A Rare Presentation of Isolated Carpal Bone Tuberculous Osteomyelitis Mimicking Gouty Arthritis

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Abstract

Tuberculosis (TB) is the most prevalent infectious disease in Southeast Asia. It causes both pulmonary and extrapulmonary diseases. TB of the wrist is rare and presents as osteomyelitis or tenosynovitis. We report a middle-aged male with carpal bone tuberculous osteomyelitis. He presented with left wrist pain initially treated as gouty arthritis. Within 2 weeks, he developed seropurulent discharge with osteomyelitic changes on imaging. He underwent debridement, and intraoperatively, there was destruction of most carpal bones. Histopathological examination revealed chronic granulomatous inflammation with abscess formation. Anti-TB medication was initiated, and he made a complete recovery with almost full range of wrist movement after 9 months of treatment. This case serves as a reminder that TB is a great mimicker, and a high index of suspicion is required to make a diagnosis of TB of the wrist. Early initiation of anti-TB is pivotal to prevent complications and deterioration of joint functions.

Keywords: Carpal bone tuberculosis, extrapulmonary, osteomyelitis

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INTRODUCTION

Tuberculosis (TB) of the wrist accounts for only 1%–3% of all TB cases. It is characterized by osteomyelitis in the carpal bones, metacarpals, and phalanges.[1] Tubercular osteomyelitis can also occur in the mandible.[2] Theories of pathogenesis include direct inoculation and hematogenous dissemination from a primary focus.[3] It presents as synovitis that can progress and mimic other forms of arthritis. Isolated lytic bone lesions in the ulnar have also been reported.[4] Diagnosis requires a combination of clinical, radiological, and histopathological findings. A prolonged course of anti-TB treatment is needed. When there is destruction of the bones, surgical debridement is performed to further eradicate the infection. We report a patient with a rare presentation of tuberculous osteomyelitis of the carpal bone. The diagnosis was made from histopathological and radiological findings, despite failure to demonstrate the culture of Mycobacterium tuberculosis (MTB) and Xpert MTP/Rifampicin (RIF) assay from these lesions. The patient made full recovery following surgery with 9 months of antituberculous treatment.

CASE REPORT

A 50-year-old male with no known medical illness presented with a 1-month history of left wrist pain and swelling. He denied any history of preceding fall or trauma and had no history of TB contact nor high-risk behavior. He worked in a pig abattoir. He had no constitutional symptoms.

On initial examination, the left wrist was swollen with a reduced range of movement. Other joints were normal. Left wrist X-ray [Figure 1a] revealed intact carpal bones. A magnetic resonance imaging (MRI) of the left wrist performed was suggestive of erosive arthropathy [Figure 1b and c]. Serum uric acid level was 412 μmol/L. Based on the presence of oligoarthropathy on MRI and elevated uric acid, he was...
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diagnosed and treated as gouty arthritis. There was initial reduction of wrist pain with tablet colchicine, however 5 weeks later, he developed seropurulent discharge from the palmar aspect of the left wrist [Figure 2a]. X-ray of the left wrist showed a new disruption of carpal bones’ alignment with proximal metacarpal bony resorption suggestive of osteomyelitis [Figure 2b] compared to the earlier MRI which showed intact carpal bones.

Other investigations revealed a raised white cell count: 13.1 × 10^9/L with lymphocyte count: 2.9 × 10^9/L, hemoglobin: 15.9 g/dL, and platelets: 349 × 10^9/L. Renal and liver profiles were normal. Chest radiograph was normal and the Mantoux test reading was 10 mm.

He underwent surgery, and intraoperatively, there was unhealthy soft-tissue of the synovium and dorsal interossei muscle. Wound debridement, synovectomy, carpectomy of most carpal bones, and arthrotomy washout were done [Figure 3a and b]. Xpert MTB/RIF assay and acid-fast bacilli were negative. Histopathological examination (HPE) of tissue and bone biopsies revealed multinucleated and Langhans type giant cell with focal area of necrosis. There was granulomatous inflammation and microabscesses [Figure 3c]. The HPE was highly suggestive of TB differentiating it from other granulomatous/rheumatological diseases. We made a diagnosis of tuberculous osteomyelitis of the carpal bone. The patient was started on anti-TB treatment, and with intensive hand physiotherapy, he made a complete recovery after 9 months of treatment. The wound completely healed and he could carry about 20 kg of weight with his left hand. He had almost full range of movement of the left wrist [Figure 4]. Compared with previous wrist X-ray [Figure 5a], latest imaging [Figure 5b and c] revealed a stable height of the distal row of the carpal bones.

