Extra spinal osteoarticular tuberculosis: a case series of 66 patients from a tertiary care hospital in Karachi

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Abstract

The demographic, clinical and laboratory data of patients diagnosed as extra-spinal osteoarticular tuberculosis, presenting at Department of Orthopaedic Surgery, Abbasi Shaheed Hospital, Karachi Medical and Dental College, Karachi, between December 2006 and January 2009 were analysed.

There were 66 patients registered for the study. Forty four (66.66%) patients were females. The mean age was 26.5±13.5 years. Swelling and pain were the commonest symptoms. Knee and hip were the most frequent sites involved. The mean time to diagnosis was 12.32±18 months (range =2- 96 months). Six (09.09%) patients had history of previous pulmonary kochs. Nine (13.63%) had concurrent pulmonary and 1(01.51%) had concurrent intestinal kochs. The average first hour ESR was 48mm/h (16-102). Manteoux test was positive in 26/42 patients. Acid Fast Bacilli (AFB) stain was positive in 1/25 while culture was positive in 7/ 25 specimens. There was 1(14.28%) case of MDR tuberculosis.

Most of the patients (95.45%), were diagnosed on positive histopathology report of involved tissues showing chronic granulomatous reaction with caseous necrosis.

Keywords: Osteoarticular tuberculosis, Musculoskeletal tuberculosis.

Introduction

Tuberculosis (TB) is still a serious health problem in the developing countries, which accounts for 95% of worldwide TB cases and 99% of worldwide TB mortality. Pakistan is one of the countries with high burden of tuberculosis, with a prevalence of 181/100,000.[1] Musculoskeletal TB represents 1-3% of all the cases of TB. It was previously considered as a rare extra pulmonary manifestation of tuberculosis (EPTB), accounting for only 10-18% of all extra pulmonary cases, but the recent studies have reported it to represent 27- 35% of all extra pulmonary cases and also the most common site of extra pulmonary involvement.[2] EPTB reports in Pakistan range from a quarter of all TB patients, presenting to a hospital in Rawalpindi, to a third of TB patients visiting General Practitioner (GP) clinics in Karachi and the frequency of EPTB cases by site has been reported highest in lymph nodes (35.6%), and spine (26.3%), followed by Central Nervous System (CNS) (18%), abdomen (18%), extra spinal skeletal system (18%), pericardium (3%), breast (3%), pleura (2%) and others.[1] The spine is involved in 50% cases while rest 50 % cases are of extra spinal osteoarticular TB. Signs and symptoms of osteoarticular tuberculosis are frequently nonspecific which overlaps with several infectious and non-infectious diseases such as rheumatoid arthritis, septic arthritis, chronic osteomyelitis and metastasis. The latency period of these bacteria can persist up to several years after the initial infection and majority of patients do not show concurrent pulmonary disease. Hence, the disease is difficult to diagnose and it may damage the joints or cause spinal cord compression resulting in paralysis.[3] Therefore, it is very important to maintain a high degree of clinical suspicion. Though the diagnosis in endemic areas can be made on clinical and radiological examination; however, the tissue diagnosis is mandatory. If diagnosed and treated early approximately 90-95% of patients would achieve healing with near normal function.[4]

The numbers of tuberculous cases is continuing to grow in Pakistan due to population growth, poor socioeconomic circumstances and inadequate treatment. Many cases of osteoarticular tuberculosis presenting to clinicians, either remain undiagnosed or are diagnosed late, therefore, bone and joint destruction is advanced.We collected and analyzed the demographic, clinical and laboratory data of patients with tuberculous osteoarticular involvement and those have been presented here to highlight this disease as a real entity. Awareness of these features help clinicians in early diagnosis and management of the disease.

Case Series

This case series was conducted at the department of orthopaedic surgery; Abbasi Shaheed Hospital, Karachi

Medical and Dental college, Karachi, from December 2006 to January 2009. Patients of all age and sex with bone and joint tuberculosis diagnosed on either of the following two criterias are included in the study.

1- Demonstration of AFB by Ziehl Neelsen (ZN) staining and/or culture of clinical specimen inclusive of pus, synovial fluid or tissues.

2- Biopsy of affected site showing granulation reaction with central caseation necrosis.

