CASE REPORTS IN PLASTIC SURGERY AND HAND SURGERY
2025, VOL. 12, NO. 1, 2473383
https://doi.org/10.1080/23320885.2025.2473383

Taylor & Francis
Taylor & Francis Group

CASE REPORT

OPEN ACCESS Check for updates

Disseminated tuberculosis presenting as finger swelling in a 2-year-old: a case report of TB osteomyelitis

Abdulrahman N. AlGhazi[a], Mohammed H. AlZahrani[b], Wijdan A. AlMutiri[c] and Nora M. AlZoum[c]

[a]Department of Plastic Surgery, Security Forces Hospital, Riyadh, Saudi Arabia; [b]Department of Pediatrics, Security Forces Hospital, Riyadh, Saudi Arabia; [c]College of Medicine, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia

ABSTRACT

Tuberculosis (TB) is a chronic granulomatous infection caused by *Mycobacterium tuberculosis*. TB primarily affects the lungs. A small percentage of cases are associated with extrapulmonary TB (EPTB). Of all EPTB, skeletal TB accounts for 1-5% of the cases, with the vertebrae being the most commonly affected. Involvement of the hands usually occurs in children under the age of six, with the bones of the proximal phalanx of the middle and index fingers being the most reported sites of infection. We describe a case of disseminated TB presenting as swelling in the index finger. Due to its nonspecific symptoms and insidious course, this condition is frequently overlooked. The presented case is unique compared to other documented TB cases as the child did not undergone Bacillus Calmette–Guérin (BCG) vaccination, a factor that might have contributed to the disease progression. Additionally, traditional cauterization was noted in the patient's history, a practice that could complicate the diagnosis. Physicians should consider TB osteomyelitis when encountering young patients with finger swelling, particularly in endemic areas. Prompt recognition and diagnosis of TB osteomyelitis are crucial for early intervention and better outcomes.

ARTICLE HISTORY
Received 26 February 2024
Accepted 22 February 2025

KEYWORDS
Tuberculosis; osteomyelitis; pulmonary TB; disseminated TB

Introduction

Tuberculosis (TB) is a leading infectious disease cause of morbidity and mortality among children, particularly in low- and middle-income countries. In 2022, an estimated one million children fell ill with TB, and approximately, 226,000 children died from the disease. Children under five years are especially vulnerable, accounting for a significant proportion of TB deaths in this demographic. Countries with a high burden of TB include India, Nigeria, Pakistan, Indonesia, and South Africa [1]. TB is a chronic granulomatous infection caused by *Mycobacterium tuberculosis*. TB primarily affects the lungs, with a small percentage of cases associated with extrapulmonary TB (EPTB). Among extrapulmonary sites, lymphatic disease accounts for 30%, followed by pleural, genitourinary, bone/joint, central nervous system, and peritoneal involvement [2]. Metacarpal and phalangeal involvement by tuberculosis is uncommon and usually results from the hematogenous dissemination of tuberculosis bacteria from the lungs. Tuberculous dactylitis involving the hand typically occurs in children under the age of six years. In this age group, the hematopoietic marrow found in tubular bones provides an ideal environment for the dissemination of tuberculosis bacteria. Symptoms often manifest 1 to 3 years after the initial infection [3]. We present a unique case of disseminated tuberculosis presenting as finger swelling in a 2-year-old female. This case underscores the importance of considering TB osteomyelitis in differential diagnoses, particularly in endemic regions, to fill the gap in understanding pediatric skeletal TB in unusual sites.

Case presentation

A 2-year-old Saudi female living in Saudi Arabia, previously healthy, was brought by her parents to the emergency department of a secondary hospital, complaining of swelling in her right index finger.

CONTACT Wijdan Awad AlMutiri Wjal1189@gmail.com, 439002980@pnu.edu.sa Dharat Laban, Riyadh, Saudi Arabia
Supplemental data for this article can be accessed online at https://doi.org/10.1080/23320885.2025.2473383.

The swelling had started one month prior and progressed over time, initially without redness or warmth. One week earlier, the family had sought medical advice at another hospital, where a magnetic resonance imaging (MRI) of the hand was performed. The MRI findings suggested a bone lesion versus an intraosseous abscess, and exploratory surgery was recommended. However, the family refused and instead opted for Arabic traditional cauterization. A traditional healer applied heated metal to burn the skin at the site of the swelling in an attempt to treat her condition. Cauterization, a cultural practice in certain regions, is sometimes used as an alternative treatment method for various ailments, despite the lack of scientific support. Traditional healers often apply heated metal to affected areas, which can delay appropriate medical care and worsen the underlying condition [4]. In this case, the cauterization caused an increase in swelling, redness, and pain.

