TUBERCULOSIS OF THE RIB WITH COLD ABSCESS MIMICKING BENIGN BONE LESION

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Abstract

Tuberculous osteomyelitis of the ribs represents a rare extrapulmonary manifestation of tuberculosis (TB), often posing significant diagnostic challenges due to its resemblance to benign lesions. The case of a 1-year-old boy with a swelling on the left anterior chest wall initially misdiagnosed as sebaceous cyst is presented. The significant growth of the swelling prompted further evaluation to rule out Ewing sarcoma. Clinical examination and imaging revealed multiseptated abscess with left fifth rib lytic lesion. Empirical anti-TB treatment was initiated based on clinical suspicion, which was subsequently confirmed by mycobacterium TB PCR despite a negative mycobacterium culture. The patient showed clinical and radiological improvement following anti-TB therapy. This case underscores the importance of considering TB osteomyelitis in the differential diagnosis of paediatric rib lesions, especially in TB-endemic regions, and highlights the role of prompt diagnostic imaging and empirical treatment to ensure timely management and effective disease containment.

Keywords: Tuberculosis, Rib Osteomyelitis, Cold Abscess

Introduction

Tuberculosis (TB) remains a major public health challenge in Malaysia, predominantly affecting the lungs. TB osteomyelitis, an uncommon extrapulmonary manifestation, can mimic benign rib lesions, necessitating thorough clinical, radiological, and microbiological evaluation for accurate diagnosis and treatment.

A case of a 1-year-old boy with a two-month history of swelling in the left anterior chest wall is presented. Initially managed as sebaceous cyst with watchful waiting by a private paediatrician, the swelling progressed prompting further investigation to rule out Ewing sarcoma. Consultations with a paediatric surgeon and infectious disease specialist led to empirical treatment due to suspected TB, subsequently confirmed by laboratory tests.

Case presentation

A 1 year and 1 month old boy from a middle-income family with no known comorbid, presented with a left anterior chest wall swelling that had persisted for two months. The child had a history of contact with a distant family member diagnosed with tuberculosis prior to the presentation. Initially observed by a private paediatrician as sebaceous cyst, the swelling increased in size from 1 cm x 1 cm to 4 cm x 3 cm, prompting referral to a paediatric surgeon to rule out Ewing sarcoma.

His vital signs were stable with body weight of 9.9 kg. Clinical examination revealed a non-tender, fixed, firm to hard 4 cm x 3 cm lobulated lump on the left anterolateral chest wall, with no skin changes or discharge. There were no palpable lymph nodes in the cervical, axillary, or inguinal regions. Laboratory tests showed normal white blood cell count (14.6 x 10^9/L), haemoglobin (128 g/L), platelets (412 x 10^9/L), erythrocyte sedimentation rate (ESR) (9 mm/h), and C-reactive protein (CRP) (0.85 mg/L). Renal and liver function tests were normal. The gastric aspiration was negative for acid-fast bacilli (AFB). Aspiration of pus from the swelling showed no AFB, but the Mantoux test was positive (12 mm).

A chest radiograph revealed a well-defined expansile lytic lesion with a narrow zone of transition, sclerotic margin and soft tissue component at the anterior left fifth rib, associated with ill-defined opacities in the left lower zone (Figure 1). Subsequent contrast-enhanced computed tomography (CT) showed an ill-defined erosive lytic bone lesion with a wide zone of transition at the left anterior fifth rib, associated with a multiseptated rim-enhancing collection (Figure 2). Minimal ground glass changes were noted in the inferior lingula segment of left upper lobe.

