International Journal of Academic Health and Medical Research (IJAHMR)
ISSN: 2643-9824
Vol. 8 Issue 7 July - 2024, Pages: 85-89

Isolated Tenosynovitis of the Extensor Tendon Sheath of the Wrist Revealing a Rare Tuberculosis Localization: A Case Report

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Abstract: *Tuberculosis (TB) is still a major public health problem in both developing and industrialized countries. Extrapulmonary manifestations are estimated to occur in approximately 20% of patients with TB.[1] and all accounts of musculoskeletal TB represent around 1–3% of tuberculous infections. Although diagnosis of extraspinal musculoskeletal TB is not possible based only on the clinical or imaging findings, the radiological aspect may guide further diagnostic workup and may result in earlier and adequate treatment. We report the case of a 14-year-old girl who presented with swelling on the dorsal aspect of the wrist. The wrist ultrasound indicated tenosynovitis accompanied by nodular thickening of the synovium, resembling pigmented villonodular synovitis. An MRI was conducted to exclude this diagnosis, revealing nodular thickening of the synovium, enhanced after contrast, suggesting a specific infection such as tuberculosis. Confirmation of the diagnosis was obtained through synovial fluid aspiration followed by PCR analysis. Musculoskeletal tuberculosis is an uncommon manifestation. Wrist tenosynovitis is exceedingly rare. Nevertheless, this diagnosis warrants consideration in cases of chronic, non-inflammatory tenosynovitis without any associated rheumatological context.*

Introduction:

Tuberculosis (TB) is still a major public health problem in both developing and industrialized countries.
Extrapulmonary manifestations are estimated to occur in approximately 20% of patients with TB.[1] and all accounts of musculoskeletal TB represent around 1–3% of tuberculous infections.
Although diagnosis of extraspinal musculoskeletal TB is not possible based only on the clinical or imaging findings, the radiological aspect may guide further diagnostic workup and may result in earlier and adequate treatment.
We report the case of a 14-year-old girl who presented with swelling on the dorsal aspect of the wrist and whom clinical and radiological investigations unveiled tuberculosis affecting the extensor tendon sheath of the wrist.

Clinical observation:

We present the case of a 14-year-old girl, without notable medical history, who came in with wrist pain and swelling persisting on the dorsal side for 5 years. Clinical examination did not reveal any systemic or infectious signs. Rheumatological examination showed no axial, enthesitic, arthralgic, or arthritic signs, and examination of the wrist revealed a resilient, mobile, painless swelling without inflammatory signs.
Given this presentation, an infectious and inflammatory blood test was performed, and all results came back within normal ranges. Additionally, an ultrasound examination was conducted revealing effusion in the extensor tendon sheath of the wrist with nodular thickening, showing Doppler signal. Several diagnoses were considered, including pigmented villonodular synovitis, synovial sarcoma, or inflammatory or infectious involvement.
An MRI was performed on this girl, revealing nodular thickening of the synovium of the extensor tendon sheath of the wrist described as hypointense on T1 and T2 weighted sequences with nodular enhancement, along with effusion in this area **(figure I, II)**. No hemosiderin deposits were found on T2* sequences, and no other joint involvement or bone erosion was noted. (Figure III). Given this presentation and considering the epidemiological context, tuberculous tenosynovitis was considered, despite the absence of significant tuberculosis exposure or signs of tuberculous impregnation.
In this context, a tuberculosis workup was requested, including QuantiFERON blood test, sputum examination for acid-fast bacilli (AFB), and chest X-ray, all of which returned normal results. A synovial fluid sample was collected, revealing a thick, yellowish citrine fluid, and PCR analysis detected traces of Mycobacterium tuberculosis, thus confirming the diagnosis.
Antitubercular treatment was initiated, leading to a favorable clinical evolution, notably marked by the reduction of dorsal swelling.

Figure I: Sagittal T2-weighted of wrist joints showing nodular thickening of the synovium of the extensor tendon sheath (arrow) along with effusion in this area and some rice bodies (star)

Figure II: Coronal T1 weighted image with gadolinium injection of wrist joints showing nodular enhancement of the extensor tendon sheath. (arrow)

Figure III: A coronal T1 weighted image of wrist joints reveals no evidence of bone erosion or joint involvement in the wrist.

DISCUSSION:

Tuberculosis (TB) is still a major public health problem in both developing and industrialized countries.

Although the incidence of TB has decreased since the introduction of antituberculous drugs, most developing countries have been facing a resurgence of the disease.

Extrapulmonary manifestations are estimated to occur in approximately 20% of patients with TB.[1] and all accounts of musculoskeletal TB represent around 1–3% of tuberculous infections.

The most usual form of musculoskeletal TB is tuberculous spondylitis (50%). Extraspinal manifestations are the least common [2]; the reported frequency of peripheral arthritis is 60%, of osteomyelitis 38%, and of tenosynovitis and bursitis 2%. [3–6]

The definitive diagnosis of musculoskeletal tuberculosis relies on histological and biological evidence. Indeed, histopathological examinations, culture identification, and polymerase chain reaction (PCR) are among the most accurate methods for diagnosis. However, the radiological appearance correlating with clinical presentation helps guide further investigations, thereby allowing for an earlier diagnosis, thus enabling treatment initiation.

