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Clinical and Radiological Presentation of Adult Tuberculous Spondylitis

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ABSTRACT

***Introduction**: Tuberculous spondylitis is an uncommon form of extra-pulmonary TB. Delay in establishing diagnosis and management causes spinal cord compression and spinal deformity.*

We studied to determine clinical and radiological presentations of this dangerous form of TB diseases.

***Materials and Methods**: During 2002-3 years, all patients over 14 years old who hospitalized with a probable diagnosis of TB spondylitis were evaluated. Everybody with mycobacteriologic or pathologic confirmation was enrolled in study.*

***Results**: fourteen patients met our inclusion criteria. The mean age (±SD) was 39(±16) year. 57% were male. Treatment delay was 8.3 months. Fever reported in 7(50%) patients. Local tenderness was reported in 92.6% of cases. PPD was positive in half of the patients. The most regions involved were T8-T12 (43%) and L1-L3 (36%) respectively. Sputum smear was surprisingly positive in 50% of cases. Most of the patients had received anti-TB drugs for 9-12 months.*

Conclusion**: CT guided aspiration and biopsy of spine lead to correct diagnosis in 93% of patients. Simultaneous pulmonary involvement is evident in half of them.* ***(Tanaffos 2003; 2(6): 59-65)

***Key words**: Tuberculosis, Extra-pulmonary TB, Spondylitis*

INTRODUCTION

The classic definition of extrapulmonary TB is the tuberculous involvement of an organ outside of the lung. It includes disseminated disease and bacteremia, pleural disease, intra thoracic lymphatic disease, Pott's disease, and other involved organs (1). Regarding prevalence of extrapulmonary TB in our country, in the latest published report, there were 28% extrapulmonary TB cases (2). In 1997, 17.9% of registered TB patients were exclusively extrapulmonary in the USA (3).

Skeletal tuberculosis was the third most common type of extrapulmonary tuberculosis (3). It typically involves the vertebrae as well as the weight-bearing joints (4). Pott's disease is a dangerous form of TB infection. Delay in establishing diagnosis and

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management causes spinal cord compression and spinal deformity (5).

There are several reports stating different treatment regimens and duration and also variable rates of complication for Pott's disease (6,7,8,9).

We designed a retrospective study to identify the frequency, presenting features, utility of diagnostic tests, and treatment strategies in a tuberculosis tertiary care center.

MATERIALS AND METHODS

Referring to records of Masih Daneshvari hospital, the files of all patients with Pott's disease were reviewed between the year 2002 and 2003. Twenty-four patients were found with tuberculosis spondylitis (Pott's disease), ranging in adult age (> 14 year). Those who had the following criteria were included:

1- Positive smear for AFB (acid-fast bacillus) in vertebral biopsy
2- Histopathology of Pott's disease (granuloma with or without necrosis)
3- Clinical and radiologic findings of Pott's disease and positive sputum smear for AFB

Finally, 14 patients were selected and evaluated retrospectively. Then, some parameters were assessed in these patients, including age, sex, nationality, the history of extra- and pulmonary tuberculosis (TB), the history of TB treatment, the onset period of signs (treatment delay), fever, pain, vertebral tenderness, paraparesis, kyphosis, mass and muscular weakness.

WBC count was divided into four groups as follows: <4000, 4000-8000, 8000-12000, and > 12000. ESR was also divided into four categories:

1) up to 30
2) 30-60
3) 60-100
4) more than 100.

CRP (+/-) and PPD (+/-) were also considered. Computed tomography scan (CT-scan) or magnetic resonance imaging (MRI) based on vertebral involvement, the presence and location of abscess and cord compression was assessed. Additionally, the location of involvement was based on the following categories:

1) cervical
2) upper thoracic (T1-T4)
3) middle/ mid thoracic (T4-T8)
4) lower thoracic (T8-T12)
5) upper lumbar (L1-L3)
6) lumbosacral (L4-S1).

Finally, abscess formation was categorize into four groups:

1) paravertebral
5) psoas
6) buttock
7) epidural

The smears of vertebral biopsy and sputum for B.K were evaluated, based on standard methods, in mycobacteriology reference laboratory. The biopsy specimens were also assessed in our pathology center. Data were recorded in questionnaires and then analyzed by SPSS software.

