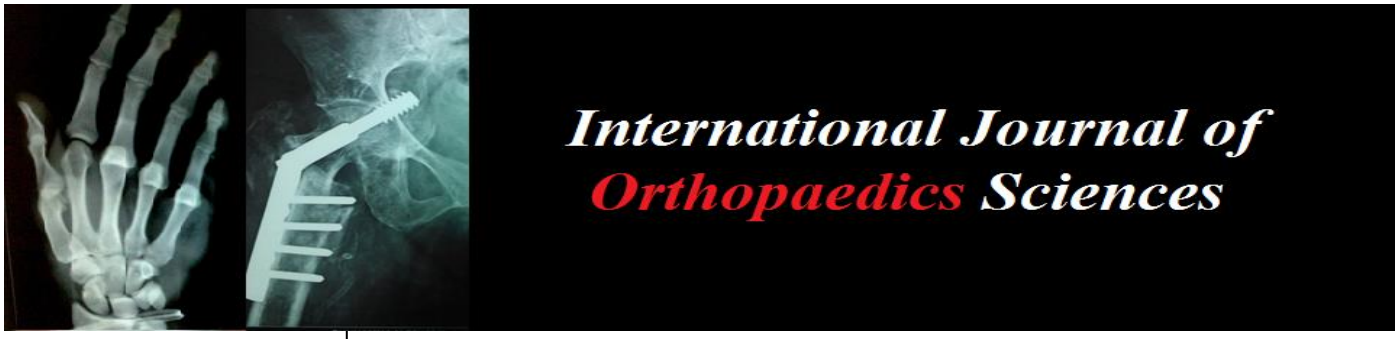

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Analysis of clinico radiological outcome in patients of thoraco lumbar potts spine managed with anterior decompression and stabilisation

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Abstract
Skeletal tuberculosis, which amounts for 1-2% cases of all systemic tuberculosis, which is always considered as secondary tuberculosis and is found in patients harboring primary tuberculosis bacilli in any other parts of the body. The most frequent site for extra pulmonary involvement of tuberculosis infection is the vertebral column and in vertebral column most frequent sites of the involvement are the dorsal and lumbar spine. Tuberculosis spine can be managed conservatively and surgically. Over the last few decades researches have mainly concentrated on surgical management of potts spine because of high mortality and post treatment residual deformity associated with conservative treatment.
Decompression of spine can be anterior or posterior. Since potts spine involves anterior column of vertebral body in more than 90% cases, anterior decompression is ideal. Decompression can be with or without instrumentation.
In this study, analysis of clinico radiological outcome in 25 patients of thoraco lumbar potts spine managed with anterior decompression and stabilisation was done and compared with available literature. All patients with indications of surgery as per middle path regime undergone anterior decompression and stabilization.
Pain assessed by VAS score, neurology grading done using Frankel grade and kyphosis angle measurement by modified Cobbs method. These three parameters were statistically analysed preoperatively and post operatively with follow up of six months.
All routine pre-anaesthetic blood checkup and pre-operative radiological investigations are done.
We found that, in patients of thoraco lumbar potts spine managed with anterior decompression and stabilisation, clinic radiological outcome found to be good and statistically significant.

