Original Research Article

Study of functional outcome of surgical treatment of tuberculosis of spine

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Abstract

Background: Tuberculosis affects most commonly involves the pulmonary system, but extrapulmonary system infection represents between 20 to 25 % of all TB cases.[1] Tuberculosis mostly affects adults. Spinal tuberculosis can lead to neurological complications with incidence about 10 to 43 percent in various studies. Present study was aimed to study functional outcome in patients underwent surgical treatment for tuberculosis of spine at our tertiary hospital. **Material and Methods:** Present study was single-center, prospective, observational study, conducted in patients 20-70 years age, either gender, had 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. **Results:** In present study most common age group was 31-40 years (34 %) followed by 21-30 years (32 %). 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 cobbs 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:** Operative intervention leads 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.

Keywords: Surgical intervention, Pott's spine, neurological status, deformity

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INTRODUCTION

Tuberculosis affects most commonly involves the pulmonary system, but extrapulmonary system infection represents between 20 to 25 % of all TB cases.[1] Tuberculosis mostly affects adults. However, all age groups are at risk. Over 95% of cases and deaths are in developing countries. The risk factors of tuberculosis are HIV, undernutrition, alcohol use and tobacco smoking. The most frequently affected extra pulmonary organs are the liver, the spleen, the lymph nodes, the meninges, the bone marrow and the adrenal glands. Bone and joint tuberculosis is said to develop generally 2 to 3 years after primary focus Any bone in the body may be involved.[2] The infection reaches skeletal system through vascular channels, generally the arteries as a result of bacillaemia but in case of axial skeletal rarely Batson's plexus of paravertebral veins is the route. Tuberculous spondylitis (Pott's disease) occurs most commonly and comprises 50-70% of the skeletal tuberculosis. Skeletal tuberculosis generally develops 2 to 3 years after primary foci.[3] Spinal tuberculosis can lead to neurological complications with incidence about 10 to 43 percent in various studies.[4] With the advent of chemotherapy drugs medical treatment remains the mainstay treatment, but in order to deal with

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residual disease chemotherapy alone is insufficient and thus the role of surgical intervention is required in to eradicate the foci for better delivering of drugs, neurological decompression, radical debridement, deformity correction and stabilization to prevent further neurological trauma. Present study was aimed to study functional outcome in patients underwent surgical treatment for tuberculosis of spine at our tertiary hospital,

MATERIAL AND METHODS

Present study was single-center, prospective, observational study, conducted in department of orthopedic surgery, at government medical college and hospital, Jammu, India. Study period was from March 2019 to December 2020. Study was approved by institutional ethical committee.

Inclusion criteria

- Patients 20-70 years age, either gender, had 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 and follow up.

Exclusion criteria

- 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 noted in case record for. For all the patients included in study routine blood investigations, ESR, CRP, Mantoux test, sputum for AFB needs to be performed pre operatively. Neurological status documented by Frankel's grading. Radiographic examination includes AP view, Lateral view of the spine, CT scan and MRI. 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. Patient underwent spine surgery as per department standard operative procedure and proper postoperative care was provided. Patients were discharged after stitches removal. 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. All patients were X-rayed, and the erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) levels, hepatic functions, and other parameters were examined at regular follow up the patients were mobilized as early as possible with crutches and spinal braces. 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 were 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. Statistical analysis was done using descriptive statistics.

RESULTS

In present study most common age group was 31-40 years (34 %) followed by 21-30 years (32 %). 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%).

Table 1: General characteristics

Characteristics	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 %
Level of the Lesion (site)		
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. 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 2: Outcome

	Preoperative	Postoperative
MEAN ESR	114.9	20.26
Mean Kyphosis (Cobb's angle)	26.36	7.72
Frank *et al.*, Grade (Neurological outcome)		
Grade B	9 (18 %)	1 (2 %)
Grade C	40 (80 %)	1 (2 %)
Grade D	1 (2 %)	13 (26 %)
Grade E	0	35 (70 %)

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. 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.[5] Effective medical and surgical management of spinal TB has improved outcome of these patients significantly even in the presence of neurologic deficits and spinal deformities.[6] In a similar study Joaquim Soares *et al.*,[7] noted that mean age of tuberculosis was 34 years. In present study, average age of presentation of spinal tuberculosis was 37.6 years. While in a meta-analysis of 37 articles with 1,997 patients; the median of the patients mean age was 43.4 years.[8] In present study, 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.*,[9] the kyphotic deformities were corrected from 32.1° ± 10.3° to 10.2° ± 2.1° in the anterior group and from 33.8° ± 11.7° to 12.6° ± 2.7° in the posterior group. While Saurabh Singh *et al.*,[10] noted that mean preoperative kyphosis was 27.2° (50-16). The mean postoperative kyphosis was 9.0° (20-0). 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. In present study, 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.*,[9] the neurologic statuses of the 23 patients with preoperative neurologic deficits improved in each group. This signifies that there is excellent improvement in neurological status of patients who gets operative treatment in Pott's spine. As above study involves both anterior as well as posterior approaches there isn't much difference apart from one case of posterior approach who lands up in implant failure that to because of stoppage of ATT.