Patients with spinal tuberculosis were excluded from the study. All the patients presenting in our outpatient clinics or the patients admitted in orthopaedic ward with clinical signs and symptoms and X-rays findings suggestive of osteoarticular tuberculosis were initially included in the study. These were patients with chronic monoarticular arthritis, chronic discharging sinuses around joints, pathological fractures and metaphyseal osteolytic lesions. The differential diagnosis included tumours, tumour like conditions and rheumatoid arthritis. A written informed consent was taken by all the patients or their care provider for inclusion in the study. A detailed history regarding general biodata, presenting symptoms , prior treatment, concurrent illness, past history of tuberculosis and its treatment, family contact, socioeconomic status of the patient, was taken. Findings were noted in a predesigned proforma. General and local examination of involved joint/bone was done to note the site, swelling, tenderness, sinus discharge, ulcer, and mobility, regional and systemic lymph nodes. Chest and abdominal examination was done to rule out their involvement by tuberculous infection. Baseline investigations included Haemoglobin, total leukocyte count (TLC), differential leukocyte count, Erythrocyte sedimentation rate (ESR), anteroposterior and lateral radiographs of involved joint or bone. Mantoux test (MT) was done by using 2 PPD units. An induration of more than 9 mm developing after 48 to 72 hours was read as positive. CT scan, MRI scan and Radioisotope bone scan were performed in those cases, when found necessary for diagnosis. In patients with obvious swelling or joint effusion, fine needle aspiration was performed and subjected to gram stain and C/S(culture and sensitivity), AFB stain and C/S culture, and detailed report (D/R). In all other cases, curettage and biopsy of bony lesion and synovial biopsy of the joint lesion were taken and sent for AFB culture/sensitivity and histopathological examination. Patients diagnosed as osteoarticular tuberculosis according to the aforementioned criteria were finally selected for the study. Multifocal disease was defined as two or more non-contiguous simultaneously occurring lesions involving bones and/or joints. Multidrug resistant tuberculosis (MDR TB) was defined as the disease caused by tuberculous bacilli resistant to both Rifampicin and Isoniazid (two key first line drugs) on culture and sensitivity report. Extensive drug resistant tuberculosis (EXDR TB) was defined as multidrug resistant tuberculosis that is also resistant to at least three of the six classes of second line antituberculous drugs. The data was entered and analyzed on SPSS version 10.0 statistical software . Descriptive analysis was done on the data. Mean±SD was calculated for quantitative variables like age of patients recorded in years, Hb level, ESR etc . Frequency and percentages was claculated for qualitative variables like age groups in years, symptoms, site of lesions, diagnostic test results and gender.

Results

There were 66 patients registered with confirmed extraspinal osteoarticular tuberculosis according to aforementioned diagnostic criteria. Forty four(66.66%) patients were females and 22(33.33%) were males. Table-1 shows the age distribution of 66 patients. The mean age was 26.5±13.5. Sixty two (93.93%) patients were under 40 years. Swelling and pain were the commonest symptoms (Table-2). The sites of involvement by Mycobacterium tuberculosis have been shown in Table-3. Knee 10 (15.15%) and hip 9(13.63%) were the most frequent sites involved, followed by ankle (10.60%), and elbow (09.09%). There was no case of multifocal involvement and no recurrent lesion in this study. The mean time to diagnosis (from onset of symptoms till positive biopsy or culture report, was 12.32±18 months (range =2- 96 months).

Ninety percent patients belonged to poor socioeconomic class. Family history of tuberculosis in first degree relatives was present in 12(18.18%) patients. Six (09.09%) patients had history of previous pulmonary Kochs, while 9(13.63%) had concurrent pulmonary and 1(01.51%) had concurrent intestinal Kochs. The average first hour erythrocyte sedimentation rate (ESR) was 48±30 mm/h (16-102), averageHb was 11.07 and TLC count was within normal limits in all patients. Main radiological findings were lytic lesion in the affected bony areas, periarticularly in osteopenia, erosion of articular surface of affected joints and soft tissue swelling (Figure-1a and 1b). Short bones of hand and foot were presented with typical fusiform expansion of bone with septation and cortical thinning, the so called spina ventosa lesion (Figure; 2a and

Table-1: Age distribution of 66 patients.

Age group(years)	No. of cases	Percentage (%)
<20	26	39.39
21-40	36	54.54
41-60	01	01.51
>60	03	04.54

Table-2: Presenting symptoms in order of frequency.

Symptoms	No. of cases	Percentage (%)
Swelling and pain	30	45.45
Discharging sinus	13	19.69
Painless Swelling	08	12.12
Pain alone	08	12.12
Non healing ulcer	04	06.06
Limp	03	04.54

Table-3: Site of lesions in order of frequency.

