	29.74	27.95
Low	13.02	12.58
Poor	17.57	17.71
Insurance		
Private	72.74	73.11
Public	11.74	17.60
Uninsured	15.53	9.29

Figure 1: Univariate logistic regression examining the relationship between screening and implementation of ACA*



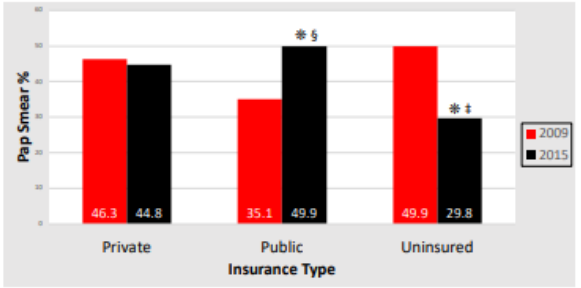
*$p = 0.07$; Odds ratio = 0.897 (95% CI: 0.797 – 1.009)

Table 3: Results from a logistic regression analysis predicting cervical cancer screening

Variable	Odds ratio	95% Confidence Interval	
ACA	0.697	0.606	0.802
Age	0.586	0.531	0.646
Race			
Asian	0.521	0.416	0.653
Black	2.002	1.684	2.381
Hispanic	1.521	1.239	1.868
Other	1.257	0.880	1.796
White (reference)			
Marital status			
With partner	1.548	1.353	1.770
No partner (reference)			
Education			
More than high school	1.386	1.130	1.700
High school diploma only	0.925	0.772	1.107
Less than high school (reference)			
Family income			
High (≥ 400%)	0.992	0.781	1.261
Middle (200 to < 400%)	0.821	0.672	1.003
Low (125 to < 200%)	0.914	0.750	1.114
Poor (< 125%; reference)			
Geographical region			
Midwest	0.775	0.622	0.965
South	1.000	0.812	1.232
West	0.834	0.671	1.036
Northeast (reference)			
Insurance			
Public	0.801	0.655	0.980
Uninsured	0.506	0.422	0.607
Private (reference)			
Risk			
Does not take risk	0.955	0.803	1.135
Risk neutral	0.826	0.668	1.023
Takes risk (reference)			
Provider			
No	0.587	0.141	2.442
Yes (reference)			
Time to reach provider			
Average (31-90 minutes)	0.990	0.772	1.270
Slow (> 90 minutes)	0.936	0.359	2.441
Fast (15-30 minutes; reference)			
Smoke			
Yes	0.708	0.603	0.831
No (reference)			

Results

Figure 2: Two sample test of proportions for pap smear utilization by insurance status



❋ $p < 0.01$
§ Percentage of individuals who had public insurance increased from 2009 to 2015.
‡ Percentage of individuals who where uninsured decreased from 2009 to 2015.

Conclusions

- CCS decreased after the implementation of ACA but was not statistically significant when compared to the previous period.
- Cervical cancer screening significantly increased for those with public insurance after the ACA.
- Race, education and insurance status were important factors associated with utilization of cervical cancer screening in U.S. women ages 21 through 65 years.
- Factors known to contribute to racial disparities in cervical cancer mortality include differences in access to high-quality regular screening and timely treatment.
- Limitations include an inability to account for state differences (some states adopted ACA provisions such as Medicaid expansion more than others).
- Further research is needed to monitor and improve utilization of preventive screenings in women.

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Disclosures: The Authors declare that there is no conflict of interest concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

Evaluating the incidence of penicillin allergy re-labeling in patients with a negative penicillin skin test

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University of Georgia College of Pharmacy, Savannah, GA[1]; St. Joseph's/Candler Health System, Savannah, GA[2]

Background

- Penicillin allergy is the most reported drug allergy in the United States, however, nearly 90% of self-reported penicillin allergies are negative upon assessment or skin testing[1,2]
- Guidelines cite allergy assessment and penicillin skin testing (PST) as useful tools to increase use of drugs of choice, while de-escalating therapy when appropriate[3]
- After a negative PST at our institution, the penicillin allergy is removed from the patient's electronic health record (EHR) and a placeholder is added to signify that a PST was performed
- The purpose of this study was to evaluate how often the penicillin allergy was re-added and how often the placeholder was removed, after PST was performed

Objectives

Primary

- Frequency (%) penicillin allergy was added back to patient's EHR

Secondary

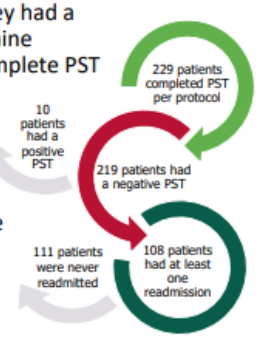
- Frequency (%) PST placeholder was removed from patient's EHR

Methods

- Patients at Candler Hospital, part of a 714-bed community health system, who had a negative PST from August 2014 to July 2019 were included in this IRB-approved, observational, non-randomized retrospective chart review
- Data including date of PST, number of times and the date each penicillin allergy was added back, number of times and the date each PST placeholder was removed, as well as profession and location of the person that removed the allergy was documented
- Descriptive statistics were used to evaluate data

Methods

- Patients were excluded if they had a positive PST, negative histamine reaction, were unable to complete PST per institution-approved protocol, or if they were never readmitted
- In total, 122 patients were excluded: 1 did not complete PST per protocol, 10 had a positive PST, and 111 did not have at least one readmission



After a negative skin test, **40%** of patients had their penicillin allergy added back **at least once**, which could potentially **limit beta-lactam prescribing** long-term.

Discussion

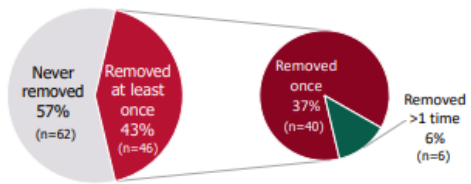
- Although considered no longer penicillin allergic after negative PST, 40% of patients had their penicillin allergy added back at least once, which could potentially limit beta-lactam prescribing long-term
- Incidence of re-labeling could potentially be reduced with added education efforts for both patients and healthcare professionals

Results

- Of 219 patients who had a negative skin test, 108 patients were readmitted at least once. Of these, 43 (40%) of patients had their penicillin allergy readded at least once

Penicillin Allergy Readdition

PST Placeholder Removal



- Patients were readmitted an average of 3.7 times. 40% of patients had their allergy readded within one year from when PST was performed
- Penicillin allergies were added back most often in the emergency department (48%). Nurses were the most common (70%) profession to re-add the allergy

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Impact of Pharmacy Intern Outreach on Statin Adherence in Patients with Type 2 Diabetes within an Integrated Healthcare System

Holly Edison, PharmD Candidate, Nadia Hason, Pharm. D., BCPS, CDE
Kaiser Permanente Georgia

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BACKGROUND

Diabetes and Statin Therapy

- Diabetes was the seventh leading cause of death in the United States (U.S.) in 2017.
- An estimated 10.5% of the U.S. population is reported to have diabetes with approximately 4.5% being undiagnosed.[1]
- According to the American College of Cardiology and American Heart Association (AHA), 48.6% of U.S. adults over 40 years of age are candidates for statin therapy.[2]
- Adults with diabetes are two to four times more likely to die from heart disease than adults without diabetes.[3]
- The AHA recommends patients between 40 to 75 years of age with diabetes mellitus and an LDL cholesterol level of ≥70 mg/dL initiate statin therapy.[4]
- The KPGA Ambulatory Care clinical pharmacy specialists initiate statin therapy under a collaborative practice agreement and conduct statin treatment counseling in appropriate patients.
- The pharmacy intern provides outreach to patients who have been prescribed statin therapy but have not filled the prescription.
- Statin therapy received in diabetic patients impacts Healthcare Effectiveness Data and Information Set (HEDIS) metrics and Medicare 5-star ratings. Further research assessing the impact of intern outreach to patients regarding statin initiation is warranted.

Kaiser Permanente Georgia (KPGA)

- KPGA is an integrated healthcare system that provides care for over 309,212 members in the metropolitan Atlanta area.
- Clinical Pharmacy Specialists (CPS) serve as panel managers and work with physicians to manage patients with diabetes under a collaborative practice agreement.
- The 2017 Healthcare Effectiveness Data and Information Set (HEDIS) ranked Kaiser Permanente Georgia (KPGA) highest in hemoglobin A1C < 8% control rate in the state.

OBJECTIVE

- To evaluate the number of Type 2 Diabetes Mellitus patients who picked up statin prescription following intern outreach.

