

Revolutionary Flowable Gentamicin: Calcaneal Osteomyelitis Does Not Need to End in Below Knee Amputation

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BACKGROUND

- Osteomyelitis of the Calcaneus is a major cause of below-knee amputations and requires prompt intervention to prevent further complications.
- The use of a Gentamicin-based antibiotic bone graft offers a dual benefit—providing structural support while simultaneously delivering localized antibiotic treatment to combat infection.
- This method provides an alternative to radical debridement or below-knee amputation preserving limb function and improving patient outcomes.
- This study aims to demonstrate that healing is achievable even in patients with advanced or complicated cases of osteomyelitis.

METHODS

- **Patient population:**
 - 5 Diabetic patients with Calcaneal osteomyelitis and multiple co-morbidities.
- **Surgical intervention:**
 - Flowable Gentamicin-based bone graft injection in the operating room.
- **Post-operative care:**
 - Monitoring in the outpatient wound clinic, including regular dressing changes and continuous monitoring for re-infection.
- **Imaging studies:**
 - Conducted before and after the procedure to confirm healing.
- **Additional treatments:**
 - Some patients received multiple injections, and some were placed in external fixation.
- **Weight-bearing status:**
 - All patients were non-weight bearing until healed.

REPRESENTATIVE CASES

Case 1

- A 67-year-old female presented with Brodie's heel abscess and Calcaneal Osteomyelitis. She underwent ORIF, with Gentamicin-based flowable antibiotic sulfate bone graft* used in the infected heel. Re-infection was noted on 5/2023 and a second fill was completed patient was placed in an external fixation device and remained non-weight bearing for 2 months, she received a graft to the heel, achieving full healing in 5 months without reinfection.

- Osteomyelitis of Calcaneus
- Brodie's Abscess and fracture
- Diabetes Mellitus Type 2 (HbA1C 7.7)
- BMI: 37
- Current Smoker
- PMH: Rheumatoid Arthritis, Chronic Kidney Disease Stage 3, Hypertension, Rheumatic Valve Narrowing and Leaking, Hyperlipidemia, GERD



Case 2

- A 54-year-old male presented with a heel ulcer, gas gangrene, and osteomyelitis. The heel was treated with gentamicin antibiotic sulfate bone graft and antibiotic beads. The Calcaneus was refilled a week later during application of external fixation. Six months after surgery, a muscle flap closure was performed. The patient was fully healed and weight-bearing 13 months after initial treatment.

- Osteomyelitis and Gas Gangrene of Calcaneus with Heel Ulcer
- Diabetes Mellitus Type 2 (HbA1C 8.9)
- BMI: 29.9
- Smokeless Tobacco
- PMH: Arthritis, Coronary Artery Disease, Diabetic Neuropathy, GERD, Esophagitis, Hypertension, Hyperlipidemia, Hepatic Steo-tosis, Intermittent Claudication, Vertigo, Psoriasis, Sleep Apnea



Case 3

- A 58-year-old female with a heel ulcer following two Achilles surgeries tested positive for Calcaneal Osteomyelitis. She received a Gentamicin bone graft injection and was treated in the outpatient wound clinic until the ulcer completely healed, which included a skin graft. 15 months after starting care, the patient is full weight-bearing. No re-infection noted.

- Osteomyelitis of Calcaneus With Heel Ulcer Present
- Diabetes Mellitus Type 2 (HbA1C 7.9)
- BMI: 33.1
- PMH: Arthritis, Depression, Hyperlipidemia, Hypertension, GERD



RESULTS

- **Resolution of osteomyelitis:**
 - All five patients showed resolution of osteomyelitis, which is a significant achievement given the challenging nature of this condition.
- **Return to full weight-bearing status:**
 - Patients were able to return to full weight-bearing status after healing, which is an important milestone in their recovery.
- **Re-infection rate:**
 - One patient re-infected and required a second treatment, which is a relatively low re-infection rate considering the complexity of the condition.

DISCUSSION

- **Innovative surgical technique:**
 - The study demonstrates the successful use of an innovative surgical technique using Cerament G to treat Calcaneal osteomyelitis.
- **Prevention of amputation:**
 - The treatment was able to prevent amputation in all five patients, including three who were initially offered amputation as a first-line treatment option.
- **Effective in difficult-to-heal cases:**
 - The treatment was effective in cases that were challenging to heal, which is a significant achievement.
- **Promising new approach:**
 - The study suggests that this treatment may be a promising new approach for treating osteomyelitis, particularly in cases where traditional treatments have failed.
- **No adverse events:**
 - The study reported no adverse events, which is a positive outcome.
- This study highlights the potential benefits of using Cerament G to treat osteomyelitis, particularly in cases where traditional treatments have failed. Further research is needed to fully explore the potential of this treatment approach and to determine its effectiveness in a larger patient population.