Tuberculous Osteomyelitis with Associated Cutaneous Abscessation: A Paediatric Case Report of Extrapulmonary Tuberculosis

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Keywords

Paediatric Tuberculosis ; Extrapulmonary Tuberculosis ; Tuberculous Osteomyelitis ; Case Report

Abstract

Tuberculosis remains a global health concern, with children at higher risk of extrapulmonary involvement. An 8-year-old immunocompetent girl, originating from Eritrea, presented with painful ankle swelling. Imaging showed osteomyelitis and systemic calcifications. *Mycobacterium tuberculosis* was isolated from surgical drainage. She was diagnosed with tuberculous osteomyelitis and scrofuloderma in the context of miliary tuberculosis, though a metastatic abscess could not be excluded. Tuberculosis should be considered in children from endemic regions presenting with persistent osteoarticular or cutaneous lesions to ensure early diagnosis and prevent complications.

Background

Tuberculosis (TB) continues to represent a major public health concern. According to the World Health Organization, one-quarter of the global population is infected with *Mycobacterium tuberculosis*, of which an estimated 10% are children. In 2023, one million paediatric TB cases were reported worldwide, of which 200,000 died due to untreated or complicated disease. The highest incidence rates were observed in South-East Asia and Africa, however TB has also re-emerged as a concern in high-income countries, largely due to international migration and increased global travel. In 2025, children accounted for 4% of newly reported tuberculosis cases in the WHO European Region, representing a 10% increase in incidence compared with 2023 (1, 2).

TB is a contagious bacterial infection caused by *M. tuberculosis,* transmitted primarily via infectious respiratory particles. Paediatric TB progression differs from adults: while approximately 10% of adults develop disease, usually from reactivation, up to 50% of immunocompetent children develop disease, typically from primary infection. Furthermore, extrapulmonary TB is more common in children, occurring in up to 54% of cases versus 16% in adults. Mediastinal/hilar lymph nodes are involved in 50% of the cases, while 20% show extrathoracic disease, most often cervical lymphadenitis (3, 4).

Diagnosing TB in children remains challenging due to the nonpulmonary subtle presentation. The increasing number of TB cases among children in Europe underscores the need for heightened awareness to enable timely diagnosis of this preventable and curable disease, thereby limiting disease progression and reducing associated morbidity and mortality.

