

# Management of Spinal Tuberculosis in the North-Eastern Region of India

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## ABSTRACT

**Background:** North East India has a high burden of tuberculous disease. Spinal tuberculosis is difficult to diagnose and managed with medical treatment. This study was carried out to document the clinical features and diagnostic modalities of spinal tuberculosis in North East India.

**Methods:** Symptoms and investigations were recorded for all patients diagnosed with spinal tuberculosis. They were followed up with anti-tubercular treatment (ATT) according to standard guidelines. X-ray and MRI findings were recorded for each patient.

**Results:** Of 70 patients with spinal tuberculosis, backache was the commonest presenting feature (84%), 42.85% had lower limb neurological deficits, gibbus in 35.71% and kyphotic deformity was recorded in 21.42%. MRI detected end plate sclerosis/erosion in 52.86%.

**Conclusion:** Diagnosis of spinal tuberculosis is challenging in the developing world. However chronic backache and specific radiological features can be useful in resource limited settings.

**Keywords:** tuberculosis, spinal infections, extra-pulmonary tuberculosis, skeletal tuberculosis

## INTRODUCTION

Percival Pott in the year 1779 described the first modern case of spinal tuberculosis although the disease dates back to 5000 year as documented in <sup>[1]</sup> Egyptian mummies. In the year 2011, World Health Organization (WHO) estimated 8.7 million incident cases and 12 million prevalent cases worldwide in 2011 where India and China accounted for almost 40% of the total global cases. <sup>[2]</sup> Spinal involvement of TB is not common occurring in less than 1% of patients. <sup>[3,4]</sup> However, increasing incidence of TB worldwide contributes to making spinal TB a healthcare associated concern. <sup>[5]</sup> Spinal TB is the most common and the most dangerous type of skeletal TB where

thoracolumbar junction seems to be the most common site. Any part of the spine can be affected by spinal TB. <sup>[6]</sup>

Differentiating spinal TB from pyogenic and fungal vertebral osteomyelitis as well as primary and metastatic spinal tumors is difficult. <sup>[7]</sup> Elevated ESR and biopsy test are useful in diagnosis of spinal TB. <sup>[8]</sup>

Through the use of modern radiological techniques like magnetic resonance imaging (MRI), early diagnosis of spinal TB is possible so that the patient can be treated more effectively before significant neurological deficits develop. MRI, amongst other imaging techniques has the ability to diagnose the disease earlier

and more accurately. [8] This study was undertaken to study the clinical features of spinal tuberculosis in the North Eastern region of India.

## MATERIALS AND METHODS

Seventy cases of spinal TB diagnosed via clinical symptoms followed by X-ray and MRI were included in this study. Patients were aged between 8 to 48 years, where, 42 were <20 years, 25 were between the age of 21 to 40 years and 3 patients were above the age of 40 years. There were 33 males and 37 females. Common symptoms like backache, constitutional symptoms, lower limb neurological deficit, bowel/bladder involvement, gibbus and kyphotic deformity were documented for each patient. Diagnosis was based upon X-ray and MRI findings followed up by either positive biopsy or culture from abscess positive to acid fast stain or respond to anti tuberculosis drug according to WHO regimen with three months follow up with MRI. CT-guided FNAC was undertaken to aid in diagnosis (fig.1). Duration of symptoms was documented for each patient. Active pulmonary Koch's detection was performed for all patients. Location was documented for all patients. Fifty nine of the 70 patients received conservative treatment. Two patients received costo-transversectomy and decompression. Four patients received decompressive laminectomy and pedicle screw and rod fixation whereas five received laminectomy and drainage of abscess. Follow-up was done for every patient and residual effect was documented.

MRI finding was documented and classified as end plate sclerosis/erosion, paraspinal soft tissue shadows, unilateral psoas abscess, bilateral psoas abscess, discitis, extradural cord compression, intrathecal root compression, spinal cord and intrathecal root compression, spinal angulation/vertebral collapse, lytic areas in vertebral bodies and epidural abscess.

