Tubercular Synovitis Mimicking Rheumatoid Nodules

S C Teo, MD*, J George, FRCR*, T Kamarul, FRCS**

*Department of Radiology, Faculty of Medicine, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia, **Hand and Microsurgery Unit, Department of Orthopaedic Surgery, Faculty of Medicine, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia

SUMMARY

Tubercular tenosynovitis is an uncommon condition and usually affects the upper limb. We report a case of a patient with Systemic Lupus Erythematosus who presented with wrist swelling. The clinical findings were suggestive of rheumatoid nodules, but the radiographic finding of calcification associated with the nodules and marked erosive changes primarily of the radio-carpal joint with sparing of the metacarpal joints led the radiologist to believe that the nodules may not be rheumatoid nodules. The presence of solid and fluid nature of the nodule and hyperechoic small echogenic foci (matted rice bodies within thickened synovium) on ultrasound suggested the presence of chronic synovitis of tuberculous infection rather than rheumatoid nodule as in our case. We recommend the use of ultrasound to determine the nature of nodular swellings seen clinically in patients with arthropathy.

KEY WORDS:
Tuberculosis, Synovitis, Systemic Lupus Erythematosus, Rheumatoid nodules

INTRODUCTION

Patients with Systemic Lupus Erythematosus (SLE) have impaired cellular and humoral immune responses intrinsically. Concomitant use of corticosteroid and immunosuppressant further contributes to the immunocompromised state of these patients resulting in them being susceptible to opportunistic infections, the most common being tuberculosis. In endemic areas in Southeast Asia, tuberculosis is frequently reported in patients with SLE. In a study conducted in Hong Kong, the prevalence of tuberculosis among SLE patients have been reported at 1.06/100 patient-years[1]. In India, a prevalence of TB ranging from 5% to 13.7% was noted in patients with SLE receiving steroid treatments [2]. Tubercular tenosynovitis is an uncommon condition and usually affects the upper limb (namely the hand and wrist). The main problem in diagnosing the disease is because of the non-specific clinical signs which can be misleading as they tend to mimic a number of other clinical manifestations such as rheumatoid nodules. The purpose of this report is to highlight the possible errors in making a diagnosis when further investigations are not employed to confirm a clinical suspicion as in this case. The wrong diagnosis of rheumatoid nodules would have resulted in a wrong clinical management if the concomitant use of imaging was not applied. It is therefore prudent that further radiological investigations are performed in "suspicious" cases where other diagnosis must be entertained especially when joint destruction and calcifications are notable in plain radiographs. In this report, we will also highlight the usefulness of the ultrasound as a modality of investigation and why we recommend its use in cases involving tendon synovitis.

CASE REPORT

A 49 year-old Malay female patient with SLE, presented with swelling on the ulnar aspect distal third of the forearm since seven months ago which began as a small and painless swelling. Over a period of four months prior to admission, the swelling had increased in size and become painful. It had affected the movements of her wrist. She was on Prednisolone 10mg daily.

On examination, a soft swelling over the dorsal surface of the left forearm was noted measuring 6cm x 6cm. It was non-tender, non-pulsatile, mobile and not attached to the surrounding structures. There were dilated superficial veins noted on the overlying skin with no sinus or scar present. Another smaller swelling was also noted over the ulna aspect of the dorsal surface of the left hand with similar characteristics as the first swelling. She was unable to extend her left wrist as well as her left middle, ring and little fingers. However, flexion of all the fingers in the left hand was normal. The clinical findings of her left wrist resemblance rheumatoid features. However, her other joints were normal.

Chest radiograph of this patient was normal. No evidence of radiographic pulmonary tuberculosis was seen.

Radiographs of the left wrist (Figure 1) showed severe osteopenia, erosions and destructions of the carpal bones and radiocarpal joint. There was a large soft tissue mass on the distal aspect of the dorsal forearm with small foci of calcification. Ultrasound (Figure 2) showed the mass to be composed of solid and cystic components. The isoechoic components represent large pannus formation with linear echogenicity representing rice bodies.

