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Spinal Tuberculosis among Yemeni Patients Admitted to Two Major Hospitals in Sana'a: Neurosurgey Experience

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ABSTRACT

Objective: To analyze the outcomes of neurosurgical treatment of dorsal spinal tuberculosis (TB) among Yemeni patients.

Methods: Forty-three patients with histopathology-confirmed dorsal spinal TB, who had been admitted to Kuwait University Hospital of Sana'a University and the University of Science and Technology Hospital, Sana'a, were followed up for the outcomes of neurosurgical treatment in the period from Ott. 2009 to Oct. 2005. Data about the clinical presentation, radiologic findings and the outcomes of surgical treatment were recorded and analyzed.

Results: Of patients undergoing neurosurgical treatment of dorsal spinal TB, 28 were males and 15 were females, with a mean age of 41.3 years (range: 18–70). Nearly a half of patients (50.6%) were farmers and 80% of patients were admitted to hospitals three months after the disease onset. All patients presented with back pain, while paraplegia/paraparesis and sensory impairment were reported in 81.4% and 87.4% of patients at presentation, respectively. Four patients (9.2 %) had cold abscesses and were treated by abscess drainage, while 90.8% of patients were treated by surgical decompression, debridement and posterior transpedicular fixation by screws and rods.

Conclusions: The posterior approach for the treatment of spinal TB, with bilateral transpedicular access to anterior decompression together with posterior transpedicular fixation, has satisfactory outcomes regarding the clinical improvement and spinal stabilization among Yemeni patients.

Keywords: Spinal tuberculosis, Neurosurgery, Sana'a

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1. Introduction

Although the spinal involvement occurs in less than 1% of patient with tuberculosis (TB), its increasing incidence poses a health challenge to both developed and developing countries (1) Spinal TB (Pott's disease) is the most common form of skeletal TB, which accounts for about 50% of cases and predominantly involves the thoracolumbar junction. However, it can also affect any part of the spine and the incidence of its neurologic complications varies from 10% to 43% (2, 3).

The basic pathology in spinal TB is a combination of osteomyelitis and arthritis, usually affecting more than one vertebra and involving the anterior aspect of the vertebral body adjacent to the subchondral plate (4, 5). Vertebral collapse and kyphosis result from progressive bone destruction. Spinal cord compression and neurological deficits are caused by the constriction of the spinal canal as a result of cold abscess formation (5). It can be difficult to differentiate spinal TB from pyogenic and fungal vertebral osteomyelitis or primary and metastatic spinal tumors based on clinical and radiologic findings only (6). Therefore, histopathology can confirm diagnosis by revealing the classic necrotizing caseous granulomas with surrounding astrogliosis and congested blood vessels (7).

Simple abscess aspiration or drainage and lesion removal through the confined posterior route were the first, even though not promising enough, surgical approaches introduced for treating spinal TB (8, 9). The anterolateral extrapleural approach was then introduced and modified for debridement of affected tissues, mechanical decompression of the spinal cord and bone grafting for anterior spinal fusion (10). Posterior and anterior spinal fusion approaches were introduced and frequently used for the management of spinal TB (10-13). In 1946, lateral decompression was performed to preserve the spinal stability by stabilizing the laminae and posterior intervertebral joints (14). Thereafter, posterolateral or transpedicular approaches have been used extensively for the management of spinal TB as safe surgical options for ventral decompression of the thoracic spine TB when followed by anti-TB treatment for 18 months and immobilization for three months (15). Pedicle screw fixation has also been advocated (16).

The present study aimed to prospectively analyze the outcomes of neurosurgical treatment of dorsal spinal TB among Yemeni patients admitted to two major hospitals in Sana'a city over a six-year period.

2. Methods

This prospective study analyzed 43 patients with histopathology-confirmed TB of the dorsal spine and subjected to neurosurgeries in Kuwait University Hospital of Sana'a University and the University of Science and Technology Hospital in Sana'a city in the period from Oct. 2009 to Oct. 2015. All patients were clinically and radiologically examined, and diagnosis was confirmed using histopathologic examinations on all patients' biopsies. Surgeries were done for those with evidence of neurologic and/or mechanical instability. Follow-up radiologic evaluation was also done early after surgery and on frequent intervals later on.