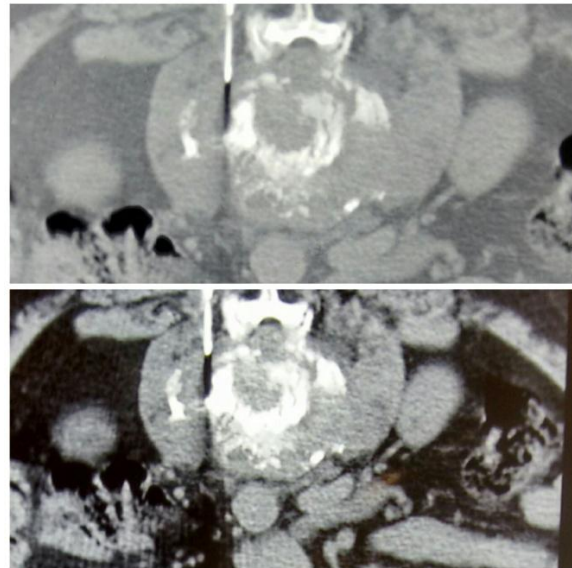


Fig.1: CT- guided FNAC being taken from vertebral body

## RESULTS AND OBSERVATIONS

In total, seventy patients were enrolled in the study with written informed consent. Common symptoms were backache 59/70 (84.28%), lower limb neurological deficit 30/70 (42.85%), gibbus 25/70 (35.71%), constitutional symptoms 17/70 (24.28%), kyphotic deformity 15/70 (21.42%) and bowel/bladder involvement 13/70 (18.57%). All symptoms are summarized in figure 2. Median duration of symptoms was 7 months (range 4-11 months). Active pulmonary Koch's was found in 24/70 (34.29%).

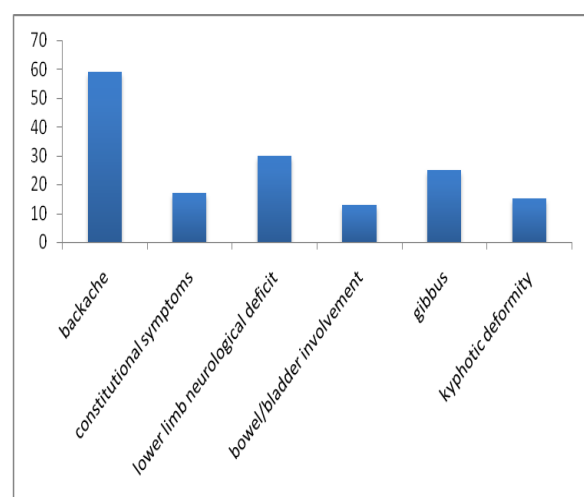


Fig 2: Symptoms documented in different numbers of patients

Fifty nine received conservative treatment, laminectomy and drainage of abscess was done in 5 patients,

decompressive laminectomy and pedicle screw and rod fixation was done in 4 patients, whereas costo-transversectomy and decompression was done in 2 patients. As residual effects, persistent paraparesis with bladder/bowel involvement was observed in 8/70 (11.43%) and persistent paraparesis with bladder/bowel involvement was observed in 1 (1.49%) of the patients. The location of the lesion varied amongst patients which is summarized in figure 3.

