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Research

Spinal tuberculosis; Clinical presentation, medical and surgical management

A prospective study on 102 patients in Basrah, South of Iraq

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Abstract

A longitudinal follow up study examined the clinical features, management and the outcome of treatment for patients with spinal tuberculosis.

Objectives: To analyse the cases with spinal tuberculosis in Basrah (the south of Iraq), to define the medical and surgical outcome of treatment.

Summary and background: All forms of tuberculosis are endemic disease in Basrah, the spine pathology is the commonest extra pulmonary site, the indication for surgery should be tailored to each patients, chemotherapy is mandatory for all.

Method: In this study, we received the specific questionnaire for the cases of spinal tuberculosis between December 2019 and May 2023, admitted in Basrah university teaching hospital, triple chemotherapy (Isoniazid, Rifampicin and Ethambutol) were given to all patients for six months, some had radical or conservative surgery according to patients local and general condition, the outcome was assessed and defined.

Results: A total of 102 patients were diagnosed with spinal tuberculosis, the mean age is 39.7 years. The most common vertebral involvement was the dorsal region, 72 patients had severe symptoms; surgery was performed for the 72 patients with severe symptoms, while the remaining 30 patients with mild symptoms had chemotherapy only.

Outcome results were as follows: 30 patients cured on conservative treatment only, 56 patients out of those who had surgery with chemotherapy (72 patients) showed good improvement in the motor and sensory function, out of them 12 patients with complete paraplegia remains in the same condition.

Conclusion: Our result showed that the early recognition of the pathology would yield very good result after conservative treatment in those without neurological deficit. The presence of neurological deficit is a good indication for surgery. Chemotherapy for six months is mandatory for all patients.

Keywords: Spine; tuberculosis; Basrah; Iraq

INTRODUCTION

Tuberculosis of the spine is one of the most serious form of extra pulmonary tuberculosis, it is considered as serious and sometimes fatal type of infection. It may lead to severe neurological deficit because of spinal compression, unfortunately, it is usually missed and late detection is usual, early detection and proper treatment may lead to eradication of the disease, so clinical awareness is very vital particularly in the endemic areas.

Spinal tuberculosis occurs in about 1%-2% of patients with tuberculosis (C H Njoku et al) [1]. Skeletal involvement affect approximately 10% of all patients of tuberculosis and the spine involved in 50% of skeletal tuberculosis (Shanley D J et al) [2]. It is usually secondary to primary focus and the lung is the most seeding source then the intestine and lymph node [2].

The mycobacterium reaches the spine via a haematogenous or lymphatic spread, rarely from invasion of nearby focus, the organism may remain silent for long time, then become activated and the disease can be detected. The pathology may involve all tissues in the spine or some of it, it may involves the vertebrae and the disc preserved or may extend to the groin through psoas muscle or lead to retroperitoneal collection.

Usually there a risk factor or even factors like malnutrition, diabetes mellitus, steroid abuse, immunosuppression for any reason.

Tuberculosis of the spine (Pott's disease) is still a life threatening condition despite of recent advances in diagnostic procedures like CT scan and MRI and medical and surgical treatment (Mehmet) [3]. Delay in reaching early diagnosis may lead to neural compression to be followed later by minor or major neurological deficit (Rajasekaran) [4].

The atypical spinal tuberculosis though small in number should be remembered because it present with different clinical features, this makes a diagnostic delay or even errors (Sankaran-Kutty) [5].

This longitudinal follow up study deals with 102 patients admitted to Basrah university teaching hospital, the aim of this study was to present and analyse the cases, to

define the medical and surgical treatment and outcome of the treatment.

PATIENTS AND METHODS

Study design: this is a longitudinal follow up study was established in Basrah university teaching hospital during the period of December 2019- May 2023.

Inclusion criteria: all cases of spinal tuberculosis

Exclusion criteria: no exclusion

DATA COLLECTION

All information's were recorded by a special well-designed questionnaire, which assess socio-demographic characteristics; this includes patient name, age, sex, occupation, address, phone number and financial status. The first author filled the questionnaire during the direct interview with the patients.

CLINICAL ASSESSMENT

Reviewing all patients' clinical symptoms regarding the chief complaints, duration, risk factors followed by whole body physical examination which was performed by the first author.

LABORATORY AND IMAGING STUDIES

Hematological tests (complete blood picture), ESR

Biochemical tests (blood sugar, HBA1C, blood urea, serum creatinine, C- reactive protein)

Bacteriological (blood culture and local swab for limited number of patients only)

Histopathological examination.