Magnetic Resonance Imaging was subsequently performed to assess extent of lesion. It revealed marked destruction of carpal and metacarpal bones. Cystic swelling was noted at the second to third metacarpal interspace, adjacent to the fifth metacarpal, and dorsal to the distal ulna. The largest

This article was accepted: 14 March 2008
Corresponding Author: Teoh Soo Chin, 52, Jalan Unta, Taman Berkeley, 41150 Klang, Selangor Darul Ehsan, Malaysia

Table I: Radiological features that distinguish rheumatoid arthritis from tubercular synovitis

	Rheumatoid arthritis	Tubercular synovitis
Plain radiographs	No calcifications.	Amorphous calcifications present.
	Erosions of carpal bones present.	Erosions of carpal bones present.
	Soft tissue nodular density present.	Soft tissue nodular density present.
Ultrasound	Nodules do not contain calcifications.	Calcifications may be noted speckled or amorphous.
	Non echogenic rice bodies described in most of the literature.	Non echogenic rice bodies described in most of the literature. Echogenicity noted in rice bodies within large pannus in our case. ?significant.
Magnetic Resonance Imaging	Nodular mass noted and mild tenosynovitis.	Nodular mass noted and marked tenosynovitis.
	Carpal bones may show destructive and increased signal on T2W due to reactive changes.	Carpal bones may show destructive and increased signal on T2W due to reactive changes.
	Rice-body formation has a characteristic appearance on MRI, manifesting as masses of intermediate signal on T1W images and low signal on T2W images.	Rice bodies may be noted in the large areas of synovial fluid.

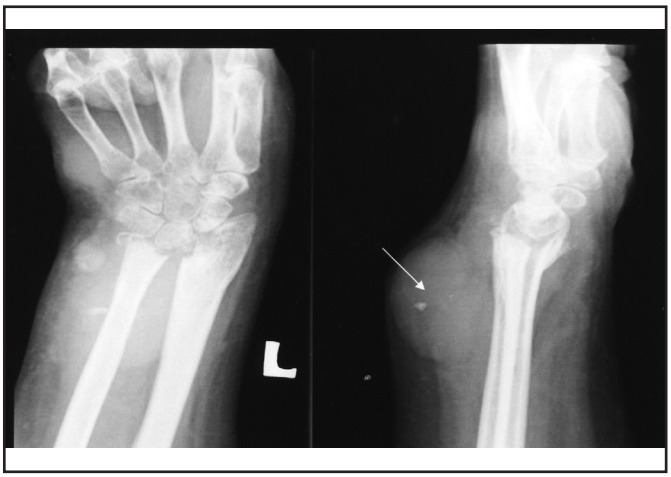

Fig. 1: Radiographs of the left wrist showed severe osteopenia, erosions and destructions of the carpal bones and radiocarpal joint. There was a large soft tissue mass on the distal aspect of the dorsal forearm with small distinct amophous foci of calcification (arrow).

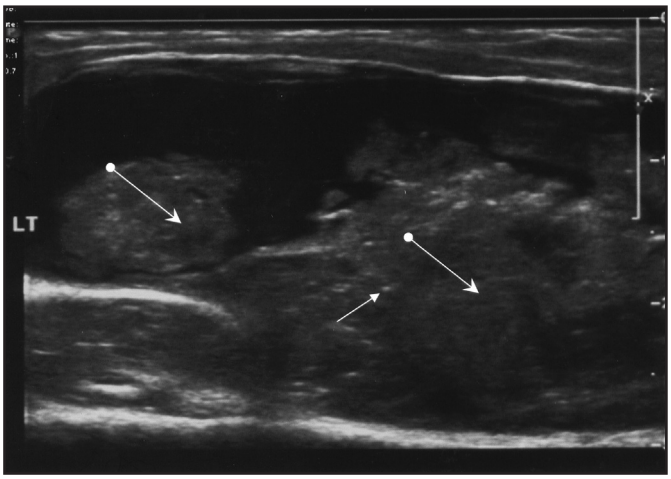

Fig. 2: Ultrasound showed the mass to be composed of solid areas which reflect marked intraarticular pannus formation (arrow with rounded end) and cystic (dotted arrow) components representing fluid which can be variable in nature. The linear hyperechoic densities noted within the pannus are rice bodies (arrow head).

