



**“Experience of Anterior debridement, decompression, bone grafting, and instrumentation for lower cervical spine and upper dorsal Pott's spine.”**

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**ABSTRACT** **BACKGROUND:** Spine tuberculosis is very common in the Indian people with high morbidity, although the Govt. of India has included treatment of the spine tuberculosis in pulmonary tuberculosis programme, the burden of the patients remained high.

**MATERIAL AND METHOD:** Twenty patients with cervical and upper dorsal Pott's spine were operated with anterior debridement, decompression, bone grafting, and instrumentation and were given ATT after wards and were followed for 6 months.

**OBSERVATION AND RESULTS:** Seventeen (85.0%) of patients showed excellent-to-good results. The fusion rates for 1-level and 2-level anterior cervical corpectomy, and for anterior plate fixation were 100%. There were no postoperative deterioration neurologically and had minimum complication which resolved over weeks' time.

**CONCLUSION:** The improved fusion rate, low cost of the treatment with lower complication rates associated with anterior cervical plating may justify its use in the treatment of cervical and dorsal Pott's associated myelopathies as the burden of tuberculosis in our country is large.

**KEYWORDS :** Anterior cervical spine, Pott's spine, corpectomy, fusion rate, anterior plating.

## INTRODUCTION

Although the first documented spinal tuberculosis (TB) cases date back to 5,000-year-old Egyptian mummies, the first modern case of spinal TB was described in 1779 by Percival Pott<sup>1</sup>. The exact incidence and prevalence of spinal tuberculosis in most parts of the world are not known. In countries with a high burden of pulmonary tuberculosis, the incidence is expected to be proportionately high. Approximately 10% of patients with extrapulmonary tuberculosis have skeletal involvement. The spine is the most common skeletal site affected, followed by the hip and knee. Spinal tuberculosis accounts for almost 50% cases of skeletal tuberculosis<sup>2</sup>. India is the country with the highest burden of TB. The World Health Organisation TB statistics for India for 2016 gave an estimated incidence figure of 2.79 million cases of TB for India. It is estimated that about 40% of the Indian population is infected with TB bacteria, the vast majority of whom have latent TB rather than TB disease.

The incidence of the TB in states of Uttar Pradesh and Haryana as notified or 2016 is 297,746 and 47,545 respectively; the incidence is increasing with association with HIV (2,501 and 447 in UP and Haryana). Treatment success rate has remained at 70% which is true in case of the chest tuberculosis *but what about the patient of the Spine Tuberculosis, most of the patient of Potts spine remain affected throughout their life, not clinically infected but having morbidity through life.*

## MATERIAL AND METHOD

We have done a study in MMIMSR, where most of the patients are from Uttar Pradesh (Saharanpur) and Haryana. Patients presented to the department of Neurosurgery with complaints of pains (cervical, dorsal and lumbar), neurological deficit in the form of the Paraparesis, paraplegia, quadriparesis, quadriplegia, bowel- bladder disturbances. A total of twenty patients were studied, individual symptoms and signs of the patients were noted and was managed after doing preoperative MRI, NCCT and doing postoperative scans and X-rays and were followed up at 3 months and 6 months with signs, symptoms and radiology. Combination of rifampicin, isoniazid, ethambutol, and pyrazinamide for two months and streptomycin for one month, followed by combination of rifampicin and isoniazid for a total period of 18 to 24 months is the most frequent protocol used for treatment of spinal TB<sup>3</sup>. The total duration of treatment and numbers of drugs needed for adequate treatment have always been subject to controversy<sup>4</sup>. For the treatment of multidrug-resistant TB, an average of 6 antitubercular drugs for at least 24 months is recommended<sup>5</sup>. The patient were operated with anterior cervical corpectomy with

discectomy with placement of the autologous bone graft with anterior cervical plating. Nurick grading system was used to for the initial assessment.

## OBSERVATION AND RESULTS

A total 20 patients 16 females and 4 males were the part of the study group, all the patients presented with pain in the cervical dorsal region, 18 patients were having pathology in the cervical spine and 2 patient in dorsal spine. The median age of the patients was 25.5 years (range 12-58 years). The power of the patient was assessed according to the Medical Research Council of United Kingdom. All the other complaints of the patient was assessed.