**DISCUSSION**

TB of the wrist commonly presents as tenosynovitis and is a slowly progressive disease. The diagnosis is usually delayed due to its insidious and indolent symptoms. The common presentation is local swelling and pain on movement of the

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**Figure 2:** Seropurulent discharge (a) from the palmar aspect of the left wrist. X-ray of the left hand (b) showed disruption of carpal bones’ alignment (mainly proximal row) with the collapse of the distal row and bony resorption at the proximal metacarpal suggestive of osteomyelitis.

**Figure 3:** Intraoperative findings revealed unhealthy soft tissue of the synovium and dorsal interossei muscle (a). Carpectomy performed (b) histopathological examination revealed multinucleated giant cells (black arrow) and granuloma (blue arrow)(c).

**Figure 4:** Functional outcome 9 months post treatment. Well-healed wound with full finger grip. (a) Improvement in wrist flexion and extension (b-e).

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**Figure 1:** Left wrist X-ray (a) revealed intact carpal bones. Magnetic resonance imaging (b) and (c) showed soft-tissue swelling with erosive arthropathy changes of the left wrist. There was presence of bony resorption at proximal metacarpals and subchondral cysts in the remaining carpal bones and distal radius.
Therefore, HPE is required to make the diagnosis of TB of the wrist. Being in the meat handling industry, he was also at risk of contracting tuberculous tenosynovitis and bursitis:

Tuberculous tenosynovitis and bursitis:


In an early stage, radiological signs are less specific. As the disease progresses, there would be articular destruction, multiple geodes (subchondral cysts), narrowed articular joint spaces, and nibbled and deformed bones.[9] Our patient’s X‑ray showed these findings. Rheumatoid arthritis has similar radiological findings, but it is usually polyarticular, and our patient did not fulfill the American College of Rheumatology/European League Against Rheumatism 2010 criteria for rheumatoid arthritis.

Late diagnosis leads to poor functional outcome despite initiating anti‑TB treatment. The treatment for TB of the wrist is essentially anti‑TB therapy with surgical procedures reserved for certain situations or complications such as excision of the diseased wrist synovium, abscess formation, carpal tunnel syndrome needing decompression of joint, or poor response to anti‑TB.[11]

The classical long‑term 1‑year of anti‑TB treatment has been replaced with a progressively shorter treatment of 6‑9 months. The American Thoracic Society and Infectious Diseases Society of America joint guideline recommends 6‑9‑month regimens of anti‑TB containing rifampicin for the treatment of bone and joint TB.[12] Our patient received 9 months of fixed‑dose combination anti‑TB treatment and recovered well.


c

Figure 5: Comparison of wrist X‑ray before surgery (a) and after completion of antituberculous treatment (b and c) which showed that the distal row of the carpal bone maintained its height.

Our patient’s diagnosis was challenging. The initial MRI showed nonspecific changes of erosive arthropathy which could also be seen in rheumatoid and gouty arthritis. However, after 2 weeks, his condition progressed with radiological changes of carpal bone destruction seen on the X‑ray which eventually led to the diagnosis of TB of the wrist. Being in the meat handling industry, he was also at risk of contracting cutaneous diseases due to a variety of bacterial diseases such as to Staphylococcus aureus, Streptococcus pyogenes, Escherichia coli, Clostridium perfringens, Erysipelothrix rhodni, and cutaneous atypical Mycobacterium.[7,8]

These bacterial organisms were excluded in our patient as tissue and bone cultures were negative.

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The positive rates in detecting MTB in the joint through TB polymerase chain reaction (PCR), Ziehl–Neelsen acid‑fast staining, and TB culture are 82.65%, 6.12%, and 17.34%, respectively. Demonstrating a positive culture acid‑fast Mycobacterium is difficult as osteoarticular TB is paucibacillary.[10] Therefore, a HPE is required to make the diagnosis of osteoarticular TB. The expected findings are giant cells forming granulomatous inflammation, caseous necrosis, or the presence of Langhans cells, as in the case presented here.

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Conclusion

This case report highlights the need for a high index of suspicion for the diagnosis of TB of the wrist and that the diagnosis should be supported by histopathological and radiological examinations. Early initiation of anti‑TB treatment and surgical debridement and complete excision of the infected synovium may be required to prevent complications and deterioration of joint functions.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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