S. No	Site	No. of cases	Percentage (%)
1	Knee joint	10	15.15
2	Hip joint	09	13.63
3	Ankle joint	07	10.60
4	Elbow joint	06	09.09
5	Tarsal bones(foot)	04	06.06
6	Metatarsals(foot)	04	06.06
7	Humerus diaphyses	03	04.54
8	Wrist	03	04.54
9	Phalanges (toes)	03	04.54
10	Phalanges (fingers)	02	03.03
11	Tibial plafond	02	03.03
12	Ileum	02	03.03
13	Calcaneus	02	03.03
14	Lateral malleolus(tibia)	01	01.51
15	Greater trochanter (femur)	01	01.51
16	Sternum	01	01.51
17	Medial condyle (humerus)	01	01.51
18	Tibial plateau	01	01.51
19	Olecranon	01	01.51
20	Radial head	01	01.51
21	Distal radius	01	01.51
22	Medial malleolus(tibia)	01	01.51

Table-4: Diagnostic test results of 66 patients.

Investigation	No. of patients(n)	Positive result	Negative result
Histopathology	63(95.45%)	63(95.45%)	0
AFB stain	25(37.87%)	01(01.51%)	24(36.36%)
AFB C/S	25(37.87%)	07(10.60%)	18(27.27%)
MT	42(63.63%)	26(39.39%)	16(24.24%)

AFB: Acid Fast Bacilli;
C/S: Culture and Sensitivity.
MT: Mantoux Test.

2b). Manteoux test (M.T) was positive in 26/42 patients (Table-4).

Procedures performed to achieve sample (fluid/tissue) for AFB staining, culture and histopathology were curettage in 32(48.48%) patients, synovial biopsy in 13(19.69%), incision and drainage in 11(16.66%) and simple aspiration of pus/synovial fluid in 10(15.15%) patients. AFB stain and culture/sensitivity (c/s) results were available for 25 specimens. AFB stain was positive in only

Figure-1a: Clinical appearance of tuberculous arthritis knee. Note swelling, erythema and discharging sinus.

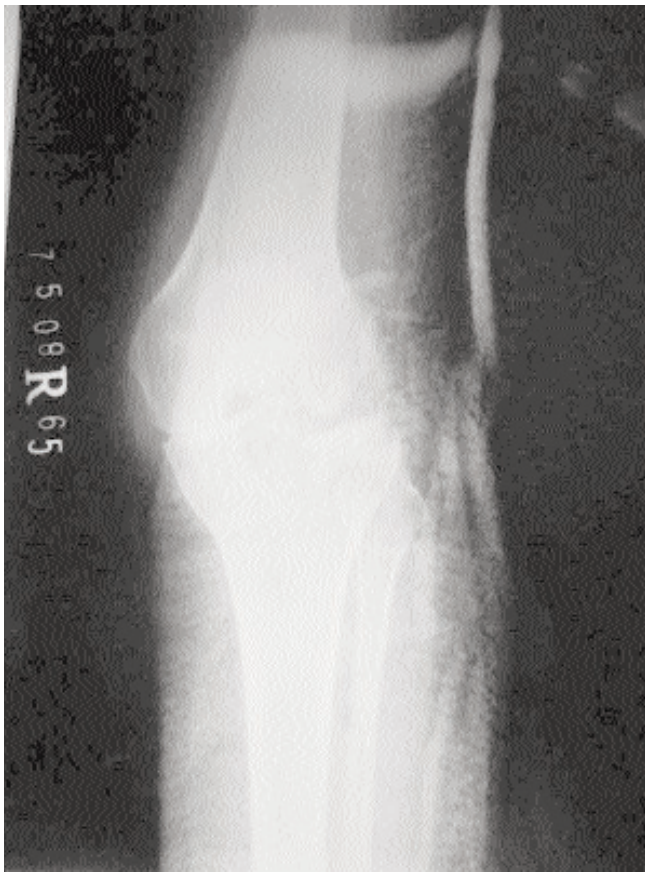

Figure-1b: Anteroposterior radiograph of same knee showing marked destruction of articular surfaces of both femur and knee by the tuberculous infection.

1(4%) case, while culture was positive in 7(28%) out of 25 specimens. There was 1(14.28%) case of multidrug resistant tuberculosis and no case of extensive drug resistant

Figure-2a: Tuberculous dactylitis presenting as fusiform swelling of finger with ulceration.