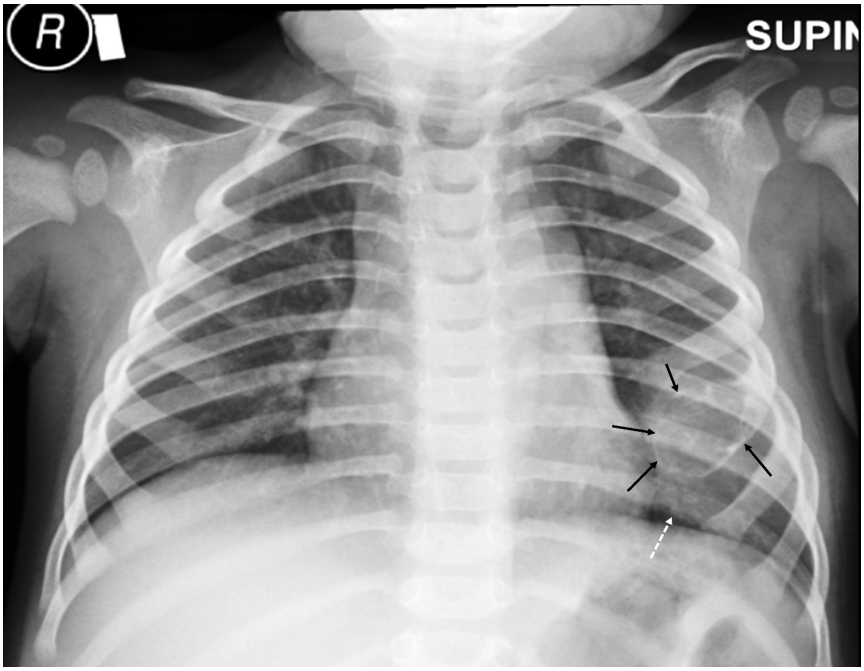

Figure 1: Chest radiograph (on the day of presentation) showed a well-defined expansile lytic lesion with a narrow zone of transition, sclerotic margin and soft tissue component at the anterior left fifth rib (black arrows), associated with ill-defined opacities in the left lower zone (white dashed arrow).

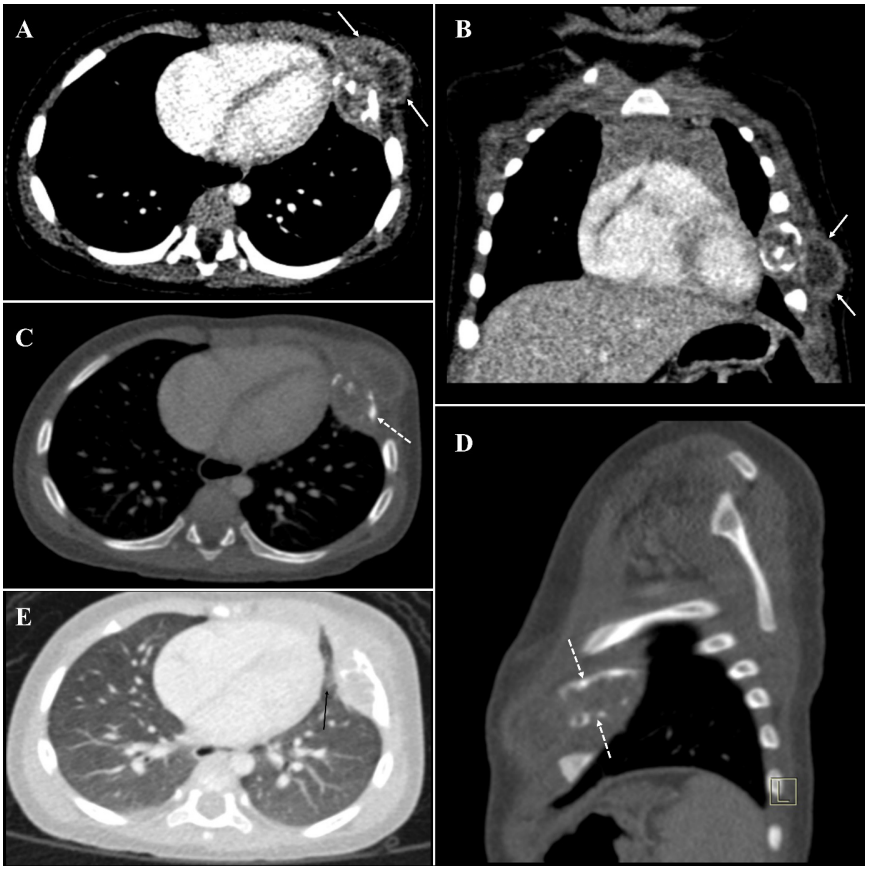

Figure 2: Contrast-enhanced CT Thorax on day 3 of admission. **(A and B)** The axial and coronal soft tissue window showed multiseptated rim-enhancing collection (white solid arrows) at the left fifth rib's lateral and medial aspects. **(C and D)** The axial and sagittal bone window showed an ill-defined expansile, erosive lytic bone lesion with a wide transition zone at the left anterior fifth rib (white dashed arrows). **(E)** The axial lung window showed minimal ground glass changes at the inferior lingula segment of the left upper lobe (black arrow).

Treatment for tuberculosis (TB) was started empirically two weeks later with the high index of suspicion for tuberculous abscess. He was prescribed with 100 mg isoniazid once daily (OD), 150 mg rifampicin OD, 300 mg pyrazinamide OD, 200 mg ethambutol OD and 5 mg pyridoxine OD. Six weeks post-treatment initiation, the mycobacterial culture of the pus returned negative. A repeat pus aspiration was performed, and the sample was sent for TB PCR, which returned positive after four days. Following 2 months of intensive phase treatment, the patient transitioned to the continuation phase which included 100 mg isoniazid OD, 150 mg rifampicin OD, and 5 mg pyridoxine OD.

