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Original Article

Orthopaedics Section

An Analysis of Treatment and Prognosis of Spinal Tuberculosis: A Prospective Study done in Tertiary Care Centre

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ABSTRACT

Introduction: In cases of skeletal Tuberculosis (TB), spinal TB is considered to be the most hazardous. Early treatment of spinal TB brings somewhat fine projections as well.

Aim: To evaluate the treatment and prognosis of patients with spinal TB.

Materials and Methods: The study involved patients with spinal TB from the period of 2017 to 2019. The total of 67 patients were included and follow-ups were made during the entire period of healing. Patients diagnosed with spinal TB and had not previously received anti-TB therapy and debridement or radical decompression surgery were included. A paired t-test was used to compare the pre-treatment and post-treatment clinical data. A p-value <0.05 was considered statistically significant.

Results: The male patients comprised of the 62.7% of the total sample size. At the final follow-up, the Visual Analogue Scale (VAS) score significantly improved from 5.99±2.11 preoperatively to 1.90±4.81 postoperatively (0<0.05), the Cobb angle significantly decreased from 16.84±6.42 preoperatively to 3.86±2.26 postoperatively (0<0.05). The Erythrocyte Sedimentation Rate (ESR) significantly decreased from 45.26±12.26 preoperatively to 9.91±6.48 postoperatively (0<0.05), and C-Reactive Protein (CRP) also significantly decreased from 49.22±42.31 to 9.84±11.53.

Conclusion: Quick treatment and diagnosis of spinal TB are essential to prevent permanent neurological disability and to minimise spinal deformity.

Keywords: Anti-tuberculosis therapy, Pott's disease, Spinal cord

INTRODUCTION

The leading hazardous variety of skeletal TB is Pott's disease of spine. Patients with such ailment are vulnerable to bone annihilation, distortion and paraplegia [1]. It generally expands when the immune responses are at stake or swamped. The diverse spots of anatomy where this disease could take place consists of vertebrae, intervertebral disc space within the spinal canal, and adjoining yielding tissues. Thoracolumbar junction can be the affected area with spinal TB. Despite progression in process of healing, morbidity ratio of this disease is very high. Even the infection ratio of *Mycobacterium tuberculosis* is very high which is worldwide approximated up to one person per second [2,3]. Spinal TB is a significant reason of non-traumatic damages in spinal cord. It could be the most widespread reason of non-traumatic spinal cord injury in developing nations [4-6].

There is a varied opinion about the treatment of spinal TB. Usually, chemotherapy or surgery is considered to be the standard healing process. However, a subway to the existing treatment is considered to be the percutaneous drainage of the paravertebral eruption along with conservative chemotherapy [4]. However, there are many researches which suggest surgery as the only remedy [5]. There is a significant dilemma too about the treatment of spinal TB. The aim of this study was to bring forth the healing procedures and diagnosis of spinal TB in right line of treatment at our teaching hospital.

MATERIALS AND METHODS

The center of this prospective study was Department of TB and Chest and Department of Orthopedics at Saraswathi Institute of Medical Science, Hapur, Uttar Pradesh, India. All the 67 patients with spinal TB that got admitted in the hospital during the period of 2017 to 2019 were included in the work. Patients complicated with severe heart and lung dysfunctions who cannot tolerate surgery; pregnant and lactating women; patients complicated with active TB were excluded from the study.

Written and verbal consent were taken from the patients and their family, and the study was well approved by the ethical committee of the institute and keeps no ethical claims of any sort (IEC.2017M/6_II, dated march 2017).

The investigations for spinal TB in these patients were conducted on grounds of one or more of the subsequent criterion:

- Earlier account of pulmonary or extrapulmonary TB with perceptible indications like low fever, chest pain, back pain, neurological dysfunction, emaciation etc.,
- Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) steady with spinal TB.
- CRP and ESR augmented to changeable extent.
- Microbiological substantiation counting somewhat any one of these: separation of *Mycobacterium tuberculosis* in blood, bone, deep soft tissues or carbuncle samples; affirmative microscopy for acid-fast bacilli from bone, deep soft tissue or abscess; *Mycobacterium tuberculosis* culture affirmative.

There were no patients who could be categorised as A or B according to the Frankel categorisation of grades where grade A stands for utterly paralysed and B for merely potted impression without motor tasking. The demographics, quantifiable images, basic ailments or else peril sources, procedures of investigation, laboratory findings as well as imaging attributes, histological as well as microbiological outcomes, approaches of treatment and medicines practiced, extent of cure, and result at the end of the noticeable time were documented. However, findings were maintained by imaging materialisation or quantifiable attributes that allied with spinal TB [6,7].

STATISTICAL ANALYSIS

The Statistical Package for Social Sciences (SPSS) version 15.0 (SPSS Inc., Chicago, IL, USA) was used in the study for all statistical computation. A paired t-test was used to compare the pre-treatment and post-treatment clinical data. The results were

reported as mean±Standard Deviation (SD). A p-value <0.05 was considered statistically significant.

RESULTS

The male patients comprised of 62.7 percentage of the total sample size. Forty eight patients of the total size were bestowed with the conventional cure while 19 required surgical attention. Three of the total numbers were identified with cervical TB [Table/Fig-1-3].

