

Tuberculosis-induced osteomyelitis of the right distal tibia in a healthy male Saudi infant: a case report

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ABSTRACT

Background: Tuberculosis (TB) is a challenging disease; however, it is preventable and curable in most cases. In 2022, TB was the second most common single infection leading to death worldwide after coronavirus disease. Almost 10 million people get infected with TB every year. TB manifests clinically in two types: pulmonary and extrapulmonary; the pulmonary type is the most common.

Case presentation: A 17-month-old medically free male infant was referred to our institution with right distal leg pain, swelling and skin changes, started 1 month ago. Since then, both pain and swelling worsened and led to limping. The father denied any history of recent trauma, fever, cough, night sweating, infections, contact with sick patients, skin rashes in other body parts, or any other systematic changes. The baby was delivered at full term by cesarian-section due to placenta previa, with a birth weight of 3500 g. Prenatal and postnatal history is unremarkable. The patient was vitally stable and appeared healthy with no dysmorphic features. He was able to bear weight on his feet; however, his gait and walking abilities could not be assessed. Local examination showed swelling, erythema, and tenderness over the right distal tibia with an intact range of motion. The patient was admitted and initial investigations were done for him. After close observation and multiple investigations, a diagnosis of TB-induced right tibial osteomyelitis was made, and first-line management was initiated.

Conclusion: This report highlights the importance of orthopedic surgeons in considering TB-induced osteomyelitis in the differential diagnosis of vague musculoskeletal symptoms.

Keywords: Case report, extra-pulmonary tuberculosis, osteomyelitis, tibia.

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Background

Tuberculosis (TB) is a challenging disease; however, it is preventable and curable in most cases. In 2022, TB was the second most common single infection leading to death worldwide after coronavirus disease. Almost 10 million people get infected with TB every year [1]. TB manifests clinically in two types: pulmonary and extrapulmonary; the pulmonary type is the most common [2]. In 2020, approximately 21% of the reported cases of TB worldwide were those of extrapulmonary TB [3]. Extrapulmonary TB commonly affects the lymph nodes and pleura but can also affect other organs [3]. Musculoskeletal TB is a rare disease, accounting for almost 10% of extrapulmonary TB cases and approximately 1%–3% of all TB cases [4]. Musculoskeletal TB can involve any bone in the body. In approximately 50% of TB-induced osteomyelitis cases, the vertebrae are the affected sites [5]. However, the femur and tibia are the most commonly affected long bones. Moreover, in children, TB of the long bones usually

involves the metaphyseal region rather than the diaphyseal region [5]. Here, we present a case of TB-induced osteomyelitis of the right distal tibia in a healthy male, Saudi infant.

Case Presentation

A 17-month-old medically free male infant was referred to our institution with right distal leg pain, swelling, and skin changes. The symptoms had started 1 month ago, when they were in Indonesia on a trip, and they thought that the symptoms were because of an insect bite. Since then, both pain and swelling worsened and led to limping. The father denied any history of recent trauma, fever, cough, night sweats, infections, contact with sick patients, skin rashes in other body parts, or any other systemic changes.

The patient was examined at multiple institutions in the region where the impression of fracture was made at one institution, and an above-knee backslap was applied to the affected leg for 9 days. After repeating and reviewing the



Figure 1. Picture of the patient's right leg showing swelling and skin changes.



Figure 2. Picture of the patient's right leg showing swelling and skin changes.

radiographs, the backslap was removed as there were no obvious fractures. However, the pain and swelling persisted, accompanied by tender, rigid, and erythematous skin changes. The patient returned to the same institution where magnetic resonance imaging (MRI) of the leg was performed; the infant was referred to our institution with the suspicion of a tumor or osteomyelitis.

The baby was delivered at full term by cesarean section due to placenta previa, with a birth weight of 3,500 g and no history of injuries during delivery or any congenital anomalies. The patient was a healthy and fully immunized baby boy, showing normal growth and meeting his age milestones. Prenatal and postnatal histories were unremarkable.

During physical examination, the patient was vitally stable and appeared healthy, with no dysmorphic features. He was able to bear weight on his feet; however, his gait and walking abilities could not be assessed. Local examination of the lower limb showed swelling, erythema, and tenderness over the right distal tibia, with an intact range of motion (Figures 1 and 2).

