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When Tuberculosis Strikes the Wrist: A Rare Case Report

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ABSTRACT

Tuberculosis of the wrist is a rare form of osteoarticular tuberculosis with nonspecific clinical presentation and imaging findings. We report a case of wrist tuberculosis in a 50-year-old woman presenting with progressive painful swelling and restricted wrist mobility. Radiographs showed destructive osteolytic lesions involving the carpal bones, distal radius, and base of the fourth metacarpal. CT demonstrated multiple osteolytic lesions associated with peripheral rim-enhancing fluid collections extending around the flexor tendons. Histopathology confirmed tuberculous infection. This case highlights the importance of recognizing the characteristic combination of destructive bone lesions and surrounding collections on CT, which can suggest the diagnosis and accurately assess the extent of osteoarticular involvement.

KEYWORDS

Wrist tuberculosis; Osteoarticular tuberculosis; Tuberculous osteomyelitis; Destructive bone lesions; CT imaging; Flexor tenosynovitis.

MAIN ARTICLE

INTRODUCTION:

Tuberculosis (TB) remains a major global health concern despite advances in its diagnosis and treatment. Although Mycobacterium tuberculosis primarily affects the lungs, extrapulmonary tuberculosis (EPTB) accounts for approximately 15–20% of cases and may involve virtually any organ system (1,2) Musculoskeletal tuberculosis represents an important manifestation of EPTB, accounting for approximately 10–20% of cases, with the spine and large weight-bearing joints being most frequently affected (3,4).

Wrist involvement is uncommon, representing 1% or fewer of skeletal tuberculosis cases (5,6). Its nonspecific clinical presentation and overlapping radiological features with other inflammatory, infectious, and neoplastic conditions can make diagnosis challenging and contribute to treatment delay (7). We report a rare case of isolated wrist tuberculosis, emphasizing the characteristic radiological findings and the role of cross-sectional imaging in establishing the diagnosis and assessing the extent of disease.

CASE REPORT:

A 50-year-old woman presented with a two-month history of progressively increasing painful swelling of the right wrist. The swelling was associated with nocturnal fever and progressive limitation of wrist mobility. There was no history of trauma, insect bite, weight loss, chronic cough, previous pulmonary tuberculosis, or known contact with a tuberculosis patient. On physical examination, diffuse swelling involving both the dorsal and palmar aspects of the wrist was noted, with local warmth, mild erythema, and tenderness. The remainder of the clinical examination was unremarkable.

Laboratory investigations showed a mild inflammatory response, with an erythrocyte sedimentation rate of 34 mm/h and a C-reactive protein level of 10 mg/L. The white blood cell count was 9,900/mm^3, with no significant leukocytosis. HIV serology was negative. Chest radiography showed no evidence of active or previous pulmonary tuberculosis.

Plain radiographs of the right wrist revealed multiple destructive osteolytic lesions involving the carpal bones, distal radius, and base of the fourth metacarpal (Figure 1). Given these findings, a CT scan was performed to better characterize the extent of osseous and soft-tissue involvement. CT demonstrated multiple geographic osteolytic lesions involving the distal radius and several carpal bones, associated with multiple hypodense fluid collections showing peripheral rim enhancement following contrast administration (Figure 2,3).

These collections were distributed around the flexor tendons, suggesting associated involvement of the tendon sheaths. No significant cortical collapse or pathological fracture was identified. Ultrasound showed synovial thickening with preserved tendon continuity and no evidence of tendon rupture.

The combination of multifocal destructive bone lesions and adjacent rim-enhancing collections raised suspicion for an infectious osteoarticular process. Given the chronic clinical course and imaging findings, tuberculosis was considered among the differential diagnoses. The patient underwent surgical exploration with debridement of the affected tissues and curettage of the osseous lesions. Histopathological examination revealed epithelioid granulomas composed of epithelioid cells and multinucleated giant cells with central caseous necrosis, confirming the diagnosis of tuberculous osteoarticular involvement of the wrist.

The patient was subsequently treated with anti-tuberculous therapy. Clinical evolution was favorable, with progressive resolution of the swelling and pain. At the end of treatment, the patient was asymptomatic, with no residual deformity and complete restoration of wrist mobility.

DISCUSSION:

Osteoarticular tuberculosis is the third most common site of tuberculosis after pulmonary and lymph node involvement and accounts for approximately 10–20% of extrapulmonary cases(1). It predominantly affects large weight-bearing joints, particularly the spine, hip, and knee. In contrast, wrist involvement is rare, accounting for less than 1% of skeletal tuberculosis cases (2). Its rarity and nonspecific clinical presentation may lead to diagnostic delay. The differential diagnosis includes chronic pyogenic osteomyelitis or arthritis, inflammatory arthropathies such as rheumatoid arthritis, osteochondral lesions, and benign or

malignant bone tumors. In our patient, the imaging findings, clinical course, and histopathological examination ultimately established the diagnosis of tuberculous osteoarticular involvement.

