

## Elbow Tuberculosis –A Case Report

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### Abstract

Mycobacterial infections of the upper extremities are rare with musculoskeletal system involvement in 1-3% of tuberculosis patients and accounts for 10% of all extra-pulmonary tuberculosis. Elbow joint is most frequently involved in upper extremity accounting for 2 to 5% of all skeletal localizations. We report a case of extraspinal musculoskeletal Tuberculosis involving right elbow joint. Early diagnosis and treatment is important to prevent serious joint and bone destruction. Although biopsy is required to make definitive diagnosis, it is imperative that radiologists understand the typical distribution patterns and imaging manifestations. Reviews of literature with emphasis on imaging features are studied.

**Keywords:** Biopsy, Elbow joint, Tuberculosis.

### Introduction

Tuberculosis most commonly involves lungs followed by central nervous, gastrointestinal, genitourinary, musculoskeletal and cardiovascular systems. Musculoskeletal tuberculosis has been showing a resurgence in the past few years due to the increased number of immunocompromised individual and emergence of drug resistant bacterial.<sup>1</sup> Musculoskeletal system is involved in 1-3% of patients with tuberculosis and accounts for 10% of all extra-pulmonary tuberculosis with the most common sites being the spine (51%), pelvis (12%), hip and femur (10%), knee & tibia (10%), and ribs (7%).

Mycobacterial infection of the upper extremities is rare with elbow joint most frequently affected accounting for 2 to 5% of all skeletal localizations.<sup>1,2</sup>

History of infection with or exposure to tuberculosis may or may not be present, and evidence of active tuberculosis is present in less than 50% of cases. A negative tuberculin skin test does not by itself exclude infection and furthermore, clinical and radiologic features of tuberculosis may mimic those of many other diseases thus delaying the diagnosis. Timely diagnosis of the disease is paramount, since delayed treatment is associated with severe morbidity and mortality. Thus, radiological assessment of patients with musculoskeletal tuberculosis is often key to adequate diagnosis and early treatment.

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## Case Report

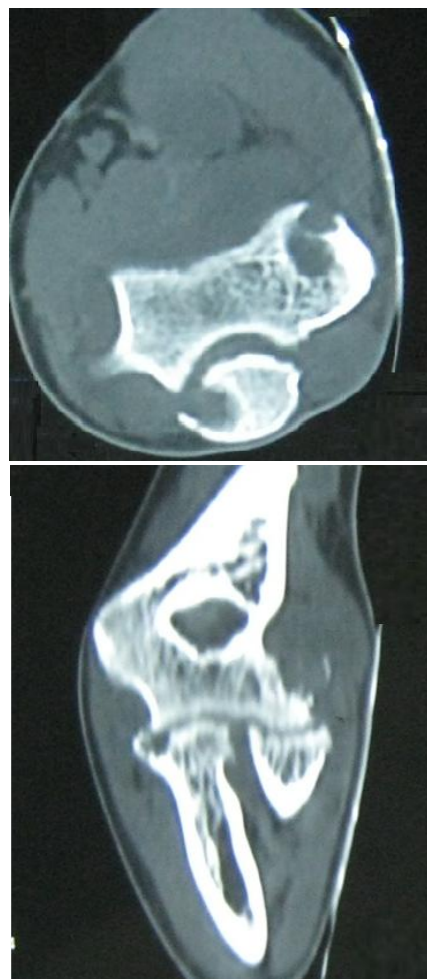
A 26 year old female patient presented with right elbow joint pain and swelling. On clinical examination there was swelling in the elbow joint with mild tenderness over condyles. Patient was non diabetic, non hypertensive and there was no previous history of tuberculosis or immune compromised status. Plain Radiograph of right elbow shows multiple ill-defined non-sclerotic lytic lesion involving humeral condyles, olecranon process of ulna and radial head. Soft tissue swelling around elbow joint due to synovial thickening was noted (Fig. 1).



**Fig. 1:** AP and lateral views of right elbow joint showing multiple well defined nonsclerotic lytic lesions involving humeral condyles, olecranon process and radial head.

On Plain CT, multiple well defined non-sclerotic lytic lesions involving humeral condyles, olecranon and radial head regions are noted. There is extensive synovial thickening with elbow joint effusion (Fig. 2). Suspicion of tuberculosis was made and further referred for biopsy of synovial membrane. Histopathology of synovial

membrane of right elbow joint shows caseating granulomas with Langhans giant cells characteristic of tuberculosis (Fig. 3).

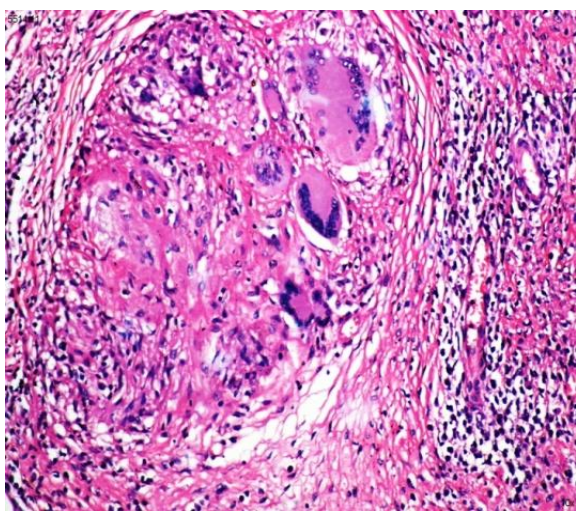


**Fig. 2:** Axial and coronal plain CT of right elbow joint showing multiple well defined non sclerotic lytic lesions in humeral condyles, olecranon and radial head with synovial thickening and joint effusion.

