Introduction

Tuberculosis (TB) infection is a major public health problem around the world. In recent years, there has been a rise in the prevalence of TB in many parts of Europe due to migration of people from countries that are endemic with TB and various socioeconomic factors. The musculoskeletal system is involved in 1%–3% of the cases, and of these only 50% involve the extraspinal bones and soft tissues.

The association of TB and rheumatologic diseases is bidirectional. In this association, Mycobacterium tuberculosis (MTB) can directly infect the musculoskeletal system. Further, patients with rheumatologic diseases are predisposed to develop TB due to the immunosuppressive state, the disease itself, or drug-induced immunosuppression.

Direct manifestations of TB musculoskeletal involvement include spondylitis, septic arthritis, osteomyelitis, myositis, bursitis, subcutaneous abscesses, or tenosynovitis. Immunologic reactions such as reactive arthritis (Poncet's), erythema nodosum, erythema induratum, or secondary amyloidosis may also manifest as a tubercular rheumatism. In addition, drugs used in the management of TB can also lead to arthropathy or tendinopathy, especially with the use of rifampin or fluoroquinolones, drug-induced lupus (DILE) by isoniazid or rifampin, and arthralgias and gout due to pyrazinamide.

Secondary musculoskeletal manifestations of tuberculosis: An observational study
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ABSTRACT

Background: Data of musculoskeletal manifestations of tuberculosis (TB) are limited to case reports, series, or retrospective studies. Therefore, we conducted this study to create awareness among doctors about musculoskeletal manifestations of TB. Materials and Methods: This was a prospective observational study conducted at a referral TB Hospital in North India in September and October 2016. The aim of our study was to study musculoskeletal manifestations of TB. We included patients who had active TB as per the World Health Organization 2010 criteria. Patients with other chronic illnesses were excluded. A detailed history, examination, and appropriate investigations (blood, urine, serological, and radiological) of the 100 consecutive patients fulfilling the inclusion criteria were recorded. Results: The mean age of patients was 32.16 ± 12.93 years. Male-to-female ratio was 43:57. The mean duration of disease was 6.85 ± 8.83 months. Of the 100 patients, 60 (60%) had pulmonary TB. The mean duration of antitubercular therapy was 1.79 ± 1.34 months. Fibromyalgia was classified in 21 (21%) patients, polyarthralgia was seen in 9 (9%), Pott’s spine in 7 (7%), osteomyelitis in 4 (4%), and scleritis in 2 (2%) patients. Uveitis, tenosynovitis, erythema induratum, subcutaneous abscess, and dactylitis were seen in 1 (1%) patient each. In 21 patients who had fibromyalgia, 11 developed fibromyalgia with the second episode of TB amounting to 60.75% patients. Conclusion: This is the first prospective study to look at the musculoskeletal manifestations of TB. Patients with active TB were found to have various rheumatological manifestations.

Keywords: Fibromyalgia, osteomyelitis, Poncet’s, Pott’s spine, rheumatology, Tuberculosis, uveitis

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fibromyalgia or chronic pain syndrome may be a manifestation of TB.

These rheumatological or musculoskeletal manifestations may be the presenting symptoms of TB. TB is a common illness in developing country like India, and if not detected at an early stage, it may lead to increased morbidity and mortality. Thus, it is important to have knowledge about these musculoskeletal manifestations for the treating doctors. Data of musculoskeletal manifestations of TB are limited to case reports, series, or retrospective study. To our knowledge, there is no prospective study addressing this issue. Therefore, we conducted this study to create awareness among doctors about musculoskeletal manifestations of TB.

Materials and Methods

It was a prospective observational study which was conducted at Rajan Babu Tuberculosis Hospital, Kingsway Camp, New Delhi, in the months of September and October 2016. Consecutive patients from outpatient and inpatient department of pulmonology were recruited irrespective of the duration of antitubercular therapy.

We included patients who were a confirmed case of active TB as per World Health Organization 2010 criteria.[14] Patients with chronic illness except TB were excluded.

Patients fulfilling the inclusion criteria were recruited for the study. A detailed history, examination, and appropriate investigations (blood, urine, and radiological) of the 100 consecutive patients fulfilling the inclusion criteria were recorded.

Musculoskeletal manifestations of TB which were looked at in patients are summarized in Table 1.

Diagnosis of Poncet’s disease was made clinically by oligo or polyarticular involvement in the presence of TB.[8,15] The classification of fibromyalgia was made by American College of Rheumatology 1990[17] classification criteria for fibromyalgia.

