Multifocal Skeletal Tuberculosis Mimicking Metastatic Bone Disease: A Dilemma on Bone Scintigraphy

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ABSTRACT

Objective: **Multifocal skeletal tuberculosis is a rare condition in immunocompetent patient even in a tuberculosis endemic area. Diagnosis of such atypical cases is challenging to the physicians and treatment is delayed in majority of cases. The objective of this case report was to present a patient with tuberculosis with skeletal lesions.**

Case report: **A case of 60 years male was presented – with bony pain. His 99m Tc methylene diphosphonate (MDP) scan showed multiple foci of increased radiotracer resembling a metastatic bone disease. However, aspiration cytology and biopsy from the focal lesions and subsequent therapeutic response to anti-tubercular treatment indicated that the lesions were from tubercular infection.**

Conclusion: **Multiple bony lesions from tuberculosis may mimic metastatic lesions in bone scan.**

Key words: **Musculoskeletal tuberculosis, multifocal skeletal tuberculosis, multifocal osteoarticular tuberculosis.**

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INTRODUCTION

Tuberculosis, a potentially fatal contagious disease, with a wide spectrum of clinical manifestations and radiological features can affect almost any part of the body. Osteoarticular tuberculosis is uncommon, constituting about 2% of all tuberculosis cases (1). Osseous tuberculosis can be presented with unifocal or multifocal bony involvement, where multifocal bony involvement accounting for only 10% of all skeletal cases approximately, even in tuberculosis endemic areas (1,2). Hematogeneous spread from any primary focus as lungs, cervical lymph nodes, tonsils or gastrointestinal tracts may be the cause of multifocal skeletal lesions. But tuberculosis with multiple bony involvements is extremely rare in immunocompetent patients (3, 4). Since patients with multifocal skeletal tuberculosis may have atypical presentations or vague wide range of symptoms, it is difficult for the physicians to diagnose this condition.

A ^{99m}Tc MDP bone scintigraphy is one of the most sensitive methods to detect metastatic focal lesions of skeletal system. This imaging technique can also detect physicochemical changes secondary to any infection or inflammation which makes this technique sensitive for early detection of such pathological conditions (5).

Here, we report a case where we faced a dilemma in diagnosis of multifocal skeletal tuberculosis in a 60 years old male patient, mimicking multiple secondary osseous metastases on ^{99m}Tc MDP bone scintigraphy.

CASE REPORT

A 60 years old man of low socio-economic condition from northern part of Bangladesh presented with a one year history of diffuse pain in back and chest. He also complained about pain for one month in left thigh including left hip and knee joints which was progressively increasing and restricting movements of affected side. He also complained of being unwell and decreased appetite. He was primarily treated with analgesic drugs prescribed by local doctors and had poor clinical response. There was no history of cough, low grade fever or exposure to tuberculosis. The patient had previous history of immunization against tuberculosis. On physical examination, there was no

obvious swelling but tenderness at upper thoracic spine, thoracolumber region, sternum and left hip and knee joint. No neurological abnormality is detected.

Laboratory tests showed an increased erythrocyte sedimentation rate of 54 mm in the first hour (normal range 0-15 mm in 1st hour) and elevated C reactive protein (CRP) of 35.8 mg/L (normal value 0-10 mg/L), normal total cell count as well as differential cell count. Ultrasonographic examination of abdomen revealed mildly enlarged prostate gland with a volume of about 29 cc. Serum tumor marker PSA was within normal range. X-ray of thoracolumber spine, chest and pelvis were normal. ^{99m} TcMDP scan showed multiple foci of increased radiotracer in manubrium sterni, both shoulder joints, upper part of both humeri, thoracic 3rd and 4th vertebral spines, left sacroiliac joint and lower part of right femur (Figure 1). A fine needle aspiration cytology (FNAC) from the manubrium sterni and biopsy from 4th thoracic vertebral spine, the corresponding site of abnormal focus on bone scan, showed evidence of caseous granuloma suggesting tuberculosis but no malignant cell. A therapeutic trial of antitubercular drugs was started to which the pain responded within one month.

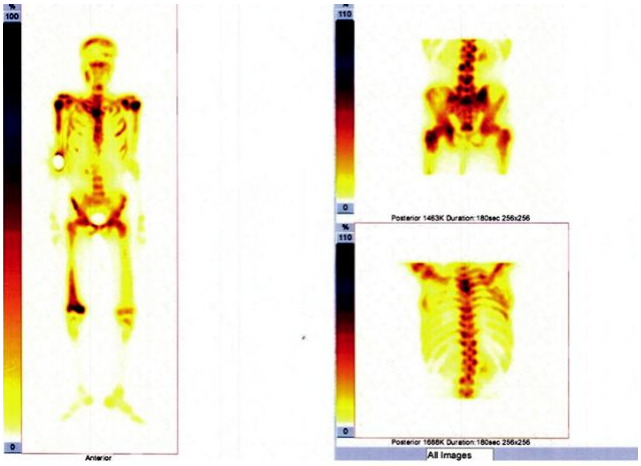

Figure 1: ^{99m} TcMDP scan in AP view and two other spot views showing multiple foci of increased radiotracer in manubrium sterni, both shoulder joints, upper part of both humeri, thoracic 3rd and 4th vertebral spines, left sacroiliac joint and lower part of right femur

DISCUSSION

Tuberculosis, a common infectious disease particularly in developing countries, can occur at any age and can affect almost any part of the body and might be a cause of mortality or morbidity if not treated properly. Skeletal localization of tuberculosis is relatively rare. The prevalence of skeletal tuberculosis is about 1-2% of all tuberculosis infections and about 15% of all extra-pulmonary tuberculosis infections (1,6). The common sites of skeletal tuberculosis are skull, axial skeleton, shoulders and pelvic regions in adults and metaphyseal region of long bones and vertebral column, specially thoracic and lumber spine in children (7). Skeletal tubercular lesions are usually unifocal. Multifocal tubercular lesions that can occur simultaneously at two or more locations account for 13% of all skeletal tuberculosis (6). In this case, the 62 years old patient was suffering from multifocal skeletal tuberculosis affecting sternum, both shoulder joints, upper part of both humeri, thoracic 3rd and 4th vertebral spines, left sacroiliac joint and lower part of right femur.