Imaging studies: Plain X- ray radiography, MRI, CT scan, patients with highly suggestive clinical feature and confirmed by CT or MRI scan, were included in the study even without histopathological and bacteriological examination.

All patients had routine chest radiography because the south of Iraq is endemic area for tuberculosis and we have good experience in this topic.

Patient's clinical details, the results of the laboratory and imaging studies in addition to the medical and surgical treatment and the outcome of treatment, all were recorded in the specially prepared questionnaire. Patients followed during the study period and there is no patient lost from

follow up in this study.

Patients included in this series were divided in to two groups, the severe and the moderate group depending on the clinical feature, neurological deficit, the number of vertebrae involved and the results of the laboratory and imaging studies. The severe group 72 (70.5%) patients was defined as having more than two vertebral involvement, cardinal clinical feature, and some neurological deficit in addition to the laboratory and imaging studies, all had chemotherapy and surgical treatment. The moderate group 30 (29.5%) patients was defined as having two or less vertebral involvement, no neurological deficit, no collection but positive clinical, laboratory and imaging studies, all were treated by chemotherapy alone without surgery.

Chemotherapy, which usually consist of Rifampicin, Isoniazid and Ethambutol given for six months or longer depending on the patient's response to all patients; we refer them to Basrah tuberculosis center for chemotherapy and follow up of the medication response.

The type of surgery was either radical surgery which consist of anterior decompression, curettage, drainage of abscess and bone graft using the ribs, to be followed by posterior fixation i.e. transpedicular fixation. The non-radical surgery was simple anterior drainage of the abscess, the transpedicular fixation with no fusion; this is because of the poor general condition of the patients.

The outcome was either favorable or unfavorable depending on the improvement in the general condition, neurological recovery, the presence of deformity or discharging sinuses.

RESULTS

Among 102 patients the age distribution was: 10-20 years were 15 (14.7%) patients, 21 years - 39 years were 41 (40.1%) patients, 40- 59 were 23 (22.4%) patients, above 60 years were 23 (22.4%) patients.

The male were 64 (62.7%) patients, 57 (55.9%) patients were unemployed, which obviously indicates the poor economic status. Sixty-six (64.7%) patients were from poor economic class, they depend on limited income, which is not enough for daily requirement of life (Table

1).

No family history or having contact with patient suffering from tuberculosis, we put suspicion on these two points because having family history with tuberculosis is a shame in our locality in addition to the lack of education.

Table 1. Details of the patients enrolled

Variables	Frequency (No.)	Percentage (%)
Age: 10 years - 20 years	15	14.7
21 years - 39 years	41	40.1
40 years - 59 years	23	22.4
Above 60 years	23	22.4
Sex: male	64	62.7
female	38	37.3
Occupation: unemployed	57	55.9
employed	45	44.1
Financial status: poor	66	64.7
good	36	35.3

The most common site for vertebral involvement was: the dorsal vertebrae were involved in 51 (50%) patients, lumbar vertebrae involved in 32 (31.3%) patients, dorsolumbar region in 8 (7.8%), the cervical vertebrae involved in 6 (5.8%) patients and multiple vertebral site involvement in 2 (1.9%) patients. The posterior part of the spine was recorded in two (1.9%) patients while the lumbosacral region was proved in only 1 (1%) patient.

Fifty-three (51.9%) patients had risk factors like: diabetes mellitus reported in 22 (21.5%) patients, old healed pulmonary tuberculosis in 12 (11.7%) patients, malignancy in 3 (2.9%) patients, 5 (4.9%) patients were steroid abusers, 3 (2.9%) patients with collagen disease and one case (1%) of renal failure. Those with malignant lesions, one with liposarcoma, one with breast cancer and one case with carcinoma of colon. Five patients were given wrongly corticosteroid prior to diagnosis; one Lady ends up with complete paraplegia after heavy dosage of steroid with no recovery despite surgical and medical treatment.

Delayed presentation was very remarkable and varied between 3 months to two years. Fifty-one (50%) patients

presented late to treatment, 16 (15.6%) presented two years after complaint to the hospital.

