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An Atypical Presentation of Brodie's Abscess: A Case Report.

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ABSTRACT

The plain X ray, computed tomography and magnetic resonance (MR) imaging features of atypical presentation of Brodie's abscess in lower end of tibia in a patient who presented as swelling and pain over lower leg has been fully evaluated.

Keywords: Brodie's abscess, osteomyelitis, abscess, lower end of tibia.

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INTRODUCTION

Brodie abscess is a rare bone lesion that forms as a result of sub-acute osteomyelitis. Patients typically present with a several month history of non-specific pain and swelling, often lacking an inciting traumatic event and systemic symptoms. While radiographs are the initial diagnostic modality, Magnetic Resonance (MR) imaging can be useful in the further delineation of the disease. We present a atypically appearing case, of Brodie abscess in distal tibia.

Case Report

A 23 year old male presented with localized pain over the lower aspect of the right leg for about two months. The physical examination revealed mild swelling and tenderness to palpation at the ankle and the patient was treated for an ankle sprain. He had similar history in the past for which drainage was done according to the patient due to unresolved symptoms and increased swelling and erythema over a 3 week period during that episode. No past history of trauma. History is suggestive of osteomyelitis with recurrence presently. Plain radiographs, CT and MR imaging of the leg were performed.

Plain Radiograph Findings



Figures 1 A and B shows the AP and lateral view radiographs of lower end of tibia and fibula which shows a well defined lucency noted in the lower end of tibia with sclerotic margins with no similar lesion elsewhere.

CT FINDINGS

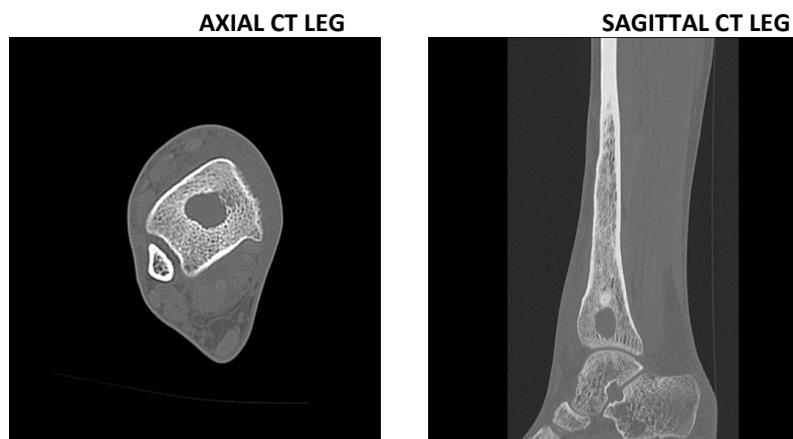


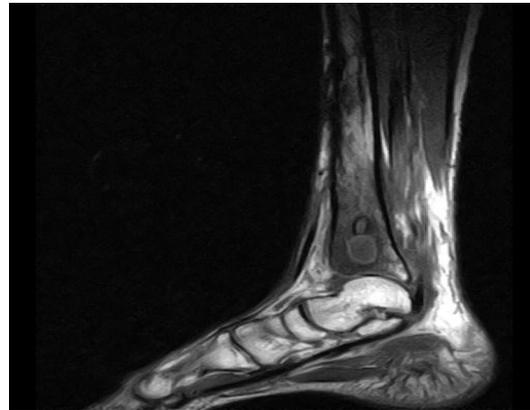
Figure 2 shows the axial and sag sections of plain CT done for lower end of tibia with ankle joint which shows a well defined homogenous lytic lesion in the lower end of tibia which appears isodense to the muscle plane and sclerotic margins.

CORONAL CT LEG



Figure 3 shows the coronal section of the plain CT and shows the similar findings as in fig 2.

MRI FINDINGS



Figures 3 shows the coronal and sag sections of MRI leg with ankle showing T1 hypo to isointense lesion with a well defined but irregular margin in the lower end of tibia.



Figures 4 shows a coronal section of MRI FOR the same patient showing T2 and STIR hyperintensity in the lower end of tibia with a surrounding halo of marrow edema.

