

# Primary diaphyseal tuberculosis of the tibia

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## ABSTRACT

**Tuberculous osteomyelitis involving primarily the diaphysis without articular involvement is very rare. Pain and swelling are the common presenting symptoms. The nonspecific nature of the symptoms leads to a delay in the diagnosis. Radiographs may mimic pyogenic osteomyelitis, Brodie's abscess, tumours or granulomatous lesions. Curettage of the lesion and the histopathological examination of the material obtained are necessary for confirmation of the diagnosis and offer a chance for early healing. We report the successful diagnosis and management of a rare case in a 28-year-old man of Indian origin afflicted with primary diaphyseal tuberculosis of the left tibia.**

**Keywords:** Brodie's abscess, diaphyseal tuberculosis, tuberculous osteomyelitis, skeletal tuberculosis

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## INTRODUCTION

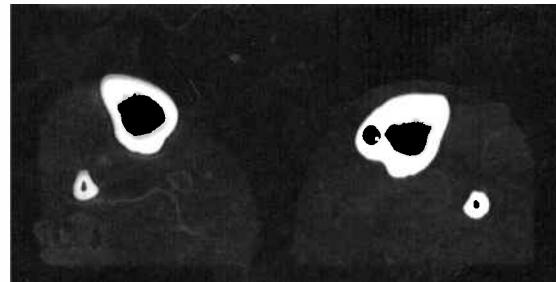
Skeletal tuberculosis is making a resurgence along with the emergence of human immunodeficiency virus (HIV) infection. However, isolated involvement of the shaft of the long bone is a rare presentation of osteoarticular tuberculosis. To the authors' knowledge, primary intracortical involvement of the diaphysis has not been previously reported. We report a case affecting the left tibia in a 28-year-old immunocompetent man of Indian origin.

## CASE REPORT

A 28-year-old man presented at the outpatient clinic with pain and swelling of the left leg for the last eight months. There was no history of injury. For the last seven months, he had a low-grade evening rise of temperature. The pain had progressively worsened during the day but did not disturb his sleep at night. The pain was not relieved by analgesics. Maximum pain was felt during standing and walking. There was no history of cough, expectoration, haemoptysis, swelling elsewhere or other joint involvement. Past history of major illnesses



**Fig. 1** Radiograph of the left tibia shows a thickened medial cortex of the upper midshaft with an intracortical lytic bone lesion associated with sclerosis and narrowing of the medullary canal. Mild swelling of the overlying soft tissue is also noted.



**Fig. 2** Contrast-enhanced axial CT image of the leg shows a thickened cortex of the midshaft of the left tibia particularly due to endosteal new bone formation, a lytic intracortical bone lesion containing a central small sequestrum, and adjacent marrow showing vascular granulation tissue. Mild oedematous thickening of the adjoining soft tissue is apparent.

like tuberculosis, diabetes mellitus, repeated blood transfusion suggestive of congenital haemolytic anaemia, was absent. The family history was non-contributory.

The patient was conscious, alert and cooperative. He was malnourished, afebrile and haemodynamically stable. There was a 6 cm × 4 cm painful tender swelling over the medial aspect of the upper one-third of the left leg, well below the knee joint. It was firm in consistency, without any fixity to the skin and had a normal local

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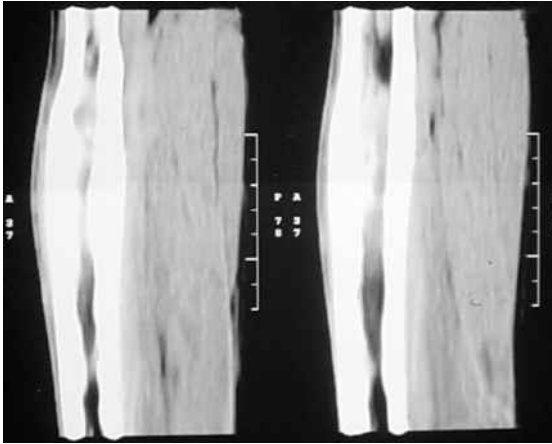
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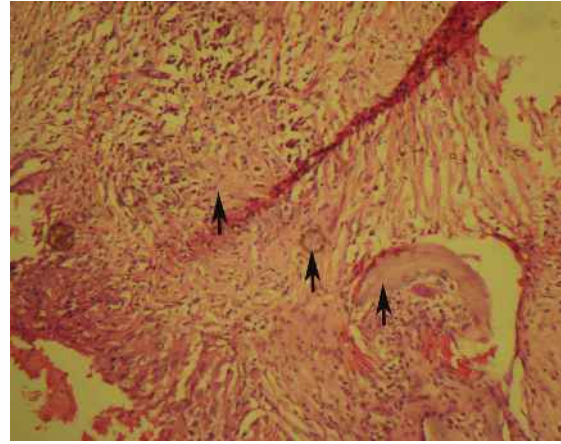
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**Fig. 3** Contrast-enhanced reconstructed sagittal CT image of the leg shows the cortical thickening of the midshaft of the left tibia, especially due to endosteal new bone formation compromising the medullary canal. Extent of vascular granulation tissue is well delineated.



**Fig. 4** Photomicrograph shows well-formed epithelioid granuloma interspersed with characteristic giant cells in the background of eosinophilic caseous material (Hematoxylin & eosin,  $\times 100$ ).

temperature. There was mild oedema of the overlying skin, but no discharge or pus from the lesion. The left knee joint was normal. There was no swelling, tenderness or any restriction in the range of movement. Examination of the other systems was also normal.

