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A rare case of chronic osteomyelitis of calcaneum: Case report

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Abstract
Calcaneal osteomyelitis accounts for 7% - 8% of all osteomyelitis cases in adults. It is often seen in association with diabetes and other comorbidities. Infection most commonly presents after a traumatic event (open fractures or following fixation) or in patients with heel ulceration due to prolonged bed rest or lower limb neuropathy or vasculopathy. The diagnosis is primarily based on clinical features such as localized pain, localized swelling, erythema, local rise of temperature, sinus or heel ulceration. Radiological assessment with radiographs and bacteriological analysis can help to confirm the diagnosis. Successful treatment of calcaneal osteomyelitis requires infection control, excision of all necrotic bone and soft tissue, dead space management while preserving weight bearing capability with good soft tissue cover. We report one case of 45-year-old male with chronic calcaneal osteomyelitis associated with diabetes mellitus treated with sequestrectomy, debridement and G-bone placement.

Keywords: Case report, calcaneum, osteomyelitis

Introduction
The calcaneum is distinguished, in that, it has specialized skin attached very tightly to the bone surface with short, dense fibers. Infection within the bone rarely causes sub-periosteal abscesses, but rather erodes through the skin producing ulceration. It is very difficult to restore this tissue loss. Appropriate limb salvage procedures for treatment of calcaneal osteomyelitis are of immense importance to achieve infection-free conditions which offer a good functional outcome for these patients. A great range of treatments are described from primary wound closure or delayed primary wound closure to negative pressure wound therapies (NPWT), pedicle flaps and microsurgical free flaps. Nevertheless, evidence on the efficacy and accuracy of combining treatments are lacking. Schildhauer et al. 2000 [1] quantified the calcaneal rate of infections to 11%. Aseptic necroses of the wound edge especially after extended lateral approaches to the calcaneus were described in the literature between 2 and 27.3%. Delayed wound healing might occur up to 25%. The preservation of the calcaneus and thus a functional pedal anatomy is the main target during the infect sanitation, though this is not always feasible. The clinical principle of treatment of this disease is antibiotic administration, irrigation, and debridement. We applied these principles using Gaenselen's split heel approach.

Case Report
A 45 year old male presented with complaints of multiple discharging sinuses [Fig 1] on either sides of right heel since 2 months. Patient was a known case of diabetes mellitus on medication with uncontrolled sugars. Patients had no history of trauma. On examination multiple discharging sinuses on the either sides of heel fixed to bone are present, with sprouting granulation tissue around the mouth of sinuses. Tenderness present diffusely around the sinus. Radiographs showed multiple irregular osteolytic lesions with sclerotic margins in the body of calcaneum suggestive of chronic osteomyelitis [Fig 2(a, b)].

Fig 1: Multiple Sinuses on either

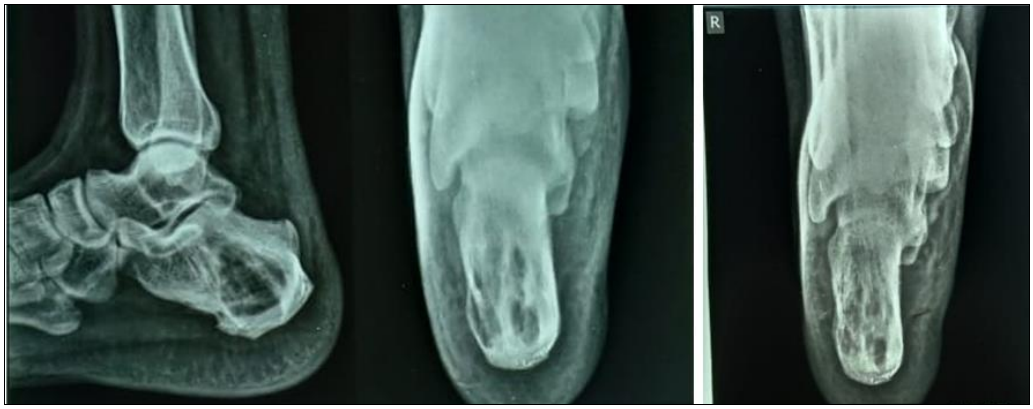

Fig 2 (a, b): Pre-Operative Radiographs side of right calcaneum

Patient was treated with sequestrectomy and debridement with Gaenslen's split heel approach for calcaneum. Patient was kept in prone position with a support beneath the affected ankle.

A longitudinal incision [Fig 3 (a)] exactly in the midline of the heel 4.0 cm from the level of the base of the fifth metatarsal posteriorly to the insertion of Achilles tendon. Superficial and further deep dissection performed.

Fig 3 (a, b): Incision and Exposure

The calcaneus is split from posterior to anterior with a broad osteotome and the two halves are retracted to expose the interior of the bone [Fig 4].

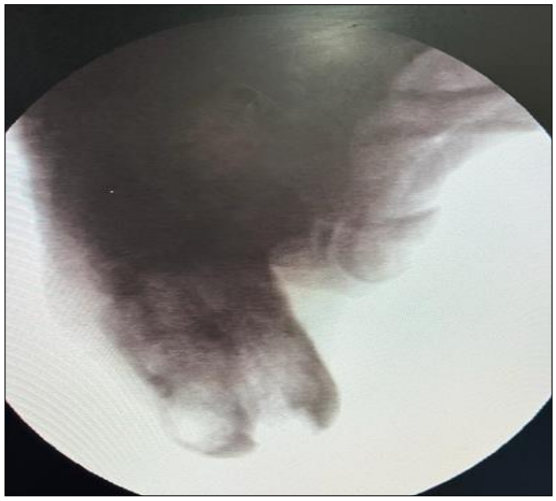

Fig 4: Intra-operative C-arm image

All sequestra and infected matter removed. Wound wash given and thorough curettage was done and all the sclerotic walls of the cavities were curettage effectively [Fig 5,6]. Sinus tracts were thoroughly excised and dead space was filled with G-bone [Fig 7]. Curated samples were sent for Culture and histopathological examination. Histopathological report showed granulomatous inflammation [Fig 8].