The patient was classified as gout according to American College of Rheumatology–European League Against Rheumatism 2015 classification criteria for Gout.[18]

The patient was classified as DILE in the presence of lupus-like symptoms (commonly fever, musculoskeletal involvement, and serositis) which was temporally related to continuous drug exposure (>1 month) which resolves with cessation of the offending drug and the patient may have positive antinuclear antibody and anti-histone antibodies with negative antibodies to dsDNA.[19]

The diagnosis of the rest of musculoskeletal manifestations was clinical, microbiological, radiological, histopathological, joint aspiration, ophthalmological, or serological depending on the manifestation.

Statistical analysis

Age and duration of disease are represented as mean ± standard deviation.

Results

The prospective study was carried out at Rajan Babu Tuberculosis Hospital. Consecutive patients who presented to the inpatient and outpatient department of respiratory and TB department were recruited. Those patients who fulfilled the inclusion and exclusion criteria were included in the study. The baseline characteristics of the study cohort are shown in Table 2. Many patients were found to have rheumatological manifestations. Table 3 shows rheumatological manifestations in patients with TB.

Rheumatological manifestations such as septic arthritis, DILE, Poncet’s arthritis, tendinopathy, amyloidosis, gout, erythema nodosum, and myositis were not seen in any patient.

Fibromyalgia was classified in 21 (21%) patients. Of these 21 patients, 11 patients developed fibromyalgia in patients with second episode of TB amounting to 60.75% patients developing

| Table 1: Musculoskeletal manifestations of tuberculosis |
|--------------------------------------------------------|
| Spondylitis                                             |
| Septic arthritis                                       |
| Osteomyelitis                                          |
| Myositis                                               |
| Subcutaneous abscesses                                 |
| Tenosynovitis                                          |
| Gout                                                   |
| Poncet’s disease                                       |

| Uveitis                                                 |
|---------------------------------------------------------|
| Tendinopathy                                           |
| Reactive arthritis                                     |
| Erythema nodosum                                       |
| Erythema induratum                                     |
| Amyloidosis                                            |
| Drug-induced lupus                                     |
| Fibromyalgia or chronic pain syndrome                   |
| Arthralgia                                              |

| Table 2: Baseline characteristic of the study group     |
|---------------------------------------------------------|
| Parameters                                              |
| Age in years (mean±standard deviation)                  |
| Male:female                                            |
| Disease duration in months (mean±standard deviation)    |
| Tuberculosis type                                       |
| Pulmonary                                               |
| Pleural                                                |
| Abdominal                                              |
| Cervical Lymphadenopathy                               |
| Pott’s spine                                           |
| Others*                                                |
| Episode of tuberculosis                                |
| First episode                                          |
| Second episode                                         |
| ATT category                                           |
| Category I                                             |
| Category 2                                             |
| Modified ATT                                           |
| Duration of ATT in months (mean±standard deviation)     |

**ATT, antitubercular therapy; *Eye tuberculosis (uveitis), breast lump**
of fibromyalgia who had second episode of TB. Of these 21 patients of fibromyalgia, 12 were female.

**Discussion**

Our study is the first prospective study of its kind to look at rheumatological manifestations in patients with active TB. Fibromyalgia is the second most common rheumatic disease. The prevalence is from 2% to 8% of the population depending on the diagnostic criteria used. Fibromyalgia may also occur with other chronic diseases such as osteoarthritis, rheumatoid arthritis, and lupus. Prevalence of fibromyalgia ranges from 10% to 30% in patients with chronic rheumatic disorders. TB is a chronic infection. In our patients with active TB, fibromyalgia was seen in 21% of patients with 60.75% with second episode of TB developing fibromyalgia. There has been no study which has evaluated the incidence or prevalence of fibromyalgia in patients with TB.

Pott’s spine is a common form of extrapulmonary TB. Around half the cases of skeletal TB are Pott’s spine. In total, 1%–2% of total TB cases are attributable to Pott’s disease. In our cohort, Pott’s spine was seen in 7% of patients with 2% having only Pott’s spine and the remaining 5% having pulmonary TB with Pott’s spine.

Polyarthralgia was observed in 9 (9%) of our study cohort. Arthralgia can be caused by antitubercular drugs as isoniazid and pyrazinamide. All our patients who developed polyarthralgia were on isoniazid or pyrazinamide.

Osteomyelitis was seen in 4 (4%) patients. Tubercular osteomyelitis occurs in 1%–2% of all cases of TB and 10% of all cases of extrapulmonary TB.

Scleritis was seen in 2 (2%) of our patients. Donahue found 1.4% ocular TB in 10,000 patients with primary pulmonary TB in the United States. In a study recently reported at Sri Lanka of the total of 2130 patients with TB, ocular TB was diagnosed in 23 patients among whom episcleritis and inflammatory scleral nodule were observed in 1 patient each.

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**Conflicts of interest**

There are no conflicts of interest.

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