

Spinal Tuberculosis: Decompression and Stabilization by single posterior approach: A Multi-Centric Cohort study

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ABSTRACT

Objective: To determine functional and fusion outcomes of postero-lateral decompression in spinal tuberculosis.

Methods: This multi-centric study was done from January 2014 to December 2017. We included 52 patients with spinal tuberculosis spondylitis between 15 to 60 years of age of both genders diagnosed on history, routine investigation and magnetic resonance imaging (MRI). All patients were operated via posterior approach under C-arm. We stabilized the involved vertebrae with pedicle screws involving one motion segments above and below. Tuberculosis abscess was drained and decompression of the spinal cord was done. All patient's fusion and functional outcome was assessed using Oswestry Disability Index. We followed patient post-operative 2 weeks, 6 weeks, 12 weeks, 6 months and 1 year.

Results: Amongst the total 52 patients, there were 36 (69.2%) male and 16 (32.8%) female. Mean age of the patients was 24.615 ± 12.281 with maximum patients between 16 to 30 years of age. There were 19 (36.4%) cases of lumbar spine, 16 (30.7%) dorsal spine and 17 (32.9%) dorso-lumbar spine. Mean surgical time from start of time till closure was 101.8654 ± 16.88 .

There was improvement in Oswestry disability index post-operatively, and out of total 51 patients 43 (84.31%) had no disability and only 06 (11.76%) had moderate disability and 02 (3.9%) has sever disability.

Conclusion: Posterolateral decompression in patients with spinal tuberculosis has good functional and fusion outcome.

Key Words: fusion, Oswestry Disability Index, Spine tuberculosis.

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INTRODUCTION

Spinal tuberculosis was believed to be a disease of developing countries till last decade. In developed countries, growing problem of human immunodeficiency virus (HIV) associated tuberculosis has emerged as a big challenge for us. It is the most common form of extra-pulmonary tuberculosis (TB) accounts for 50 to 60% of cases.^{1,2} It is present in 1.7% of the population worldwide.³ Percival Pott in 1779, first describe the spinal deformity due to TB.⁴ Early diagnosis of spinal TB is difficult, and disease commonly unveils at advance stage. Delay in making diagnosis and start of treatment can be associated with severe complications rate included cord compression and

kyphotic deformity. In advance stage, most commonly disease present with lower limb weakness, pain, and Gibbus deformity.

Anti-tuberculosis chemotherapy is the mainstay of conservative treatment. The disease can be diagnosed early with the help of magnetic resonance image (MRI). The course of conservative treatment is lengthy, and there can be a progression of the deformity, risk of neurological compromise, instability and patient needs a long-term rest for alleviation of severe low back pain. We can avoid these problems with rigid internal fixation.⁵

Different surgical options include anterior spinal fusion, antero-posterior spinal fusion, posterior spinal fusion alone and posterior spinal fusion with anterior fusion.⁶⁻⁸ The indication for every single surgical procedure, complication rates, including implant loosening, neurological deficit, pain relief, chest related complication, early rehabilitation is not clear.

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We planned this study to determine functional and fusion outcome of postero-lateral decompression in spinal tuberculosis.

METHODOLOGY

This multi-centric study was done from January 2014 to December 2017. After approval from ethical board of the Institutions and informed consent from the patients, we included 52 patients between 15 to 60 years of age, of both gender who presented with conventional history of low grade fever, ± weight loss, backache, diagnosed with raised erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), x-rays, and later confirmed with Magnetic Resonance Image (MRI) and biopsy. Patients with abscess, confirmed on MRI, were planned for drainage of abscess and posterior instrumentation. All patients were operated via posterior approach under C-arm. Pre-operatively, third generation cephalon-sporin injection ceftriaxone 1gm was given half an hour before surgery and 2gm/ 24 hours post-operatively for 48 hours. We stabilized the involved vertebrae with pedicle screws involving one motion segment above

and below. Tuberculosis abscess was drained and decompression of the spinal cord was done. In thoracic spine, part of excised rib was used as sturt graft. Tri-cortical iliac crest graft or cage with bone substitute was used in lumbar spine wherever required. We recorded surgical procedure time, hospital stay, chest related complications, wound healing, early return to work, clinical and radiological fusion of the segment compared with other approaches. All patient’s functional outcome was assessed using Oswesrty Disability Index. We followed patient post-operative 2 weeks, 6 weeks, 12 weeks, 6 months and 1 year. Important variables were analysed with SPSS version 20 and data represented in table where necessary.

