Post Traumatic Tuberculous Tenosynovitis in a Patient that Manifests as Soft Tissue Tumor: A Case Report

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Abstract

Mycobacterium tuberculosis infection is one of the oldest diseases of the human race. This bacteria can attack any organ in the human body. Extra Pulmonary Tuberculosis (EPTB) infection diagnosis are rarely straightforward, and in many cases, delayed due to various reasons. Tuberculous tenosynovitis (inflammation of the tendon and its capsule because of Mycobacterium tuberculosis complex infection) is a rare form of EPTB. Tuberculosis infection at sites of previous trauma have been reported consistently though rarely. We present the case of a 48 years old male with complains of lumps on his lower left arm (with prior history of blunt trauma on the location) and progressive inability to flex the fingers of his left hand. Early examinations suggest the diagnosis to be a soft tissue tumour. However, tissue biopsy later showed that the patient was actually suffering from tuberculosis infection. The patient later showed satisfying response to tuberculosis medication on subsequent follow ups.

Key Words: *Mycobacterium Tuberculosis, Tuberculous Tenosynovitis, Extra Pulmonary Tuberculosis*

Introduction

Tuberculosis (TB) is one of the oldest diseases of the human race, thought to first appear around 70,000 years ago in Africa. This Mycobacterium complex infection primarily affects the lung parenchyma, but other organs and tissues can also be infected[1].

TB is one of the diseases with the heaviest global burden. More than a third of the human race is infected. In 2016, the WHO reported 1.7 million deaths caused by the disease, with 10.4 million of new cases of TB. Seven countries hosted 64 % of all new cases: India, Indonesia, China, Pakistan, Nigeria, and South Africa[2].

Extra Pulmonary Tuberculosis (EPTB) are defined as Mycobacterium tuberculosis infection of any tissue apart from lung tissue. EPTB represents 20-25 % of all tuberculosis. This number increases significantly in Human Immunodeficiency Virus patients[1,3].

The diagnosis of EPTB is rarely straightforward. In many cases, it took a considerable amount of time before the diagnosis is established. This phenomenon most often is caused by the delayed addition of EPTB into the differential diagnosis due to various reasons[4].

Tuberculous tenosynovitis (inflammation of the tendon and its capsule because of Mycobacterium tuberculosis complex infection) is a rare form of EPTB. Among tuberculosis patients, 1-3 %

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have musculoskeletal infection, and tuberculous tenosynovitis accounts for 5 % of this group, comprising of around 0.05 % of all TB cases[5]

EPTB developing at sites of previous trauma have been reported consistently, though rarely, in the literature of the past century. The mechanism that can explain how these cases emerge has been rarely researched. The study into the pathogenesis of post-traumatic tuberculosis might offer new understandings of tuberculosis pathogenesis[6].

Case Report

A 48 years old male came to the hospital with complaint of progressive inability to flex the fingers on his left hand. The patient has been having difficulty in moving his left hand since 6 months ago. The disturbance worsened until he was not able to hold a glass filled with water. No other part of the body was affected. The patient also complained about two bumps on his left lower arm. The first bump appeared in 8 months ago on the lateral side just below his elbow. About one month before the appearance of the first bump, his lower left arm was hit by a wood while working at the same location. The skin was red, with mild pain for a few days after the trauma, but no visible wound was observed on the skin. The first bump gradually increases in size, with local paresthesia and light pain when pressed. About one month after the first bump appears, a second bump emerges close to his wrist, also gradually increasing in size. The skin on both bumps appears normal during the course of the disease. Five months after the trauma, the increasing difficulty experienced by the patient in moving his fingers brought him to the local hospital, which referred him to our hospital. The patient's appetite is normal, no complaints of night sweats or decrease of body weight. No history of past illness or family history of cancer. The patient is a farmer from a rural area.

The patient is fully alert and in good general condition. Height 155 cm. Weight 55.2 kg. BMI 23 kg/m2. Blood pressure 120/70 mmHg. Pulse 82 bpm. Breathing 17x/min. Temperature 36.3 degree celsius. On head and neck examination, we found no anemia, jaundice, cyanosis, or dyspnea. Lymph nodes were not enlarged. On thoracic examination, chest wall appears symmetrical, no intercostal retractions. Heart sound and breath sound normal. On abdominal examination, the surface appears normal, bowel movement normal, no ascites, and no organ enlargement. On extremity examination, the patient's perfusion was normal. Two bumps were observed on the patient's left antebrachium, the first was on the lateral side, just below the elbow, with the size of 5 x 3 x 1 cm. The second bump was on the medial side, just above the wrist, with the size of 4 x 2 x 1 cm. Both bumps have a rubbery consistency on palpation and were immobile.

