

Calcaneal Osteomyelitis Caused By Pseudomonas Aeruginosa with Blunt Trauma in an Adult Patient

Erişkin Bir Hastada Künt Travma Sonrası Pseudomonas Aeruginosa'ya Bağlı Kalkaneal Osteomyelit

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Penetran yaralanma olmaksızın sağlıklı bireylerde *Pseudomonas aeruginosa*'ya bağlı kalkaneal osteomyelit olgusu nadirdir. Bu olgu bildirimde belirgin bir yaralanma öyküsü olmadan *Pseudomonas aeruginosa*'ya bağlı gelişen bir kalkaneal osteomyelit olgusu sunduk. Olguda, 30 yaşında erkek hasta bir haftadır sağ topuk ağrısı şikayeti ile ortopedi polikliniğine başvurdu. Hastanın altı ay önce sağ ayağını yere vurma öyküsü mevcuttu. Sağ ayak bileği yan grafisinde kalkaneusta litik lezyon izlendi. Doku biyopsi örneğinin mikrobiyolojik incelemesinde *Pseudomonas aeruginosa* üredi. Antibiyotik duyarlılık sonuçlarına göre hastaya günde iki kez 500 mg siprofloksasin oral başlandı. Hastanın topuk ağrısı 10. günde düzeldi. Osteomyelit bölgesinin devam etmesi nedeniyle hasta 3. ayın sonunda opere edildi.

Anahtar Kelimeler: Kalkaneus, osteomyelit, pseudomonas aeruginosa, delici olmayan yaralanma**ABSTRACT**

Pseudomonas aeruginosa-associated calcaneal osteomyelitis in a healthy individual without penetrating injury is rare. Here, we presented a case of calcaneal osteomyelitis due to *Pseudomonas aeruginosa* without any apparent damage. A 30-year-old male patient visited the orthopedics outpatient clinic for a week due to right heel pain. The patient had a history of hitting his right foot on the floor six months ago. On the lateral radiograph of the right ankle, a lytic lesion was observed in the calcaneus. In the microbiological examination of the tissue biopsy sample, *Pseudomonas aeruginosa* was grown. The antibiotic sensitivity results showed that the patient was started orally on 500 mg of ciprofloxacin twice daily. The patient's heel pain resolved on the 10th day. The patient was operated on at the end of the 3rd month because the osteomyelitis area persisted.

Keywords: Calcaneus, osteomyelitis, pseudomonas aeruginosa, nonpenetrating wounds**INTRODUCTION**

Osteomyelitis is an inflammatory event of the bone or bone marrow and is mostly bacterial and occurs by hematogenous or contamination such as surgery or trauma (1). The most frequent causative agent isolated in all ages is *Staphylococcus aureus*.

Osteomyelitis most commonly affects the long bone metaphyses. Involvement of tarsal bones in the lower extremity is rare, and it has been reported that tarsal bone osteomyelitis is less than 10%. Of the tarsal bones, the most common involvement is in the calcaneus and talus (2).

Osteomyelitis caused by *Pseudomonas aeruginosa* most commonly occurs through puncture injury (3). This article presented calcaneal osteomyelitis due to *Pseudomonas aeruginosa* without a penetrating or an open-blunt injury.

CASE REPORT

A 30-year-old male patient visited the orthopedics outpatient clinic for a week due to right heel pain. The patient had a history of hitting his right foot on the floor six months ago. Except for chronic HBV infection, the patient had no comorbid disease or history of hospitalization or int-

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ravenous drug use. At admission, the patient's complete blood count, CRP, and sedimentation values were within normal limits. On the lateral radiograph of the right ankle, a lytic lesion was observed in the calcaneus (Figure 1).



Figure 1. A lytic lesion of the calcaneus posterior inferior is observed in the lateral radiograph of the ankle.

In the MRI of the right foot, peripheral contrast involvement was observed in sagittal sections of the posterior part of the calcaneus, 26x17 mm, with lobulated contours. The image suggested an abscess, primarily based on osteomyelitis (Figure 2).

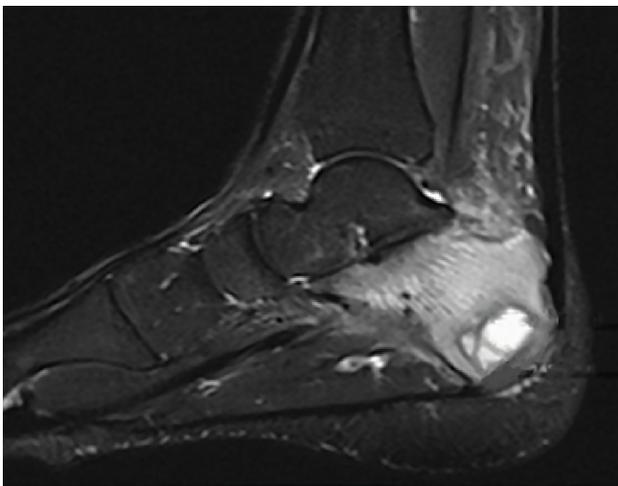


Figure 2. In sagittal T2-Weighted Fat-Suppressed MRI, a hyperintense abscess with an edematous area in the calcaneus.

