

## ANALYSIS OF CLINICO-RADIOLOGICAL OUTCOME OF POSTERIOR INSTRUMENTATION IN EARLY ONSET POTT'S PARAPARESIS: A RETROSPECTIVE STUDY

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**ABSTRACT: BACKGROUND:** The preferred modality of surgical intervention in thoraco-lumbar spinal tuberculosis has been controversial. The aim is to evaluate the role of isolated posterior instrumentation without anterior instrumentation and without anterior or posterior bone grafting in cases of early onset pott's paraparesis. **MATERIAL AND METHODS:** 22 patients with early onset Pott's Paraparesis have been treated surgically by posterior instrumentation (Pedicular screws with rods) with posterior decompression with paraspinal abscess drainage as a single stage procedure under chemotherapy cover. Patients have been followed for minimum of 18 months. **RESULTS:** Inter-body fusion has been noticed in all patients in follow-up. The mean kyphotic angle of 28° has been improved to mean kyphotic angle of 5.4° in immediate post-operative period. **CONCLUSION:** Isolated posterior stabilization seems to be adequate for clinical and radiological improvement in early onset pott's paraparesis with maintenance of acceptable kyphotic angle.

**KEYWORDS:** Outcome, Posterior instrumentation, early onset Pott's Paraparesis.

**MESHTERMS:** Paraparesis, radiology, retrospective studies.

**INTRODUCTION:** Tuberculosis (TB) is the most common granulomatous bacterial infection in the spine.<sup>[1]</sup> Spinal tuberculosis is also known as Pott's spine after the name of Sir Percival Pott, who described it as a progressive painful deformity of spine associated with paraparesis.<sup>[2]</sup> It is the most common form of extra pulmonary tuberculosis.<sup>[3]</sup> It has the ability to cause bone destruction leading to deformity and paraplegia.<sup>[4]</sup>

Chemotherapy appears to be the mainstay of treatment of spinal tuberculosis. Kyphosis in spinal tuberculosis continues to progress with conservative treatment alone in 3-5% of cases.<sup>[5,6]</sup>

Indications of surgery in spinal tuberculosis (as per middle path regime described by Tuli<sup>[7]</sup>) are:

- a. Large para-spinal abscess.
- b. Persistence or deterioration of neurological deficit in spite of anti-tubercular treatment.
- c. Presence of instability in spinal column due to bone destruction and with severe kyphotic deformity.

Traditionally, the anterior approach has been preferred for thoraco-lumbar tuberculosis, as the pathology of spinal tuberculosis mainly affects the vertebral body with intervening disc and anterior approach allows direct access to infected focus and is convenient for debridement and reconstruction.<sup>[8,9]</sup>

Some authors believe anterior approach to be more invasive for thoraco-lumbar tuberculosis and osteoporosis associated with infection renders the anterior construct structurally weak.

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Recently, posterior approach gained popularity as it is less invasive, can be extended proximally and distally of involved segment and allows fixation through uninvolved posterior elements, drainage of para-vertebral abscess, and circumferential spinal cord decompression.

Whether the posterior instrumentation is more efficacious than anterior instrumentation is still controversial.<sup>[10,11]</sup>

Our aim is to analyze the role of isolated posterior instrumentation without bone grafting in early onset Pott's paraparesis.

**MATERIAL AND METHODS:** This is a retrospective study of 22 patients of thoraco-lumbar Pott's paraparesis. All underwent single stage posterior decompression with posterior instrumentation with pedicular screws and connecting rods with drainage of para-vertebral abscess if needed. All patients were early onset Pott's paraparesis.

Pre-operative kyphosis angle found to be varied from 7° to 49° (mean kyphotic angle of 28°). There were 12 females and 10 males. The age of patient varies from 19 years to 63 years (mean 39.1 years). Minimum follow-up period was 18 months. All patients were having single level disease. The involvement of vertebral body varies from 30% to near total collapse.

Neurological assessment was done using Frankel grading. Two patients were in Frankel group B, 11 patients in Frankel grade C and 9 patients in Frankel group D.

All patients had preoperative investigations including complete blood picture, ESR, CRP, chest Xray, Mantoux test with AP and Lateral view of spine. MRI done in all patients to evaluate the extent of vertebral body involvement, presence of epidural collection, cord compression, myelomalacia, paravertebral collection and presence of skip lesions.

