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Isolated Carpal and Metacarpal Bone Tuberculosis - A Case Report

Dr. Satish Arakeri | Assistant Professor, Department of Pathology, DMWIMS, Naseera nagar, Meppadi (PO), Kalpetta, Wayanad, Kerala, India - 673577

Dr. Uroos Fatima | Associate Professor, Department of Pathology, DMWIMS, Naseera nagar, Meppadi (PO), Kalpetta, Wayanad, Kerala, India - 673577

Dr. Ramkumar KR | Professor & HOD, Department of Pathology, DMWIMS, Naseera nagar, Meppadi (PO), Kalpetta, Wayanad, Kerala, India - 673577

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ABSTRACT

Tuberculosis infection of the musculoskeletal system comprises 10% of all extra pulmonary cases of tuberculosis. Although musculoskeletal tuberculosis frequently affects the spine (51%), pelvis (12%), hip and femur (10%), knee and tibia (10%), and ribs (7%) 2, tuberculosis involving of the carpal and metacarpal bones is rare3, 6. When it occurs, the patient may experience a variety of symptoms including local pain and swelling, limitation of movements and soft-tissue mass. The diagnosis of tuberculous involvement of the carpal and metacarpal bones is often difficult, particularly in the absence of a history of tubercular infection and of the rarity of site. The confirmatory diagnosis is by demonstrating typical granulomas with acid fast bacilli. Hereby, we report a case of female patient presented with the aggressive nature of chronic progressive monoarticular symptoms that did not respond to conventional treatment.

Introduction:
Tuberculosis (TB) is the second most frequent infectious disease after malaria on a worldwide basis and remains a major cause of skeletal infection in many parts of the world8. The tubercle bacillus infects one-third of the world's population. It is the most common single agent causing death in young adults and causes two million deaths each year around the world8. Here we are presenting an interesting case which will mislead the clinician in arriving at a proper diagnosis.

Case report:
A 70 year old female patient came to the department of orthopaedics with complaint of pain and swelling of left wrist joint since 5 months. Detailed history revealed that swelling was initially less, which increased progressively. Pain was continuous, dull aching type. She also had low grade fever. She was given antibiotics and other supportive treatment earlier but there was no improvement. There was no history of cough or any chest symptoms. There was no past history of tuberculosis/antitubercular treatment as well as no history of diabetes / hypertensive / any allergy.

General examination revealed an under nourished patient. Pallor was present. No cyanosis / icterus / lymphadenopathy were present. She was afebrile. Her resting pulse rate was 92/min and blood pressure was 112/68 mmHg. Examination of left hand revealed gross swelling over the dorsum of left wrist and fingers. On palpation, skin was warm with severe tenderness over the entire left wrist and hand. A tender fluctuant mass measuring 3 x 2 cm was palpated over dorsum of hand. Wrist and finger movements were restricted and painful. There was no distal neurovascular deficit. Respiratory system examination was within normal limit. Examination of others system was unremarkable. Clinical examination was suggestive of septic arthritis of left hand.

Thorough investigation had been done. On routine blood examination, patient was mild anaemic (9.5 gm/dl), total WBC count was 7700/cumm with predominant neutrophils (77%) and raised ESR (93mm/hr). Liver and renal function tests were within normal limit. Serum HIV and HbsAg were negative. C-reactive protein was positive. Rheumatoid factor was negative. X-ray of left wrist showed diffuse osteopenia of the visualized bones. Erosions of distal carpal bones i.e.-trapezium, trapezoid, capitate and hamate. Erosions of base of 2nd, 3rd and 4th metacarpal bones were noted. Trapezium and hamate bone showed sclerosis. Carpometacarpal joint space is reduced. Radiocarpal joint space appeared normal. Soft tissue swelling was seen noted around the wrist. No evidence of periosseous reaction was seen (Figure 1). There was no evidence of tuberculosis lesion in the chest X-ray.

**Figure 1:** X-Ray of left wrist joint (PA view) showing diffuse osteopenia and erosion of carpal and metacarpal bones and reduced carpometacarpal joint space

**Figure 2:** Section showing multiple granulomas with giant cells. (H&E.4X)
The patients with osteoarticular tuberculosis present with mild degree of fever, swelling and pain over the affected area. On examination, there will local rise in temperature, tenderness with restriction of full range of movements of the affected joint. The diagnosis of osteoarticular tuberculosis is established by one of two criteria:

(a) Positive culture for mycobacterium tuberculosis from synovial fluid, synovial tissue or paravertebral abscess; or

(b) Histological findings of caseating granulomas in biopsied tissues from the joints along with a clinical response to antituberculous therapy.

Mere presence of local signs and symptoms over the affected area without pulmonary manifestation poses a big diagnostic challenge for the treating physician to diagnose the osteoarticular tuberculosis. Many differentials can come into the picture and hence delay the treatment. Among various differentials, few are discussed with their typical presentation. 1) Septic arthritis: the clinical presentation is acute with high rise of temperature. The ESR is well above 100 mm/hr and there is a possibility of septicemia. 2) Rheumatoid arthritis: rheumatoid (seronegative) involvement and ankylosing spondylitis can be differentiated with haematological investigations; no abscess shadow is seen radiologically. 3) Traumatic compression fracture: history of trauma is significant 4) Malignancy: either benign or malignant may have to be differentiated from skeletal tuberculosis. Malignant lesions may either be primary or secondary. Primary malignancy usually will not produce high degree of fever and pain, whereas secondaries usually have some evidence of signs and symptoms of primary malignancy. 5) Lyme arthritis: presence of rashes and antibody detection by ELISA is usually diagnostic.

Due to various differentials and rare involvement of site, detailed investigations of such cases is needed to arrive at the proper diagnosis. On routine investigation, patients will be anaemic with increased ESR and increase in total leucocyte count (>10,000/cumm). There are no specific radiologic features for the confirmatory diagnosis of tuberculosis bone. Common radiological findings seen are fusiform soft-tissue swelling and periostitis. As underlying bone is destroyed, a cyst like cavity forms and the remaining bone appears to be ballooned out. This appearance is termed spina ventosa (“wind-filled sail”). CT-scan and MRI: These imaging modalities are helpful in demonstrating the extent of disease and complications. The sensitivity of demonstration of acid fast bacilli in synovial fluid/aspirate is around 20-25%. The culture of aspirate for tuberculosis bacilli is around 90-100% in biopsy material. So, for the confirmatory diagnosis, biopsy material should be sent for both histopathological examinations for the demonstration of granuloma and acid fast bacilli as well as for culture.

The cornerstone of treatment is multi-drug anti-tubercular therapy and active or assisted non-weight bearing exercises of the involved joint throughout the period of healing. An initial period of rest is to be followed by supervised physiotherapy and aqua rehabilitation. Adequate nutritional support is also essential, as in all forms of TB. The goals of treatment are to contain and eradicate the infection, relieve pain, and preserve and restore bone and joint function. The main reason for poor outcome is delay in the diagnosis, which is common.

Conclusion:
In conclusion, the preoperative diagnosis of tuberculosis involving carpal and metacarpal bones is often difficult, particularly in the absence of a history of tubercular infection and because of rarity of site. We report a patient who presented...
with the aggressive nature of chronic progressive monoarticular symptoms that did not respond to conventional treatment. Appropriate diagnosis is essential to avoid delay in establishing appropriate therapy.

REFERENCES