

Type of article: Case report

## **A RARE CASE OF TUBERCULOSIS OF THE WRIST JOINT: CASE REPORT**

Running Title: *A RARE CASE OF TUBERCULOSIS OF THE WRIST JOINT*

Contributors:

1. Dr. Ankit Barosani, Resident, Dr. D.Y Patil Medical College, Hospital and Research Centre, **Dr. D.Y Patil Vidyapeeth**, Pimpri, Pune
2. Dr. Anurag Anand, Resident, Dr D.Y Patil Medical College, Hospital and Research Centre, **Dr. D.Y Patil Vidyapeeth**, Pimpri, Pune
3. Dr. Anirudh Kandari, Asisstant Professor, Dr. D Y Patil Medical College, Hospital and Research Centre, **Dr. D.Y Patil Vidyapeeth**, Pimpri, Pune
4. Dr. Shubham Taori, Resident, Dr D.Y Patil Medical College, Hospital and Research Centre, **Dr. D.Y Patil Vidyapeeth**, Pimpri, Pune
5. Dr. Shivappa Devarmani, Resident, Dr. D.Y Patil Medical College, Hospital and Research Centre, **Dr. D.Y Patil Vidyapeeth**, Pimpri, Pune

Name of corresponding author: Dr. Anurag Anand

Address of the corresponding author. Department of Pathology, Dr D.Y Patil Medical College, Hospital and Research Centre, **Dr. D.Y Patil Vidyapeeth**, Pimpri, Pune

### **ABSTRACT:**

With an incidence of just 2-4%, wrist TB is a rather uncommon condition. The radiocarpal joint and the inter-carpal joint involvement are particularly rare. Due to the slow progression of symptoms, it is often detected when there has been significant carpal destruction or arthritis. The condition occurred in a 55-year-old female, presenting with wrist pain for 2 years. Clinical examination revealed a localized ganglion-like swelling over the left wrist with a full range of motion but painful terminally. Following radiographic examination, the diagnosis of osteoarticular tuberculosis was suspected, and was confirmed on histopathological analysis. Patient underwent debridement with synovectomy followed by anti-bacillary chemotherapy of 12 months which promoted healing and good outcome. We conclude from this case that tuberculous arthritis is uncommon and the functional outcome depends on obtaining an early diagnosis before radiological signs of joint damage appear.

**KEY WORDS:** Wrist tuberculosis; wrist arthritis; musculoskeletal tuberculosis

**INTRODUCTION:**

Tuberculosis (TB) remains as one of the most worldwide spread infectious disease. India being an endemic country has a high incidence of 188 by 100,000 inhabitants in 2020. Skeletal tuberculosis being one of the extra-pulmonary manifestations of TB can cause mono-articular involvement.

The osteoarticular localization is rare; the hand and the wrist show exceptional involvement. Each specific location of TB in the wrist and the hand has its own symptomatology. Usually, wrist involvement originates at the scapho-lunate joint. Synovitis is typically the first manifestation, followed by periarticular demineralization, marginal erosions, and ultimately joint destruction.

The diagnosis is usually delayed due to a misleading presentation, but when discovered at an early stage, a well-followed surgical and medical treatment is usually enough to provide full healing and recovery.

**CASE PRESENTATION:**

A 55year old female presented with symptoms of pain and swelling over the volar aspect of her left wrist which was gradually progressive and a full range of motion which was painful on extremes. The patient did not have a history of constitutional symptoms like evening rise of temperature, malaise and weight loss. The swelling was soft on palpation, with minimal fluctuation, non-pulsatile, non-mobile measuring approximately 3cm x 2cm with mild local tenderness and no local rise in temperature. There were no signs of an active or old discharging sinus. The patient did not mention any prior history or familial history of TB. She showed no signs of any respiratory illness. The chest radiograph was normal.

A total white cell count (TWC) of 9,400/UL, an erythrocyte sedimentation rate (ESR) of 45 mm/h, and a C-reactive protein (CRP) of 90 mg/L were observed in the blood tests.

The results of viral testing for syphilis, hepatitis, and HIV were negative. Glycated haemoglobin, renal function, uric acid level and other biochemical markers were all within reference limits. The Mantoux test was positive at 15 mm.

A left wrist X-ray was done which showed a soft tissue shadow over the volar aspect of the wrist without any radio-carpal or inter-carpal arthritic changes.



