Acta Ortopédica Mexicana 2026; 40(1): Jan.-Feb. 44-47

Clinical case

doi: 10.35366/122373

Bone tuberculosis in the distal metaphysis of a child's radius: case report

Tuberculosis ósea en la metáfisis del radio de un niño: reporte de caso

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ABSTRACT. Introduction: tuberculosis is an important public health problem associated with patient's morbidity and increased public expenses in Brazil. The disease typically affects the lungs, but can affect other sites as well. Extrapulmonary manifestations are estimated to occur in approximately 20% of patients with tuberculosis. The diagnosis is often difficult and neglected, which can generate important consequences for the patients. Radiological images, bacteriological exams and histopathology of the tissue allowing the isolation of pathogens and identification of the bacillus are part of the diagnosis. **Case report:** the authors report a case of a child aged one and four months with osteoarticular tuberculosis affecting the distal metaphysis of the radius, with a diagnosis confirmed through histopathological exams and bacteriological analysis of the lesion by biopsy and culture. Curettage of the lesion was performed and chemotherapy

RESUMEN. Introducción: la tuberculosis es un importante problema de salud pública asociado con la morbilidad del paciente y el aumento de los gastos públicos en Brasil. La enfermedad típicamente afecta los pulmones, pero también puede afectar otros sitios. Se estima que las manifestaciones extrapulmonares ocurren en aproximadamente 20% de los pacientes con tuberculosis. El diagnóstico suele ser difícil y descuidado, lo que puede generar importantes consecuencias para los pacientes. Las imágenes radiológicas, los exámenes bacteriológicos y la histopatología del tejido que permiten el aislamiento de patógenos e identificación del bacilo son parte del diagnóstico. **Reporte del caso:** los autores informan un caso de un niño de un año y cuatro meses con tuberculosis osteoarticular que afecta la metáfisis distal del radio, con un diagnóstico confirmado a través de exámenes histopatológicos y análisis bacteriológicos de la

Level of evidence: IV

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Received: 26-08-2024. Accepted: 27-06-2025.

How to cite: Sanches-Silva MV, Agrizzi-de Angeli LR, Correa-Serafim BL, Rotta-Lucena P, Moreno-Grangeiro P, Akel-Junior AN. Bone tuberculosis in the distal metaphysis of a child's radius: case report. Acta Ortop Mex. 2026; 40(1): 44-47. https://dx.doi.org/10.35366/122373

drugs were administered (Rifampicin, Isoniazid and Pyrazinamide), with clinical and radiological improvement. The authors discuss the importance of tuberculosis as a differential diagnosis in cases with similar clinical and radiological findings (tumors and bone infections) in an endemic region.

Keywords: child, radius, osteomyelitis, tuberculosis osteoarticular.

lesión mediante biopsia y cultivo. Se realizó curetaje de la lesión y se administraron medicamentos de quimioterapia (Rifampicina, Isoniazida y Pirazinamida), con mejoría clínica y radiológica. Los autores discuten la importancia de la tuberculosis como diagnóstico diferencial en casos con hallazgos clínicos y radiológicos similares (tumores e infecciones óseas) en una región endémica.

Palabras clave: niño, radio, osteomielitis, tuberculosis osteoarticular.

Abbreviations:
CRP = C-Reactive Protein
ESR = Erythrocyte Sedimentation Rate
INH = Isoniazid
LGC = Langerhans Giant Cells
OAT = Osteoarticular Tuberculosis
PZA = Pyrazinamide
RMP = Rifampin
TB = Tuberculosis

Introduction

Tuberculosis (TB) is a significant public health issue that affects patients' health and increases public expenses.[1,2] Approximately one-third of the world's population has been infected with *Mycobacterium tuberculosis* at some point in their lives. Although most TB cases occur in adults, it causes 5% of global pediatric deaths annually.[3,4] In Brazil, 78,057 new TB cases were diagnosed in 2022, with 3.5% occurring in those under 15 years of age.[1]

Extrapulmonary manifestations occur in an estimated 20% of patients with TB.[5] Osteoarticular tuberculosis (OAT) accounts for 1-5% of all forms of TB and 10-17% of extrapulmonary forms,[3,4,6,7,8] and is considered the third most common type of extrapulmonary TB.[7]

Contributing risk factors for other forms of tuberculosis, such as immune deficiency and low socioeconomic status, are also associated with OAT.[6] The clinical presentation of OAT is often subtle, with children typically presenting with local pain, swelling, tenderness, and decreased range of motion.[9,10] Common radiological features of OAT include osteopenia, soft tissue swelling, and minimal periosteal reaction, as well as irregularly contoured osteolytic lesions sometimes surrounded by a thin area of osteocondensation.[8] TB can mimic the symptoms of many other diseases, including other infections and cancer, making early diagnosis and treatment crucial for its successful management.[1,3,4,5]

We present the case of a male child with OAT affecting the distal metaphysis of the radius. This report was structured according to the SCARE guidelines checklist after receiving approval from the local ethics committee and obtaining informed consent (IC) from the patient's family.

Case report

We present the case of a one-year-and-four-month-old male child who was admitted with a painless fibroelastic mass of 20 mm diameter on the right wrist noted 10 days before. The wrist range of motion was full. The caregiver reported a fracture in the same location three months prior that was treated with a cast for 30 days. The patient had no history of fever, loss of appetite, or weight loss. There was no family history of TB and they lived in a favela, thus being at social risk.