Lab result showed: Hb 14,5 g/dL, RBC 5,65 jt/µl, HCT 43,9%, MCV 77,7 fL, MCH 25,5 pg, MCHC 33,0 g/dL, PLT 356.000/ µl, WBC 8.420/µl (Eos 3,4 %, Baso 1,1 %, Neut 63,9 %, Lymph 22,8 %, Mono 8,8 %) SGOT 29 U/L, SGPT 14 U/L, Serum creatinine 0,65 mg/dL, BUN 9 mg/dL, Random Blood Glucose 86 mg/dL, C-Reactive Protein 4 mg/dL. Antebracium x-ray of the patient's left arm within normal limit. US of both masses showed hypoechoic, well defined mass that attaches to the surrounding tendons and muscles, possibly a soft tissue tumor. Fine Needle Aspiration Biopsy showed proximal mass: hypocellular smear showing macrophage and lymphocyte distribution with purplish mucoid matrix. Distal mass: adequate cell smear showing distribution of round-nucleated cells with smooth chromatin, spacious cytoplasm. Small number of round-spindle nucleated cells with smooth chromatin (conclusion: Proximal mass: no signs of malignancy; tenosynovitis suspected. Distal mass: probably fibrohystiocytic tumor). MRI result: Synovial proliferation with enhancements that obliterates the tendon of the flexor pollicis longus and flexor digitorum profundus muscles along distal of the radius until the palm region, as high as the left metacarpal head. Hypointens lesion observed on T1M1 and T2M1, strict demarcation, regularly shaped with a size of 3.2 x 2.3 x 1.9 cm, underneath the extensor

carpi radialis longus muscle and anterolateral of the left radial bone. Normal bone trabeculation. Joint gap and surface appeared normal. Conclusion: Sclerosing tenosynovitis along distal of the radius until palmar region as high as the left metacarpal head; Soft tissue mass with strict demarcation, regular edge, in the size of 3.2 x 2.33 x 1.9 cm profundus of the long extensor carpi radial muscle and anterolateral from the left radial bone. Allegedly a deep myxoid tumor.

The patient then underwent surgical removal of the tumors. Biopsy result from the tumors showed granulomatic inflammation that's consistent with tuberculosis.

The patient received category I treatment for extra pulmonary tuberculosis for 6 months using the Fixed Dose Combination (FDC) regiment: Rifampicin 600 mg, Isoniazid 300 mg, Pyrazinamide 1600 mg, and Etambuthol 1100 mg daily for 2 months, followed by Rifampicin 600 mg and Isoniazid 600 mg three times a week for 4 months.

At the follow op 2 months after EPTB medication started, the range of movement of the patient's left hand fingers has improved, although not yet at the previous normal level. The patient is now able to hold a cup filled with water without any problem. Light activity which involves the hand, such as doing laundry, gardening, or lifting water from a water dipper can be done with relatively little problem. Pain and paresthesia are gone, and surgical wound was healing well.

Discussion

From the physical examination, two bumps were observed on the patient's left antebrachium, the first was on the lateral side, just below the elbow, with the size of 5 x 3 x 1 cm. The second bump was on the medial side, just above the wrist, with the size of 4 x 2 x 1 cm. Both bumps have a rubbery consistency on palpation, immobile, with very mild pain on pressure. No other signs of infection or inflammation.

Frank pain, pathological fracture, and bone abnormality on x-ray was not found in the patient, excluding bone tumor from the differential diagnosis. Signs of infection such as tenderness, erythema, swelling, and warmth was not found. Pain was minimun on pressure of the lesion. The size of the lesions, their increase in size, and immobility points towards a possibility of a soft tissue tumor.

USG was planned to confirm the existence of soft tissue tumor and revealed hypoechoic, well defined mass that attaches to the surrounding tendons and muscles.

The immobility of the tumors and their adherence to the surrounding muscles and tendons, augmented by the fact that they kept getting bigger raised the suspicion of malignancy. FNAB was chosen as the earlier examination to minimize morbidity and risk of tumor spread.

