Comparison of plain radiography and MRI in evaluation of spinal tuberculosis

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Abstract

Background: Spinal tuberculosis is possibly one of the oldest demonstrated diseases of mankind. The present study was conducted to compare plain radiography and MRI in evaluation of spinal tuberculosis.**Materials & Methods:** 46 patients of spinal tuberculosis of both genders were selected and clinical symptoms such as backache, stiffness, tenderness wasrecorded. All underwent X-ray spine including cervical and dorsoloumbar taken in both anteroposterior and lateral views. MRI spine scan was done on 1.5 T MRI scanner.**Results:** Out of 46 patients, males were 26 and females were 20. Plain radiography and MRI showed that vertebrae involved were cervical in 15 and 16, lumber in 12 and 11, thoracic in 10 and 9 and sacral in 9 and 10. Disc space was normal in 8 and 7 and reduced in 38 and 39. Deformities were present in 34 and 38 and absent in 12 and 8. Vertebral body height was decreased in 35 and 40 and normal in 11 and 6. Collection/Abscess was present in 40 and 42 and absent in 6 and 4. Spinal cord and nerve root involvement was seen in 32 and 38 and absent in 14 and 8 respectively. The difference was significant (P< 0.05).**Conclusion:** Plain X-ray remains the primary and the first imaging modality to evaluate the disease whereas MRI is the modality of choice in evaluationof spinal tuberculosis.

Key words: spinal tuberculosis, MRI, Plain radiography

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Introduction

Tuberculosis (TB) is an infectious disease caused by various strains of mycobacteria usually Mycobacterium tuberculosis. It is more common in the Eastern hemisphere of the world.[1] Spinal tuberculosis is possibly one of the oldest demonstrated diseases of mankind, having been documented in ancient Egyptian mummies. The first modern case of spinal tuberculosis was described by Sir Percival Pott was first to describe the spinal tuberculosis in 1779, after whom the disease is commonly referred to as “Pott’s Spine”.[2]

Plain film radiography (PFR) is one of the first and the most common imaging technique used to confirm the diagnosis of spine tuberculosis by the radiologists in most clinical settings and has been reported to have a diagnostic efficacy of 91-99%.Plain radiographs can be used in later stages of disease.[3]

The best diagnostic modality in the present scenario for the diagnosis of spinal tuberculosis is MRI. It is more sensitive than radiography and more specific than CT in the diagnosis and can also provide the diagnosis of Pott’s spine 4-6 months earlier than conventional methods, offering the benefits of earlier detection and treatment.[4]

MRI is sensitive in early detection and diagnosis of edema, soft tissue changes and spinal cord involvement.[5] The management of the patient depends on the severity of infection levels of vertebral involvement, so

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early diagnosis leads to prevent bone deformities and spinal cord compression.[6]The present study was conducted to compare plain radiography and MRI in evaluation of spinal tuberculosis.

Materials & Methods

The present study comprised of 46 patients of spinal tuberculosis of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Clinical symptoms such as backache, stiffness, tenderness was recorded. All underwent X-ray spine including cervical and dorsoloumbar taken in both anteroposterior and lateral views. MRI spine scan was done on 1.5 T MRI scanner.Multiplanar reconstructed images can be taken. The pulse sequences acquired was Sagittal T1, T2, STIR, Axial T1, T2, Post contrast –T1Axial and Sagittal. ADC and DWI sequences were also taken. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 46		
Gender	**Males**	**Females**
Number	26	20

Table I shows that out of 46 patients, males were 26 and females were 20.

Table II Assessment of parameters

Parameters	Variables	Plain radiograph	MRI	P value
Vertebrae involved	Cervical	15	16	0.80
	Lumber	12	11	
	Thoracic	10	9	
	Sacral	9	10	
Disc space	Normal	8	7	0.01
	Reduced	38	39	
Deformities	Present	34	38	0.04
	Absent	12	8	
Vertebral body height	Decreased	35	40	0.01
	Normal	11	6	
Collection/Abscess	Present	40	42	0.01
	Absent	6	4	
Spinal cord and nerve root involvement	Present	32	38	0.05
	Absent	14	8	

Table II, graph I shows that plain radiography and MRI showed that vertebrae involved were cervical in 15 and 16, lumber in 12 and 11, thoracic in 10and 9 and sacral in 9 and 10. Disc space was normal in 8 and 7 and reduced in 38 and 39. Deformities were present in 34 and 38 and absent in 12 and 8. Vertebral body height was decreased in 35 and 40 and normal in 11 and 6. Collection/Abscess was present in 40 and 42 and absent in 6 and 4. Spinal cord and nerve root involvement was seen in 32 and 38 and absent in 14 and 8 respectively. The difference was significant (P< 0.05).

