

Study of neurological status improvement in patients underwent surgical treatment of Pott's spine at a tertiary hospital

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Abstract

Background: Osteoarticular tuberculosis accounts for 11% of EPTB, common site of lesion is paradiscal followed by central thus causing anterior column destruction and resulting into kyphotic deformity. Surgical procedures are superior in the prevention of neurological deterioration, maintenance of stability, prevention of deformity, early recovery and early mobilization. Present study was aimed to evaluate the neurological status improvement in patients underwent surgical treatment of Pott's spine at a tertiary hospital. **Material and Methods:** Present study was nonrandomized prospective observation study was conducted in patients with clinical and radiographic evidence of tuberculosis of any vertebral body from C1 to S1 both inclusive, evidence of activity of the disease clinically and or radiographically, underwent surgical treatment. **Results:** Fifty patients of spinal tuberculosis were taken for study from March 2019 to December 2020. The most common age group was third and fourth decade (66 percent). There was almost equal distribution in males and females (male 56 and female 44%). The level of lesion most commonly affected was lower thoracic including thoracolumbar junction (70%). The mean preoperative ESR value was 114.9 and mean postoperative value was 20.26. Preoperative mean kyphotic deformity was 26.36 percent and postoperative after correction mean kyphotic deformity was 7.72 as calculated by cobb's angle in postoperative X-ray's. Neurological function preoperative, postoperative and on subsequent follow up was graded according to Frankel *et al.*, grading. Preoperatively 9 patients were classified under grade B, 40 patients graded under grade C and 1 patient under grade D. Postoperatively 35 patients improves to grade E, 13 patients to grade D, 1 patient under grade C, and 1 patients remains unchanged to grade B. **Conclusion:** There is excellent improvement in neurological status of patients who gets operative treatment in Pott's spine.

Keywords: neurological status, Operative treatment, Pott's spine, deformity

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INTRODUCTION

Tuberculosis is ubiquitous in distribution. In 2019, an estimated 10 million people fell ill with tuberculosis

worldwide. A total of 1.4 million people died from TB in 2019.¹ India has the highest burden of both tuberculosis and multidrug-resistant TB based on estimates reported in Global TB Report 2016.² Tuberculosis affects most commonly involves the pulmonary system, but extrapulmonary system infection represents between 20 to 25 % of all TB cases.² Osteoarticular tuberculosis accounts for 11% of EPTB forms according to published series.³ Although it can affect any bone, spondylitis or Pott disease, represents 50% of all cases.⁴ Spinal tuberculosis generally starts in vertebral bodies and intervertebral discs and is so called as spondylodiscitis. The common site of lesion is paradiscal followed by central thus causing anterior column destruction and resulting into kyphotic deformity.⁵ Other less commonly types include anterior, appendicular

and synovial. Approximately 40% of the cases of tuberculosis of the spine with paraplegia show recovery with ant tuberculous treatment, rest, and/or traction. However, with proper indications, surgical procedures are superior in the prevention of neurological deterioration, maintenance of stability, prevention of deformity, early recovery and early mobilization.^{6,7,8} Present study was aimed to evaluate the neurological status improvement in patients underwent surgical treatment of Pott’s spine at a tertiary hospital

MATERIAL AND METHODS

Present study was nonrandomized prospective observation study was conducted in department of orthopaedic surgery, GMC Jammu. Fifty patients of spinal tuberculosis were taken for study from March 2019 to December 2020. Study was approved by institutional ethical committee.

Inclusion criteria

- Clinical and radiographic evidence of tuberculosis of any vertebral body from C1 to S1 both inclusive, evidence of activity of the disease clinically and or radiographically.
- patient willing to participate in study and follow up for 1 year

Exclusion criteria

- Children <10 years of age and old patients > 70 years of age.
- Total destruction equivalent to six or more vertebral bodies.
- Tuberculosis of the spine associated with tuberculoma brain/ meningitis / tuberculous arthritis of other joints.
- Serious non- tuberculous disease likely to prejudice the response to treatment or its assessment.
- Any contra- indication to any of the methods of treatment under comparison.

Study was explained in local language and a written informed consent was taken for participation in study. Detailed history, clinical examination findings were

RESULTS

The most common age group was third and fourth decade (66 percent). There was almost equal distribution in males and females (male 56 and female 44%).

noted in case record for. For all the patients included in study standard AP and Lateral radiogram and MRI spine, routine blood investigations, ESR, CRP, Mantoux test, sputum for AFB needs to be performed pre operatively.

Neurological function preoperative, postoperative and on subsequent follow up was graded according to Frankel *et al.*, grading.

- A. Absent motor and sensory function below the segmental level.
- B. Sensation present, absent motor function.
- C. Sensation present, some motor power present below the level of the lesion but not useful to the patient (Grade <3/5).
- D. Sensation present, motor function present and patient could walk with or without aids (Grade 3, 4/5).
- E. Normal motor and sensory function. Abnormal reflexes may be present.

All patients are to be given appropriate bed rest, analgesics, bowel bladder care, and 4 drugs anti-tubercular treatment according to appropriate regime for 3 weeks before surgery except those with progressive neural deficit and kyphotic deformity greater than 40 degree requiring urgent decompression patients shall be followed up at 3, 6 and 12 months. The standard chemotherapy consisting of isoniazid (5 mg/kg), rifampicin (10 mg/kg), ethambutol (15 mg/kg), and pyrazinamide (25 mg/kg) was administered for 3 months after the operations. Subsequently, a regimen of rifampicin, isoniazid, and ethambutol was continued for at least 9 months. At each follow-up evaluation, plain radiographic studies were obtained in standing position to determine the fusion status, development or progression of deformity after surgery and instrumentation failure. Patients will be evaluated for radiological parameters like improvement in local kyphosis. ESR and CRP were done to check the status of resolution of infection on each follow up. Data was collected and compiled using Microsoft Excel. Statistical analysis was done using descriptive statistics.

