



ORIGINAL RESEARCH PAPER

Plastic Surgery

RARE CASE OF TUBERCULOSIS HAND – AN UPDATE

KEY WORDS:

Tuberculosis, Hand, Synovium, Swelling, Rice Bodies.

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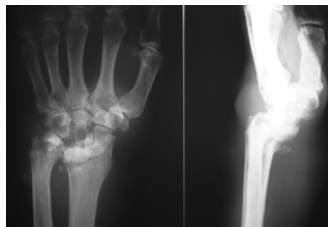
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ABSTRACT

Tuberculosis is the most prevalent infectious disease in the world. It is mainly caused by *Mycobacterium tuberculosis*. Osteoarticular tuberculosis represents 1%–3%. Tenosynovitis is the most common form of the disease in the hand. Common feature of the synovial sac is formation of rice bodies within the sac. Dumbell swelling across the wrist joint . Prolonged discomfort over the moving fingers and sensation loss are some of the rare features. Latent infection occurs in about 2 billion people. Approximately 8 million people/year develop the active form. Tuberculosis in the hand is manifested as osteomyelitis in small bones (carpal bones), metacarpals and phalanges.

INTRODUCTION

Tuberculosis is the most prevalent infectious disease in the world. It is mainly caused by *Mycobacterium tuberculosis*. Osteoarticular tuberculosis represents 1%–3%. Tenosynovitis is the most common form of the disease in the hand. Common feature of the synovial sac is formation of rice bodies within the sac. Dumbell swelling across the wrist joint . Prolonged discomfort over the moving fingers and sensation loss are some of the rare features.



(Fig no:2)



Fig No : 1

MATERIAL AND METHOD

A case report of synovial tuberculosis on the hand and the management performed in the hand and microsurgery department.

Case Study

A 32-year-old male patient with asymmetric and progressive increased tumours on the right wrist with 3 years of progression. During the examination, it was demonstrated flexion and extension finger's limitation (Fig no 1). The X-ray of the right wrist shows radiolucent lesions in carpal bones, reduction of intercarpal joint spaces and swelling of the soft tissues (Fig no 2) A cavity was observed after a complete synovectomy.

Epidemiology

The Southeast Asia accounts for 40% of cases worldwide. 10% of extrapulmonary tuberculosis (EP-TBC) cases occur in HIV-infected patients, one-third of adults with osteoarticular TBC (O-TBC) are HIV-positive. In children, 20% of all mycobacterial infections are EP-TBC. The most common EP-TBC sites are lymph nodes, genitourinary tract, bone marrow, central nervous system (CNS) and musculoskeletal system, which include bones, joint, bursas and tendons or tenosynovium.

O-TBC represents 1%–3% of all cases and 5%–10% of EP-TBC, followed by pleural and lymphatic tuberculosis. It is usually monoarticular and located in joints that support body weight, such as the vertebrae, knee and hip; some locations such as the scapula are rare. [3] Tenosynovitis is the most common form of the disease in the hand. [18,19,20] It is important to note that individuals with advanced HIV infection are more likely to have EP-TBC such as musculoskeletal manifestations. [21]

Joint infection is derived from adjacent osteomyelitis or by contact of synovial fluid with blood, where the cartilage undergoes necrosis. Vascularised bones such as the vertebrae are targets of microorganisms. [1,2,3,7,8,9,10,13]

DISCUSSION

Tuberculosis remains one of the most prevalent infectious diseases in the world. O-TBC accounts for 1%–3% of cases and 5%–10% of EP-TBC after pleural and lymph node disease. The commonly affected extrapulmonary sites are lymph nodes genitourinary tract, bone marrow, CNS and musculoskeletal. The pathogenesis may be direct inoculation or haematogenous spread from a primary focus. [6]

