Original Research Paper

Volume - 14 | Issue - 05 | May - 2024 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Radio-Diagnosis

MR FINDINGS IN TUBERCULAR SPONDYLITIS : A CASE SERIES

Dr Deepkaran Singh PG Resident, Dept. of Radiodiagnosis, MMMCH, Solan, Himachal Pradesh.

Dr Achleshwar Sharma PG Resident, Dept. of Radiodiagnosis, MMMCH, Solan, Himachal Pradesh.

Dr(Col.) DS Grewal Professor, Dept. of Radiodiagnosis, MMMCH, Solan, Himachal Pradesh.

ABSTRACT **Introduction:** Pott's spine, also known as tubercular spondylitis, is a form of tuberculosis of the spine. Numerous pathological processes, including abscess development, cord compression, and gibbus deformity, are brought on by the spinal involvement. The preferred imaging technique for Pott's spine patients is magnetic resonance imaging (MRI), which not only aids in diagnosis but also provides important information about potential complications, helping with case management. **Methods:** This study examined the different degenerative processes affecting the spine by retrospectively analyzing the MRI images of 30 confirmed instances of tubercular spondylitis. **Results:** 53.3% of the 30 patients that made up this study's sample were male, and 46.7% were female. Most instances were seen in the age range of 21–40 years. Compared to the dorsal vertebrae, the lumbar vertebrae were more often impacted. The most frequent pattern was contiguous two vertebral involvement, with skip lesions observed in 6.7% of patients. Soft tissue components of the pre-, paravertebral, and epidural regions were seen in 76.7%, 86.7%, and instances, respectively. In 95% of instances, intervertebral disc involvement was observed, and in 16.7% of cases, cord edema was observed. **Conclusion:** Pott's spine, also known as tubercular spondylitis, is an extrapulmonary type of TB that affects the spine. When it comes to both diagnosing the illness and directing surgical care, magnetic resonance imaging (MRI) is the preferred imaging modality. The many pathological abnormalities that the illness produces in the spine as it advances were carefully examined in the cases of spinal TB.

KEYWORDS :

INTRODUCTION

Caused by Mycobacterium tuberculosis, tuberculosis (TB) is an infection with microorganisms. Although other regions of the body may be affected, the lungs are usually affected. It's known as extrapulmonary TB when the illness extends outside the lungs. Usually as a result of an additional spinal source of infection, the tubercle bacillus enters vertebrae by the hematogenous pathway through the Batson venous plexus.

Pott's spine, so named after Percivall Pott's 1779 description of the tubercular infection of the spine, is a more common diagnosis. The anterior vertebral body, which is next to the subchondral plate, is initially affected. The nearby intervertebral discs are then affected as it spreads from that location.

The diagnosis and treatment of spinal TB mostly rely on imaging tests such as radiography, computed tomography (CT), and magnetic resonance imaging (MRI), in addition to clinical signs and symptoms. MRI has emerged as the preferred modality for spinal TB due to its multiplanar capabilities and innate ability to better illustrate the involvement of the marrow and soft tissues than CT, even if CT is thought to be superior for imaging bones. It shows not just the involvement of the bony spine but also the involvement of the cord, which may be impacted secondary.

MATERIAL AND METHODS

The purpose of this research was to examine the pattern of involvement of the spine and associated consequences in individuals with spinal TB who had MRIs performed as part of their diagnostic workup. This investigation was conducted in the radiodiagnosis department of a teaching hospital for tertiary care at Solan.

The study comprised MRI images from every instance of Pott's spine that was histopathologically verified between December 2022 and August 2023. This study comprised 30 patients where tubercular infection was demonstrated either before or after the MRI scan using the Ziehl Neelsen stain, culture, or histological evidence of a caseating granuloma. Aspiration of collection or pus was performed if indicated by CT or ultrasound guidance. Histopathological analysis of the tissue was performed in all surgical instances to verify the diagnosis.

The research covered individuals of both sexes and all age groups; repeat scans of the same patients were not included. The 1.5T Phillips MRI scanner was used to perform the scans. For the spine, we adhered to our institution's MR Protocol, which is listed in Table 1.

Table 1 – MR protocol for spine.

Plane	Sequence
Sagittal	T2W (screening of whole spine) T1W, T2W (Affected spine) STIR, Pre contrast FS Myelogram
Coronal	STIR Myelogram
Axial	T1W T2W
Multiplanar (axial, coronal, sagittal)	Post contrast fat sat

To detect severe canal impairment, an MR myelogram was performed in the coronal and sag planes. The quantity and location of vertebral bodies involved in the spine were assessed. Marrow edema on T1W and (Short T1 inversion recovery) STIR pictures, continuity of end plates, and wedging/collapse or deformity on Sag and Cor T1W, T2W, and STIR sequences were evaluated for the vertebral bodies. The posterior bulge or retropulsion of the posterior cortex was investigated. The height, signal intensity, and post-contrast enhancement of the intervertebral disc were measured. Sagittal and axial pictures were used to evaluate the changed signal intensity and the erosion or destruction of posterior components. The soft tissue component of the pre-, paravertebral, and epidural regions as well as the Psoas collection were evaluated and recorded. A cord edema or compression assessment was performed on the spinal cord.

