

## Original Research Article

# Conservative treatment of spinal tuberculosis and its outcome: an observational study

E. S. Radhe Shyam\*, Mirza Baig Atif

Department of Orthopaedic, Shadan Institute of Medical Sciences, Hospital and Research Centre, Hyderabad, Telangana, India

**Received:** 16 October 2018

**Revised:** 02 November 2018

**Accepted:** 03 November 2018

**\*Correspondence:**

Dr. E. S. Radhe Shyam,

E-mail: [eyunnis@yahoo.co.in](mailto:eyunnis@yahoo.co.in)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Spinal tuberculosis or Pott's spine occurs in about 1-2% of patients with tuberculosis and accounts for 40-50% of musculoskeletal tuberculosis. It is caused due to the infection of the bone by *Mycobacterium tuberculosis* bacteria with the combination of spread through haematogenous route as well as lymphatic drainage.

**Methods:** This observational study was done for a period of 2 years from Jan 2016 to Jan 2018. The total number of study participants was 51. The functional outcome was assessed using modified McCormick's scale.

**Results:** Majority of study participants were females accounting for 60.7% compared to males (39.21%). The main complaint of study participants was back pain (39.21%) which was followed by fever in 21.5%. Loss of appetite was the most prominent symptom seen in 15.6%. Thoracolumbar vertebrae were the site of involvement in 37.2%.

**Conclusions:** Patients responded well with anti-tubercular treatment in mild and moderate cases of spinal TB, if there was no gross neurological deficit. Thus it is very important to identify the early symptoms of spinal TB so that timely prompt treatment should be initiated.

**Keywords:** Tuberculosis, Pain, Spinal, Kyphosis

### INTRODUCTION

Spinal tuberculosis is said to be the most frequent bone tuberculosis which accounts for 50%. Mostly it may be associated to pulmonary diseases or not. If it is left undiagnosed and not treated early may lead to major complications such as paraplegia and deformities, which ultimately leads to functional loss.<sup>1</sup>

Spinal tuberculosis or Pott's spine occurs in about 1-2% of patients with tuberculosis and accounts for 40-50% of musculoskeletal tuberculosis.<sup>2,3</sup> It is caused by infection of the bone by *Mycobacterium tuberculosis* bacteria by combination of haematogenous route and lymphatic drainage. Usually the organism may stay dormant in the skeletal system for an extended period of time before the

actual disease is detected. The primary lesion is osteomyelitis and arthritis. The spinal cord may be involved in compression by bony elements and/or expanding abscess or by direct involvement of cord and leptomeninges by granulation tissue. Neurological deficit are usually more symmetrical and of more gradual onset than those resulting from other pathological conditions.<sup>4</sup>

It has been observed that the thoraco-lumbar junction is the most common site of the spinal column involvement in spinal TB and any part of the spine can also be affected.<sup>5</sup> The incidence of neurologic complications in spinal TB may vary from 10% to 43%.<sup>6</sup> Diagnosing the condition early is difficult due to the insidious onset of neurological symptoms and radiological diagnosis is confirmed in less than 50% of cases.<sup>7</sup>

There are two lines of management for spinal TB which includes conservative and operative treatments. There are different surgical indications such as progressive neurologic deficit, progressive increase in spinal deformity (coronal or sagittal), uncertain diagnosis: this could be an inability to obtain microbiological diagnosis from microscopy, culture, or even via detection of mycobacterium DNA using polymerase chain reaction (PCR) techniques,<sup>8-10</sup>

Ideally, the treatment of spinal tuberculosis is by chemotherapy and surgery is needed only if there are any complications arising from the disease process. Hence, most cases of spinal TB cases should be treated with chemotherapy and surgery line should be considered in complications only. Therefore, the present study was conducted in tertiary care teaching hospital. This study was performed to assess the functional outcome of patients of spinal TB with conservative treatment.

**METHODS**

This observational study was done by the Department of Orthopaedics at Shadan Institute of Medical Sciences, Hospital and Research Centre for period of 2 years from January 2016-January 2018. During this period, a total of 56 patients with age >15 years who attended OPD of Orthopaedic department and presented with symptoms related to spinal TB were enrolled. Out of 56 patients 5 patients didn't come for treatment and follow up. This study was cleared by the Institutional Ethical Committee. A pre-designed, pre-structured questionnaire was used. The variables used were demographic information, symptoms, signs related to spinal TB on local examination, Radiology imaging findings and outcome was assessed at subsequent interval to see improvement in symptoms and physical signs. All the cases were started with chemotherapy (anti-tubercular treatment). Three follow up visits were done after the initiation of ATT.