Table 1: Age and gender distribution

	No. of Patient	Percentage
Age group (in years)		
21-30	16	32 %
31-40	17	34 %
41-50	11	22 %
51-60	5	10 %
61-70	1	2 %
Gender		
Males	28	56 %

Females	22	44 %
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The level of lesion most commonly affected was lower thoracic including thoracolumbar junction (70%).

Table 2: Level of the Lesion

Level of the Lesion (site)	No. of Patient	Percentage
C1-C7	2	4 %
D1-D6	9	18 %
D6-D7	2	4 %
D7-D12	27	54 %
TL Junction	8	16 %
Lumbar	2	4 %

The mean preoperative ESR value was 114.9 and mean postoperative value was 20.26. Preoperative mean kyphotic deformity was 26.36 percent and postoperative after correction mean kyphotic deformity was 7.72 as calculated by cobbs angle in postoperative X-ray's.

Table 3: ESR and Cobb's angle

	Preoperative	Postoperative
MEAN ESR	114.9	20.26
Mean Kyphosis(Cobb's angle)	26.36	7.72

Neurological function preoperative, postoperative and on subsequent follow up was graded according to Frankel *et al.*, grading. Preoperatively 9 patients were classified under grade B, 40 patients graded under grade C and 1 patient under grade D. Postoperatively 35 patients improves to grade E, 13 patients to grade D, 1 patient under grade C, and 1 patients remains unchanged to grade B.

Table 4: Neurological outcome

Frank <i>et al.</i> , Grade	Preoperative	Postoperative
B	9	1
C	40	1
D	1	13
E	0	35

Complications - One patient develops implant failure with chronic discharging sinus at one year follow up, patient had stop taking ATT from the last 6 months. Neurological status of the patient improves and on corrective surgery intraoperatively as the implant removed a bone fusion mass was present at infective site.

DISCUSSION

The treatment of tuberculosis of spine consists of conservative methods or surgical management. Conservative method comprises Bed rest with or without Plaster casts, Chemotherapy, Supervision with Imaging and blood markers every 3 months followed by resumption of activity with braces. It requires long period of immobilization and it leads to complications of prolonged recumbency like deep vein thrombosis, bed sore and chest infection. It cannot prevent the progression of kyphotic deformity. To circumvent the problems associated with conservative management and those who did not show signs of progressive recovery, development of neurological problems, neurological worsening during conservative therapy, advanced cases and in the elderly, surgery is indicated. The goals of surgery in Tuberculosis of spine are adequate decompression, adequate debridement, maintenance and reinforcement of stability and correction and to stop the progression of kyphosis.⁹ The average age of presentation of spinal tuberculosis was 37.6 in our study. In a similar study it was noted that mean

age of tuberculosis was 34.¹⁰ Manuel Fuentes Ferrer *et al.*,¹¹ reviewed 37 articles with a total of 1,997 patients; the median of the patients mean age was 43.4 years. The no. of male patient were 28 and female 22 in our study. Similar trends were seen in study conducted by Hodgson AR.¹² The mean ESR noted in our study was 114.9 preoperatively. Erythrocyte sedimentation rate (ESR) is a sensitive marker of infection and can be used to monitor therapeutic response, but its low specificity is a concern. Usually in TB, ESR is >20 mm/h and decreases as healing progresses. In study by Wang *et al.*,¹³ mean ESR of the patients at the initial hospitalization was 96.4 ± 20.8 mm/h. The mean kyphosis as calculated by cobbs angle was 26.36 preoperative and after corrective surgery mean kyphosis was 7.72. In a study conducted by Xu Cui *et al.*,¹⁴ the kyphotic deformities were corrected from $32.1^\circ \pm 10.3^\circ$ to $10.2^\circ \pm 2.1^\circ$ in the anterior group and from $33.8^\circ \pm 11.7^\circ$ to $12.6^\circ \pm 2.7^\circ$ in the posterior group. The mean preoperative kyphosis was 27.2° (50-16) and mean postoperative kyphosis was 9.0° (20-0) in a study conducted by Saurabh Singh *et al.*,¹⁵ There is marked

correction in deformity by operative measures which leads to reversal of neurological complication, better cosmetic appearance and helps in preventing complications like sinus formation, bed sores DVT. About 40 patients falls in grade C, 9 in grade B and 1 in grade D preoperatively and post operatively there is significant improvement in neurological status and by the end of one year follow up 35 patients improves to grade E, 13 to grade D, 1 patient to grade C and 1 patient remains in grade B. In a study by Xu Cui *et al.*,¹⁴ the neurologic statuses of the 23 patients with preoperative neurologic deficits improved in each group. In an another by Sombat Kunakornsawat *et al.*,¹⁶ study No patients had Frankel grade A or B postoperatively at the final follow-up. In some patients with Pott's disease of the spine early surgical intervention is preferred, because they will not benefit from medical treatment alone due to presence of sequestrum or constricting fibrous bands compressing the spinal cord. The kyphotic deformity of greater than 40 degree requires correction Surgical intervention allows early mobilization of patients avoiding complications such as deep vein thrombosis, pulmonary complications, psychological well being, sinus formation, pain gets settle in shorter time period and bedsores.

CONCLUSION

There is excellent improvement in neurological status of patients who gets operative treatment in Pott's spine. Surgical intervention will lead to excellent improvement in neurological status, correction of deformity is also achieved in desired manner and overall complication of Pott's spine will be minimized.

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