The most common presenting complain was back pain in 97 (95%) patients followed by loss of appetite in 67 (65.6%) patients, low grade fever more noticed at night in 42 (41.1%) patients while radicular pain was recorded in 35 (34.3%) patients. Local back deformity as a mass or gibbus were noticed in 16 (15.6%) patients, only 4 patients presented with discharging sinuses in the dorsal region. In 29 (28.4%) patients, the initial presentation was neurological deficit (paraplegia or paraparesis), weight loss was felt by 26 (25.6%) patients while night sweat was confirmed in 22 (21.5%) patients. The one case of lumbosacral region involvement presented with gluteal mass which is very rare presentation (Table 2).

Table 2. The local physical findings

Variables	Frequency (No.)	Percentage (%)
Look: deformity (kyphosis)	12	11.7
mass	9	8.9
sinuses	9	8.8
cachexia	13	12.7
Feel: tenderness	24	23.5
Muscle power: Grade 0\5	12	11.8
Grade 2\5	7	6.9
Grade 3\5	4	3.9
Grade 4\5	6	5.9
Grade 5\5	30	29.4
Sensory loss	25	24.5
Absent reflexes	16	15.6

Ninety six (94.1%) patients had high ESR, while we record high C reactive protein in all of the 101 (100%) patients. Ninety four (92.1%) patients in our series were anaemic and the lymphocyte count was high in 87 (85.2%) patients.

The routine chest x ray in 19 (18.6%) patients confirmed concomitant old pulmonary tuberculosis. Plain spine radiography was negative in 10 patients while CT scan

was positive for all patients concerning the bones, and MRI was positive in 99 (98%) patients concerning the soft tissues.

Fifty (49%) patients had radicular surgery while 22 (21.5%) patients had only simple drainage of the paraspinal muscle with curettage of the diseased vertebrae because of their poor general condition.

Histopathological examination was positive in 70 (97.2%) patients out of the 72 patient who had surgery.

The 30 (29.5%) patients in the moderate group had chemotherapy alone with very good results because the diagnosis was very early.

Out of the 72 (70.5%) patients whom had surgical treatment, 56 (77.7%) patients improved, 10 (13.8%) patients showed partial recovery, but the remaining 6 (8.3%) patients showed no response, 29 (40.2%) patients have some elements of neurological deficit, complete paraplegia found in 12 (11.7%) patients, only 6 (50%) patients showed partial recovery, the other with partial loss of muscle power showed gratifying outcome after surgery and chemotherapy.

DISCUSSION

Depending on our local experience, spinal tuberculosis is not rare in our locality that is related to many factors. We analyzed 102 patients during 3 years period.

Spinal tuberculosis was recorded in 64 (62.7%) male patients, this is in agreement with the study by (Hao Zeng) who reported in his study that more than 50% were male, also (Denis) reported more male involved than female, the male dominance was also confirmed by (Peng Wang) in china; this is probably related to more chance of exposure by the male to infected focus [6-8].

In our study the age mostly affected was between 21 years - 39 years probably because they had more chance of exposure but the age more than 40 years is reported in most of studies like (Dae Won Park), (LF Wolabi), (Peng Wang), (Roghie Golsha) and (Hao Zeng) who reported age range between 18 years - 45 years in 63.93% of the studied patients [6, 8-11].

We proved tuberculosis is a disease of poverty, as it is recognized all over the globe, 66 (64.7%) of our patients were from the poor class, it looks logical point because of lack of proper nutrition which adversely affect the body immunity.

The dorsal vertebrae were the most common site of involvement as seen in 55 (53.9%) patients, this result is similar to the result of the study (Hongwei Wang) and (L Godlwana), in contrast (Peng Wang), (Eduard Pertuiset) and (Dae Won Park) reported that the lumbar vertebrae is the most common site of involvement [8,9,11,13,14]. Only 2 (2.1%) patients had multiple spinal site involvement; one Lady with Sheehan syndrome and one man with very poor general condition from a very low social class while (Peter Polley) reported non-contagious spinal tuberculosis in 16.3% of patients with special emphasis on the higher risk of neurological deficit. (Hongwei Wang) reported 5.6% of his cases, had non-contagious involvement, both studies confirmed a higher incidence of multiplicity than in our study [12,15].

