Title: Evaluation of Carbapenem Use Restriction in a Community Hospital

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Learning objective: Report the impact of the antibiotic therapy restriction policy on the carbapenem utilization and cost-savings at a community hospital.

Background: Carbapenems are broad-spectrum antibiotics used to treat multidrug-resistant organisms, intra-abdominal infections, and severe, life-threatening conditions. Inappropriate carbapenem utilization has been associated with a rising incidence of carbapenem-resistant Enterobacteriaceae (CRE*), Clostridioides difficile*, and other drug-resistant organisms. To minimize inappropriate carbapenem utilization and resistance, a restriction policy was implemented for this community hospital's inpatient practice in April 2020.

Methods: This is a retrospective pre and post-intervention analysis on all adult patients who received greater than 24 hours of carbapenem therapy (ertapenem or meropenem) from January 1, 2019, to November 30, 2020, at the community hospital. Assessment of appropriate carbapenem utilization was made based on the hospital's antimicrobial stewardship policy, which restricted their use to infectious disease (ID) providers and surgeons performing abdominal surgeries. An ID physician consult or consultation with an ID pharmacist would be required to continue carbapenem treatment empirically beyond 24 hours. Data collected includes age, sex, race, indication, antibiotic allergies, adverse reactions to carbapenems, culture results, ID consult, number of days and doses of carbapenem therapy, history of multi-drug resistant organism (MDRO), and alternative antibiotic therapy options and their projected cost differences.

Results: We have reviewed 154 patients; 86 were from the pre-intervention phase and 68 from the post-intervention phase. The patients' average age was 63 years old, 94% of the patient was Caucasian, and 83 patients were female in the study. About 35% of patients had a penicillin allergy, and 37 people had a history of multi-drug resistant organisms (MDROs). Out of 37 patients, 21 patients had extended spectrum beta-lactamase (ESBL), and one patient had CRE in the past. The most common infection sites treated with carbapenem were intra-abdominal, followed by pneumonia and urinary tract infection. ID providers were consulted about 30% in the pre-intervention treatment and 43% during the post-intervention treatments. 30% of carbapenem treatments were prescribed appropriately in the pre-intervention phase, and 54% during post-intervention therapy. The total cost of carbapenem therapy during the observation period was estimated at $14,541.54. The total cost of alternative antimicrobial treatment to the carbapenems was calculated at $4,423.23.

Conclusions: Carbapenem therapy's appropriateness has increased during the post-intervention phase compared to pre-intervention treatments. The percentage of ID consults during the pre-intervention phase was similar to post-implementation therapy. The projected cost saving for utilizing the alternative therapies was 70% when compared to carbapenem treatment. Some of the study's limitations include retrospective data collection, single-centered, charting accuracy, and concurrent intervention by ID pharmacist, which could have influenced the data before the restriction policy implementation. The study's final findings will be presented to local physicians and surgeons to provide education on decreasing the use of empiric carbapenem therapy for abdominal surgeries.