CASE REPORT

Glenohumeral joint tuberculosis with multiple cold abscesses: an uncommon cause of shoulder pain

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SUMMARY

The musculoskeletal system involvement of tuberculosis (TB) other than spinal TB is a rare and less-known entity. Furthermore symptoms of musculoskeletal involvement of TB infection are non-specific, relatively slow and indolent. The diagnosis of TB is less considered by clinicians among other common causes of shoulder pain including traumatic and degenerative conditions. We reported a 72-year-old patient suffering shoulder pain for the last 2 years who was diagnosed with glenohumeral joint TB arthritis associated with multiple cold abscesses in adjacent soft tissues; emphasising significant clinical and imaging findings.

BACKGROUND

Tuberculosis (TB) infection is a global public health problem associated with lower socioeconomic levels in developing countries and also with HIV in developed countries and has not yet been taken fully under control.¹ The WHO estimates 8.3 million new TB cases and 1.4 million (1 million HIV positive, 400 000 HIV negative) TB-related deaths have occurred worldwide in 2011. One to three per cent of all patients with TB in Europe have musculoskeletal TB and about half of them are in the form of spinal TB.²⁻³ Musculoskeletal involvement other than spinal TB is a rare and less well-known group.⁴

Symptoms of musculoskeletal involvement of TB infection are quite obscure and non-specific; it is considered less often in the differential diagnosis among common traumatic and degenerative conditions of these regions.

Early diagnosis and early initiation of treatment prevents severe joint damage and surgery. We here share the significant clinical and MRI findings of TB arthritis diagnosed in the late period with multiple cold abscesses in the shoulder girdle muscles because no TB arthritis was considered in the differential diagnosis initially and the right shoulder pain had continued for 2 years.

CASE PRESENTATION

A 72-year-old man was referred to the infectious diseases clinic with symptoms of swelling and a sore in the last 15 days that had been added to right shoulder pain for nearly 2 years. The right shoulder movements and especially abduction and external rotation were restricted and painful on physical examination. Soft tissue swelling around the shoulder and a slight purulent wound on the front part of the axilla were observed. He had been receiving analgesics and antirheumatic drug therapy

from time to time with a diagnosis of rotator cuff tendon tear for nearly 2 years. The patient's medical history revealed a diagnosis of rotator cuff tendon tear for 2 years.

INVESTIGATIONS

The patient was negative in terms of HIV and immunodeficiency. Laboratory tests revealed normal values except anaemia (haemoglobin 7.2 mg/dL) increased erythrocyte sedimentation rate (ESR; 80 mm/h), C reactive protein (8.2 mg/dL) and creatinine (1.69 mg/dL). No active pulmonary TB findings were present. Purified protein derivative was negative and a chest radiograph revealed nothing of significance except calcified nodular opacities in the middle zone of the right lung. *Staphylococcus aureus* and *Staphylococcus haemolyticus* grew in the wound aspiration culture. Anteroposterior (AP) X-ray of right shoulder showed radiolucent areas with sclerosis on the periphery adjacent to the joint in the glenoid and humeral head. Humeral head contours were irregular in appearance, especially in the inferomedial section. Joint space could not be clearly demarcated and the joint surface was irregular and deformed as well. Osteopaenia was present through the humerus. It was also accompanied by soft tissue swelling in shoulder girdle. Millimetric amorphous multiple calcifications were barely seen in the soft tissue swelling in the lower axillary area. A deformity belonging to an old fracture was seen in the right clavicle of the patient. A calcified pulmonary nodule in the right lung middle zone included in the right shoulder AP X-ray was thought to belong to a primary Ghon complex (figure 1). MRI revealed intraosseous abscesses having low signal intensity (SI) in T1-weighted and high SI in proton density sequence (figure 2) consisting of non-vital areas of which the central part did not enhance whereas the peripheral part enhanced with contrast, in the subchondral bone marrow at the level of the humeral head and glenoid (figures 2 and 3). There was relatively less intra-articular effusion. The synovium surrounding the joint was very thick and enhanced intensely (figures 3). The shoulder joint looked expanded in general. Thickening and enhancement of the synovium was observed along the subdeltoid and subacromial bursae. Multiple collections of intermediate intensity with rim-like enhancement (figure 3B) were observed in muscles around the shoulder joint and these were hyperintense peripherally and hypointense centrally on precontrast T1 sequences (figure 3A). There were similar collections within the fatty tissue in the axillary area, some may be due to lymphadenitis. The collection in the

