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

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.

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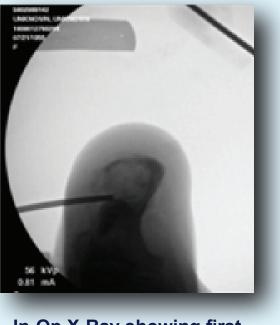
REPRESENTATIVE CASES

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.







In-Op X-Ray showing first fill of Calcaneus with Flowable Gentamicin based antibiotic bone graft*



Post-Op photo showing External Fixator and open surgical incision



6/7/2023 Healing incision by secondary retention

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.



Pre-Op Ulcer Right Heel 7/2023



In-Op X-Ray showing fill of Calcaneus with Flowable Gentamicin based antibiotic bone graft



Post-Op photo showing External Fixator and open urgical incision with antibiotic beads present



Ulcer picture 8/2023 prior t muscle flap

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.





Initial Picture of Chronic Heel Ulcer



ost-Op phont with Start of Dehiscence 8/2024



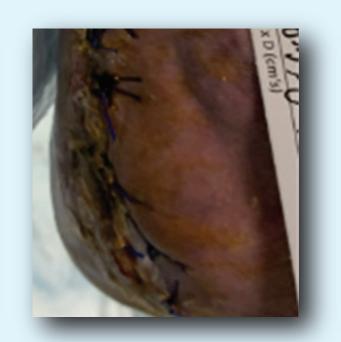
Wound Continues to Dehisce 9/2024

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

- 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 Steotosis, Intermittent Claudication, Vertigo, Psoriasis, Sleep Apnea



Right Heel 6 months post muscle flap 3/2024



Right Heel 6/2024



Right Heel Healed Ulcer 8/2024

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





Graft Application 9/2024



Dry Graft Just Before Complete Healing 10/2024



Final X-ray Shows Patient Full Weight Bearing

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.