Keywords: radiological, spinal tuberculosis, thoracic spine and thoraco lumbar

Introduction
Tuberculosis (TB) is considered as one of the most common cause of death from infectious disease all over the world. Spinal tuberculosis is also called as Pott's spine after the name of Sir Percival Pott (1714-1788) English surgeon, who described it as a gradually progressive painful deformity of spine associated with sensory or motor deficit1. Hematogenous route is considered as primary way through which mycobacterium tuberculosis bacilli gets lodged in the bone and joints, and spine is no exception in this case. In spinal tuberculosis, mycobacterium tuberculosis bacilli can be lodged in the anterior spinal column that is vertebral body (anterior spinal tuberculosis), most commonly seen which constitutes 90-95% or in posterior spinal column components of posterior vertebral arch (posterior spinal tuberculosis) which constitutes 5-10%. The most frequent site for extra pulmonary involvement of tuberculosis infection is the vertebral column. 2, 3, 4, 5 and in vertebral column most frequent sites of the involvement are the dorsal and lumbar spine 6, 7. The intervertebral disc and the superior and inferior end plates of the adjacent superior and inferior vertebral bodies are often involved in potts spine, which ultimately will lead to severe destruction of these elements, angulation of spine and may lead to kyphotic deformities8. Tuberculosis of the spine is always secondary to an active primary focus elsewhere. This fact dictated that whenever a patient is diagnosed with potts spine complete systemic examination of the patient should be done and also treated as a whole, and not only as a "case of spinal tuberculosis". Tuberculosis of the

spine involves the vertebral body in 98% of cases and is usually treated by anterior decompression, fusion and posterior stabilisation 9, 10, 11, 12. In order to achieve this, the vertebral body needs to be approached from both front and the back. This can be undertaken in one or two stages. If posterior stabilisation is undertaken without previous anterior decompression the kyphosis cannot be corrected. If anterior decompression and fusion are performed first without instrumentation, the spine is rendered grossly unstable increasing the risk of further neurological injury until second-stage instrumentation is undertaken. The selection of anterior versus posterior approach for surgical treatment of thoracolumbar tuberculosis is still a matter of debate. There is no universally accepted gold standard surgical approach for thoraco lumbar potts spine

Very few studies available in Indian population regarding clinical and radiological outcome in patients of thoraco lumbar potts spine managed with anterior decompression and stabilization.

Material and Methods

This prospective observational study is based on about 25 patients of either sex diagnosed with thoraco lumbar potts spine and undergone anterior decompression and stabilisation in the department of Orthopaedics, ESI-PGIMSR, Basaidarapur, New Delhi during the period 2017-2019.

The Patients were Eligible for the Study if the Following Conditions were Present

1. Age more than 5years and less than 70years
2. Symptomatic potts spine with neurological deficit not responding to conservative management
3. Spinal cord or nerve root compression not responding to conservative management
4. Significant soft tissue collection requiring drainage
5. Spinal instability due to osteolysis
6. Kyphosis angle more than30

Exclusion Criteria

1. Cervical potts spine
2. Sacral potts spine
3. Pregnancy
4. Age less than 5years and more than70yrs
5. Malignancy

After taking thorough clinical history all patients were assessed preoperatively for:

1. Clinical status (VAS)
2. Neurological status (Frankel Grade)
3. Radiological evaluation (Cobbs Angle)

All patients were started on ATT if not started earlier. Chemotherapy includes four drug regime for 18 months with pyrazinamide stopped after 2months and Ethambutol stopped after six months. Drugs are Isoniazid 5mgs/kg, Rifampicin 10mgs/kg, Pyrazinamide 20mgs/kg and Ethambutol 15mgs/kg

Anterior Trans Thoracic Transpleural Approach

We have approached through the left thoracotomy in all our patients, although, it is stated that one may approach through the right thoracotomy where X-rays show an unusually large abscess on the right side or when left thoracotomy is difficult because of pulmonary complications, or prior operation An incision is made along the rib which is the landmark in the mid axillary line which lies opposite the center of the lesion, ie, 8th rib for the D8 lesion. A J shaped parascapular incision is required for lesions from C7 to D8 so that the scapula can be lifted off the chest wall and the appropriate rib can be selected for opening the chest. The muscles and the periosteum are cut over the selected rib from the costochondral junction to the posterior part of the rib. Having freed the lung, it is retracted anteriorly displaying the aorta and paravertebral bulge or the diseased area of the vertebral column. The paravertebral abscess present is opened by a T-shaped incision with the vertical limb at the center of the diseased bodies and the horizontal limb of the T placed vertically medial to the lateral parts of the divided intercostals vessels. Anterior instrumentation was done prior to decompression.

