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CASE REPORT

Osteoarticular Tuberculosis in an Immunocompetent Child: A Case Report

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Abstract

Introduction: Tuberculosis (TB) remains a major public health concern in Brazil and is currently classified as the leading cause of death from a single infectious agent worldwide. TB in children and adolescents poses diagnostic challenges, particularly in extrapulmonary forms. Osteoarticular TB, although rare, presents with nonspecific symptoms and frequently affects the spine and large joints. **Objectives:** Describe the case of an immunocompetent patient with osteoarticular TB, as well as the clinical course and outcome. **Case report:** This case report describes the case of a four-year-and-four-month-old female patient presenting with monoarthritis of the right knee caused by *Mycobacterium tuberculosis*, with an insidious course, no extra-articular symptoms, and no history of prior contact with TB. Magnetic resonance imaging revealed a lesion suggestive of osteomyelitis associated with popliteal lymphadenopathy. The patient initially received antibiotic therapy targeting common pathogens and underwent surgical management of the joint, but showed no clinical improvement. Both culture and acid-fast bacilli (AFB) smear were negative, and the etiological diagnosis was confirmed through the identification of the *M. tuberculosis* complex by a rapid molecular test. Treatment was carried out with anti-tuberculosis drugs, which resulted in satisfactory clinical and radiographic outcomes, leading to the patient's cure. **Conclusion:** The case highlights osteoarticular tuberculosis as a necessary and challenging differential diagnosis in the management of arthritis cases in the pediatric population. Mastery of diagnostic methods is essential to guide appropriate investigation.

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INTRODUCTION

Tuberculosis (TB) is a chronic progressive infectious disease that represents a major public health challenge, despite being preventable and curable.[1,2] According to the Global Tuberculosis Report released by the World Health Organization (WHO) in 2024, TB returned to being the leading cause of death worldwide from a single infectious agent in 2023, after three years in which it was surpassed by coronavirus disease (COVID-19)[3].

In Brazil, although national efforts are undertaken to control the disease or infection caused by *Mycobacterium tuberculosis* (Mtb), preliminary data released by the Ministry of Health (MH) in 2025 indicate that, in 2024, 84,308 new TB cases were identified, representing an incidence of 37 cases per 100,000 inhabitants. In this context, children up to 15 years of age accounted for 4.1% (3,468) of all new TB cases, with an increase in the proportion of children aged zero to four years and five to 10 years affected by the disease since 2021[2].

In view of this, TB in the pediatric population is understood to represent a significant challenge, as, in addition to the low bacillary load and the absence of pathognomonic features, this group presents a higher incidence of extrapulmonary disease, making diagnosis more difficult. In this presentation, 10 to 20% correspond to bone TB, an insidious condition with nonspecific clinical presentation, which most frequently affects the vertebral column and the hip and knee joints[4].

Thus, the present article aims to present and discuss the osteoarticular form of the disease in the pediatric population through the description of a clinical case, its complications, and outcome. The report was approved by an institutional Research Ethics Committee under opinion number 70784323.4.0000.536.

CASE REPORT

A female patient, four years and four months old, immunocompetent and previously healthy, presented to the emergency department of a tertiary pediatric hospital, referred from a private clinic for bone biopsy. The clinical presentation consisted of joint pain in the right knee and difficulty walking, with symptom onset reported by the caregiver six months prior. Additionally, flattening of the weight–height growth curve was observed. Other symptoms, such as fever, asthenia, and cough, were denied by the guardian. The patient had no history of prior contact with TB, and her vaccination status was up to date. On physical examination, the joint was swollen, and mobility was impaired; other inflammatory signs were absent. During this period, complete blood counts were performed, all within normal limits. The erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were at borderline levels (10 mm/h and 5 mg/L, respectively). In view of this, observation was chosen, but no clinical improvement was noted.

