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MAGNETIC RESONANCE EVALUATION OF SPINAL TUBERCULOSIS

Radiodiagnosis

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ABSTRACT

INTRODUCTION: Spinal Tuberculosis is the most clinically important form of extra-pulmonary tuberculosis, as it may produce serious neurological sequel. Early recognition and prompt treatment are therefore necessary. This prospective study lightens and correlates the image morphology of spinal tuberculosis on MRI.

MATERIALS & METHOD: The study was done from January 2019 to August 2019 on 30 patients with provisional clinical diagnosis of Spinal Tuberculosis in Dhiraj General Hospital, Vadodara. MRI of spine was carried out in all the patients.

RESULTS: This study showed that the most common vertebrae involved were lumbar & most common vertebral lesion was paradiscal type. Soft tissue involvement was better delineated by MRI. The sensitivity of MRI for diagnosing spinal tuberculosis was 99% .

CONCLUSION: MRI provides better visualization of the bone and soft tissue components of spinal tuberculosis and helps to identify disease at distant asymptomatic sites (skip lesions) earlier and accurately.

KEYWORDS

Spinal Tuberculosis, Mri, Pott's Spine, Spinal Tuberculoma, Spinal Meningitis

INTRODUCTION

Spinal tuberculosis is the most common form of tubercular bone infection and accounts for 50 % of all musculoskeletal infections. It is usually a secondary infection from primary tuberculosis or genital tract infection via hematogenous route.Though it may occur at any vertebral level, the thoracolumbar region is the most commonly involved.

Infection usually occurs at anterior ends of vertebral bodies and spreads under the longitudinal ligaments to involve contiguous vertebrae. Skip lesions are due to hematogenous route. Vertebral body is commonly involved which shows three patterns- paradiscal lesion, anterior lesion and central lesion. Gibbus deformities occur due to vertebral body collapse manifesting as angulation in the spine . Paraspinal abscess formation also occurs and typically shows no significant features suggestive of inflammation, hence called as cold abscess.

Imaging investigative modalities used for the diagnosis of spinal tuberculosis are conventional radiography, CT and MRI. MRI has been found very useful for assessment of tuberculous vertebral osteomyelitis.

MRI could possibily detect the lesion at early stages, hence complications of untreated / delayed treatment can be avoided as early diagnosis is available for further treatment management. [1]

Soft tissue lesions and paraspinal abscesses are well delineated on MRI than conventional radiography and CT. The conventional radiography shows findings in the late stages of disease making the early diagnosis difficult.[2]

MRI has been reliably used to differentiate between tubercular spondylitis and pyogenic spondylitis. MRI could be extremely useful in diagnosing the difficult and rare sites of disease like craniovertebral junction.[3]

Repeated radiation exposure in follow up cases can be avoided by using MRI than CT & conventional radiography. It has been a preferred technique for defining the activity and extent of the infection. MRI has been found to be the most sensitive and specific modality in the diagnosis of spinal tuberculosis than the other imaging modalities.[4].

Thus this is a study design to evaluate the contribution of imaging science towards the evaluation of diagnosis of spinal tuberculosis.

MATERIALS AND METHODS

The aim of this study was to diagnose and evaluate patients of spinal tuberculosis presenting at radiodiagnosis department of Dhiraj general hospital by using MRI

STUDY DESIGN : Observational- cross sectional study

SOURCE OF DATA : Patients referred to the department of radiodi agnosis of Dhiraj hospital over a period of 8 months and diagnosed with Spinal tuberculosis on MRI were included.

SAMPLE SIZE : Purposeful sampling -A minimum of 30 patients were included in the study.

Cases were selected consequently with following inclusion and exclusion criteria.

SELECTION CRITERIA:

INCLUSION CRITERIA:

- Only those patients who were willing to participate in the study were included.
- All the patients found to have spinal tuberculosis on MRI during the study period were included.
- Patients who were accidentally found to have spinal tuberculosis were included in this study.
- Cases above 18 years age group irrespective of sex were included.

EXCLUSION CRITERIA:

- Patients who were previously diagnosed with spinal tuberculosis and have taken surgical treatment.
- Follow up cases who were on antitubercular treatement.
- Patient having history of claustrophobia.
- Patients having history of metallic implants insertions, cardiac pacemakers, metallic foreign body in situ.
- Patients not willing to participate.

EXAMINATION TECHNIQUE-

The patients after having filled the informed written consent form in English/ vernacular language underwent a MRI spine [plain + contrast] on the 1.5 tesla MRI machine available at Dhiraj Hospital. The observations were noted on the proforma and then MRI diagnosis of spinal tuberculosis will be made.

