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1097. An Antimicrobial Stewardship Intervention to Optimize Cefazolin Dosing for Surgical Prophylaxis

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Background. Guidelines for antimicrobial prophylaxis in surgery recommend cefazolin dose be adjusted based on patient weight. Adults weighing ≥ 120 kg should receive a 3 g dose, all other adult patients should receive a 2 g dose pre-operatively. To promote guideline adherence, an antimicrobial stewardship pharmacist-driven dose optimization intervention was implemented.

Methods. Retrospective, pre (February 1, 2017–March 31, 2017)/post (February 1, 2018–March 31, 2018) study evaluating the impact of a pharmacist-driven cefazolin dose optimization intervention at a large health system. An alert within the electronic health record notified pharmacists during order verification when cefazolin dose from a surgical prophylaxis order set did not match weight-based recommendations. All patients with cefazolin orders for surgical prophylaxis were included; pediatric and pregnant patients were excluded.

Results. Pre-group included 9,830 patients, post-group 10,025 patients. In both groups, the mean age was 58 years, mean weight 87 kg, and 8% of patients weighed ≥ 120 kg. Approximately 21% of patients were seen at the academic medical center, 8% at ambulatory surgery centers, and the remainder amongst 10 community hospitals. Most common surgical procedure types were orthopedic (26%), general surgery (21%) and urologic (10%). Primary cefazolin dose was 2 g in 89.8% vs. 88.7%, followed by 3 g 6.6% vs. 6.9% and 1 g in 3.9% vs. 4.4%, pre- and post-intervention, respectively. Overall adherence to weight-based cefazolin dosing was 92.2% pre-group and 92.4% post-group. In patients weighing ≥ 120 kg, adherence improved from 62% (514/827) to 71% (582/817) post-intervention, $P < 0.001$. Adherence was better both pre- and post-intervention when an order set was used (pre: order set 95.0% vs. no order set 85.9%, $P < 0.001$; post: order set 96.4% vs. no order set 84.8%, $P < 0.001$). There were no differences between surgical services or hospital locations. Investigation of guideline nonadherent cases found order sets without updated dosing recommendations and allowed for targeted education efforts.

Conclusion. Overall adherence to cefazolin weight-based dosing recommendations for surgical prophylaxis was high, especially with the use of order sets. Pharmacist-driven dose optimization intervention improved guideline adherence in patients weighing ≥ 120 kg.

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1098. Perioperative Antibiotic Stewardship for Interventional Radiology Cases Improves Antibiotic Decision-Making

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Background. Appropriate periprocedural antibiotic prophylaxis is critical to optimize in order to reduce excessive antibiotics exposure for patients and to minimize

the risk for procedure-related infection. Wrong antibiotic or excess antibiotics increase the risk for development of antimicrobial resistance, *Clostridium difficile* infection, adverse side effects. Incorrect or missed antibiotic can put the patient at risk for an infection.

Methods. Interventions included education of vascular and interventional radiology (IR) consult RN and physicians regarding updated institutional antimicrobial prophylaxis guidelines for vascular and IR procedures, creation of a consulting template that incorporated ongoing antibiotics. Review of recent cultures was incorporated into workflow and consult evaluation. Handoff between the IR RN and IR attendings was expanded to include a review of antimicrobials.

Results. All IR cases were reviewed for antibiotic administration for 3 months pre- and post-intervention. In the pre-intervention timeframe, 23 of 290 procedures (7.9%) were associated with inappropriate antibiotic administration, further delineated as 6 cases where no antibiotics were given, 7 cases of inappropriate antibiotics administered, and 10 cases where extraneous antibiotics were administered. Of the 39 total procedures where antibiotics were indicated, 17 (43.6%) were associated with antibiotic errors. In the post-intervention period, only 9 of 309 total procedures (10.3%) were associated with inappropriate antibiotic administration: missed antibiotics in 3 cases, inappropriate antibiotics in 4 cases, and unnecessary antibiotics in 2 cases. Of the 32 cases where antibiotics were indicated, only 7 (21.9%) were associated with antibiotic errors.

Conclusion. Incorporating current antibiotics and review of culture data in a preoperative review and template for patients who need a surgical procedure helps guide appropriate antibiotic decision-making and greatly decreases administration of unnecessary antibiotics.

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1099. The Correlation Between Antimicrobial Utilization and Resistance in a Medical Intensive Care Unit

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Background. The relationship between antimicrobial utilization and the incidence of antimicrobial-resistant pathogens can be obscured by a lack of longitudinal data. We used 9 years of antimicrobial utilization data combined with a unique metric of antimicrobial resistance to examine this relationship.

Methods. The medical intensive care unit (MICU) at UVMMC has 22 beds. The unit's size and location did not change during the study. Since 2010, defined daily doses (DDD) in the MICU for ceftazidime, ceftriaxone, cefepime, ciprofloxacin, levofloxacin, piperacillin-tazobactam, meropenem, and vancomycin were measured. Concurrently, a database of positive cultures acquired in MICU, whether colonization or infection, was built for 6 selected organisms: *Clostridioides difficile*, methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant enterococci, ceftazidime-resistant Gram-negative bacilli, fluoroquinolone-resistant *Pseudomonas aeruginosa* (QRPA), and *Stenotrophomonas maltophilia*. The occurrence of these 6 organisms/1,000 patient-days is termed "resistance index." Data for both metrics were collected in the same way, by the same person, throughout. The relationship between these 2 measures was analyzed with simple linear regression.

Results. From 2010 to 2018, the use of 8 broad-spectrum antibiotics fell in a linear fashion from 12.11 to 4.39 DDD/100,000 patient-days. The resistance index for the 6 multidrug-resistant organisms in MICU also fell in parallel from 6.5 to 1.5/1,000 patient-days (figure, $r = 0.9$, $P = 0.001$). For the 2 quinolones specifically, use fell from 2.26 to 0.18 DDD/100,000 patient-days, while the occurrence of QRPA fell from 1.5 to 0/1,000 patient-days (figure, $r = 0.84$, $P = 0.004$).

Conclusion. These longitudinal data, collected consistently over 9 years, clearly demonstrate a significant correlation between broad-spectrum antibiotic use and the occurrence of multidrug-resistant organisms in a MICU. A steep, linear decline in antibiotic use was correlated with a parallel fall in these 6 organisms. These data demonstrate that sustained, meaningful reductions in antimicrobial utilization in a MICU can result in significant reductions in the incidence of antimicrobial-resistant pathogens.