Arthritis caused by O-TBC presents as monoarticular and is located in the joints that support the body weight and are more vascularised. Hand tuberculosis presents as osteomyelitis associated with pain, swelling and functional limitation, with or without constitutional symptoms. Tenosynovitis though rare and is the most common presentation. The flexor apparatus is most affected, as well as the ulnar side when compared to the radial one; [18,19,20] tenosynovitis is more common in upper limb as compare to lower limb and commonly involves the flexor or volar site of wrist and hand of dominant limb; [24] this detail was observed in the cases presented in a 5-year period in our hand surgery service. Tendon rupture is a common complication that was not observed in the cases discussed. Clinical presentation is like a slow-growing tumour, associated with local pain that worsens with movement of the fingers. The growth within the carpal tunnel produces median nerve compression. This was observed in one case. There are three histopathological stages of disease depending on duration of disease, resistance of patient and virulence of infecting agent; in early stage, there is vascular granulation tissue formation followed by obliteration of tendon sheath by fibrous tissue fluid accumulation and formation of rice bodies or sago seeds (which are fibrinous masses or tubercle made by caseation). In the final stage, there is rupture of tendon sheath, extensive caseation and granulation take place. [27] The rice bodies are also commonly found in many diseases such as SLE, rheumatoid arthritis, seronegative arthritis and osteoarthritis of joint. [29]

Synovial biopsy is important for diagnosis and was performed in all patients (excisional biopsy) confirming the

diagnosis by specific Ziehl-Neelsen staining and culture for AARB.

Treatment should include an antituberculosis chemotherapy regimen of 12 months, as the WHO recommendations. The ideal time for a surgical approach is still controversial. In this case, synovectomy with surgical debridement of the hypertrophied tissue, with or without surgical repair of the flexor-extensor apparatus, can be performed.

The main treatment in all cases presented was the initial surgical approach. Management was removal of the hypertrophied synovial tissue and debridement of the affected area, combined with post-operative anti-tuberculosis chemotherapy for 1 year. To make a provisional diagnosis of tuberculosis and to start antituberculosis treatment, it is always better to rule out other common causes and conclude clinical, radiological, histopathological and PCR findings suggestive of tubercular tenosynovitis.

CONCLUSIONS

Tuberculosis remains one of the most prevalent infectious diseases worldwide. Osteoarticular involvement is infrequent and synovial infection in the hand is rare. When the disease is not treated in time and properly, consequences in the hand can be permanent in the flexor-extensor apparatus. Knowledge of this type of disease in the hand can provide a better diagnosis and outcome.

Tb Hand

Tuberculosis in the hand is manifested as osteomyelitis in small bones (carpal bones), metacarpals and phalanges [1] or as dactylitis. [12] There is phlogosis in the bone, and constitutional symptoms can occur, such as fever, night sweats, weight loss and anorexia. [1,22]

Tenosynovitis is the most common form. It presents gradually and for unknown reasons, the flexor side is more affected than the extensor, as well as the ulnar side compared to the radial one. Tenosynovitis is also more frequent in the arms when compared to the lower limbs, and it often is found of the dominant arm. [24] The delay in diagnosis may result in tendon rupture. Furthermore, muscles and nerves are resistant to infection. [22] Compound palmar ganglion also known as chronic flexor tenosynovitis is a rare manifestation of the flexor tendons at the wrist or palm and is the tubercular infection affecting the tenosynovium of long flexor tendons. [6] There are many differential diagnoses that should also be thought about when considering compound palmar ganglion. These include gouty arthritis, rheumatoid arthritis, sarcoidosis, pyogenic infection, a possibly infected ganglion, foreign body tenosynovitis and fungal infection, pigmented villonodular synovitis of tendon sheath, amyloidosis and synovial chondromatosis. [25]

Occasionally, the mass can compress the median nerve and cause a carpal tunnel syndrome. [20] Symptoms can include pain, finger paraesthesia, hand edema, thenar atrophy, Phalen and Tinel signs, elevated red blood cell sedimentation rate and alteration in electrodiagnostic tests. [18]

In general, tenosynovitis evolves slowly with pain and functional limitation and manifests as 'a sausage shape mass' along the inflamed tendons. There are other rare forms of tuberculosis in the hand, such as cutaneous tuberculosis or bursitis. [22] Marquet *et al.* described a case of verrucous tuberculosis caused by *Mycobacterium bovis* causing carpal joint infection on the contralateral side. [26]

