ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 6, Issue – 1, January – 2021 , Page No. : 53 - 58

Institutional Review of Pott's Spine on MRI Imaging

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Citation this Article: Dr Ojaswi Bharat Khandediya, Dr Sujoy Mani, Dr Priti Kapoor, Dr. Vishal A Singh, "Institutional Review of Pott's Spine on MRI Imaging", IJMSIR- January - 2021, Vol – 6, Issue - 1, P. No. 53 – 58.

Type of Publication: Case Series

Conflicts of Interest: Nil

Abstract

Tuberculosis of the spine is known as Pott's spine. It is caused by Mycobacterium Tuberculosis which is the most common infection in developing countries. The most common site of involvement is lungs. Extrapulmonary tuberculosis is a major public health problem in developing countries. The Pott's spine accounts for around 50% of musculoskeletal tuberculosis. It presents in variety of spectrum clinically as well as on imaging. The main differential diagnosis of the entity is pyogenic spondylitis and malignancy. Delayed diagnosis can result in significant instability and deformity. The prompt and accurate diagnosis and treatment can prevent irreversible and permanent neurological and psychological damage to the patient. MRI is sensitive and specific imaging modality to evaluate the suspected cases, the extent of involvement and follow up the neurological involvement. The objective of the study is to review various spectrum of presentation and typical and atypical imaging findings observed in a tertiary care centre.

Keywords: Pott's spine, Tuberculosis, MRI, Paraspinal Abscess, Spondylitis, Discitis, Disc Collapse, Psoas Abscess, Histopathology

Introduction

The spinal infection ranges from pyogenic osteomyelitis to the most severe non-pyogenic infections like tuberculosis. Pott's spine is the most common form of musculoskeletal tuberculosis (1). More than 50% cases of musculoskeletal TB involve spine with no gender predilection (2-3). The most common site of involvement is the thoracic spine followed by lumbar spine (4). The classical pattern of disease shows two contagious vertebral bodies involvement along with the intervening disc. However, multiple vertebral disc involvement is not uncommon. Various studies show the subligamentous spread of the infection is the most likely route for multiple level involvements (5).

The patients usually presents with back pain, fever, loss of weight and paresthesia. The delayed presentation is usually associated with various complications like cold abscess, sinus tracts, neurological weakness, vertebral collapse and kyphosis (6).

The accurate and early diagnosis can hasten the treatment and prevent the associated morbidity. The initial site of infection is due to haematogenous spread through arterial vessels. The vertebral body corner is the initial site of infection due to rich arterial supply in that zone (7-8). However, the disc spaces are preserved due to absence of proteolytic enzymes required for disc degeneration (9, 10). Te early disease process is characterized by tubercle with central caseating necrosis along with phlegmon and cold abscess formation. The late disease process however shows fibrous lesion with calcification. The progressive and aggressive disease process leads to vertebral osteolysis which leads to kyphosis and vertebral body collapse (11).

The differential diagnosis of the TB spine includes fungal infections, neuropathic spondyloarthropathies and metastasis (12, 13).

Method

It is a retrospective study performed on 25 suspected cases of tuberculosis of spine at tertiary care centre. The clinical history and presentation were recorded. Spine radiograph was performed in all the patients in order to rule out fractures or malignancy. MRI imaging was performed on 1.5 T Toshiba machine. T1W, T2W, STIR, T1W PDFS and T1W contrast scan was performed in axial, coronal and sagittal planes. Those diagnosed with Pott's spine underwent biopsy and the histopathology correlation was done. The patients with diagnosed cases were followed up post operatively.

Cases -1

A 42 year old male came with complaints of low back pain and fever with history of pulmonary TB 7 years back. The images shows T2W and STIR coronal and sagittal sections of lumbar spine with e/o two consecutive vertebral body involvement with sparing of disc. There is e/o L3 vertebral body collapse. And no e/o adjacent paraspinal tissue involvement.

