Prophylactic Tobramycin Injection Reduces Infection Following Internal Fixation of Open Fractures

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Purpose: Open fractures are at an increased risk of infection compared to closed fractures despite early administration of systemic antibiotics and prompt surgical debridement. These fracture-related infections (FRIs) result in significant morbidity, need for additional intervention with associated costs, and even long-term disability. Increasing evidence has suggested that local antibiotics may improve infection rates following surgical fixation. The goal of this study was to assess if local antibiotics administered at the time of definitive fixation in open fractures improved rates of infection. We hypothesized that local administration of tobramycin in open fractures improves rates of infection.

Methods: A retrospective control study was performed at our institution of all patients with an open fracture treated with internal fixation and local aqueous tobramycin over a 3.5-year time period by a single surgeon. A control group was created by retrospectively reviewing an equal number of patients with an open fracture fixed with hardware but without local tobramycin. Patient demographics, smoking social history, injury characteristics, infection, microbial speciation, and fracture nonunion were reviewed. For patients receiving tobramycin, all received a local aqueous wound cavity injection of up to 40 mL of 2 mg / mL concentration.

Results: In total, 158 consecutive patients were included with 79 each in the tobramycin injection and control groups. The tobramycin and control groups were similar with respect to demographics including age (mean 47 vs 46 years, P = 0.84), sex (30 vs 42 female, P = 0.06), diabetes (12 vs 12, P = 1), smoking (47 vs 46, P = 0.87), alcohol (27 vs 31, P = 0 .51), drug use (17 vs 22, P = 0.36), injury extremity (58 vs 58 lower extremity, P = 1) and injury severity (P = 0.73). The FRI rate was 10% in the tobramycin group compared to 24% in the control group (P = 0.02). The nonunion rate was 13% in the tobramycin group compared to 19% in the control group (P = 0.28). Tobramycin group infections with positive cultures, grew predominantly gram-negative organisms while the control group grew predominantly gram-positives.

Conclusion: Local aqueous tobramycin injection at the time of definitive closure in open fractures treated with internal fixation significantly reduced FRI. No significant difference in union rates was appreciated. Microbial speciation was predominately gram-positive in the control relative to the treatment group. The limitations in this retrospective study have prompted a prospective blinded randomized control trial to evaluate the efficacy of this adjunct therapy further.