To assess the functional outcome Modified McCormick's functional outcome scale was used which we recorded at the time of initiation of treatment, at 3rd month and 6th month and at the end of completion of treatment. Informed consent was taken from every study participant and purpose of study was explained to study participant before the start of the study. The inclusion criteria for the patients was mild to moderate cases with mild to moderate neurological deficit, with involvement of only vertebrate but without involvement of spinal canal. Patients who were not willing to participate, Severe cases, Severe neurological cases and patients with spinal canal involvement related symptoms were excluded from the study.

Institutional ethical permission was taken before the start of the study.

Data was entered in Microsoft excel sheet and statistical analysis was done using simple proportions.

**RESULTS**

Table 1 shows that majority of study participants were in the age group of 31-45 years (41.17%) followed by 31.3% in 46-60 years of age group. About 11.7% were in >60 years of age group.

**Table 1: Age wise distribution of study participants.**

Age (in years)	Frequency	Percentage (%)
15-30	08	15.6
31-45	21	41.17
46-60	16	31.3
>60	6	11.7
<b>Total</b>	51	100

Out of total 51 patients, the majority was females with 31 cases (60.7%) in contrast to males who were 20 in number (39.3%) (Table 2).

**Table 2: Sex wise distribution of study participants.**

Sex	Frequency	Percentage (%)
Male	20	39.3
Female	31	60.7
<b>Total</b>	51	100

In Table 3, the main complaint of study participants was back pain (39.21%) which was followed by fever in 21.5%. Loss of appetite was symptom seen in 15.6% of them. Near about 9.8% of study participants said they had cough. Loss of weight was observed in 7.8% and night sweats were seen in 5.8% of them.

**Table 3: Symptoms wise distribution of study participants.**

Symptoms	Frequency	Percentage (%)
Back pain	20	39.21
Loss of appetite	08	15.6
Cough (dry)	05	9.8
Fever	11	21.5
Loss of weight	04	7.8
Night sweats	03	5.8
<b>Total</b>	51	100

Table 4 shows that on examination it was found that about 56.8% had percussion pain followed by local deformity in 15.6% and kyphosis was seen in 27.4% of them.

Table 5 shows that thoracolumbar vertebrae was the site of involvement in 37.2%. Lumbar vertebrae was involved in 25.4% followed by thoracic vertebrae in 19.6%, cervical (9.8%) and sacral in 7.8%.

**Table 4: Distribution of study participants with different signs.**

Signs	Frequency	Percentage (%)
Local deformity	08	15.6
Percussion pain	29	56.8
Kyphosis	14	27.4
<b>Total</b>	<b>51</b>	<b>100</b>

**Table 5: Distribution of study participants with involvement of site of vertebra.**

Vertebrae	Frequency	Percentage (%)
Cervical	05	9.8
Thoracic	10	19.6
Lumbar	13	25.4
Thoracolumbar	19	37.2
Sacral	04	7.8
<b>Total</b>	<b>51</b>	<b>100</b>

Table 6 shows that disc space reduction (41.1%) was seen in majority of study participants followed by local kyphosis in 27.4% of them. Vertebral body destruction was seen in 19.6% and paravertebral abscess was seen in 11.76% of them.

**Table 6: Distribution of study participants with imaging appearance.**

Imaging Appearance	Frequency	Percentage (%)
Vertebral body destruction	10	19.6
Local kyphosis	14	27.4
Disc space reduction	21	41.1
Paravertebral abscess	6	11.76
<b>Total</b>	<b>51</b>	<b>100</b>

Table 7 shows that functional assessment at pre-treatment stage 43.1% were in Grade-I, 49.01% in Grade-II and 7.8% in Grade-III. No one was in Grade-IV and Grade-V. At first follow at 3<sup>rd</sup> month after starting the treatment there was improvement in functional outcome such as in Grade-III only 3.9% study participants were present and near about 60.7% were in Grade-I. At second follow up there was improvement in functional outcome like study participants were only Grade-I. At last follow at the end of treatment 100% were in Grade-I which shows that overall improvement was observed after the start of the treatment.