STUDY DESIGN

- Study Period: November 1st, 2019 – January 15th, 2020
- Study Setting: Ambulatory Care Pharmacy Department

METHODS

Pharmacy intern generated a report from an electronic medical record system which determined patients eligible for outreach

↓

The report provided a list of patients with Type 2 Diabetes Mellitus who were prescribed statin therapy

↓

The selected patients had received statin treatment counseling regarding the importance of statin therapy at least three weeks prior to outreach

↓

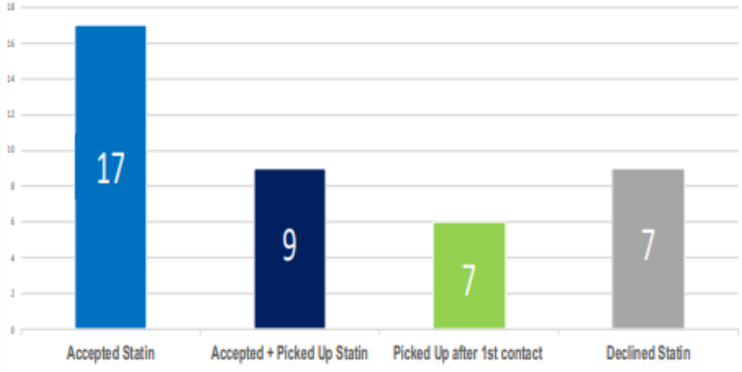
The intern conducted outreach to patients who had not picked up their statin medication and informed patients about the importance of initiating statins to reduce cardiovascular events

↓

The number of patients who picked up statin therapy from the pharmacy after verbally accepting the statin was assessed using descriptive statistics

RESULTS

102 Patients Contacted
31 Active Encounters



CONCLUSIONS

- Clinical pharmacy specialists' monthly reviews of patients eligible to receive statin therapy was initiated in July 2018. There were two outreach periods by clinical interns including September 2018 and November 2019.
- The HEDIS metric has improved by 5.6% since ambulatory care clinical pharmacists' interventions were initiated.
- A limitation of this study is that the clinical intern conducted cold calls which impacted the number of patients who answered outreach. This led to a high number of unable to reach responses.

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DISCLOSURES

- Authors of this presentation: Holly Edison, Nothing to Disclose; Nadia Hason, Nothing to Disclose

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Real World Experiences with Angiotensin II in Refractory Shock

Zachary D. Halbig, PharmD Candidate; Susan E. Smith, PharmD, BCPS, BCCCP; Andrea S. Newsome, PharmD, BCPS, BCCCP; Shravan Kethireddy, MD

BACKGROUND

- Refractory shock is characterized by an inadequate response to conventional catecholamine vasopressors and is associated with increased mortality.
- Norepinephrine is considered the first line agent, most notably in distributive shock followed by vasopressin as the leading second line agent.
- A novel agent, Giapreza™ (Angiotensin II, ATII), was FDA approved in 2017 for refractory shock through ATHOS-3 trial.
- Safety and efficacy data from a pragmatic setting are lacking.
- This study describes two institution's real-world experiences with ATII, including prescribing information and patient outcomes.

OUTCOMES

Primary

- Characterize when, how, and in what patients ATII was prescribed.

Secondary

- Hemodynamic Response
- Incidence of Venous Thromboembolism (VTE)
- Inpatient mortality
- Drug Expenditure

STUDY DESIGN

- **Design**: IRB-approved, retrospective cohort study
- **Time Frame**: June 2018 to January 2019
- **Setting**: Northeast Georgia Health System (Gainesville and Braselton)
- **Inclusion Criteria:**
  - Adult Patients
  - Admitted to either facility
  - Received ATII
  - Vasopressors for longer than 3 hours
- **Identification of Patients**: Pharmacy dispensing records
- **Administration Confirmation:** Via chart review

RESULTS

Variable	n=34*
Age	68 (57 – 72)
Male Gender	14 (41)
Weight	103 (87 – 113)
Home ACEI/ARB	9 (26)
Distributive Shock	26 (76)
Indication for Vasopressors	
Septic shock	22 (65)
Cardiogenic shock	4 (12)
Combined septic and cardiogenic shock	3 (9)
Vasoplegia	3 (9)
Hypovolemic shock	1 (3)
Vasodilatory shock	1 (3)
Number of Vasopressors	3 (2 – 3)
Ordering location of angiotensin II	
Critical care unit	11 (32)
Cardiovascular intensive care unit	6 (18)
Medical intensive care unit	6 (18)
Surgery/trauma intensive care unit	6 (18)
Operating room	3 (9)
Intensive care unit	2 (6)
Ordering service of angiotensin II	
Critical Care	26 (76)
CT Surgery	3 (9)
Anesthesia	2 (6)
Trauma	2 (6)
Heart Failure	1 (1)
Initial angiotensin II Dose	10 (10 – 10)
Maximum angiotensin II Dose	55 (40 – 80)
Appropriate angiotensin II Dose Titration	21 (62)
Duration of angiotensin II (min)	1073 (223 – 3613)
Initial MAP (mmHg)	59 (53 – 70)
MAP after 3 h (mmHg)	74 (62 – 80)
Number of Vials of angiotensin II	2 (1 – 6)
Cost of angiotensin II ($)	3000 (1500 – 9000)
Time to reach MAP ≥ 65 mmHg (min)	16 (7 – 54)
Mortality	15 (44)
Venous thromboembolism prophylaxis	27 (79)
Venous thromboembolism	3 (9)

*Values presented as Median (Interquartile Range) or Number (Percent)
ACEI – angiotensin converting enzyme inhibitor; ARB – angiotensin receptor blocker;
MAP – mean arterial pressure

RESULTS CONTINUED

- Patients were receiving a median of three vasopressors at the time of ATII initiation
- Received ATII for a median of 18 hours
- Within 3 hours of ATII initiation, mean arterial pressure (MAP) increased by a median of 15 mmHg
- Median Time to reach MAP >65 was 16 minutes
- Twenty-Seven patients (79%) received VTE prophylaxis and three of these (9%) developed a VTE within 28 days
- Fifteen Patients (44%) did not survive to discharge
- Median Drug expenditure was $3000 per patient (cumulative expenditure $186,000)
- Trend towards higher mortality in patients with distributive shock compared to other shock states. (see chart below).

Covariate	Odds Ratio	95% Confidence Interval	p-value
Age	1.004	0.951 – 1.059	0.896
Female Gender	0.715	0.147 – 3.470	0.677
Concomitant ACEI/ARB	2.383	0.499 – 11.375	0.276
Distributive Shock	10.398	0.928 – 116.570	0.058
Number of Vasopressor Prior to ATII	1.128	0.392 – 3.246	0.823

Average Wholesale Price		
Drug	Amount	Price
Norepinephrine	1mg vial	$2.63
Vasopressin	20 unit vial	$215.75
Angiotensin II	2.5mg vial	$1800

CONCLUSIONS

- The study observed a positive hemodynamic response to ATII and a lower mortality rate in refractory states.
- Future research should compare the safety and efficacy of ATII to other second-line vasoactive agents (e.g., vasopressin).
- Limitations:
  - Small sample size
  - Retrospective design
  - Lack of control group
  - Absence of illness severity score
- Advantages:
  - Largest case series of ATII to date
  - Only one to include mixed shock states

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Characterizing Glucagon-like Peptide 1 Agonist and Sodium Glucose Co-transporter 2 Inhibitor Prescribing and Adverse Effects in an Academic Medical Center Family Medicine Clinic

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Background

- With clinical practice guidelines now recommending glucagon-like peptide 1 agonists (GLP1a) and sodium glucose co-transporter 2 inhibitors (SGLT2i) as first-line add-on to metformin in specific populations, it is imperative to determine whether these agents are safe and effective in clinical practice.
- The following chart contains the most common adverse effects reported in clinical trials and post-marketing data:

Table 1: Adverse Effects

GLP1a Adverse Effects[1,2]	SGLT2i Adverse Effects[3,4]
• Nausea (8 – 28.4%) • Diarrhea (<2 – 17.1%) • Vomiting (4 – 10.9%) • Constipation (<1% 9.9%)	• Female genital mycotic infections (5.4 – 11.4) • Male genital mycotic infections (1.6 – 4.2%) • Renal function impairment (0.5 – 28.3%) • Increased urination (0.3 – 5.3%)

Objective

- The purpose of this medication use evaluation was to determine if patients are being prescribed GLP1a and SGLT2i and evaluate whether these medications are safe and effective in patients seen within a family medicine clinic in a disproportionate share academic medical center and to evaluate whether discontinuation and adverse effects of medication are properly documented in the electronic health record (EHR).

Methods

- Using a combination of automated reports run by Family Medicine Center (FMC) information technology, a list was generated of all patients with a diagnosis of type 2 diabetes mellitus (T2DM) who were prescribed a SGLT2i or GLP1a between January 1, 2017 and December 31, 2018.
- Patients were randomly selected from this list and data was collected from the EHR.
- Patients were excluded if they did not return to clinic after the GLP1a/SGLT2i was prescribed/initiated.
- Patients were followed forward to present day or to the time of discontinuation of GLP1a/SGLT2i therapy.