There was no history of trauma, wounds, or systemic symptoms such as fever, night sweats, fatigue, weight loss, or appetite loss. A systematic review was unremarkable. The patient had no past medical or surgical history, no family history of similar complaints, and no known active tuberculosis within the family. Her vaccinations were up to date, except for the Bacillus Calmette-Guérin (BCG) vaccine. It is notable that the patient had not received the BCG vaccine, which is routinely administered in countries with a high burden of TB to offer protection especially against severe forms of the disease in children [1,5]. Lack of BCG vaccination may have contributed to the dissemination of tuberculosis in this patient.

On examination, the patient was vitally stable, afebrile, and not in respiratory distress. Local examination showed a 1.2 cm hard, non-fluctuant swelling at the proximal phalanx of the right index finger, associated with redness and tenderness. She had an intact and painless range of motion in the affected finger. No other skin lesions or rashes were observed, and no sensory deficit or regional lymphadenopathy was detected. Examination of the skin on the remaining digits and other systemic examinations were unremarkable (Figure 1***).***

The ER physician started intravenous clindamycin 146 mg TID, and the plastic surgery team was consulted on the case. Initial investigations included a complete blood count (CBC), inflammatory markers, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and a hand X-ray. The CBC showed an elevated white blood cell count of 19.0 × 10^9/L (range: 6.0–18.0 × 10^9/L), a hemoglobin level of 100.0 g/L (range: 111.0–141.0 g/L), CRP at 62.500 mg/L (range: 0.100–2.800 mg/L), and ESR at 55 mm/h (range: 2–29 mm/h). The hand X-ray revealed a mildly expansile lytic bone lesion in the proximal phalanx of the right index finger, which is typically suggestive of an infection **(**Figure 2(A)).

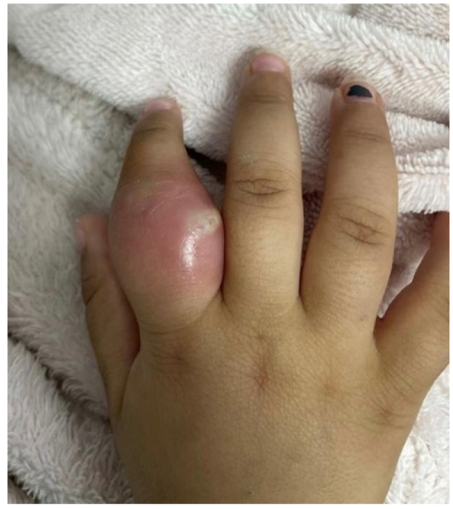

Figure 1. Showing right index finger swelling and redness.

The patient was admitted under the care of the plastic surgery team, and an MRI of the hand was ordered. Additionally, a pediatric infectious diseases team was consulted, and they recommended an abdominal ultrasound (US), liver function tests (LFTs), and continuing clindamycin while adding ceftriaxone 412 mg BID.

The abdominal US showed an enlarged liver measuring 11 cm with normal parenchymal echogenicity, no focal lesions, and no intrahepatic biliary dilatation. Multiple prominent abdominal lymph nodes were noted: parahepatic nodes measuring approximately 1.07 and 1.05 cm, and parasplenic nodes measuring roughly 0.82 × 0.6 cm and 0.6 × 0.4 cm. The spleen was enlarged, measuring approximately 7.13 cm, and appeared grossly unremarkable. The results of the LFTs were as follows: alanine transaminase 13 U/L (range: ≤ 33 U/L), aspartate aminotransferase 33 U/L (range: ≤ 32 U/L), alkaline phosphatase 324 U/L (range: 142-335 U/L), gamma-glutamyl transferase 4 U/L (range: 5-36 U/L), and total bilirubin 4.2 µmol/L (range: 5-21 µmol/L). Given the unremarkable abdominal US findings and LFTs results, abdominal TB was considered unlikely.

MRI of the right hand showed a destructive bone lesion with smooth surrounding soft tissue edema (Figure 2(B,C)). The differential diagnosis includes chronic inflammation/infection, with underlying malignancy being less likely. The radiologist recommended a biopsy.

