An unusual tenosynovitis agent of the hand: Tuberculotic tenosynovitis

Gokce Yildiran, Mustafa Sutcu, Erden Erkut Erkol, Osman Akdag, Zekeriya Tosun

ABSTRACT
Tuberculosis (TB) is a disease that mainly affects the lungs and is primarily caused by Mycobacterium tuberculosis bacteria. However, the hand involvement is extremely rare. Diagnosing the tenosynovitis due to the tuberculosis is the main challenge for the surgeons. It is aimed to present a case of Mycobacterium tenosynovitis of the hand and outline the treatment protocol for its diagnosis. A 46-year-old male patient was presented with swelling in his right hand. Physical examination revealed no pathology except for swelling in the right thenar region. Magnetic resonance imaging (MRI) revealed chronic tenosynovitis. Synovectomy was planned for the patient, and following the thenar incision, mass formations in the form of pale-yellow rice grains were found inside the thickened sheath of the flexor pollicis longus. Since these formations suggested TT intraoperatively, the intraoperative wound culture, samples for acid-resistant staining, TB DNA, and TB culture, as well as pathology samples, were taken. Intraoperative suspicion of TT is extremely important in order to prove the diagnosis. Although TB that affects the hand is rare, it is an element of tenosynovitis that must be kept in mind in areas where TB is endemic. Rice bodies are important guiding agents for intraoperative diagnosis and subsequent treatment.

Key words: Rice body, tenosynovitis, tuberculosis

Introduction
Tuberculosis (TB) is a disease that mainly affects the lungs and is primarily caused by Mycobacterium tuberculosis bacteria. However, extrapulmonary TB can be in the form of urogenital, skeletal, or abdominal TB and can affect numerous organs, from the pericardium to the nervous system. The most common forms of skeletal TB are Pott disease, arthritis, and extraspinal osteomyelitis [1].

Tuberculotic tenosynovitis (TT) is a clinical form of extrapulmonary TB. Despite the musculoskeletal system being affected and detected in 10% of extrapulmonary TB cases, TT of the hand and wrist is rare [2]. However, it has been found that Mycobacterium tenosynovitis of the hand frequently has its origins in active pulmonary TB [3].

Tenosynovitis of the hand has led to increased cases of hand surgery, and since the description provided...
by Kanavel in 1905 [4], infectious diseases of the flexor tendon sheaths have evolved.

Diagnosing TT in the preoperative period is extremely difficult because TB can mimic numerous diseases, such as compression neuropathy, ganglion cysts, De Quervain’s tenosynovitis, and gout. Thus, TB is often referred to as “the great imitator” [5]. Because it is closely related to active pulmonary TB, it is extremely important that it is diagnosed intraoperatively. However, this requires extensive experience among surgeons.

Thus, the aim of this report is to present a case of Mycobacterium tenosynovitis of the hand and outline the treatment protocol for its diagnosis.

**Case Report**

A 46-year-old male patient was presented with swelling in his right hand (Figure 1). The hand had been swollen for one year. No comorbid disease was found, and a physical examination revealed no pathology except for swelling in the right thenar region. An X-ray did not detect any significant abnormalities in the hand (Figure 2). An ultrasonography reported flexor tenosynovitis in the thenar region. Magnetic resonance imaging (MRI) revealed chronic tenosynovitis (Figure 3). A synovectomy was planned for the patient.

Following an incision of the thenar region, the surrounding structures were dissected, and mass formations in the form of pale-yellow rice grains were found inside the thickened sheath of the flexor pollicis longus (Figure 4). Since these formations suggested TT intraoperatively, the intraoperative wound culture, samples for acid-resistant staining, TB DNA, and TB culture, as well as pathology samples, were taken.

In terms of systemic TB, interferon (IFN)-gamma release assay tests, chest X-rays, PPD, serology, and acute phase reactants were studied. The pathology was evaluated as villonodular tenosynovitis. TB culture
from the wound was evaluated as Mycobacterium tuberculosis complex, and the patient was referred to an infectious diseases clinic for systemic treatment. In the one-year follow-up, no recurrence was noted.

