

# Instrumentation in Potts Spine: A Two Year Retrospective Study in CCM Medical College and Hospital Durg

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## Abstract

Most of the patient suffering from tuberculosis can be managed on anti-tuberculous therapy. Spinal TB patients can present with various signs and symptoms which include leg or back pain, palpable mass in the paraspinal region, kyphotic deformity and neurological compromise, out of these most important sequelae of TB spine are kyphotic deformity and neurological compromise. The spinal cord undergoes intrinsic changes due to tuberculosis and late-onset paraplegia is produced, with consequent poor chances of neural recovery even after surgery. When treatment is started the diseased segment of the spine or vertebral body is the weakest portion and it must be protected by suitable external braces. Fracture and dislocation of a diseased vertebral body may occur secondary to mechanical trauma and surgical decompression adds further instability. So indications for instrumented stabilisation can be advised. Surgical management or instrumentation in Pott's spine helps regain motor function and ameliorates disability. **Material and Methods:** 38 patients were included with Thoracic and Thoracolumbar Pott's disease. Included patients were having severe kyphosis with an active disease. Clinical evaluation of the outcome measures were evaluated at baseline, postoperatively and at 3rd, 6th and 1 year. Preoperative and postoperative X-ray, loss of kyphotic correction. Average operation time, bony fusion and implant failure were observed. **Results:** During study period total 1456 patients were diagnosed as TB out of which 99 were extra pulmonary cases and 58 were diagnosed as pott's spine with thoracic and thoracolumbar TB and 38 patients were included in the study who meet the inclusion criteria for our study. In our study of the 38 patients 18 were male and 20 were female patients. Mean age was 43.82. In Dorsal group D1 to D4, D5 to D8 and D9 to D12 involvement was seen in 4(10.53%), 10 (26.32%) and 13 (34.21%) respectively. Multi-segment involvement was observed in 3 (7.89%) patients. Dorsolumbar and lumbar involvement was seen in 5 patients. In lumbar, L1 to L2, L2 to L3, L3 to L4 and L4 to L5 involvement was 1(2.63%), 0, 1(2.63%) and 2 (5.26%) respectively. Mean operation time was 290±41minutes and mean hospital stay was 16 days ranging from 8 days to 72 days. 34 patients had a successful bony fusion within a mean of 7±1.2 months, whereas 4 patients had late fusion or nonfusion because of secondary infections. Mean preoperative kyphosis was 21 degrees which was corrected to 9 degrees in final follow up after instrumentation. **Conclusion:** Instrumented stabilisation is safe in spinal TB. Posterior transpedicular approach is a safe surgical procedure for thoracic and thoracolumbar Pott's spine. Also Posterior transpedicular approach shows improved functional status and significantly improves neurological pain and fusion rate. However clinical trials with a larger sample size and a longer follow-up period are required.

## Introduction

The treatment of tuberculosis of the spine (Pott's disease) is generally conservative and most of the patients can be managed on anti-tuberculosis therapy (ATT).<sup>[1]</sup> With the advent of effective combination chemotherapy in the early 1950s, the mortality rate among patients with spinal tuberculosis decreased from approximately 1% to 3%. Hodgson and Stock in 1960 introduced the concept of radical debridement and anterior fusion.<sup>[2,3]</sup> Spinal TB patients can present with various signs and symptoms which include leg or back pain, palpable mass in the paraspinal region, kyphotic deformity and neurological compromise, out of these most important sequelae of TB spine are kyphotic deformity and neurological compromise. Neurological deficits occur due to the kyphotic deformity or spinal abscess and/or granulation tissue compressing the spinal cord or cauda equine.<sup>[4]</sup> In children even after the healed status, spinal deformities continue to advance due to the biomechanical stresses on the structurally weakened vertebral column and can produce severe degenerative changes in the proximal and distal segments of the spine.<sup>[5,6]</sup>

The spinal cord undergoes intrinsic changes due to tuberculosis and late-onset paraplegia is produced, with consequent poor chances of neural recovery even after surgery.<sup>[7]</sup> Percentage of Spinal tuberculosis