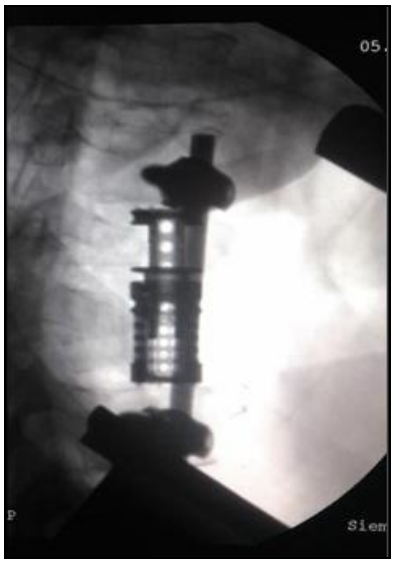

Fig 1: Intraoperative Fluoroscopic picture of cage with screws and rods

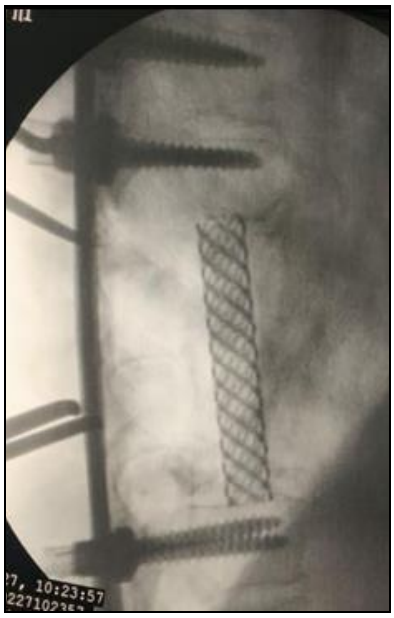

Fig 2: Intra operative fluoroscopic picture of cage with scews and rod

Anterolateral Extra Pleural Approach

A T-shaped posterior incision 14 cm to 15 cm long was made with the central incision over the spinous process at the apex of the kyphosis, and the transverse incision about 8 cm from the midline and perpendicular to it at the apex of kyphosis on the left side. The three ribs at the apex of the kyphosis were

identified and marked and their posterior 6cm to 8cm, upto the angle of the ribs, were resected. The diseased vertebral bodies were sufficiently debrided or resected to decompress the spinal cord which was exposed over the whole length of the diseased segment the transverse process of the diseased level, either L1 or L2, was identified and its tip defined by diathermy. In patients with short-segment or partially-healed disease, the two adjacent healthy vertebrae on either side of the involved segment were exposed. In those with long-segment disease at least one healthy segment on each side was exposed. Posterior fixation done with pedicle screws and Harrington rod, next, the anterior wound was approached again. Then the sides of the bodies of the diseased lumbar vertebrae is exposed for debridement, curettage, decompression, and bone grafting using iliac bone graft or rib grafting as as needed. The gap created by the excision of the vertebral bodies was grafted with autogenous bone by creating a slot in the healthy proximal and distal vertebrae. Wound closed in layer ASD done.

Anterior instrumentation was done when transthoracic approach was used and posterior instrumentation was used when anterolateral approach was done. Depending upon the approach used, spine is stabilized using the rib (allograft) harvested during thoracotomy or tricortical iliac bone graft is broken into pieces such that it fills the titanium or Polyether ether ketone (PEEK cage) to be implanted. The cage is fixed in the removed diseased segment and stabilized using single rod with 2 mono axial screws fixed to the normal vertebral bodies above and below the diseased segment when anterior instrumentation was done.

Post-Operative Follow up

All wounds was routinely inspected on fifth day and at the time of suture removal. All patients assessed clinically and radiologically in outpatient department of Orthopaedics at 6 weeks, 3months and 6months postoperatively

Outcome Evaluation

Clinical Assessment

1. Visual analogue scale for pain
2. Frankel's grade for neurological assessment

The above examination was done at Day 7, 12 weeks, & 24 weeks postoperatively.