Chemotherapy was started as soon as clinico-radiological diagnosis made along with supportive brace. Chemotherapy was according to extended DOTS regime (2 months of intensive phase and 6 months of continuation phase) as recommended by WHO. MRI evaluation has been done at the end of 8 months to decide regarding the continuation or stoppage of chemotherapy.

Selection of patients for surgery has been done according to middle path regime described by Tuli.

Under general anesthesia, patient in prone position, level of affected vertebrae was confirmed using fluoroscopy. Midline posterior incision centering over affected segment given, paraspinal muscles retracted on both sides. Titanium polyaxial pedicular screws inserted in healthy vertebrae above and below the affected level and connecting rods applied temporarily on one side to prevent instability during decompression. Hemi-laminectomy/Total laminectomy performed on affected level according to cord compression in MRI. Paraspinal abscess drained through inter-transverse space. Material sent for histo-pathological examination and PCR examination. Kyphosis was corrected by applying compression between pedicular screws before tightening them to rods. If the fixation spans more than two levels, a connector has been applied between connecting rods.

Mobilization was started in Frankel grade D with the help of brace from 2<sup>nd</sup> post-operative day and wheel chair mobilization started for non-ambulant patients.

Taylor's brace was applied in lesion below D6 and Milwaukee brace applied for D5-6 level.

Disease was considered to be healed when there is no spinal tenderness, improvement of hematological parameters (ESR, CRP). Radiologically fusion was considered when trabeculations joins the adjacent vertebrae. ATT was stopped when MRI shows healed status.

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**RESULTS:** The mean duration of operation was 124min (97min- 154 min). The mean intra-operative blood loss was 450 ml (300-640 ml). Wound healed well in all patients.

**All patients improved Neurologically:**

Frankel grade pre-operative		Frankel grade post-operative				
A		A	B	C	D	E
B	2				1	1
C	11				2	9
D	9					9
E						

Table 1

The mean pre-operative kyphosis angle of 28° (range 7° to 49°) reduced to 5. 4° (range 0° - 11°) in immediate post-operative period. At the time of final follow-up the mean kyphotic angle increased to 9° (0°-19°). There was loss of 3. 6° of kyphotic correction during the healing phase of disease. After radiological bony fusion, there was no loss of kyphotic correction.

Solid bony fusion achieved between 4-9 months in all patients post-operatively.

**DISCUSSION:** The surgical approach to Thoraco-lumbar tuberculosis remains controversial.

Anatomically, Thoraco-lumbar spine is one of the most complicated areas to approach. The diaphragm divides the chest from abdominal cavity. Thoraco-lumbar junction is anteriorly related to major blood vessels, cysterna chyli, sympathetic chain, kidney and ureter.<sup>[12,13,14,15,and16]</sup>

Thoraco-lumbar junction can be approached anteriorly by trans-thoracic approach or retro-peritoneal extra-pleural approach. These approaches have their own complications.

The advantage of anterior approach is to address the disease pathology and to keep large bone grafts in compression mode.<sup>[17]</sup>

The argument against the use of foreign material (Including mesh and implants) anteriorly (diseased area) is that bacteria will adhere to implants surface and bio-film will be made on them which prevents antibiotics to act seems to be invalid. Oga et al<sup>[18]</sup> evaluated the adherence capacity of Mycobacterium Tuberculosis to stainless steel to be negligible and found use of implants in the area of active tuberculosis safe.

Besides, the approach is more invasive, there are issues regarding stability of fixation due to concomitant osteoporosis.<sup>[19]</sup>

Anterior graft is able to provide sufficient stability and structural support only in 41% of patients with short defect.<sup>[20]</sup> To avoid this complication Posterior stabilization is added sequentially or in same sitting. Campbell et al<sup>[21]</sup> have reported higher rates of complications with isolated anterior fixation and combined anterior and posterior spinal fusion in comparison to isolated posterior fusion.

Posterior instrumentation has advantage that it can provide good fixation through uninvolved posterior elements as disease pathology is anterior.<sup>[22,23]</sup>

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However, very few studies have been reported the use of isolated pedicle instrumentation without bone grafting. This procedure relies on anterior inter body fusion attained by chemotherapy and has an advantage of avoiding donor site morbidity.

Nowadays, due to advent of MRI, patients can be diagnosed early and availability of effective ambulatory chemotherapy controls the disease in early stages with less bony destruction.