(TB) is 2% of all cases of TB, with up to 15% of cases being extrapulmonary TB and 50% being skeletal TB.<sup>[8,7]</sup> Spinal TB commonly affects the lower thoracic and lumbar vertebrae, followed by the middle thoracic and cervical vertebrae.<sup>[8]</sup> Combined medical and surgical or pharmacological strategies can control the disease in most patients.<sup>[9]</sup>

When treatment is started the diseased segment of the spine or vertebral body is the weakest portion.<sup>[10]</sup> and it must be protected by suitable external braces. Fracture and dislocation of a diseased vertebral body may occur secondary to mechanical trauma and surgical decompression adds further instability. So indications for instrumented stabilisation can be advised.

Surgical management or instrumentation in Pott's spine helps regain motor function and ameliorates disability. The selection of an optimal surgical approach for treating thoracolumbar TB still remains controversial.<sup>[11,12]</sup> The anterior approach was preferred traditionally as it enabled direct access to the infected focus and provided easier access for debridement and reconstruction of defects.<sup>[11]</sup> But anterior and posterior approach can be helpful as it gives more stability as compared to anterior approach.<sup>[12]</sup>

## Material and Methods

Present study was carried out in the Dept. of Surgery at CCM Medical College and Hospital Kachandur, Durg from Jan 2015 to Dec. 2017.

Patients aged >18 years who had thoracic and Thoracolumbar Pott's disease were eligible and included in the study. Histopathological examination was done on all patients for confirmation of diagnosis. Included patients were having severe kyphosis with an active disease (>45° in adults and >30° in adolescents), deteriorating neurology with conservative treatment, spinal instability on X-ray, grade 4 paraplegics due to progression of kyphotic deformity and limited improvement even with ATT for 4–6 weeks.

Patients were excluded if they had cervical or sacral TB, having severe comorbidities like uncontrolled diabetes, ischemic heart disease, uncontrolled hypertension etc. and were certified unfit for the surgical procedure.

The study was approved by the Institutional ethics committee. Written informed consent was taken from all the patients.

Clinical evaluation of the outcome measures were evaluated at baseline, postoperatively and at 3rd, 6th and 1 year. Preoperative and postoperative X-ray, loss of kyphotic correction. Average operation time, bony fusion and implant failure were observed.

All data was collected and statistical analysis was done by SPSS software.

## Results

During study period total 1456 patients were diagnosed as TB out of which 99 were extrapulmonary cases and 58 were diagnosed as pott's spine with thoracic and thoracolumbar TB and 38 patients were included in the study who meet the inclusion criteria for our study.

In our study of the 38 patients 18 were male and 20 were female patients. Mean age was 43.82. (Range 20 to 64 years) There was 1 (2.63%) patient in 20 to 30 years age group. In 21 to 40 years age group 6(15.79%) patients. In 41 to 50 age group 15(39.47%) and in >50 years age there were 16(42.11%). Most cases were observed in > 50 years age group.

**Table 1: Demographic characteristics**

FACTOR	Number	%
Age: Mean 43.82. (range 20 to 64 years)		
20 to 30 years	1	2.63
21 to 40 years	6	15.79
41 to 50 years	15	39.47
> 50 years	16	42.11
Sex		
Male	18	47.37
Female	20	52.63

**Table 2: Level affected**

	n=38	Number	%
Level affected			
Dorsal	D1 to D4	4	10.53
	D5 to D8	10	26.32
	D9 to D12	13	34.21
	Multisegment	3	7.89
	Dorsolumbar	4	10.53
Lumber	L1 to L2	1	2.63
	L2 to L3	0	0
	L3 to L4	1	2.63
	L4 to L5	2	5.26

In Dorsal group D1 to D4, D5 to D8 and D9 to D12 involvement was seen in 4(10.53%), 10 (26.32%) and 13 (34.21%) respectively. Multi-segment involvement was observed in 3 (7.89%) patients. Dorsolumbar and lumbar involvement was seen in 5 patients.