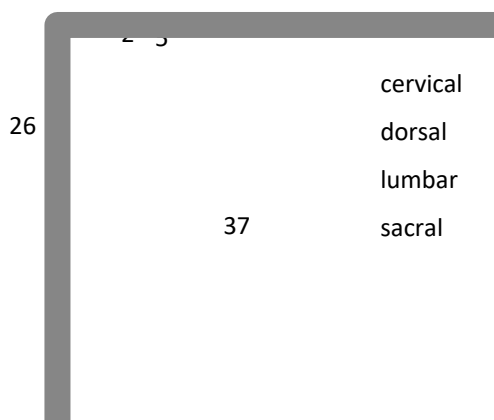


Fig 3-Location of the lesions in the patients

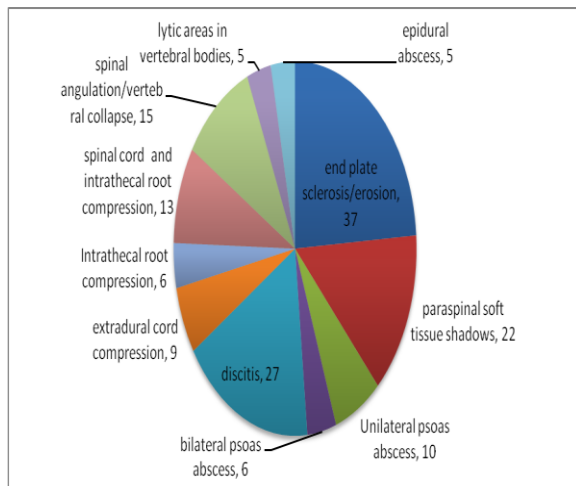


Fig 4: MRI Findings of the patients

MRI findings were diverse amongst the patients. End plate sclerosis/erosion was detected in 37/70 (52.86%), discitis in 27/70 (38.57%), paraspinal soft tissue shadows were detected in 22/70 (31.43%), spinal angulation/vertebral collapse was detected in 15/70 (21.43%), spinal cord and

intrathecal root compression 13/70 (18.57%), unilateral psoas abscess 10/70 (14.29%), extradural cord compression 9/70 (12.86%), intrathecal root compression in 6/70 (8.57%), bilateral psoas abscess 6/70 (8.57%), lytic areas in vertebral bodies in 5/70 (7.14%) and epidural abscess was detected in 5/70 (7.14%). Figure 4 summarizes the MRI findings in the study subjects. MRI images of a patient are shown in figure 5.



Fig.5: Sagittal, coronal and axial MRI images of the dorsal spine showing spondylodiscitis with D9,D10,D11 vertebra collapse with ventral epidural, prevertebral and paravertebral abscess formation with compressive myelopathy suggestive of tubercular etiology

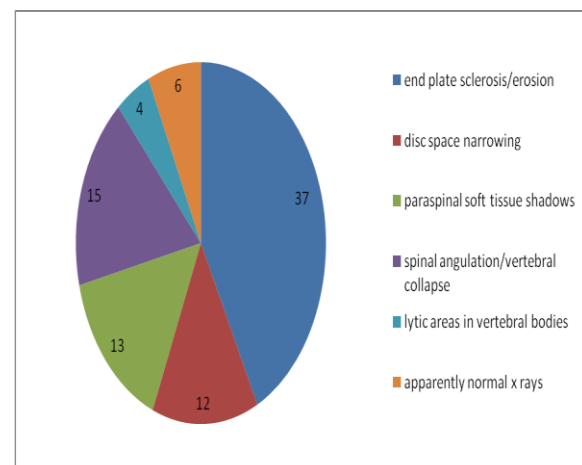


Fig 6: Summary of X-ray findings

X-ray detected five different findings in the study subjects. End plate sclerosis/erosion was detected in 37/70 (52.86%), paraspinal soft tissue shadows

were observed in 13/70 (15.87%), disc space narrowing was detected in 12/70 (17.14%), lytic areas in vertebral bodies was observed in 4/70 (5.71%) and apparently normal X-rays were detected in 6/70 (8.57%). Spinal angulation/vertebral collapse was detected in 15/70 (21.43%)

any of the patients. Figure 6 summarizes the X-ray findings in the study subjects.

Histopathological examination of the biopsy specimen obtained under image guidance as well as operatively demonstrated chronic granulomatous inflammatory changes consistent with tuberculosis.(fig.7)

