

## CASE REPORT OF A RARE TUBERCULOUS OSTEOMYELITIS OF THE PROXIMAL TIBIA.

### Orthopedics

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### ABSTRACT

**Introduction:** Tuberculosis (TB) affecting bones persists as a significant issue in India. The presentation of tuberculosis osteomyelitis in children differs from that in adults, and the clinical manifestations lack specificity. Tuberculosis osteomyelitis is infrequently observed in the diaphyseal bones and can be mistaken for Brodie's abscess due to similar clinical, radiological, and laboratory presentations. These cases, which exhibit low virulence, frequently lead to diagnostic delays and progressive bone damage. **Case Report:** We report a case of tuberculous osteomyelitis of the proximal tibia in an 18-month-old female who presented with complaints of left knee swelling. The patient was managed with excision and debridement of the swelling, and a biopsy was conducted to detect tuberculosis. The patient was started on Anti-Tuberculosis drugs following surgery and had an uneventful follow-up. **Conclusion:** Tuberculous osteomyelitis is a crucial differential diagnosis in children with musculoskeletal complaints of swelling and stiffness. Therefore, a strong suspicion of tuberculosis is expected in any case of osteomyelitis in children. The absence of pulmonary TB does not exclude the diagnosis of infantile tuberculous osteomyelitis, and the exclusion of tuberculosis by standard tests should be a benchmark in cases of osteomyelitis.

### KEYWORDS

Pediatric, Tuberculous, Osteomyelitis, Tibia

### INTRODUCTION

Tuberculosis (TB) affecting bones is uncommon in developed Western nations, yet it persists as a significant issue in numerous developing regions. TB infection can impact any bone throughout the body, with the spine being the most commonly affected site, followed by the hip and knee regions. The presentation of tuberculosis osteomyelitis in children differs from that in adults, and the clinical manifestations lack specificity [1]. Tuberculosis osteomyelitis is infrequently observed in the diaphyseal bones and can be mistaken for Brodie's abscess due to similar clinical, radiological, and laboratory presentations. Delayed diagnosis of the condition can result in bone deterioration. The slow progression of tuberculous osteomyelitis, characterized by minimal changes in laboratory values and radiographic appearance, often leads to confusion with subacute osteomyelitis subtypes like Brodie's abscess [2]. These cases, which exhibit low virulence, frequently lead to diagnostic delays and progressive bone damage.

### CASE REPORT

An 18-month-old girl was brought by her parents with a 2-week history of a painful mass over her left knee. The child was previously healthy with a normal birth developmental history. All her vaccinations, including BCG, were up to date. There was no history of trauma and no family history suggestive of pulmonary tuberculosis (TB). General and systemic examination was insignificant. The local examination revealed a swelling over the medial aspect of her left proximal tibia with normal overlying skin and no focal temperature change. Antero-posterior radiographs of her left knee were suggestive of significant soft tissue swelling in the region of the left knee joint space, supra patellar, patellar, and infra patellar regions, with dirty adjacent subcutaneous fat especially in the infra patellar region, with scalloping and lucency in the anteromedial cortex of the proximal tibial epiphysis suggesting likely large joint effusion with involvement of medial support structures and bones secondary to infection. [Fig. 1, 2]. Magnetic Resonance Imaging (MRI) suggested an infective etiology in the form of proximal tibial osteomyelitis involving the medial aspect of the epiphysis, growth plate, and metaphysis, associated with osseous destruction, juxtacortical soft tissue thickening, periosteal reaction, and a medium-sized fluid collection/abscess of approximately size 4x4x3.8cm, 30ml [Fig. 3, 4]. On local physical examination, the knee mass was fluctuant, minimally tender, and non-

pulsatile on palpation and without an associated knee effusion. The child had an abnormal gait and pain on passive range of motion of her left knee. There was no neurovascular compromise. The rest of the joints were normal. Hemogram showed an abnormally raised level of leucocyte count ( $16.88 \times 10^3/\mu\text{L}$ ).



Fig. 1.: Pre-operative radiograph of the left knee

### XR LEFT KNEE JOINT -AP LATERAL

Significant soft tissue swelling seen in the region of the left knee joint space / supra patellar - patellar - infra patellar regions with dirty adjacent subcutaneous fat especially in the infra patellar region with scalloping of anterior cortex of upper tibia / lucency in the medial aspect of the upper tibia / medial aspect of the proximal tibial epiphysis suggesting likely large joint effusion with involvement of patellar tendon / medial support structures and involvement of bones as described in text? Secondary infection. Suggested further evaluation with MRI / CT.

Fig. 2.: Radiograph (Left knee) report

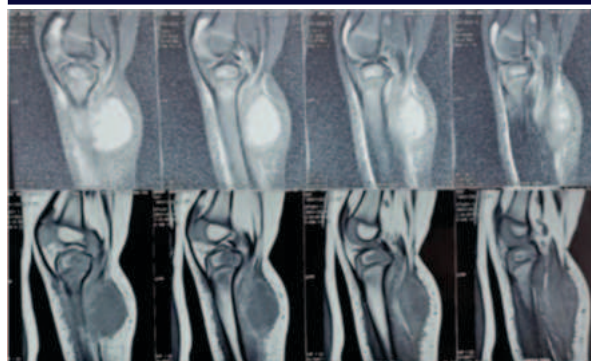


Fig. 3 : MRI (T1 and T2) sagittal plane of left knee showing soft tissue thickening, periosteal reaction and medium sized fluid collection/abscess of approximate size 4x4x3.8cm, 30ml