**Table 7: Functional outcome of study subjects using modified McCormick’s scale.**

Modified McCormick’s scale	Pre-treatment (%)	First follow up (3 <sup>rd</sup> month) (%)	Second Follow up (6 <sup>th</sup> month) (%)	Third follow up on completion of treatment (%)
<b>I</b>	22 (43.1)	31 (60.7)	51 (100)	51 (100)
<b>II</b>	25 (49.01)	18 (35.2)	0	0
<b>III</b>	04 (7.8)	02 (3.9)	0	0
<b>IV</b>	0	0	0	0
<b>V</b>	0	0	0	0
<b>Total</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>

**DISCUSSION**

In present study it was observed that that majority of study participants were in the age group of 31-45 years (41.17%) followed by 31.3% in 46-60 years of age group. About 11.7% were in >60 years of age group. In another study maximum number of study participants were in the age group of 15-40 years (48.3%) followed by 39.3% in 41-60 years of age group.<sup>11</sup> In another study majority of study participants were in the age group of 31-40 years (20.7%) which is similar to present study findings.<sup>12</sup>

In present study majority of study participants were females accounting for 60.7% compared to males (39.21%) respectively. Present study findings were consistent with another study where females were more in number compared to males.<sup>13</sup> In a study done Zehua Zhang et al, 52% of the study were females and 48% were males.<sup>11</sup> In another study males were more in

number compared to females.<sup>14,15</sup> In Pradhan et al, study 63.6% were males.<sup>16</sup>

It was noted in present study that the main complaint of study participants was back pain (39.21%) which was followed by fever in 21.5%. Loss of appetite was symptom seen in 15.6% of them. Near about 9.8% of study participants said they had cough. Loss of weight was observed in 7.8% and night sweats were seen in 5.8% of them. In a study done by Zhang et al, main presenting symptom among the study participants was back pain (98%) followed by night sweats in 37.08% and fever in 28.09%.<sup>11</sup> In a study done by Abbas et al, the main presenting symptom was back pain in 95.7% which is also main presenting complaint.<sup>12</sup> In another study too back pain was the main presenting symptom (77%) followed by weight loss in 57% which is more than present study findings and fever was seen in 37% of study participants.<sup>15</sup>

In present study it was observed about 56.8% had percussion pain followed by local deformity in 15.6% and kyphosis was seen in 27.4% of them. The present study findings were consistent with another study where percussion pain was noted in 98.88%.<sup>11</sup> Local deformity was observed in another study in 11% of study participants which is nearly similar to present study findings.<sup>11</sup>

The site of involvement in present study was thoracolumbar (37.2%). Lumbar vertebrae was involved in 25.4% followed by thoracic vertebrae in 19.6%, cervical (9.8%) and sacral in 7.8%. In another study the main site of involvement was lumbar (56.2%) which is not similar with the present study.<sup>11</sup> In a study done by Abbas 54.1% were having lumbar spine involvement for TB.<sup>13</sup> In a study done by Njoku et al lumbar spine was involved in 41.5% of study participants.<sup>12</sup>

The imaging findings in the present study suggests that that disc space reduction (41.1%) was seen in majority of study participants followed by local kyphosis in 27.4% of them. Vertebral body destruction was seen in 19.6% and paravertebral abscess was seen in 11.76% of them. In another study the disc space reduction was seen in 91.01% which is more than the present study.<sup>11</sup> The local kyphosis in another study was observed in 77.53% and vertebral body destruction was seen in 98.38%.<sup>11</sup>

The functional outcome was assessed using Modified McCormick's scale which shows that pre-treatment stage 43.1% were in Grade -I, 49.01% in Grade-II and 7.8% in Grade-III. No one was in Grade-IV and Grade-V. At first follow at 3<sup>rd</sup> month after starting the treatment there was improvement in functional outcome such as in Grade-III only 3.9% study participants were present and near about 60.7% were in Grade-I. At second follow up there was improvement in functional outcome like study participants were only Grade-I. At last follow at the end of treatment 100% were in Grade-I which shows that overall improvement was observed after the start of the treatment. The present study findings were consistent with other study where there was good improvement in functional outcome of study participants after the start of the treatment at subsequent follow up visits.<sup>17</sup>