Summary of Imaging Findings

Plain radiograph images (Fig 1) shows the AP and lateral view radiographs of lower end of tibia and fibula which shows a well-defined lucency [3] noted in the lower end of tibia with sclerotic margins with no similar lesion elsewhere. There are no fracture lucencies and the ankle joint space is maintained. Computed tomography (Fig 2) shows the axial and sag sections of plain CT done for lower end of tibia with ankle joint which shows a well defined homogenous lytic lesion in the lower end of tibia which appears isodense to the muscle plane and sclerotic margins. MRI [5] (Fig 3 AND Fig 4) shows the coronal and sag sections of MRI leg with ankle showing T1 hypo to isointense lesion with a well defined but irregular margin in the lower end of tibia surrounded by a thick intermediate signal intensity rim with a low signal intensity periphery and Fig 4 shows a T2 and STIR hyperintensity in the lower end of tibia with a surrounding halo of marrow edema^{7,9,10}.

Patient Discussion

On imaging studies, our patient showed findings consistent with a Brodie abscess in lower end of tibia. The differential diagnosis in this case includes eosinophilic granuloma, rhabdomyosarcoma, ganglions, fibrous defects, or bone cysts, tubercular or fungal infection. These alternate diagnoses can be excluded by the extensive bone marrow and soft tissue inflammation, thick rim enhancement with fluid centrally, and the absence of a lesion 15 months prior to presentation. Curettage and bone cementing was done for the patient under aseptic precautions following draining of pus. Histopathologic confirmation and positive cultures for *Staphylococcus aureus*, provided the definitive diagnosis of a Brodie abscess in our case.

DISCUSSION

Sir Benjamin Collins Brodie (1830's) recognized a chronic inflammatory process in the tibia without acute symptoms or precipitating infection [1-3]. This rare lesion, known today as a Brodie abscess, is a localized type of subacute or chronic pyogenic osteomyelitis [1-4]. Pathogenesis is due to an insidious bacteremia with septic emboli to a normal or minimally traumatized long bone, often from an infection with *Staphylococcus aureus* [5,6]. The lesion is predominant in young males with unfused epiphyseal plates, typically presenting during the second decade of life [2,3]. Brodie abscess is a chronic abscess of bone surrounded by dense fibrous tissue and sclerotic bone usually presenting with recurrent pain and localized swelling [1,2]; systemic symptoms are typically absent [3]. Radiographs of a Brodie abscess often demonstrate a localized area of radiolucency with surrounding sclerosis. The lucent region is commonly located in the metaphysis where it may extend to or through the growth plate. Bone scans are more sensitive than radiographs for the early detection of osteomyelitis. On scintigraphy, a focal area of radiopharmaceutical uptake at the site of suspected infection with central photopenia suggests a Brodie abscess. MR imaging provides a greater accuracy in delineating the extent of disease, a more rapid evaluation, and the ability to perform the study without ionizing radiation. In a review of the literature by Matowe and Gilbert, the average sensitivity of MR imaging in osteomyelitis was 91%, the average specificity [9]. Brodie Abscess was 82%, the average accuracy was 88%, and the average positive likelihood ratio was 7.8. Grey et al [6] have described a 'penumbra sign' on T1-weighted MRI scans. The penumbra is a discrete peripheral zone of marginally higher signal intensity than the abscess cavity and surrounding marrow oedema/ sclerosis, and of lower signal intensity than fatty bone marrow, and often enhancing with contrast. This has been postulated to be due to the presence of active, vascular, inflammatory granulation tissue around the abscess. Although this sign was also found in single isolated cases of eosinophilic granuloma and chondrosarcoma, a sensitivity of 75% and a specificity of 99% with an accuracy of 99%, a positive predictive value of 92% and a negative predictive value of 99% has been stated. It appears as high intensity signal centrally with a thick, low intensity rim on T2 weighted MR images. Treatment for Brodie abscess includes surgical debridement and antibiotic therapy. A sterile abscess may be treated without antibiotics only if there is symptomatic improvement and radiographic regression of the lesion. Complications include joint contractures, pathological fractures, amyloid disease and malignant changes in epidermis [7,8].

CONCLUSION

As much as 90% of the cases are initially misdiagnosed, with a mean delay of 3 months to correct diagnosis [12]. Fifty percent of the cases are wrongly suspected to be of tumoral origin [12]. The upper end of tibia is the most common site [4,12,13] while Brodie's abscess is rarer in the lower end of tibia [1,11,13]. We have

evaluated the imaging features of plain radiograph, CT and MRI in a patient with a Brodie's abscess in lower end of tibia.

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