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Case Reports and Series

Osteomyelitis of the First Metatarsal Head Treated With Joint-Preserving Surgery and a Synthetic Resorbable Bone Graft Substitute: A Case Report

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ABSTRACT

Managing infections of the first metatarsophalangeal joint can be demanding because many patients present with late-stage infection and partial or total amputation of the first ray or the phalanx could be necessary. We describe such a patient who was successfully treated with a calcium-based resorbable bone substitute that preserved the first metatarsophalangeal joint. A 38-year-old female presented to our department with a foot infection. Examination revealed a methicillin-susceptible *Staphylococcus aureus* infection of the first metatarsophalangeal joint. The histopathologic findings confirmed active osteomyelitis of the first metatarsal head. The metatarsophalangeal joint was debrided with open synovectomy, the metatarsal head was curetted, and the bone defect was filled with 2 mL of a synthetic bone graft substitute. Two years later, she reported no problems with function or pain, the joint had full range of motion, and she had no local or systemic signs of infection. The most recent radiographs revealed no damage to the first metatarsophalangeal joint. A synthetic bone graft substitute can be a good alternative for treating forefoot infections when the soft tissues are intact and the bone defect is not so large that partial or full amputation is necessary.

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Patients with forefoot infections often have diabetes mellitus with concomitant peripheral neuropathy and arterial disease (1,2). This triad commonly limits conservative management options because patients usually present late in the infection with extensive tissue damage.

Plantar neuropathic ulceration of the first metatarsal head with underlying osteomyelitis is usually managed by debriding the infected soft tissues and bone and can require resection of the metatarsal head or even amputation of the first ray (1,3–6). One-stage protocols (5), 2-stage procedures using antibiotic-loaded bone cement, and stabilization with external fixation have been described (7). When first ray amputation is not necessary, arthrodesis of the first metatarsophalangeal joint is often performed to manage the infection (8). A bone-block arthrodesis can preserve the length (9,10); however, other reconstruction options could be necessary, depending on the amount of the proximal phalanx that can be preserved (11). The incidence of joint preservation has been rather scarce at the site of these infections.

We report the case of an immunocompetent female with osteomyelitis of the first metatarsal head and an infection of the first metatarsophalangeal joint. She was successfully treated without amputation using an antibiotic-loaded, calcium-based, resorbable bone substitute and joint-preserving surgery. This technique could be an alternative to other more invasive treatment options in the management of such cases.

Case Report

In September 2014, a 38-year-old female presented to our department with an 8-week history of pain and swelling in the first metatarsophalangeal joint of her left foot. She had had no infections or trauma before the onset of the current symptoms. Radiographs, computed tomography (Fig. 1), and magnetic resonance imaging (Fig. 2) acquired in the outpatient setting revealed an osteolytic area on the first metatarsal head involving the first metatarsophalangeal joint and the surrounding tissues that was highly suspicious for infection. At admission, the dorsal part of the first metatarsophalangeal joint was swollen and tender. The C-reactive protein concentration was 46.8 mg/dL (normal <5 mg/dL), and her white blood cell count was 7400×10^6/L (normal $<10{,}000 \times 10^6$/L).

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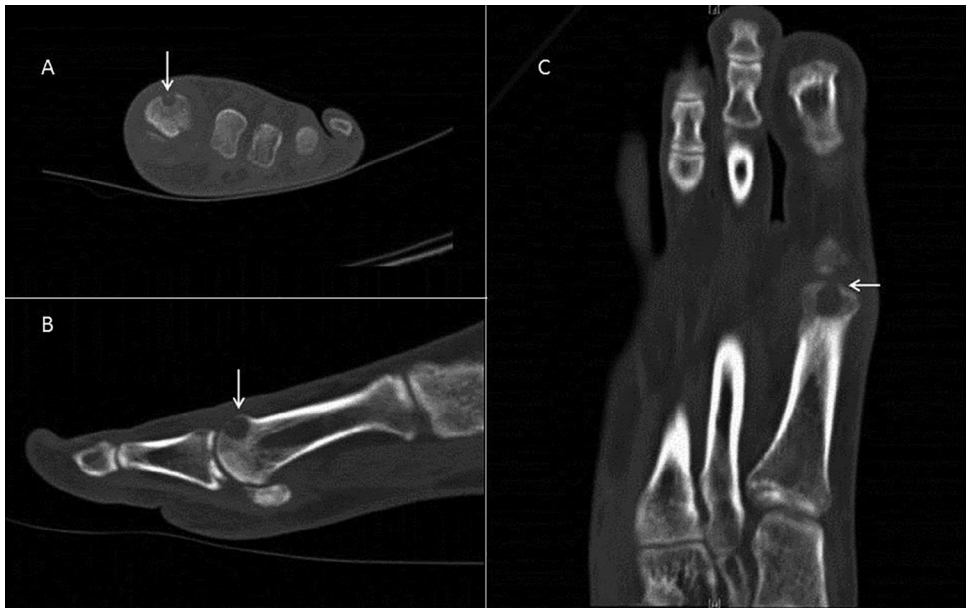

Fig. 1. Radiographs showing osteomyelitis of the first metatarsal head *(arrows)* of the left foot of a 38-year-old female: *(A)* axial, *(B)* sagittal, and *(C)* coronal views.

The first metatarsophalangeal joint was debrided and lavaged, and open synovectomy was performed. The dorsum of the first metatarsal head had been destroyed, and the cartilage was partially damaged (Fig. 3). However, the remaining cartilage of the first metatarsal head and the phalanx was intact. To preserve the first metatarsal head, we meticulously curetted the osteolytic area. The bone defect was filled with 2 mL of a synthetic bone graft substitute (Cerament G™; Bonesupport Holding AB, Lund, Sweden; Fig. 4). The wound was then closed in layers.

Staphylococcus aureus was found in all samples of joint fluid, tissue, and bone specimens. The histopathologic findings confirmed active osteomyelitis. The blood cultures were negative. Intravenous cefuroxime was administered for 3 weeks, followed by oral ciprofloxacin for another 3 weeks. The patient was mobilized on crutches and instructed to keep her foot non-weightbearing for 6 weeks. The postoperative course was uneventful.

After 2 years, the patient was pain free, reported no problems with function, had full range of motion in her toe, and had no local or sys-

Fig. 2. T2-weighted magnetic resonance images of the left foot. The hyperintensity is highly suspicious for osteomyelitis of the first metatarsal head with reactive bone marrow edema affecting the surrounding tissues and an infection of the first metatarsophalangeal joint *(arrows)*: *(A)* axial, *(B)* sagittal, and *(C)* coronal views.

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