He was under monthly follow-up with the paediatric team, which demonstrated gradual size reduction of the left chest wall abscess to 1 cm x 2 cm over a four-month period, with complete resolution after seven months. Additionally, ophthalmologic evaluation showed normal findings. A follow-up chest radiograph seven months later showed a smaller lytic lesion with a more sclerotic margin at the left fifth rib (Figure 3), indicating treatment response. The patient remained compliant with anti-TB medication, planned for a total one-year duration (1).

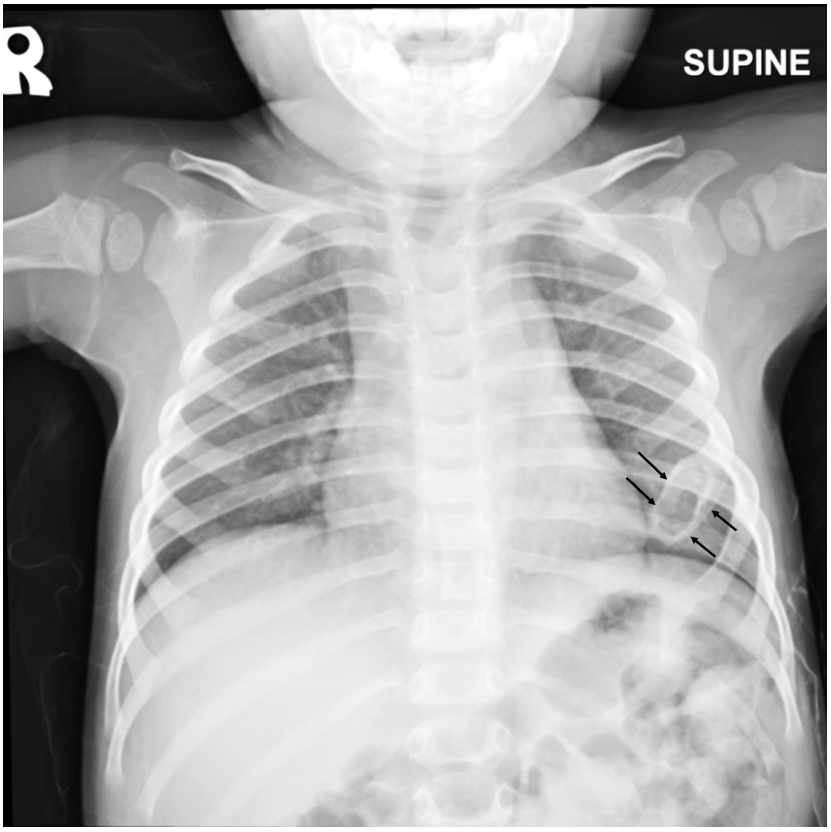

Figure 3: Follow up chest radiograph (7 months later) showed a smaller lytic lesion of the left fifth rib with a more sclerotic margin (black arrows).

Discussion

Malaysia, classified as an intermediate tuberculosis (TB) burden country with a notification rate of fewer than 100 cases per 100,000 people, faces distinct challenges in TB control, particularly regarding paediatric cases and less common manifestations like musculoskeletal TB. The National Strategic Plan for TB control indicates a rising trend in paediatric TB cases, from 741 cases (incidence rate of 9.5 per 100,000) in 2015 to 863 cases (notification rate of 11.3 per 100,000) in 2019 (2). The World Health Organisation (WHO) estimated that in 2022, 12% of the 10 million TB cases worldwide were amongst children (3). In Malaysia, registered TB cases amongst children accounted for less than 5% of the total in 2020, with 771 cases reported amongst those under 15 years, translating to an incidence rate of 9.9 per 100,000 (4).

Diagnosing tuberculosis in children presents significant challenges because of the disease's paucibacillary and disseminated nature, as well as the variety of clinical symptoms that often resemble common childhood illnesses. A positive TB contact history, often linked to an adult index case, serves as a crucial indicator for diagnosing symptomatic children. Furthermore, risk factors for rapid progression of TB in children include being under five years old, malnutrition, and HIV infection (4).

Extrapulmonary TB, particularly lymphadenitis, is the most common manifestation in children, while musculoskeletal TB, involving sites like the spine, hip, and occasionally ribs, is relatively rare. Tuberculosis of the ribs constitutes only 2% of all musculoskeletal TB cases (5).