Radiologic Evaluation

Neutral anteroposterior and lateral radiographs of spine was obtained postoperative day 1, 3 months and 6months.

MRI scan of thoraco lumbar spine was be obtained at 6 months All X-rays and MRI was evaluated for-

1. Kyphosis angle

Neurologic Evaluation

Neurological examination was done preoperatively and post operatively at day 7, 12 week& 6 months postoperatively. Neurological status of the patients was determined by measuring objective clinical findings:

1. Motor function,
2. Sensory function,
3. Deep tendon reflexes.
4. Frankel grade

Statistical Analysis

Descriptive statistics was analyzed with SPSS version 17.0 software. Continuous variables are presented as mean ± SD. Categorical variables are expressed as frequencies and percentages. The Pearson's chi-square test or Fisher's exact test was used to determine the relationship between two categorical variables. $P<0.05$ was considered statistically significant.

The data was entered in MS EXCEL spreadsheet and analysis was done using Stastical package for social sciences (SPSS) version 21.0

Results

Table 1: Incidence and Age at Presentation

Age Groups	Frequency	%
<=30 yrs	6	24.0%
31 - 40 yrs	6	24.0%
41 - 50 yrs	2	8.0%
51 - 60 yrs	6	24.0%
61 - 70 yrs	5	20.0%
Total	25	100%
Mean ± SD	45.36 ± 16.40	
Median	45	
Min - Max	13 - 70	

Clinico Radiological Analysis

The mean preoperative VAS Score of all 25 patients was 8.36±0.81, with minimum score of 7 and maximum score of 9. Post-operative Day 7 mean VAS score was 4.64 ±0.81, with minimum score of 3 and maximum score 6. 3rd month mean VAS score was 2.56±0.71 with minimum score being 2 and maximum score being 4 and final follow up VAS that is 6th month was 1.48±0.59, with minimum score of 1 and maximum score of 3. This shows that severe pain preoperatively became moderate pain postoperatively day 7 and mild pain at final follow up that is 24weeks. So there was a significant decrease ($P<0.001$) in pain intensity postoperatively.

Frankel grading preoperatively was grade B in 2 patients, grade C in 6 patients, and grade D in 17 patients, which improved to grade C in 6 patients, grade D in 12 patients, grade E in 7 patients in post-operative day 7, which further improved to grade D in 6 patients, grade E in 19 patients at 12 weeks and in final follow up (24 weeks) grade D in 2 patients and complete neurological recovery was seen in 23 patients that is Grade E. In our study complete neurological recovery was seen in 92%patients

The mean pre-operative cobbs' angle is 29.80±3.25 in which 36 was highest and 24 lowest. Mean immediate post-operative cobbs value (day1) was7.84±1.55, that is mean surgical correction obtained was 21.96±3.08. The mean cobbs angle at final follow up (24 weeks) was 9.96±7.72. The mean sagittal loss of alignment is 2.12±0.88.

Table 2: Shows VAS score N Mean ± SD and p value

VAS score	N	Mean ± SD	p value
Pre-Op	25	8.36 ± 0.81	<0.001
VAS SCORE DAY 7	25	4.64 ± 0.81	
VAS 3rd Month	25	2.56 ± 0.71	
VAS 6th Month	25	1.48 ± 0.59	