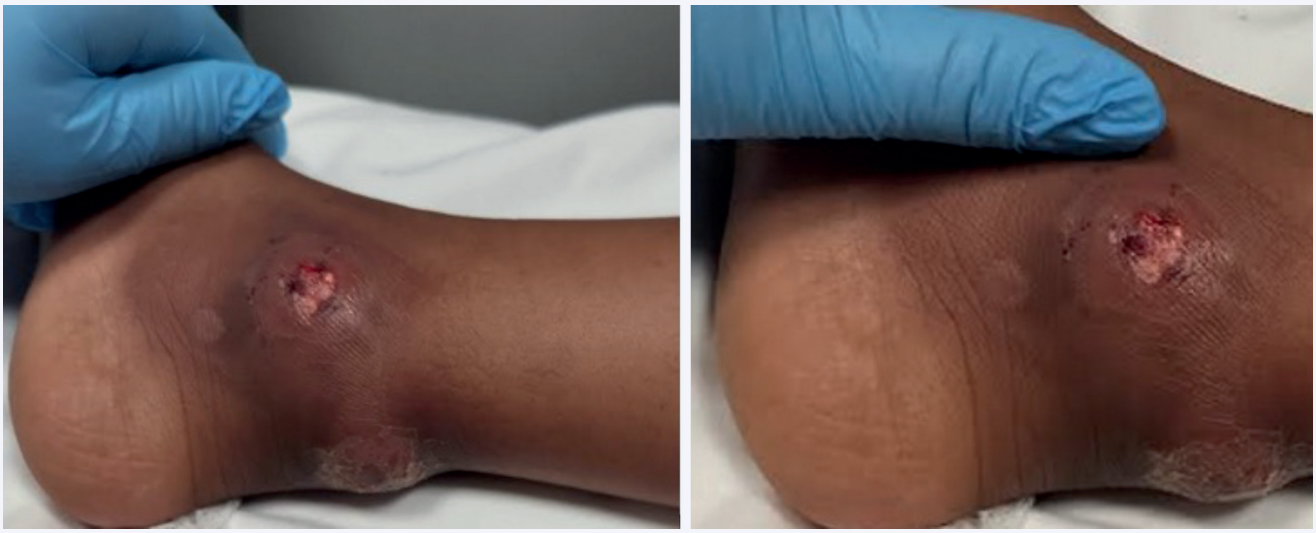
Case report

In April 2025, an 8-year-old girl presented to the emergency department of Hôpital Universitaire des Enfants Reine Fabiola in Brussels Belgium with right ankle pain following a sprain. The patient, born in Eritrea, lived in Uganda for seven years before arriving in Belgium in February 2025. No symptoms were reported prior to the injury. Apart from minimal swelling, no additional clinical signs were observed on admission. Initial X-ray suggested a possible fracture after which a cast was applied. Subsequent clinical follow-up was reassuring. In June 2025, the patient re-presented with persistent right ankle pain, without associated swelling or cutaneous manifestations. Repeat X-ray was reassuring and conservative management was advised.

In July 2025, the patient re-presented with a painful swelling of the right ankle persisting for five days. Apart from fatigue, there were no signs of weight loss, fever, or other systemic symptoms. Vitals signs were within normal limits. Clinical examination showed two ~4 cm abscesses medio-posterior on the right ankle with surrounding erythematous, painful skin (Figure 1). Lung auscultation revealed mild right-sided crackles, and painless bilateral cervical lymphadenopathy was present. The remainder of the examination was unremarkable.

Ankle X-ray suggested osteomyelitis (Figure 2), after which MRI confirmed osteitis with suspected fistulized Brodie's abscess. Chest X-ray (Figure 3) and subsequent CT revealed pulmonary, mediastinal, hilar, hepatic, and splenic calcifications. Blood investigations, including complete blood count, C-reactive protein, renal and hepatic function, extensive serology (including HIV), as well as superficial smears and gastric aspirates, were negative.

FIGURE 1: Photos of clinical examination of the right ankle retrieved during admission.



Tuberculin skin test was positive (induration size undocumented), no interferon-gamma release assay was performed. *M. tuberculosis* was confirmed by culture obtained from surgical drainage (consisting of evacuation of purulent secretions through two skin incisions over the affected area, followed by curettage and irrigation with physiological saline and povidone-iodine).

With all the clinical findings, radiological and microbiological results, the patient was diagnosed with tuberculous osteomyelitis. The patient was hospitalized for a total of 2 months and received antituberculosis quadritherapy, resulting in total resolution of clinical symptoms and signs.

Discussion

This case illustrates an uncommon presentation of extrapulmonary TB in an immunocompetent child without comorbidities. As mentioned earlier, paediatric TB progresses rapidly after primary infection with more frequent extrapulmonary manifestations compared with adults. Children under the age of five are at highest risk for dissemination, but extrapulmonary disease may also occur in older immunocompetent children. The true global burden of paediatric extrapulmonary TB remains uncertain due to underdiagnosis and incomplete reporting (1-5).

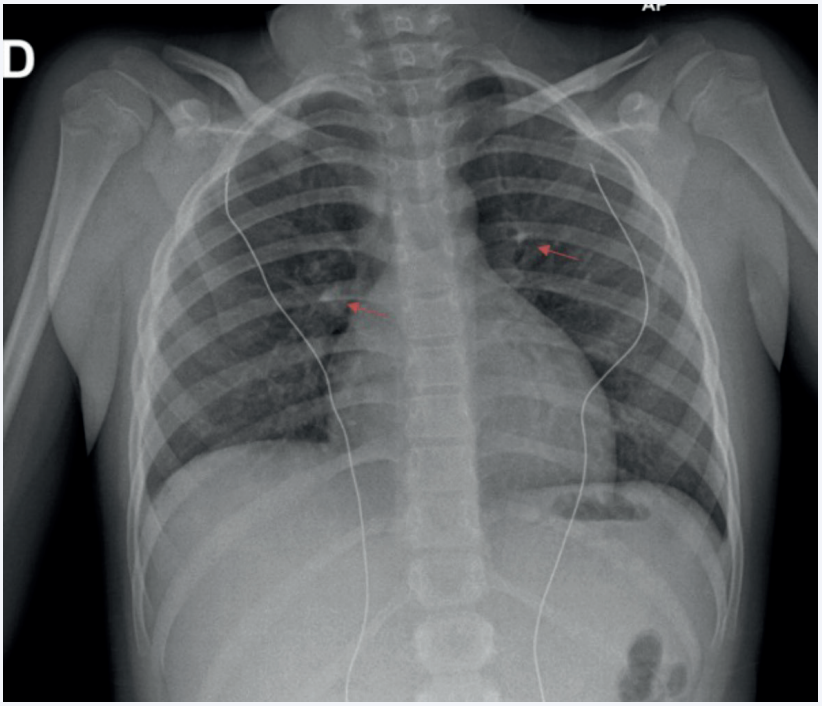
Osteoarticular TB accounts for 5% of all TB and 10% of paediatric extrapulmonary cases. Although the initial ankle sprain may have been coincidental, the possibility that antecedent trauma facilitated the invasion of *M. tuberculosis* within osseous tissue cannot be excluded. If so, this case could be consistent with post-traumatic osteoarticular tuberculosis, a rare and frequently misdiagnosed subtype due to its variable clinical presentation thereby underscoring the importance of a thorough medical history (6).