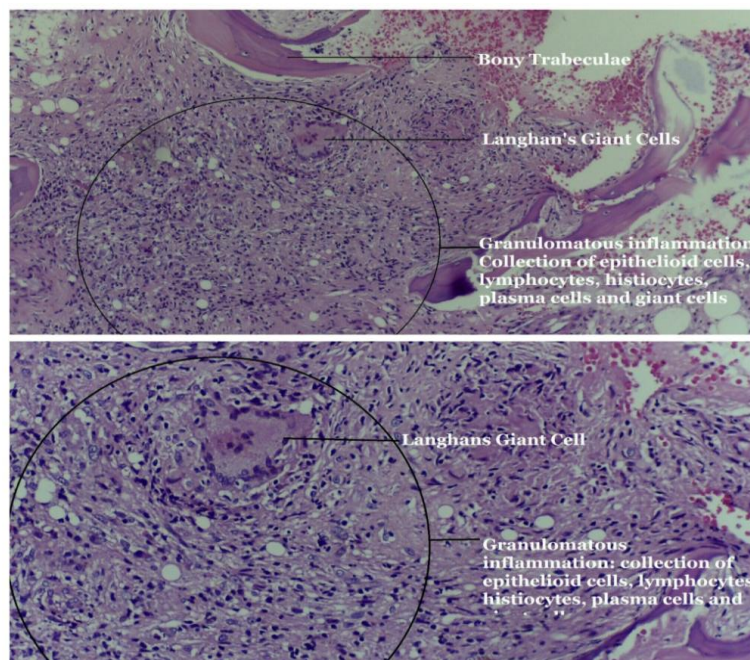


Fig 7:Histopathological picture of spinal tuberculosis

## DISCUSSION

WHO reports Spinal TB to be ranked eighth in the world among all sites of extra-pulmonary TB. [9] Although the disease is being partly managed in the developed world, in the developing countries it has been at an alarming increase. [10] Spinal TB, known also as Pott's disease, accounts for less than 1% of all TB cases. [11] Objective of this study was to document the clinical features of spinal TB in the study population.

MRI was used for diagnosis so that patients of spinal TB could be picked based upon specific structural changes in the spine, including the intervertebral discs, vertebral bodies, ligaments, paravertebral spaces and so on. However confirmatory diagnosis was made on culture or positive biopsy. [12]

Backache remained the most commonly documented symptom in our study. Other studies also suggest that chronic backache is the commonest symptom in spinal TB ranging from 79 to 100%. [13-15] Especially in the developing countries, the symptoms mostly compel the patient to visit a clinician. [16,17] Gibbus, which occurs predominantly in the dorsal spine, was observed in 27.2% of the cases, which was reported only in one third of the cases in a study which was done in Africa. [18]

Kyphosis was found to be a common sign (21.42%). Reports of other researchers show kyphosis to be a valuable marker for spinal tuberculosis. [19] Our study also demonstrated that some of patients had some disturbance on the angle of spine. For conservative treatment the WHO regimen of anti-tuberculosis drug was followed and the

follow up MRI was taken after three months, to observe the effectiveness of treatment. [20] In our study, end plate sclerosis/erosion was most commonly detected (52.86%).

Sequential MRI scans can suggest the response to the treatment of spinal TB. The appearance of sclerosis and the fatty changes in the bony tissue, the appearance of ankylosis, a reduction in the quantity of the epidural collection and the fibrosis and the resolution of the paraspinal signal changes highly favour a good response to the treatment.

## CONCLUSION

Diagnosis of spinal tuberculosis is challenging due to the lack of facilities in the developing world and due to low suspicion in the developed world. [21] However the radiological features of the disease has been well described. [22, 23] Our data showed that chronic backache as well as specific radiological features, with histopathological confirmation in selected cases, helped diagnosis of spinal tuberculosis.

