

## Two Cases of Chronic Forearm Arthritis Caused by Mycobacterium Tuberculosis

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### ABSTRACT:-

In the absence of active pulmonary disease, tuberculosis is typically excluded from the differential diagnosis of chronic joint inflammation. The cases of two immigrant patients with forearm tuberculous arthritis are described. In both instances, nonspecific arthritis or trauma was suspected, resulting in a delay of 21 and 24 months, respectively, between the beginning of symptoms and the initiation of specific therapy. Synovial biopsy material was examined histologically and microbiologically to determine the diagnosis. One patient's Mycobacterium tuberculosis complex polymerase chain reaction was positive. The treatment included chemotherapy against tuberculosis, surgical synovectomy, and debridement of the afflicted joints. Although rare, these cases serve as a warning that tuberculosis can induce persistent arthritis.

**Keywords:** mycobacterium, tuberculosis, predominantly

### INTRODUCTION: -

Mycobacterium tuberculosis complex infections affect approximately one-third of the world's population [1]. Over the years, musculoskeletal manifestations have remained the most common form of extrapulmonary tuberculosis, accounting for 10-19% of the cases [2, 3]. Arthritis due to Mycobacterium tuberculosis complex usually presents as a chronic, slowly progressive, mainly monoarticular infection that predominantly involves the weight-bearing joints and the spine. The joints and bursae of the forearm are less frequently involved; therefore, in cases involving these areas, the diagnosis is often delayed, not made at all, or not even considered, particularly if the clinical presentation is unusual. We report two cases of osteoarticular tuberculosis of the elbow and the wrist to illustrate the difficulties in diagnosing these rare manifestations of extrapulmonary tuberculosis. Case Reports Patient [1]. A 35-year-old Ethiopian immigrant was referred to the Orthopaedic Department of the Santosh University Hospital in June 1996 for evaluation of a painful swelling of the right elbow that had appeared intermittently during the previous 18 months. There was no history of trauma or rheumatic disease. In February 1995 joint mobilisation under anaesthesia had been performed without success at another institution. At that time the synovial fluid obtained by aspiration yielded no bacterial growth in routine bacteriological cultures. No further

analyses were performed. The main clinical findings on admission to our department were a subcutaneous swelling (3 cm x 4 cm x 3.5 cm) on the radial aspect of the right elbow and diminished range of motion (0-30~ ~ ) in extension/flexion. Local or systemic signs of infection were not evident. In addition to minimal osteoporosis of the adjacent bones, the elbow radiographs (anteriorposterior and lateral) showed no signs of osteomyelitis or other abnormalities. Routine laboratory investigations revealed a slightly abnormal sedimentation rate of 16 mm/h and a C-reactive protein level of 0.4 mg/l. No synovial fluid could be obtained by arthrocentesis.

The Mycobacterium tuberculosis polymerase chain reaction (RMtbPCR, Roche, Switzerland) [4, 5] was used to attempt a direct molecular biological diagnosis of tuberculosis from these samples. Within one day, a favourable result was achieved. The histological pattern was that of granulomatous synovitis with caseous necrosis, but direct smears identified no acid-fast bacilli in the samples. Two weeks later, liquid cultures (Middlebrook 7H9 broth, Bactec 460TB; Becton-Dickinson, Germany) produced acid-fast rods that were recognised by a particular DNA probe [6] and standard biochemical identification as Mycobacterium tuberculosis. The strain was highly susceptible. The patient's medical history revealed no signs of apparent tuberculosis, and screening for additional tuberculous lesions revealed an unremarkable chest radiograph and a negative sputum culture. After the diagnosis, a combination of rifampicin, isoniazid, streptomycin, and ethambutol was administered. Two weeks following surgery, a plaster cast was inserted and physical therapy commenced. When last seen four weeks later, the patient's condition had improved. Unfortunately, we were unable to capture the final functional outcome because the patient rejected further clinical follow-up in our outpatient department.

At the time of admission, an intradermal tuberculin test revealed a positive reaction of 8 mm in diameter, and the sedimentation rate was somewhat elevated (16 mm/h). Radiographs performed at the time (Figure 1) revealed advanced osseous degeneration compromised joint. The arthrocentesis only provided 1.5 cc of murky fluid, which was sent for microbiological analysis. The synovial fluid RMtb-PCR results were negative, as were direct smears for acid-fast rods and standard bacteriological cultures. Therefore, surgical revision of the joint with synovectomy and restricted articular surface and capitate bone excision was undertaken. A biopsy indicated granulomatous synovitis with a few epithelioid and large cells compatible with tuberculosis but no acid-fast bacilli.

Physiotherapy and multidrug therapy with isoniazid, rifampin, ethambutol, and pyrazinamid were initiated based on the histology findings. Three weeks later, Mycobacterium tuberculosis was identified from the synovial fluid in liquid medium, confirming that the persistent arthritis was caused by tuberculosis.

