

Surgical Treatment of Spinal Tuberculosis :With Posterior Decompression , Laminectomy and Pedicle Screw Fixation



Medical Science

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ABSTRACT

The spinal column is involved in less than 1% of all cases of tuberculosis (TB). Spinal TB is a very dangerous type of skeletal TB as it can be associated with neurologic deficit due to compression of adjacent neural structures and significant spinal deformity. Therefore, early diagnosis and management of spinal TB has special importance in preventing these serious complications. Although the development of more accurate imaging modalities such as magnetic resonance imaging and advanced surgical techniques have made the early diagnosis and management of spinal TB much easier, these are still very challenging topics. In this we aim to discuss the diagnosis and management of spinal TB based on surgical treatment

Introduction

Although the first documented spinal tuberculosis (TB) cases date back to 5,000-year-old Egyptian mummies, the first modern case of spinal TB was described in 1779 by Percival Pott [1]. Spinal involvement occurs in less than 1% of patients with TB [2,3] but the increasing frequency of TB in both developed and developing countries has continued to make spinal TB a health problem [2,4]. Spinal TB (Pott's disease) is the most common as well as one of the most dangerous forms of skeletal TB and accounts for 50% of all cases of skeletal TB. Although the thoracolumbar junction seems to be the most common site of the spinal column involvement in spinal TB, any part of the spine can be affected [5]. Furthermore, the incidence of neurologic complications in spinal TB varies from 10% to 43% [1].

The objective of this study is to know the functional outcome of tuberculosis of spine treated with laminectomy posterior decompression and pedicle screw fixation.

Materials and Methods

This study was conducted at Mahatma Gandhi Medical college , Jaipur . 30 patients were included in this study suffering from tuberculosis of spine from May 2014 to May 2016

Inclusion Criteria :

1. Patient not responding to medical therapy
2. Patient with progressive neurological deficiency on medical treatment
3. Patient with neurological deficiency

Exclusion Criteria :

1. Patient diagnose with pott's spine without neurological deficiency

Pathophysiology

There are two distinct types of spinal TB, the classic form or spondylodiscitis, and an increasingly common atypical form which is spondylitis without disc involvement [6]. In adults, the involvement of the intervertebral disc is secondary to spread from adjacent infected vertebra whereas in children it can be primarily due to the vascularized nature of the intervertebral disc. The basic lesion in Pott's disease is a combination of osteomyelitis and arthritis, usually affecting more than one vertebra. The anterior aspect of the vertebral body adjacent to the subchondral plate is commonly involved [7]. Spinal TB can include any of the following: progressive bone destruction leading to vertebral collapse and kyphosis, cold abscess formation (due to extension of infection into adjacent ligaments and soft tissues), spinal canal narrowing by abscesses, granulation tis-

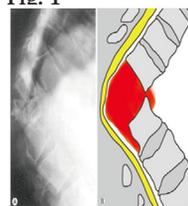
sue or direct dural invasion resulting in spinal cord compression and neurologic deficits [7].

Diagnosis

A history of tuberculosis, a positive skin test (its value declines in endemic areas), and an elevated erythrocyte sedimentation rate (ESR) may be useful in the diagnosis of spinal TB [8,9]. Biopsy plays a valuable role in the diagnosis of spinal TB infection. The use of DNA amplification techniques (polymerase chain reaction or PCR) may facilitate rapid and accurate diagnosis of the disease [10].

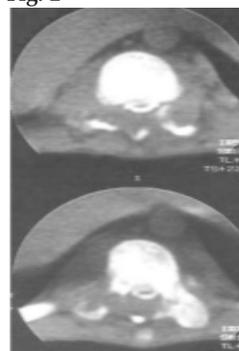
Computed tomography (CT) provides bony detail, while MRI evaluates the involvement of soft tissue and abscess formation.