Patients with wrist tuberculosis typically present with nonspecific local symptoms, including chronic pain, swelling, stiffness, and restricted range of motion. Systemic manifestations such as fever, night sweats, and weight loss may be present but are not consistent findings (7). Laboratory abnormalities are also nonspecific, with elevated ESR and CRP reflecting an inflammatory process but not distinguishing tuberculosis from other infectious or inflammatory conditions. Microbiological and histopathological investigations are therefore essential for definitive diagnosis, although their diagnostic yield may be limited in paucibacillary disease(9).Histopathology typically demonstrates necrotizing granulomatous inflammation with epithelioid cells and multinucleated giant cells, as observed in our patient.

Approximately one-third of wrist tuberculosis cases are associated with pulmonary involvement, whereas two-thirds occur as isolated disease (10,11). Initial imaging evaluation includes plain radiography of the wrist, complemented by chest radiography to assess for associated pulmonary tuberculosis. Radiographs may show osteolytic lesions, bone destruction, and sclerosis involving the carpal bones and adjacent osseous structures. However, these findings are nonspecific and may mimic pyogenic osteomyelitis, inflammatory arthritis, or neoplastic lesions (11).

CT is particularly useful for evaluating the extent of osseous destruction and detecting associated soft-tissue abnormalities, including abscesses and tendon sheath involvement. In our patient, CT demonstrated multiple osteolytic lesions involving the distal radius and carpal bones, associated with multiple peripheral rim-enhancing fluid collections extending around the flexor tendons. MRI is considered the most sensitive modality for assessing bone marrow, synovial, and soft-tissue involvement; however, it could not be performed in our patient because of limited resources. Despite this limitation, CT provided sufficient information to demonstrate the extensive osseous and soft-tissue involvement. Ultrasound may also contribute to the assessment of synovial thickening and tendon involvement.

Definitive diagnosis requires microbiological and/or histopathological confirmation. Histopathological examination typically reveals necrotizing granulomatous inflammation with epithelioid histiocytes, central caseous necrosis, and Langhans-type multinucleated giant

cells (12). In our patient, these characteristic histopathological findings confirmed the diagnosis of tuberculous osteoarticular involvement of the wrist.

Treatment of wrist tuberculosis is primarily medical and relies on an appropriate course of anti-tuberculous therapy. Standard treatment generally consists of a 2-month intensive phase with rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by a 4-month continuation phase with rifampicin and isoniazid (13). Most patients respond favorably to medical treatment, with good functional outcomes. Surgical management is reserved for selected cases, particularly those with extensive osseous destruction, large abscesses, neurological compression, impending bone collapse, or the need for tissue diagnosis and surgical debridement. In our patient, the extensive osseous and soft-tissue involvement warranted surgical debridement and curettage, followed by anti-tuberculous therapy, with complete clinical and functional recovery.

CONCLUSION:

Tuberculosis of the wrist is a rare manifestation of osteoarticular tuberculosis that may be overlooked because of its nonspecific clinical presentation. A high index of suspicion is essential, particularly in endemic settings. Recognition of the characteristic combination of destructive osteolytic lesions and associated soft-tissue collections on imaging can help suggest the diagnosis and assess disease extent. Definitive diagnosis requires microbiological and/or histopathological confirmation. Early diagnosis and appropriate anti-tuberculous therapy, with surgery reserved for selected cases, can lead to favorable clinical and functional outcomes.

FIGURES



Figure 1: Plain radiograph of the right wrist showing multiple erosive and osteolytic lesions involving the carpal bones and the distal radius.



Figure 2. Non-enhanced coronal CT image of the right wrist, viewed in the bone window, showing multiple osteolytic lesions involving the carpal bones and the distal radius.

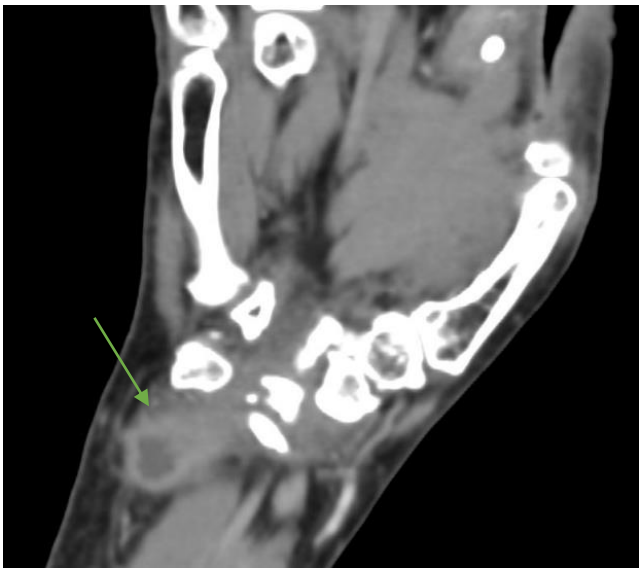


Figure 3. Contrast-enhanced coronal CT image of the right wrist showing a hypodense fluid collection with peripheral rim enhancement.

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