## Discussion

Osteoarticular tuberculosis is characteristically a monoarticular disease<sup>1</sup> and usually affects weight-bearing joints, with 10-15% being polyarticular. Non-weight bearing joints affected by tuberculosis, such as the elbow, are rarely reported in the medical literature. Elbow joint is most frequently involved in the upper extremity followed by shoulder joint.<sup>1,2</sup>

Mycobacterium tuberculosis is the main causative organism with only few cases attributable to mycobacterium bovis and atypical mycobacteria accounting for 1-4% of cases.<sup>3</sup> Osteoarticular tuberculosis is the result of blood, lymphatic, or local contamination from adjacent or other areas of primary infection with rare cases from direct inoculation of bacteria.<sup>4</sup>



**Fig. 3: Histopathology of synovial membrane of right elbow joint shows caseating granulomas with langhans giant cells characteristic of tuberculosis.**

Pathogenesis of elbow joint TB involves reactive hyperaemia resulting in marked juxta-articular bone demineralization, local bone destruction and periosteal new bone formation. When the disease process reaches the subchondral region, the articular cartilage gets detached from the bone resulting in loose bodies. Infection starts as synovitis causing joint effusion erosions and destruction of bone and cartilage. In long-standing disease, rice bodies made up of necrotic articular cartilage and fibrinous material are found in synovial joints, tendon sheaths, and bursa. When untreated para-articular soft tissue masses, cold abscesses and sinus tracts may develop.

Clinically, the diagnosis of Osteoarticular tuberculosis is difficult with gradual onset of joint pain, swelling, decreased range of motion progressive loss of function and deformity. In the early stage tuberculous arthritis may be easily mistaken for trauma, rheumatoid or septic arthritis. Osteoarticular TB should be suspected in patients of south Asian and African origin presenting with bony and soft tissue infective lesions.<sup>5</sup> Although in many cases biopsy or culture specimens are required to make the definitive diagnosis, it is imperative that radiologists and clinicians understand the typical distribution, patterns, and imaging manifestations of musculoskeletal tuberculosis.<sup>6</sup> Proximal ulna is the site most frequently affected by tuberculosis followed by distal humerus. An “ice cream scoop” appearance of the proximal part of the ulna in children should raise suspicion for tuberculosis. Periosteal reaction is rare and seen in some patients which could be attributed to superadded pyogenic infection. In the Indian subcontinent, the presentation of elbow tuberculosis is usually exudative with abscess formation and the disease is fairly advanced at the time of diagnosis as in our case. Delay in diagnosis can lead to complications of septic arthritis and irreversible osteodestruction. Our patient did not show any pulmonary lesions with systemic symptoms usually absent in extra pulmonary tuberculosis. Pulmonary disease is seen on chest radiographs in only 50% of patients presenting with musculoskeletal tuberculosis.

Changes in plain film radiography of the affected joint may include periarticular osteoporosis, peripherally located osseous erosions and gradual narrowing of the cartilage space known as Phemister’s triad.

Round or oval lesions with poorly defined margins in bone adjacent to the affected joint with joint effusion and soft tissue swelling are a common finding in extremity tuberculosis, as in our patient.<sup>7</sup> Ultrasound shows synovial thickening with joint effusion. Computed tomography (CT) can be used to evaluate the degree of bone destruction, soft tissue extension and sequestrum formation but our patient did not show any sequestrum in the joint space. MRI features include bone marrow changes indicating osteomyelitis or bone marrow oedema, bone erosions, synovial thickening and joint effusion. Synovial thickening associated with osteoarticular tuberculosis is hypointense on T2-weighted MRI images, distinguishing this from other proliferating synovial arthropathies.

Radiological findings in osteoarticular tuberculosis are non-specific and require aspiration or synovial biopsy for definitive diagnosis. Microscopy and cultures of synovial fluid yield positive results in up to 80% of patients with osteoarticular tuberculosis and remainder diagnosed through synovial or bone biopsies. Histology shows caseating granulomas even when a Ziehl-Nielsen stain is negative. The differential diagnosis in patients with elbow involvement should include pyogenic arthritis, gout, pigmented villonodular synovitis, haemophilic arthropathies, rheumatoid arthritis, synovial osteochondromatosis and neoplasm. Early diagnosis and treatment in cases of elbow tuberculosis are possible through a combination of good history taking, clinical and radiological examination and a high degree of clinical suspicion so as to prevent serious joint and bone destruction. Thus timely radiological diagnosis is very

important to prevent morbidity and mortality associated with elbow tuberculosis.

## References

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