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TO STUDY THE FUNCTIONAL AND THE RADIOLOGICAL OUTCOME OF TUBERCULOSIS OF SPINE OPERATED BY POSTERIOR APPROACH.

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Abstract

Background: Tuberculosis is ubiquitous in distribution. Globally, nearly 30 million people suffer from tuberculosis. 3 million deaths occur due to tuberculosis per year. India has burden of 6 million cases. Of these 1-3% constitutes skeletal system involvement.

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: There was improvement from preoperative kyphotic angle to postoperative kyphotic angle and improvement in kyphotic angle as a significant difference less than 0.05 (p value is 0.01).

Conclusion: At the end of our study, we concluded that good sagittal balance along with good fusion of the vertebrae leads to better functional outcome in patients.

Keywords: Spine, TB, Kyphotic angle.

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]

The fibrocartilaginous intervertebral disc lie between the bodies of the vertebra. Each disc has a central gelatinous material, nucleus pulposus, which develops from notochord and it is surrounded by annular fibrosus. They function chiefly as fluctuant shock absorbers. The disc is avascular in adults and the nutrition is dependent upon the diffusion of fluid from the adjacent vertebral bodies.[2]

Tuberculosis is ubiquitous in distribution. Globally, nearly 30 million people suffer from tuberculosis. 3 million deaths occur due to tuberculosis per year. India has burden of 6 million cases. Of these 1-3% constitutes skeletal system involvement.[3]

The spine has been described as the most common site for osseous involvement of tuberculosis, accounting for nearly 50% of skeletal tuberculosis.[4] Tuberculosis of spine is a tertiary lesion.[5] It is most common during first 3 decades of life. The disease is equally distributed among both sexes. Any part of the spinal column may be affected but it is most commonly found in the lower thoracic and thoracolumbar region.[6] Lumbosacral tuberculosis is rare, accounting for only 2-3% of all spinal tuberculosis**.** Spinal tuberculosis is known to have neurological complication in about 10-43% of cases.[7] The WHO Global Tuberculosis report 2015 ranked tuberculosis alongside HIV as a leading cause of death worldwide.[8]

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 was 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: Distribution of patients as per postoperative functional and Economical status (Prolo Scale)

	Prolo Scale	Frequency	Percentage
Functional Status	F1	2	7.1
	F2	2	7.1
	F3	4	14.3
	F4	14	50.0
	F5	6	21.4
Economic Status	E1	1	3.6
	E2	7	25.0
	E3	0	0.0
	E4	19	67.9
	E5	1	3.6

50% of patients had near normal functional status after surgery. 67.9% of patients were able to go to their previous workplace after surgery.

Table 3: Comparison of Preoperative frankel grading vs postoperative frankel grading

Preop Frankel grading	Postop Frankel grading					p Value
	Grade A	**Grade B**	**Grade C**	**Grade D**	**Grade E**	
Grade A	0		1	3	1	0.007
Grade B	0		0	2	9	
Grade C	0		3	0	9	
Grade D	0		0	0	0	
Grade E	0		0	0	0	

Improvement from preoperative frankel grading to postoperative frankel grading is highly significant having p value of 0.007.

Table 4: Comparison of Preoperative kyphotic angle vs Postoperative kyphotic angle and Improvement

		Postop kyphotic angle			p value
		0-10 degree	11-20 degree	>20 degree	
Preop kyphotic angle	10-20	7	0	0	0.01
	21-30	5	3	0	
	31-40	3	4	3	
	>40	1	1	1	
Improvement	10-20	5	2	0	0.01
	21-30	1	7	0	
	31-40	3	4	3	
	>40	0	1	2	

There was improvement from preoperative kyphotic angle to postoperative kyphotic angle and improvement in kyphotic angle as a significant difference less than 0.05 (p value is 0.01).

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.[9]

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.[3]

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 .[10]

In this study, pre-operative kyphotic angle was most common in the range of 31 to 40 degrees with a mean of 31.71±12.61 degrees. The maximum mean kyphotic angle was seen in vertebral level D4 to D8.

In study by Gupta A et al. mean preoperative kyphotic angle was 23.8±4.2 degrees.[11]

In study by Garg et al., the mean preoperative kyphotic angle in anterior group was 44.6 degrees and 74.6 degrees in posterior approach.[12]

Mak et al. in his meta-analysis concluded that a kyphotic angle of 60 degrees should be considered significant and should be addressed surgically.[13]

In this study, 57.1% of the patients had a kyphotic angle of less than 10 degrees. The mean post op kyphosis seen in posterior approach is 12.61±8.11 degrees. A mean improvement in the kyphotic angle was 19.11±12.18 degrees by posterior approach. A significant (p value of 0.01) improvement in post-operative kyphotic angle was seen in patients operated by posterior approach.

Liu et al. reported average of preoperative and postoperative spinal kyphotic Cobb's angle was 28.3 ± 11.95 degree and 5.5 ± 11.84degree; the difference was significant ($p< 0.05$).[14]

Zeng et al. in their study showed kyphotic angle was 34.1 ± 12.3° preoperatively; which significantly decreased to 8.2 ± 1.8° postoperatively ($p <0.05$).[15]

P. Wu et al. showed preoperative and postoperative change in degree of deformity was statistically significant ($p<0.01$).The average preoperative angle was 22.9 ± 3.2 which decreased to15.6 ± 2.2 degree post-operation.[16]

Conclusion

At the end of our study, we concluded that good sagittal balance along with good fusion of the vertebrae leads to better functional outcome in patients.

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