Delayed presentation was a real problem in our community; this is obviously related to lack of awareness and lack of education. Fifty-one (50%) patients presented late to treatment at variable time from having the symptom, out of those lately presented patients, 16 (31.3%) patients presented two years late. Many authors recorded the delay in presentation as (Peng Wang) confirm a delay of 17 months from having the symptoms until medical consultation, (Eduard Pertuiset) reported a delay from one week to three years, (Hao Zeng) reported a delay of 1 day to 220 months, (Denis Mulleman) reported average delay of 43 months, in (A G Fam) study, the delay was 1 months -18 months while (LF Wolabi) reported that 75% of his patients were more than 2 months late, meantime from symptoms onset to diagnosis was 18 months (range 3 days to 36 months) in the series of (Hangwei Wang) with a significant difference between rural patients with 23 months and urban patients with 10.7 months [6,7,8,16,10,12,14]. Obviously clear, there is global delay in the presentation, so a high index of suspicion of spinal tuberculosis is very vital to improve the outcome of treatment.

We confirmed risk factor in 53 (51.9%) patients, 22 were

diabetic, 19 had concomitant old pulmonary tuberculosis, 3 patients had malignancy and 3 patients had collagen disease, 5 patients were steroid abuser and one patient had renal failure. (Denis Mulleman) reported diabetes in two patients only while (Peng Wang) reported the following risk factors, smoking in 41.37% , hepatitis B in 2.35%, diabetes in 9 (1.5%) patients and 31 patients had previous history of tuberculosis so our risk factors differs from the recorded one also none of our patients were AIDS positive [7,8].

Back pain was the first presenting symptoms in our series, 97 (95%) patients of our study presented with dull aching back pain, worse by days; this is in agreement with (Peng Wang) who confirm pain in 89.34%. (Roghie Golsha) reported pain in 96.9% of his patients while (Hao Zeng) reported pain as the most commonly reported symptom in 78.6% of his patients [6, 8,11]. (LF Wolabi) reported back pain in 90.8% of his series, this obviously indicates the importance of seriously considering back pain in endemic area, but surprisingly (Mehmet Turgut) reported back pain in only 21% of his patients though Turkey is endemic area for tuberculosis [3,10].

We reported radicular pain in 35 (34.4%) patients, higher percentage of radicular pain 68 (78%) patients was reported by (LF Wolabi) [10]. (Hao Zeng) confirmed radicular pain in 51.98% patients of his study, so our percentage for radicular pain was the lowest reported [6].

We reported loss of appetite in 67 (65.6%) patients, fever in 42 (41.1%) patients and weight loss in 26 (25.4%) patients, we feel all these symptoms plays a role in the diagnosis of spinal tuberculosis.(Roghie Golsha) also confirmed the importance of looking for weight loss, fever, night sweat as the most common constitutional symptoms [11].

(Hao Zeng) confirmed toxemia in 43.53% while none of our patients presented with toxemia [6].

Local back deformity as a mass or gibbus was noticed in 16 (15.6%) patients but (Mehmet Turgut) mentioned that 46% of his patients presented with gibbus deformity and 10% of his patients presented with mass [3].

Only 24 (23.5%) patients in our study presented with local tenderness while (A G Fam) consider persistent spinal pain and local tenderness were the most frequent

presenting findings [16].

Four patients presented with discharging sinus in the dorsal region in our study. Only one patient in our series presented with gluteal mass, which was related to tuberculosis of the lumbosacral region, this finding was not recorded in other studies.

We recorded 29 (28.4%) patients with variable neurological deficit, 12 patients with complete paraplegia while 17 patients presented with variable grade. Six (50%) patients of the 12 patients showed some neurological recovery. (LF Wolabi) reported 100% incidence of paralysis or paraplegia or sensory impairment probably because his recorded patients presented very late [10]. On the contrary (Peng Wang) reported variable degree of neurological deficit in only 29.82% in his series of 597 patients while (L Godlwana) reported only 32% of his patients presented with complete paraplegia, so from prognostic point of view it is very vital to search for any degree of neurological deficit as soon as possible [8,13].

Concomitant pulmonary tuberculosis was recorded only in 19 (18.6%) patients discovered by routine chest x ray which is unexpected because pulmonary tuberculosis is the main source of the spinal tuberculosis, our result is lower than the percentage recorded by Hong Wei Wang who confirm concomitant pulmonary tuberculosis in 25.5% of his patients.

In regards to blood test, we found very high ESR and C reactive protein. Ninety six (94.1%) patients had high ESR, while we record high C reactive protein in 101 (99.9%) patients; our results differ from the result of Hao Zeng et al who find a range of ESR between 2 mm\hour - 152 mm\hour in 54.1% of his patients and normal C reactive protein in 22.84% of his patients. In addition, our result is not similar to the reported result by (Hongwei Wang) who mentioned that ESR was normal in 26.8% and C reactive protein was normal in 30.2% [12].