Upon admission, his laboratory values were as follows: white blood cells, $13.8 \times 10^9/l$; erythrocyte cementation



Figure 3. Radiographic anteroposterior view showing lytic lesion involving the posterior cortex of right distal tibial metaphysis.

rate, 35 mm/hours; C reactive protein, 8.5 mg/l; hemoglobin, 11.1 g/dl; platelets, $362 \times 10^9/l$; eosinophils, 2.5%; and hematocrit, 36.2%.

Right distal tibial radiography revealed diffuse soft tissue swelling, aggressive erosion, and a lytic lesion involving the posterior cortex of the distal tibial metaphysis with a laminated periosteal reaction (Figures 3 and 4). MRI of the right leg and ankle indicated the presence of an aggressive infection (Figures 5 and 6). Chest radiography findings were unremarkable (Figure 7). The patient underwent an emergency incision, drainage, and biopsy of the affected right distal leg. The operative findings were significant, with a large amount of purulent yellow pus draining from the right distal tibia. Three days later, the patient underwent another incision, drainage, and biopsy for a second examination that revealed significant serous accumulation in the right distal tibia. Right distal tibial biopsy revealed necrotizing granulomatous inflammation. All other cultures and synovial fluid samples from the right distal tibia yielded negative findings, except for tuberculosis polymerase chain reaction and acid-fast bacilli. Therefore, TB-induced right tibial osteomyelitis was diagnosed, and first-line management was initiated with rifampin, isoniazid, pyrazinamide, ethambutol, and vitamin B6. After 16 weeks of treatment, the patient was doing well, with the pain under control and improvements in the swelling and skin changes in the right foot.

Discussion

Musculoskeletal TB is a rare form of extrapulmonary TB, with only a few cases reported in the literature. It accounts for 10% of all extrapulmonary TB cases [6]. Almost half of all skeletal TB cases affect the spine [6]. Owing to the rarity of the disease and the vague, nonspecific clinical



Figure 4. Radiographic lateral view showing lytic lesion involving the posterior cortex of right distal tibial metaphysis.



Figure 6. Postoperative radiographic anteroposterior view of right leg.



Figure 5. Postoperative radiographic lateral view of right leg.

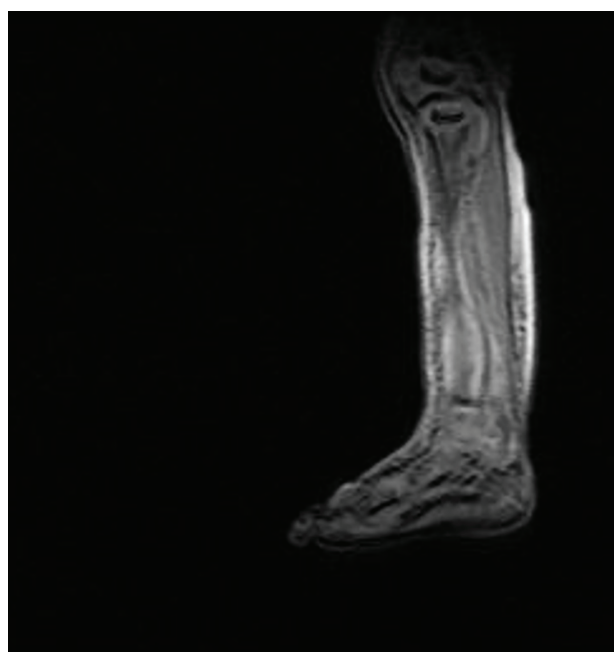


Figure 7. Sagittal MRI view suggestive of aggressive infection.

manifestations of the early disease process, TB may not be at the top of the differential diagnosis. It is usually confused with other diseases, especially malignancy, causing delays in establishing a diagnosis and initiating proper management in many cases. The average delay in the diagnosis of skeletal TB cases can range from 10 days to 6 years [5].

Tuberculous osteomyelitis is uncommon in children, and its clinical manifestations differ from those in adults. Swelling and pain in the affected limbs are the only early symptoms manifested in children with ongoing tuberculous osteomyelitis [5]. These types of infections most frequently involve the metaphysis and can cross the physes of the long bones [5]. Skeletal TB most commonly involves

the large lower limb bones in children compared to adults, in whom the spinal bones and pelvis are the common sites of involvement [5,6].