FNAB examination revealed no signs of malignancy on proximal mass with tenosynovitis suspected. Distal mass analysis revealed probable fibrohistiocytic tumor. Tenosynovitis can be caused by fibrohistiocytic tumor that infiltrates tendon capsule[7,8]. MRI was planned as the next step for evaluation of the soft tissue lesion. The result of the MRI will help with planning the biopsy and tumor excision, if necessary.

MRI showed sclerosing tenosynovitis along distal of the radius to palmar region as high as the left metacarpal head; Soft tissue mass with strict demarcation, regular edge, in the size of 3.2 x 2.33 x 1.9 cm profundus of the long extensor carpi radial muscle and anterolateral from the left radial bone. Allegedly a deep myxoid tumor. Open biopsy and tumor excision if possible were our next planned course of action.

Biopsy result from the left elbow and wrist: both preparations showed similar picture. Tissue samples consist of groups of epitheloid hystiocytes, surrounded by lymphocytic inflammatory cells that

forms a granuloma. Also visible are distributions of datia langhans cells and necrosis. Muscle and fat tissue visible. No sign of malignancy. Conclusion: granulomatic inflammation, consistent with tuberculosis is the cause of the tenosynovitis.

Tuberculous tenosynovitis (inflammation of the tendon and its capsule because of Mycobacterium tuberculosis complex infection) is a rare form of EPTB, comprising of around 0.05 % of all TB cases[5]. A number of predisposing factors exist for tuberculous tenosynovtis: trauma, joint overuse, old age, low socioeconomic status, malnutrition, alcohol consumption, and immunosuppression. By far, the most affected location is flexor tendons of the hand and wrist. Involvement of other location is very rare. The dominant extremity is affected more (possibly because of the higher probability of trauma and overuse). Men are affected more than women. Infection results from direct inoculation from a wound or adjacent bone or joint, or the spread of tuberculosis from pre-existing lesions in the body[9].

The clinical manifestation of tuberculous tenosynovitis is slow-growing mass along the inflamed tendon without (or with minimum) pain. The patient may experience carpal tunnel syndrome, decreased range of motion, even tendon rupture when treatment is delayed. The slow progresivity of this disease often causes late diagnosis, when extensive damage has been done[9].

In tuberculous tenosynovitis, laboratory examination is generally within normal limits except for increasing erythrocyte sedimentation rate. MRI can provide a good evaluation of tendon and its capsule. Nonspecific tenosynovitis with serous exudate is the most frequent MRI result in higromatous phase. In serofibrous phase, we can usually find thickening of the synovium, thinning of the tendon, tendon damage or adhesion. Extensive spread of granuloma forming a soft tissue tumor is often observed in the fungoid phase[10].

According to the WHO, the diagnosis of EPTB must be based on one of the three criteria below, followed by administration of antituberculosis medications by the clinician[11]:

1. A culture that's positive for Mycobacterium tuberculosis complex.

2. Acid fast bacilli in histological examination.

3. A sound clinical evidence of an active EPTB (radiology, pathology, response to treatment).

Diagnosing EPTB is rarely an easy task. Wide spectrum of manifestation, affected by location, agresivity of infection, and patient's immune response add to the complexity of diagnosis effort. In many cases, it took a considerable amount of time before the diagnosis is established. This phenomenon most often is caused by delayed addition of EPTB into the differential diagnosis due to various reasons. Not often, empiric antibiotics have been given when TB is suspected. EPTB lesions are often pauci-bacilli, making histological diagnosis more difficult. Hard-to reach lesions complicates efforts to obtain samples for microscopy, histology, culture, or molecular examination[4].

The conformity we found in the patient's socioeconomic status, clinical manifestation, radiological, and pathological examination with clinical picture of serofibrous phase of tuberculous tenosynovitis convinced us to conclude that it is the right diagnosis.

Tuberculosis infection developing at sites of previous trauma has been reported consistently (albeit rarely) in the literature in the last century. The publication of these cases is divided into three cathegories: Tuberculosis in the location of previous open or stab wounds; Tuberculosis at sites of previous fracture fixation or prosthetic joint insertion; Tuberculosis at sites of previous blunt trauma (excluding direct inoculation of Mycobacterium)[6].

Barr et al. studied published cases of post traumatic tuberculosis in the last 50 years. Among 26 patients reported during that period, 25 of them was in or emigrated from tuberculosis endemic areas (Indonesia is, unfortunately still an endemic area for TB). Time span between trauma and onset of symptom ranged from 1 to 42 weeks with a median of 8 weeks[6] (4 weeks in our patient).