RESULTS:

The investigation involved a diverse cohort of 30 individuals diagnosed with spinal tuberculosis. The study population exhibited a balanced gender distribution, with 16 (53.3%) male and 14 (46.7%) female cases. The age range varied widely, spanning from 21 to 80 years, with a mean age of 56.3 years.

The analysis of vertebral involvement revealed that the majority of cases (73.3%) displayed adjacency in 2 vertebral bodies, while 10% showed engagement of 3 vertebral bodies. Single vertebral body involvement was observed in 6.7% of cases, and more extensive involvement of more than 5 vertebrae occurred in 6.7% of cases.

The lumbar region was the most frequently affected, accounting for 53.3% of cases, followed by dorsal vertebrae in 26.7% of cases. Dorsolumbar (D12-L1) and Lumbosacral (L5-S1) spine segments were affected in 20% and 10% of cases, respectively. Notably, no cases involving the cervicodorsal spine were identified in our study. Skip lesions or noncontiguous involvement were observed in 13.3% of cases. Intervertebral disc involvement was prevalent, occurring in 63.3% of cases.

Soft tissue components were evident in 86.7% of cases, with pre- and paravertebral involvement noted in 76.7% of cases. An epidural component was observed in 66.7% of cases, leading to myelographic cutoff in 20% of cases. Posterior elements displayed inflammatory marrow edema, erosion, or destruction in 40% of cases. Cord edema with compression occurred in 16.7% of cases, and Psoas abscess was identified in 30% of cases. Gibbus deformity was present in 26.7% of cases. Neurological complications included paraparesis and quadriparesis in 13.3% and 6.7% of cases, respectively. Compressive neuropathy in lower limbs was documented in 23.3% of cases, while Cauda equina syndrome was identified in 10% of cases.

DISCUSSION:

Our investigation delved into a comprehensive assessment of spinal tuberculosis through the analysis of a diverse cohort of 30 individuals. The study population's demographics mirrored a wide age range, with participants spanning from 21 to 80 years, highlighting the pervasive nature of tuberculosis affecting various age groups. Interestingly, our findings suggest a predilection for the economically productive age group of 21–40 years, echoing the vulnerability of this segment in developing nations.

Vertebral involvement patterns disclosed a predominate affinity for the lumbar vertebrae, in contrast to some previous reports identifying the dorsolumbar spine as the most common site. Noteworthy is the identification of skip lesions and single vertebral involvement, both considered atypical presentations of spinal tuberculosis. The increased incidence of single vertebral involvement could be attributed to early MRI evaluations, detecting cases before the infection extends subligamentously or completely involves the intervertebral disc.

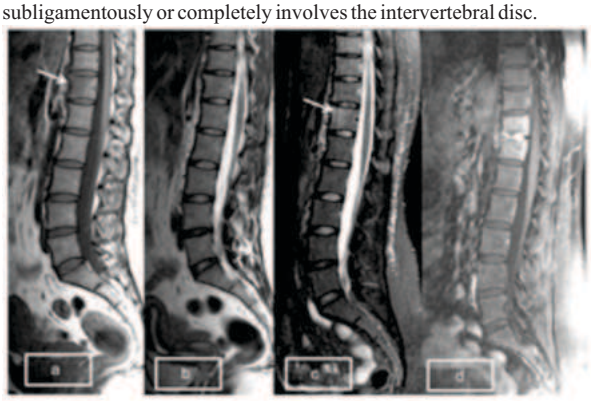

Fig.1: (a) T1W Sag image showing hypointense signal in the anterior subchondral region of D12 vertebral body (arrow) suggestive of early marrow edema. (b) T2W image in same patient does not show any significant abnormality in the D12 vertebral body. (c) STIR Sag image showing subtle marrow hyperintensity in D12 vertebral body suggesting marrow edema. (d) Post contrast Sag T1 fat sat image of the same patient after one month without treatment now shows marked enhancement of D11 and D12 vertebral bodies and the IV disc.

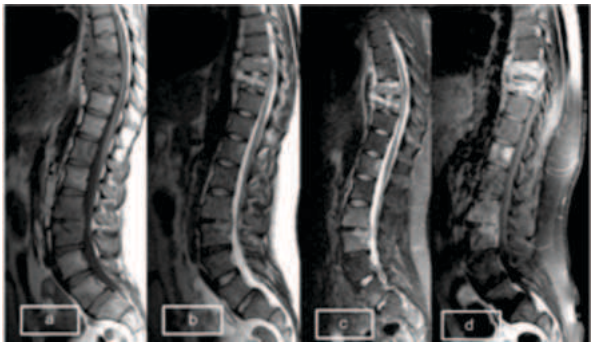

Fig. 2: (a–c) Sag T1W, T2W, and STIR images show skip lesions with altered marrow signal intensity (hypointense on T1W and hyperintense on T2W/STIR) in dorsal and lumbar vertebrae with prevertebral component at D8-9 level. (d) Sag post contrast image shows noncontiguous enhancement of the affected vertebral bodies. Note relatively preserved IV disc except involvement of L2-3 disc.