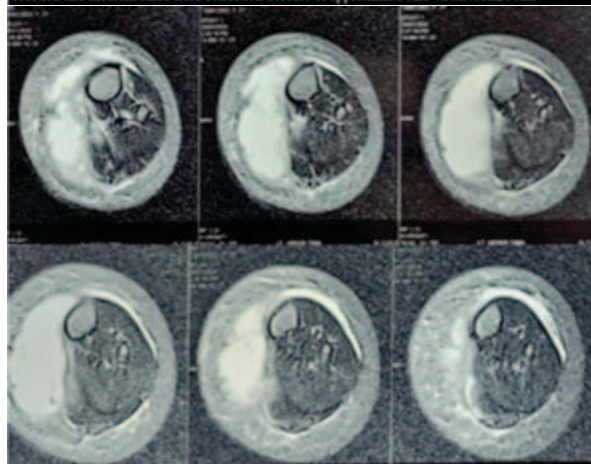


Fig. 4 : MRI Axial plane of Left Knee showing soft tissue thickening, periosteal reaction and medium sized fluid collection/abscess of approximate size 4x4x3.8cm (30ml)

A provisional diagnosis of osteomyelitis was made. She was scheduled for emergency excision and debridement. Intraoperatively, a thick-walled abscess cavity containing serous fluid was found in the soft tissues on the posterior-medial aspect of the left proximal lower leg. Intraoperative samples were collected for microscopy, serology, and culture-sensitivity. Tissue biopsy was taken for histopathological evaluation. [Fig.5].



Fig. 5.: Intra-operative photos of soft tissue (a and b); Closure site (c)

Histopathological examination reported multiple tissue bits showing ill-defined epithelioid cell granulomas with Langhans giant cells and lymphocytes with foci of caseous necrosis, fibrocollagenous tissue, and hemorrhage [Fig. 6]. The report concluded a granulomatous lesion suggestive of tuberculosis. Cartridge-based nucleic acid amplification testing (CBNAAT) was positive for *Mycobacterium tuberculosis* (MTB).

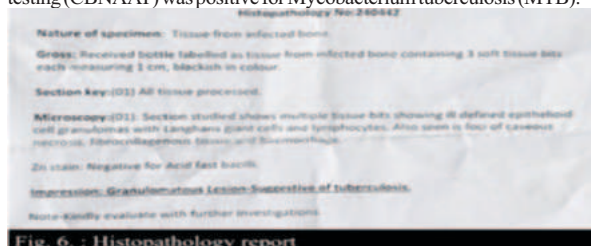


Fig. 6. : Histopathology report



Fig. 7 : Clinical photo of the patient at 3 month follow-up showing unassisted full weight bearing on affected limb

Post-operatively, the child recovered well and was discharged on anti-TB drugs for another 9 months. After the first month, a dramatic clinical improvement was observed. Radiographs at the two-month mark showed soft callus, and the patient's knee had full range of motion without any complaints. Informed consent was obtained before writing this report.

## DISCUSSION

- 1 Tuberculosis (TB) of the bones and joints is an uncommon granulomatous infection caused by *Mycobacterium tuberculosis*. While it remains a significant issue in developing countries, it is rare in developed Western nations. Extra-pulmonary tuberculosis, including skeletal involvement, is more prevalent among children. The Bacillus-Calmette-Guerin (BCG) vaccination itself can occasionally lead to tuberculosis osteomyelitis. The source of infection is sometimes unclear, as observed in the current cases[3,4].
- 1 TB bacilli typically spread hematogenously to the proximal tibia, resulting in a metaphyseal focus. In children under one-and-a-half years old, further dissemination to the epiphysis occurs through patent transphyseal vessels originating from this metaphyseal focus. Concurrent septic arthritis can arise from the drainage of an epiphyseal abscess into the joint through the articular surface, while physeal involvement can result from direct spread from adjacent metaphyseal or epiphyseal abscesses[5]. Due to the relative rarity of skeletal tuberculosis and nonspecific clinical presentations, diagnosis is often significantly delayed. Rasool et al. [6] reported the duration of symptoms ranging from 1 to 3 months among 13 children they treated. Primary epiphyseal involvement was seen in only two patients, and only two patients had a limitation in joint movement after treatment. Kerri and Martini [8] reported 98 patients with tuberculosis of the knee; 13 of their patients were children. The average delay was 40 months, and one-third of the patients did not have a destructive bony lesion. Teklali et al. [7] reported an average delay in diagnosis of 10 months (range, 10 days to 6 years), indicating the difficulty of making a prompt diagnosis.
- Radiological signs may include changes in the joint space, sub-chondral erosions, lytic bone lesions, and articular osteopenia. Markers of acute infection or inflammation such as ESR and CRP are typically elevated but lack specificity. A definitive diagnosis requires biopsy and culture, with CT and MRI aiding in precise lesion delineation and subsequent tissue procurement for diagnosis and therapy. The radiological appearance of tuberculosis osteomyelitis can resemble various conditions in children, including pyogenic infections and bone tumors.
- When performing a biopsy, diagnostic material is commonly obtained from the destructive area reflecting the granulomatous focus. Curettage without bone grafting is typically performed if typical caseous necrosis is observed on macroscopic examination or a granulomatous infection is confirmed on frozen section. However, if there is uncertainty regarding the diagnosis, surgical intervention should be halted until tuberculosis is confirmed.
- The current treatment of skeletal tuberculosis in children includes