Results

- Sixty-five of the 177 patients prescribed a GLP1a or SGLT2i between January 1, 2017 and December 31, 2018 were randomly selected.
- Forty-nine of the 65 randomly selected patients met inclusion criteria for evaluation.
- Of the 49 patients evaluated, approximately 80% started the GLP1a or SGLT2i prescribed (84.8% [28/33] and 80% [16/20], respectively).
- At final A1c follow-up, a decrease in A1c was observed in patients receiving GLP1a and increase in A1c for patients receiving SGLT2i.
- Seven out of 28 (25%) patients prescribed a GLP1a and five out of 16 (31.3%) patients prescribed a SGLT2i experienced an adverse effect.

Table 2: Patient characteristics and objective endpoints

Characteristics & Objectives	GLP1a (n=33)	SGLT2i (n=20)
Age (avg)	56	56
Male (%)	42	45
Patients who started agent (#)	28	16
Avg baseline A1c of all patients with at least one follow up	9.6 (n=19)	9.6 (n=11)
Difference in A1c at 1st follow up (avg)	0.8 (n=19)	1.5 (n=11)
Difference in A1c at 2nd follow up (avg)	1.0 (n=15)	1.1 (n=7)
Difference in A1c at 3rd follow up (avg)	1.1 (n=12)	-0.1 (n=6)
Patients who experienced an AE (%)	25	31

Figure 1: Reason for GLP1a discontinuation

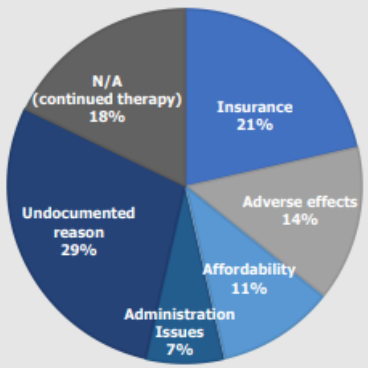

Figure 2: Reason for SGLT2i discontinuation

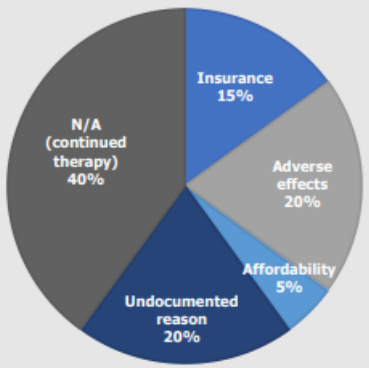

Table 3: Adverse effects associated with use

Adverse Effects	
GLP1a (n=7)	**SGLT2i (n=5)**
• Gastrointestinal complications (4) • ASCVD (1) • Hives (1) • Elevation of liver enzymes (1)	• Genitourinary infections (3) • Hypoglycemia (1) • Change in urinary frequency (1)

Conclusions

- With the T2DM population in the FMC exceeding 1,000, one would expect more than 177 patients being prescribed these medications.
- The guideline update recommending these newer agents as first-line add on to metformin in specific populations was published after the evaluation period, which may be the reason for less prescribing observed.
- Positive hemoglobin A1c changes and less adverse effects were associated with the use of GLP1a versus SGLT2i.
- A1c reductions in patients receiving GLP1a in this evaluation were comparable to current literature.
- At 1st and 2nd follow up, there was an average decrease in A1c in patients receiving SGLT2i. By the third A1c follow up, the average A1c increased. The increase in A1c in the SGLT2i group is not reflected in current literature and is likely due to patient non-adherence and dietary indiscretions.
- Improved documentation within the EHR by prescribers and more in-depth assessment of adverse effects could lead to more definitive association of adverse effects with drug use.

Next Steps

- Deliver data to the providers within the FMC at Augusta University Medical Center.
- Provide education on the following:
  - Review of current guideline recommendations
  - Determination of insurance coverage
  - GLP1a administration technique training
  - Standard procedure for documenting adverse effects to these medications and reason for discontinuation

Disclosures and References

- Authors of this presentation have nothing to disclose.
- This project is part of the health system medication use evaluation and improvement (MUE) program, which has been reviewed by the Institutional Review Board and determined not to be human subjects research.

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Comparing weight based and non-weight based norepinephrine dosing strategies

PROJECT DETAILS

Background

- Norepinephrine is designated a high-alert medication by the Institute for Safe Medication Practices.
- There is currently little guidance on norepinephrine dosing. Pharmacy resources advise to titrate to lowest effective dose and state that institutional protocols may vary.
- Current literature has not identified a clear benefit of either weight based (WBD) or non-weight based dosing (Non-WBD).

Objective

- To quantify and compare the use of norepinephrine between dosing strategies

Methods

- Single-centered, IRB-approved, retrospective chart review
- Pre and post June 2018 protocol revision from non-WBD to WBD of norepinephrine
- Inclusion criteria
  - Critical care patients receiving norepinephrine as their initial vasopressor for >1 hour
- Exclusion criteria
  - Pregnant or <18 years old
  - Initial vasopressor other than norepinephrine
  - Norepinephrine drip started at outside institution
  - Second shock event in same admission
- Discrete and continuous data were analyzed with the Chi Squared and Mann-Whitney U tests, respectively

Primary Outcome

- Assess differences in norepinephrine usage between the dosing strategies

Secondary Outcomes

- Initial, average, and maximum norepinephrine infusion rates
- Cumulative norepinephrine dose
- Use of second or third vasopressors

Results

- 69 patients were included, with 32 receiving non-WBD and 37 receiving WBD.

Discussion and Implications

- This study was limited by its small sample size and retrospective nature.
- Patients in the non-WBD group received higher infusion rates and cumulative doses of norepinephrine.
- Non-WBD patients were more severely ill at baseline and experienced increased mortality rates. This may limit the external validity of the study since sicker patients tend to require higher vasopressor doses.
- Future research will further assess the differences in severity of illness between the groups

INVESTIGATOR TEAM

Peyton Moon, PharmD Candidate; Steven Castellanos, PharmD Candidate; Ansley Gayle, PharmD Candidate; Maty Ray, PharmD; Susan E Smith, PharmD, BCPS, BCCCP

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TABLES AND FIGURES

Table 1. Baseline Demographics

	Non-WBD (n=32)	WBD (n=37)	P-value
Age (years)	62 (53-72)	67 (56-76)	0.268
BMI	29 (23-35)	29 (25-39)	0.432
Male Gender	18 (56%)	19 (51%)	0.684
Caucasian Race	28 (88%)	30 (81%)	0.573
Cardiovascular ICU	16 (50%)	14 (38%)	0.422
All values presented as Number (%) or Median (Interquartile Range)			

Table 2. Co-morbidities and Organ Dysfunction

	Non-WBD (n=32)	WBD (n=37)	P-value
CAD	14 (44%)	11 (30%)	0.227
CHF	9 (28%)	14 (38%)	0.393
COPD	7 (22%)	8 (22%)	0.980
Liver dysfunction			0.238
Hepatitis	2 (6%)	3 (8%)	
Cirrhosis	0 (0%)	3 (8%)	
Kidney dysfunction			0.011
Renal	8 (25%)	0 (0%)	
CKD	1 (3%)	3 (8%)	
ESRD	1 (3%)	3 (8%)	
CRRT	7 (22%)	7 (19%)	0.761
SOFA score	12 (10-13)	8 (4.5-11)	<0.001
All values presented as Number (%) or Median (Interquartile Range)			

Figure 1. Norepinephrine Infusion Rates (mcg/min)

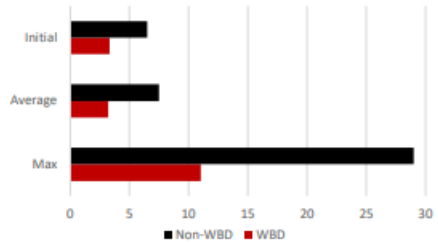

Table 3. Vasopressor Usage

	Non-WBD (n=32)	WBD (n=37)	P-value
Cumulative NE dose (mg)	39 (6-99)	7 (2-23)	0.003
Total NE Duration (days)	2.5 (1-5.5)	1 (1-2.5)	0.038
Use of second vasopressor	23 (72%)	8 (22%)	<0.001
Use of third vasopressor	12 (38%)	3 (8%)	0.003
Use of ionodilator	7 (22%)	2 (5%)	0.032
All values presented as Number (%) or Median (Interquartile Range)			

Table 4. Clinical Outcomes

	Non-WBD (n=32)	WBD (n=37)	P-value
Mortality	25 (78%)	9 (24%)	<0.001
Hospital LOS	6 (3 – 11)	9 (4 – 16)	0.158
Mechanical ventilation	32 (100%)	24 (65%)	<0.001
Vent free time (days)	0 (0-0)	25 (6-28)	<0.001
All numbers presented as Number (%) or Median (Interquartile Range)			

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Pharmacist-driven Fluid Stewardship Recommendations: Four Rights and ROSE Model

Nicole Poirier, PharmD Candidate; W. Anthony Hawkins, PharmD, BCCCP; D. Paul Dossett, PharmD Candidate; Sydney Butler, PharmD Candidate; Susan E. Smith, PharmD, BCCCP, BCPS

BACKGROUND

- The use of intravenous fluids (IVF) is nearly ubiquitous in the intensive care unit (ICU).
- Appropriate use of IVF can have significant impact on improving patient outcomes, but it is unknown to what extent pharmacists make recommendations related to IVF.
- The four rights of fluid stewardship include right patient, right drug, right route, and right dose.
- The ROSE Model of fluid administration is comprised of four stages: Rescue, Optimization, Stabilization, and Evacuation.
- **Purpose:** Identify and categorize pharmacist recommendations related to the four rights of fluid stewardship and ROSE model of fluid administration.
- **Hypothesis:** A significant number of pharmacist recommendations would be related to fluid administration.

