Original Article

Comparison of Pyogenic, Tuberculous and Brucellar Spondylitis during 10 Years in a Central City of Iran

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Received Apr 07, 2018; Accepted Apr 11, 2018

Introduction: Spondylitis is a serious disease caused by a variety of pathogens. The identification of spondylitis etiologies is a very important medical issue. This study was conducted to compare clinical, laboratory and radiological features of the patients with tuberculous (TS), brucellar (BS) and pyogenic spondylitis (PS) in a central city of Iran. **Methods:** In this retrospective study, we obtained the data of 100 patients with spondylitis from a hospital in Arak city. The patients were divided into three groups including TS (8 cases), BS (71 cases) and PS (21 cases), based on the spondylitis etiology. **Results:** The mean age of cases with TS, BS, and PS was 67.25±20.26, 55.39±15.60 and 52.19±12.74 years, respectively. The most common clinical feature was back pain followed by fever. Twenty-one cases had psoas abscess which was more common in PS group. No significant difference regarding the involved vertebral regions was observed between the groups. Intravenous drug use, history of vertebral surgery and chronic renal failure were frequent in patients with PS, and all TS cases had pulmonary involvement. **Conclusion:** Our data showed that presence of concomitant pulmonary involvement and a confirmed history of tuberculosis are suggestive of tuberculous spondylitis. However, the distinction between TS and BS is still problematic and only a combination of clinical data, laboratory findings, radiological features and history of TB can be helpful in differentiation of TS and BS. *J Med Microbiol Infect Dis, 2017, 5 (3-4): 62-65. DOI: 10.29252/JoMMID.5.3.4.62*

Keywords: Spondylitis, Brucellosis, Tuberculosis, Pyogenic.

INTRODUCTION

Spondylitis is a serious illness representing 2-4% of bone and joint infections with an incidence rate of almost 2.2/100,000 per year [1, 2]. In endemic areas, *Mycobacterium tuberculosis* and *Brucella* spp. are also considered as the common causative agents [3].

Spondylitis is an adulthood disease, and most cases occur in patients over 50 years old with more frequency in men. The rate of spondylitis is on the increase due to various factors such as higher life expectancy, increased comorbidities, *e.g.*, intravenous drug use, diabetes mellitus, underlying chronic diseases or immunosuppression status and increased vertebral surgeries [4, 5].

Though spondylitis has a low incidence, it has attracted a great clinical attention since the quick and early detection and treatment of this disease is a crucial factor for reducing morbidity, mortality and neurological sequelae of patients [6]. Besides, some patients have a poor response to antimicrobial treatment, and complete remission takes a long time [7].

The distinction between tuberculous spondylitis (TS), brucellar spondylitis (BS) and pyogenic spondylitis (PS) is essential as treatment and outcome of these issues are entirely different. Since the confirmation of diagnosis by bacteriological studies is mostly difficult, therefore evaluation of clinical, laboratory and radiological findings can be discriminative for different types of spondylitis [8].

In the present survey, we compared the epidemiological features, clinical manifestations, and laboratory and radiological findings of spondylitis patients due to *M. tuberculosis*, *Brucellosis* spp., and other bacterial agents in a central city of Iran during a ten years period.

PATIENT AND METHODS

In this descriptive retrospective study, we reviewed the medical records of the patients with spondylitis (including clinical, radiological and laboratory results) admitted to Vali-Asr hospital in Arak city during a ten years period from 2007 to 2017.

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One hundred complete patients' records were collected for this study. The project was approved by Arak University of Medical Sciences ethical committee.

Diagnosis of spondylitis was according to a combination of clinical features, radiologic assessment, and microbiologic grounds. The purified protein derivative (PPD), serum agglutination test (SAT) and the positive culture results from blood or vertebral biopsy were used to categorize the cases. Individuals who remained culture negative but had elevated inflammatory markers and responded favorably to antimicrobial therapy were also enrolled in the study. The diagnosis of TS was based on clinical manifestations, laboratory and radiological signs, and/or histopathological examination combined with a PPD test with positive results (values of 10 mm over 48-72 h after intracutaneous administration of five tuberculin units of PPDs) and/or history of TB. All cases were previously vaccinated against *M. tuberculosis* according to the Expanded Program of Immunization (EPI) of Iran.

