Do Tibial Plateau Fractures at Low Risk of Infection also Benefit from Topical Vancomycin Powder?

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Purpose: Vancomycin powder was recently shown in a large, randomized trial to be effective in reducing gram-positive surgical-site infection by 50% in articular tibia fractures at high risk of infection (VANCO study, 2021). However, it is unknown if this same benefit applies to fractures at a lower risk of infection. We hypothesized that intrawound vancomycin powder would also effectively reduce gram-positive infection in tibial plateau fractures at low risk of infection.

Methods: We retrospectively identified 459 "low-risk" patients with tibial plateau fractures treated at an academic trauma center between 2003 and 2018 with at least 90 days of orthopaedic follow-up. Patients were considered "high risk" based on the criteria of the VANCO study (open fracture, compartment syndrome requiring fasciotomy, or use of temporary external fixation for swelling). All other patients were considered low risk and included in the analysis. We determined whether each patient received the study intervention—a 1- or 2-g dose of intrawound topical vancomycin powder placed at the time of definitive fixation during closure. The primary outcome was a deep surgical-site infection treated with operative debridement and at least 1 culture that grew a gram-positive pathogen. Multivariable regression was used to calculate the association between vancomycin powder and a deep infection while controlling for potential confounders such as patient's injury characteristics, age, sex, body mass index, diabetes, MRSA (methicillin-resistant Staphylococcus aureus) nasal swab positivity, and American Society of Anesthesiologists classification.

Results: In the unadjusted analysis of low-risk tibial plateau fractures (n = 459), vancomycin powder was associated with a reduction in gram-positive infections (0%, 0/115, vs 4.4%, 15/344; P = 0.02). The adjusted analysis demonstrated a similar large relative reduction in deep infections, with a 93% reduction in the odds of infection for the treatment group (odds ratio 0.07, 95% confidence interval 0.03-0.19; P = 0.04).

Conclusion: These data suggest vancomycin powder might provide even greater relative protection against gram-positive infections in low-risk tibial plateau fractures than has been observed in high-risk tibial plateau fractures. This difference may be due to a larger proportion of infections in low-risk fractures attributable to low levels of wound contamination during closure, as compared with the multiple factors contributing to infection in high-risk fractures. These retrospective data argue that this low-cost intervention may have benefit in preventing gram-positive infection after fixation of tibial plateau fractures at low risk of infection.