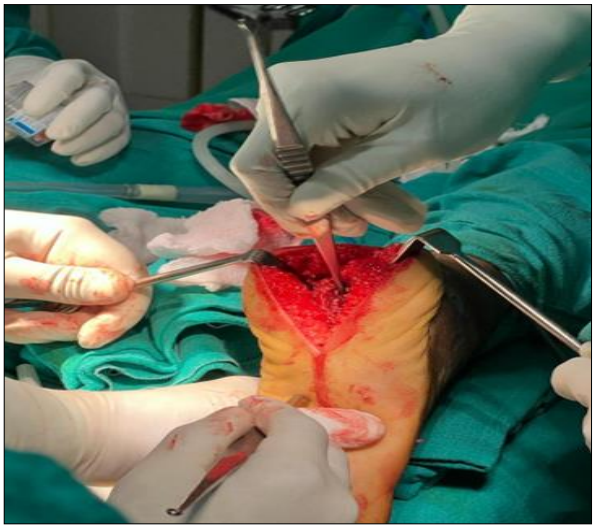

Fig 5: Curettage

Fig 6: Curated bone cavity

Fig 7: After G-bone Placement

Fig 9: Post-Operative Radiographs

Patient was started on AKT-4. Wound dressings were done on day 2,5and 10 [Fig 10]. Delayed suture removal was done on day 14 [Fig 11] and patient was immobilised with slab application. Patient was followed up after 2 weeks and started on toe touch weight bearing followed by partial weight bearing.

Fig 10 (a, b, c): Wound in Post-Operative period

Fig 11: Wound at suture removal

Discussion

According to the evidence reviewed over the last 18 years, calcaneal osteomyelitis treatment tried to deliver the following objectives: bone infection control (surgical excision and systemic antimicrobial treatment), dead space and wound management (with or without local antibiotic delivery and wound closure) and a good functional outcome.

Limitations of the included studies are first, the lack of standardized definitions of infection, failure, relapse, recurrence of infection, and wound healing disorders. In some studies, detailed information about important diagnostic protocols, outcome parameters, such as recurrence of infection or functional results, is completely absent. Many studies report no recurrence of infection but list numerous patients with "poor wound healing" or "wound breakdown". Clearly some of these will have either persistence of the initial infection or recurrence as the cause of the open wound. There is a need for a standardized method of reporting wound problems and careful use of a definition for recurrent infection. Moreover, there is an important potential bias because the extent of the infection is not fully described in all the papers and therefore, may be variable.

Regarding bone management results, bone preserving and more radical procedures seem to have comparable relapse and recurrence rates of osteomyelitis, although functional results may be better with less radical surgeries However, the functional outcome was not always specified. Only the study by Oliver et al. (2015) assessed the lower limb function objectively by using the Lower Extremity Function Scale (LEFS), in which patients with less aggressive surgeries provided better LEFS functional scores. Other studies assessed the walking capability of their patients and compared it with their preoperative walking ability. These studies generally show preservation or improvement of the functional outcome after surgery.

Wound closure can be achieved by various plastic procedures if a primary wound closure is not possible: free muscle flaps (serratus anterior, gracilis), or local flaps (rotational flaps, abductor digiti minimi flap, neurocutaneous or fascio musculocutaneous flaps). The choice of soft tissue coverage should be based on the location and size of the soft tissue defect. Direct closure with the adjacent normal specialised skin is preferable, but small defects may be reliably covered by local pedicle flaps.

In larger defects, free flaps which provide a good obliteration of dead space should be used. They also import well perfused tissue which can deliver antibiotics and immune cells to the area. Disadvantages of free flaps are the need of microsurgery, long operation time, and prolonged hospital stay combined with higher costs. They are also usually insensate, producing a later risk of pressure ulceration. Regardless of which coverage is used, the applied procedure should guarantee an improved bone vascularisation and a good dead space management to avoid haematoma formation.

Calcaneal osteomyelitis can be associated with various comorbidities. Neuropathy and vasculopathy are known to reduce soft tissue healing resulting in higher recurrence and amputation rates. Merlet et al. (2014) [2], found several prognostic factors for a poorer outcome including neuropathy and diabetes, age >65 years, ASA >2 and posttraumatic origin of the infection. Interestingly, vasculopathy was not reported to be a risk factor for wound healing disorders alone, although diabetes (which often produces vascular insufficiency) was included.

Healing rates after treatment of calcaneal osteomyelitis range from 66% to 100% in all included studies, although every article provided different definitions. Some considered that healing was achieved if there was no need for multiple debridements; others preferred using clinical and/or radiological signs of ongoing infection even if the patient needed repeated debridements or different surgical approaches to control the infection. Studies which investigated diabetic patients generally showed a reduced healing rate.

Calcaneal osteomyelitis is difficult to manage and requires a multidisciplinary approach involving orthopaedic surgeons, plastic surgeons and infectious diseases physicians. Studies with standardized treatment algorithms and outcome measures including inputs from all three disciplines would be valuable in clinical practice. However, patients with this condition have varied co-morbidities and different components of disease in the calcaneum, requiring an individual treatment strategy.

Conclusion

Calcaneal osteomyelitis is rare condition among other bones. Care should be taken during closure of wound and post wound care for better healing of the wound.

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Conflict of Interest

Not available

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Not available

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