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Editorial

Bone drilling and antibiotic-loaded bone cement in managing pressure ulcer complicated by chronic ischial osteomyelitis: A case report

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Abstract

Chronic ischial osteomyelitis is a debilitating complication of longstanding pressure ulcers, especially in paraplegic patients. Antibiotic-loaded bone cement (ALBC) offers sustained local antibiotic delivery, aiding in infection control. We present a 35-year-old paraplegic male with bilateral ischial ulcers and osteomyelitis unresponsive to systemic antibiotics. He underwent bone drilling and ALBC placement. Follow-up imaging at 3 weeks showed signs of resolution, and flap reconstruction was planned. This case underscores the role of ALBC in managing osteomyelitis in pressure ulcers.

Keywords: Ischial osteomyelitis, Pressure ulcer, Antibiotic-loaded bone cement, Bone drilling, Chronic wound management

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1. Introduction

Ischial osteomyelitis complicating pressure ulcers is challenging to manage due to local ischemia, biofilm formation, and poor antibiotic penetration.[1]

Systemic antibiotics often fail to reach therapeutic concentrations in infected bone, especially in chronic cases where vascularity is compromised.[2] Antibiotic-loaded bone cement (ALBC), comprising polymethylmethacrylate (PMMA) and heat-stable antibiotics (e.g., gentamicin, vancomycin), enables sustained high local antibiotic levels while minimising systemic toxicity. ALBC is widely used in orthopaedics for prosthetic joint infections and post-traumatic osteomyelitis, but is less reported in pressure ulcer–associated ischial osteomyelitis.[3] We report a case of bilateral chronic ischial osteomyelitis successfully managed with bone drilling and ALBC.

2. Materials and Methods

A 35-year-old male with traumatic paraparesis for 10 years presented with bilateral grade 4 ischial pressure ulcers (4×3 cm), with undermining, seropurulent discharge, and exposed brittle bone. There were no systemic signs of sepsis. Deep tissue culture grew methicillin-sensitive *Staphylococcus aureus*, and histopathology confirmed osteomyelitis. CT pelvis revealed cortical erosion, bone destruction, and sclerosis of the ischial tuberosities (**Figure 1**). Tc-99m MDP bone scan showed increased uptake, confirming active bilateral ischial osteomyelitis.

Systemic antibiotics were started as per sensitivity along with daily wound care and negative pressure wound therapy (NPWT). Due to persistent discharge, adjunctive surgical management was planned.

Under general anaesthesia, thorough surgical debridement of soft tissue was performed, and loose bone fragments were removed. With Image intensifier guidance, multiple holes were drilled into the cortex of the ischial tuberosity and adjacent reactive sclerosis (**Figure 2**). Antibiotic-loaded polymethylmethacrylate (PMMA) bone cement containing heat-stable gentamicin (pre-mixed) was prepared intraoperatively (40g PMMA with 1 MIU

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gentamicin). The cement was molded into beads and placed into the drill holes to fill dead space and allow sustained local antibiotic delivery (**Figure 3**). The wound was closed with Negative pressure wound therapy (NPWT) to assist granulation until soft tissue closure was feasible.

3. Results

Wound condition improved steadily with granulation tissue by week two and the absence of discharge. At 3 weeks, imaging showed signs of resolving osteomyelitis (**Figure 4**). The cement remained stable without loosening or collection. With positive clinical and radiologic findings, the patient was scheduled for definitive flap coverage. He will be kept on follow-up with emphasis on pressure offloading and nutritional optimisation to support final reconstruction.

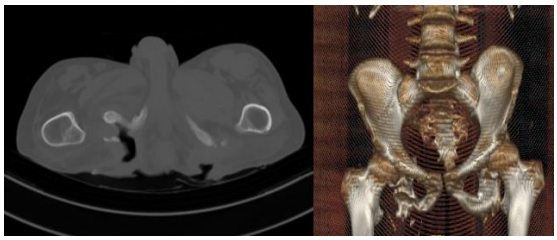

Figure 1: CT pelvis with 3D reconstruction showing features of bilateral chronic osteomyelitis.

Figure 2: Bone drilling under image intensifier guidance.

Figure 3: Antibiotic-loaded bone cement being prepared.

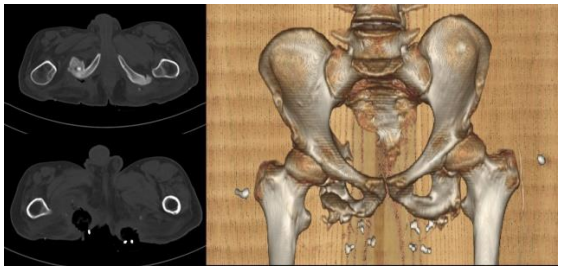

Figure 4: Follow-up CT showing resolving osteomyelitis.

4. Discussion

Cierny–Mader's classification aids osteomyelitis management by combining host factors and anatomic involvement. Our patient was a Type A host with Type 2 (superficial) osteomyelitis. Standard management involves debridement to viable bone (paprika sign), but we opted for a less aggressive bone-drilling approach to preserve bone integrity. Biofilm formation in chronic osteomyelitis renders conventional antibiotics less effective.[2] Local antibiotic carriers such as ALBC bypass the need for vascular delivery and achieve bactericidal levels directly at the site.[4]

The duration for which drug elution by the bone cement continues depends upon various factors such as the type and concentration of the antibiotic used, and the type of bone cement.[5] ALBC mixed by hand also differs significantly from premixed commercially available kits.[6] Hand mixing by surgeons offers the benefit of using specific antibiotics individualised to culture sensitivity reports. It helps cut costs at the expense of shorter elution periods. The antibiotics used should be thermally stable as the polymerisation process of the bone cement is exothermic.[7] Commonly used antibiotics include gentamicin, tobramycin and vancomycin.[8]

A randomized trial in diabetic foot osteomyelitis showed ALBC reduced surgical interventions and hospital stay compared to vacuum-sealing therapy alone.[9]

Hansenn et al described the use of ALBC in managing infected joint replacements.[10] Ismat et al reviewed its role across long bone infections, prosthesis-associated osteomyelitis, and polytrauma.[11]

Although ALBC rarely causes systemic toxicity, local cytotoxicity is possible. In vitro data suggest vancomycin is less toxic than aminoglycosides. Bone Cement Implantation Syndrome (BCIS), while rare, can cause perioperative cardiovascular compromise, possibly due to emboli or immune reactions.[12]

5. Conclusion

This case illustrates the successful use of bone drilling and ALBC as adjuncts in treating chronic ischial osteomyelitis. Combined with debridement and systemic antibiotics, ALBC contributed to infection control and wound bed preparation, enabling definitive reconstruction. Broader studies are needed to establish protocols and assess long-term outcomes.

6. Source of Funding

None.

7. Conflicts of Interest

None.

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