Brucellosis was diagnosed on the basis of compatible signs and symptoms and STA ≥1:160 in the presence of 2-Mercaptoethanol (2ME) agglutination ≥40. Besides, the detection of *Brucella* spp. in blood or other body specimens' cultures could be helpful in some cases.

Statistical analysis. The Chi-square test was used with the SPSS 16 package program for statistical analysis (Chicago, IL, USA). The data are presented as mean ± SD or, when indicated, as an absolute number and percentage.

RESULTS

The patients had a mean age of 55.67±1.57 years, and a sex ratio of 42% men, and 58% women. About 68% and 32% of patients were inhabitants of rural and urban areas, respectively. Based on the spondylitis etiology, 8 patients including 4 men and 4 women with mean age 67.25±20.26 years had TS with 87.5% of cases from rural areas. Seventy-one patients including 43 men and 28 women with mean age 55.39±15.60 years had BS, and 74.6% were from rural areas. Also, 21 patients, 11 male and 10 female with mean age 52.19±12.74 years had PS, and 38% of cases were from rural areas.

The distribution of the cases by the involved vertebral region is reflected in Table 1. There were no significant differences in the affected vertebral region between the groups. Table 2 demonstrates the distribution of subjects by accompanying conditions. Intravenous drug use (IDU), history of vertebral surgery and chronic renal failure were more common in the PS patients. All TS cases had pulmonary involvement.

Table 3 shows the clinical manifestation of patients. The most common clinical feature was back pain (94%), which was more common in TS group followed by fever (70%). Twenty-one cases (21%) had psoas abscess which was more frequent in PS group. Erythrocyte sedimentation rate (ESR) was higher in the patients with TS (44.37±20.26 mm/h) followed by BS (35.9±22.48 mm/h) and PS (35.23±23.41 mm/h).

DISCUSSION

This study compared clinical, laboratory and radiological findings of spondylitis caused by *M. tuberculosis*, *Brucellosis* spp. and other bacterial agents, which still make difficulties in diagnosis and treatment of the disease.

Table 1. The distribution of cases by spondylitis location

Involved Vertebral Region	TS N (%) n=8	BS N (%) n=71	PS N (%) n=21	Total N (%) n=100
Cervical	0 (0%)	3 (4.2%)	2 (9.5%)	5 (5%)
Thoracic	1 (12.5%)	10 (14.1%)	8 (38.1%)	19 (19%)
Lumbar	5 (62.5%)	32 (45.1%)	5 (23.8%)	42 (42%)
Lumbosacral	0 (0%)	15 (21.1%)	3 (14.3%)	18 (18%)
Thoracic& Lumbar	1 (12.5%)	3 (4.2%)	0 (0%)	4 (4%)
Lumbar& Lumbosacral	1 (12.5%)	8 (11.3%)	3 (14.3%)	12 (12%)

TS: Tuberculous spondylitis; BS: Brucellar spondylitis; PS: Pyogenic spondylitis

Table 2. The distribution of subjects according to the accompanying conditions

Accompanying condition	TS N (%) n=8	BS N (%) n=71	PS N (%) n=21	Total N (%) n=100
Diabetes Mellitus	0 (0%)	1 (1.4%)	0 (0%)	1 (1%)
Chronic Renal Failure	0 (0%)	1 (1.4%)	2 (9.5%)	3 (3%)
Intravenous Drug Use	0 (0%)	4 (5.6%)	3 (14.3%)	7 (7%)
History of Vertebral Surgery	4 (50%)	10 (14.1%)	12 (57.1%)	26 (26%)

TS: Tuberculous spondylitis; BS: Brucellar spondylitis; PS: Pyogenic spondylitis

Table 3. Clinical manifestation of patients

Clinical manifestation	TS N (%) n=8	BS N (%) n=71	PS N (%) n=21	Total N (%) n=100
Fever	4 (50%)	62 (87.3%)	4 (19%)	70 (70%)
Back pain	8 (100%)	67 (94.4%)	19 (90.5%)	94 (94%)
Psoas abscess	2 (25%)	13 (18.3%)	6 (28.6%)	21 (21%)

TS: Tuberculous spondylitis; BS: Brucellar spondylitis; PS: Pyogenic spondylitis

We showed that the presence of back pain, concomitant pulmonary involvement, elevated ESR and a confirmed history of tuberculosis in association with the radiological involvement of the lumbar vertebra were suggestive of tuberculous spondylitis. On the other hand, history of Intravenous drug use, vertebral surgery and presence of psoas abscess were suggestive of pyogenic spondylitis.