OUTCOMES

Primary

- Percentage of pharmacy recommendations related to fluid stewardship

Secondary

- Number and percentage of recommendations stratified by the four rights and stages of the ROSE model

STUDY DESIGN

- **Design**: IRB-exempt, retrospective, single-center cohort study
- **Time Frame**: June 2016 through June 2019
- **Setting:** Community hospital
- **Inclusion Criteria**:
  - Adults admitted to the medical ICU and followed by the academic rounding team
- **Statistical Plan**:
  - Descriptive statistics were used for all outcomes.
  - Measures of frequency (count, percent) were utilized to define results.

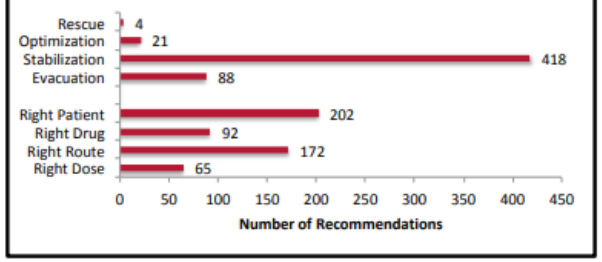
RESULTS

Table I.

Number of Patients	**350**
Total Patient Days	**905**
Student Recommendations*	458 (50.6%)
Resident Recommendations*	447 (49.4%)
Total Pharmacy Recommendations	**2731**
Average per day	3
Total Recommendations Related to FS%	**531(18.9%)**
Average per day	0.6
Most Common Recommendations#	
Convert route of medication from IV to non-IV route	151 (28.4%)
Discontinue maintenance IV	111 (20.9%)
Initiate enteral water (diet or feeding tube)	53 (10%)
Initiate diuretic (loop or thiazide, NOT spironolactone)	52 (9.8%)
Adjust dose of enteral fluid	29 (5.5%)

* Each patient day, recommendations were made by either a pharmacy student or pharmacy resident and then classified accordingly.
% FS: Fluid Stewardship
# Categorization of each recommendation type was determined by consensus of the investigators *a priori*.

Figure I. Recommendations Stratified by the ROSE Model and Four Rights



RESULTS CONTINUED

Figure II. Recommendations According to the Four Rights

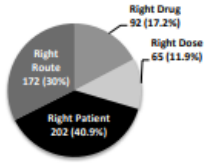
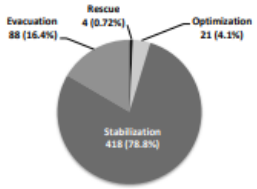


Figure III. Recommendations According to the ROSE Model



CONCLUSIONS

- Almost one-fifth of all pharmacist recommendations were related to fluid stewardship.
- Of all recommendations made, the majority were classified as being related to right patient or utilized for stabilization. The most common recommendation could be qualified under right route and stabilization.
- The study was limited by the opportunity for inaccurate classification of recommendations by a single reviewer.
- The study highlights the frequency by which the pharmacist can impact fluid administration in the ICU and can be used as a model for clinical pharmacists.
- Future research will look at the acceptance rate of recommendations and subsequent effect on patient outcomes.

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Automated molecular docking of FDA-approved drugs to screen for lead antibiotic candidates

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Introduction

BACKGROUND

CysB and **CbI** (*CysB-like*) are LysR-type transcriptional regulators that regulate cysteine biosynthesis in bacteria.[1] CysB responds to ligands such as inorganic sulfate and thiosulfate, as well as two intermediates in cysteine biosynthesis, **adenosine-5′-phosphosulfate (APS)** and N-acetyl-serine (NAS). X-ray crystallographic data of CysB/CbI from the soil bacterium ***Acinetobacter baylyi*** ADP1 (related to the opportunistic pathogen *Acinetobacter baumannii*) were obtained by prior work in the Momany lab. Inspection of the atomic structure revealed a significant binding surface with regions targetable by virtual screening. It is hypothesized that the obtained structure represents an inactive state of the protein. Thus, we hypothesize that stabilization of this conformation would inhibit *in vitro* activity of CysB/CbI, resulting in toxic sulfur accumulation and subsequent bacterial death.

SCOPE

A recent version of automated molecular docking software was implemented for screening ligand libraries against CysB/CbI.[2] Prior work aimed to discover lead candidates for drug discovery from a library of largely underutilized chemicals of varying applications.

In addition to continued work in this area, we aim to initiate a second investigation into a library of more familiar chemicals: **FDA-Approved drugs**. Discovering already-approved drugs which exhibit binding affinity for our target bacterial transcriptional regulator (CysB/CbI) presents the lucrative possibility of expanding the labeled indication(s) of medications which have already been proven to be safe and tolerable in humans. Here we present molecular docking results from our docking trials and discuss the potential applications of these discoveries.

RELEVANCE

Antimicrobial resistance is considered a global public health threat. In 2014, the United States government established the National Strategy for Combating Antibiotic-Resistant Bacteria. The declaration made several recommendations regarding antibiotic use and surveillance. It also highlighted the importance and encouraged the development of new therapies and innovative technologies to fight drug-resistant bacteria[3]. Despite this, the Center for Disease Control (CDC) estimated 2.8 million people in the US were infected with pathogens displaying multi-drug resistance, resulting in 35000 deaths[4].

Among the organisms with greatest concerns for resistance is ***Acinetobacter baumanii***. The CDC and the World Health Organization (WHO) both list *A. baumanii* as one of their highest priority threats[4,5].

Method

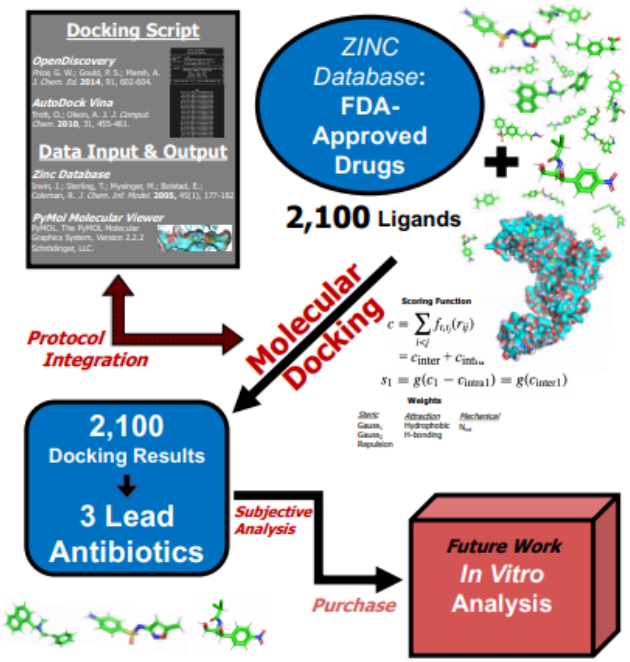

Fig. 1: ***Automated Molecular Docking Workflow***

Results

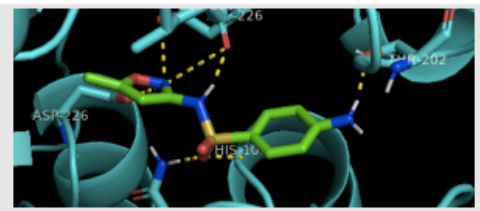

Fig. 2: ***Sulfamethoxazole & CysB - Complex***

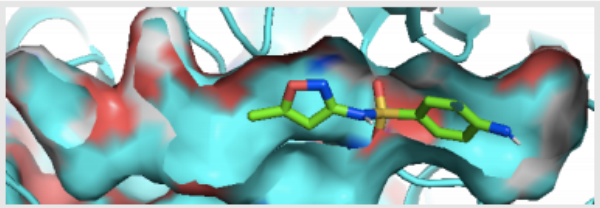

Fig. 3: ***Sulfamethoxazole & CysB – Molecular Surface***

Compound	Generic name *(Brand Name)*	ΔG (kcal/mol)	Cost (from Sigma-Aldrich®)
APS	--	-4.3	--
Ligand-1124	**naftifine** *(Naftin®)*	-7.1	$2.72/mg
Ligand-449	**sulfamethoxazole** *(Gantanol®)*	-6.6	$0.003/mg
Ligand-1096	**chloramphenicol** *(Chloromycetin®)*	-6.5	$0.77/mg

Discussion

Today, *A. baumanii* frequently exhibits resistance to a plethora of first-line therapies, including carbapenems[7]. Because of this, new strategies are desperately needed to fight these infections. However, antibiotic innovation in recent times has slowed. Aside from bedaquiline in 2012, no antimicrobial with a previously undiscovered mechanism of action has been approved since daptomycin in 2003[8]. One reason for this is due to a lack of profitability. New therapies introduced to practice are often withheld to prevent the development of resistance. As a result, only 4 of the largest 50 drug manufacturers are currently involved in research and development of antibiotics[9]. This further emphasizes the need for new strategies and innovative technologies to contribute to therapy. Molecular docking presents a method for reassessing existing drugs for the treatment of bacterial infections by exploiting a novel mechanism.

