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Tuberculosis of dorsal and lumbar spine – Posterior decompression & posterior stabilization

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Abstract

Introduction: Vertebral disease is the commonest form of skeletal tuberculosis, accounting for half of the cases. The most frequent sites of involvement are the thoracic and the thoracolumbar spine. Antituberculous chemotherapy remains the mainstay of treatment now that MRI allows early diagnosis. This conservative approach cannot, however, prevent the progression of a kyphotic deformity, and long-term rest is usually required to relieve severe back pain. These problems may be avoided by rigid internal stabilisation of the spine.

Treatment options: Various methods have been described for spinal tuberculosis including 1) anterior decompression and fusion, 2) combined anterior and posterior fusion, 3) posterior decompression and fusion alone.

Materials and methods: Prospective study done between April 2010 to August 2014. Eight patients had been operated with average age group of 60. Dorsal spine – 1 pt, Dorsolumbar – 5 pts, Lumbar – 2pts. Normal neurology but with kyphosis of 30 degree – 3 pts. ASIA grade B & C paralysis – 4 pts. Grade-A paralysis – 1 pt.

Indications for surgery: Failure of conservative treatment and significant kyphotic deformity. Surgical Technique: Pedicle screw fixation done avoiding the infected vertebral segment and the screws were inserted in the adjacent vertebral bodies. Through transpedicular approach, body was approached posterolaterally. Costotransversectomy and decompression was done for dorsal spine. If necessary root is sacrificed for better exposure. Next, the disc space was distracted and the infected end-plate, disc and soft tissue were meticulously debrided 1) Interbody fusion was done with bone graft, voids were filled with graft. Short segment stabilization was done with pedicle screw construction. 2) ATT was started. Follow up (Range from 8 months to 2 years) early mobilization from the bed with Taylor brace. Muscle strengthening exercises from 3rd week onwards. Bending after radiological healing.

Results: Radiological and clinical improvement was noticed within one month in all patients. 10 degree of vertebral collapse was noticed in one patient. 2 patients – neurological recovery from B, to Grade D. 2 patients – Grade C recovered to Grade E. One patient with grade A didn't show any improvement.

Conclusion: Posterior decompression and stabilization in tuberculosis of dorsal, dorsolumbar and lumbar spine is a very useful alternate procedure. It is very safe surgery with good results, particularly in elderly individuals.

Keywords: Tb spine, posterior decompression, posterior stabilization

Introduction

- Tuberculosis causes three million deaths each year, and 90 million new cases have been diagnosed in the last ten years. Vertebral disease is the commonest form of skeletal tuberculosis, accounting for half of the cases. The most frequent sites of involvement are the thoracic and the thoracolumbar spine.
- Antituberculous chemotherapy remains the mainstay of treatment now that MRI allows early diagnosis. This conservative approach cannot, however, prevent the progression of a kyphotic deformity, and long-term rest is usually required to relieve severe back pain.
- These problems may be avoided by rigid internal stabilisation of the spine.

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Picture 1



Picture 2

Conservative therapy (picture 1 & picture 2) showing significant kyphosis.

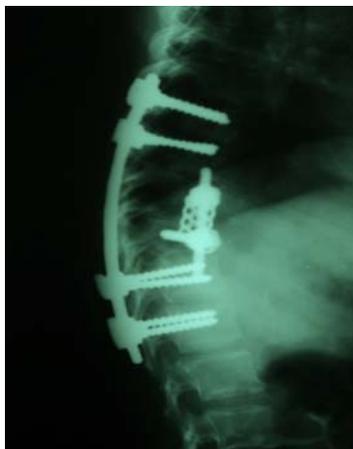
Treatment options

- Various methods have been described for spinal tuberculosis including

- 1) Anterior decompression and fusion, (picture 3)
- 2) combined anterior and posterior fusion (picture 4)
- 3) Posterior decompression and fusion alone (picture 5)



Picture 3



Picture 4

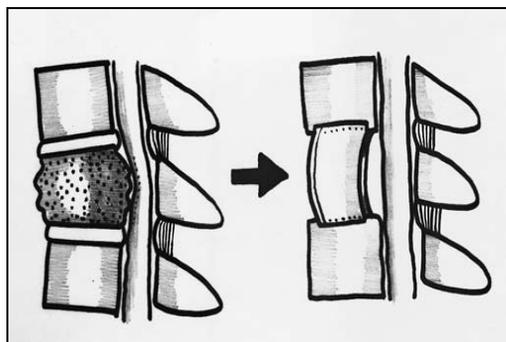


Picture 5

The treatment methods can be classified according to the site of involvement and the degree of kyphosis and the general condition and comorbid factors. (A Classification Based On

the Selection of Surgical Strategies J. S. Mehta, S. Y. Bhojraj
From Hinduja Hospital, Mahim Mumbai, India