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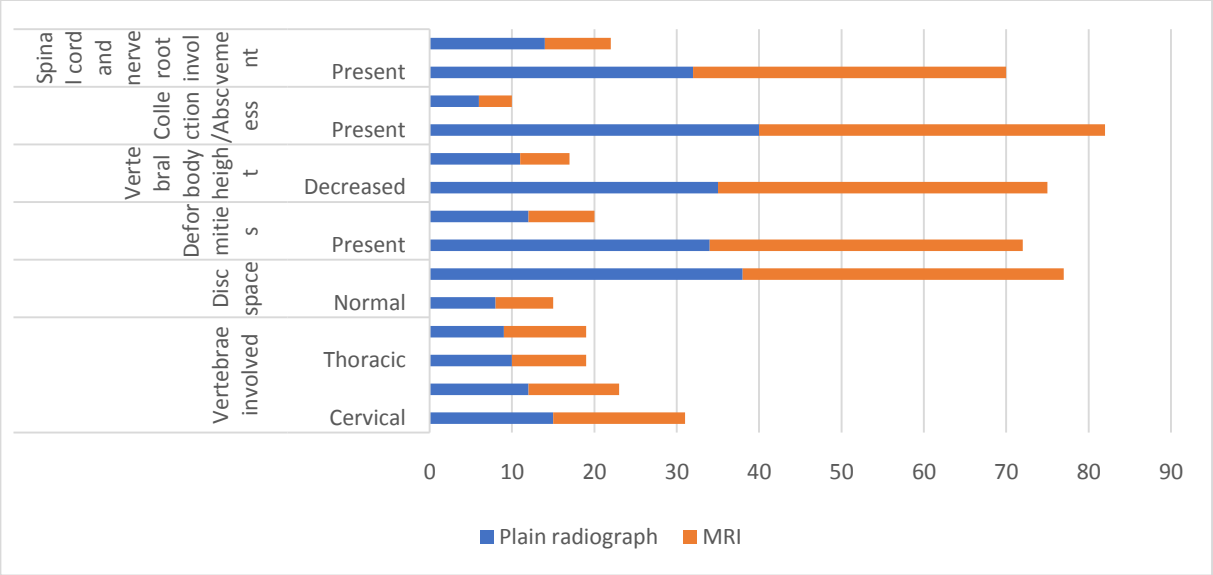
Graph I Assessment of parameters



Discussion

Spinal TB occurs most commonly by haematogenous spread from pulmonary tuberculosis but could be from extra pulmonary site as well.[7,8] It usually involves the thoracic and lumbar spine with thoracolumbar junction being the most frequent site of involvement.[9] Other sites like cervical region and sacrum being less common.[10,11] Four radiological types of vertebral involvement have been described: paradiscal, anterior, central, neural arch or appendiceal. Out of these paradiscal type is the most common.[12,13]The present study was conducted to compare plain radiography and MRI in evaluation of spinal tuberculosis.

We found that out of 46 patients, males were 26 and females were 20. Bahnudas et al[14]studied plain radiographs and MRI spine of 60 patients who presented to radiology department with complaints of low backache. Plain radiographs were used to detect bony abnormalities, paravertebral densities. MRI is used to detect soft tissue changes, paravertebral abscesses. ADC and DWI were used to diagnose abscesses. MRI is superior to radiographs in identifying soft tissue changes, neural involvement, spinal cord involvement. MRI is more sensitive to detect the severity and extent of disease process. MRI is more superior for early diagnosis of Potts spine and in various stages of disease progression and follow up after treatment.

We found that plain radiography and MRI showed that vertebrae involved were cervical in 15 and 16, lumber in 12 and 11, thoracic in 10 and 9 and sacral in 9 and 10. Disc space was normal in 8 and 7 and reduced in 38 and 39. Deformities were present in 34 and 38 and absent in 12 and 8. Vertebral body height was decreased in 35 and 40 and normal in 11 and 6. Collection/Abscess was present in 40 and 42 and absent in 6 and 4. Spinal cord and nerve root involvement was seen in 32 and 38 and absent in 14 and 8 respectively. Kukreja et al[15]sixty- five patients suspected of spinal tuberculosiswere subjected to evaluation by plain radiographs and MRI, while post contrast MRI study was done. Dorsal vertebrae were most commonly involved with the paradiscal type being the most common radiological type of involvement. Disc involvement, endplate irregularity, abscess, calcification, reduction in vertebral height and spinal cord compromise were important radiological features. MRI was noted to be a better modality for the evaluation of the spinal cord/ canal status. Plain radiography showed a crucial role in picking up calcification within the abscess.

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The limitation the study is small sample size.

Conclusion

Authors found that Plain X-ray remains the primary and the first imaging modality to evaluate the disease whereas MRI is the modality of choice in evaluationof spinal tuberculosis.

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