Conclusions

High-throughput virtual screening rapidly identified 3 lead antibiotic candidates: **naftifine, sulfamethoxazole,** and **chloramphenicol**.

- ΔG values ranged from -6.5 to -7.7 kcal/mol.
- ΔG values < APS ΔG of -4.3 kcal/mol indicate that these three drugs have **higher affinity** for CysB/CbI's binding site than the proposed endogenous ligand

As a transcriptional regulator, stabilization of CysB/CbI in the inactive state may result in **bacterial death** through toxic sulfur accumulation.

- These results warrant investigation with transcriptional assays

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Post-Marketing Impact of Highly Concentrated Insulin Preparations on Hypoglycemia Rates

Bethany Taylor, 3rd Year Pharmacy Student; Kimberly L. Barefield, Pharm.D, BCPS
Philadelphia College of Osteopathic Medicine School of Pharmacy, Suwanee, Georgia

INTRODUCTION

Insulin preparations are widely used for type I and type II diabetes mellitus to assist in regulating glucose metabolism by stimulating peripheral glucose uptake and decreasing hepatic glucose production. With insulin use, hypoglycemia is the most common adverse effect in patients, especially when the patient is not educated on proper administration. The use of highly concentrated insulins (insulins with concentration greater than 100 units/mL) have the attractive quality of reduced frequency of administration for patients on higher doses of insulin, but the increased risk of hypoglycemia. Per the ADA guidelines[2], insulin glargine U-300 has a longer duration of action than U-100 glargine but modestly lower efficacy per unit administered. The FDA has also approved a concentrated formulation of rapid-acting insulin lispro, U-200 (200 units/mL). The increased concentrations of these insulin preparations may improve adherence for patients by reducing the amount of injections and providing convenience.

The more concentrated insulins, insulin lispro U-200 and insulin glargine U-300, were approved by the FDA in 2015. Since they are still relatively new to the market, their effect on hypoglycemia rates in diabetic patients have not been assessed extensively. The FDA Adverse Events Reporting System (FAERS) provides reported incidents of adverse drug reactions that can be used to evaluate clinical safety of drugs. The benefits of concentrated insulins compared to increased safety risk of hypoglycemia should be evaluated to determine when their use is clinically appropriate.

HYPOTHESIS

The rates of hypoglycemia have increased since the release of highly concentrated insulins such as insulin lispro U-200 and insulin glargine U-300.

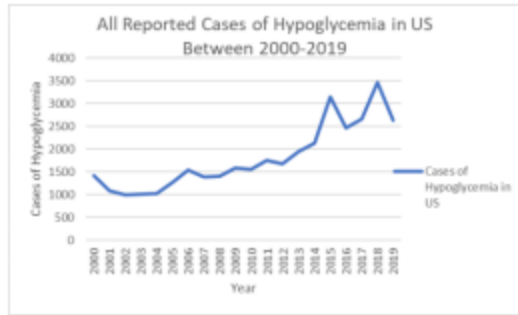
SPECIFIC AIMS/OBJCTIVES

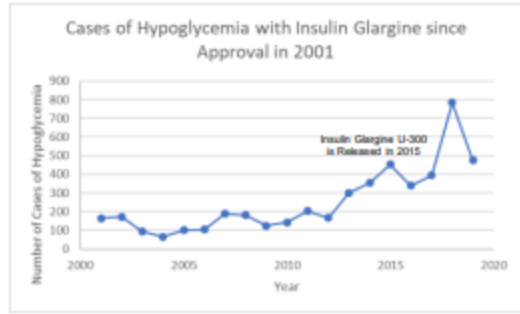
- Determine the difference in the rates of hypoglycemia since the release of highly concentrated insulins
- Analyze risk vs. benefit of higher concentrations of insulin
- Provide information for the clinical use of highly concentrated insulins
- Describe the post-marketing impact of highly concentrated insulins on patient safety

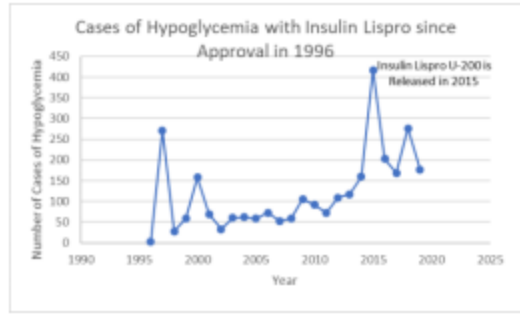
METHODS

The FDA Adverse Events Reporting System (FAERS) database was used to collect reported incidents of hypoglycemia for both insulin lispro and insulin glargine. Specific time periods were observed during the years before the release of insulin lispro U-200 and insulin glargine U-300 and compared to 2015-2019 after the higher concentrated insulin preparations were approved by the FDA. The number incidents of hypoglycemia in insulin lispro were collected for the first 5 years after approval from the FDA (1996-2000) and the 5 years after insulin lispro U-200 was approved by the FDA (2015-2019). The number of hypoglycemic incidents with insulin glargine were collected in the same manner for the first 5 years after approval (2001-2005) and 5 years after approval of insulin glargine U-300 (2015-2019). The number of incidents collected were used to compare changes in rates of hypoglycemia with insulin preparations since higher concentrated insulins have entered the market.

RESULTS







CONCLUSION

Patients have exhibited more incidents of hypoglycemia since the approval of highly concentrated insulin preparations insulin lispro U-200 and insulin glargine U-300.

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Authors of this presentation disclose the following relationships with commercial interests related to the subject of this poster:

Bethany Taylor: Nothing to disclose

Kimberly Barefield, PharmD: Nothing to disclose

Prevalence of bowel regimens among patients receiving home opiate therapy admitted for bowel obstruction requiring total parenteral nutrition

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Background

- Opioid analgesics are a mainstay in the treatment of acute and chronic pain management
- Despite their efficacy in pain relief, they have many debilitating adverse effects
- The most common adverse effect is opioid-induced constipation (OIC) and 2018 American Gastroenterological Association guidelines recommend prophylactic therapies for patients receiving opioids to both prevent and treat OIC
- Opioid induced constipation is defined as any change in bowel habits that follows the initiation of opioid analgesics
- A large number of patients admitted for small bowel obstruction (SBO) or ileus receive outpatient opioid therapy and ultimately require total parenteral nutrition (TPN)
- The purpose of this study is to determine the number patients receiving guideline-approved pharmacological OIC prophylaxis while prescribed outpatient opioid therapy that were admitted for SBO/ileus and ultimately required TPN therapy

Objectives

Primary

- The presence of a guideline-approved OIC prevention regimen

Secondary

- Morphine milliequivalents (MME) per day patients were receiving prior to admission
- Readmission rates
- Length of stay
- Concomitant agents that cause constipation

Methods

- Single–center, retrospective cross-sectional study
- Electronic chart, prescription fill history, and TPN monitoring form review conducted for adult hospitalized patients during July 2018 through June 2019

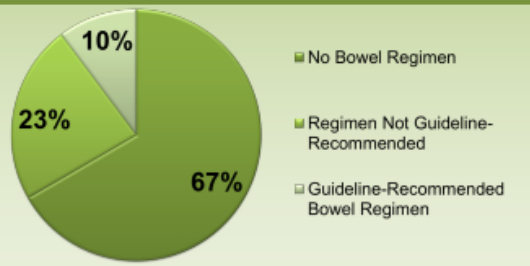
Inclusion Criteria	Exclusion Criteria
18 years of age or older	Pregnancy
Hospitalized for SBO/Ileus	Gastroparesis
Prescribed opioid analgesics outpatient prior to admission	Diagnosis of cancer at time of admission or diagnosed during hospitalization
Received at least one day of TPN therapy	