Ninty four (92.1%) patients in our series were anaemic and the lymphocyte count was above normal in 87 (85.2%) patients, so we feel lymphocyte count is supportive in the diagnosis. (Hao Zeng) reported only

1.3% of his patients were anaemic but in our series 94 (92.1%) patients were anaemic probably the nutritional status in his patients were better so we feel that laboratory tests were supportive for the diagnosis but (Eduard Pertuiset) feel that laboratory test was of little diagnostic assistance [6,14].

Plain radiography was negative in 10 patients while CT scan was positive for all patients concerning the bones, and MRI was positive in 99 (97%) patients concerning soft tissue, so it is mandatory to include the three imaging for all patients with minimal suspicion of spinal tuberculosis to achieve a comprehensive view. This very high sensitivity and specificity for the cases included is definitely related to the delayed presentation. (Peng Wang) consider CT and MRI as the most common imaging with 96.8% sensitivity for CT and 84% for MRI[8]. (A G Fam) emphasize the diagnostic usefulness of CT and MRI in defining subtle discovertebral lesion and in detecting paravertebral soft tissue extension [16]. (Peter Polley) confirm that full spine sagittal MRI is extremely useful in identifying spinal tuberculosis; we also emphasize the importance of whole spine imaging rather than local imaging [15]. (Eduard Pertuiset) also use plain radiography, MRI and CT to detect tuberculosis [14].

All patients (100%) had Spondylodiscitis (disc involvement) because of the late presentation of the cases. We drained paravertebral abscess in 70 (68.6%) patients, it was huge amount in one patient with lumbar tuberculosis, and this result is in agreement with the result of (Hao Zeng) who confirmed paravertebral abscess in 62.77% of his patients [6].

We did not consider tuberculin skin test useful in the diagnosis because of repeated exposure to small dosage of the bacilli in our region. (Eduard Pertuiset) confirm that out of his 70 patients who had tuberculin skin test, only 4 (5.7%) patients had negative result [14].

For the definitive diagnosis we depend on the histopathological examination, it was positive in 70 (97.2%) patients out of the 72 patient who had surgery, we feel finding the bacilli in the lesion is rare and also

don't have a very good bacteriological facilities. (Hao Zeng) support our suggestion and depends on histopathological examination, that it is very difficult to isolate mycobacteria from the lesion; this is contrary to the results of (Eduard Pertuiset) who proved that the culture was positive in 83% of patients [6,14]. (Denis Mulleman) mentioned that percutaneous vertebral biopsy was positive in 16 out of 20 patients [7].

The outcome of the 30 (29.4%) patients in the moderate who had chemotherapy only were gratifying because of early presentation. (Upadhyay Shantis) gave chemotherapy for three groups 6 months, 9 months and 18 months, his conclusion was the 6 months regimen ends up with cure rate, out of them 56 (54.9%) patients showed very good improvement, 10 (9.8%) patients showed some improvement and 6 (5.8%) patients showed no improvement [17]. The chemotherapy was given in Basrah tuberculosis center and usually they follow the response, the resistance or the toxicity but we follow the surgical aspect.

All our patients were given anti tuberculosis drugs prior to surgery although (Hao Zeng) confirmed that only 90.65% had ant tuberculosis drugs prior to surgery, his cure rate was 78.41% while 3.78% had post-operative relapse, our result was 86 (84.3%) improved patients [6].

Fifty (49%) patients had radicular surgery and 22 (21.5%) patients had simple drainage of the abscess (because of the poor general condition), all the 72 patients had both surgery and chemotherapy for six months. (Dae Won Park) performed radical surgery for 84 (62.2%) patients, 94 (68.6%) patients end up with favorable outcome while 22 (16%) patients showed unfavorable outcome [9].

Both (Aqsa Hag) and (S Bloch)] reported paradoxical reaction (Paradoxical reactions are recognized phenomena in the management of tuberculosis, these are defined as the worsening of clinical or radiological features following initial improvement with anti-TB medication in the absence of any other possible causes for deterioration) but luckily, we have not seen paradoxical reaction in our series [18,19].

We do not record death in our series but (Mehmet Turgut) report 10 death (2%) in his series [3].

CONCLUSION

Our result showed that the early recognition of the pathology would yield very good result after conservative treatment in those without neurological deficit. The presence of neurological deficit is a good indication for surgery. Chemotherapy for six months is mandatory for all patients.

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