In the microbiological examination of the tissue biopsy sample, *Pseudomonas aeruginosa* was grown. Many neutrophils were seen in the pathological examination of the biopsy specimen. According to the antibiotic sensitivity results, the patient was started on 500 mg of ciprofloxacin twice daily, orally. The disc diffusion method was used to determine antibiotic sensitivity. Antibiotic susceptibility was evaluated by the recommendations of The European Committee on Antimicrobial Susceptibility Testing (EUCAST). The patient's heel pain resolved on the 10th

day. At the end of the 3rd month, the patient's control MR examination revealed that the osteomyelitis area was self-limiting (Figure 3) but required surgical treatment.

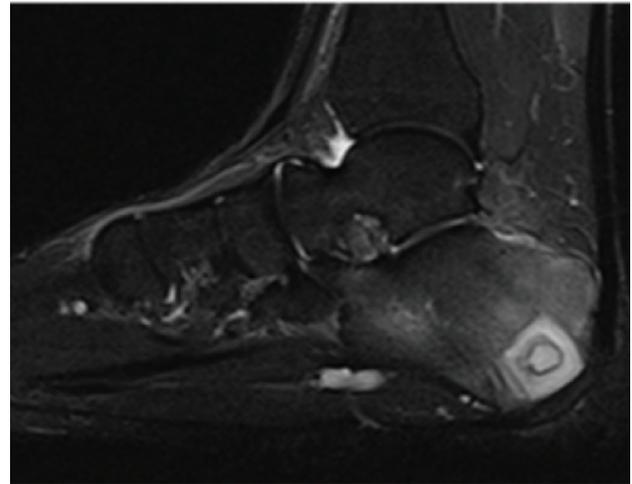


Figure 3. In control sagittal T2-Weighted Fat-Suppressed MRI examination after the treatment, it is observed that the size of the abscess has decreased, and the edema area has regressed significantly.

DISCUSSION

Osteomyelitis is inflammation and infection of bone resulting from bacteremia, trauma, orthopedic surgery, or soft tissue infection. Although osteomyelitis occurs in all bones, it is most common in the long bones, spine, and feet. The most common pathogen in all age groups is *Staphylococcus aureus*. Osteomyelitis is classified as acute or chronic according to the histopathological findings instead of the duration of the infection. Inflammatory bone changes occur in acute osteomyelitis; symptoms often appear within two weeks of infection. Acute osteomyelitis may develop by hematogenous pathways in patients with various risk factors. It can also be created from bacterial inoculation from the adjacent focus of infection in a diabetic foot ulcer, prosthetic device, or traumatic injury. The diagnosis is based on a clinical history, imaging, and microbiological tests, and a bone biopsy is required for a definitive microbial diagnosis. Treatment consists of surgical debridement of infected and necrotic tissue and antibiotic therapy. Antibiotic therapy usually starts as an IV according to culture and sensitivity results (4).

Calcaneal osteomyelitis accounts for 3-10% of all bone infections in adults with post-traumatic, post-surgical, or chronic ulceration conditions. Calcaneal osteomyelitis is an infection that challenges clinicians due to its frequent recurrence, long duration, and difficulty in treatment. The treatment of calcaneal osteomyelitis requires a multidisciplinary approach. Comorbid diseases such as advanced age, diabetes mellitus, and neuropathy are among the risk factors (5,6). In our patient, there was no comorbid disease except chronic HBV infection.

The culture of bone specimens is considered the gold standard for the definitive diagnosis of osteomyelitis. Although percutaneous bone biopsy is an invasive technique, it has been proven safe, especially in patients with diabetic foot osteomyelitis (7).

The calcaneus consists of spongy bone with a thin cortical outer shell. Disruption of the thin cortical layer predisposes the calcaneus to infection as bacteria infiltrate the spongy bone (Figure 4).

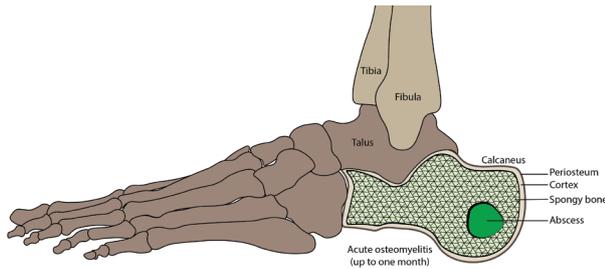


Figure 4. Schematic drawing of calcaneal osteomyelitis

Regular walking increases ground forces up to 1.5 times the person's body weight, increasing pressure on the calcaneus. Increased stresses weaken the thin cortical bone and create microcracks and channels for infection. *Staphylococcus aureus* is the most frequently isolated organism in calcaneal osteomyelitis. Polymicrobial infections, contiguous or exogenous, are common in adults. Significantly, the risk of disease with Gram-negative species and *Pseudomonas aeruginosa* increases when penetrating traumatic injury or chronic ulceration occurs (8). Our patient had osteomyelitis due to *Pseudomonas aeruginosa* without a condition such as penetrating traumatic injury or chronic ulceration where the skin integrity was affected.

The management of calcaneal osteomyelitis includes antibiotic therapy or surgical therapy, such as partial or total calcaneotomy or proximal amputations. The condition and vascularity of the soft tissue, the patient's compliance, and the surgeon's choice guide the treatment (8). In our patient, first medical and then surgical treatment was applied.

Conclusion

In this case report, we wanted to emphasize that *Pseudomonas aeruginosa*-associated osteomyelitis can be caused by blunt trauma in healthy adults.

Informed Consent: Written informed consent was obtained from the subject for the publication of the study.

Conflict of Interest: The authors declare no conflict of interest in this study.

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