Definitions

- Constipating medications included in secondary outcomes
  - Iron supplements, calcium supplements, anti-diarrheal agents, anti-cholinergics, tricyclic antidepressants, calcium channel blockers, and non-steroidal anti-inflammatory agents
- Guideline-recommended bowel regimens
  - Senna plus docusate sodium, laxatives, peripherally-acting mu-opioid receptor antagonists
  - Stool softeners alone are not considered appropriate bowel regimen

Results

n=35



Opiate doses ≥ to 30 MME/day had an odds ratio of 4.8 (95% CI 1.03-22.57) versus doses less than 30 MME/day (with concomitant constipating medications), indicating a possible correlation

Results

Potentially Avoided Events Based on NNT=4	
96 days of hospital admission	2 ICU admissions
38 days of ICU admissions	48 total days of TPN
8 total TPNs	3 readmissions

Secondary Outcomes, n=35	
MME/day, mean	35.5
LOS, mean	12.4
Duration of TPN, mean	6.1
ICU admission, n (%)	8 (23)
ICU admission, days	18.9
Readmissions, n (%)	11 (31)
Mortality, n (%)	4 (11)

Conclusions

- Overall, guideline-recommended bowel regimens to treat and prevent OIC were underrepresented
- In order to prevent severe OIC complications, such as SBO, the utilization of guideline-approved OIC prophylaxis should be increased
- Extra consideration could be given to patients on higher MME doses and concomitant medications that cause constipation

Limitations

- Retrospective study
- Poor documentation of home medications

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The authors have no disclosures or conflict of interest

A Retrospective Comparison of Traditional Trough Target Vancomycin Dosing Versus Area Under the Curve (AUC) Target Dosing in a Tri-Campus Healthcare System

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INTRODUCTION

- Vancomycin is a glycopeptide antibiotic that provides coverage for gram positive organisms and is the treatment of choice for methicillin-resistant *staphylococcus aureus* (MRSA).[1]
- According to the most recent vancomycin management guidelines published in 2009, trough serum concentrations serve as a reliable surrogate marker for AUC:MIC targets and a trough of 15-20 mg/L is required to achieve an AUC:MIC ratio of ≥ 400 mg*h/L.
- Recent studies and revised guidelines suggest the current model of aggressive trough target of 15-20 mg/L may not be necessary to achieve the desired AUC:MIC target.[2]
- Additionally, trough targets of 15-20 mg/L have since been identified as an independent risk factor for vancomycin induced nephrotoxicity (VIN).[3]

PURPOSE

- This study aims to validate the novel approach of direct AUC vancomycin management in the Northside Hospital patient population.

METHODS

Study Design: Retrospective chart review

Patient Stratification: documented first trough level of <15 mg/L, 15-20 mg/L, and >20 mg/L

Inclusion Criteria:

- patients ≥ 18 years who received vancomycin therapy for ≥ 72 hours with goal trough level of 15 – 20 mg/L
- at least one documented trough level obtained at steady state (approximately 5 half-lives or just prior to the 4th or 5th dose)

Exclusion Criteria:

- pregnant patients
- any patient with acute kidney injury, documented chronic kidney disease or end stage renal disease

Primary endpoint: Correlation coefficient and best fit regression analysis of traditional trough target vancomycin dosing compared to AUC target vancomycin dosing.

Secondary endpoint: Evaluation of the potential impact of AUC dose management strategy on incidence of VIN.

Statistical Analysis: Linear regression modeling and correlation coefficient

RESULTS

- N =150
- The majority of patients were male (57.3%), mean age of all patients was 61 years.

Table 1. Primary Endpoint

	All Patients (n=150)	Trough <15 mg/dL (n=76)	Trough 15-20 mg/dL (n=41)	Trough >20 mg/dL (n=33)
Mean Trough (mg/L)	15.74 ± 5	11.8± 2.14	17.2 ± 1.3	23.2 ± 2.5
Mean AUC (mg*h/L)	604.6 ± 137.6	498.6 ± 66	643.9 ± 49.1	803.4 ± 67.2
Correlation Coefficient	0.95	0.83	0.49	0.71

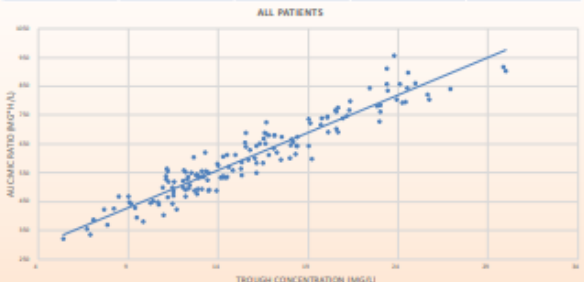

Figure 1. Relationship of trough concentration to AUC:MIC ratio

CONCLUSION

- Overall, we identified a positive relationship between trough and AUC levels as evidenced by a correlation coefficient of 0.95
- Among the three groups stratified by trough levels, patients in the < 15 mg/L treatment arm were most correlated to our theoretical AUC target range of 400-600 mg*h/L (r=0.83) and mean AUC of 498 mg*h/L
- Our study has several limitations, including a relatively small sample size, the use of retrospective mathematical modeling, a short time period of observation for VIN which limits the assessment of our secondary endpoint, and inclusion of patients only requiring trough of 15-20 mg/L
- Our study showed strong correlation to attainment of goal AUC of 400-600 mg*h/L with trough-based dosing of <15 mg/L which supports previously published studies that suggest that a majority of the patients can meet this AUC target with trough concentrations of <15 mg/L.

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Assessing use of four factor prothrombin complex concentrate (4FPCC) for reversal of direct factor Xa inhibitors at an academic medical center

Kendyl Weeks, PharmD Candidate[2]; Jody Rocker, PharmD, BCPS[1]; Lindsey Sellers Coppiano, PharmD[1]

Augusta University Medical Center[1]; University of Georgia College of Pharmacy[2]

BACKGROUND

- Direct factor Xa (fXa) inhibitors are increasingly being used for anticoagulation
- 4FPCC has been used off-label for direct fXa inhibitor-associated bleeding
- Studies assessing the use of 4FPCC for the reversal of bleeding due to direct fXa inhibitors are limited

PURPOSE

The purpose of this project is to assess patient outcomes after administration of 4FPCC for bleeding associated with direct fXa inhibitors.

METHODS

Design: Single-site, retrospective chart review

Inclusion: Patients >18 years old receiving 4FPCC for reversal of apixaban or rivaroxaban associated bleeding between October 1, 2015 and May 30, 2019

Exclusion: Patients receiving 4FPCC for a warfarin related bleed

Data Collection:

- Patient demographics, indication for reversal, weight for 4FPCC dosing, need for emergent surgery, use of other hemostatic agents
- Clinical hemostasis assessed using Sarode Criteria

Table 1. Sarode Criteria[1]

Criteria	Non-Visible	Visible	Musculoskeletal	Intracranial
A	Hgb level stable after treatment	Cessation of visible bleeding within 4h after end of administration of hemostatic agent	Pain and swelling improved within 24h	Hematoma volume stable or increased by <35% on follow up CT within 12h
B	No need for further treatment after 48h of initial treatment		Fasciotomy avoided or carried out with blood loss not exceeding expected	No deterioration of Extended Glasgow Outcome Scale at 24h after presentation*
C	Invasive interventions are avoided or does not have excessive blood loss		No need for further treatment after 48h of initial treatment	
D			No neurologic dysfunction or loss of limb at discharge	No neurologic dysfunction at discharge

*Glasgow Coma Score was used as a surrogate for the Extended Glasgow Coma Score as specified in the Sarode Criteria
Hgb: hemoglobin

RESULTS

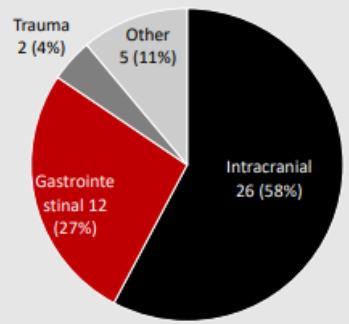
Patient Characteristics:

Table 2. Patient Demographics, N=45

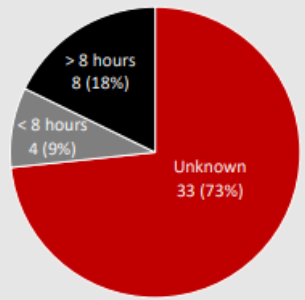
Demographic	
Male, n (%)	51.1
Age, mean (SD)	72.8 (±11.6)
Need for emergency surgery, n (%)	20 (44.4%)
Renal Function	
CrCl < 30, n (%)	7 (15.6%)
CrCl 30 – 50, n (%)	10 (22.2%)
CrCl > 50, n (%)	28 (62.2%)
Anticoagulant	
Rivaroxaban, n (%)	13 (28.9%)
Apixaban, n (%)	32 (71.1%)