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Figure 1 Anteroposterior plain film of right shoulder is depicting radiolucent areas with sclerotic margins in the subchondral trabecular bone of glenohumeral joint (stars). Irregularity of humeral head and glenoid is causing deformation and irregular widening of joint space. Osteopaenia is also visible in proximal humerus. There is marked swelling of soft tissue in the right shoulder including subtle calcific foci (black arrow) in the axillary pouch. The calcified pulmonary nodule in the right lung is superposed to this image (white arrow). Deformation of joint space and nodular thickening of synovium is being identified clearly.

subcutaneous fat opened to the skin in the anterior axilla through a fistula (figure 2).

Fluid aspiration was performed from the abscess inside the supraspinatus muscle with ultrasonography (US) for microbiological confirmation; no acid-fast bacilli were seen on direct examination. *Mycobacterium tuberculosis* complex grew 4 months later in the aspiration culture. No drug resistance was found.

Figure 2 Proton density with fat saturation sequence of coronal section is revealing joint fluid as well as multiple collections (cold abscesses) in periarticular muscles (black star) those having intermediate signal intensity. Marked thickening of synovium of the joint and subacromial and subdeltoid bursae can be seen as well (white star). There are similar collections in axillary fatty tissue indicating lymphadenitis (white arrows). Black arrow is demarcating subcutaneous abscess draining to the skin.

TREATMENT

The patient was thought to have right shoulder tuberculous osteoarthritis and multiple cold abscess involving the right shoulder girdle muscles according to the MRI findings and anti-TB treatment was started. Isoniazid 300 mg, rifampicin 600 mg, ethambutol 1500 mg and morphazinamide hydrochloride 2500 mg were used for initial treatment. He was then hospitalised in the orthopaedic clinic for debridement on the 15th day after the start of treatment. Debridement was not considered due to the age of the patient and the cardiovascular risk. A total of 12 months of treatment with double anti-TB treatment was planned for the patient 2 months later.

DISCUSSION

Extra-pulmonary TB is 15% of newly diagnosed TB cases and these can involve the lymphatic system, the genitourinary system and the musculoskeletal system.^{1 2} There has been an increase in extrapulmonary forms of TB and it is related with HIV, immunosuppression due to drugs of some disease or transplantations or older population.³ The second most common (30%) form of musculoskeletal system TB after spondylitis is arthritis.³ It appears as slowly progressing monoarthritis in the lower limbs. Pain and swelling of the joint and a decrease in joint movements are observed. Cold abscesses and sinuses are found in the periarticular soft tissues in cases that are diagnosed late. It most commonly involves the hip and knee (each 10%) and more rarely the other joints.²⁻⁴ Joint involvement mostly affects load-bearing joints and shoulder joint involvement is rare. Soler *et al*⁵ reported shoulder joint involvement in only two patients in a series with 18 extraspinal TB cases. Abscess and fistula formation to the skin, especially in neighbouring soft tissues, should suggest joint TB.

TB osteoarthritis should be considered in the differential diagnosis of disorders that cause shoulder pain. ESR elevation is a sensitive but non-specific finding.⁶ Diagnosis was delayed because of the previous rotator tendon tear diagnosis based only on clinical symptoms in our case.

A primary focus is detected in 30% to 50% of osteoarticular TB cases, but concurrence with active pulmonary disease is rare.⁷ The calcified pulmonary nodule in the right lung middle zone in the right shoulder AP X-ray of our patient had demonstrated the concurrence of a primary Ghon complex.