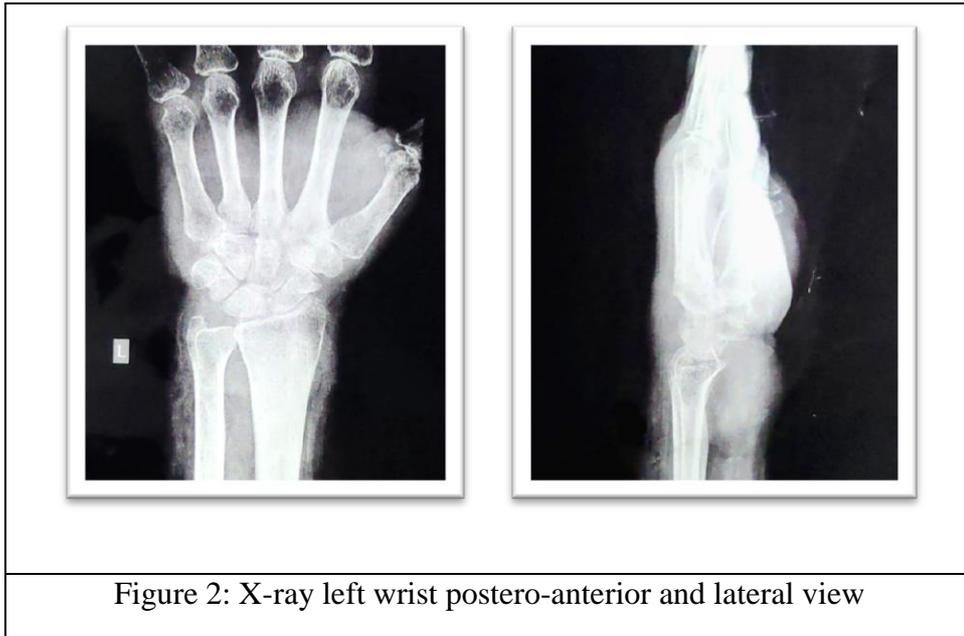


Figure 2: X-ray left wrist postero-anterior and lateral view



Figure 3: MRI of left wrist sagittal and coronal view. Blue arrows showing a lobulated mass extending till the level of MCP joints

An ultrasound imaging study revealed a multi-loculated collection having an intra-articular extension. A magnetic resonance study of the left wrist joint was suggestive of erosive arthritis involving the inter carpal and radiocarpal joints with a large lobulated soft tissue mass with multiple rice bodies encasing all flexor tendons.

Under regional anaesthesia (supraclavicular block), a thorough debridement, synovectomy and curettage of the left wrist were performed. Intraoperatively two swellings were identified encompassing the flexor tendons with minimal fluid and cheese-like material containing rice bodies communicating with the carpal bones. A histological and microbiological analysis of the samples revealed many caseating epithelioid granulomas indicative of tuberculosis (TB). Acid-fast bacilli were detected by smear on Ziehl-Neelsen (ZN) stain (AFB). After six weeks, the TB culture was negative. She was treated with isoniazid, rifampicin, ethambutol, and pyrazinamide in the intensive phase for two months and isoniazid and rifampicin for the rest of her treatment duration.