The individual symptoms and signs of the patients is presented in the table no 1 & 2. 17/20 (85%) patients presented with upper limb weakness and 20/20 (100%) presented with the lower limb weakness. 25 % of the patients presented with C3 - C4 involvement and 50 % of the patient presented with C5- C6- C7 involvement. Prevertebral cold abscess was present in 50% of the patients. All patient had MRI of the spine. MRI featured endplate involvements as heterogeneously enhancing endplate irregularity on post-contrast sequences. Vertebral lesions appeared hypointense on T1W images, hyperintense on T2W images and heterogeneous enhancement on post-contrast T1W images. Intervertebral disc involvement appeared as hypointense on T1W, hyperintense on T2W images and heterogeneous enhancement on post-contrast T1W images. Marrow edema appeared hyperintense on T2W and STIR images. Seven of the patient had prevertebral and paravertebral abscess. The patients were further subjected to the CT scan which showed significant bone destruction.

Total number of the patients	20	Percentage
Males	4	20%
Females	16	80%
Patients having pain	20	100%
Involvement of the Spine	5	25%
C3-C4	2	10%
C4-C5	10	50%
C5-C6 , C5-C6-C7	1	5%
C7-T1	2	10%
T3-T4		

**TABLE NO 1. SHOWING THE PATIENTS PROFILE WITH SYMPTOMS AND INVOLVEMENT OF THE SPINE.**

Upper limb weakness	17	85%
Lower limb weakness	20	100%
Intrinsic hand muscle atrophy	7	35%
Biceps and deltoid weakness	15	75%
Respiratory problems	None	0%
Flexors spasm	5	25%
Hoarseness of voice	2	10%
Gross muscle atrophy	7	35%
Bladder involvement	20	100%
Bowel involvement [Constipation]	20	100%
Fever	11	55%
Weight loss	20	100%
Kyphosis	3	15%
Associated AIDS	None	0%
Hepatitis	None	0%
Diabetes Mellitus	1	5%
Associated Pulmonary tuberculosis	1	5%

**TABLE NO 2. SYMPTOMS, SIGNS AND RELATION OF THE PATIENTS ON PRESENTATION.**

Iliac crest tricortico cancellous (Smith-Robinson) bone graft was used in all the 20 cases. The average time of the surgery was 180.2 minutes (Range 152 min - 197 min) Seventeen (85.0%) of patients showed excellent-to-good results. The fusion rates for 1-level and 2-level anterior cervical corpectomy, and for anterior plate fixation were 100%. The mean fusion period was 12 weeks (range, 10–15 weeks). Improvement of the patient showed in the table 3. Fourteen (70%) of the patient presented to us with grade 5 weakness, after 3 months of the surgery only 6 (30%) remained with grade 5 and that was reduced to 5 patients at the end of the 6 months. Nurick classification (Table no 3) was used to assess the improvement in the patients at 3 months and 6 month (Table no 4). None of the patient developed postoperative neurological deterioration; therefore, no postoperative MRI was performed. 15 patients improved significantly in the bladder and Bowel and were free of the Foley's catheter. Significant improvement was observed in the power of lower and upper limbs. Only 2 patients out of 7 patients had improvement in the intrinsic muscle atrophy.

Classification	
Grade 0	signs or symptoms of root involvement but without evidence of spinal cord disease
Grade 1	signs of spinal cord disease but no difficulty in walking
Grade 2	slight difficulty in walking which does not prevent full-time employment
Grade 3	difficulty in walking which prevented full time employment or the ability to do all housework, but which was not so severe as to require someone else's help to walk
Grade 4	able to walk only with someone else's help or with the aid of a frame
Grade 5	chairbound or bedridden.

**TABLE NO. A SIX GRADE SYSTEM (0-5) BASED ON THE 'DIFFICULTY IN WALKING'. SOURCE ARTICLE6: NURICK S. THE PATHOGENESIS OF THE SPINAL CORD DISORDER ASSOCIATED WITH CERVICAL SPONDYLOSIS. BRAIN. 95:87-100 (1972).**

Classification	Preoperative status	Postoperative status at 3 months	Postoperative status at 6 months
Grade 0	None	None	None
Grade 1	None	None	1(5%)
Grade 2	None	4(20%)	5(25%)
Grade 3	2(10%)	4(20%)	5(25%)
Grade 4	4(20%)	6(30%)	4(20%)
Grade 5	14(70%)	6(30%)	5(25%)

**TABLE NO 4. NURICK GRADING OF THE PATIENTS SHOWED NO IMPROVEMENT IN 5 PATIENTS AND SIGNIFICANT IMPROVEMENT IN THE REST OF THE PATIENTS.**

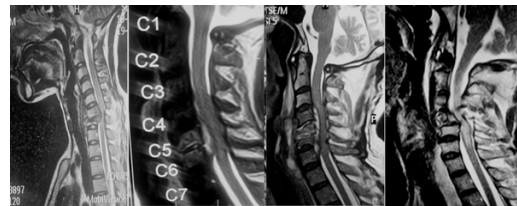


Figure 1. Preoperative T2 sag. MRI of the patients having C6C7, C5C6 and C3C4 Potts involvement.