Musculoskeletal tuberculosis primarily arises from the hematogenous dissemination of Mycobacterium tuberculosis, the main causative agent of tuberculosis. However, it can rarely occur due to the direct inoculation of the organism into the site.

Tenosynovial involvement may result from direct hematogenous dissemination, the most probable mechanism in our patient, or periarticular extension of tuberculous arthritis. This leads to congestion and thickening of the synovium, along with tendon infiltration, potentially causing tendon thinning or rupture. Additionally, granulomatous synovial lesions may extend onto the bone at the synovial reflections, resulting in subsequent erosions and cartilage destruction. Fortunately, our patient shows no signs of cartilage or bone involvement. This is because the exudate in tuberculous arthritis lacks proteolytic enzymes, delaying cartilage loss until later stages of the disease. While joint tuberculosis typically affects a single joint, approximately 10% of patients develop multifocal joint disease. The hip and knee joints are most commonly affected, followed by the sacroiliac, shoulder, elbow, ankle, and wrist joints, as demonstrated in our case. .[7–13]

Although standard radiographs are often negative in the early stages of the disease, conventional radiography remains the first imaging study to be conducted when investigating articular symptoms. In advanced cases, a triad of radiological abnormalities, known as Phlemister's Triad, has been described. It consists of periarticular osteoporosis, peripheral osseous erosion, and a gradual reduction in joint space. [14–18]

Ultrasound (US) can reveal the presence of joint effusions, synovial thickening—which can be nodular—and synovial congestion, detected through Doppler hyperemia, as seen in our case. It is also useful for evaluating the condition of tendons. Additionally,

ultrasound can assist in guiding the aspiration of joint effusions for microbiological, histopathological, and PCR testing. However, ultrasound is not a specific diagnostic tool for joint tuberculosis.

MRI is the modality of choice for the early detection of joint tuberculosis. Synovial proliferation due to tuberculous arthritis is generally described as hypointense on T2-weighted images, which can be a useful sign for differentiating tuberculous arthritis from other proliferative synovial arthropathies [19,20]. Indeed, tuberculous granulomas and fibrosis resulting from chronic inflammatory changes typically appear hypointense on T2-weighted images. In cases with caseous necrosis within the granulomas, a necrotic center with T2 hyperintensity may be observed. Additionally, hemosiderin deposits, appearing as areas of low signal on susceptibility-weighted imaging, can be identified. [5]

In MRI, These tiny nodules correspond to the rice bodies previously reported in the literature. Finally, there is the fungoid stage, which is characterized by a soft tissue mass involving the tendon and tendon sheath.

Three primary stages of tuberculous tenosynovitis have been described, depending on the duration of the disease progression: the hygromatous, serofibrinous, and fungoid stages. The hygromatous stage is characterized by the presence of fluid in the tendon sheath without any associated thickening or tendon involvement. The serofibrinous stage shows thickening of the synovium and tendons, along with multiple small hypointense nodules within the hyperintense synovial fluid on T2-weighted images, corresponding to rice bodies described in the literature. Finally, the fungoid stage is marked by a pseudo-tumoral appearance with a soft tissue mass involving the tendon and tendon sheath. [24]

Chondral lesions and subchondral bone erosions may be visible at a stage when the joint space is still well preserved. Associated bone marrow edema osteomyelitis, and soft tissue abnormalities such as myositis, cellulitis,
para-articular abscess formation, tenosynovitis, bursitis, and
skin ulceration/sinus tract formation may be seen.[21]

Para-articular abscesses mostly show a thin and smooth enhancing wall.[22] Definitive diagnosis of TB requires aspiration or synovial biopsy and further anatomopathological and/or biological studies.

Conclusion:

Tuberculous tenosynovitis is very rare, especially in the tendon sheaths of the wrist, as seen in our case. The diagnosis is quite difficult to establish; however, understanding the various radiological features provides valuable diagnostic assistance.

Keywords:

Tuberculosis, tenosynovitis, MRI, ultrasound, wrist

LIST OF ABBREVIATIONS:

TB : Tuberculosis
AFB : acid-fast bacilli
PCR: polymerase chain reaction
US :Ultrasound

DECLARATIONS:

The authors do not declare any conflict of interest.

Ethics approval and consent to participate.

Not applicable.

CONSENT FOR PUBLICATION

Written informed consent was obtained from the patient, and legal guardian for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

PATIENT PERSPECTIVE

Since beginning the treatment for wrist tuberculosis, I have noticed a significant reduction in both pain and swelling. The discomfort that once made daily activities challenging has considerably diminished, allowing me to use my wrist more comfortably. This improvement has brought a sense of relief and hope as I continue with the prescribed regimen.

Availability of data and materials

The data sets are generated on the data system of the CHU Hassan II of Fes, including the biological data and the interventional report.

Competing interests

The authors declare that they have no competing interests.

Funding

No source of funding was received.

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