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To study the neurological recovery after surgical decompression of tuberculosis of spine by posterior approach

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Abstract

Background: Tuberculosis spondylitis or Pott's disease is the most common destructive form of skeletal tuberculosis. The most commonly affected site is the thoracolumbar vertebra.

Methods: The present study included prospective cases of tuberculosis of dorsal and lumbar spine admitted and operated at Indira Gandhi Medical College, Shimla between May 2017 to May 2018 and retrospective patients who have been operated before May 2017.

Results: Improvement from preoperative ASIA score to postoperative ASIA score is significant with p value of 0.02. Majority of the patients had mild pain i.e. 42.9% at follow-up.

Conclusion: At the end of our study, we concluded that progressive neurological recovery was seen in patients.

Keywords: Spine, TB, ASIA.

Introduction

The vertebral column usually consists of 33 vertebral segments. The usual number of vertebrae is 7 cervical, 12 thoracic, 5 lumbar, 5 sacral and 4 coccygeal. A typical vertebra has a ventral body and a dorsal vertebral (neural) arch and they constitute spinal canal, which is occupied by the spinal cord, meninges and their vessels. On each side the vertebral arch has a vertically narrower ventral part, the pedicle, and a broader lamina dorsally. Paired transverse, superior and inferior articular processes (zygapophyseal or facet joints) project from their junctions. There is a median dorsal spinous process. Spinal column is having spinal cord with 31 pairs of spinal nerves branch off the spinal cord.[1]

Tuberculosis of spine (TB spine) is the most dreaded neurological complication. The incidence of neurological involvement in Pott's disease is 10–20 % in highly developed nations and 20–41 % in underdeveloped countries, particularly if thoracic spine is involved. Paraplegia rarely occurs in a tuberculous affection below lumbar one (L1) where the spinal canal is capacious and contains only cauda equina. Dorsal spine is most commonly associated with neurological

complications as it has narrow spinal canal and the physiological thoracic kyphosis forces the diseased tissue inside the spinal canal. The abscess tends to remain localized under anterior longitudinal ligament and enters the spinal canal through intervertebral foramina to cause cord compression, unlike in lumbar spine where it trickles down in psoas muscle.[2-3]

Material and Methods

The present study included prospective cases of tuberculosis of dorsal and lumbar spine admitted and operated at Indira Gandhi Medical College, Shimla between May 2017 to May 2018 and retrospective patients who have been operated before May 2017. This study included the evaluation of results in prospective and retrospective patients operated for tuberculosis of dorsolumbar spine by posterior approach only. In retrospective group, patients operated before May 2017, the records were retrieved from Medical Records Department of IGMC Shimla, and those patients were called for follow-up, assessed radiologically, neurologically and for functional outcome.

Inclusion criteria

Patient clinically suffering from tuberculosis of the dorsolumbar spine with radiological signs of destructive lesion of vertebral bodies with anterior and anterolateral cord compression due to bony wedge, liquid and soft tissue.

- Neurological complications
  - Do not start showing sign of recovery to conservative therapy (3 to 4 weeks).
  - Patient develops neurological complication during the conservative management.
  - Patient with neurological complication which become worse when undergoing therapy with anti-tubercular drugs and bed rest.
  - Patients who have recurrence of neurological complications.
  - Advanced cases of neurological involvement such as marked sensory and sphincter disturbances, flaccid paralysis or severe flexor spasms.
  - Older patients with neural complications require earlier operative decompression to avoid hazards of prolonged recumbency and immobilization.
- Significant kyphosis (>40 degrees).
- Age group of 9 to 70 years.

Exclusion criteria

- Patient with comorbid conditions and not fit for surgery.
- Patient who had clinical improvement on conservative management (anti-tubercular drug therapy and bed rest).

Statistical Analysis

Statistical analysis was conducted with the statistical package for the social science system version SPSS 20.0. continuous variables were presented as mean +/- SD or median (IQR) for non- normally distributed data. Categorical variables were presented as frequencies and percentage. The comparison of normally distributed continuous variables between the groups were performed using student's t test. Nominal categorical data between the groups were compared using chi-square test or fisher's exact test as appropriate. Odd ratio was calculated. For all statistical tests, p value less than 0.05 was taken to indicate a significant difference.

