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Brodie Abscess

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Abstract

Brodie abscess is a relatively rare subacute form of osteomyelitis that is difficult to diagnose due to its insidious onset and limited initial systemic response. We present a case of Brodie abscess in a person with knee pain, swelling and antalgic gait. Diagnosis was made initially using plain radiography, this was supported by magnetic resonance imaging and confirmed on bacterial culture of the surgical samples.

Case report

A 41-year-old male presented to the emergency department with left knee pain. This symptom first appeared approximately 20 years ago with intermittent non-traumatic pain in his left knee. This did not initially restrict his activities of daily living and he was able to occasionally relieve his pain with simple bandage support. The patient attributed this to wear and tear in his knee. However, his symptoms became progressively more frequent 10 weeks prior to his presentation; he felt a 'pop' in the knee and the following day his left lower leg was swollen. The pain became progressively and significantly worse such that he found mobilising very difficult.

On examination, he had a temperature of 38 degrees. It was noted that there was a swelling approximately 3 cm in diameter over the anteromedial aspect of the proximal tibia. There was extruding swelling at the site of the original lesion, this was migrating from the source of the infection with a discharging sinus. On palpation, the mass was fluctuant and warm to touch without effusion of the knee joint or bony tenderness over the joint line.

A routine set of blood tests demonstrated a white cell count of 13 ($\times 10^9$/L) and a C-reactive protein of 227 (mg/L) and were otherwise unremarkable. A plain radiograph of the left knee illustrated a large ill-defined ovoid lucency in the proximal tibia

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with a wide zone transition and permeative pattern seen extending distally (Figure 1). In retrospect, a radiograph of the same knee taken 6 years previously shows a subtle intramedullary lucency, which has progressed in size (Figure 2).

Subsequently, magnetic resonance imaging (MRI) was performed and revealed features consistent with a Brodie abscess with a well-defined lobulated intramedullary abscess in the proximal tibia measuring 36 × 37 × 96 mm (AP, LR, CC). The abscess has a subtle high signal T1-weighted rim with avid peripheral enhancement consistent with a 'penumbra sign'. There is a convincing cortical breach just lateral to the tibial tuberosity with extension of the intraosseous abscess into the deep subcutaneous tissues (Figure 3). These are MRI features characteristic of a defined abscess. There are some shared features with other conditions such as Langerhans cell histiocytosis, eosinophilic granuloma and tuberculosis [1].

The abscess pointed and ruptured prior to surgery. Incision and drainage were followed by application of topical negative pressure therapy dressing to the wound. Staphylococcus aureus was isolated from surgical samples. The patient was treated with a 4-week course of antibiotics. The outcome was good with complete recovery.

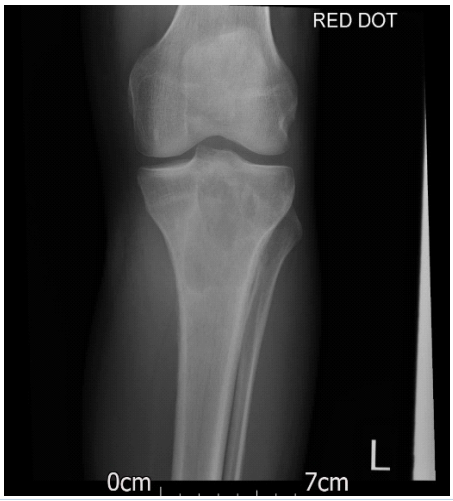

Figure 1: A plain radiograph of the left knee illustrated a large ill-defined ovoid lucency in the proximal tibia with a wide zone transition and permeative pattern seen extending distally.

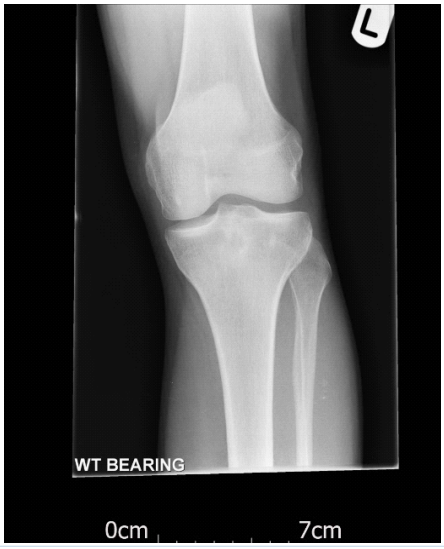

Figure 2: In retrospect, a radiograph of the same knee taken 6 years previously shows a subtle intramedullary lucency, which has progressed in size.

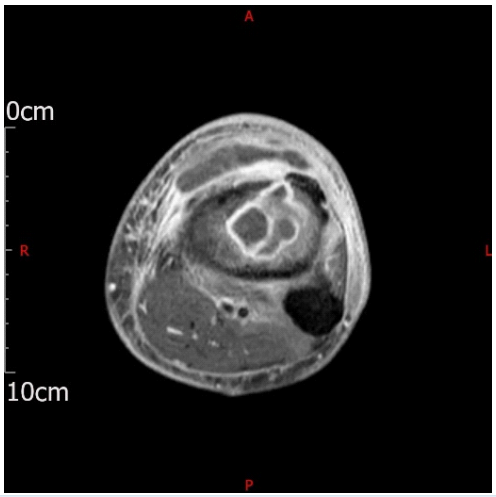

Figure 3: A well-defined lobulated intramedullary abscess in the proximal tibia measuring 36 × 37 × 96 mm (AP, LR, CC). The abscess has a subtle high signal T1-weighted rim with avid peripheral enhancement consistent with a 'penumbra sign'. There is a convincing cortical breach just lateral to the tibial tuberosity with extension of the intraosseous abscess into the deep subcutaneous tissues.

Discussion

Brodie abscess is a contained collection of pus in the bone surrounded by a sclerotic wall resulting in a subdued systemic inflammatory response [2]. It has been described as a rare form of subacute presentation of osteomyelitis with a single focus of intraosseous abscess formation [3]. Brodie abscess is one of the many clinical presentations of haematogenous osteomyelitis most frequently encountered in young men. Due to its insidious onset and limited initial systemic response, it can easily be underdiagnosed by clinicians unless adequate imaging is done. Therefore, early diagnosis of Brodie abscess is deemed important to achieve a good clinical outcome by avoiding serious complications such as dead bone that continues to harbour bacteria. The most affected bone is the tibia and the pathogen most often identified on culture is Staphylococcus aureus [2].

Conventional radiographs are still the most utilized diagnostic imaging modality for most physicians when considering the diagnosis of Brodie abscess. MRI has also been proven to be effective at supporting initial findings from plain radiographs with further characterisation of lesions [1]. The 'penumbra sign' is helpful in differentiating neoplasm from infection; a high specificity of 96% despite a low sensitivity of 27% for musculoskeletal infections makes its presence a useful confirmatory sign [4]. Surgical debridement followed by a prolonged course of parenteral antibiotics is the preferred mode of treatment and the outcome is generally reported as favourable [5]. Following surgical drainage, culture or histopathological evaluation of the subsequent aspirate or biopsy confirms the final diagnosis [6].

Summary

This case report discusses the findings from conventional as well as magnetic resonance imaging to diagnose a relatively rare subacute form of osteomyelitis known as Brodie abscess. The patient was transferred to a tertiary hospital for incision and drainage and made a complete recovery from the intervention.

Patient consent

Informed consent was obtained from the patient related to this case.

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