The imaging signs of joint TB are consistent with the pathogenesis of the infection. *Mycobacteria* first elicit a granulomatous inflammatory reaction and then caseification in the tissue they are located in. While inflammation causes reactive hyperaemia, oedema and osteoporosis, the caseous necrosis leads to destruction and abscess formation in the subchondral cortical and trabecular bone tissue.⁸

The first step in the diagnosis of extra-axial osteoarticular TB is direct X-rays but the signs are non-specific. The findings have been defined as Phemister's triad in the literature and consist of juxtaarticular osteoporosis, subchondral erosions and joint space narrowing. Subchondral erosions are seen in the form of well-defined lytic areas on X-ray examination. New bone formation and periosteal reaction are not encountered except in children. The presence of sclerosis in the periphery of the lytic areas suggests that the process has become chronic. Recovery is often in the form of fibrous ankylosis while bone ankylosis is a common finding in septic arthritis. The joint space is affected at a later period than septic arthritis.⁹

A CT is used to show bone destruction, joint destruction and the spread to surrounding structures. A CT is superior in

Figure 3 Precontrast T1 (A) and contrast-enhanced T1-weighted axial images (B) are demonstrating rim-like enhancement of collections (cold abscesses) in periarticular muscles (black arrows) which have high peripheral and low central signal intensity (white arrows). Marked enhancement of synovium along with joint space and bursae is also visible (black stars). Humeral head and glenoid are containing subchondral devitalised intraosseous areas without central enhancement related to intraosseous abscesses (white stars).

demonstrating calcification inside the abscesses.⁷ A US is also valuable in showing soft tissue abscesses and joint effusion and allows histological or microbiological examination with biopsy and aspiration.¹⁰

But MRI is the generally accepted modality for the diagnosis and evaluation of soft tissue involvement in TB arthritis and for other pathologies in the differential diagnosis.¹¹ Bone marrow involvement, joint effusion and cartilage damage, especially in the early stage, can be determined with higher resolution and multiplanar sections. MRI is also highly successful in demonstrating the periarticular collections in the late stage. Synovial fluid is hypointense with a hyperintense rim on a T1-weighted MRI and of intermediate intensity on T2-weighted MRI.^{8–10} Although Soler *et al*⁵ reported a higher rate of intra-articular effusion in TB arthritis, there was little effusion but more synovial inflammation in our case. TB should be considered in the differential diagnosis of arthritis where low or intermediate density effusion is detected in the joint space.^{8–10} MRI can show non-specific oedematous signal changes for hyperintense acute osteomyelitis on T2A and hypointense on T1A in the subchondral bone marrow next to the joint.¹⁰ Periarticular collections in TB are typically of intermediate intensity on T2, with a hyperintense periphery and hypointense centre on T1 and rim-shaped enhancement on SI.^{11–12} The T1 and postcontrast signals were compatible with the literature in our case and showed intermediate intensity on T2 sequences.

Muscle involvement of TB is usually secondary and primary involvement is extremely rare in MRI. It is seen in a single muscle or multiple muscle groups in the literature.^{5–9–13} Multiple cold abscesses were present in all of the shoulder girdle muscles in our case (figure 2). Soft tissue abscesses of TB extend through a less resistance route and spread along the fascial planes and bursae.^{12–13} Sinus tracts that are fistulised to the skin are formed as a result of subcutaneous fat tissue involvement.¹⁰ Positive results of 80% have been reported with synovial fluid aspiration for the diagnosis.¹⁰ However, in this case, the material was so viscous that sampling was unsuccessful.

Beside the expectation of an increase in the incidence of musculoskeletal TB all over the world, it is a serious infection as it has insidious and slowly progressive clinical findings. It is not

easily noticed at the early stage in plain films, it is not usually considered in the differential diagnosis with mechanical and other inflammatory pathologies. It leads to loss of function in the late period. The generally accepted modality in tuberculous arthritis for evaluation of its spread and showing other pathologies for the differential diagnosis is MRI. The fact that monoarticular septic arthritis joint involvement is not isolated but together with collections in periarticular tissues, intermediate densities in the joint effusion, abscesses in subchondral bone and fistulised collections on MRI should alert the clinician in the differential diagnosis.

Learning points

- ▶ The clinical presentation of the musculoskeletal involvement of tuberculosis (TB) is indolent and non-specific.
- ▶ There has been an increase in extrapulmonary forms of TB related with HIV, immunosuppression due to drugs of some chronic diseases, transplantations or older population.
- ▶ TB arthritis should be kept in mind in differential diagnosis of common degenerative and traumatic conditions in the older population.
- ▶ Plain radiographs can demonstrate subtle changes in early stages of the infections.
- ▶ MRI is successful in determining a diagnosis, differential diagnosis and extension of the infection.

Competing interests None.

Patient consent Obtained.

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