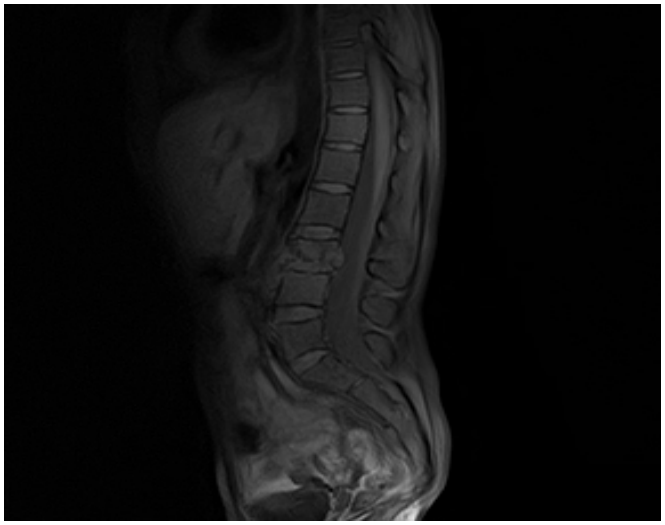

Figure 1

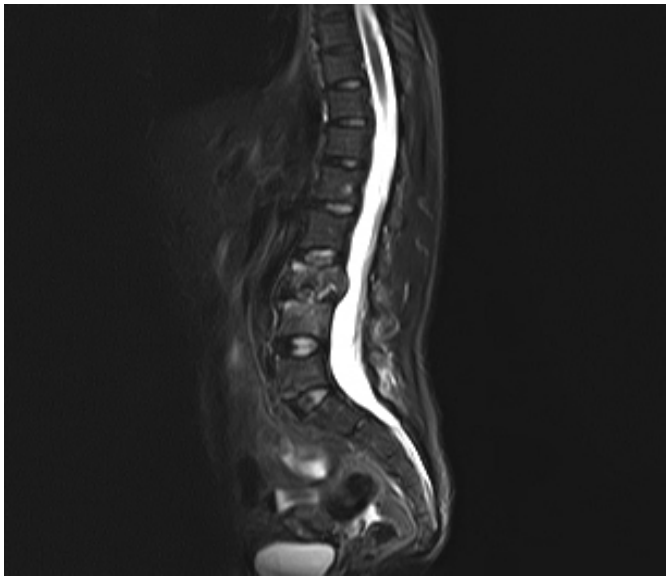

Figure 2

Figure 3

Case - 2

A 55 year old female patient came with excruciating pain, fever and bilateral lower limb paresthesia. On imaging there was e/o L4 and L5 signal intensities with bilateral large psoas abscesses with left epidural abscesses. We present coronal and axial sections of T2W imaging of lumbar spine.

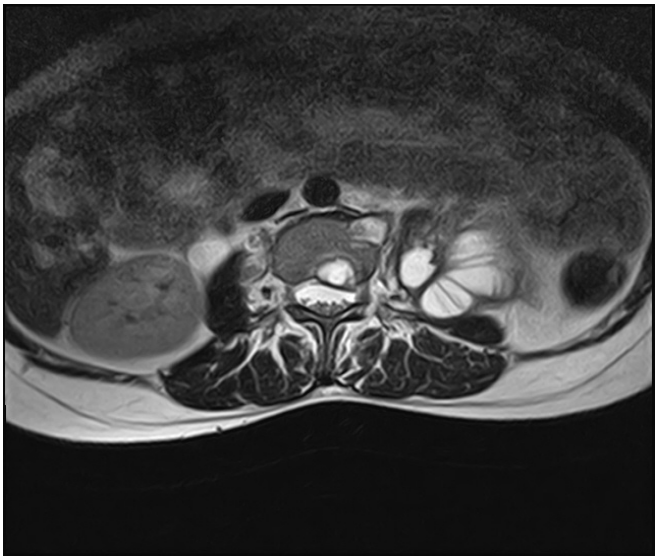

Figure 4

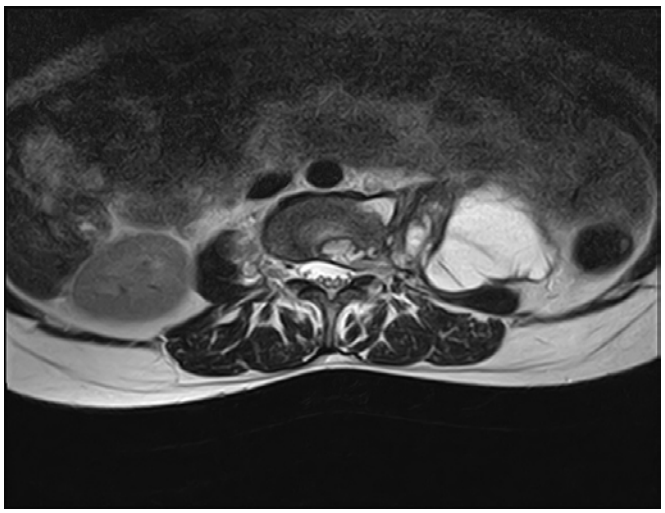

Figure 5

Figure 6

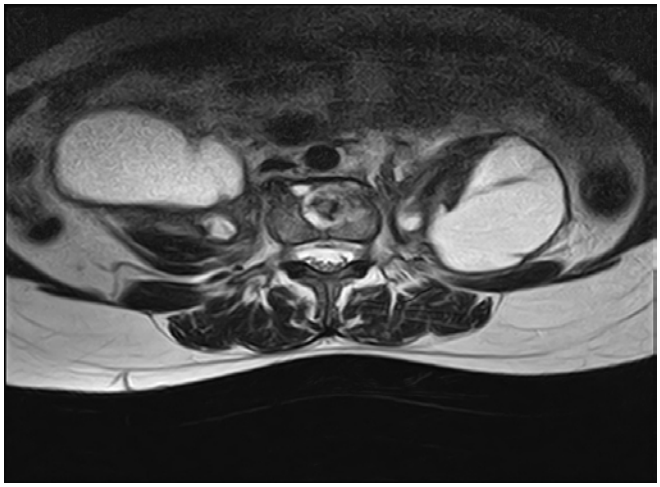

Figure 7

Results

The study included 16 male and 09 female suspects. Majority of the patients belonged to the age group of