Radiographs showed a cystic and lytic central lesion in the distal metaphysis of the right radius with expansive characteristics and cortical rupture *(Figure 1)*. Computed tomography (CT) showed a mass with a liquefied center and peripheral enhancement, oval in shape, presenting communication with the bone marrow on its medial surface.

Figure 1: Radiographic image of a lytic lesion in the distal metaphysis of the radius, with expansive characteristics and cortical rupture.

A cortical rupture was visualized with medullary interstitial calcification (bone sequestra). The lesion measured 27 × 22 × 20 mm.

The patient underwent a surgical procedure two weeks after the first evaluation and purulent drainage was found in the soft tissues around the lesion with communication to the bone marrow. Curettage was performed for investigation and the lesion was irrigated with saline solution. A splint was used for four weeks postoperatively.

The bacterial culture did not contain significant bacterial growth after 72 hours of incubation. The anatomopathological study showed the proliferation of histiocytes with granuloma formation and multinucleated Langerhans Giant Cells (LGC) surrounded by a dense lymphocytic infiltration with rare plasma cells. A necrotizing granulomatous inflammatory process in the soft and bone tissues was seen, with the histological appearance of TB. Sputum test was negative for TB bacillus and laboratory tests showed a C-Reactive Protein (CRP) test of 0.40 mg/l and Erythrocyte Sedimentation Rate (ESR) of 63 mm. Tuberculin skin test had a weak reaction (7 mm) and the detection of acid-alcohol-resistant bacillus (BAAR) was positive.

OAT was diagnosed. Treatment with isoniazid (INH), rifampin (RMP), and pyrazinamide (PZA) combination was started for two months right after the diagnosis, followed by INH and RMP for another 10 months. Follow-up was carried out by the orthopedics and infectious diseases team, and at one year follow-up complete resolution of the condition was obtained. The patient presented clinical improvement, as well as bone and tissue restitution, without residual deformities. Radiographs showed no deformity or commitment in the distal radius *(Figure 2)*.

Figure 2: Radiographic image showing the complete resolution of the condition at one-year follow-up. Restitution of bone and tissue is seen without any residual deformities.

Discussion

The burden of TB worldwide is significant.[1,2,4] OAT is a rare but important cause of lytic bone lesions. Differential diagnoses include subacute and chronic osteomyelitis, bone cysts, cartilaginous tumors, osteoid osteoma, granulomatous lesions, hematological diseases, and malignant tumors.[10]

OAT mostly results from hematogenous dissemination from the primary or reactivated focus of infection.[5,7] This spread is favored by bone characteristics like increased vascularity in the metaphysis, which is the commonest site involvement in children.[8]

In young children, minor trauma history and the lack of verbal ability may delay diagnosis and treatment.[9] Initial work-up includes history, physical examination, and radiographs, which can provide valuable information regarding the aggressiveness of the lesion.[9] CT can accurately demonstrate bony sclerosis and destruction.[10]

OAT produces no pathognomonic image signs and might mimic other lesions. Blood tests, including a complete blood count, blood cultures, CRP, and ESR may show increased values due to underlying inflammation.[3,5,6] However, a biopsy should be performed to confirm the diagnosis of TB.[3]

Diagnosis is confirmed in the histologic analysis showing caseating giant cell granulomas with epithelioid cells. In this report, the biopsy showed proliferation of histiocytes, with granuloma formation, and multinucleated LGC with the histological appearance of TB. The literature reports that curettage alone at the time of biopsy can yield favorable results.[9,10]

In children, treatment with INH, RMP, and PZA will likely be sufficient for all forms of OAT. The Brazilian treatment protocol recommends intensive treatment with INH, RMP and PZA for the first two months, followed by four months of INH and RMP.[1,2] Treatment should last at least six months, except in severe cases, where treatment regimens can be prolonged. Our patient presented a complete resolution after 10 months of antibiotic therapy.

In Brazil, one of the major limitations in the management and follow-up of pediatric tuberculosis cases, particularly in rural or underserved areas, is the difficulty families face in accessing continued healthcare. Many patients come from remote regions and must travel long distances to reach specialized centers, which often leads to irregular follow-up and missed appointments. This challenge directly impacts the ability to monitor treatment progress through serial imaging or clinical evaluations. In the present case, this reality is reflected in the availability of only the initial and final radiographs.

Conclusion

TB remains a significant public health challenge in Brazil, particularly in vulnerable populations. Although

pulmonary TB is the most common form, extrapulmonary manifestations are not uncommon and often present diagnostic and therapeutic challenges due to their insidious onset and nonspecific symptoms. Early diagnosis and appropriate treatment are essential to prevent long-term sequelae, especially in pediatric cases where the risk of complications is higher.

This case highlights the importance of maintaining a high index of suspicion for TB, even in its rarer forms, within endemic areas like Brazil. Due to its potentially serious prognosis if left untreated and its ability to be misdiagnosed, OAT is an important differential diagnosis to lytic and metaphyseal lesions and must always be considered, especially in developing and underdeveloped countries.

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Disclosure: the authors did not receive any outside funding or grants to support their research or preparation of this work. Neither they nor a member of their immediate family received payments, other benefits, or a commitment or agreement to provide such benefits from a commercial entity.

Acknowledgments: all of the figures are owned by the authors and are from their personal files. They have not been published before. All authors read and approved the final manuscript.

Financing: the authors have no relevant financial or non-financial interests to disclose.