Magnetic resonance imaging (MRI) of the affected joint was then performed after four months of disease progression. It revealed cavitations and a liquefied metaepiphyseal component with an epicenter in the lateral femoral condyle. Additionally, joint effusion with signs of synovitis and bone edema in the medial femoral condyle were present. Based on imaging suggestive of distal right femoral osteomyelitis, surgical intervention was performed. In addition to surgical management, intravenous antibiotic therapy with oxacillin was administered for seven days, followed by 45 days of oral cephalexin. However, no favorable clinical evolution was observed after the intervention.

At the hospital, a new imaging study of the joint was performed, which demonstrated progression of epiphyseal osteomyelitis with physeal involvement and a metaphyseal abscess, along with the appearance of mobile, painless lymphadenopathy in the popliteal region. Figure 1 shows the MRI findings, allowing comparative observation of the progression of joint involvement. Thus, a diagnosis of bone TB was considered, and a bone biopsy with testing of joint secretion was performed. The diagnostic suspicion of extrapulmonary TB involving the distal femur with epiphyseal involvement was confirmed, with detection of rifampicin-sensitive *Mtb* by rapid molecular testing (RMT) of the joint secretion. Acid-fast bacilli (AFB) testing was negative in both the secretion and bone biopsy, as was culture. A chest radiograph was performed and showed no abnormalities. Subsequently, the patient tested negative for HIV, and standard TB treatment was initiated, consisting of rifampicin, isoniazid, and pyrazinamide for two months, followed by ten months of rifampicin and isoniazid.

After four months, during outpatient follow-up, a new imaging study was performed, revealing a lesion with an irregular contour, peripheral enhancement, and slight increase compared to the previous pattern. In light of this new finding, the medical team decided to perform a new joint aspiration and lavage to rule out the possibility of associated pathogens or resistance. The new culture of bone secretion was negative for common pathogens, fungi, and other mycobacteria. *Mtb* could no longer be isolated from the sample, and no histopathological examination was performed. Additionally, inborn errors of immunity were ruled out.

Following this episode, the patient showed reduction of the radiographic lesion, satisfactory clinical evolution, and completed treatment, characterizing cure of the infection.

DISCUSSION

Bone TB represents a challenging diagnosis, as its signs, symptoms, and radiographic features are nonspecific, which may lead to delays, unnecessary treatments, and long-term complications. In these cases, pathogen dissemination generally occurs via the lymphohematogenous route, preceded by a primary infection or an inflammatory reaction to an