## CONCLUSION

Patients responded good with anti-tubercular treatment in mild and moderate cases of spinal TB in case if there is no gross neurological deficit. It's very important to identify the early symptoms of spinal TB and timely prompt treatment should be initiated so that complications can be prevented at the earliest. Those who don't respond with first line of treatment, second line of treatment should be started. In certain cases where conservative treatment is not showing improvement and if there is clear cut picture of neurological deficit then surgical line of treatment should be considered. The best

way is to do early diagnosis of spinal TB and treatment should be initiated at the earliest.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the institutional ethics committee*

## REFERENCES

1. De Medeiros RS, Abd RCT. Treatment of Spinal Tuberculosis: Conservative or Surgical. *Acta Ortop Bras.* 2007;15(3):128-13.
2. Obajimi MU, Jumah KB, Ogoe E, Asiame S, Kamita A, Brakohiappa E. Computed tomographic evaluation of Pott's disease in Accra. *West Afr J Med.* 2004;23:50-2.
3. Huelskamp L, Andrew S, Bernhard TM. TB of the spine: Pott's diseases. *Orthop Nurs.* 2000;19:31-35.
4. Turgut M. Multifocal extensive spinal tuberculosis (Pott's disease involving cervical, thoracic and lumbar vertebra) *Br J Neurosurg.* 2001;15:142-6.
5. Moorthy S, Prabhu NK. Spectrum of MR imaging findings in spinal tuberculosis. *AJR Am J Roentgenol.* 2002;179:979-83.
6. Sai Kiran NA, Vaishya S, Kale SS, Sharma BS, Mahapatra AK. Surgical results in patients with tuberculosis of the spine and severe lower-extremity motor deficits: a retrospective study of 48 patients. *J Neurosurg Spine.* 2007;6:320-6.
7. Hayes AJ, Choksey M, Barnes N, Sparrow OC. Spinal tuberculosis in developed countries: difficulties in diagnosis. *J R Coll Surg Edin* 1996;41:192-6.
8. Jain AK. Tuberculosis of the spine: a fresh look at an old disease. *J Bone Joint Surg* 2010;92(7):905-13.
9. Mak KC, Cheung KM. Surgical treatment of acute TB spondylitis: indications and outcomes. *Eur Spine J.* 2013;22 4:603-11.
10. Jutte PC, Van Loenhout-Rooyackers JH. Routine surgery in addition to chemotherapy for treating spinal tuberculosis. *Cochrane Database Syst Rev.* 2006;1:CD004532.
11. Zhang Z, Luo F, Zhou Q, Dai F, Sun D, Xu J. The outcomes of chemotherapy only treatment on mild spinal tuberculosis. *J Orthop Surg Res* 2016;11(49):1-8.
12. Njoku CH, Makusidi MA, Ezunu EO. Experiences in Management of Pott's Paraplegia and Paraparesis in Medical Wards of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. *Ann African Med.* 2007;6(1):22-5.
13. Abbas A, Rizvi SRH, Mahesri M, Salahuddin HRA. Conservative Management of Spinal Tuberculosis: Initial Series from Pakistan. *Asian Spine J* 2013;7(2):73-80.
14. Kamper-Jorgensen Z, Andersen AB, Kok-Jensen A, et al. Migrant tuberculosis: the extent of transmission in a low burden country. *BMC Infect Dis.* 2012;12:60.

15. Garg B, Kandwal P, Nagaraja UB, Goswami A, Jayaswal A. Anterior versus posterior procedure for surgical treatment of thoracolumbar tuberculosis: a retrospective analysis. *Indian J Orthop*. 2012;46:165-70.
16. Pradhan RL, Pandey BL, Sharma S, Lakhey S, Manadhar RR, Rijal KP, et al. Conservative treatment of TB Spondylitis in Dorsolumbar and Lumbar spine. *NOAJ*. 2013;3(2):1-6.
17. Bodapati PC, Vemula RCV, Mohammad AA, Mohan A. Outcome and management of spinal tuberculosis according to severity at a tertiary referral center. *Asian J Neurosurg*. 2017;12(3):441-6.

**Cite this article as:** Shyam ESR, Atif MB. Conservative treatment of spinal tuberculosis and its outcome: an observational study. *Int J Res Orthop* 2019;5:xxx-xx.