RESULTS

Amongst the total 52 patients, there were 36 (69.2%) male patients and 16 (32.8%) patients were female. Important variables are shown summarized in table 1. Mean age of the patients was 24.615±12.281 with maximum patients between 16 to 30 years of age.

Table 1: Frequency of age, gender, surgical time and Oswesrty disability index.

Variables	Frequency (N=52)	Percentage
Gender of the patient		
• Male	36	(69.2%)
• Female	16	(32.8%)
Mean age±SD	24.615±12.281	
Level of Spine		
• Doral spine	19	(36.4%)
• Lumbar spine	16	(30.7%)
• Dorso-lumbar spine	17	(32.9%)
Mean Surgical Time	101.8654±16.88	
Oswestry Disability Index		
• Moderate	06	(11.5%)
• Severe	02	(3.8%)



Case 1: Involvement of Lumbar 3rd and 4th vertebrae.



Case 2: Involvement of Dorsal spine level D10-11

There were 19 (36.4%) cases of lumbar spine, 16 (30.7%) dorsal spine and 17 (32.9%) were dorso-lumbar spine. Mean surgical time from start of time till closure was 101.8654 ± 16.88 . Good response was observed in all patient in first five weeks. ASIA scoring was done and 16 patients had pre operative neurological deficit. Six (40%) patients recovered from grade B, to grade D, 7 (46.66%) patients recovered from C to E grade while three (20%) patients with A grade didn't showed any recovery. There was improvement in Oswestry disability index post-operatively, and out of total 51 patients 43 (84.31%) had no disability and 06 (11.76%) had moderate disability only 02 (3.9%) had sever disability. One patient got expired during 3rd month and other patients were followed till last follow up time.

DISCUSSION

Tuberculosis is an ancient disease, that has worldwide impact. Every year 9 million new cases are reported and associated with high rate of mortality.^{9,10} This disease results into economic burden and affects patient social and personal life. The efficacy of anti-tuberculosis chemotherapy is questioned in certain cases due to increase in drug resistance.¹¹ Mostly patient presents and diagnosed with advance stage of the disease. In advance stage, with long conservative therapy (9-18 months), patients need cast, drugs and long rest to cure disease and prevent deformity.^{12, 13}

The modern treatment method of spinal tuberculosis involves, drainage of the abscess, spinal cord decompression, deformity correction, stabilization and further protection of cord. There are different approaches for surgical management of spinal tuberculosis. For cervical spine, anterior approach is used commonly. There are various approaches for thoracic spine including anterior and antero-lateral decompression by thoraco-abdomen approach, posteriorly costo-transversectomy. In thoracic spine, there are high chances of pleural damage, atelectasis and complications associated with chest tube insertion in anterior and antero-lateral approaches. In some

cases, cage may be used for stabilization but it has its own merits and demerits. For lumbar TB three approaches, anterior, antero-lateral and posterior are viable.

Different methods of surgical fusion have been described in past 50 years.¹⁴⁻¹⁶ Post approach has good results of fusion in spinal tuberculosis.^{17,18} The approach bypasses the opening of thoracic and abdominal cavities. It provides three-dimensional correction and ultimately stabilization due the strength of the rods. When we compared with anterior stabilization it has more complications including spinal instability.¹⁹ Similarly, Xie et al. reported in his data that posterior elements of the spinal cord are necessary for spinal column stability and cope the effect of shear and rotational forces.²⁰ Degrief et al. reported 27% loss of rotational stability in patients treated with laminectomy.²¹ The clinical significance of surgical approach is high in which there is minimal loss to the posterior column of the spine.

As small sample size and short follow up period are the two limitations of our study. We, therefore recommend large sample size studies with longer follow up period to confirm our results.

CONCLUSION

We concluded that posterolateral approach has minimum complications and good functional outcomes in the treatment of spinal tuberculosis. Patients satisfaction and early return to activity is also good. We, therefore recommend this surgical approach to treat spinal tuberculosis.

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Authorship and Contribution Declaration

Mian Muhammad Hanif, Conception and design, Acquisition of data, Final approval of the version for publication
Khizar Ghalib, Revised the manuscript critically for important intellectual content
Muhammad Khalid ur Rehman, Drafted the manuscript
Abhishek Kumar Thakur, Interpreted the Data