In lumber, L1 to L2, L2 to L3, L3 to L4 and L4 to L5 involvement was 1(2.63%), 0, 1(2.63%) and 2 (5.26%) respectively.

17 patients years underwent anterior debridement, decompression and instrumentation by anterior transthoracic, transpleural and/or retroperitoneal diaphragm cutting approach. 21 patients were operated by posterolateral (extracavitary) decompression and posterior instrumentation. Mean surgical time in anterior debridement group was 6 h 12 min versus 4 h 45 min in posterior instrumentation group.

**Table 3: preoperative ad CRP**

	post-operative
ESR	43±13mm/hr
CRP	31±15 mg/L,

The average preoperative erythrocyte sedimentation rate (ESR) and C-reactive protein values were 43±13mm/hr and 31±15 mg/L, respectively. These values decreased over 1–2 months after the operation and returned to normal at 4–8 months after the procedure. Recurrence of spinal TB was not found in any of the case. Mean operation time was 290±41 minutes and mean hospital stay was 16 days ranging from 8 days to 72 days. 34 patients had a successful bony fusion within a mean of 7±1.2 months, whereas 4 patients had late fusion or nonfusion because of secondary infections. No active surgical intervention was performed in any of the patient. No neurological complications were seen in any patient. After surgery, patients were allowed to sit up and walk around with appropriate spinal orthoses. Mean preoperative kyphosis was 21 degrees which was corrected to 9 degrees in final follow up after instrumentation.

## Discussion and Conclusion

Spinal tuberculosis generally produces neurological complications and grotesque spinal deformity.<sup>[6]</sup> The spinal cord can undergo intrinsic changes which produce late-onset paraplegia, and there is a poor chance of neural recovery after surgery.<sup>[7]</sup> After introduction of antitubercular drugs, now the objective is to achieve healed states as well as to reduce deformities by instrumentation of the pott's spine with no sequelae of neural complications and an almost near-normal spine. Surgically treatable lesions are debrided, and the resultant gap which is weakest is grafted using a tricortical cortico-cancellous bone graft.<sup>[13]</sup> Excellent results can be achieved if the diagnosis is early.<sup>[11]</sup>

Surgical options such as anterior or posterior operation alone or a combination of both can be used to prevent and reduce spinal deformity.<sup>[14]</sup> In our study, patients anterior decompression and posterior stabilization through the posterior transpedicular approach was done which leads the patients to rapid recovery and early mobilization. Recovery and improvement in the functional ability of the patients was increased after the instrumentation. The most common indication for operation in our study was a progressive neurological deficit which was observed in all 38 patients and 31 patients were having pain and neurological deficit.

Debridement with spinal cord decompression and stabilization was done in our surgical management. The anterior approach was considered as the gold standard for surgically treating Pott's spine as described by AR Hodgson.<sup>[12]</sup> as it enables a direct access to the vertebral body and have optimal visualization. Posterior transpedicular approach is an effective method to stabilize the thoracolumbar spine and promote healing. Also this approach prevents graft complications

and kyphosis progression and reduces the total operation time and morbidity.<sup>[11]</sup>

Oga et.al<sup>[16]</sup> in his study observed no persistent or recurrent infection after surgery in patients with spinal TB treated with posterior spinal Instrumentation. Similar results were observed in our study. Stabilisation was mostly performed to prevent on treatment the deterioration of kyphosis.

In a study by Jain Et al.<sup>[17]</sup> mean preoperative kyphosis was 25.35°, immediate postoperative kyphosis was 9.08° and final kyphosis was 12.97°. In our study mean preoperative kyphosis was 21 degrees which was corrected to 9 degrees in final follow.

Instrumented stabilisation is safe in spinal TB. Posterior transpedicular approach is a safe surgical procedure for thoracic and thoracolumbar Pott's spine. Also Posterior transpedicular approach shows improved functional status and significantly improves neurological pain and fusion rate. However clinical trials with a larger sample size and a longer follow-up period are required.

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