## REFERENCES

1. 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 Apr; 6(4):320-6.
2. World Health Organization (2012) Global tuberculosis report; WHO/HTM/TB/2012.6, ISBN 978 92 4 156450 2. Available: [http://www.who.int/tb/publications/global\\_report/en/index.html](http://www.who.int/tb/publications/global_report/en/index.html) Accessed 2013 Jan 5
3. Rezai AR, Lee M, Cooper PR, Errico TJ, Koslow M. Modern management of spinal tuberculosis. *Neurosurgery*. 1995 Jan; 36(1):87-97; discussion 97-8.
4. Turgut M. Spinal tuberculosis (Pott's disease): its clinical presentation, surgical management, and outcome. A survey study on 694 patients. *Neurosurg Rev*. 2001 Mar; 24(1):8-13.
5. Barnes PF, Bloch AB, Davidson PT, Snider DE Jr. Tuberculosis in patients with human immunodeficiency virus infection. *N Engl J Med*. 1991 Jun 6; 324(23):1644-50.
6. Moorthy S, Prabhu NK. Spectrum of MR imaging findings in spinal tuberculosis. *AJR Am J Roentgenol*. 2002 Oct; 179(4):979-83.
7. Nussbaum ES, Rockswold GL, Bergman TA, Erickson DL, Seljeskog EL. Spinal tuberculosis: a diagnostic and management challenge. *J Neurosurg*. 1995 Aug; 83(2):243-7.
8. Jain AK. Tuberculosis of the spine: a fresh look at an old disease. *J Bone Joint Surg Br*. 2010;92:905-913.
9. Chandir S, Hussain H, Salahuddin N, Amir M, Ali F, Lotia I, Khan AJ. Extrapulmonary tuberculosis: a retrospective review of 194 cases at a tertiary care hospital in Karachi, Pakistan. *J Pak Med Assoc*. 2010 Feb; 60(2):105-9.
10. Sinan T, Al-Khawari H, Ismail M, Ben-Nakhi A, Sheikh M. Spinal tuberculosis: CT and MRI feature. *Ann Saudi Med*. 2004 Nov-Dec; 24(6):437-41.
11. Zhang X, Ji J, Liu B. Management of spinal tuberculosis: a systematic review and meta-analysis. *J Int Med Res*. 2013 Oct; 41(5):1395-407.
12. Desai SS. Early diagnosis of spinal tuberculosis by MRI. *J Bone Joint Surg Br*. 1994 Nov; 76(6):863-9.
13. Pertuiset E, Beaudreuil J, Liote F, Horowitzky A, Kemiche F, Richette P, et al. Spinal tuberculosis in adults. A study of 103 cases in a developed country, 1980- 1994. *Medicine (Baltimore)* 1999; 78: 309-20.
14. Stabler A, Reiser MF. Imaging of spinal infection. *Radiol Clin North Am* 2001; 39: 115-35.
15. Davidson PT, Horowitz I. Skeletal tuberculosis: A review with patient presentations and discussion. *Am J Med* 1970; 48(1): 77-84.
16. Maeda Y, Izawa K, Nabeshima T, Yonenobu K. Tuberculous spondylitis

- in elderly Japanese patients. *J Orthop Sci.* 2008 Jan; 13(1):16-20.
17. Cormican L, Hammal R, Messenger J, Milburn HJ. Current difficulties in the diagnosis and management of spinal tuberculosis. *Postgrad Med J.* 2006 Jan; 82(963):46-51.
  18. Owolabi LF, Nagoda MM, Samaila AA, Aliyu I. Spinal tuberculosis in adults: A study of 87 cases in Northwestern Nigeria. *Neurology Asia* [Internet] 2010;15(3):239-44
  19. Alothman A, Memish ZA, Awada A, Al-Mahmood S, Al-Sadoon S, Rahman MM, Khan MY. Tuberculous spondylitis: analysis of 69 cases from Saudi Arabia. *Spine (Phila Pa 1976).* 2001 Dec 15; 26(24):E565-70.
  20. Alvi AA, Raees A, Khan Rehmani MA, Aslam HM, Saleem S, Ashraf J. Magnetic Resonance Image findings of Spinal Tuberculosis at first presentation. *International Archives of Medicine.* 2014;7:12. doi:10.1186/1755-7682-7-12.
  21. Cormican L, Hammal R, Messenger J, Milburn HJ. Current difficulties in the diagnosis and management of spinal tuberculosis. *Postgrad Med J* 2006; 82: 46-51.
  22. Moorthy S, Prabhu NK: Pictorial essay – Spectrum of MR imaging findings in spinal tuberculosis. *AJR* 2002; 179: 979-83.
  23. Shanely DJ. Pictorial essay - Tuberculosis of the spine: imaging features. *AJR* 1995; 164: 659-64.

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