Anterior approach is considered the gold standard for debridement and decompression in Pott's spine. Anterior radical surgery was popularized by Hodgson and Stock in 1960.[11] Advantages of the traditional anterior approach are ability to directly access the disease and perform decompression, better correction of deformity, less muscle dissection and the ability to place a graft under compressive load for fusion. Posterior instrumentation has been reported to be quite effective in preventing graft related complications and progression of kyphosis. The main advantage of posterior instrumentation is that it can

provide good fixation through posterior elements as the disease pathology is anterior. Posterior fixation also helps in correcting pre-existing kyphosis effectively. Though anterior approach is a favored method for debridement and decompression as the lesion is situated anteriorly, there is an increased morbidity related to the approach (transthoracic, trans pleural). The posterior/ posterolateral approach (extracavitory approach) gives a reasonable access to the lateral and anterior aspects of the cord for an equally good decompression of the cord. Better functional outcome and significantly better sagittal plane and kyphosis correction by the posterior approach are strong pointers favoring the posterior approach.[12] Careful X-Ray examination of the spines and clinical history, blood investigations (ESR) nearly always disclose the diagnosis but investigation like MRI is done in order to pick the disease in early stage as well as strengthening the diagnosis.

CONCLUSION

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. Operative intervention leads 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.

REFERENCES

1. WHO report 2009. Global Tuberculosis control: epidemiología, strategy, financing. Geneva: World Health; 2009.
2. Kumar A, Varshney MK, Trikha V, Khan SA. Isolated tuberculosis of the coccyx. J Bone Joint Surg Br 2006; 88(10): 1388-9.
3. Donowitz GR, Mandell GL. Acutepneumonia. In: Mandell GL, Bennet JE, Dolin R. Principles and practice of Infectious diseases, 6th edn. Philadelphia:2005, pp.819-45.
4. Narayanam Anantha Sai Kiran, et al. Surgical results in patients with tuberculosis of the spine and severe lower-extremity motor deficits: a retrospective study of 48 patients. J Neurosurg Spine 2007, 111.
5. Benli T, Kaya A, Acaroglu E. Anterior instrumentation in tuberculous spondylitis: Is it effective and safe? Clin Orthop Relat Res 2007;460:108- 16.
6. Mohammad R. Rasouli et al. Report on findings and results in 300 cases of Pott's disease treated Asian Spine Journal Vol. 6, No. 4, pp 294-308, 2012.
7. Joaquim Soares Do Brito, Antonio Tirado, Pedro Fernandes Surgical treatment of spinal tuberculosis complicated with extensive abscess lowa Orthop J. 2014;34:129-36.
8. Manuel Fuentes Ferrer, Luisa Gutiérrez Torres, Oscar Ayala Ramírez, Mercedes Rumayor Zarzuelo, and Náyade del Prado González Tuberculosis of the spine. A systematic review of case series Int Orthop. 2012 Feb; 36(2): 221–231.
9. Xu Cui, Li-tao Li, Yuan-zheng Ma. Anterior and Posterior Instrumentation with Different Debridement and Grafting Procedures for Multi-Level Contiguous Thoracic Spinal Tuberculosis Orthop Surg. 2016 Nov; 8(4): 454–461. Published online 2016 Dec 29.
10. Saurabh Singh, Alok Rai, GI Siddalingeshwara. Long-term outcome of anterior decompression and instrumentation in tuberculosis of spine Vol:10/Issue:1/Page:34-36.
11. Hodgson AR. Report on findings and results in 300 cases of Pott's disease treated byanterior fusion of the spine J. West Pacific Orthop. Ass. 1961, 1:3.
12. Bhavuk Garg, Pankaj Kandwal, Bidre Nagaraja Upendra, Ankur Goswami, Arvind Jayaswal (2012) Department of Orthopaedics, All India Institute of Medical Sciences, Ansari Nagar , New Delhi, India.

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