Figure-2b: Anteroposterior radiograph of same patient showing typical spina ventosa lesion involving proximal and middle phalanges of middle finger.

tuberculosis. Majority of patients, 63(95.45%), were diagnosed on positive histopathology report showing chronic granulomatous reaction with caseaous necrosis. Only 3(4.91%) patients were diagnosed on positive culture and sensitivety report alone.

All patients were treated with standard four drug regimen: isoniazid, rifampicin, ethambutal and pyrazinamide for initial phase of 2 months, followed by at least 10 months of continuation phase with three drugs: isoniazid, rifampicin and ethambutol. The involved joint/bone was splinted till the inflammatory phase subsided. Thirty four (51.55%) out of 66 patients completed the chemotherapy during the study period. All of these achieved good functional results with restoration of bone/joint functions except one patient who was marked knee destruction at diagnosis. This patient was treated surgically by knee joint fusion (arthrodesis).

Discussion

Tuberculosis is still a major cause of significant morbidity and mortality despite universal availability of effective chemotherapy. Sixty six cases of extraspinal osteoarticular tuberculosis diagnosed in a very short duration, indicates a high prevalence of the disease, albeit thought a rare entity.

Majority of patients in the study were young. The mean age in white patients is higher than those of Indian origin.[4] Females were affected more than males (male to female ratio= 1:2). This is in accordance with other local studies on tuberculosis and may reflect a poor nutrition among females in our male dominated society.[1,5] As in the study, the most common presenting symptoms of osteoarticular tuberculosis were pain and swelling of affected part.[6] After the spine, weight bearing joints of lower limb like knee, hip and ankle are the most frequent sites involved by osteoarticular tuberculosis.[7] This is also reflected in the study. There were only 3 cases of humeral diaphyseal osteomyelitis; otherwise all other cases were involving joints or metaphyseal region of bone near joint, the so called osteoarticular involvement-typical of tuberculosis. Isolated bony involvement sparing joints is a rare entity.[7] Among the foot cases, midtarsal joints were frequently involved, while in a large series of foot and ankle tuberculosis, Calcaneus was involved frequently, followed by midtarsal joints.[8] As in our study, the delay in the diagnosis of osteoarticular tuberculosis is very common. Researchers report mean delay of 5 to 12 months in its diagnosis.[1,4,6,9] This may be due to non specific clinical manifestations of the disease, poor awareness of treating physicians and lack of a rapid microbiological diagnostic method.[3,9] Significant predisposing factors in the study were poor socioeconomic status (90%), household contact (16.39%), concurrent pulmonary/ intestinal kochs (14.74%) and previous pulmonary tuberculosis (8.19%). Concurrent pulmonary tuberculosis occurs in 12-50% of the patients. From the available, skin sensitivety test (MT) results, only 65.78% were positive, although it remained an important diagnostic tool, several reports noticed variable percentages

of false negative skin tests, which might be due to extensive illness that provoked lack of reactivity on skin tests.[3,9] The ESR, although typically elevated, can be normal and peripheral leucocytes count is usually normal. Radio logically metaphyseal infection (osteomyelitis) presented with typical osteolytic areas abutting joint articular surfaces. Tuberculous arthritis of early stages presented with nonspecific findings like osteoporosis and soft tissue swelling. The radiographic features of cystic expansion of the short tubular bones of hand and feet are termed as "spina ventosa". Though this lesion is typically found in tubercular dactylytis in children,[10] but found among the adult patients as well.

The studies report sensitivety of AFB staining in the range of 25-75% and AFB culture-sensitivety from 19-80%, while histopathological diagnosis of osteoarticular tuberculosis has been reported and it ranges from 72-97%.[9,11] In the series, AFB smear and culture-sensitivity were positive only in 4% and 28% cases respectively while more than 90% of the cases were diagnosed on positive histopathology report. As the disease is paucibacillary, a positive AFB smear is rare , so the diagnosis usually is confirmed by obtaining granulomatous tissues on biopsy.[12] Tissues taken for histopathology should also be sent for AFB stain and AFB culture and sensitivity, to rule out MDR and XDR tuberculosis.

Longer duration of chemotherapy, at least 12 months, is recommended for bone and joint tuberculosis.[1,10] In majority of cases, good healing and restoration of function are achieved with chemotherapy alone. However, the late diagnosed, advanced- staged lesions may result in permanent restriction of joint movements, which may need surgical joint fusion or replacement.

Conclusion

Osteoarticular tuberculosis is common in females. Any joint of body can be involved. Hip and knee are frequently involved. Histopathology of infected tissue is major diagnostic tool. It should be kept on top of the list in differential diagnosis of chronic periarticular osteolytic lesion.

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