Does the Addition of 1200 mg of Topical Tobramycin Powder Increase the Risk of Renal Failure?

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Purpose: Topical antibiotic powders have become increasingly popular as a means to potentially decrease deep surgical site infection. Although recent prospective data have shown low serum levels and minimal evidence of renal toxicity for 1000 mg vancomycin powder use in fracture patients, no similar data exist for the addition of 1200 mg of tobramycin powder. The primary aim of this study was to determine if a combined tobramycin and vancomycin intrawound powder prophylaxis increased a fracture patient's risk of nephrotoxicity compared to intrawound vancomycin powder only. Our hypothesis was that there would be no increase in renal toxicity.

Methods: This retrospective cohort study randomly sampled patients from an ongoing prospective clinical trial dataset at a single clinical site. We included patients with surgically treated appendicular fractures who received either intrawound tobramycin and vancomycin power or intrawound vancomycin powder only. Patients were excluded if they also received antibiotic beads, vancomycin doses other than 1 g, tobramycin doses other than 1.2 g, or had more than 1 fracture surgery. The primary outcome was nephrotoxicity, using the previously published standard of a rise in serum creatinine of 0.5 mg/dL or more if the baseline value was below 3.0 mg/dL, or as a rise of 1.0 mg/dL or more if the baseline was 3.0 mg/dL or more. The risk difference in nephrotoxicity between treatment groups was calculated using a $\chi 2$ test.

Results: 105 patients were included in the study. 71 of the patients (68%) received both tobramycin and vancomycin intrawound powder, and 34 patients (32%) received only vancomycin intrawound power. Nephrotoxicity occurred in 1 patient (1.4%) who received tobramycin and vancomycin intrawound powder, and in 1 patient (2.9%) that received only intrawound vancomycin powder (risk difference: – 1.5%, 95% confidence interval [CI]: –11.2 to 5.6%, P = 0.59). The single patient with an elevated creatinine in the tobramycin group was a chronic renal failure patient on dialysis with chronically vacillating creatinine values. The single patient in the vancomycin powder only group also had chronic kidney disease. In both cases the creatinine values returned to baseline without new treatment.

Conclusion: The findings suggest there is no difference in the patient's nephrotoxicity risk with a combined 1200 mg tobramycin and 1000 mg vancomycin intrawound power prophylaxis compared to only 1000 mg vancomycin powder. Some incidence of increased creatinine is expected in these complex polytrauma patients but the low levels demonstrated in the tobramycin and vancomycin groups are very reassuring.