A number of studies on animals showed tuberculosis infection developing at sites of previous injury, not long after systemic injection of Mycobacterium Tuberculosis. In latent TB patients, granuloma formed surrounding focus of Mycobacterium infection to contain it. Recent data from animal models showed that mycobacterium-infected monocytes and dendritic cells can travel freely in and out of granulomas. Meanwhile, a continuous influx of monocytes and macrophages keep moving into granulomas, phagocyting dead or dying infected macrophages. Granuloma that once thought to be limiting infection, appears to be playing a role in disease spreading[6,12].

Sterile tissue injury provokes the release of several chemoattractant. Macrophage Chemoattractant Protein-1 (MCP-1) pulls monocytes from the circulation into inflamed locations. Hypothesis for the mechanism of post-traumatic tuberculosis is that in latent TB patient, infected monocytes can move out of granulomas to follow chemoattractant signals from inflamed tissues caused by trauma. This inflamed tissue might provide an environment that allows TB reactivation inside the infected monocytes, rapidly infecting numerous monocytes and macrophages gathered there, establishing a new Mycobacterium infection focus[6,13].

Reports of infection by Salmonella enteritidis at sites of previous trauma is an interesting information that might support the above hypothesis. Salmonella enteritidis is an intracellular facultative bacteria, just like Mycobacterium tuberculosis[6].

Conclusion

In regions where tuberculosis is endemic, it is important to have a high suspicion index for cases of EPTB. The multitude of signs and symptoms it can exhibit can be very problematic in determining its true cause. This increased awareness can help hasten diagnosis, avoiding worse outcome as a result of a delayed treatment.

Signs of chronic infection or inflammation at sites of previous trauma in TB endemic regions, should alert clinicians of a potential EPTB. Post-traumatic TB can probably be explained by transportation of mycobacterium by monocytes and macrophages in the circulation, contrary to previous understandings that in latent TB patients, the infection is contained and inactive inside granulomas. Further pursuit to understand this mechanism is important to expand current knowledge of TB pathogenesis.

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References

1. Kasper D, Hauser S, Larry J, Fauci A, Longo D, Joseph L. Harrison's principles of internal medicine [19th ed.]. 19th ed. McGraw-Hill Education; 2015.
2. Global tuberculosis report 2017. World Health Organization. 2017.
3. Ramírez-Lapausa M, Menéndez-Saldaña A, Noguerado-Asensio A. Extrapulmonary tuberculosis: an overview. Rev Esp Sanid Penit. 2015 Oct 23;17(1):3-11.
4. Norbis L, Alagna R, Tortoli E, Codecasa L, Migliori G, Cirillo D. Challenges and perspectives in the diagnosis of extrapulmonary tuberculosis. Expert Review of Anti-infective

Therapy. 2014;12(5):633-647.

5. Jaovisidha S, Chen C, Ryu K, Siriwongpairat P, Pekanan P, Sartoris D et al. Tuberculous tenosynovitis and bursitis: imaging findings in 21 cases. Radiology. 1996 Jul 12;201(2):507-513.
6. Barr D, Whittington A, White B, Patterson B, Davidson R. Extra-pulmonary tuberculosis developing at sites of previous trauma. Journal of Infection. 2013 Aug 29;66(4):313-319.
7. Monaghan H, M Salter D. Giant cell tumour of tendon sheath (localised nodular tenosynovitis): clinicopathological features of 71 cases. Journal of Clinical Pathology. 2001 May 1;54(5):404-407.
8. Smith P, Pieterse A, McClure J. Fibroma of tendon sheath. Journal of Clinical Pathology. 1982 Aug 1;35(8):842-848.
9. Lall H, Nag S, Jain V, Khare R, Mittal D. Tuberculous extensor tenosynovitis of the wrist with extensor pollicis longus rupture: a case report. Journal of Medical Case Reports. 2009 Nov 20;3(142).
10. Sanders C, Schucany W. Tuberculous Tenosynovitis. Baylor University Medical Center Proceedings. 2008 Jan;21(1):71-72.
11. Treatment of Tuberculosis: Guidelines. 4th edition. World Health Organization. 2010.
12. Davis J, Ramakrishnan L. The Role of the Granuloma in Expansion and Dissemination of Early Tuberculous Infection. Cell. 2009 Jan 9;136(1):37-49.
13. Imhof B, Aurrand-Lions M. Adhesion mechanisms regulating the migration of monocytes. Nature Reviews Immunology. 2004 June 1;4(6):432-444.