3. Results

In the period from Oct. 2009 to Oct. 2015, 43 patients were confirmed by histopathology to have spinal TB and subjected to neurosurgeries in the two studied hospitals. The mean age of patients was 41.3 years (range: 18–70) and about two-thirds were males (65.1%; 28/43). Most of the patients were farmers and housewives, being 50.6% and 34.5%, respectively (Table 1).

Table 1. Demographic and clinical characteristics of patients with histopathology-confirmed spinal TB subjected to neurosurgeries in two hospitals in Sana'a, Yemen (2009–2015)*

Characteristic	*n* (%)
Gender	
Male	28 (**65.1**)
Female	15 (**34.9**)
Age (years)	
Mean age: 41.3	
Range: 18–70	
Occupation	
Farmer	22 (**50.6**)
Housewife	15 (**34.5**)
Other	6 (**13.9**)
Back pain	43 (**100.0**)
Paraplegia/paraparesis	35 (**81.4**)
Loss of sensation	20 (**46.0**)
Fever	30 (**69.0**)
Cough	10 (**23.0**)
Weight loss	15 (**34.5**)
Back swelling (gibbous)	10 (**23.0**)
Past treatment of pulmonary TB	4 (**9.2**)

* Total number of patients was 43.

Clinically, 81.4% of patients were presented with paraparesis or paraplegia and 46.0% of patients had sensory deficits. However, all patients had back pain on presentation (Table 1). Even with such serious complications, more than 80.0% of patients were admitted to hospitals three months after their first complaints (Figures1 & 2). Surgical drainage of cold abscesses was done for four (9.3%) patients with spinal cord compression and/or nerve root compression without mechanical instability.

Figure 1. MRI sagittal section showing the destruction of the bodies of T8 and T9 by spinal TB with backward compression of the spinal cord as well as the destruction of L3 body.

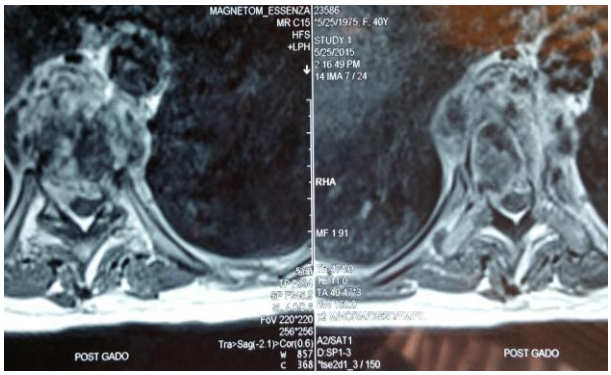

Figure 2. Axial sections of the same patient in Figure (1) showing anterior spinal cord compression

On the other hand, neurologic decompression and spinal fixation were done for 39 (90.7%) patients, where the posterolateral approach was performed in four patients (9.3%) while the posterior bilateral transpedicular approach was performed in 35 (81.4%) patients (Figure 3).

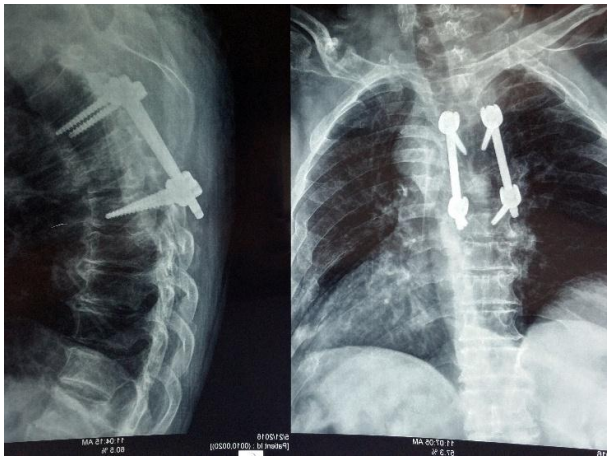

Figure 3. Plain X-ray anteroposterior and lateral views after surgical decompression and fixation

Surgical procedures and follow-up of patients showed that the posterior bilateral transpedicular approach has the best outcomes in the treatment of spinal TB as it resulted in complete neurologic decompression and a strong (three-column) transpedicular spinal fixation (Figure 4).