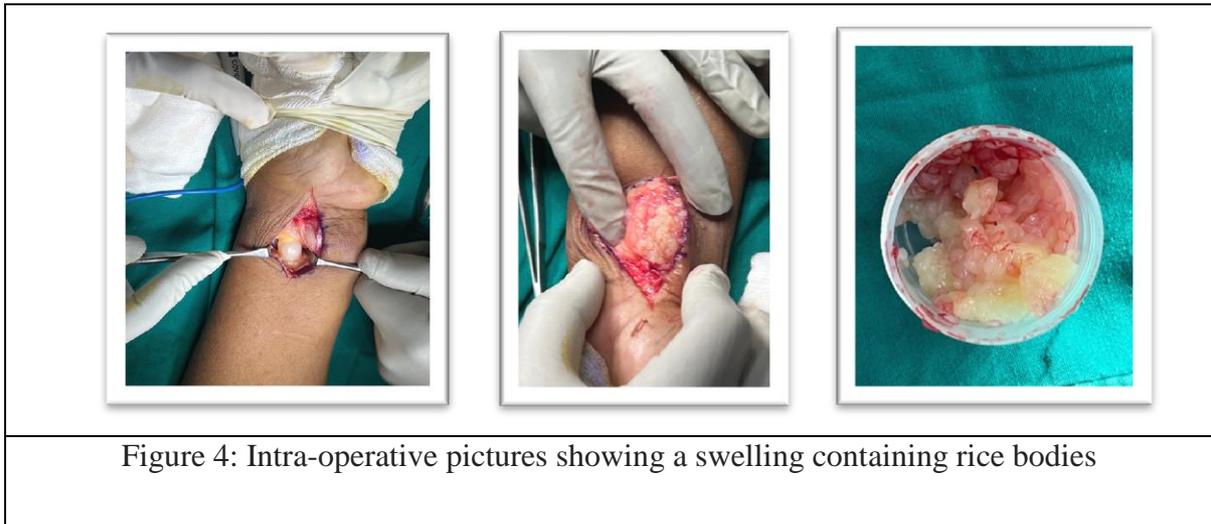


Figure 4: Intra-operative pictures showing a swelling containing rice bodies

### **DISCUSSION:**

The main causative organism of tuberculosis is *Mycobacterium tuberculosis*, which is a thin, non-motile, strictly aerobic rod which primarily affects the lung. Extra-pulmonary tuberculosis usually is a result of reactivation of the primary foci and secondary to haematogenous spread<sup>1</sup>.

Bone, being the third most prevalent location of TB after the lungs and lymph nodes, accounts for around 10% of all extra-pulmonary tuberculosis cases<sup>6</sup>.

Approximately 1% of extra-pulmonary tuberculosis has been described in wrist joints<sup>2</sup>.

Spondylitis, osteomyelitis, and arthritis are all included in the clinical spectrum of skeletal TB. TB spondylitis (Pott's disease) contributes to 50% of the total cases<sup>4</sup>.

Infectious monoarticular arthritis, which is the most common variety, inflammatory type polyarthritis (Poncet's disease) and infections of prosthetic joints are all examples of tuberculous arthritis.

In the monoarticular group, the hip followed by the knee are most frequently affected.

Patients are more likely to acquire monoarticular TB in conditions that affect their immune systems, such as chronic renal illness, HIV infection, or malnutrition<sup>5</sup>.

On the basis of clinical and histological characteristics, skeletal TB has been divided into two types<sup>7</sup>. The more aggressive, caseous exudative kind, manifests as a localized swelling gradually into an abscess with or without sinus development. The granular form, which affects the afflicted region more quietly. Based on the interaction between the host immune system and the pathogen, several clinical and pathological patterns might occur<sup>8</sup>.

There have been reports of mycobacteria other than tuberculous causing wrist arthritis. In particular, wrist and carpal osteomyelitis by *Mycobacterium bovis*<sup>9</sup>.

extensor tenosynovitis by *Mycobacterium marinum*<sup>10</sup> and synovial tissue infections<sup>11</sup> are some of the examples.

Compression of the median nerve resulting in carpal tunnel syndrome has also been reported in addition to the involvement of bones and tendons<sup>12</sup>.

Due to the rarity of wrist tuberculosis, it can be challenging to identify it on the initial visit since it can be mistaken for a number of different conditions, including osteochondrosis, Ewing's sarcoma, osteoclastoma, rheumatoid arthritis, and Kaposi sarcoma<sup>3</sup>.

Plain radiographs of the wrist and chest are required in order to provide an appropriate diagnosis. Usually, the affected bones have osteolytic lesions and sclerosis. This is non-specific and can occur in a number of illnesses, including inflammatory arthritis, malignancy, and pyogenic osteomyelitis<sup>13</sup>. Also nonspecific are CT and MRI scans. The extent of the oedema may be estimated using them, however.

Making a diagnosis may be aided by finding acid-fast bacilli on Ziehl-Neelsen staining. Its sensitivity is just 20%, much lower than that of polymerase chain reaction tests, histological inspection, and mycobacterium culture, which have sensitivity values of 63%, 65%, and 80%, respectively<sup>14</sup>.

As a paucibacillary lesion, hand TB often results in negative smears and cultures. Therefore, a treatment trial with anti-tubercular medications is commonly carried out in patients from endemic areas with characteristic clinical and radiological symptoms, and the demonstration of a positive smear or culture is not mandatory<sup>15</sup>.

According to recommendations made by the World Health Organization in 2017, treatment for wrist tuberculosis consists of a combination of anti-tuberculous drugs that include an initial two-month intensive phase using a combination of rifampicin, isoniazid, ethambutol, and pyrazinamide followed by an additional four-month continuation phase using rifampicin and isoniazid<sup>16</sup>.

The majority (about 75%) of wrist TB patients are effectively treated with anti-tuberculosis drugs, with positive hand and wrist functional results<sup>18</sup>.

However, surgery is advisable whenever there is a nerve compression, functional impairment, imminent bone collapse, or when the joint needs to be debrided, or drainage of a large abscess or when a deformity needs to be corrected in the setting of a healed disease<sup>1</sup>.