TB commonly involves the bone with the hematogenous spread of *Mycobacterium TB*, but it can also spread to the bone or joint via lymphatic drainage or secondary to a contiguous focus of the disease. Growth plates receive the richest vascular supply; therefore, they are the most frequently affected sites [6]. In children, hematogenous spread from a primary source is the main course of infection for musculoskeletal TB [6]. During growth, the increased vascularity of a child’s bone makes them more susceptible to infections; therefore, historically, children

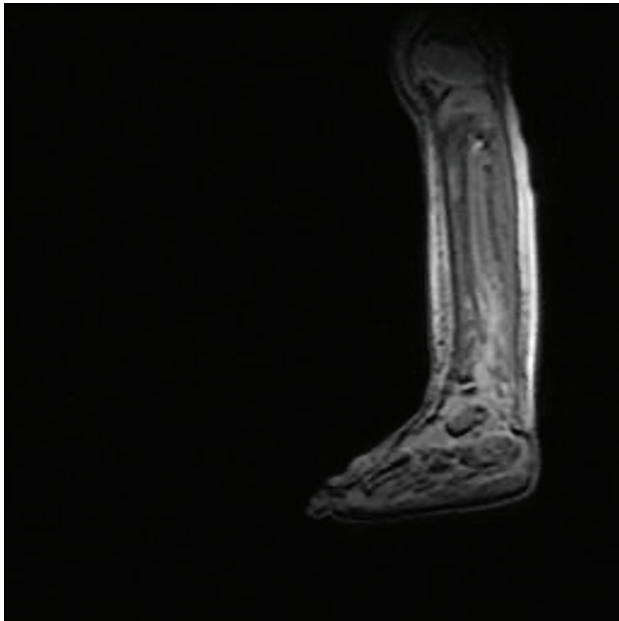


Figure 8. Sagittal MRI view suggestive of aggressive infection.

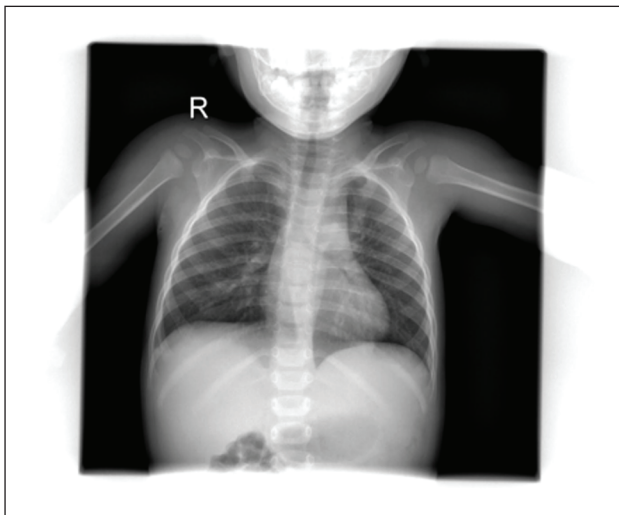


Figure 9. Chest radiograph.

have been more affected by musculoskeletal TB than adults [6].

Since the clinical manifestations of skeletal TB are nonspecific, and there are no specific pathognomonic radiographic features, isolation of *Mycobacterium tuberculosis* by culture is the only method to provide a definitive diagnosis of TB [5,6]. To avoid loss of function and deformities, proper treatment should be initiated as soon as a diagnosis is made. Extra-pulmonary TB is managed in the same manner as pulmonary TB. The effective doses for the treatment of drug-susceptible pulmonary TB are used to treat drug-susceptible skeletal TB [6]. In clinical trials of surgical debridement for spinal TB, no additional benefit of debridement was observed compared to chemotherapy alone. Moreover, surgical management of musculoskeletal TB is recommended in specific cases based on expert opinion [6].

Conclusion

This report highlights the importance of considering TB-induced osteomyelitis in the differential diagnosis of vague musculoskeletal symptoms. Further studies are needed to investigate the early signs and symptoms, common sites of involvement, and prevalence of TB-induced bone infections in the Kingdom of Saudi Arabia.

What is new?

Orthopedic surgeons should consider TB-induced osteomyelitis in differential diagnoses when encountering unexplained musculoskeletal symptoms in children, as shown by a case in a 17-month-old Saudi infant with vague leg pain and swelling. #Orthopedics #Osteomyelitis #TuberculosisAwareness.

List of Abbreviations

MRI, magnetic resonance imaging.
TB, tuberculosis.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent for publication

Written informed consent was obtained from the parents of the patient.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Summary of the case

1	Patient (gender, age)	17-month-old medically free male infant
2	Final diagnosis	TB-induced right tibial osteomyelitis
3	Symptoms	Leg pain, swelling, and skin changes.
4	Medications	Rifampin, isoniazid, pyrazinamide, ethambutol, and vitamin B6
5	Clinical procedure	Incision, drainage, and biopsy
6	Specialty	Orthopedic surgery