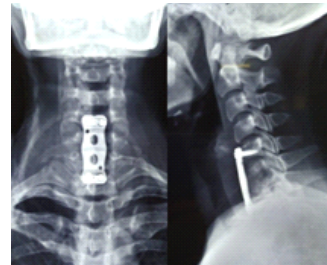


Figure 2. Shows the AP and lateral view of the cervical spine after C6 & C7 corpectomy with iliac graft and plating.

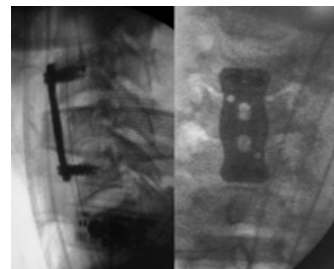


Figure 3. Shows the Intraoperative X-rays using C arm of the patient with C5 involvement.



Figure 4. Preoperative CT, MRI and the postoperative X-ray of the patient with C7-T1Pott's spine.

**COMPLICATIONS**

Paraesthesia and transient dysphagia were seen in 7 patients which completely resolved after a mean of 6 months. Hoarseness as well as a choking sensation was experienced in 3 individuals possible because of minor damage to the recurrent laryngeal nerve which improved in 2 weeks. Spinal fluid leak was seen in one individual which resolved in 10 days with CSF lumbar puncture and Acetazolamide. All the patients (100%) complained of the pain at the iliac crest site rather than the cervical region which got better in two week. There were no neurological complications, no infections or graft-related complications (e.g. subsidence, extrusion, and collapse).

**DISCUSSION**

Plating of the anterior cervical spine was first described in 1980s, mainly for the treatment of acute cervical spinal fracture. Improvements in the procedure, has led to increase use for degenerative and diseased cervical spine disease. Many clinical studies have reported higher fusion rates with anterior cervical plates.<sup>7-12</sup> Fusion rates for our single-level and multiple level was 100%. Many reports have shown that anterior cervical plating across 2 or more segments increases stability and fusion rates.<sup>13,14</sup>

The use of only anterior cervical plate in the treatment of tuberculosis

has been disputed. The increased stability across the operative segment decreases motion between the graft and vertebral endplate and increases the chance of solid fusion in single. The increased stability provided by an anterior cervical plate effectively reduces the motion across 2 segments, thus enhancing the rate of fusion usually in the younger patients which is similar with our series. Although in multiple level involvements fusion with the homologous graft alone with plating has lower rates of fusion as compared to the cage and plating. The rates of graft migration and related complications are also known to increase with multilevel procedures<sup>15</sup>. Using the healthy tricorticocancellous iliac crest autologous graft with Indian made plating has decreased the burden of the patient as it is very economical. The overall fusion rate in this study was 100%, and many other recent studies have also reported a 100% fusion rate<sup>16-18</sup>.

There are multiple factor for the better results

1. Surgery with care to prevent further cord injury.
2. Starting ATT previous to the surgery.
3. Better nutrition to the patient.
4. The endplates were prepared till healthy bleeding cancellous bone surface
5. Skull traction was applied.
6. Plating was done taking care not to enter the healthy disc space and end plates above and below.

All these factors shown to significantly improve graft healing. Neurologic complications due to Pott's disease seem to be "relatively benign" if early adequate medical and surgical managements are employed<sup>19,20</sup>. Similar study has been reported by Rajeswari R et al.<sup>21</sup>, Jain AK et al.<sup>22</sup>, and Alothman A et al.<sup>23</sup>

## CONCLUSION

The use of anterior cervical plating after anterior corpectomy and fusion with autologous bone graft greatly enhances arthrodesis. The improved fusion rate, low cost of the treatment and lower complication rates associated with anterior cervical plating may justify its use in the treatment of cervical and dorsal Pott's associated myelopathies as the burden of tuberculosis in our country is large.

## STATISTICAL ANALYSIS

Statistical tests used to analyze statistical significance included the Fisher exact and  $\chi^2$  tests as well as the Student's *t* test. Statistical significance was established at a *p* value of less than 0.05. All statistical analyses were performed using the SPSS program

**Conflict of Interest** None.

## Consent

Obtained, No benefits of any form have been received from a commercial party related directly or indirectly to the subject of this article.

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