Similar Efficacy and Lower Cost Associated with Ceftazidime Compared to Tobramycin in Antibiotic Spacers

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INTRODUCTION:

An aminoglycoside, often tobramycin, along with vancomycin are commonly used in antibiotic spacers for the treatment of prosthetic joint infection (PJI). Three years ago, due to a national shortage of tobramycin, we transitioned from tobramycin to ceftazidime, coupled with vancomycin. Ceftazidime has similar antibiotic properties to tobramycin, however, is rarely clinically used due to historical concerns over its heat stability in bone cement. In this retrospective cohort study, we hypothesized the non-inferiority of ceftazidime/vancomycin (CV) when compared to tobramycin/vancomycin (TV), while also performing secondary cost and safety analyses.

METHODS:

From 2014-2022, we identified 243 patients who underwent a stage 1 revision for PJI. TV was used in 127 and CV in 116 patients. Primary outcome was recurrent infection. We were adequately powered to detect a 10% difference in recurrent infection as a non-inferiority study. Secondary outcomes were cost and risk of acute kidney injury (AKI). Patients with a prior failed stage 1 or two-stage revision for infection, AKI prior to surgery, or end stage renal disease were excluded. Given no other changes to our spacer constructs, we also estimated cost differences attributable to the antibiotic change. Chi-square, t-tests, and multivariable logistic regression were used to compare the two groups.

RESULTS:

Recurrent infection within one-year of stage 1 was similar between the TV and CV groups (9.8% vs. 7.8%, p=0.60). At final follow up of 48 months in the TV group and 21 months in the CV group, infection recurrence remained similar (12.6% vs. 8.6%, p=0.32). No difference was observed in rates of AKI (p=0.39). Adjusting for demographics, comorbidities, and systemic vancomycin did not alter the results for recurrent infection or AKI. Cost difference for tobramycin vs. ceftazidime is approximately $68,550 per hundred patients.

DISCUSSION AND CONCLUSION:

Despite concerns over heat stability, the synergistic effects of ceftazdime and vancomycin in antibiotic spacers appear to have similar and non-inferior PJI eradication success to tobramycin and vancomycin, at a lower cost. The rate of AKI was similar in both groups, with few events attributable to the cement. We have sustained the previously “supply-chain” driven change to the alternative antibiotic in our spacers, and continue to use ceftazidime given these results. Larger studies are warranted to confirm these efficacy and cost-saving results, but our data justify continued use of CV spacers.