Fig. 1



(A) Lateral radiography shows severe kyphosis resulting from significant destruction of two contiguous vertebral segments by tuberculosis infection in the thoracolumbar junction (Modified from Rahimi-Movaghar [15]), (B) Schematic representation of the pathology, affecting the intervertebral disc, vertebral bodies, and anterior paravertebral region (orange). The posterior elements are also involved. As a result of such a significant deformity, noticeable compression endangers spinal cord (yellow).

Fig. 2



Computed tomography scan of the same case (Fig. 1) demonstrating significant destruction of vertebral posterior elements (Modified from Rahimi-Movaghar [15]).

Indications of Surgical Intervention

Indications of surgical intervention are shown in Table 1. Table 2 shows the management of epidural abscesses.

Table 1

Indications of surgery	
Neurological deficit	
Emergent surgical intervention should be performed if neurologic deficit exists, unless the deficit is minimal and non-progressive or the patient has medical co-morbidities such as sepsis or coagulopathy.	
If the deficit is minimal the patient should be carefully monitored to detect any progression in the symptoms.	
Failed medical therapy and progression of disease despite best medical therapy	
Chronic pain after medical management	
Prominent deformity	
Significant instability	

Indications of surgery (note that medical therapy should always be started as well)

Table 2

Texture of the mass	Liquid-pus (Hyperintense core in T2 with ring enhancement)	Solid phlegmon-granulation tissue (Hypointense or isointense core in T2 with homogenous enhancement)
Focal neurological deficit	Yes Surgery No If an organism is found and the patient can be closely followed or if the length of involvement is very extensive, conservative treatment Consider surgery with no definite bacteriologic diagnosis, remaining or progression despite medical therapy or impossible close follow-up	Surgery Conservative treatment

Surgical vs. medical therapy for epidural abscess

Surgical Techniques

The following techniques are currently used for the treatment of TB spondylitis: 1) posterior decompression and fusion with bone autografts, 2) anterior debridement/decompression and fusion with bone autografts, 3) anterior debridement/decompression and fusion, followed by simultaneous or sequential posterior fusion with instrumentation, and 4) posterior fusion with instrumentation, followed by simultaneous or sequential anterior debridement/decompression and fusion [16]. In our study the spine was exposed from the posterior aspect in all 30 cases. It was then stabilized with four pedicle screws. Hemilaminectomy was done and was gradually removed with rongeurs and nibblers. The cord was decompressed posteriorly. Posterolateral fusion with bone graft was undertaken and the surgical wound was closed in layers. Figure 3. MRI scan of the affected spine. Figure 4. MRI scan of the affected spine. Post-operatively the patient was continued with chemotherapy along with assisted physiotherapy. Motor power gradually improved after the surgery and regained motor power mostly of grade 3 after four weeks and grade 4 after eight weeks. Bladder control came back after four weeks and started walking with walker from eight weeks with a Taylor brace. Back pain resolved and no episode of fever was noted after the operation. Figure 5. Showing postoperative x- ray.



Fig 3.



Fig 4.



Fig 5.

DISCUSSION

Surgical treatment for spinal tuberculosis with paraplegia is constantly evolving. Neurological involvement warrant early surgical intervention. In earlier days the spinal canal was decompressed by simple laminectomy via posterior approach. Patients used to recover from the neural compression but the spine became unstable. As majority of spinal tuberculosis involve and destruct the anterior column, the only stabilizing structure preventing the kyphosis remained the posterior elements. So, laminectomy further destabilizes the spinal column. Hodgson et al. during their Hongkong experience devised the radical excision of the diseased area by anterior thoracic or thoraco-lumbar approach and reconstructing the anterior column by rib graft. They noted significant improvement in terms of mortality, spinal stability and cure from the infection [14]. Rajasekaran and Soundarapandian noted failure of rib graft and progression of kyphosis following the Hongkong procedure [14]. Presently these are mostly replaced by pedicle screw-rod system. All of them act as a tension band in stabilizing the spine; so the anterior column continuity is a prerequisite for them. Anterior column reconstruction from the posterior transpedicular approach has slowly gained popularity. The diseased material is curetted from the posterior aspect, the cord got decompressed from both anterior and lateral aspect and expandable cage fills the anterior column defect. Posterior instrumentation then stabilizes the spine

CONCLUSION

Posterior transpedicular limited anterior decompression is a viable option in Pott's paraplegia. However, anterior column reconstruction is important in preventing kyphosis progression. Pseudoarthrosis may be present in infective spinal conditions also.

