

Effectiveness of Single-Stage Debridement with High-Dose Medullary Antibiotic Injection for Treating Osteomyelitis

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INTRODUCTION: Osteomyelitis presents a complex challenge in medical treatment due to the unique structure and function of bone and surrounding soft tissues. Treatment is usually multidisciplinary and can include nonsurgical and surgical interventions. Our research question was: Is a single stage debridement and injection of a high dose of medullary antibiotics effective in treating Cierny stage III and IV osteomyelitis?

METHODS:

A retrospective review of surgically managed osteomyelitis at a level 1 trauma center from 2020-2023 was done. We identified cases with Cierny stage III and IV osteomyelitis over this time period. The treatment protocol included a single stage debridement of the osteomyelitis and medullary injection of high dose of antibiotics using calcium sulfate as a carrier. The surgical technique included local debridement and medullary debridement using a reamer irrigator, with injection of 30 mL of calcium sulfate in the canal using a french tube and a tumi syringe, mixed with 9g of Vancomycin and 3.6g of Tobramycin. Intravenous antibiotics were used adjuvantly based on intraoperative cultures. Multiple metabolic panels were obtained in the postoperative period, and the creatinine levels were trended over time.

RESULTS: Our series consisted of 12 consecutive patients. The average age was 46 (range 15-73). There were 4 femur osteomyelitis and 8 tibia shaft osteomyelitis. There were 7 patients with Cierny IV and 5 patients with Cierny III osteomyelitis. 4 patients were type A hosts, and 8 patients were type B hosts. The most common cultured organism was methicillin resistant staph aureus (MRSA, 5/12 patients), followed by streptococcus species and pseudomonas. At final follow up, no patients had a recurrent infection. One patient (8%) had an acute kidney injury at 8 weeks post injection, defined as creatinine >0.3 mg/dL from baseline, which was managed with a change in his oral antibiotic therapy and supportive hydration.

DISCUSSION AND CONCLUSION:

Surgical debridement and high dose antibiotic injection can be an effective and safe way to treat Cierny stage III and IV osteomyelitis. The surgeon must be vigilant for renal function postoperatively when injecting antibiotics in the medullary canal.