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Brodie's abscess of tarsal cuboid after foot trauma

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Abstract
Brodie's abscess is an uncommon disease that rarely occurs in the tarsal bones. It is characterized as chronic osteomyelitis. We describe a case of Brodie's abscess of the tarsal cuboid on the right foot of a 9 year old boy. The abscess appeared 2 weeks after he stepped in thin wooden skewer. The X-ray showed a cavitary osteolytic lesion in the bone. We performed surgical drainage of the abscess associated with broad-spectrum antibiotics, which resulted in complete resolution of the symptoms 6 weeks after the surgery.

Keywords: Brodie's abscess, foot; tarsal cuboid, trauma, *Streptococcus pyogenes*

Introduction
Brodie's abscess (BA) is a bone abscess described as a localized primary purulent collection. It was first described by Sir Benjamin Brodie in 1836 after observing a localized abscess on the tibia [1].
BA is usually confined to the metaphysis of the long bones [2]. Its occurrence in small bones of hand and foot is a rarity [2, 3]. There may be ambiguity in differentiating BA from other malignant and benign osseous lesions in radiographic images [4].
We aim to report a case of BA on the tarsal cuboid bone caused by *Streptococcus pyogenes* after a traumatic event with the purpose of discussing the main aspects of this disease.

Case Presentation
A 9-year-old boy presented to our clinic with moderate pain and swelling on the right foot for 2 weeks. The patient reported that one month ago, he suffered an injury on the aforementioned region as he stepped onto a small wood skewer a month before the onset of symptoms. The patient was afebrile and had no signs of systemic illness.
Physical examination revealed mild soft tissue swelling over lateral aspect of midfoot with some tenderness without any sign of acute inflammation. He denied history of previous acute osteomyelitis or antibiotic treatment. X-ray showed a well circumscribed lytic lesion surrounded by dense sclerotic rim, which was located on the subchondral region of cuboid bone (Figure 1).
The patient was taken to operation room for aggressive curettage with generous saline irrigation until a fresh punctate bleeding was achieved from the floor of the abscess cavity. This technique was used to grossly identify viable bone. Subsequently, he was treated with intravenous antibiotics (amoxicillin-clavulanic acid) for 3 weeks, which was followed by 3 weeks of oral antibiotics. Follow up was performed 3, 6 and 9 months after main treatment.

Fig 1: Preoperative radiography of the right foot showing a large osteolytic lesion on the cuboid bone (white asterisk)

Discussion
BA is characterized as a rare form of subacute or chronic pyogenic osteomyelitis usually caused by local trauma or severe systemic exertion, although in a great number of cases it can happen without any recognized etiology [5-7]. It has a preference for patients below 25 years old and most papers report BA in long bones (such as the femur, tibia or humerus), usually nearby their distal extremity or the epiphysis [2, 5], such is the case that classifications of BA in five different types were proposed [1].
BA cases of carpal and tarsal bones are quite rare [2, 7]. There are only 6 cases described in the literature of BA of the cuboid bone [2, 3, 6, 8].
The preference for the subchondral region of small bones may be due to their morphological similarities with the vascular aspects of metaphysis in long bones [3].
Symptoms of BA include local pain, swelling, tenderness,

restricted joint movements (in cases of BA near joints), thus it can be confused with many different diseases [3, 6]. It does not possess any systemic involvement - hence, its symptoms are restricted to the abscess site [7].

It can be diagnosed through imaging exams (radiography, tomography, Magnetic resonance imaging (MRI)) in later stages, whereas bone scan is useful for early stages of the disease [4, 5, 7].

Since it usually presents itself as an osteolytic lesion with marginal sclerosis in x-rays, BA can often be misdiagnosed with other diseases, such as: Langerhans cell histiocytosis, osteoid osteoma, intracortical hemangioma, ossifying fibroma, fibrous dysplasia, chondroblastoma, no ossifying fibroma, giant cell tumor, Ewing's sarcoma and other infections, such as tuberculosis, thus, resulting in delayed and diagnosis and treatment [5-7].

MRI exams can often present the penumbra sign, which is a rim lining of an abscess cavity with higher signal intensity than that of the main abscess on T1-weighted images, thus revealing the well-circumscribed nature of the lesion as compared to more extensive involvement seen in diffuse osteomyelitis [4, 9].

The most usual pathogen associated with BA is Staphylococcus aureus, although agents such as Pseudomonas aeruginosa, Klebsiella spp., Salmonella typhi, Kingella kingae, Escherichia coli, Treponema pallidum, Framboesia, Actinomyces and Histoplasma have been reported in the literature [2, 7, 9]. This is the second case of *Streptococcus pyogenes* on a cuboid BA reported in the literature, whereas the first was published by Amit *et al.* (2015) [2] .

Treatment of BA usually involves surgical debridement, prolonged antibiotic therapy and abscess drainage. Although it seems simple, surgery is often complicated and should be thorough, as the surgeon must remove every necrotic area and nonviable bony tissue as well as any infected granulation tissue in order to prevent recurrence of infection [5, 9] .

We conclude that BA is a rare condition, and even rarer in small bones such as the cuboid, and as it usually presents itself with unspecific symptoms, it can be misdiagnosed with a great number of different diseases. Knowledge of this illness is important and our report serves as a reminder that a simple wooden skewer may cause serious damage if left unchecked or unseen.

Conflicts of interest

The authors declare no conflicts of interest.

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