The patient is currently on isoniazid and rifampin maintenance therapy, which will continue for another two months. The 10-month follow-up examination revealed 10 in. of wrist motion

flexion/extension and 20 degrees in radial/ulnar abduction. 30% of the grip strength of the unaffected hand.

## DISCUSSION :-

Musculoskeletal infections caused by Mycobacterium tuberculosis complex are caused by the early haematogenous dissemination of the tubercle bacillus disease. 84 percent of osteoarticular tuberculosis patients [2] include joint involvement. Although any bone, joint, tendon, or bursa can get infected, weight-bearing joints and those subjected to recurrent stress appear to be the most commonly affected (spine 50%, pelvis 12%, ribs 7%, hip and femur 10%, shoulder and ankle 2%) [7]. Only 4-10% of bone and joint TB cases [7, 8] involve the upper extremities. In civilised nations, tuberculous lesions of the elbow or wrist and the accompanying bursae are uncommon, accounting for just 2% of cases of osteoarticular tuberculosis [7]; nevertheless, such cases may be more common in orthopaedic centres.

Even when they partially corroborate the clinical diagnosis of tuberculous arthritis, conventional radiography findings, computed tomography, and magnetic resonance imaging seem to be of limited diagnostic relevance [17, 22, 23]. Sadly, there is no pathognomonic radiographic sign of joint degeneration.

TB, at least in the disease's early stages [7]. In addition, persistent pyogenic osteomyelitis is characterised by osteopenia, soft-tissue edoema, cysts, abscesses, and joint space constriction. Typically, additional haematological examinations [17] do not aid in the diagnosis. As observed in these examples, tuberculin skin testing frequently offers diagnostic information. It must be highlighted, however, that a negative skin test does not necessarily rule out tuberculosis [14]. If available, joint fluid analysis is beneficial. Elevated protein, low fluid sugar levels, and leukocyte counts in the range of 10,000 to 20,000 cells/mm<sup>3</sup> are suggestive of tuberculous arthritis, but these findings are highly variable [15].

Even though acidfast bacilli may not be visible with Ziehl-Neelsen stain [10, 15], examination of a biopsied material is the most significant and useful diagnostic approach. Other types of granulomatous synovitis caused by infectious or non-infectious aetiologies are commonly characterised by extremely similar or identical histological findings [10, 18]. Conventional mycobacterial culture of synovial fluid or, preferably, synovial membrane needs 2 to 8 weeks and yields a positive result in 47 to 81% of cases [15, 16]. Using liquid culture techniques in conjunction with particular DNA probes [6] can shorten the mean time to identify Mycobacterium tuberculosis complex to under 16 days. If mycobacterial infection is suspected, molecular biological approaches can identify Mycobacterium tuberculosis complex in up to 98% of smear-positive specimens within 24 hours [5]. Nonetheless, there is a significant loss of sensitivity in smear-negative samples and biopsies (up to 47%) due to the fact that bacilli are typically present in extremely low numbers and have a non-homogeneous distribution [5], especially after the initiation of therapy. In addition, the presence of inhibitors in around 5% of samples may lead to false-negative results. As a result of false-

positive amplification of cross-contaminating DNA [29, 30], it is also possible to see the opposite occurrence.

Asaka et al. [22] were the first to report the discovery of Mycobacterium tuberculosis complex by PCR in a case of persistent elbow joint infection in 1996. Our case is, to the best of our knowledge, only the second instance of tuberculous arthritis of the elbow appropriately detected by PCR. PCR should only be used in conjunction with conventional Mycobacterium tuberculosis complex culture. Thus, PCR results may be validated, and susceptibility testing becomes practical.

Osteoarticular disease is treated with essentially the same treatment regimens as pulmonary tuberculosis, although according to the majority of writers [7, 21], it should be continued for at least 9 to 12 months in cases with osseous involvement. Early and isolated types of osteoarticular TB of the forearm can be treated with antibiotic therapy and plaster immobilisation [12, 14, 19].

Later stages of the illness require additional surgical debridement and drainage of abscesses to achieve joint sterilise and restore articular function [7, 15, 16, 21]. Even in instances with severely damaging lesions, physiotherapy appears to enhance range of motion [12]. The functional outcome in the cases we evaluated [8-19] varied significantly according on the location, disease stage, and implemented therapy regimen. Thus, whereas the prognosis was favourable for synovial and extra articular lesions, the prognosis was bad for advanced articular involvement. Numerous patients with elbow tuberculosis obtained a good range of motion, but wrist involvement more frequently led in ankylosis. In cases of prolonged discomfort or joint degeneration, arthrodesis may be required.[20-21]

## **CONCLUSION :-**

In conclusion, the diagnosis of tuberculous forearm arthritis remains a problem for physicians and microbiologists due to the rarity of this disease and the current limits of diagnostic tools. It must always be included in the differential diagnosis of chronic arthritis of unknown cause, as early diagnosis is essential for joint preservation.[22-24]To get an accurate diagnosis, all attempts, including invasive procedures such as synovial biopsy, should be made. Above all, a high level of clinical knowledge of osteoarticular TB is necessary to avoid diagnostic and therapeutic delays.

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