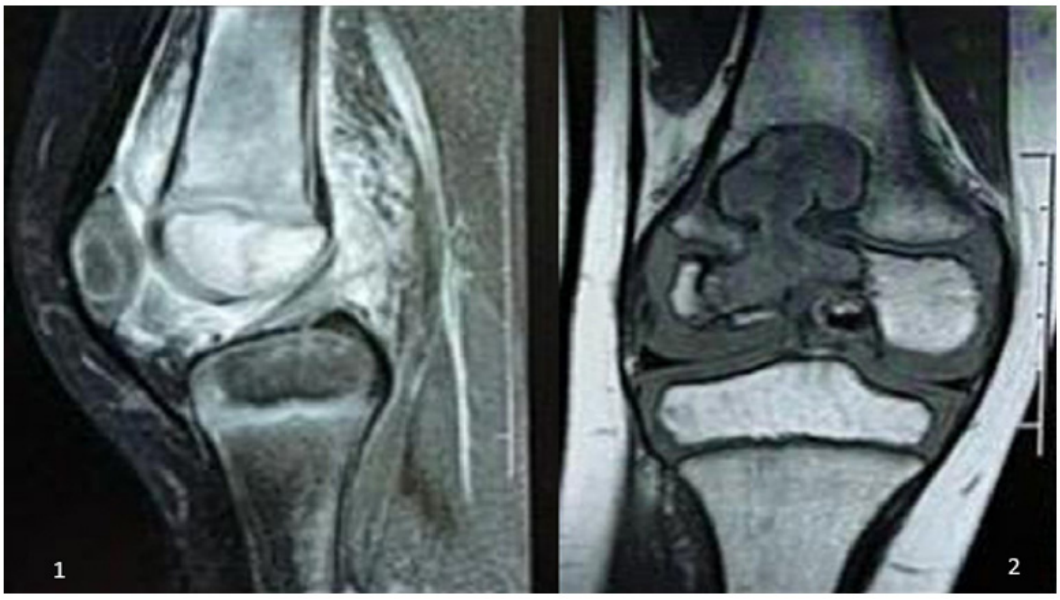


Figure 1: T2-weighted knee MRI showing the initial epiphyseal lesion in the distal femur and significant synovitis
Figure 2: T1-weighted knee MRI showing progression of the lesion, communication with the joint, and transphyseal extension causing metaphyseal involvement

Table 1. Laboratory comparison between the first and second approaches to right knee aspiration.

Test	1st Approach – Joint Secretion	1st Approach – Bone Biopsy	2nd Approach – Joint Secretion
RMT (GeneXpert Ultra)	Positive for *Mycobacterium tuberculosis*, rifampicin-sensitive	RMT not detected	RMT not detected
AFB (bacilloscopy)	Absence of AFB	Absence of AFB	Absence of AFB
Culture for *M. tuberculosis*	Negative	Negative	Negative
Direct mycological examination	Not performed	Not performed	Negative
Fungal culture	Not performed	Not performed	Negative
Culture for common pathogens	Not performed	Not performed	Negative

extra-articular focus[5]. In general, bone infection caused by *Mtb* presents as arthritis and/or osteomyelitis with insidious progression but significant morbidity[6]. Large joints and the metaphyses of long bones, such as the knee, are frequently affected due to their rich vascular supply. The location of osteomyelitis depends on the patient's age, given its direct relationship with intraosseous vascular distribution. In children aged one to 16 years, the metaphysis is the most common site of involvement, as the epiphyseal growth plate acts as a barrier to the spread of infection[7]. However, involvement of other bone regions should not be sufficient to rule out *Mtb* infection, as observed in the reported case. Tuberculous osteomyelitis typically presents early with pain but may also be associated with systemic symptoms such as weight loss, night sweats, edema, difficulty walking, and delayed treatment or ineffective therapy may result in destruction of osteochondral tissue by the pathogen and by autologous inflammatory mechanisms, potentially leading to growth impairment and bone tissue damage[8,9,10].

Diagnosis of TB may be supported by laboratory tests such as complete blood count, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP); however, these are generally nonspecific[11].

For diagnostic confirmation, isolation of *Mtb* from sputum or tissue obtained from the affected site is required, with culture established as the gold standard. An alternative is rapid molecular testing (RMT), which has proven capable of confirming extrapulmonary TB of bones and joints more rapidly; however, its sensitivity ranges from 60 to 70% for bone TB, and therefore a negative result is insufficient to exclude the diagnosis. In the described case, RMT was the test of choice, given the need for rapid diagnosis to improve prognosis in a patient who already had a six-month delay in diagnosis[6]. Biopsy of the affected tissue is also used for histopathological and bacteriological confirmation of TB; however, due to the paucibacillary nature of the disease, negative cultures are frequent. Even with negative tests, the presence of typical histopathological features such as tuberculous granulomas strongly supports the diagnosis[7,9].

Regarding imaging studies, radiography and magnetic resonance imaging are the main modalities used to detect the disease, its complications, and its progression, and are of great importance during investigation[6]. It is important to note that chest radiographs are useful for suggesting associated pulmonary TB when typical findings are present. Ultrasound may be used, particularly to guide aspirations for sample collection[7].

Diagnoses such as bacterial osteomyelitis and chronic recurrent multifocal osteomyelitis should include osteoarticular TB as a differential diagnosis, as they share similar findings in both clinical presentation and imaging—such as bone destruction and soft tissue edema—highlighting the need for clinical vigilance. Neoplasms and collagen diseases should also be considered as diagnostic hypotheses, depending on the presentation[8,12].