Results

Table 1: Distribution of patients according to age and sex

		Male	Female	Total	Percent
Age	Child(0-12)	1	0	1	3.6
	Young age (13-30)	1	2	3	10.7
	Middle age(31-50)	4	8	12	42.9
	Senior age (51-70)	7	5	12	42.9
Total		13(46.4%)	15(53.6%)	28	100

Most of the patients were in the age group of 31-70 years. Youngest patient was of age 9 years and oldest was of 70 years. The mean age in the study was 47.14±13.62 years. Of the total patients, 46.4% were male and 53.6% were female. Females predominated males in the study with a Male:Female ratio of 0.86:1.

Table 2: Comparison of preoperative vs postoperative ASIA score

Preop ASIA Score	Postop ASIA Score			p value
	Grade C	Grade D	Grade E	
Grade A	1	0	4	0.02
Grade B	2	6	2	
Grade C	0	4	9	

Improvement from preoperative ASIA score to postoperative ASIA score is significant with p value of 0.02.

Table 3: Pain improvement as per VAS scale

Pain improvement VAS scale	Frequency	Percentage
No pain	9	32.1
Mild pain	12	42.9
Moderate pain	6	21.4
Worst pain	1	3.6
Total	28	100.0

Majority of the patients had mild pain i.e. 42.9% at follow-up.

Discussion

Tuberculosis is a medical disease treated by anti-tubercular treatment. Anti-TB drug therapy is the mainstay of treatment for spinal tuberculosis.

Conservative method comprises Bed rest, Chemotherapy, Supervision with imaging and blood markers followed by resumption of activity with braces. Medical management is the first choice for eradicating the infection, restoring and preserving the structure and function of spine, and alleviating pain. Also when surgery is indicated, concomitant medical treatment is essential.[4]

Medical management 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.[5]

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 thoracic and lumbar spine are adequate decompression, adequate debridement, maintenance and reinforcement of stability, correction and to stop the progression of kyphosis and finally to achieve normal sagittal contours of the spinal column, unrestricted mobility, and full activities of daily living as soon as possible .[6]

On presentation according to ASIA neurological grading, 13(46.4%) with ASIA grade C, 10(35.7%) with ASIA grade B, 5(17.6%) with ASIA grade A.

This pattern of neurological deficit seen in our study was due to delayed presentation of patients might be

because of difficult terrain and non-compliance of patients to conservative therapy.

Dorsal spine is most commonly associated with neurological complications as it has a narrow spinal canal and the physiological kyphosis forces the diseased tissue inside the spinal canal. Also the bird nest appearance type of abscess in dorsal spine tends to remain localized under the anterior longitudinal ligament causing cord compression.

53.7% of the patients had good neurological status (ASIA Grade E) after surgery. In 28 patients operated by posterior approach, 15(67.9%) patients had ASIA Grade E, 10(35.7%) had ASIA Grade D, 3(10.7%) patients had Frankel Grade C neurological status. Neurological improvement as per post op ASIA score had significant p value of 0.02.

Similarly according to Kumar and Tuli grading, 67.9% of the patients had good neurological status (Kumar and Tuli Grade 1) after surgery. In 28 patients operated by posterior approach, 19(67.9%) patients had Grade 1, 6(21.4%) had Grade 2, 2(7.1%) patients had Grade 3 and 1 patient had Grade 4 neurological status with p value of 0.63. No deterioration of neurological status was seen in any patient. All 18 patients had neurological deficit preoperatively in study conducted by Pang et al. had significant postoperative neurological improvement [7].

Garg et al. studied 70 patients operated by anterior and posterior approach. At follow up, in patients operated by posterior approach, 19 patients with Frenkel C preoperatively, 12 patients improved to Frenkel E, 5 patients to Frenkel D and 2 patients remained Frenkel C. Of 11 patients with Frenkel D preoperatively, 9 patients improved to Frenkel E postoperatively and 2 remained at Frenkel D.[8]

Sahoo et al. in their study, severe neurological involvement (Frankel grade A and B) was seen in 12 patients (66.67%), of which all recovered to grade D or E except 1 patient, who had no recovery.[9]

Conclusion

At the end of our study, we concluded that progressive neurological recovery was seen in patients.

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