cystic swelling adjacent to the distal ulna contained intermediate signal soft tissue masses and some low signal foci consistent with calcification. These cysts seemed to extend from the wrists and carpal joints. The tendons were not affected.

Complete blood count revealed elevated white blood cell count of 13.8 x 10^9/L with high neutrophil differential count of 92% but low lymphocyte differential count of 5%. ESR was also elevated (36mm/hr). Antinuclear factor was positive. Synovial fluid analysis of the left wrist swelling revealed elevated white blood cell count of 1680/uL. However, no organism was identified.

Following discussion with the orthopaedic surgeons, open tenosynovectomy was performed for this patient as a treatment procedure with the tissue from the pathology site sent for histological assessment. Intraoperatively, joint and tendon destruction were obvious with no anatomical plane identified in the dorsum of the left arm. Soft creamy tissue with numerous "rice bodies" was noted within the synovial tissue and "cheese-like" necrotic materials within the joint and cavitated bone. The histopathology later confirmed the diagnosis of tuberculous synovitis with features of chronic synovitis.

DISCUSSION

Patients with impaired cell mediated immunity are susceptible to Mycobacterium tuberculosis infection, which may be disseminated readily resulting in high mortality rates. Patients with symptomatic human immunodeficiency virus infection and those requiring immunosuppressive therapies, such as post-renal transplant patients, have been reported to be more susceptible to tuberculosis. There have also been increasing reports of patients with rheumatoid arthritis being infected with tuberculosis following treatment using novel biologic agents including tumor necrosis factor-alpha antagonists [1].

A high index of clinical suspicion is therefore more important in identifying patients with latent TB infection [1].

Disseminated and extra pulmonary TB is common among SLE patients. Extra pulmonary and disseminated TB is found to occur in 39.6% of TB episodes [1]. In this case report, we present a patient with TB synovitis who had SLE and was on prednisolone. Prednisolone is a known immunosuppressant even in small quantities. Tuberculous tenosynovitis is not common. It most frequently involves the tendon sheaths of the wrist and hands. The clinical onset is gradual with slowly progressive swelling followed by pain and limitation of movement. Often, the symptoms are so mild that the disease often is well advanced, even of several years duration, before the patient seeks treatment. Commonly cited predisposing factors include age greater than 60 years, low socioeconomic status, malnutrition, alchohol abuse, history of or exposure to tuberculosis, immunosuppression from any cause, and previous local injection of corticosteroid[3]. The two theories regarding the pathogenesis of tuberculous tenosynovitis direct inoculation and hematogenous dissemination from a primary focus [3]. A full examination should thus be conducted to locate other foci as this will result in further progression of the disease if not eradicated completely. Infection appears to start in the synovium and then gradually spread to the tendons and even the bones.

The differential diagnosis in this case is De Quervain's tenosynovitis or tophaceous gout. Diagnosis is more often established after culture of mycobacteria from biopsies or tenosynovectomies. However, culture may take up to 6 weeks to yield any results and is only 50% sensitive.

Tuberculous tenosynovitis may appear in various forms as a result of the long duration of the disease, the varying resistance of the individual, and the varying virulence of the organism. It can be in hygromatous form (earliest stage), serofibrinous form (second stage), or fungoid form (third stage)[3]. Plain radiographs usually show soft-tissue swelling with or without calcification. Osteopenia corresponds to hyperemia. In long-standing cases, the disease process extends beyond the borders of the sheath. Narrowing of the nearby joint space is due to destruction of the articular cartilage by tuberculous pannus, and bone involvement may follow. A radiolucent bone lesion corresponds to a cystic area filled with granulation tissue [3].