According to Kumar's classification (1998), early Pott's spine with active destruction with mild (10°-30°) to moderate (30°-60°) kyphosis are suited for this procedure.<sup>[24]</sup> Patients with severe and very severe kyphosis, late onset Paraparesis having bony internal gibbus, multi-segmental involvement are candidates for combined anterior and posterior instrumentation. Patients where bone healing is unpredictable and likely to be delayed as in patients with immunodeficiency, multi drug resistant tuberculosis and non-compliant patients for chemotherapy are not suited for this procedure as this technique relies on prompt anterior inter-body fusion for load sharing by chemotherapy.<sup>[25]</sup> It is better to add fusion either anterior or posterior along with instrumentation to avoid pseudo-arthrosis in these cases.

The minimal loss of kyphosis correction in initial post-operative phase occurs till anterior inter-body fusion occurs. There is no loss of kyphotic correction after that till final follow-up.

The limitation of our study is similar to other retrospective studies. Pre and post-operative functional scores were not available for reporting. Nevertheless, further studies are needed to establish the efficacy of this procedure as it is less invasive and avoids graft donor site complications.

**CONCLUSION:** In our study, posterior instrumentation without bone grafting for one level disc involvement with active disease in chemotherapy compliant patients is found to be adequate.

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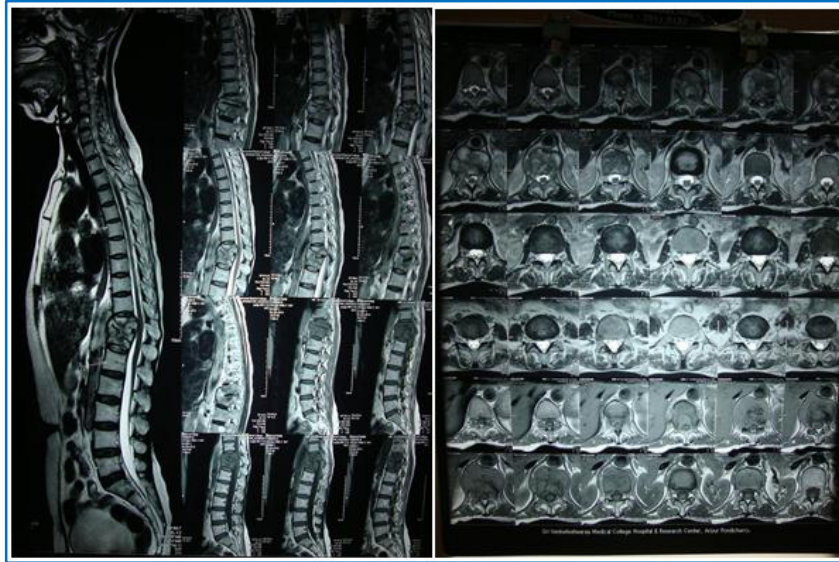
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**Fig. 1 & 2:** Pott's spine involving D11, D12 vertebrae with intervening disc with epidural abscess causing secondary spinal canal stenosis at D11, D12 level with small Pre and Paravertebral abscess.



**Fig. 1 & 2**

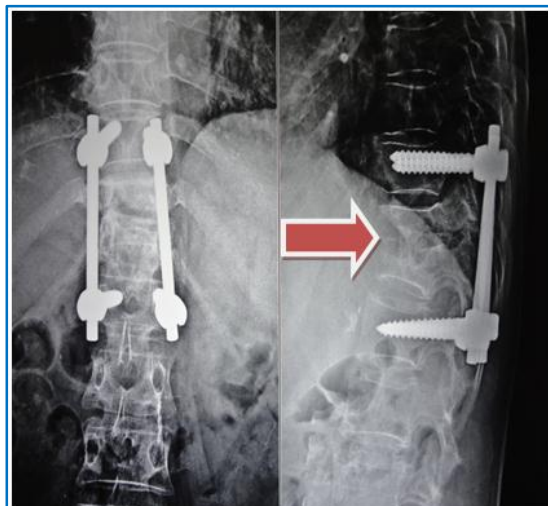
**Fig. 3:** Immediate Post-op X-ray after posterior decompression with posterior instrumentation.



**Fig. 3**

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**Fig. 4:** 4 months post op showing bony fusion of D11 & D12 (Bony trabeculae are joining the adjacent vertebrae).



**Fig. 4**

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