The Financial Burden of Cefazolin Alternatives in a Single Large Hospital System

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INTRODUCTION:

In our hospital system, vancomycin is the primary alternative antibiotic used as a cefazolin substitute for patients reporting penicillin allergies who plan to undergo Total Knee Arthroplasty (TKA) and Total Hip Arthroplasty (THA). A large body of research has shown that this use of non-cefazolin alternatives significantly increases the rate of periprosthetic joint infection.

Beyond the risk posed to patients, the practice of substituting cefazolin for vancomycin involves preoperative allergy testing and intravenous administration that increases surgery wait times and requires the recruitment of additional staff.

The purpose of this study was to quantify the hospital-specific time and cost expenses incurred by this practice.

METHODS:

We created a model that captured the cost incurred by our hospital for patients who receive intravenous vancomycin rather than cefazolin before arthroplasty surgery. The model included the cost of supplies, the cost of the antibiotic used, and the cost of the salaries of the workers in both preoperative holding and operating rooms.

Upon factoring in the number of arthroplasties performed in our hospital system, the percentage of the population presenting with a penicillin allergy, and the increased rate of infection with non-cephalosporin antibiotics, we derived yearly expense figures for our hospital system.

RESULTS:

According to the CDC, less than 1% of the population have IgE-mediated allergic reactions to penicillins. Our institution relies primarily on the patient's report of history of a penicillin allergy to inform non-cephalosporin use.

We found that a single patient treated with vancomycin requires an additional hour in preoperative holding, costing the hospital $10,700 more than a patient receiving cefazolin, after accounting for holding and operating room staffing, supplies, and medication expenses. Our institution performs approximately 9,000 TKAs and THAs annually. This extrapolates to an estimated annual cost of $7,704,000.

The 2002-2017 Nationwide Inpatient Sample (NIS) arthroplasty infection rate of approximately 1.5% was used. With the existing literature that shows a significant 32% decrease in infection rate when using cefazolin over vancomycin, our calculations suggest that the cost of infection for patients who received vancomycin cost an additional $386,000 for a total annual cost of over $8,000,000.

DISCUSSION AND CONCLUSION: On top of the clear cost to patients who risk higher infection and revision rates by using cefazolin alternatives, there is a significant cost to hospital systems that is seldom highlighted in the conversation around penicillin allergies. Multi-center studies are warranted to comprehensively detail the expenses incurred and examine how these costs may be reduced.