Group A



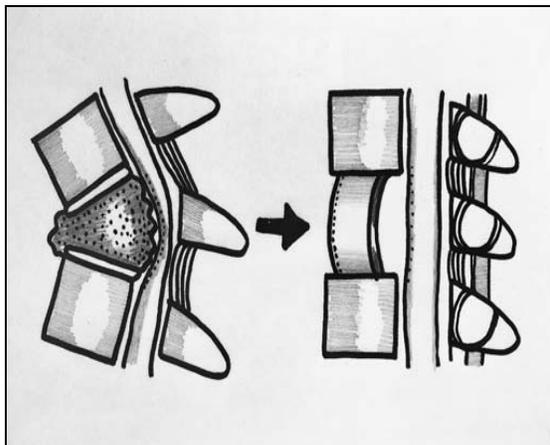
Picture 6



Picture 7

Group A consisted of patients with anterior lesions which were stable with no kyphotic deformity, and were treated with anterior debridement and strut grafting.

Group B



Picture 8



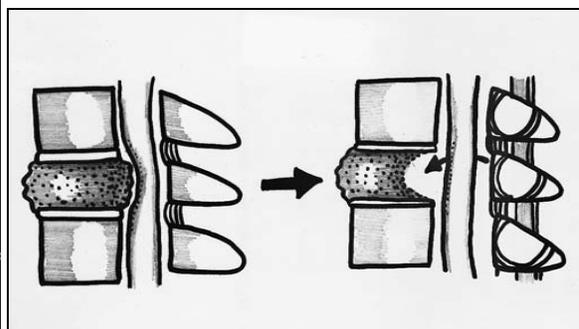
Picture 9

Group B comprised patients with global lesions, kyphosis and instability who were treated with posterior instrumentation, and by anterior strut grafting.

Group C



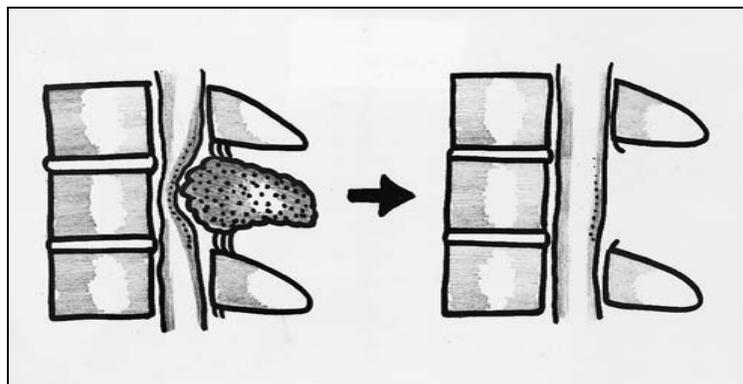
Picture 10



Picture 11

Group C with anterior or global lesions as in the previous groups, but who were at a high risk for transthoracic surgery because of medical and possible anesthetic complications. These patients had a global decompression of the cord posteriorly, the anterior portion of the cord being approached through a transpedicular route. Posterior instrumentation done.

Group D



Picture 12

Group D comprised patients with isolated posterior lesions which required posterior decompression only.

Anterior decompression (picture 13 and 14)

- Considered as Gold standard since the pathology is Anterior. Thorough removal of diseased material is possible. But it is a more morbid surgery particularly in elderly individuals.

- Adjacent vertebral body is osteoporotic hence the pulling power of screws is reduced leading to a less stable construct.
- Most of the time we may need the help of a thoracic surgeon.



Picture 13



Picture 14

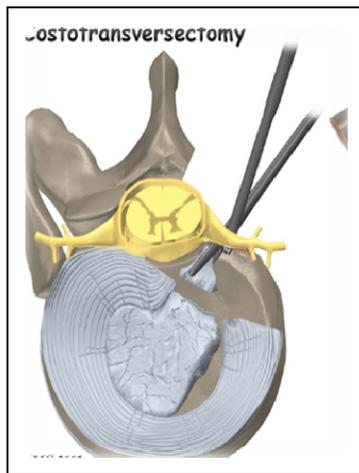
To overcome these difficulties, we tried to decompress the spine from the posterior aspect and stabilize the spine with posterior pedicle screw construct.