Multiple rice bodies are composed of amorphous material surrounded by collagen and fibrin with unknown etiology. Two possible theories of their origin are firstly that they arise from microinfarcted synovium leading to shedding of synovium that subsequently is encased by fibrin derived from synovial fluid. The second theory is that they are due to organisation similar to connective tissues, with the formation of mature collagen, reticulin and elastin. Microscopically, the thickened synovium usually shows chronic, non-specific inflammation without evidence of pannus or granuloma formation.

Rice body formation is most commonly observed in chronic rheumatoid arthritis complicated by florid pannus formation, less frequently observed in seronegative arthropathy and in chronic low-grade synovitis secondary to infections such as tuberculosis. Rice bodies may appear hyperechoic, isoechoic or heterogenous on ultrasound. The MR appearances of rice bodies have been described as iso- or hypointense on T1- and T2- weighted images.

In this patient, the clinical findings were suggestive of rheumatoid nodules, but the radiographic finding of calcification associated with the nodules and marked erosive changes primarily of the radio-carpal joint with sparing of the metacarpal joints led the radiologist to believe that the nodules may not be rheumatoid nodules and suggested an ultrasound and then subsequently an MRI to be performed. In the hygromatous stage, a serous exudate is present. In the serofibrinous stage, there will be thickened synovium, low-signal intensity material in the synovial fluid on T2W images and tendon involvement. Synovial fluid is confined to definite portions of the sheath. In the fungoid stage, there is soft tissue mass formation[3]. The histopathological analysis of the synovial tissue taken following the synovectomy of this patient revealed fibrous tissue with areas of granulomatous inflammation characterized by caseation necrosis surrounded by epithelioid cells, macrophages and Langhans type multinucleated giant cells. These features were inherently suggestive of tuberculosis.

Comparison of imaging findings between rheumatoid and tuberculous synovitis are shown in Table I.

CONCLUSION

There are important lessons in this case. SLE patients are prone to tuberculosis infection due to impaired cellular and humoral immune response. Tuberculous tenosynovitis may mimic rheumatoid nodule. Tubercular infection should be considered as a differential diagnosis of patients with chronic nodular swellings near joints in patient with SLE and chronic synovitis although only low incidences of this condition have been reported. We recommend the use of ultrasound to determine the nature of nodular swellings seen clinically in patients with arthropathy. The presence of echogenic rice bodies within large areas of pannus as noted in our case is not generally reported in literature as associated with either tuberculous or rheumatoid synovitis. Further observation is necessary to see if this sign is more suggestive of infective rather than rheumatoid synovitis. It is important to scan not only the visible nodule but also check the distal tendon sheaths in the hands for changes in the tendon sheaths not visible clinically. In our experience, the yield of histopathology and culture is low from ultrasound guided biopsy of synovial tissue and we thus recommend open tenosynovectomy in our institution.

REFERENCES

1. Mo YM, Yi L, Tak MC. Tuberculosis in Systemic Lupus Erythematosus in an endemic area and the role of Isoniazid prophylaxis during corticosteroid therapy. The J Rheumatology 2005; 32 (4): 609-15.
2. Gaitonde S, Pathan E, Sule A, *et al.* Efficacy of Isoniazid prophylaxis in patients with systemic lupus erythematosus receiving long term steroid treatment. Annals Rheumatic Diseases 2002; 61: 251-53.
3. Jaovisidha S, Chen C, Kyung N.R, *et al.* Tuberculous Tenosynovitis and Bursitis:Imaging Findings in 21 cases. Radiology 1996; 201: 507-13.
4. Lund PJ, Heikal A, Maricic MJ, *et al.* Ultrasonographic imaging of the hand and wrist in rheumatoid arthritis. Skeletal Radiology 1995; 24: 591-96.