SD = Standard deviation, CrCl = Creatinine Clearance

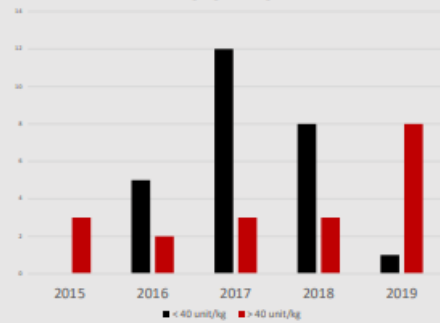
Graph 1. Reversal Indication, n (%)



Graph 2. Time since last dose of anticoagulant n (%)



Graph 4. Weight Based Dosing of 4FPCC Over Time



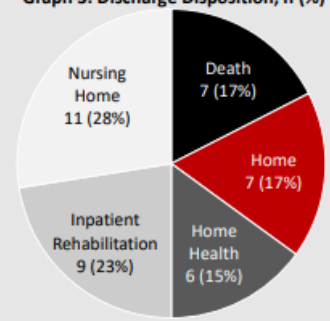
Results:

Table 3. Sarode Criteria Results

Criteria met, n (%)	Non-Visible (N= 14)	Visible (N=3)	Musculo-skeletal (N=1)	Intracranial (N=26)
Criteria A met, n (%)	6 (42.9)	2 (66.7)	1 (100)	19 (73.1)
Criteria B met, n (%)	9 (64.3)	3 (100)	0 (0)	19 (73.1)
Criteria C met, n (%)	12 (85.7)	3 (100)	1 (100)	21 (80.1)
Criteria D met, n (%)	-	-	1 (100)	17 (65.4)
All criteria met, n (%)	3 (21.4)	2 (66.7)	0 (0)	13 (50)

RESULTS

Graph 3. Discharge Disposition, n (%)



DISCUSSION

- Most patients who received 4FPCC achieved clinical hemostasis of their bleed
- Patients who did not survive their hospital admission generally had poor prognosis on admission
- Incidence of deep vein thrombosis and venous thromboembolism associated with 4FPCC was very low

CONCLUSIONS

- Administration of 4FPCC was effective for most patients requiring emergent reversal of the direct fXa inhibitors
- Results are consistent with that of previous studies with similar designs[2,3]

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DISCLOSURE

The authors of this presentation have nothing to disclose regarding this evaluation.

This project is part of the health system medication use evaluation and improvement (MUE) program, which has been reviewed by the Institutional Review Board and determined not to be human subjects research.

Assessing Guideline Adherence and Characterizing Risk Factors for *Clostridioides difficile* Infections at an Academic Medical Center

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University of Georgia College of Pharmacy, Athens, GA[1] and AU Medical Center, Augusta, GA[2]

BACKGROUND

- *Clostridioides difficile* (*C. diff*) is a bacterium that colonizes the human gastrointestinal tract and causes diarrhea and colitis.[1]
- *C. diff* infection (CDI) is classified as one of the five urgent threats according to the Center for Disease Control as it causes over 200,000 infections per year as well as over 12,000 deaths per year.[2]
- Management of CDI includes proper testing, classification, treatment and infection control.[1]
- Various risk factors for CDI have been identified and include patient-specific factors as well as medications.[1]

PURPOSE

The primary objective of this project was to assess institution-specific guideline adherence and to characterize risk factors associated with CDI, particularly previous antibiotic exposure, at AU Medical Center (AUMC).

METHODS

Design: Single site retrospective review
Data Collection:

- Patient Demographics: age, gender, weight, facility transfer, baseline white blood cell count (WBC) and serum creatinine (SCr)
- Guideline Adherence: severity of CDI reported, infectious disease consults, polymerase chain reaction (PCR) order and collection dates, length of stay until diagnosis, CDI treatment and duration, contact precautions order, previous CDI occurrences in past year or 60-day recurrences, and 30-day all-cause mortality
- Risk Factors: concurrent medications at time of diagnosis, history of antibiotic administration within 90 days, presence of malignancy, immunosuppression, organ or bone marrow transplant, chronic kidney disease, bowel disease, gastrointestinal surgery, or enteral tube feeding, hospitalization within 90 days, antidepressant (for depression) or steroid use in previous 60 days

Inclusion: Patients of all ages with documented CDI testing from November 1, 2018 to May 31, 2019 at AUMC
Exclusion: Duplicate encounters of CDI after initial episode were classified as recurrent

RESULTS

Adherence:

Table 1. Patient Demographics

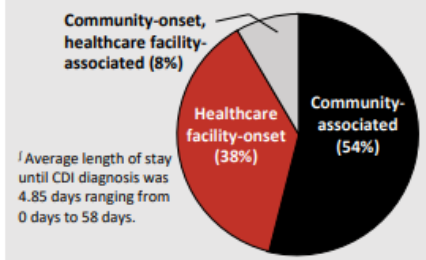
Characteristics	n = 178 [range]
Male (%)	44.9
Age (yr)	51.3 [0.25 - 100]
Adult Patients > 18 years (%)	*87.1*
Weight (kg)	71.9 [4-186.7]
Baseline WBC (10^3 cells/mm^3)	11.1 [0-52.8]
Baseline SCr (mg/dL)	1.45 [0.17-11.1]
From Outside Facility (%)	21.3
Presence of CDI in past year (%)	13

Table 2. Adherence Assessment

Measurements	n = 178 (%)
≥ 3 loose stools prior to testing	113 (63.5)
PCR ordered†	151 (84.8)
GI Panel ordered	27 (15.2)
PCR collected ≤ 24h after PCR order	137 (77)
Contact precautions ordered ≤ 24h after PCR order	106 (59.6)
Correct treatment regimen	100 (56.2)
Correct treatment duration	98 (55.1)

†Both PCR and GI Panel orders were collected in 19 patients (10.7%).

Figure 1. Type of CDI[ƒ]



[ƒ]Average length of stay until CDI diagnosis was 4.85 days ranging from 0 days to 58 days.

Table 3. Patient Outcomes

Outcomes	n = 178
Length of stay (d)	6.7 (1-83)
30-day all-cause mortality[ǂ]	18 (10.1%)
Recurrence within 6 months of successful treatment	23 (12.9%)

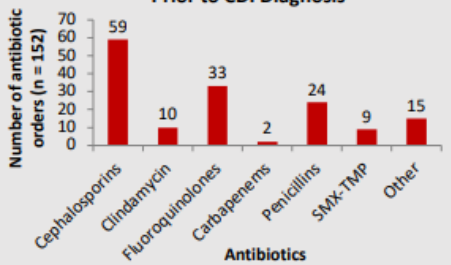
[ǂ]One patient died from healthcare facility-onset CDI.

Risk Factors:

Table 4. Presence of Pre Specified Risk Factors

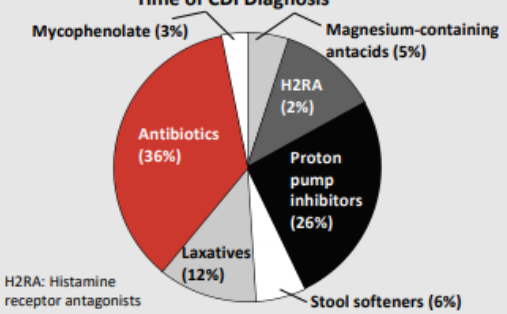
Characteristic	n = 178 (%)
Antibiotic use within 90 days	99 (57)
Presence or history of malignancy	126 (71)
Immunocompromised (other than cancer)	13 (7)
Recent hospitalization within 90 days	82 (46)
History of organ or bone marrow transplant	13 (7)
History of chronic kidney disease	32 (18)
History of bowel disease	10 (6)
History of gastrointestinal surgery	16 (9)
Enteral tube feeding	24 (13)
Antidepressant use in past 60 days (for diagnosis of depression)	38 (21)
Steroid use in past 60 days	69 (39)

Figure 2. Antibiotics Used 90 days Prior to CDI Diagnosis



Other: doxycycline, azithromycin, vancomycin, aminoglycosides, linezolid, nitrofurantoin
SMX-TMP: sulfamethoxazole-trimethoprim

Figure 3. Concurrent Medications at Time of CDI Diagnosis



H2RA: Histamine receptor antagonists

DISCUSSION

- Thirty-seven percent of patients were tested without presence of loose stools
- Of those with loose stools, 12% were on laxatives at time of testing
- Over 20% of specimens and 40% of contact precautions were not collected or ordered within 24 hours of PCR order
- Only half of the study population was treated for CDI according to current IDSA guideline recommendations and AUMC protocol
- Concurrent medication use at the time of CDI diagnosis may have potentiated CDI symptoms
- Limitations: limited chart information in regards to histories of antibiotic use and CDI recurrences

CONCLUSIONS

Further antimicrobial stewardship initiatives at AUMC can help lower CDI rates particularly in patients at increased risk for CDI development.