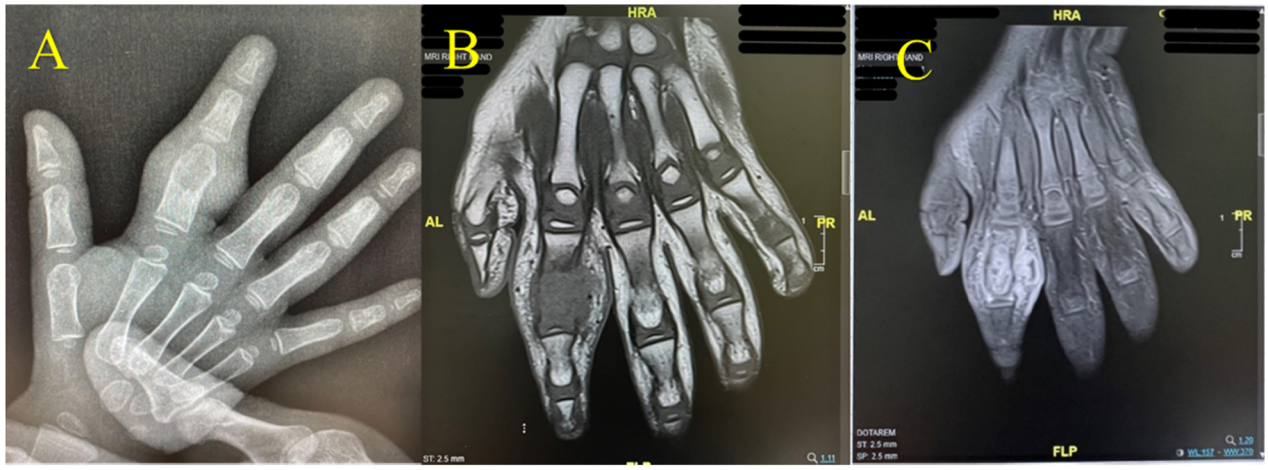

Figure 2. A: X-ray of the right hand showing an expansile lytic bone lesion in the proximal phalanx of the index finger. B: T1-weighted MRI (T1WI) showing destructive hypo-intense bone lesion with mild extraosseous involvement. C: Postcontrast T1WI MRI revealing a moderately enhancing lesion within the bone and surrounding soft tissue.

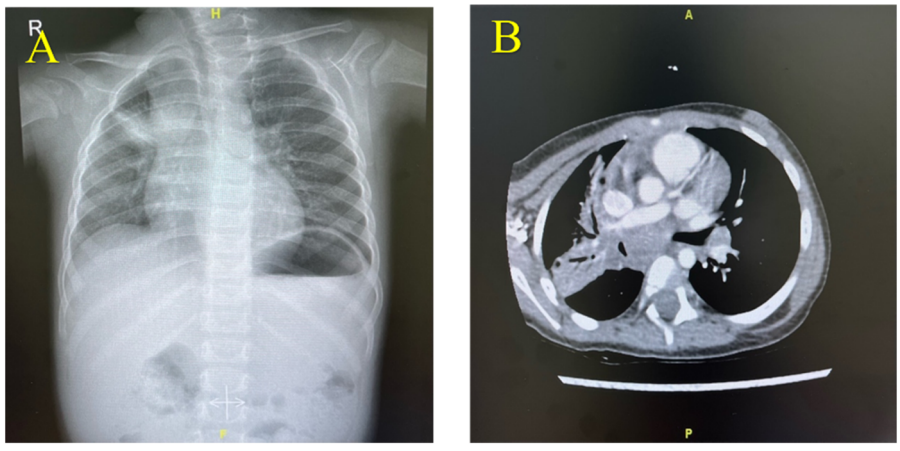

Figure 3. A: Chest X-ray PA view showing right upper zone opacity and widened mediastinum, findings that are commonly associated with pulmonary TB. B: Axial chest CT with IV-Contrast showing multiple matted, hypo-dense enlarged mediastinal lymph nodes, along with consolidation in the right upper lobe. These features are indicative of pulmonary TB, which often presents with mediastinal lymphadenopathy and parenchymal consolidation, particularly in the upper lung fields.

An incisional biopsy was performed and sent for bacterial culture, Gram stain, acid-fast bacilli (AFB) stain, bone biopsy, and fungal stain.

During the postoperative period, the patient experienced a wheezing attack and was treated with a bronchodilator for a few days. She had no prior history of asthma. A chest X-ray was ordered, which showed signs of pulmonary TB (Figure 3(A)). A TB-polymerase chain reaction (PCR GeneXpert for *Mycobacterium tuberculosis* and rifampicin resistance) was ordered alongside the biopsy's microbiological evaluation. Additionally, the chest CT findings further supported the diagnosis of pulmonary TB (Figure 3(B)).

Tissue culture, gram stain, and fungal staining were negative. However, the AFB stain and TB PCR were positive for Mycobacterium tuberculosis, with no rifampicin resistance detected. The patient was isolated in a single negative pressure room and started on anti-TB medications (isoniazid 100 mg PO OD, rifampicin 200 mg PO OD, ethambutol 200 mg PO OD, and pyrazinamide 250 mg PO OD). She will complete a nine-month course. The patient was discharged with scheduled follow-up appointments in the OPD.