REFERENCES :

- Sai Kiran NA, Vaishya S, Kale SS, Sharma BS, Mahapatra AK. 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;6:320-326. [PubMed]
- Rezaei AR, Lee M, Cooper PR, Errico TJ, Koslow M. Modern management of spinal tuberculosis. *Neurosurgery*. 1995;36:87-97. [PubMed]
- Turgut M. Spinal tuberculosis (Pott's disease): its clinical presentation, surgical management, and outcome. A survey study on 694 patients. *Neurosurg Rev*. 2001;24:8-13. [PubMed]
- Barnes PF, Bloch AB, Davidson PT, Snider DE, Jr Tuberculosis in patients with human immunodeficiency virus infection. *N Engl J Med*. 1991;324:1644-1650. [PubMed]
- Moorthy S, Prabhu NK. Spectrum of MR imaging findings in spinal tuberculosis. *AJR Am J Roentgenol*. 2002;179:979-983. [PubMed]
- Pertuiset E, Beaudreuil J, Liote F, et al. Spinal tuberculosis in adults, A study of 103 cases in a developed country, 1980-1994. *Medicine (Baltimore)* 1999;78:309-320. [PubMed]
- Hidalgo JA, Alangaden G, Cunha BA, et al. Pott disease: tuberculous spondylitis [Internet]. New York: WebMD LLC; 2008. [cited 2010, Oct 15]. Available from: <http://emedicine.medscape.com/article/226141-overview>.
- Nussbaum ES, Rockswold GL, Bergman TA, Erickson DL, Seljeskog EL. Spinal tuberculosis: a diagnostic and management challenge. *J Neurosurg*. 1995;83:243-247. [PubMed]
- Jain AK. Tuberculosis of the spine: a fresh look at an old disease. *J Bone Joint Surg Br*. 2010;92:905-913. [PubMed]
- Brisson-Noel A, Aznar C, Chureau C, et al. Diagnosis of tuberculosis by DNA amplification in clinical practice evaluation. *Lancet*. 1991;338:364-366. [PubMed]
- al Arabi KM, al Sebai MW, al Chakaki M. Evaluation of radiological investigations in spinal tuberculosis. *Int Orthop*. 1992;16:165-167. [PubMed]
- Andronikou S, Jadwat S, Douis H. Patterns of disease on MRI in 53 children with tuberculous spondylitis and the role of gadolinium. *Pediatr Radiol*. 2002;32:798-805. [PubMed]
- Babhulkar SS, Tayade WB, Babhulkar SK. Atypical spinal tuberculosis. *J*

- Bone Joint Surg Br.1984;66:239–242. [PubMed]
14. Pande KC, Babhulkar SS. Atypical spinal tuberculosis. Clin Orthop Relat Res. 2002;(398):67–74.[PubMed]
 15. Rahimi-Movaghar V. A case report of Pott's disease with unusual involvement of two separate levels of spine and delayed progressive Kyphosis. Acta Med Iran. 2001;39:54–57.
 16. Desai SS. Early diagnosis of spinal tuberculosis by MRI. J Bone Joint Surg Br. 1994;76:863–869.[PubMed]
 17. Narlawar RS, Shah JR, Pimple MK, Patkar DP, Patankar T, Castillo M. Isolated tuberculosis of posterior elements of spine: magnetic resonance imaging findings in 33 patients. Spine (Phila Pa 1976) 2002;27:275–281. [PubMed]