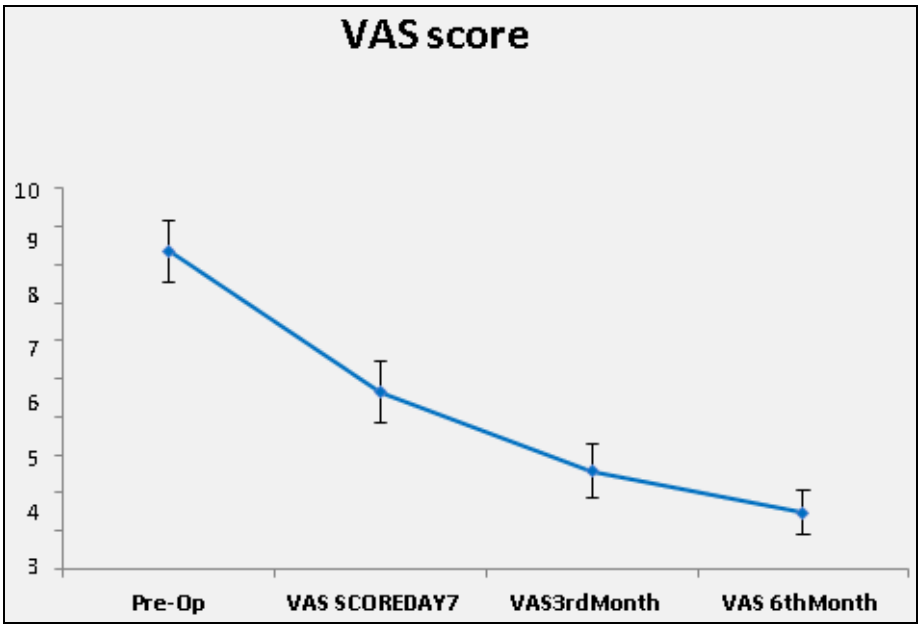

Fig 3: Shows VAS Score

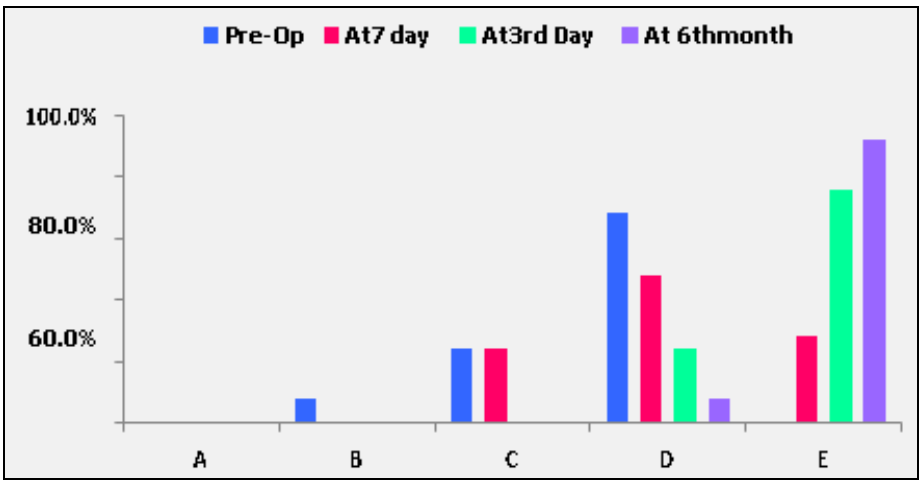

Fig 4: Frankel Grade

Table 2: Shows Cobb's Angle N Mean ± SD and p value

Cobb's Angle	N	Mean ± SD	p value
Preop	25	29.80 ± 3.25	<0.001
Immediate Postoperative Cobbs Value	25	7.84 ± 1.55	
Final Follow Up Cobbs Value	25	9.96 ± 1.72	

Discussion

Proponents of management of Pott's spine, with both conservative and surgical methods claim impressive results. It is well established that a significant number of patients get satisfactorily controlled and cured with conservative treatment but it is also a fact that a large number of patients do not get cured and even get worse under conservative regime and requires surgical intervention13. Kyphosis has been a common complication in patients treated with antitubercular drugs alone. Hodgson and Stock's13, 14 through their various studies in 1960 reported that, for tuberculosis of spine anterior arthrodesis is the treatment of choice. Better results where shown when anterior arthrodesis was followed by placing of bone graft in structurally stable position