RESULTS

The study patients were 8 women (57.1%) and 6 men (42.9%) with mean (+/- SD) age of 39 (+/- 16.4) years (ranging 20-82 years). Among them, 4 patients (28.6%) were Iranian, 9 (64.3%) were Afghans, and 1(7.1%) was Indian. Except one patient, the others had no history of pulmonary tuberculosis. None of the patients had history of extrapulmonary tuberculosis, and only one had undergone therapeutic regimen for TB. The time interval between onset of symptoms and initiation of treatment ranged from 1 to 24 months with mean (+/- SD) of 8.3 (+/- 7.9). Regarding symptoms, 7 cases had fever. All patients had experienced pain in the involved vertebra, and 13(92.9%) had tenderness on the related site. There was no paraparesis, but kyphosis was observed in 3

(21.4%) patients. A palpable mass was detected in two cases. One patient had also muscular weakness.

Paraclinical examinations showed the following results:

1- WBC count was 4000-8000, 8000-12000, and 12000 in 8(57.1%), 5 (32.7%) and 1(7.2%) cases, respectively. The mean number of WBC was 7800.
2- CRP was positive in 13(92.9%) cases.
3- ESR in 5 (35.7%), 4 (28.6%), and 5 (35.7%) cases were less than 30, 30-60 and 60-100 respectively. ESR >100 was not detected in any patients. The mean (+/-SD) was 46.3 (+/- 23.4)
4- Seven patients showed normochromic and normocytic anemia.

Regarding location of involvement, mid-thoracic (T5-T8), lower thoracic, upper lumbar (L1-L3), and lumbosacral involvements were observed in one, 6 (42.9%), 5 (35.7%) and one cases, respectively. One patient had both lower and mid-thoracic involvements.

Electromyography (EMG) and Nerve Conduction Velocity (NCV) were performed in 7 patients; 4 demonstrated lumbosacral involvement and 3 had normal EMG-NCV.

Twelve patients (85.7%) had abscess including paravertebral, psoas, and gluteal (buttock) in 6 (42.9%), 2 (14.3%) and 1 respectively. Two patients showed paravertebral and epidural abscesses concurrently, and one had both psoas and paravertebral involvements. Additionally, an inguinal fistula was reported in one patient. Arachnoiditis and cord compression were detected in 1 and 3 (21.4%) patients respectively.

The smears, vertebral biopsy specimen, and sputum for AFB were positive in 6 (42.9%) and 7 (50%) cases respectively. Pathologically, 5 patients (35.7%) had granuloma with necrosis, and 2 (14.3%) were without necrosis (granuloma).

All patients had received therapeutic regimen for TB with four drugs. The duration was between 9 and 12 months. One case underwent surgery and 2 received corticosteriod therapy.

DISCUSSION

As shown in our study, vertebral tuberculosis commonly involves active group of age (mean, 39 years). In a study by Moon et al. (10), the mean age was 38 years old. Lavrov and colleagues (11) reported the age range of 20-78 years, which is compatible with our study. In the present study, the majority of patients were Afghans which is explained by the high prevalence of TB in their country. In a study by Alothman et al. (12), 7% of the patients had previous history of tuberculosis similar to our study.

Regarding delay in treatment which includes patient and doctor delay, the present study reported the period of 8.3 +/- 7.9 months resembling other numerous studies. Lavrov determined the percentage of patients based on the duration of disease (11). The accurate diagnosis was made only in 24% of them in the first three months, and 13% were diagnosed twelve months after onset of symptoms. A study by Garcia et al. (13) in Spain, showed delay in treatment varying from 2 days to 24 months; thus, based on results of other studies, the necessary time for diagnosing of tuberculosis spondylitis is long. Some authors have reported delay in diagnosis of pulmonary TB for about 3 months (14); thus, the difference is obviously significant indicating insidious nature of tuberculosis spondylitis.

Regarding clinical symptoms, the incidence of fever, systemic symptoms like tremor, weight loss, and fatigue were reported in 20-32% (6,12). In our study, 50% of patients had systemic signs. On the other hand, pain of the involved vertebra is the most common sign in tuberculous spondylitis which was well demonstrated in the present study as well as in the above mentioned studies. The rate of low back pain compliant was 100% in our study as reported 65-99% in similar studies (12,13,15).