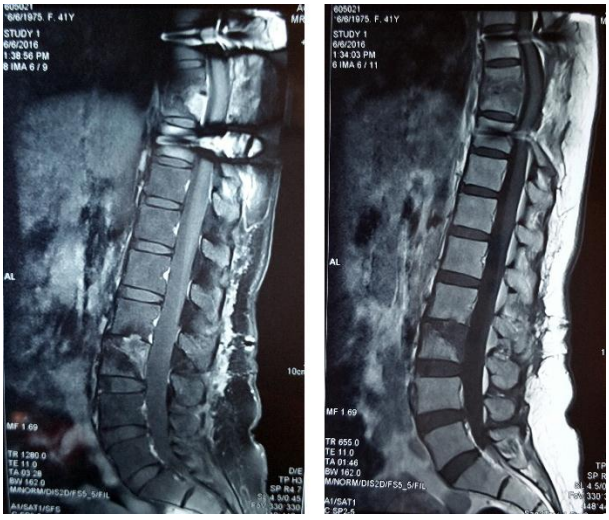

Figure 4. Complete release of the compression at the affected levels one year post surgery

4. Discussion

In the present study, the higher proportion of spinal TB among male than female patients is consistent with that found among Nigerian patients (17). This, however, could be attributed to inadequate education and difficulties in seeking medical services among females. On the other hand, the peak percentage (58. 1%) of spinal TB was observed among patients in the age group of 40–60 years. This is in contrast to the situation in other developing countries, where spinal TB usually occurs in children and young adults as reported from southeast Iran (18).

Although back pain was present in all patients with spinal TB, such a manifestation is not specific. However, a considerable proportion (81.4%) of the patients in the present study complained of paraplegia/paraparesis. This finding is consistent with that by Obajimi et al. (20), who reported the presentation of paraplegia/paraparesis among 60% of patients in Accra, Ghana.

According to the management of spinal TB, 9.3% of patients underwent simple drainage of cold abscesses compared to 90.7% of patients subjected to surgical decompression and fixation 90.7%. In this respect, Djientchen et al. (21) suggested that surgery definitely plays a major role in the diagnosis and treatment of spinal TB, particularly in countries where patients are admitted to hospitals in the late stages and complications of the disease. On the other hand, all patients in the present study were found to receive anti-TB chemotherapy post-operatively during the follow-up intervals. It is noteworthy that Turgut et al. (1) found that decompressing surgery plus anti-TB chemotherapy remains the best approach to the treatment of spinal TB.

Of the 90.7% patients operated for decompression and fixation in the present study, the majority (81.4%) were decompressed by the posterior approach with bilateral transpedicular axis for anterior decompression facing the ventral pathology. This resulted in good outcomes with respect to circumferential decompression and fusion supported by posterior transpedicular fixation of the adjacent segments. This approach was also recommended by Lee et al. (22), who found it simple, safe, effec-

tive and easy to apply besides being less invasive for ventral dural compressive lesions.

5. Conclusions

The posterior approach to the treatment of spinal TB, with bilateral transpedicular access to anterior decompression together with posterior transpedicular fixation, has satisfactory outcomes regarding the clinical improvement and spinal stabilization among Yemeni patients.

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Authors' contributions

MAA contributed to study design, data collection, interpretation of results and manuscript drafting. MAE contributed to study design and histopathologic examinations. All authors revised the manuscript and approved the final draft.

Competing interests

The authors declare that they have no competing interests associated with this article.

Ethical approval

This study protocol was approved by the Ethics Committee of the Faculty of Medicine and Health Sciences, Sana'a University, Sana'a Yemen. Written consent was obtained from each patient before participation.

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