Evaluation of Surgical Antibiotic Prophylaxis Compliance at a Large, Tertiary Medical Center

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**Background**

- Surgical site infections (SSIs) are a significant cause of morbidity, prolonged hospitalization, and mortality.
- Studies estimate SSIs contribute to nearly one million additional inpatient days per year and SSI mortality rate has been estimated to be 3%.
- Additionally, SSIs in the US alone have an annual cost of approximately $3.5 billion.
- A prior quality improvement project performed at a large, tertiary medical center in 2018-2019 identified that consistent adherence to the system surgical antibiotic prophylaxis (SAP) guideline and institutional antibiogram for antibiotic selection was an area for improvement.
- This was particularly evident in hysterectomy and colorectal surgeries; therefore, the institutional SSI committee implemented quality improvement changes in July 2020.
- For hysterectomies, the committee recommended adding metronidazole to cefazolin.
- For colorectal surgeries, the preferred agent was changed from cefazolin plus metronidazole to ceftriaxone plus metronidazole.

**Purpose**

- To evaluate the overall compliance of SAP selection prior to incision based on guideline recommendations from the institutional SSI committee.

**Objectives**

- Assess hysterectomy and colorectal surgery peri-operative antibiotic prophylaxis for compliance from previous recommendations made by the institutional SSI committee.
- Measure the percent change of primary surgeon and anesthesiologist SAP selection from the pre-intervention analysis phase to post-intervention analysis phase.

**Methodology**

- Institutional Review Board (IRB)-approved.
- Electronic health record (EHR)-based retrospective and prospective analysis of hysterectomy and colorectal surgeries performed at a tertiary medical center.
- Study population:
  - Patients ≥ 18 years old
  - Underwent a hysterectomy or colorectal surgery
- Study period:
  - Pre-intervention: October 2019-March 2020
  - Post intervention: July-December 2020
  - April-June 2020 was excluded due to the COVID-19 pandemic.
- Exclusion criteria:
  - Underwent greater than one type of surgery
  - All patients meeting inclusion criteria were included
  - Primary outcomes: overall compliance of SAP and the percent change from the pre-to post-intervention analysis phase.

**Results**

**SAP Review - Regimen Selection**

- Figure 1: Hysterectomy SAP Regimen Percent Use
- Figure 2: Colorectal SAP Regimen Percent Use

**Clinical Outcomes**

**Hysterectomy SAP**

- 35% achieved the primary outcome of compliance to the system guidelines in the pre-intervention analysis.
- 71.6% achieved the primary outcome of compliance to the system guidelines in the post-intervention analysis.
- Overall, there was a 105% change in SAP selection for hysterectomy surgeries. 1,793 patients were included in the pre-intervention analysis and 1,939 patients were included in the post-intervention analysis.

**Clinical Outcomes (continued)**

- Colorectal SAP
  - 75.8% achieved the primary outcome of compliance to the institutional guidelines in the pre-intervention analysis (cefazolin or ceftriaxone plus metronidazole).
  - 80.5% achieved the primary outcome of compliance to the institutional guidelines in the post-intervention analysis.
  - Overall, there was a 75.2% change in SAP selection for colorectal surgeries to the institutional preferred regimen (cefazolin to ceftriaxone).

**Surgical Site Infection (SSI) Occurrence**

- No SSIs occurred in October-December 2019 for either procedure.
- Four SSIs occurred in January-March 2020 for colorectal surgeries. All cases included cefazolin plus metronidazole.
- Two SSIs occurred in July-December 2020 for colorectal surgeries. Both cases included ceftriaxone plus metronidazole.
- One SSI occurred after a hysterectomy in August 2020 using the regimen cefazolin plus metronidazole.

**Study Limitations**

- Retrospective, non-randomized study.
- Data was pulled from EHR via retrospective chart review by single reviewer.
- Could not include April-June 2020 data due to the absence of elective surgeries during the start of the COVID-19 pandemic.
- Did not assess patients with a history of MRSA who should have received vancomycin pre-operatively.

**Conclusions**

- This study was performed to assess hysterectomy and colorectal surgery peri-operative antibiotic prophylaxis for compliance from previous recommendations made by the institutional SSI committee and measure the percent change from the pre-intervention analysis.
- The rate of change to the recommended SAP was 105% and 75.2% for hysterectomy and colorectal surgeries, respectively.
- The rate of incorrect use associated with the use of cefazolin in colorectal surgeries.
- The rate of incorrect use of an alternative regimen for a beta-lactam allergy in hysterectomies decreased from 2.6% to 1.5% (pre- and post-intervention, respectively).
- The rate of incorrect use of an alternative regimen for a beta-lactam allergy in colorectal surgeries decreased from 2.4% to 2% (pre- and post-intervention, respectively).
- Four SSIs occurred in the pre-intervention phase compared to two SSIs in the post-intervention phase in colorectal surgeries. However, it is difficult to assess if antibiotic selection was the main cause of infection, as there were many other variables to consider:
  - Individual provider data was collected and shared internally for the purpose of quality improvement.
  - Additional statistical analysis is currently being assessed.

**References**


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