The rate of tenderness on the related vertebra was 92% in majority of our study patients which is more than that of other studies (12,15). Additionally, the rate of palpable mass was 14% compared to 10% in Turgut's study (5).

Paraclinically, more than half of our patients did not have leucocytosis, and the mean WBC count was 7800. CRP was positive in 92% of patients, and ESR was high in all cases; however, none of them had ESR> 100. Increasing ESR was also reported in 92% of patients in Alothman's study (2). Except these two indices, other tests are useful in paraclinical diagnosis (12). Fifty percent of our patients had positive PPD which is compatible with the spanish report (13). Normochromic and normocytic anemia was observed in half of the cases indicating chronicity of the disease.

Turgut (5) has demonstrated that the most involved vertebrae are thoracic. Rasit et al. (15) reported the 9^{th} vertebra as the most common and the 3^{th} as the most unusual vertebra involved; the mean number of them was 3. In a study conducted by Watts (16), 50% of involved vertebrae were thoracic, 25% were cervical and 25% were lumbar, sixty percent of these patients had thoracic involvements and the remaining had lumbar and lumbosacral ones. No cervical case was reported. It seems that like Rasit's report, involvement of cervical vertebrae is not common in our country. Abscess formation was observed in 85% of the study patients including 43% with paravertebral and 34% with gluteal abscesses; the remaining had combination of them. Based on experiences of Mackenzie et al. (17), 50% of epidural abscesses were caused by tuberculosis bacillus. However, we did not detect any case of epidural spinal abscess in our patients. In Alothman's study (12), 80% of patients had paraspinal abscess, Omari et al. (18), had also detected psoas and paraspinal abscesses in 10 out of 11 patients with tuberculosis spondylitis indicating high prevalence rate of abscess formation in this disease.

Cord compression has occurred in many patients of the Spanish study, but we observed it only in 21% of the cases, and among them only one had the progressive form and was candidated for the operation.

After CT-guided vertebral biopsy, 43% of patients had positive smear for AFB, and 50% had granuloma. In contrast, 35% of the smears and 75% of the pathologies were positive for TB in Alothman's study (12).

The results of Rasit's study were similar to ours in which 44% of patients had pathologies compatible with tuberculosis (15).

An interesting note in our study was the presence of positive sputum smear (for AFB) and culture (for Mycobacterium Tuberculosis) in 50% of cases, indicating concurrently involvement of lung and vertebral column. In contrast, Rasit (15) showed synchronous pulmonary involvement in only 8% of the patients. This phenomenon may be explained, in spite of negative HIV tests in all patients of the present study, by concomitant involvement of lung and thoracic vertebra via adjacency.

All of the study patients received standard therapeutic regimens with four drugs. The treatment period varied from 9 to 12 months. In a recent study published by Van Loenhout et al., the efficacy of a 6-month period of treatment had comparable results with more duration. They followed up the patients for 1-12 months post therapy and finally concluded that a period of 6- month treatment might be effective in patients treatment in comparison with that of 9- month regimen (19). Other studies have recommended 6-9 month period of treatment (20,21), of course, it has been continued up to 18 months in special cases (22).

Our study showed two cases with signs of arachnoiditis or cord compression in which corticosteriod was used.

CONCLUSION

Tuberculous spondylitis or vertebral tuberculosis exists in our country and must be evaluated carefully. There is a higher percentage of Afghan patients as compared to Iranian cases. Delay in diagnosis, like other regions of the world, is still much longer than the similar one in pulmonary tuberculosis indicating necessity for more attention to this disease. The most common complaint and finding are pain and tenderness of affected vertebrae respectively. Paraclinically only high ESR and positive CRP are helpful in the diagnosis; however, no patient had ESR> 100 in our study. The most common site of involvement is in thoracic region specially lower thoracic vertebrae. Despite some reports, the involvement of cervical vertebra was not observed in our study. MRI and CT-scan of vertebra are excellent instruments for assessing the involved vertebra, paravertebral, and psoas abscesses. In addition, experienced radiologist can easily obtain appropriate specimen for definite diagnosis; thus, diagnostic surgery is not essential. We observed that synchronous pulmonary involvement was present in majority of the study patients. As a conclusion, drug therapy can improve tuberculosis spondylitis in many cases.

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