Discussion

Tenosynovitis is the inflammation of the tenosynovium. Bacterial tenosynovitis can occur in three ways: via direct inoculation, via regional spread, and via hematogenous spread. Hematogenous infections comprise Neisseria gonorrhoeae and Mycobacterium spp.

Extrapulmonary and skeletal TB may be seen, especially in endemic areas. TT of the hand accounts for 1–5% of skeletal TB cases [2,6]. In contrast to acute flexor tenosynovitis, gradual and non-specific symptoms, such as hand swelling and pain, delay admission and reduce the possibility of early diagnosis. Thus, the chief difficulty in TT is diagnosing the disease. Other mycobacterial, bacterial, or fungal infections, as well as brucellosis, sarcoidosis, inflammatory arthritis, De Quervain's tenosynovitis, and foreign body tenosynovitis form the differential diagnosis [7]. In the case presented here, the first suggestion of TT was the intraoperative rice bodies. The presence of the rice bodies helped diagnose the disease. Rice bodies are pale-yellow and are small abundant masses clumped together. They can develop in different forms of inflammatory arthritis such as rheumatoid arthritis and systemic lupus erythematosus. However, the bodies detected in rheumatoid arthritis are smaller than the rice bodies of TT [8]. As well as this, another symptom of inflammatory arthritis is joint pain. Even with new-onset rheumatoid arthritis, the initial symptoms are occasionally boggy swelling and tenderness of the hand [9].

Intraoperative suspicion of TT is extremely important in order to prove the diagnosis, as the samples taken from the tenosynovium should be examined and investigated for TT. In this regard, the TB culture test should be conducted. Because the pathology cannot reveal any TB diagnosis. In order to reveal the exact diagnosis pathology is insufficient, but the TB cultures are the only way to reveal a chronic disease. If the pre-operative diagnosis of TB cannot be done, the TB culture test is not sent, and the diagnosis cannot be made. As well as the TB culture test, IFN-gamma oscillation tests, TB-DNA, acid-resistant staining, and PPD samples should be performed on patients with rice body formation and patients whose preliminary diagnosis is TB. If TB is considered, the patient’s immunosuppression status, such as HIV positivity, should be evaluated. X-rays should examine bone involvement. MRI may reveal chronic tenosynovitis, as in the case presented here. T2-weighted sequences are more successful in diagnosing tenosynovitis. Microscopy is often negative in terms of diagnosing extrapulmonary TB. Thus, the diagnosis of TB should not be avoided on negative microscopy.

Kanavel defined the cardinal signs of flexor tenosynovitis and separated TT into three stages [4,10]. The first stage comprises sheath thickening and serous exudate; the second stage comprises rice body formation; and the third stage comprises necrosis [10]. Thus, the proliferative stage of TT forms the rice bodies before tissue necrosis begins. The proliferative stage is the most difficult stage for the patient due to the swelling and pain experienced during finger movements. Thus, the patient is more likely to be treated by an experienced surgeon at this stage. In the case presented here, the patient was admitted during the proliferative stage.
of the disease, meaning that no tissue necrosis was determined. However, it was easy to find the rice bodies and diagnose TT. This means that in terms of TT diagnosis, the importance of rice bodies is high, as these structures are critical for the diagnosis and elimination of TB after intraoperative observation.

Rice bodies are not only helpful for the diagnosis of TT but are also responsible for the recurrence of the disease. Because of this, all rice bodies should be debrided in order to prevent recurrence. In surgical treatment, the tenosynovium should be excised widely, as a radical tenosynovectomy reduces the recurrence rate. The surgeon should also alert the pathologist and microbiologist in terms of possible chronic TT in order to make it easier to diagnose this rare disease.

Although TB that affects the hand is rare, it is an element of tenosynovitis that must be kept in mind in areas where TB is endemic. Although TT surgery does not differ from infective tenosynovitis surgery, it is important to recognize the intraoperative findings and diagnose and treat the endemic disease based on these findings only. Rice bodies are important guiding agents for intraoperative diagnosis and subsequent treatment.

**Conflict of interest statement**

The authors have no conflicts of interest to declare.

**References**