Operative treatment options include a synovectomy, abscess incision and drainage, carpal tunnel release, synovial biopsy, and open or arthroscopic debridement<sup>17</sup>.

Patients who have wrist and hand tuberculosis, particularly if the dominant hand is affected, suffer from severe disabilities. To alleviate this impairment, surgical intervention must be followed by physiotherapy, occupational therapy, and oral medications.

### **CONCLUSION:**

Tuberculous arthritis of the wrist is an uncommon entity. Because of the slow progression and variable presentation, diagnosis is often challenging and delayed. Histopathological analysis and microbiological confirmation are necessary for a conclusive diagnosis. The effectiveness of anti-tuberculous therapy relies on early detection, before there is any radiographic evidence of joint damage. If a functional limitation renders daily tasks challenging, surgical intervention must be taken into consideration.

### **REFERENCES:**

- 1: M.M. Al-Qattan, A. Al-Namla, A. Al-Thunayan, M. Al-Omawi ;Tuberculosis of the hand J Hand Surg Am, 36 (2011), pp. 1413-1422
- 2: Isolated Tuberculosis of capitate and triquetrum. Mustafa Karakaplan, MD Muhammed Koroğlu, MD Zeynep Maraş Özdemir, MD Kadir Ertem, MD MD. *J Wrist Surg.* 2017;6:70–73.
3. Tuberculosis of the left wrist joint and spine. [May;2020 ];Sivasamy P, Bajuri MY, Ghani AW. *Cureus.* 2019 11:0.
4. R. Vohra, H. S. Kang, S. Dogra, R. R. Sagggar, and R. Sharma, “Tuberculous osteomyelitis,” *The Journal of Bone and Joint Surgery*, vol. 79, no. 4, pp. 562–566, 1997.
5. J. J. Ellner, “Review: the immune response in human tuberculosis—implications for tuberculosis control,” *The Journal of Infectious Diseases*, vol. 176, no. 5, pp. 1351–1359, 1997.
6. S. Sharma and A. Mohan, “Extrapulmonary tuberculosis,” *Indian Journal of Medical Research*, vol. 120, no. 4, pp. 316–353, 2004.
7. S. M. Tuli, *Tuberculosis of the Skeletal System*, JP Medical Ltd., 2016.
8. A. Lenaerts, C. E. Barry III, and V. Dartois, “Heterogeneity in tuberculosis pathology, microenvironments and therapeutic responses,” *Immunological Reviews*, vol. 264, no. 1, pp. 288–307, 2015
9. D. Glinborg and J. Wandall, “A rare cause of osteomyelitis. A case of Mycobacterium bovis in a wrist,” *Ugeskrift for Laeger*, vol. 162, no. 12, pp. 1747-1748, 2000.

10. A. Causero, C. Screm, A. Beltrame, and L. Mastidoro, "Mycobacterium marinum: a case of skin granuloma complicated by tenosynovitis of the extensors," *Chirurgia Degli Organi di Movimento*, vol. 88, no. 1, pp. 93–97, 2003.
11. P. J. Kelly, A. G. Karlson, L. A. Weed, and P. R. Lipscomb, "Infection of synovial tissues by mycobacteria other than Mycobacterium tuberculosis," *The Journal of Bone and Joint Surgery*, vol. 49, no. 8, pp. 1521–1530, 1967.
12. S. E. Hassanpour and J. Gousheh, "Mycobacterium tuberculosis–induced carpal tunnel syndrome: management and follow-up evaluation," *The Journal of Hand Surgery*, vol. 31, no. 4, pp. 575–579, 2006.
13. Tuberculosis of the musculoskeletal system. Spiegel DA, Singh GK, Banskota AK. *Tech Orthop*. 2005;20:167–178
14. Tuberculosis of the hand. Al-Qattan MM, Al-Namla A, Al-Thunayan A, Al-Omawi M. *J Hand Surg Am*. 2011;36:1413–1421.
15. P.J. Skoll, D.A. Hudson  
Tuberculosis of the upper extremity  
*Ann Plast Surg*, 43 (1999), pp. 374-378
16. Guidelines for treatment of drug-susceptible tuberculosis and patient care (2017 update)  
[Apr;2020 ]
17. P.P. Kotwal, S.A. Khan  
Tuberculosis of the hand: clinical presentation and functional outcome in 32 patients  
*J Bone Joint Surg Br*, 91 (2009), pp. 1054-1057
18. Isolated tuberculosis of the wrist: a rare case of extrapulmonary tuberculosis. Altayeb Mussa M, Fitzgerald O'Connor E, Waterston S, Taylor M, Iwuagwu F. *Intl J Case Rep Images*. 2013;4:541–545.