CASE STUDY

Calcaneal Osteomyelitis Associated With a Severe Abscess

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Abstract Diabetic foot osteomyelitis (DFO) is a common complication of the diabetic foot and the majority of minor and major amputations are preceded by DFO. The diagnosis and treatment of DFO are both challenging. Early recognition and comprehensive management of diabetic foot infections may obviate DFO, hence the dreadful consequence-resection of the infected bone. Herein, we present the successful management of a patient presenting with DFO and severe abscess formation of the heel.
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Introduction

Diabetic foot osteomyelitis (DFO) is a common complication of the diabetic foot¹ and the majority of minor and major amputations are preceded by DFO.² Patients with a diabetic foot infection usually present with pain, tenderness, redness, warmth, or induration of the foot.³ Several specific signs and symptoms such as visible exposed bone; a red swollen (“sausage”) toe; an ulcer that is deep, fails to heal, or is located over a bony forefoot prominence; and, the presence of a soft tissue sinus, especially with purulent discharge, however, should raise suspicion for DFO. While DFO and abscess formation are, each, frequent complications of the diabetic foot, the co-occurrence of the two, with such a prominent presentation, as reported herein, is not as common.

Case Report

A 61-year-old woman with type 2 diabetes mellitus of 17-year duration presented with a significantly swollen right heel (Fig. 1). Her medical history revealed a foot ulcer developed on the right heel at the age of 45 years and requiring surgical drainage. Ten years ago, she underwent a second surgical operation due to the recurrence of the ulcer and associated soft tissue abscess. During the courses of active infection, the patient received several short courses of antimicrobial treatment. On examination she had hyperemia and increased temperature over the heel and on palpation the lesion was suggestive of a cystic formation. Pedal pulses were palpable but she had poor sensation of the foot. Plain X-ray showed cortical destruction at the posteroinferior aspect of the calcaneus and magnetic resonance images confirmed a diagnosis of osteomyelitis of the calcaneus as well as an abscess formation (Figs. 2 and 3). White blood cell count ($4.9 \times 10^3/\mu\text{L}$) was within the normal range; C reactive protein (62.1 g/dL) and erythrocyte sedimentation

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Figure 1 The heel as seen from the lateral aspect. Note the unusual swelling.

rate (ESR) (96 mm/min) were markedly elevated. Physical and laboratory examination were otherwise normal. The patient underwent surgical pus drainage and was prescribed

Figure 2 Lateral foot X-ray showing destruction of the posteroinferior aspect of the calcaneus.

fusidic acid 500 mg p.o. tid and ciprofloxacin 500 mg p.o. bid for a total of eight weeks. The ulcer healed successfully and no relapse was observed at 3 months (Fig. 4).

Discussion

DFO, unlike osteomyelitis of other bones, generally occurs through the spread of a soft tissue infection to bone. Healthy bone tissue is normally resistant to infection but may become vulnerable following ischemia, trauma or foreign body exposure.^{4,5} Once infected, the eradication of the microorganisms from the bone is extremely challenging. Often times the decision is partial or total resection of the infected bone. The occurrence of DFO has several important and severe implications such as an increased risk of minor or major amputation, increased risk of reulceration due to the anatomical malformations occurring following amputations and reduced quality of life. Hopefully, several recent studies reported on the success of a more conservative approach which comprises the use of long-term antimicrobial treatment instead of surgical resection of the infected bone.⁶

The diagnosis and treatment of DFO are both challenging. Early recognition and comprehensive management of diabetic foot infections may obviate DFO, hence the dreadful consequence-resection of the infected bone. Several clinical findings such as hyperemia, increased foot temperature, severe soft tissue edema over the affected bone (sausage toe), fluctuation, fistula formation, or purulent secretion from the fistula, as well as an exposed bone or a positive probe to bone test are frequently associated with DFO. Besides, the pre-diagnosis of DFO may be supported by laboratory findings; particularly an ESR greater than 70 mm/h, is suggestive of DFO. Imaging studies such as serial plain radiographs obtained throughout the course of the disease and magnetic resonance imaging may provide further evidence for diagnosing DFO. Finally, performing bone biopsy, is the gold standard. In brief, a non-healing or recurrent wound and/or infection of the soft tissue, i.e. abscess in the current case, associated with increased inflammatory markers, particularly the ESR, and imaging findings should raise the suspicion of DFO.⁷⁻¹¹

DFO is the most difficult-to-treat complication of diabetes mellitus. The presence of osteomyelitis increases the hospital length of hospital stay, duration of antibiotic therapy and time to wound healing.² While several guidelines recommend the early surgical excision of all infected bone to eradicate osteomyelitis, a growing body of literature suggests that antibiotherapy alone may provide amputation-free outcomes.^{2,6,12} Surgery may, nevertheless, still be necessary particularly in complex cases associated with deep abscesses, compartment syndrome or necrotizing soft tissue infections. Recent guidelines recommend the use of 6 weeks of antibiotic therapy for patients who do not undergo resection of infected bone and no more than a week of antibiotic

Figure 3 T1 (A, B and C) and fat suppressed T2-weighted (D, E and F) right ankle magnetic resonance sagittal images showing calcaneal osteomyelitis (arrow) and giant abscess of the heel (*).

treatment if all infected bone is resected.⁶ Antimicrobial treatment should, preferably, be given according to culture results, but if a culture could not be obtained, empiric

therapy should be based on epidemiologic data and clinical severity of the infection. In the current case, the patient received long-term antimicrobial therapy following abscess drainage and successfully healed at three months.

Figure 4 The foot observed at 3 months follow up showing a healed ulcer.

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