Reactivations of the latent foci that are seeded during the primary episode or hematogenous/lymphatic spread from reactivated pulmonary or extra-pulmonary foci are thought to be the main pathology of osteoarticular tuberculosis (8). Again it is reported that multifocal form of osseous tuberculosis is usually associated with pulmonary tuberculosis where a suppressed host immune response is a predisposing factor. Multifocal osseous tuberculosis is extremely rare in non-immunocompromised patient and in those with normal pulmonary finding even in tuberculosis endemic area (4). In this rare multifocal skeletal tuberculosis case, our patient was from northern part of Bangladesh ranking sixth among 22 high tuberculosis burden countries according to World Health Organization. But he had no pulmonary symptom or any past history of pulmonary tuberculosis. His chest X-ray was normal.

To prevent a missed or delayed diagnosis of such a rare condition several observations of different authors should be considered. Firstly, in almost every cases of osteoarticular tuberculosis patients presented with pain. There may be no other associated symptoms. Fever, weight loss, night sweat and other symptoms may appear at late stages of musculoskeletal tuberculosis (9). So, a physician should consider the possibility of musculoskeletal tuberculosis in case of long term musculoskeletal pain without any history of fever or any other systemic sign symptoms. In our case, the patient had a long (one year) history of diffuse pain in back and chest and a short history of pain (for one month) in left thigh including left hip and knee joints which was progressively increasing and restricting movements of affected side, which supports the previous observations.

Increasing CRP and ESR level, although having low specificity are considered as potential marker for tuberculosis patient (10, 11) and CRP is also a good marker to indicate the response of antitubercular treatment (11). In our patient both ESR and CRP values were above normal range.

Multifocal skeletal tuberculosis has a similar imaging appearance as metastatic bone disease in radiology. So, imaging examinations are not sensitive for differentiation for multiple bone metastasis and multifocal skeletal tuberculosis. They even may appear as normal in early stage of bony tuberculosis. MRI is more sensitive test for musculoskeletal tuberculosis but its imaging appearance can also be misjudged in case of multiple foci or non-contiguous vertebral involvement (12). Nuclear medicine techniques as Tc-99m MDP bone scintigraphy and FDG-PET, on the other hand are very effective in early detection of chronic infections when radiology is negative and non-specific symptom of bone involvement. Though non-specific tests they can provide early detection of pathological sites and thereby guide to further diagnostic tools as biopsy, FNAC etc (13). Since Tc-99m MDP scintigraphy is easily available, less expensive and has less radiation hazards it can be considered as a valuable diagnostic procedure for evaluation of multifocal bone tuberculosis. In this case, X-rays of thoracolumber spines, chest and pelvis are normal. Then the patient was referred to nuclear medicine institute for Tc-99m MDP bone scan that showed multiple bony foci of increased radiotracer concentration which resembles to secondary metastatic bone lesions. As abdominal ultrasound scan of the patient showed mildly enlarged prostate gland, serum PSA level was done to exclude/confirm any primary lesion. We found the PSA level normal and recommended the patient for FNAC from the pathological site.

FNAC and bone or soft tissue biopsy play an important role to make a definite diagnosis. In case of musculoskeletal tuberculosis the possibility of detecting mycobacterium may be less than 50% due to low bacterial load to the site of lesion (14). For this reason, few researchers suggest multiple biopsies to be performed (9). In this case at first fine needle aspiration cytology (FNAC) from the manubrium sterni was done and then another biopsy from 4_{th} thoracic vertebral spine at the site of abnormal focus on bone scan was performed. Both the tests showed evidence of caseous granuloma suggesting tuberculosis but no malignant cell.

T-SPOT and PCR (polymerase chain reaction) are also suggested as two effective diagnostic tools to detect tuberculosis by few authors. T-SPOT has the sensitivity rate of 69-83% and specificity of 52-61% (15). PCR has higher sensitivity and specificity (16). In this case these tests were not done.

Antitubercular chemotherapy is the choice of treatment for musculoskeletal tuberculosis. Even therapeutic response to antitubercular treatment has been widely accepted modality of diagnosis of tuberculosis(13). Surgery is needed only if any neurological deficit or spinal instability (4). We referred our patient to the DOTS (directly observed treatment short course) corner of medical college

hospital for antitubercular therapy and a good clinical response to the antitubercular chemotherapy was reported after 1 month.

CONCLUSION

Musculoskeletal tuberculosis often creates a diagnostic challenge due to its non-specific clinical picture and confusing imaging appearances. Multifocal skeletal tuberculosis should be one of the important differential diagnoses of multiple destructive bone lesions found in bone scanning. There should be clinical, biochemical and histopathological correlation to reduce the probability of image misdiagnosis.

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