40-55 years. The most common clinical presentation was chronic backache followed by fever, kyphotic deformity and weight loss. The most common region involved was thoracolumbar vertebral level followed by thoracic level. Out of 25 suspects, 08 subjects had previous history of pulmonary tuberculosis. 20 out of 25 suspects were diagnosed as tuberculosis spine on histopathology. Four different patterns were observed during the study: paradiscal, anterior, central and posterior. The majority of the patients showed the paradiscal pattern of involvement followed by central and anterior involvement. Paraspinal mass and abscess is observed in 11 out of 20 patients. The infected vertebral bodies were hypointense on T1W and hyperintense on T2W with heterogenous post contrast enhancement. The patients with chronic presentation showed vertebral collapse, kyphotic deformity and spinal cord compression. Involvement of the vertebral arch and extradural space was observed in 2 cases. There is no specific and definitive finding of tuberculosis on MRI and the biopsy is the gold standard for definitive diagnosis.

Discussion

This study was done to report spectrum of MRI findings in Pott's disease. Spinal tuberculosis results from hematogenous seeding of the vertebral body, and the diagnosis often remains elusive because of the indolent nature of the infection. Tuberculous spondylitis has more prevalence in the developing countries due to risk factors like higher cases of pulmonary tuberculosis, low nutrition, overcrowding, poor hygienic condition and low socioeconomic condition. In developed countries, the most important risk factor is immunocompromised status. Male predominance was observed in study by Jalleh et al. Our study showed thoracolumbar spine to be the most commonly involved level, Ram et al and Tulsi et al also showed the same. Radiography is the initial modality of choice; however, MRI is superior to all other imaging modalities in assessing Pott's disease due to better soft tissue resolution. It delineates the characteristic features of the involvement as well as extent of the disease in great detail. It describes the involvement of vertebrae, paravertebral soft tissues, severity of cord compression, nerve root compression and vertebral canal size with greater details in comparison to other available modalities. Spinal tuberculosis classically begins in the anterior inferior portion of a vertebral body. The infection spreads beneath the anterior longitudinal ligament to involve adjacent vertebral bodies. Disc space narrowing is a secondary phenomenon, occurring when destruction of the cancellous bone permits herniation of the disc into the affected vertebral body. Imaging manifestations of tuberculous spondylitis include destroyed vertebrae with associated intraosseous and paraspinal abscess formation, subligamentous spread of infection, extension into the spinal epidural space, vertebral body collapse, and focal gibbus formation. Involvement of a single vertebra is a relatively common finding. Large psoas abscesses can occur without any signs of bone involvement. The involvement of multiple contiguous vertebrae in spinal tuberculosis is well documented. However, in all such cases, the invariable involvement of intervertebral disc spaces has been seen. In our case, selective sparing of intervertebral disc spaces was seen in spite of extensive involvement of multiple contiguous vertebrae. The largest number of radiologically involved vertebrae so far has been 10 contiguous dorsal vertebrae in 4 patients over a period of 30 years of observation. Biopsy is commonly required to differentiate between neoplasm and infection.

Pott's disease of the spine may mimic other disease processes, and thus a definite list of differential diagnosis should be kept in mind before proceeding with specific treatment. The following lesions should be considered and ruled out-atypical mycobacterial or nontuberculous infections-pyogenic, fungal, hydatid, etc., metastasis, primary bone tumors (aneurysmal bone cyst, giant cell tumors, chordomas, plasma cell tumors, myelomas, etc.).

These features can be used to monitor the response of the disease to therapeutic agents by comparing successive scans with the previous ones. MRI can thus significantly alter the patient's management. And due to non invasive and radiation free modality it is the investigation of choice for diagnosis as well as for follow up. The accurate diagnosis can prevent the complications

Conclusion

MRI is the imaging modality of choice for detecting spinal pathologies. The better soft tissue resolution, neurological involvement, skip lesions aids in narrowing the differential diagnosis of the various infective etiologies. It helps in localising the lesion, its extent, progression which helps in planning biopsy, interventional procedures as well as follow up. Early and prompt diagnosis can prevent the devastating complications, morbidity and irreversible neurological compromise. The awareness of the various imaging spectrum aids in early treatment by preventing the irreversible complications and damage.

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