Posterior decompression and stabilization (Picture 15 and 16)

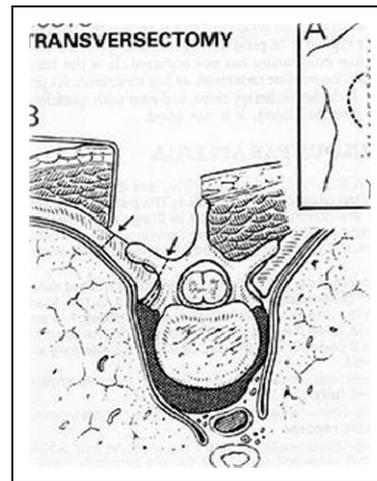
- Is a less morbid surgery. Adequate decompression can be achieved via transpedicular/ costotransversectomy approach in thoracic spine and posterior approach in

lumbar spine.

- The diseased and compressing elements removed – rest is taken care by ATT.
- It is more stable construct because of pedicle screws and hence early mobilisation. More familiar approach.



Picture 15



Picture 16

AIM

- To study the clinical and radiological outcome of tuberculosis of dorsolumbar & lumbar spine treated with posterior decompression and stabilization.

AIM OF SURGERY

- Decompression of canal
- Stabilization of spine
- Improvement of neurological

Outcome

Materials and methods

- Prospective study done between April 2010 to August 2014.
- Eight patients had been operated with average age group of 60.
- Dorsal spine – 1 pt, Dorsolumbar – 5 pts, Lumbar – 2pts.
- Normal neurology but with kyphosis of 30 degree – 3 pts.

- ASIA grade B & C paralysis – 4 pts. Grade-A paralysis – 1 pt.

Indications for surgery

Failure of conservative treatment and significant kyphotic deformity.

Surgical Technique

- Pedicle screw fixation done avoiding the infected vertebral segment and the screws were inserted in the adjacent vertebral bodies. Through transpedicular approach, body was approached poster laterally. Costotransversectomy and decompression was done for dorsal spine. If necessary root is sacrificed for better exposure. Next, the disc space was distracted and the infected end-plate, disc and soft tissue were meticulously

debrided

- Interbody fusion was done with bone graft, voids were filled with graft. Short segment stabilization was done with pedicle screw construction.
- ATT was started.

Follow up- Range from 8 months to 2 years

- Early mobilisation from the bed with Taylor brace.
- Muscle strengthening exercises from 3rd week onwards.
- Bending after radiological healing.

Results

- Radiological and clinical improvement was noticed within one month in all patients.
- 10 degree of vertebral collapse was noticed in one patient.
- 2 patients – neurological recovery from B, to Grade D.
- 2 patients – Grade C recovered to Grade E
- One patient with grade A didn't show any improvement.

Discussion

Surgery for tuberculous spondylitis is indicated for spinal deformity, the failure of non-operative management, persistent severe pain and neurological dysfunction which does not resolve or which develops while patients are undergoing ant tuberculous chemotherapy. In addition, older patients with Pott's paraplegia require decompressive surgery to avoid the hazards of prolonged immobilization.

Nussbaum *et al* recommended surgical treatment even for those with a mild neurological deficit because both epidural infection and bone destruction typically progress for a time after ant tuberculous chemotherapy has been started.

Various surgical techniques have been used to treat spinal tuberculosis but there are few reports on the use of posterior lumbar interbody fusion and pedicle screw fixation. Combined anterior radical debridement and arthrodesis has some advantages, including direct access to, and excision of, the focus of disease, rapid bony union, and less progressive kyphotic collapse. In contrast, posterior fusion with rigid instrumentation is safer, technically easier and avoids the potential intra- and post-operative complications, which can be associated with the anterior approach. Although the epidural abscess associated with lumbar tuberculous spondylitis is usually anterior, in cases of epidural suppuration, access to the neural elements can be limited, if an anterior approach is used. Because modern imaging facilitates early diagnosis and the advent of more effective regimens of ant tuberculous chemotherapy, it is now possible to treat patients conservatively rather than by an anterior radical approach. Moon *et al* reported patients with active tuberculosis of the Lumbar and lumbosacral spine who had been treated conservatively with triple chemotherapy for 12 to 18 months.