In a similar study by Mete and colleagues (2012) on 100 cases with vertebral spondylitis in Turkey, 44% identified with PS, and 24% and 32% of the cases showed BS and TS, respectively. The Mean age of patients was 55±15.6 years, and 69% of the patients had lumbar involvement but thoracic involvement was more predominant in TS group [9]. Another study in Turkey reported a higher rate of chronic renal failure, constitutional symptoms, psoas abscess, high ESR and surgical treatment in the TS group. The mean age of cases was 57.8±14.8 years with no significant difference between groups regarding age and gender. The most common symptom was back pain, and fever was significantly more frequent in BS cases [10]. Yaldız and colleagues (2015) studied 39 spondylodiscitis cases and showed that the most frequent symptoms in patients were back pain and paravertebral muscle spasm with raised ESR in 77% of subjects [11].

In another survey by Celik and colleagues (2011), the most common symptom was back pain, and constitutional symptoms were more frequent in the TS group. They demonstrated that involvements of the posterior parts of the vertebrae in accompany with constitutional symptoms and high levels of ESR were useful in differentiation of TS from BS and PS [12]. Yoon and colleagues (2015) compared tuberculous spondylodiscitis and pyogenic spondylodiscitis in the Republic of Korea and showed that the lumbar region was the most commonly affected region in both groups and the thoracic or cervical vertebras were more frequently affected in TS cases [13]. In a survey by Erdem and colleagues (2015), the majority of spondylodiscitis patients were over 50 years of age. This study showed no significant difference in the rate of diabetes mellitus, chronic renal failure, malignancy and immunosuppression between BS and TS patients. All TS cases showed pulmonary involvement and a higher rate of fever and fatigue was seen in BS patients [14]. In another survey from Spain, the lumbar vertebra was the most affected site in spondylitis cases, and coexistence of diabetes mellitus, IDU, recent vertebral surgery and high ESR were significantly associated with PS subjects [15].

In our study, the mean age of our patients was 55.67±1.57 years. The TS patients were older, but there were no significant age and gender differences between the groups which are in agreement with the result of some similar studies [9, 10, 14]. The clinical manifestations of spondylitis are insidious. In our study, the most common symptom was back pain which was in agreement with other studies conducted by others [9, 12, 16]. Hence, as refractory back pain in some patients could be due to spondylitis, further evaluation of cases with laboratory and radiologic data could be helpful in the correct diagnosis of the etiological agent.

In our survey, fever was absent in 30% of cases and was more common in BS group, but ESR was higher in TS patients, which is in accordance with other similar reports [10, 14]. The most common involved area in our patients was the lumbar vertebra as reported by others [13, 15]. Although thoracic involvement was more predominant in the PS group, spondylitis location does not strongly suggest the pathogenic agent. The concomitant diseases such as diabetes mellitus are known as assisting factor in the development of spondylitis. However, our study did not show any significant difference in the rate of diabetes mellitus between groups, which is similar to the report of Erdem and colleagues [14].

In conclusion, our investigation showed that the *Brucella* spp. was the main cause of spondylitis in our area. In endemic regions like Iran, TB and brucellar spondylitis could be confused, and the differentiation between them is critical. Our data showed that presence of concomitant pulmonary involvement and a confirmed history of tuberculosis were suggestive of tuberculous spondylitis. However the distinction between TS and BS is still problematic, and only the combination of clinical data, laboratory findings, radiological features and history of TB can be helpful in differentiating of TS and BS.

ACKNOWLEDGEMENT

This work was performed in partial fulfillment of the requirements for MD thesis of Fatemeh Pourbaferani, in School of Medicine, Arak University of Medical Sciences, Arak, Iran.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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