Ertapenem and Surgical Prophylaxis: The Impact of Antimicrobial Stewardship Interventions on Inappropriate Carbapenem Utilization at a Community Teaching Hospital

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Introduction

- The Centers for Disease Control and Prevention (CDC) have recognized carbapenem-resistant Enterobacteriaceae (CRE) as an urgent threat in the United States. Inappropriate use of carbapenems appears to be a contributing factor in the development of CRE.
- At AtlanticCare Regional Medical Center (ARMC), we have observed an average of 14 CRE isolates per year since 2016. Additionally, there has been a recent outbreak of Carbapenem-resistant Acinetobacter baumannii (CRAB) within our region. Internal analysis of ertapenem utilization revealed a significant number of providers using this antibiotic inappropriately for surgical prophylaxis, specifically abdominal procedures.
- In response, the Antimicrobial Management TEAM (AMT) at ARMC delivered a multimodal intervention to promote the appropriate use of ertapenem.

Objective

- The primary objective of this pre-post study is to evaluate the impact of our interventions on ertapenem utilization for surgical prophylaxis.

Methods

- From March to October 2019, ertapenem utilization for surgical prophylaxis was analyzed. Our AMT interventions were implemented in June 2019. Reports generated from SurgiNet software were evaluated to identify all antibiotics utilized for abdominal surgical prophylaxis. This collection included usage of ertapenem and other antibiotics of type of abdominal surgery, and prescriber information. In addition, surgical site infections (SSI) rates were monitored. Appendectomy and trauma cases were excluded.
- The interventions employed by our AMT included the following:
  - Extensive provider education.
  - Review and update of our surgical prophylactic antibiotic protocol (SPAP).
  - Monitoring of policy compliance by adding ertapenem utilization to the division of general surgery quality scorecard.
- The antibiotics recommended in the SPAP are consistent with the American Society of Health-System Pharmacists Antimicrobial Prophylaxis in Surgery guideline.
- As a quality measure, our stewardship initiative was considered successful if monthly ertapenem utilization comprised less than 5% of all prophylactic antibiotics dispensed for surgical prophylaxis. Data collection included usage of ertapenem and other antibiotics.

Results

- In total, 1,080 cases were reviewed. To trend ertapenem utilization, a percentage was calculated for each month by comparing the number of ertapenem cases to the total number of surgical prophylaxis cases.
- As a quality measure, our stewardship initiative was considered successful if the use of ertapenem was <5% (Fig.1). The rate of SSI did not increase after AMT intervention, suggesting the antimicrobial program is safe and effective for surgical prophylaxis in our patient population at ARMC.

Discussion

- Our AMT delivered effective interventions to minimize prophylactic use of ertapenem (Fig.1), with the quality measure of <5% utilization target achieved each month after June (Table 1). In total, ertapenem use was reduced by 72.4% (Fig.2). The SSI rates were monitored. Appendectomy and trauma cases were excluded.
- As an additional measure to further limit ertapenem use, AMT continues to review surgical prophylaxis computerized provider order entry sets and where appropriate, replaces ertapenem with the antibiotics recommended in our SPAP.

Conclusion

- AMT interventions were successful at reducing prophylactic use of ertapenem through provider education, SPAP implementation, and quality measures. The AMT will continue to identify, monitor, develop, and deliver interventions in an effort to reduce the incidence of CRE and CRAB as a part of the ongoing stewardship service at ARMC.

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References