They emphasized the importance of early diagnosis and the immediate initiation of chemotherapy in order to cure the disease and to minimize the residual kyphosis. Recent reports emphasize the importance of tailoring the treatment of spinal tuberculosis to the individual. Nussbaum *et al*, based their treatment on the degree of bone destruction. Aggressive debridement and fusion were only carried out in patients in whom extensive involvement of vertebral bodies resulted in kyphosis. Güzey *et al* and Rath *et al* reported good neurological results after posterior debridement and internal fixation in patients with neurological impairment due to spondylitis. Their results wer comparable with the best results obtained after anterior decompression which may be explained

by the extent of the neural decompression possible through a posterior approach. Mehta and Bhojraj advocated posterior instrumentation with anterior debridement and grafting in patients with kyphosis. They also reported good results after posterior transpedicular debridement and instrumented fusion without anterior debridement in patients at high risk because of their underlying medical condition.

In our series, we carried out posterior debridement, posterior lumbar interbody fusion for lumbar spine and posterolateral interbody fusion for thoracic spine with autogenous iliac-bone grafting and posterior instrumentation with pedicle screws.

We prefer a posterior approach because of our familiarity with it, its simplicity, and its low complication rate. Posterior lumbar interbody fusion with instrumentation may be performed safely in patients with spinal tuberculosis except for those with multilevel involvement and a large paravertebral abscess. Such cases are few because modern imaging techniques allow earlier diagnosis. The benefits of our approach are early ambulation, decreased morbidity, and good access to dural abscesses, sequestered bone and small abscesses in the anterior spine. Posterior instrumentation can be used to correct deformity and any concurrent spinal stenosis in elderly patients can be treated simultaneously.

The stability provided by posterior fixation, particularly transpedicular fixation, protects the vertebral correction, and patients are able to return to normal activities within a short period of time. In general, transpedicular screws can be placed in an affected vertebra if the upper part of the vertebral body is not destroyed by the infection thereby reducing the surgical exposure and the extent of fixation.

Our results demonstrate that posterior r interbody fusion with autogenous iliac-bone grafting and posterior instrumentation can give satisfactory results for thoracic and lumbar tuberculous spondylitis. It allows easy access to the spinal canal for neural decompression, prevents loss of correction of vertebral alignment, and facilitates early mobilization. We recommend this procedure for patients with an accessible small abscess in the anterior spine and slight vertebral body destruction, an epidural abscess in the posterior dura, spinal stenosis, and in

those who cannot be treated from the front because the abscess is in the thoracic and lumbar spine.

Conclusion

- Posterior decompression and stabilisation in tuberculosis of dorsal, dorsolumbar and lumbar spine is a very useful alternate procedure.
- It is very safe surgery with good results, particularly in elderly individuals.

Case 1: 65 yrs female ASIA grade C neurological involvement

Pre-Operative





Per-Operative



Post-Operative

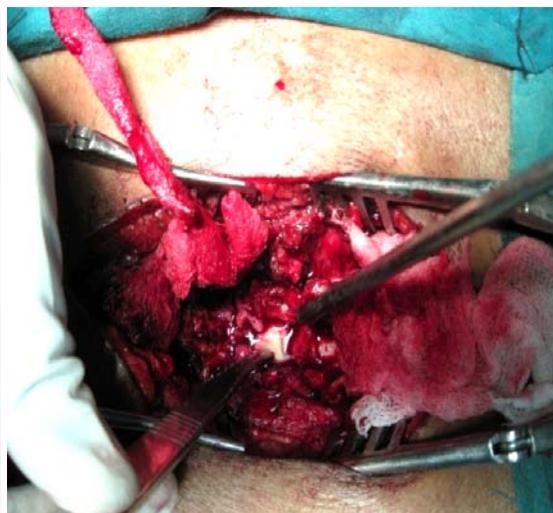
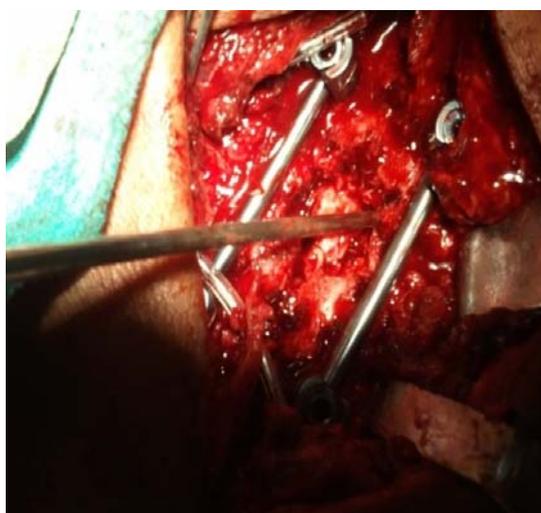


Case 2:
70 years female
ASIA Grade B

Pre-Operative



Per-Operative



Post-Operative



Case 3:
65 years male
ASIA Grade C neurological deficit.