Age (years)	Number	Percentage
20-30	5	7.5
31-40	18	26.9
41-50	22	32.8
51-60	14	20.9
61-70	7	10.4
<70	1	1.5

[Table/Fig-1]: Age distribution of spinal TB patients.

Gender	Number	Percentage
Male	42	62.7
Female	25	37.3

[Table/Fig-2]: Gender distribution of spinal TB patients.

	Conservative treatment, (n=48)	Surgical treatment, (n=19)	Statistical analysis
Age (years)	44.29±11.2	46.35±18.21	p=0.062
Region of the lesion			
Cervical vertebrae	2	1	
Thoracic vertebrae	17	8	
Thoracolumbar	13	6	
Lumbar	15	2	
Sacral vertebrae	1	2	
Frankel classification			
A	0	0	
B	0	0	
C	0	3	
D	9	7	
E	39	9	
Intricate abscess site			
Paravertebral	12	6	
Intraspinal	6	1	
Paravertebral and intraspinal	17	7	
Psoas	4	2	
Iliac fossa	1	0	
None	8	3	
Preoperative VAS score	6.64±3.08	6.95±1.05	p=0.462
Operation approach			
Lateral approach		9	
Anterior approach		3	
Posterior approach		1	
Combined anterior approach with posterior approach		6	

[Table/Fig-3]: General and clinical information of patients.

At the final follow-up, the VAS score significantly improved from 5.99±2.11 preoperatively to 1.90±4.81 postoperatively (p<0.05). The Cobb angle significantly decreased from 16.84±6.42 preoperatively to 3.86±2.26 postoperatively (p<0.05). The ESR significantly decreased from 45.26±12.26 preoperatively to 9.91±6.48 postoperatively (p<0.05), and CRP also significantly decreased from 49.22±42.31 to 9.84±11.53 [Table/Fig-4].

	CRP	ESR	Cobb	VAS score
Prior to surgery	49.22±42.31	45.26±12.26	16.84±6.42	5.99±2.11
1 month after surgery	38.15±26.10*	36.34±25.29*	5.54±3.61*#	4.00±2.09*
3 month after surgery	27.49±21.09*	21.48±7.39*	3.28±2.17*#	2.87±1.69*
6 month after surgery	19.56±19.43*	16.29 ±9.64*	3.99±2.25*#	1.48±1.91*
Final follow-up	9.84±11.53*	9.91±6.48*	3.86±2.26*#	1.90±4.81*

[Table/Fig-4]: Alterations in parameter in the due course of ailment in patients going through surgery.
*versus data before surgery, p<0.05; # between the time points, p>0.05

DISCUSSION

Anti-TB treatment may not be adequate in spinal TB which carries a risk of deformity, instability and neurlogic deficit. Studies found surgery to be the best option in such cases [6,7]. This study too found a good functional improvement among all the patients. Researches have portrayed the surgical procedure as the cure modality for such instances [6,7]. Timely finding paves way to quick therapeutic procedures and deterrence of probable hurdles.

Largely, the most frequent amendments perceived on plain radiographs are disk space contraction and vertebral body obliteration, which possibly is nonetheless usual at the earliest outset of the illness. Keeping in view the findings of other researches [8], the thoracic and lumbar spines were the spinal segments most frequently affected. In disparity to the account given by Peto HM et al., half of the lacerations were occupied in the thoracic and lumbar spine [9]. Similar to other studies, in the present study three of the total numbers were identified with cervical TB. Nineteen of them were diagnosed with thoracolumbar TB, 25 with thoracic TB, three with sacral and 17 with lumbar TB.

The patients with more appalling illness of spinal TB in the shape of stern disability, coarse neurological discrepancy, spinal distortion, and autonomic connection asks added belligerent healing in the shape of the therapeutic removals and blend events in addition to straight anti-TB therapy.

ESR and CRP are the most commonly used parameters to monitor the disease activity and follow-up the therapeutic response of spinal TB [10]. ESR is a very sensitive but a highly non-specific test. In present study, ESR ranged from 1 to 45.26 mm/h, which was different from other authors' observation [11].

There was a definate surgical treatment efficacy on spinal TB. Combined techniques, anterior and posterior as well as osteotomies, vertebral column resection, have been defined for spinal alignment and bring back sagittal balance [12,13]. In this study, among 19 patients (28.3%) treated with surgery after anti-TB chemotherapy proved to be effective. Choice of procedure in all patients was based on the location and level of vertebral association. A part of the patients with spinal TB chose slightly invasive operating treatment [12,13].

This study add to the existing knowledge is that "It is essential to strengthen the TB preventive strategies and improve the health awareness of residents."

Limitation(s)

The study was done in a single centre and within a limited time period. So, the results can not be generalised.

CONCLUSION(S)

All patients received suitable treatment after diagnosis was made and attained good effectiveness. Quick treatment and initial diagnosis of spinal TB are essential to prevent permanent neurological disability and to minimise spinal deformity. The most usual sites were thoracic and lumbar vertebrae. The enormous

preponderance of convalescents having paravertebral and intra-spinal carbuncle is in the main stream of the study. Though, vigilant and thorough assortments of patients on the basis of the quantifiable and radiological ruling are essential for drawing a conclusion and initiating the treatment.

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