Tuberculous osteomyelitis of the ribs typically arises from hematogenous spread, lymphatic dissemination, or direct extension from nearby pleuro-pulmonary structures (6). In some cases, the lungs can act as primary foci of infection, leading to rib involvement. However, the gastric aspiration of this patient was negative for AFB.

Amongst the ribs, the shaft and costovertebral and costochondral junctions are frequently affected, with characteristic radiological findings, including osteolytic lesions, cortical disruptions, and occasionally expansile features (7). Initial imaging in this case revealed a well-defined expansile lesion on the anterior left fifth rib, likely due to chronic reactive periostitis and local inflammation (8).

Cold abscess formation is a common feature of TB osteomyelitis of the rib and is typically better visualised by using CT, which provides detailed cross-sectional views of bone destruction, abscess extension, associated lung and lymph node changes. Ultrasound can also be used to assess chest wall abscesses without radiation exposure (6).

In paediatric patients, benign-appearing solitary rib lesions often include entities like enchondroma, Langerhans cell histiocytosis (LCH), and fibrous dysplasia. TB osteomyelitis, though rare, must be considered in the differential diagnosis. In this case, initial radiographs resembled features seen in benign conditions like enchondroma or LCH, delaying the correct diagnosis until a CT scan revealed a rim-enhancing collection, emphasising the need for clinical vigilance and prompt imaging in such cases (9).

The tuberculin skin test (TST) and Interferon Gamma Release Assays (IGRAs) are two primary methods for diagnosing latent TB infection. The TST involves intradermal injection of purified protein derivative (PPD) and requires reading the induration after 48 to 72 hours. Its sensitivity can be limited in young children, especially in those who are immunocompromised or have recently been infected, leading to a higher likelihood of false negatives. Additionally, prior BCG vaccination can affect the test's accuracy, complicating its interpretation (10, 11). Despite its ease of administration, these limitations make the TST less reliable for diagnosing TB in very young children.

In contrast, IGRAs, such as QuantiFERON, measure the immune response to specific TB antigens in a blood sample, offering several advantages, including less influence from prior BCG vaccination and no need for follow-up visits. However, IGRAs may still have reduced sensitivity in children under 2 years, particularly amongst those with weakened immune systems (1, 12, 13). Both IGRA and TST should be interpreted with caution, particularly in the immunocompromised children (4).

Early initiation of empirical anti-tubercular therapy is crucial pending confirmatory laboratory results, such as mycobacterium TB PCR, which was also the course in concerned patient. Anti-tubercular drugs are the cornerstone of treatment for TB osteomyelitis, leading to clinical and radiological improvement, as observed in this case (14).

The treatment duration for extrapulmonary tuberculosis (TB), particularly in cases involving osteoarticular structures, is generally extended compared to pulmonary TB, as outlined in various guidelines. According to the Malaysian Ministry of Health's Clinical Practice Guidelines, the treatment includes 2 months of ethambutol (E), isoniazid (H), rifampicin (R), Pyrazinamide (Z) [EHRZ] and 4 to 7 months of two-drug regimen (HR) (4). On contrary, the World Health Organisation (WHO) guidelines recommended a four-drug regimen (EHRZ) for 2 months followed by a two-drug regimen (HR) for 10 months, the total duration of treatment being 12 months (1). The patient was planned to receive a total of 12 months duration of treatment following WHO guideline.

Prompt diagnosis and treatment of TB are essential not only for individual patient management but also for public health efforts, including isolation, contact tracing, and disease containment. This approach is vital in achieving the goals set by the World Health Organisation's End TB Strategy, aiming to reduce TB incidence and mortality significantly by 2030, with the ultimate vision of global TB elimination by 2035 (World Health Assembly, 2014).

Achieving these ambitious targets requires concerted efforts from governments, policymakers, NGOs, healthcare providers, and various stakeholders to reduce TB burden and eliminate the disease as a public health threat. Vigilance in recognising atypical presentations of TB, such as musculoskeletal involvement in children, is crucial for timely diagnosis and effective management, ultimately contributing to the broader goal of TB eradication.

Conclusion

Tuberculous osteomyelitis of the rib with a cold abscess is a rare manifestation of musculoskeletal tuberculosis. This case report highlights the importance of recognising TB osteomyelitis as a differential diagnosis for solitary rib lesions in the endemic country, as it is a treatable infectious disease.

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Competing interests

The authors declare that they have no conflict of interest.

Informed Consent

Written informed consent for the publication of images was obtained from the patient's mother.

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