Clinical presentation of osteoarticular TB is typically insidious, with progressive joint pain, swelling, and decreased range of motion. Systemic symptoms are often absent, radiological findings nonspecific, and microbiological yield is limited due to the paucibacillary nature of osteoarticular lesions. Pathophysiologically, synovial invasion triggers chronic inflammation, pannus formation, fibrosis, and progressive destruction of cartilage and bone. Early radiographic changes are nonspecific and include joint effusion, soft tissue swelling, juxta-articular osteopenia, and peripheral erosions. Definitive diagnosis requires microbiological confirmation and/or histopathological evidence of caseating granulomas (1, 6-8). In this patient, imaging findings and microbiological culture confirmed TB osteomyelitis.

Cutaneous TB is rarer: 1% of all TB; and 10% of paediatric extrapulmonary TB. Pathophysiologically, cutaneous TB occurs mostly due to contiguous spread from an underlying focus or hematogenous/lymphatic dissemination but can also occur due to direct inoculation though extremely rare (1, 3-5). In our patient, MRI suggested fistulisation of osteomyelitis to the overlying skin, consistent with scrofuloderma, the most frequent form of cutaneous TB in children. However, the clinical presentation

FIGURE 2: Results of X-ray of the right ankle: Osteolytic lesion at the distal metaphysis of the right fibula. Periosteal apposition. Significant swelling of the soft tissues around the malleolus.

FIGURE 3: Results of chest x-ray: Calcifications in the upper left lobe and middle right lobe. Examination within normal limits.



also raised suspicion of a tuberculous gumma (i.e. a metastatic tuberculous abscess), a rare form accounting for 1–2% of all cutaneous TB cases. These lesions typically begin as cold, painless subcutaneous nodules that liquefy into abscesses and may perforate the skin, forming sinus tracts and ulcerations. Metastatic tuberculous abscesses may occur during established TB or, more rarely, as the first manifestation of disseminated disease. Although usually associated with immunocompromised or malnourished patients, several cases in immunocompetent hosts, including children, have been reported.

Diagnosis of cutaneous TB remains challenging due to its variable morphology and broad differential diagnosis. Ziehl–Neelsen staining is positive in fewer than 50% of cases, while cultures are positive in up to 85%. Histopathology typically reveals granulomatous inflammation with or without caseation in over 80% of cases (9-11). In this case, histopathological examination was not performed to confirm TB (no rationale for omitting this investigation was specified).

This case report has several limitations. As a single paediatric case, it limits generalizability to other children with extrathoracic tuberculosis; however, it underscores the ongoing problem of underdiagnosis and highlights the need to consider a broad differential diagnosis, even with subtle clinical signs. Furthermore, histopathological examination was not performed, although it was not required to establish the diagnosis and would not have distinguished scrofuloderma from metastatic abscess. Finally, reliance on surgical culture for confirmation limits the applicability of these findings to broader clinical practice, yet it emphasizes that negative microscopy of superficial smears or gastric aspirates do not exclude tuberculosis when clinical suspicion is high.

Conclusion

Extrapulmonary TB in children remains diagnostically challenging due to its nonspecific clinical manifestations. This case highlights the importance of maintaining a high index of suspicion for TB in children from endemic regions presenting with persistent joint pain and/or cutaneous abscesses, even in the absence of systemic symptoms. Increased awareness of atypical presentations will facilitate timely diagnosis and management, thereby reducing morbidity and preventing long-term sequelae.

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