All the necessary measures were taken to avoid any complications if they occur due to the contrast.

RESULTS

TABLE NO. 1: TYPES OF SPINAL TUBERCULOSIS:

TYPE	NO. OF CASES
POTT'S SPINE	28

NON-OSSEOUS TUBERCULOMAS	1
SPINAL MENINGITIS AND ARACHNODITIS	1

As observed in the above table, most patients suffering from spinal infection presented with Pott's spine

TABLE NO. 2: TYPE OF LESION IN POTT'S SPINE:

TYPE OF LESION	NO. OF CASES
PARADISCAL	24
CENTRAL	3
SUBLIGAMENTOUS	1
POSTERIOR ELEMENTS	0

As observed in this table, most of the lesions were paradiscal with involvement of the articular discs. Very rarely, a subligamentous lesion was observed whereas lesions involving the posterior elements were not observed at all in my study.

TABLE NO 3: DISTRIBUTION ACCORDING TO VERTEB RAL LEVELS :

LEVEL	NO.OF CASES
LUMBAR	15
DORSAL	11
MULTIPLE LEVELS	3
CERVICAL	1
SACRAL	0

As seen in the above table, the commonest level affected in my study was the lumbar vertebrae followed by the dorsal level where as cervical vertebrae were very rarely involved.

TABLE NO. 4:MRI IN DIAGNOSIS OF SPINAL TUBER CULOSIS:

MRI	HISTOPATHOLOGICAL DIAGNOSIS		TOTAL
	POSITIVE	NEGATIVE	
POTT'S SPINE	27	1	28
INTRAMEDULLARY TUBERCULOMA	1	0	1
SPINAL MENINGITIS	1	0	1

The above table proves MRI to be confirmative in spinal tuberculosis.

CASE IMAGES

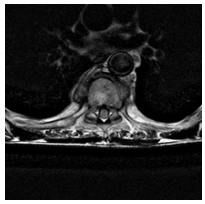
SPINAL MANIFESTATIONS OF TUBERCULOSIS:
A] POTT'S SPINE:
1.PARADISCAL SPREAD:
MRI DORSO-LUMBAR SPINE

Erosion and compression wedging of D7,D8 and D9 vertebral bodies with involvement of the articular discs which appear to be hypointense on T1WI and hyperintense on T2WI. There is presence of pre and para vertebral abscess which causes extradural cord compression. Contrast images show enhancement of the pre and para vertebral abscess and articular discs which is suggestive of Pott's spine with paradiscal involvement.

T2WI SAG

T1WI SAG

T1WI AXIAL



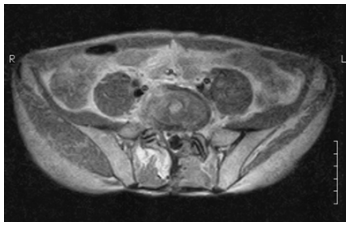
2.CENTRAL SPREAD:
MRI LUMBAR SPINE:

Presence of erosion of the antero-superior margin of L5 vertebral body is seen which appears hypointense on T1WI and hyperintense on T2WI and shows enhancement on contrast images. The disc appears to be normal. There is presence of a pre and paravertebral abscess present. The findings are suggestive of central type of spread of spinal tuberculosis.

T2WI SAG

T1W CONTRAST IMAGES SAG

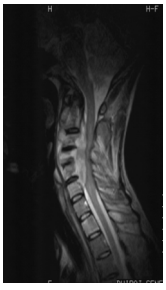
T1W CONTRAST IMAGE AXIAL



3. SUBLIGAMENTOUS SPREAD:
MRI CERVIC0-DORSAL SPINE:

There is presence of pre and paravertebral abscess formation which appears hypointense on T1WI and hyperintense on T2WI. Contrast studies show enhancement of the abscesses. The vertebral bodies and the discs appear to be normal. The findings suggest a subligamentous spread of tuberculosis.

T2WI SAG



T1W CONTRAST IMAGE SAG

B] NON-OSSEOUS SPINAL INTRAMEDULLARY TUBERC ULOMA:
MRI DORSO-LUMBAR SPINE

There is expansion of the spinal cord at the level of D11- D12 with lesions which appear to be isointense on T1WI, hypointense with surrounding edema on T2WI and shows ring enhancement on contrast images suggesting intramedullary tuberculomas.

T2WI SAG

T1W CONTRAST IMAGE SAG

C) SPINAL MENINGITIS:
MRI DORSO-LUMBAR SPINE

There is presence of cord expansion at the level of D11-D12 with haziness of the meninges. There is enhancement of the meninges seen on contrast images suggestive of spinal meningitis.

