Evaluation of Colorectal and Hip/Knee Arthroplasty Surgical Site Infections at Ocean University Medical Center

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INTRODUCTION

- A surgical site infection (SSI) is defined as an infection that occurs up to 30 days after surgery without an implant, or within one year if an implant is placed
- In 2021, there were 19 reported SSIs associated with colorectal and hip/knee replacement surgeries at Ocean University Medical Center (OUMC)
- The 2013 antimicrobial prophylaxis surgery guidelines published by ASHP, IDSA, SIS, and SHEA have developed guidance on appropriate antimicrobial prophylaxis in order to combat SSIs
- Ideally, an antimicrobial agent for surgical prophylaxis should be: active against the pathogens most likely to contaminate the surgical site, given at an appropriate dose and time, and administered for the shortest effective period to minimize the development of resistance
- In the preoperative phase of care, most antimicrobial prophylaxis should be administered within 60 minutes before an incision is made in order to provide serum concentrations that exceed the minimum inhibitory concentration (MIC) for the probable organisms associated with the procedure

OBJECTIVES

- Primary
  - Evaluate appropriate preoperative antibiotic administration based on the type of surgical procedure
- Secondary
  - Appropriate weight based dosing of preoperative antibiotics
  - Appropriate timing of preoperative antibiotic administration
  - Appropriate duration of postoperative antibiotic

METHODS

- An infection prevention report was obtained and exported on a protected excel spreadsheet to identify all the SSIs for OUMC from January 1, 2021 to December 30, 2021
- Appropriate preoperative antibiotics was defined as administration of a guideline recommended agent for the given procedure
- Appropriate timing was defined as antibiotics administered within guideline recommended time frames prior to procedure start time
- Weight based doses were compared to the guideline recommendations and patient weight at time of administration to determine appropriateness
- Appropriate postoperative antibiotic duration was defined as postoperative antibiotics administered for < 24 hours after the procedure was completed

RESULTS

Figure 1. Amount of patients with SSI's based on procedure type

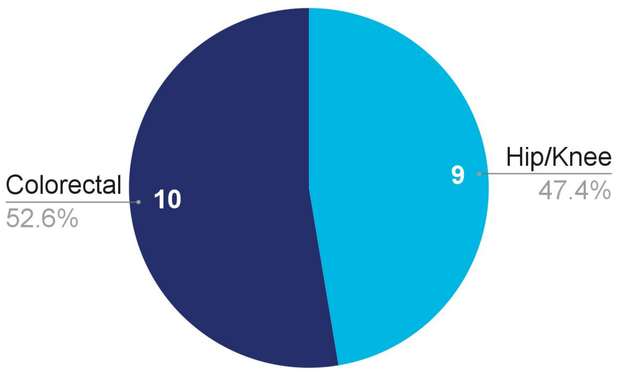


Figure 2: Preoperative antibiotic administered prior to surgery

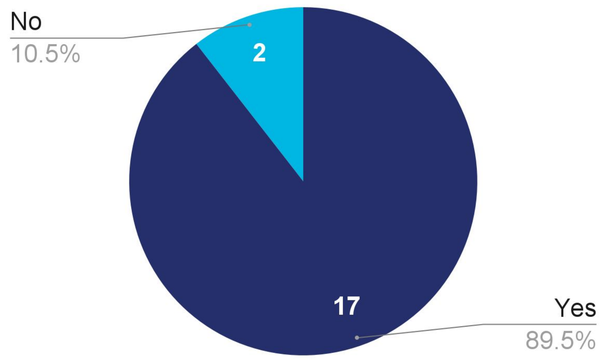


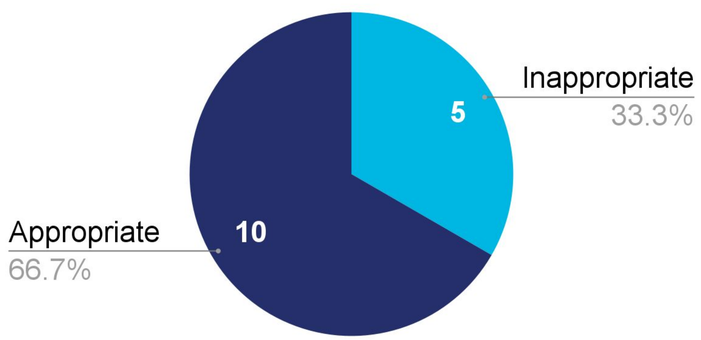
Table 1. Appropriate preoperative antibiotics administered based on surgery

Antibiotics administered	Allergy: Agent [Reaction]	Type of surgery	Appropriate (Yes/No)
Vancomycin	Penicillin [Hives]	Colorectal	No
Vancomycin	Penicillin [Hives]	Colorectal	No
Piperacillin/ Tazobactam	None	Colorectal	No
Piperacillin/ Tazobactam	None	Colorectal	No
Piperacillin/ Tazobactam	None	Colorectal	No
Ampicillin/ Sulbactam	None	Colorectal	Yes
Cefotetan	None	Colorectal	Yes
Ertapenem	None	Colorectal	Yes
Ampicillin/ Sulbactam	None	Colorectal	Yes
Vancomycin	Penicillin [Anaphylaxis]	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes
Cefazolin	None	Hip/Knee Arthroplasty	Yes

Table 2. Appropriate dosing of weight based preoperative antibiotics

Antibiotics administered	Dose administered (g)	Weight (kg)	Appropriateness (Yes/No)
Vancomycin	1	52.1	No
Vancomycin	1	137.8	No
Vancomycin	1.75	117	Yes
Cefazolin	2	77.1	Yes
Cefazolin	2	58.9	Yes
Cefazolin	2	110.2	Yes
Cefazolin	2	90.7	Yes
Cefazolin	2	73.9	Yes
Cefazolin	2	78.4	Yes
Cefazolin	2	66	Yes

Figure 3: Appropriate Postoperative Antibiotic Duration



DISCUSSION

- Of the 10% of patients who did not receive preoperative antibiotics, it was found that 1 of those 2 patients had received antibiotics within a 24 hour time period prior to the procedure
- Piperacillin/tazobactam was administered for three patients that had undergone colorectal procedures
  - Although its spectrum of coverage matches what is needed for colorectal procedures, it is not a recommended choice per SSI guidelines
- Vancomycin was found to have been administered for two patients that had undergone colorectal procedures
- Two of three vancomycin orders (67%) were found to have inappropriate weight based dosing, as shown in table 2
- Timing of preoperative antibiotics was appropriate in 76% (13 of 17) patients
  - All preoperative piperacillin/tazobactam orders were not administered within the appropriate time frame
- When assessing the overall compliance with antibiotic selection and timing, 58% (11 of 19) of cases followed all guideline recommendations

CONCLUSIONS

- OUMC does not have a protocol in place regarding appropriate selection and timing of antibiotics in the operative setting
- Incorporating a protocol would encourage antibiotic administration within 60 minutes (or 120 minutes) before the first cut regardless of current inpatient antibiotics ordered
- OUMC has incorporated an order set for preoperative antimicrobial prophylaxis titled “Pre-Op Antibiotics for Surgical Prophylaxis” to help guide clinicians for appropriate prescribing
- Based on the results of this study, it was determined the order set was not utilized by some prescribing physicians
- An inservice/in-person education to physicians will be presented covering the orderset and surgical prophylaxis

REFERENCES

- Bratzler, D., Dellinger, E., Olsen, K., et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery, American Journal of Health-System Pharmacy, Volume 70, Issue 3, 1 February 2013, Pages 195-283