In surgical management of potts spine as anterior column of spine is involved in majority of cases, decompression when needed should be anterior. Proponents of management of Pott's spine with surgical decompression, with both posterior and anterior claim impressive results. For anterior decompression, anterior approach and antero-lateralapproach have been conventionally preferred, because they provide direct access to involved vertebrae and allow direct decompression of the cord by removal of the tubercular debris and granulation tissue which cause predominantly anterior compression on the cord. They enable removal of internal gibbus (that may impinge upon the cord when the kyphosis is corrected) and increase space for the cord anteriorly. Opponents of anterior approach claim that it is an extensive operation and is more dangerous than a posterior fusion. Anterior fusion takes more time and more whole blood transfusion and involve more specialist like the neurosurgeons, cardiothoracic surgeons and neuroanesthesia. Anaesthesia is much more critical in the anterior approaches and the anesthetist must be competent to manage open chest operations.

In our study 15 patients were female and 10 patients were male that is 60% female and 40% male. Similar male female ratio was seen in studies of Sundaraj *et al* [15] and Jain *et al* 16. Age of patients in our study ranged from 13years to 70 years. Majority of patients in our study were in the 3rd (31 to 40 years) or 5th decade (51to 60years), 6 patients each. Schmorl

G *et al* [17] in his study observed that TB spine most commonly occured in 1st (50%) and 2nd (25%) decade. Age distribution in Jainetal [16] study was between 2 to 57 years. It shows there is no age predilection for potts spine as it can occur in any age group especially in Indian Subcontinent. So Potts spine should be kept as one of the differential diagnosis in any patient presenting with lower back pain with or without neurological deficit.

Our study results for VAS score is comparable to Suryakant Singh *et al* [18]. In our study complete neurological recovery was seen in 25 patients (92%) which is comparable with the study of Garg *et al* [19].

Instrumentation helps in kyphosis correction and maintenance of corrected kyphosis. As a result whenever internal stabilisation is done, prolonged immobilisation and use of external spinal braces can be avoided and patient can be early mobilised. So, whenever possible anterior debridement, decompression and strut grafting should be combined with stabilisation that can be anterior instrumentation or posterior instrumentation, Dai *et al* [20] have shown that instrumentation when done anterior in dorsolumbarpotts spine shown high fusion rate, low complication rate, and much better correction of kyphosis. When patients have kyphosis related to potts spine anterior instrumentation is better than posterior instrumentation for deformity correction and stabilizing the vertebral column as stated by Yilmaz *et al* [21].

In our study five patients anterior instrumentation was done and in remaining 20 patients posterior instrumentation was done.

Another concern with instrumentation is that, since potts spine is a infectious disease instrumentation will act as a foreign body which will lead to reactivation of infection with biofilm formation. Oga M *et al* [22] in 1993 conducted a study evaluating the risk of instrumentation as a foreign body in spinal tuberculosis and he found there was negligible adherence of mycobacterium to stainless steel discs. Various other studies also shows anterior instrumentation is safe in active tuberculosis [21, 23, 24]. In our study also no implant related complication was observed. So we conclude that stabilisation with instrumentation is safe even inactive tuberculosis and is no added risk of recurrent infection.

Conclusion

In patients of thoraco lumbar potts spine managed with anterior decompression and stabilisation, clinico radiological outcome found to be good providing statistically significant clinical and radiological outcome after six months follow up. However, large sample size and long term follow up is needed for better study