Pre-Operative

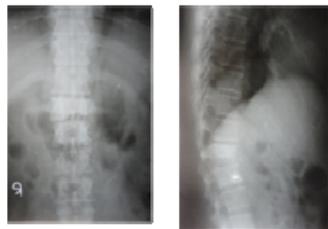


Post-Operative

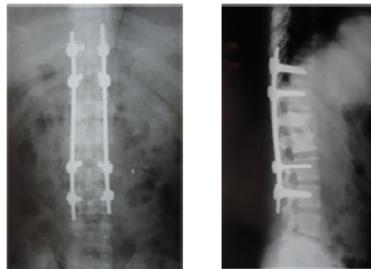


Case 4

Preop radiographs

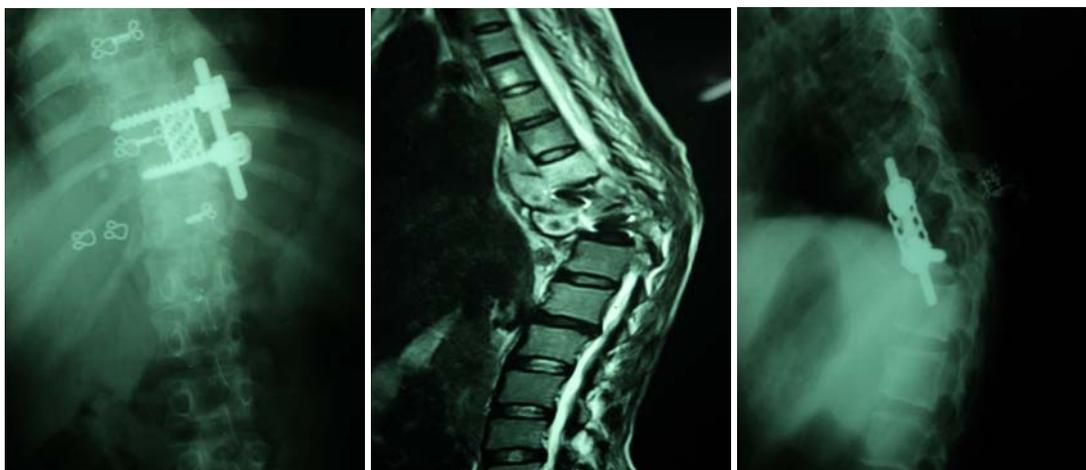


Postop radiographs



Case: 5
55 years female ASIA Grade B (failed anterior surgery)

Pre-Operative

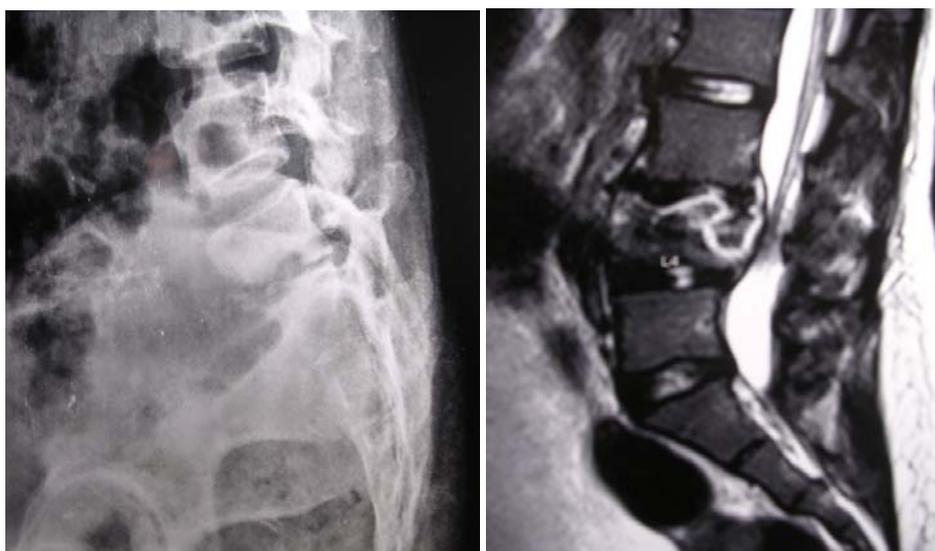


Post-Operative



Case 6:
55 years female ASIA Grade E

Pre-Operative



Post-Operative



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