Routine laboratory workup revealed that the erythrocyte sedimentation rate was 56 mm in the first hour. Haemoglobin level was 9.8 g/dL. The full blood count showed normocytic normochromic anaemia, and a normal total and differential white cell count. The Mantoux test was normal. The renal and liver function tests were also normal. The fasting blood sugar level was 77 mg/dL. Serology for hepatitis B and C as well as HIV were negative. Radiograph of the chest was normal.

Radiograph of the left tibia revealed a thickening of the medial cortex of the upper midshaft, with an intracortical lytic bone lesion associated with sclerosis of the affected bone segment and narrowing of the medullary canal. Mild swelling of the overlying soft tissue was also noted (Fig. 1). Contrast-enhanced computed tomography (CT) of the leg confirmed the presence of a thickened cortex due to endosteal new bone formation. The intracortical lytic bone lesion contained a central small sequestrum. The marrow of the affected bony part showed increased density and enhancement, suggesting vascular granulation tissue. Mild oedematous thickening of the adjoining soft tissue was also noted (Figs. 2 & 3). The clinical features, radiographical appearance and CT findings were suggestive of intracortical diaphyseal Brodie's abscess.

Exploration and saucerisation of the lesion was performed. The histopathological examination of the obtained necrotic material revealed well-formed

epithelioid granuloma interspersed with characteristic giant cells in the background of eosinophilic caseous material, characteristic of tubercular osteomyelitis (Fig. 4). The culture of the biopsy specimen grew acid-fast bacilli. The final diagnosis was isolated diaphyseal tuberculous osteomyelitis of the left tibia. The patient was offered standard three drug anti-tuberculous regimen comprising rifampicin 450 mg (R), isoniazid 300 mg (H) and ethambutol 800 mg (E), daily initially for two months (RHE), followed by a seven-month course of two drugs (HR). The patient recovered well without any deformity or restriction of movement, and was under regular follow-up for one year postoperation.

## DISCUSSION

Concurrent with the resurgence of pulmonary tuberculosis due to the pandemic of HIV infection, there has been an increase in the number of musculoskeletal tuberculosis as well.<sup>(1)</sup> About 1%–3% of immunocompetent patients have musculoskeletal tubercular.<sup>(2)</sup> Tuberculosis has been reported in all bones of the body. Up to 50% of the extrapulmonary tubercular infections occur in the spine.<sup>(3)</sup> Extrapulmonary tubercular osteomyelitis (ETO) is caused by a haematogenous spread from an active focus that is usually located in the lungs. ETO can involve any bone, although it is rare in the ischia and pubic bones.<sup>(4)</sup> The knee and tibia are reported to be involved in 10% of cases.<sup>(5)</sup> Isolated involvement of the bone without joint involvement is uncommon. Tuberculosis of the shaft of tubular bones makes up less than 1% of all cases of skeletal tuberculosis and was commonly noted in persons of Chinese descent.<sup>(5)</sup> Among 30 cases of atypical skeletal tuberculosis in multiracial immigrants

in the United Kingdom, only two cases involved the shaft of tubular bones, and in both cases, the disease was widespread and not limited to a single tubular bone.<sup>(6)</sup> In our case, the patient was an adult of Indian origin and the site of involvement was the diaphysis of a single bone, i.e. the tibia.

Primary diaphyseal involvement is postulated to be caused by a tuberculous embolus that remains lodged in the nutrient vessel and thus fails to spread to the common site of involvement, the metaphyseal region.<sup>(7)</sup> Because of the mild local symptoms and low index of suspicion, there is a delay in the diagnosis. Commonly presenting features are pain and swelling of the bone.<sup>(8)</sup> Tenderness, abscess or sinus formation may also occur. Initial partial relief of symptoms by analgesics often renders a false sense of security and may contribute towards the delay in diagnosis. Only about one third of patients who have tuberculosis of the bone or joint have a history of pulmonary disease, contributing to the low index of suspicion.<sup>(9)</sup>

A solitary lesion in the diaphysis of the long tubular bone may mimic chronic pyogenic osteomyelitis, Brodie's abscess, cystic lesions, tumours or granulomatous lesions, either fungal or bacterial.<sup>(10-12)</sup> Solitary cystic tubercular lesion of the diaphysis is particularly common in children.<sup>(13,14)</sup> In a primarily diaphyseal intracortical lesion, as in our case, it is essential to exclude osteoid osteoma, intracortical haemangioma and type three Brodie's abscess.<sup>(15)</sup> The patient was an adult, and the absence of response to salicylates made the diagnosis of osteoid osteoma unlikely. The absence of characteristic intracortical contrast enhancement in CT ruled out the possibility of haemangioma. Bone pain that does not respond to simple analgesics may be of infective or neoplastic aetiology. There are no specific radiographical features of tuberculous osteomyelitis. Signs like osteoporosis, bone lysis, sclerosis, and periostitis are seen in both tuberculous and pyogenic osteomyelitis, often making it difficult to differentiate these conditions. Sometimes, the radiographical findings are similar to those in Brodie's abscess.<sup>(7)</sup> Because of such varied clinical and radiological presentations, biopsy and culture are necessary to establish the diagnosis.

This particular case merits special attention because isolated diaphyseal tuberculous osteomyelitis without articular involvement is a rarity in an immunocompetent individual.<sup>(16)</sup> Primary intracortical involvement with endosteal, and to some extent, periosteal new bone formation, has not been reported before. In the absence of specific clinical features and radiographical signs, awareness of diaphyseal tuberculosis and a high index of suspicion in adults with unexplained pain and swelling of the bone, could help to establish the diagnosis.

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