References

1. Percivall Pott. Dobson J Ann R CollSurg Engl. 1972; 50(1):54-6.
2. Kumar K. A clinical study and classification of posterior spinal tuberculosis. Int Orthop (SICOT). 1985; 9:147-152.
3. Benli IT, Acaroglu E, Akalin S, Kis M, Duman E, Un A. Anterior radical debridement and anterior instrumentation in tuberculosis spondylitis. Eur Spin J. 2003; 12(2):224-34.
4. Tuli SM. Tuberculosis of the skeletal system (Bone, Joints, Spine and Bursal Sheaths, 4nd edn. New Delhi; Jaypee Brothers, 2010, 193-353.
5. Talbot JC, Bismil Q, Saralaya D, Newton DAG, Frizzel RM, Shaw DL. Musculoskeletal tuberculosis in Bradford-a 6-year review. Ann R CollSurgEngl. 2007; 89:405-9.
6. Mehta JS, Bhojray SY. Tuberculosis of thoracic spine. JB one Joint Surg. 2001; 83-B:859-63.
7. Hodgson AR, Stock FE, Frog HSY, Ong GB. Anterior spinal fusion: The operative approach and pathological findings in 412 patients with Pott's disease of the spine. Br J Surg. 1960; 48:172-178.
8. Tuli SM. Severe kyphotic deformity in tuberculosis of the spine. Int Orthop. 1995; 19:327-31.
9. Jain AK, Maheshwari AV, Jena S. Kyphus correction in spinal tuberculosis. Clin Orthop. 2007; 460:117-23.
10. Laheri VJ, Badhe NP, Dewnany GT**.** Single stage decompression, anterior interbody fusion and posterior instrumentation for tuberculous kyphosis of the dorso-lumbar spine. Spinal Cord. 2001; 39:429-36.
11. Moon MS. Combined posterior instrumentation and anterior interbody fusion for active tuberculous kyphosis of the thoraco-lumbar spine. Curr Orthopaedics. 1991; 5:177-9.
12. Moon MS, Woo YK, Lee KS *et al*. Posterior instrumentation and anterior interbody fusion for tuberculous kyphosis of dorsal and lumbar spines. Spine. 1995; 20:1910-16.
13. Tuli SM. Results of treatment of spinal tuberculosis by middle path regime. J Bone Joint Surg [Br 1975;57B:13-23]
14. Hodgson AR, Stock FS. Anterior fusion for the treatment of tuberculosis of the spine: The operative findings and result of treatment in the first one hundred cases. J Bone Joint Surg1960;42-A:295-310
15. Sundararaj GD, Behera S, Ravi V, Venkatesh K, Cherian VM, Lee V. Role of posterior stabilization in the management of tuberculosis of the dorsal and lumbar spine. J Bone Joint Surg. 2003; 85-B:100-06.
16. Jain AK, Aggarwal A, Dhammi IK, Aggarwal PK, Singh S. Extrapleural anterolateral decompression in tuberculosis of the dorsal spine. JB one Joint Surg Br. 2004; 86:1027-31.
17. Schmorl G, Goin LS, Junghanns H, Wilk SP. The human spine in health and disease: anatomico pathologic. New York: Grune & Stratton, 1959.
18. Suryakant Singh, Hitesh Dawar, Kalidutta Das, Bibhudendu Mohapatra, Somya Prasad. Functional and Radiological Outcomes of Anterior Decompression and Posterior Stabilization via Posterior Transpedicular Approach in Thoracic and Thoracolumbar Pott's disease: A Retrospective Study Asian Spine J. 2017; 11(4):618-626.
19. Garg RK, Somvanshi DS. Spinal tuberculosis: a review. J Spinal Cord Med. 2011; 34:440-54.
20. Dai LY, Chen WH, Jiang LS. Anterior instrumentation for the treatment of pyogenic vertebral osteomyelitis of thoracic and lumbar spine. Eur Spine J. 2008; 17(8):1027.
21. Yilmaz C, Selek HY, Gürkan I, Erdemli B, Korkusuz Z. Anterior instrumentation for the treatment of spinal tuberculosis. J Bone Joint Surg Am. 1999; 81:1261-7.
22. Oga M, Arizono T, Takasita M, Sugioka Y. Evaluation of the risk of instrumentation as a foreign body in spinal tuberculosis: Clinical and biologic study. Spine. 1993; 18:1890-1894.
23. Benli IT, Acaroglu E, Akalin S, Kis M, Duman E, Un A. Anterior radical debridement and anterior instrumentation in tuberculosis spondylitis. Eur Spine J. 2003; 12:224-34.
24. Hassan MG. Anterior plating for lower cervical spine tuberculosis. Int Orthop. 2003; 27:73-7.