Does Topical Vancomycin Powder Use in Fracture Surgery Change Bacteriology and Antibiotic Susceptibilities? An Analysis of the VANCO Trial

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Purpose: Recently the VANCO trial demonstrated that topical vancomycin powder used in tibial plateau and pilon fracture surgery appeared to decrease surgical site infection, particularly in terms of gram-positive infections. However, it is unknown if the bacteriology differs between patients who have infections with or without vancomycin powder, particularly in regard to the emergence of different organisms or increased rate of antibiotic resistant pathogens. Our hypothesis was that there would be no differences in the species or susceptibilities in the patients who did and did not receive vancomycin powder.

Methods: This study was a preplanned secondary aim of the VANCO trial (980 patients enrolled in a phase III, prospective, randomized clinical trial, comparing topical vancomycin powder to controls in high-energy tibial plateau and pilon fractures). For this study we analyzed only patients with deep surgical site infections (n = 29 in the treatment arm and n = 45 in the control arm) as determined by a blinded adjudication committee. Pathogens and susceptibilities were determined from routine clinical sterile culture in the operating room. The primary outcome measures were pathogen type and bacterial susceptibilities.

Results: There were differences in the pathogens observed in the 2 treatment arms. As would be expected based on vancomycin's activity against gram-positive bacteria, there was a lower proportion of gram-positive bacteria in the treatment group (55% vs 76%, Fisher's exact test: P <0.01). Rates of methicillin-resistant Staphylococcus aureus (MRSA) infections were comparable in both groups (14% vs 9%) but rates of methicillin-susceptible S. aureus (MSSA) infections (17% vs 42%) and coagulase-negative Staph (CoNS) infections (10% vs 18%) were observed to be higher in the control group. Gram-negative rod infections were similar in both groups (52% vs 42%). There was no important difference in susceptibilities between groups including the rates of vancomycin- resistant enterococcus or MRSA (17% vs 11%).

Conclusion: Vancomycin powder decreases the likelihood of gram-positive infections. We were unable to assess the effect of vancomycin powder on MRSA infections because rates were low in both groups but there were fewer MSSA and CoNS infections in the vancomycin group. There was no concerning evolution of gram- negative rod infections or increased resistance patterns observed. Clinicians should be reassured that the use of topical vancomycin powder does not appear to produce infections with pathogens that will be more difficult to treat than would have occurred without its use.