Systemic Absorption and Nephrotoxicity Associated With Topical Vancomycin Powder for Fracture Surgery

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**Purpose:** The topical application of vancomycin powder during fracture surgery has been proposed as a possible method to reduce surgical site infection in orthopaedic fracture surgery. It is unknown whether vancomycin powder used in this manner results in systemic absorption. Our hypothesis was that the use of topical vancomycin powder in fracture surgery would result in low levels of vancomycin in the serum and would not result in nephrotoxicity.

**Methods:** A sub-study was performed as part of the VANCO study, a multicenter randomized controlled trial of the efficacy of 1000 mg of topical vancomycin powder to reduce surgical site infection after fracture fixation of high-energy tibial plateau and pilon fractures. Patients at a single site were prospectively enrolled and had vancomycin levels checked from blood drawn in the recovery room and 6-8 hours later. Serum creatinine was obtained prior to surgery, the day after surgery and at 2 weeks post-surgery. The study group included 58 patients who had vancomycin levels drawn at both time points: 56 received IV cefazolin perioperatively and 2 received IV vancomycin. The study group had an average age of 44 years and was composed of 38 tibial plateau and 20 pilon fractures. Serum creatinine was obtained in 56 patients 6-8 hours after surgery and in 46 patients 2 weeks after surgery.

**Results:** 0 of 56 patients who received cefazolin perioperatively (0%, 95% confidence interval [CI]: 0-4.4%) had detectable (>5 µg/mL) serum levels of vancomycin powder at 1 hour and 6-8 hours. The 2 patients who received IV vancomycin had detectable levels that were either below or within the recommended therapeutic level of 12-15 µg/mL. One patient with a prior history of elevation of serum creatinine had a minor increase of serum creatinine but had undetectable vancomycin levels. None of the other patients at any of the time points had a clinically significant increase in creatinine.

**Conclusion:** Despite its relatively widespread usage, there are few data regarding the systemic levels and nephrotoxicity associated with the topical use of vancomycin powder in orthopaedic fracture surgery. These prospective data indicate that there appears to be little clinical concern for toxicity associated with systemic absorption of vancomycin powder in this specific clinical application.