T2WI SAG **T1W CONTRAST IMAGE SAG**

CONCLUSION

This study proved that MRI offers better results in all the manifestations of spinal tuberculosis. However, histopathology disapproved of spinal tuberculosis in 1% case , hence histopathological and laboratory correlation with imaging is important in diagnosing spinal tuberculosis to increase the accuracy of the diagnosis of spinal tuberculosis.

DISCUSSION

1. TYPES OF SPINAL TUBERCULOSIS:

My study showed the maximum occurrence of Pott's spine in spinal involvement of tuberculosis. Intraspinal tuberculoma and spinal meningitis were rare manifestations where only 1 patient showed involvement of the spine for each.

2. TYPE OF LESION IN POTT'S SPINE:

The commonest type of lesion in Pott's spine in my study was a paradiscal lesion, followed by central type of lesion. Only 1 case of subligamentous spread was observed in our study. Whereas none were observed involving the posterior elements of the vertebral body.

3. DISTRIBUTION ACCORDING TO THE VERTEBRAL LEVELS:

The lumbar vertebrae were the commonest level of vertebrae involved in this study, followed by the thoracic vertebrae. Cervical vertebrae were very rarely involved.

4. MRI IN THE DIAGNOSIS OF SPINAL TUBERCULOSIS:

30 patients underwent MRI for spinal evaluation, out of these, 28 patients were diagnosed to have Pott's spine, 1 patient had intramedullary tuberculoma and 1 had spinal meningitis. All of these results were compared to the pathological findings in these patients, and it was observed that MRI had a sensitivity of about 99% in the evaluation of the spinal tuberculosis.

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REFERENCES

1. Rajashankar B, Whitehouse R W. Bone, joint and spinal infection. Grainger and allison's diagnostic radiology 6th edition, volume 2, page 1271-1273
2. Trivedi R ,Saksena S , Gupta R K . Magnetic resonance imaging in central nervous system tuberculosis. Indian j radiol imaging 2009;19:256-6
3. Ansari S , Amandullah M F , Ahmed K and Rauniyar R K. Pott's spine :diagnostic imaging modalities and technology assessment. N j med sci. 2013 jul; 404 -411. Doi:10.4103/1947-2714.115775
4. Gehlot P S ,Chaturvedi S, Kashyap R ,Singh V.J Clin Diagn Res.2012 nov, 6 (9):1534-1538. 2012 nov 15. doi:10.7860/JCDR/2012/4618.2552
5. Georgy BA, Snow RD, Hesselink JR. MR imaging of spinal nerve roots: techniques, enhancement patterns, and imaging findings. AJR Am J Roentgenol. Jan 1996;166(1):173-9. [Medline
6. Ferrer MF, Torres LG, Ramírez OA, Zarzuelo MR, Del Prado González N. Tuberculosis of the spine. A systematic review of case series. Int Orthop. Nov 25 2011.
7. Ravindra Kumar Garg, Tuberculosis of the central nervous system, Postgrad Med J 1999;75:133-140 doi:10.1136/pgmj.75.881.133.
8. Shafi Ullah, Syed Humayun Shah, Aziz-ur-Rehman, Arshad Kamal, Norin Begum, Ghaazaan Khan, J Ayub Med Coll Abbottabad 2008; 20(2).
9. Cristina Otilia Laza1, Gina Enciu1 and Simona Andreea Dinu .Tuberculosis of the Cervical Spine ,Volume 13 Issue 3, Global Journal of Otolayngology
10. Hidalgo JA, Cunha BA. Medscape Reference [Internet]. WebMD. Updated 2011 Dec 5. Accessed 2012 Mar 28. Available from: http://emedicine.medscape.com /article/226141-overview#a0104
11. Tuberculosis of the spine (Pott's disease) presenting as 'compression fractures', B Dass, T A Puet, C Watanakunanorn, Nov 2002, Vol 40(11),Pg: 604-608, available at www.nature.com/sc/journal/v40/n11/full/3101365a.htm.
12. Robert L. Serafino Wani MBBS, MRCP, MSc (Trop Med), Clinical manifestations of pulmonary and extra-pulmonary tuberculosis.
13. 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.
14. Dr. Shahid Latheef, Department of Orthopaedic, Yenepoya medical college, Manglore: Management:Tuberculosis of Spine.
15. A.I. De Backer, K.J. Mortelé, I.J. Vanschoubroeck, D. Deeren, F.M. Vanhoenacker, B.L. De Keulenaer, P. Bomans,M.M. Kockx, JBR-BTR 2005 Mar-Apr;88(2):92-7: Tuberculosis of the Spine: MR Imaging Features.