On follow-up after one month, there was significant improvement with no deformity or pain. The family was advised to undergo TB screening for all members at their local hospital. The patient showed complete recovery at the final evaluation, after a total follow-up of nine months and she did not require any additional surgical debridement. Chest and hand X-rays were performed at the final evaluation confirming total recovery (Figure 4).

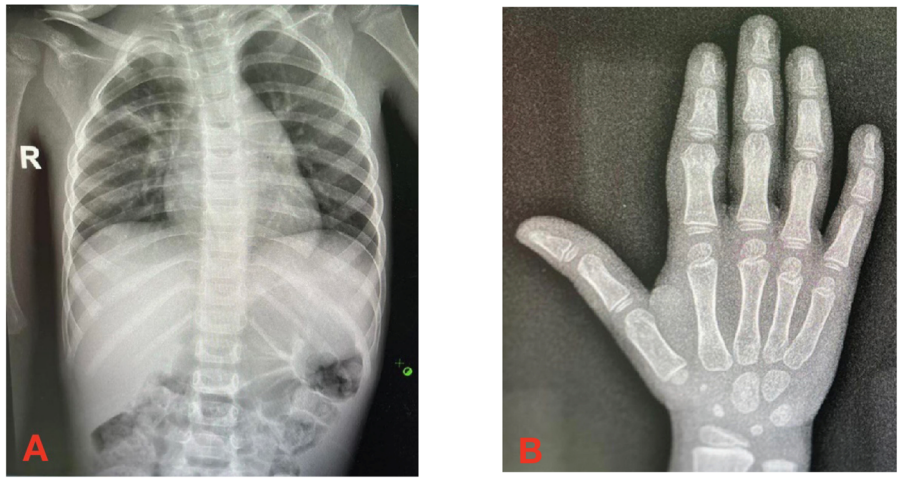

Figure 4. A: Follow-up chest X-ray, taken 9 months after the initiation of anti-TB therapy, showing significant improvement in the right lung opacity. B: Follow-up hand X-ray, taken 9 months after starting anti-TB therapy, showing restoration of normal bone structure.

No protocols for directly observed therapy (DOT) were implemented due to logistical issues. However, the patient's parents were educated about the recommended dosages of anti-tuberculosis medications, potential side effects, and the risk of resistance if the medication is not taken regularly. Compliance was not an issue with this patient; she completed a nine-month treatment course without complications.

Discussion

Tuberculosis is a significant global health issue, with 7.5 million newly diagnosed cases in 2022 [1]. Of all extrapulmonary tuberculosis (EPTB), skeletal TB accounts for 1–5% of the cases. The vertebrae are mostly affected. Involvement of the hands usually occurs in children under the age of six, with bones of the proximal phalanx of the middle and index fingers being the most reported sites of infection [3]. Concomitant involvement of the lungs is common and can occur in up to 45% of cases [6].

Infection can occur through lymphohematogenous spread or direct inoculation, with a history of trauma and immunodeficiency (such as diabetes, breast cancer, and corticosteroid therapy) being noted in many cases [7].

Patients usually present with pain and swelling. The presentation is generally indolent. Other manifestations may include sinus formation, anorexia, and weight loss [3].

Tuberculous osteomyelitis is often confused with pyogenic osteomyelitis, as seen in our case. Other differential diagnoses include syphilitic dactylitis, neoplastic conditions, mycotic infections, sarcoidosis, and brucellosis [8].

The diagnosis of EPTB is challenging due to its paucibacillary nature and location. Imaging help determine the extent of the disease. A definitive diagnosis is typically achieved through the culture of *Mycobacterium tuberculosis* from a specimen, though this process can take several weeks. Rapid molecular tests, such as cartridge-based nucleic acid amplification tests (GeneXpert or chip-based TrueNat) and line probe assays, can be employed for faster diagnosis and for assessing drug susceptibility to both first-line and second-line anti-TB drugs. Additionally, histological examination may reveal key features such as acid-fast bacilli, granulomas, and caseation [9].

The mainstay treatment for tuberculous osteomyelitis is anti-TB drug therapy, and in advanced-stage lesions, surgical intervention may be indicated. Most patients achieve good healing and functional recovery with drug therapy alone [10]. The duration of therapy is controversial, but most data suggest a treatment period of 9-12 months [9].