Intervertebral disc involvement was a prevalent feature in our study, observed in 95% of cases, potentially enhanced by the use of intravenous contrast agents. This underscores the diagnostic value of post-contrast T1W fat sat images, particularly in comparison to non-contrast studies relying on T2W/STIR hyperintensity demonstrated by the affected disc.

Soft tissue components, including pre and paravertebral involvement, align with literature findings, with 96.25% of cases demonstrating such features. Notably, Psoas abscess, a complication of tubercular spondylitis, was observed in 25% of cases, deviating from the lower frequencies reported in other studies.

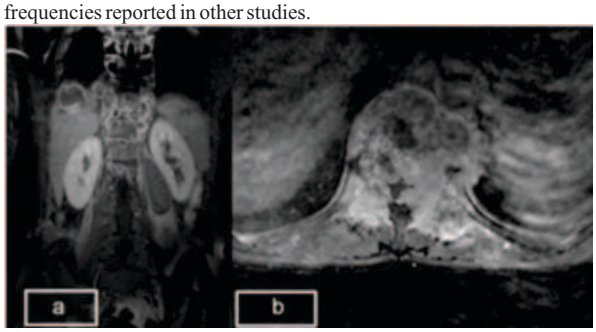

Fig. 3 : (a) Coronal images showing bilateral paravertebral and Psoas abscess in left Psoas muscle. (b) Axial post contrast image shows destruction of bilateral pedicles and transverse processes with soft tissue component

Epidural soft tissue component, a potentially serious complication leading to cord compression, was identified in 62.5% of cases. This highlights the need for vigilant monitoring to prevent irreversible neurological complications and reinforces the significance of considering cord edema or compression when an epidural component or retropulsion is observed.

Intriguingly, posterior elements' involvement, typically considered uncommon in tubercular spondylitis, was identified in 37.5% of cases. This finding challenges the conventional belief that tuberculosis rarely affects the posterior elements, particularly the pedicle.

Gibbus deformity, a manifestation of collapsed vertebrae, was documented in 27.5% of cases. This underscores the importance of attention to prevent cord edema or compression, which may lead to paraplegia or quadriplegia.

Cord edema or compression, identified in 15% of cases, emerged as a critical concern, necessitating prompt intervention to prevent irreversible neurological complications.

Our study highlighted the significance of post-contrast MRI in assessing the effects of Anti-tubercular treatment (ATT). Healing features, including reduction in vertebral and IV discal enhancement, as well as soft tissue components, were better visualized on post-contrast images. This emphasizes the role of contrast-enhanced MRI in evaluating treatment response.

In conclusion, the study sheds light on the varied manifestations of spinal tuberculosis, challenging some conventional beliefs and emphasizing the importance of advanced imaging techniques in accurate diagnosis and treatment monitoring. Future research endeavors should address the limitations, including the need for comprehensive follow-up and consideration of patients' immune status for a more nuanced understanding of spinal tuberculosis.

CONCLUSIONS

Tubercular spondylitis, or Pott's spine, poses a serious extrapulmonary manifestation of tuberculosis affecting the spine. The early engagement of the vertebral body and intervertebral disc can lead to complications like cord compression. MRI stands out as the preferred diagnostic tool, showcasing bony involvement and visualizing associated complications. Its pivotal role extends to guiding surgical

management, providing detailed insights for timely interventions.

While plain MRI often suffices for diagnosis, contrast-enhanced imaging refines assessments, particularly in post-treatment evaluations. This enhanced visualization aids in prognostication, contributing to informed decision-making in patient care. In summary, MRI's versatile capabilities in diagnosing and managing tubercular spondylitis, along with the strategic use of contrast, significantly improve patient outcomes.

REFERENCES:

1. Cambau E, Drancourt M. Steps towards the discovery of Mycobacterium tuberculosis by Robert Koch, 1882. Clin Microbiol Infect. 2014;20(March (3)):196–201.
2. Burrill J, Williams CJ, Bain G, et al. Tuberculosis: a radiologic review. Radiographics. 2007;27(5):1255–1273.
3. Tuli SM. Tuberculosis of the spine: a historical review. Clin Orthop Relat Res. 2007;460:29–38. 4. Rasouli MR, Mirkoohi M, Vaccaro AR, et al. Spinal tuberculosis: diagnosis and management. Asian Spine J. 2012;6(December (4)):294–308.
4. Gehlot PS, Chaturvedi S, Kashyap R, Singh V. Pott's spine retrospective analysis of MRI scans of 70 cases. J Clin Diagn Res. 2012;6(November (9)):1534–1538.
5. Owolabi LF, Nagoda MM, Samaila AA, Aliyu I. Spinal tuberculosis in adults: a study of 87 cases in Northwestern Nigeria. Neurol Asia. 2010;15(3):239–244.
6. Moorthy S, Prabhu NK. Spectrum of MR imaging findings in spinal tuberculosis. Am J Roentgenol. 2002;179(October (4)):979–983.