CLINICAL IMPLICATIONS

- Prior to collecting specimens for CDI diagnosis, clinicians should consider other causes of loose stools including medications
- In order to prevent the spread of infection, contact precautions should be ordered at time of PCR order
- Electronic order sentencing should be updated in accordance with newest guidelines to prevent medication errors
- Patients should be discharged with only remaining duration of antibiotic therapy

DISCLOSURE

Amanda Wolfe, Aubrey Slaughter, Kendyl Weeks, Sonal Patel, Allison McMullen, Joze Vasquez, and Dianne May have nothing to disclose regarding this evaluation.

REFERENCES

[1]McDonald LC, Gerding DN, Johnson S, et al. Clinical Practice Guidelines for Clostridium difficile Infection in Adults and Children: 2017. Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). Clin Infect Dis 2018; 66:987.
[2]Center for Disease Control. (2019) Antibiotic Resistance: Biggest Threats & Data. Retrieved from https://www.cdc.gov/drugresistance/biggest-threats.html.

This project is part of the health system medication use evaluation and improvement (MUE) program, which has been reviewed by the Institutional Review Board and determined not to be human subjects research.

GSHP Virtual Poster Session 2020

PRACTITIONER POSTER

Impact of Pharmacist Intervention in an Outpatient Internal Medicine Clinic During Hospital Discharge Clinic Follow Up Visits on Patient Readmission Rates

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INTRODUCTION

- Pharmacist involvement in medication reconciliation and multidisciplinary teams has been the focus of several studies.
- Outcomes in pharmacist led post discharge intervention reduced the rate of 30-day hospital readmissions in elderly patients with heart failure.1
- Pharmacist led medication reconciliation and counseling reduced the 30-day readmission rates in a single academic center, 16.8% versus 26% with usual care.2
- Pharmacists do not have consistent involvement in medication reconciliation during hospital follow up visits for patients seen in the Internal Medicine Clinic at W.T. Anderson Health Center (AHC).
- This quality improvement initiative was designed to determine the impact of pharmacist led medication reconciliation for hospital follow up visits in an outpatient internal medicine clinic.

OBJECTIVES

Primary

- Compare the 30-day readmission rate for hospital discharge clinic visit patients who had pharmacist led medication reconciliation versus the current standard of care (physician/nurse only team)

Secondary

- Compare 60-day readmission rates
- Determine reasons for admission and readmission
- Evaluate interventions made by pharmacists
- Determine average per patient cost for admissions and readmissions

METHODS

Inclusion Criteria

- All patients who attended a hospital discharge appointment from April 2017 to March of 2019 were included.
- Pharmacists conducted medication reconciliations during hospital follow up visits from April 2018 to March 2019.
- Medication reconciliations were conducted as the pharmacists' schedules permitted. Patients were only included in the intervention group if a pharmacist conducted the medication reconciliation.
- The control population was obtained from reports spanning April 2017 to March 2018.

Exclusion Criteria

- Patients were excluded if they were admitted to the emergency center (EC) the day of their hospital discharge clinic visit to AHC.

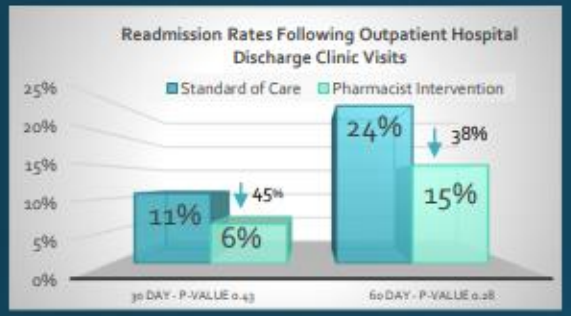
Analysis

- Chi Square Tests were applied to primary and secondary outcomes for nominal data.
- Student's T-Test was applied to financial data.

RESULTS

30- and 60-Day Readmission Rates

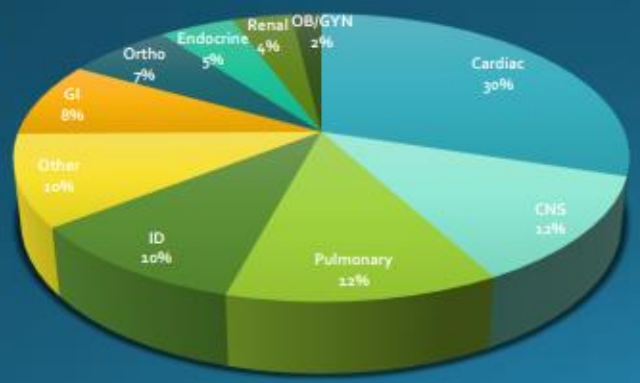
- A total of 110 patients were analyzed. There were 74 patients in the Standard of Care group and 33 in the Pharmacist Intervention group.



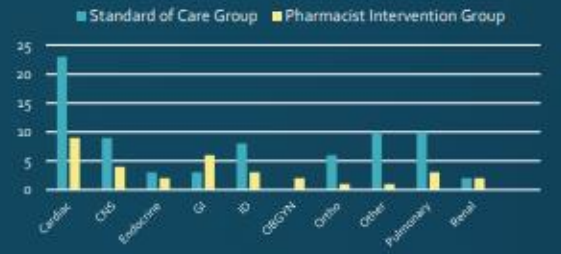
Reasons for EC or Hospital Admission

- The predominant reason for all initial EC visits or hospital admissions in the AHC population from April 2017 to March 2019 was a cardiac related diagnosis.
- CNS, Pulmonary, ID, and Other categories each accounted for 10-12% of diagnoses.
- Together these five therapeutic categories comprised 74% of the initial admissions to the EC or hospital for the two-year study period.

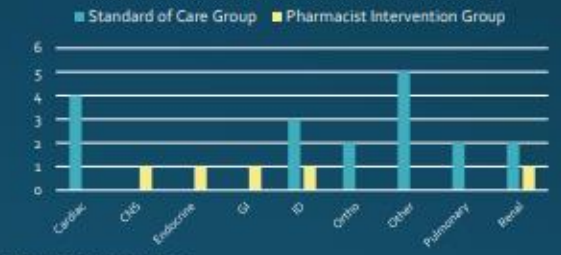
Therapeutic Categories for Initial EC Visit/Hospital Admission (2017-2019)



Initial Reasons for EC Visit/Hospitalization per Group



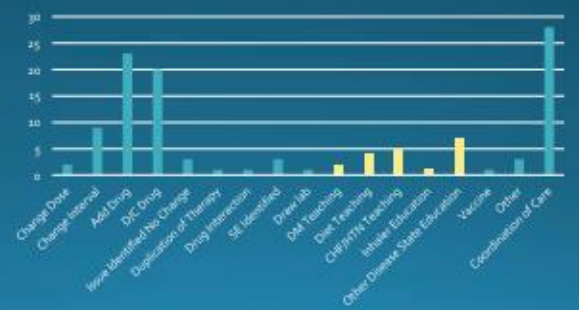
Diagnoses for 60-Day Readmissions to EC/Hospital



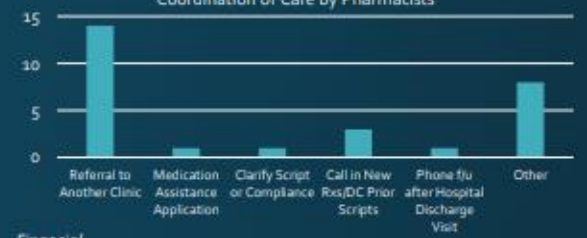
Pharmacist Interventions

- There were 114 pharmacist interventions during the study period.
- The most common intervention was assisting in Coordination of Care.
- If all education related interventions were combined, this would total 19 interventions. Thus, education was a prominent component to pharmacist intervention in the study period.

Pharmacist Interventions



Coordination of Care by Pharmacists



Financial

- The financial impact of interventions made cannot be completely assessed as the pharmacists' time was not recorded .
- For the factors assessed, the initial cost values are considered statistically different.
- Values post readmission do not hold the significance despite cost dropping of $2,360 per patient.

	Standard of Care	Pharmacist Intervention	P-value
Total Direct Variable Cost (TDVC)	$237,126 (74)	$195,500 (33)	
TDVC per patient	$3,205	$5,924	0.02
TDVC (Readmission)	$68,438 (18)	$7,211 (5)	
TDVC per Patient (Readmission)	$3,802	$1,442	0.20

CONCLUSION

Statistical significance was not demonstrated. However, all endpoints studied improved in the intervention group. Considering this, limited sample size, and chance of a type II error, results might still support pharmacist involvement in AHC hospital discharge visits.

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