Synovial biopsy is important for diagnosis. Imagine generally assists in the diagnosis and can reveal a decrease in ossification and in the diameter of the synovial sheath. Diagnosis is difficult when presented as polyarticular, causing similar symptoms such as rheumatoid arthritis. [18,19,20] X-

rays of the hand bones can reveal cysts, lytic images and joint destruction. Magnetic resonance imaging (MRI) is not specific but helps to determine the extent of the lesion. [22]

The synovial sheath is replaced by 'rice bodies', which are fibrinous masses present in 50% of cases of tuberculosis. [18,19,20]

Early diagnosis, surgical transection of the transverse carpal ligament, debridement and complete excision of the infected synovium may be required, accompanied by treatment with antituberculosis drugs. Post-operative drug combinations are used for 1 year (rifampicin, ethambutol, isoniazid and pyrazinamide). [18] Other procedures for joint lesions can be considered when there is severe cartilage destruction and poor response to drug therapy. [19,20]

Diagnosis

Diagnosis can be difficult, and delay can cause harm, but most people with EP-TBC can be cured if they have access to diagnosis and treatment with anti-TB drugs in time. For this reason, when facilities permit, all patients suspected of having EP-TBC should have appropriate samples taken for microbiological and/or histological testing. As there is an extensive list of differential diagnoses for tubercular tenosynovitis plus the fact that non-specific clinical, radiological and histopathological findings can significantly delay both the diagnosis and management leading to complications. The best method to make a concluding diagnosis is open biopsy and mycobacterial culture; especially in acute suppurative tenosynovitis, where synovial sheath fluid is the predominant feature. Laboratory findings are generally negative, except for the erythrocyte sedimentation rate, which is usually increased. However, the culture usually needs some weeks to reach a diagnosis. The positive result of synovial fluid acid-fast bacteria staining, culture of mycobacterium, histology and polymerase chain reaction (PCR) are 32%, 80%, 65% and 63%, respectively, and PCR can be used at the beginning for initial diagnosis. [6,27,28]

The presence of alcohol-acid-resistant bacilli (AARB) on Ziehl-Neelsen staining may indicate tuberculosis, but this is not pathognomonic (positive in only 20%). Definitive diagnosis is by isolation of Koch's bacillus in synovial fluid. Culture has more specificity and a positivity of 80%, [5] so biopsy confirms the diagnosis. Analysis of protein and glucose levels is non-specific. [1,2,7,8,9,10,11,12,13,14] Histopathological examination shows caseous necrosis, epithelial granuloma and Langhans type giant cells.

Microbial culture is positive in 80% of cases, [1,8] but sterile cultures can result in partially treated disease. [7] In endemic areas, if the patient exhibits clinical and radiological aspects of the disease, the administration of preventive antimicrobial drugs can be started without the need of microbiological culture. [22]

The purified protein derivative test (PPD) may indicate the presence of *M. tuberculosis* (but false negatives are frequent). [1,2,3,9,13,14,22]

A simple X-ray may not be useful in the early stages of the disease or may be non-specific. Pelayo *et al.* published a protocol for the diagnosis and treatment of septic arthritis. They recommended performing imaging tests before the histological and microbiological tests to eliminate others diagnostic hypotheses. In tuberculous arthritis, the Phemister triad can be observed (articular osteoporosis, bone erosion and reduced joint space). Ultrasound can guide joint drainage. [1,7,8,9,10,13,17]

Treatment

The WHO recommends the inclusion of pyrazinamide and ethambutol (or streptomycin) in the first 2 months. O-TBC in children requires at least 12 months of treatment. Personal

monitoring is critical for a successful outcome. Erythrocyte sedimentation rate and serum protein C values are useful for monitoring the patient's treatment. [1,3,7,9,10]

Occasionally, surgery is recommended with specific guidelines when treatment does not entirely work and one of the following complications occurs: Nerve compression, impending bone collapse, joint debridement, drainage of large abscesses and correction of deformity in healed disease, where debridement, abscess drainage, removal of ovoid bodies and synovectomy, are required. [1,7,9,10,11,12,13,22,27] When the tendon repair is performed, the immobilisation is recommended for 14 days and early physiotherapy is indicated to avoid tendon adherence and tenodesis.

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