One study (Subasi et al. 2004) describes the outcome of seven patients diagnosed with tuberculosis of the metacarpals and phalanges TB. Patients received two months of a four-drug regimens followed by ten months of a two-drug regimens. At the time of the last follow-up (mean follow-up of 30 months), all lesions had healed with no recurrence and with satisfactory functional outcomes [11].

Our patient was started on a two-month course of rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by seven months of rifampicin and isoniazid

only. Pyridoxine was not given, as its supplementation in children receiving isoniazid is not routinely recommended. However, it should be considered in HIV-positive or malnourished children [12].

Throughout the treatment, the patient did not experience any side effects. Generally, children handle anti-TB medications very well when administered at recommended dosages. Serious adverse effects are rare, and even mild symptoms like nausea or vomiting are infrequent. However, there are occasional reports of severe hepatotoxicity [13].

Conclusions

We describe a case of tuberculosis osteomyelitis in the index finger. Due to its nonspecific symptoms and insidious course, this condition is frequently overlooked. This case highlights the need for heightened vigilance, particularly in pediatric populations in TB-endemic regions, and emphasizes the importance of considering tuberculosis in atypical presentations, such as isolated finger swelling. Early recognition can prevent unnecessary delays in treatment and improve functional outcomes.

Acknowledgment

None.

Authors contribution

A.G.: Concept, design, data acquisition, manuscript editing and manuscript review.
M.Z.: Concept, design, manuscript editing and manuscript review.
W.M.: Literature search, manuscript preparation, manuscript editing and manuscript review.
N.Z.: Literature search, manuscript preparation, manuscript editing and manuscript review.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The authors report there is no funding to declare.

Data availability statement

The data supporting this case report's findings are available from the corresponding author on reasonable request.

References

[1] Global tuberculosis report 2023 [Internet]. 2023. Available from: https://iris.who.int/.
[2] Rieder HL, Snider DE, Cauthen GM. Extrapulmonary tuberculosis in the United States. Am Rev Respir Dis. 1990; 41(2):347–351. doi: 10.1164/ajrccm/141.2.347.
[3] Abebe W, Abebe B, Molla K, et al. Tuberculous dactylitis: an uncommon presentation of skeletal tuberculosis. Ethiop J Health Sci. 2016; May 126(3):301–303. doi: 10.4314/ejhs.v26i3.15.
[4] Kamal M, El-Mansoury A. Kaiy (traditional cautery) in Benghazi, Libya: complications versus effectiveness. Pan Afr Med J. 2015;22:22. doi: 10.11604/pamj.2015.22.98.6399.
[5] Kuan R, Muskat K, Peters B, et al. Is mapping the BCG vaccine-induced immune responses the key to improving the efficacy against tuberculosis? J Intern Med. 2020;288(6):651–660. doi: 10.1111/joim.13191.
[6] Shivakumar SVBY, Padmapriyadarsini C, Chavan A, et al. Concomitant pulmonary disease is common among patients with extrapulmonary TB. Int J Tuberc Lung Dis. 2022; Apr 126(4):341–347. doi: 10.5588/ijtld.21.0501.
[7] Sbai MA, Benzarti S, Sahli H, et al. Osteoarticular tuberculosis dactylitis: four cases. Int J Mycobacteriol. 2015; 4(3):250–254. doi: 10.1016/j.ijmyco.2015.05.006.
[8] Bandyopadhyay R, Mukherjee A, Mondal RK. Case report: "Spina Ventosa" tuberculous dactylitis in a 2 year old boy-a very rare disease. Open Orthop J. 2012;6(1):118–120. doi: 10.2174/1874325001206010118.
[9] Sharma SK, Mohan A, Kohli M. Extrapulmonary tuberculosis. Vol. 15, Expert Review of Respiratory Medicine. Expert Rev Respir Med. 2021;15(7):931–948. doi: 10.1080/17476348.2021.1927718.
[10] Wiratnaya IGE, Susila IWRB, Sindhughosa DA. Tuberculous osteomyelitis mimicking a lytic bone tumor: report of two cases and literature review. Rev Bras Ortop (Sao Paulo). 2019;54(6):731–735. doi: 10.1016/j.rboe.2017.11.015.
[11] Subasi M, Bukte Y, Kapukaya A, et al. Tuberculosis of the metacarpals and phalanges of the hand. Ann Plast Surg. 2004;53(5):469–472. doi: 10.1097/01.sap.0000130708.80606.6a.
[12] Module 5: management of tuberculosis in children and adolescents WHO operational handbook on tuberculosis.2022.
[13] Abdusalomova M, Denisiuk O, Davtyan H, et al. Adverse drug reactions among children with tuberculosis in Tashkent, Uzbekistan, 2019. Int J Environ Res Public Health. 2021; 218(14):7574.