Treatment of musculoskeletal TB is pharmacological, and traditionally lasts 12 months, using the standard regimen with extension of the maintenance phase to 10 months[4]. In the present case, the patient received the treatment recommended by the Brazilian Ministry of Health and achieved effective cure of the infection, with recovery of mobility and no osteoarticular sequelae.

CONCLUSION

Due to the difficulty in diagnosing osteoarticular TB in children, the importance of early detection and understanding of its clinical manifestations is emphasized. Knowledge of investigative methods is essential to support diagnostic evaluation and enable early diagnosis and timely treatment, thereby minimizing morbidity and mortality in the pediatric population.

REFERENCES

1. Baykan AH, Baykan M, Acar T, Ceylan N. Extrapulmonary tuberculosis: an old but resurgent problem. Insights Imaging. 2022;13(1):39. doi: http://www.doi.org/10.1186/s13244-022-01172-0
2. Brasil. Ministério da Saúde. Boletim epidemiológico: tuberculose 2025. Brasília: Ministério da Saúde; 2025[citado em 25 maio 2025]. Disponível em: https://www.gov.br/aids/pt-br/central-de-conteudo/boletins-epidemiologicos/2025/boletim-epidemiologico-tuberculose-2025
3. World Health Organization. Global tuberculosis report 2024. Geneva: World Health Organization; 2024[citado em 14 mar 2025]. Disponível em: https://www.who.int/teams/global-programme-on-tuberculosis-and-lung-health/tb-reports/global-tuberculosis-report-2024
4. Brasil. Ministério da Saúde. Manual de recomendações para o controle da tuberculose no Brasil. 2ª ed. Brasília: Ministério da Saúde; 2019.
5. Gottschalk C, Carvalho ER. Tuberculose osteoarticular do joelho como apresentação única em lactente de 10 meses: um caso raro de diagnóstico comumente tardio. Rev Bras Ortop. 2024;59(Suppl 1):56-59. doi: http://www.doi.org/10.1055/s-0042-1748944
6. Lopes WF, Vasconcello AG, Baraúna D, Oliveira RCM. Tuberculose óssea em pediatria: relato de caso. Rev Cient HSI. 2023;7(3):97-104[citado em 25 maio 2025]. Disponível em: https://revistacientifica.hospitalsantaizabel.org.br/index.php/RCHSI/article/view/409
7. Pattamapaspong N, et al. Imaging of musculoskeletal tuberculosis. Br J Radiol. 2024;97(1153):1-12. doi: http://www.doi.org/10.1093/bjr/tqad019
8. Ortiz GJ, Delgado J, Ramírez T, Galeano MA, Barnafi N, Pillaca O, Corral G. Osteoarticular tuberculosis: imaging findings in pediatric patients. Pediatr Radiol. 2025;55(1):104-114. doi: http://www.doi.org/10.1007/s00247-024-06092-3
9. Agashe VM, et al. Diagnosis of osteoarticular tuberculosis: perceptions, protocols, practices, and priorities in the endemic and non-endemic areas of the world: a WAIOT view. Microorganisms. 2020;8(9):1312. doi: http://www.doi.org/10.3390/microorganisms8091312
10. Zonis GHC, Marques MLC, Oliveira CM, Palis AM, Andrade PS, Parente AAAI, et al. Tuberculose pulmonar e estado nutricional: estudo seccional com crianças e adolescentes. Resid Pediatr. 2024;14(3):968[citado em 25 maio 2025]. Doi : http://www.doi.org/10.25060/residpediatr-2024.v14n3-968
11. Agarwal A. Paediatric osteoarticular tuberculosis: a review. J Clin Orthop Trauma. 2020;11(2):202-207. doi: http://www.doi.org/10.1016/j.jcot.2020.01.005
12. Abid W, Ladeb MF, Chidambaranathan N, et al. Imaging of musculoskeletal tuberculosis. Skeletal Radiol. 2024;53:2081-2097. doi: http://www.doi.org/10.1007/s00256-023-04556-5