Original Research Article

A study of role of magnetic resonance imaging in the evaluation of compressive myelopathy

Mukesh Kumar Sharma[1*], N K Kardam[2], K B Gehlot[3]

[1,2,3]Department of Radiodiagnosis, Ravindranath Medical College, Udaipur Rajasthan, INDIA.
Email: drmyke2501@gmail.com

Abstract

A descriptive imaging study of 30 patients was carried out by 1.5 TESLA MRI scanner with the objective to study the various causes of compressive myelopathy and MRI features of them to evaluate role of MRI in diagnosis of the various causes of compressive myelopathy. In our study of 30 cases of compressive myelopathy we found various different causes for compression. Among these are trauma[12], infectious causes (08), primary neoplasms (04) and secondary neoplasm (06). Most common causes for compressive myelopathy in our study are extradural compression from trauma (40%) and infective/TB (26.67%).

Key Word: compressive myelopathy, MRI, extradural, intradural, intramedullary, metastasis, schwanoma, neurofibroma

[*]**Address for Correspondence:**
Dr. Mukesh Kumar Sharma, Department of Radiodiagnosis, Ravindranath Medical College, Udaipur Rajasthan, INDIA.
Email: drmyke2501@gmail.com
Received Date: 08/11/2018 Revised Date: 16/12/2018 Accepted Date: 04/01/2019
DOI: https://doi.org/10.26611/1013916

Access this article online

Quick Response Code:

Website: www.medpulse.in

Accessed Date: 11 January 2019

INTRODUCTION

Compressive myelopathy is the term used to describe the spinal cord compression either from outside or within the cord itself. Compression may be due to Herniated disc, ossified posterior longitudinal ligaments, post traumatic compression by fracture / displaced Vertebra, epidural haemorrhage / abscess or Epidural / Intradural (Intramedullary and Extramedullary) neoplasm. Plain radiographs have a low sensitivity for identifying traumatic spinal lesions. CT scan is more sensitive to detect fracture of vertebral body as compare to Plain radiograph and MRI, particularly posterior neural arch and retropulsion fracture. However, less sensitive than MRI for detection of spinal cord injuries/involvement. MRI is the definitive modality in assessing spinal soft tissue injuries, especially in evaluation of spinal cord, intervertebral discs and ligaments. It also allows differentiate spinal cord haemorrhage and edema which may have a prognostic value.

MATERIAL AND METHODS

The patients who were clinically suspected as a case of compressive myelopathy, referred from various departments of RNT Medical College and attached hospitals to investigate with PHILLIPS ACHIEVA 1.5 TESLA MRI scanner in the Department of Radiodiagnosis. The study group was included a sample size of 30 patients selected by a purposive sampling. The data were analysed by a descriptive analysis.

EXCLUSION CRITERIA

- Cases of non – compressive myelopathy.
- Degenerative changes including disc herniation, degenerative facetopathy, ossified posterior longitudinal ligaments etc.

RESULTS AND DISCUSSION

In our study of 30 cases of compressive myelopathy we found various different causes for compression. Among these are trauma[12], infectious causes (08), primary neoplasms(04) and secondary neoplasm (06).

How to cite this article: Mukesh Kumar Sharma, N K Kardam, K B Gehlot. A study of role of magnetic resonance imaging in the evaluation of compressive myelopathy. *MedPulse – International Journal of Radiology*. January 2019; 9(1): 24-27.
http://www.medpulse.in/Radio%20Diagnosis/

Table 1: Causes of compressive myelopathy

MR diagnosis	Number of patients (n=30)	%
Traumatic Myelopathy	12	40
Infection/TB	8	26.67
Secondary Neoplasm /Metastases	6	20
Primary Neoplasm	4	13.33

Out of 30 cases of compressive myelopathy, we had 12 (40%) cases of spinal trauma. Among 12 patients the mode of injury was RTA (70%) and fall from height (30%). In a study conducted by Kulkarni *et al*[1], most common mode of injury to the spinal cord was vehicular accident and least cause was the fall. The similar finding of the mode of injury is found in our study conducted. The age of the patient in our study ranged from 12-70years, mean 42 years and 10 were males and 2 were females (M : F = 5:1) : This is in comparison to the study conducted by Yamashita *et al*[2]. In our study the level of injuries among the 12 patients were thoracic (58.33%), cervical (41.67%) and lumbar (16.67%). This is comparable to the study conducted by Kerslake *et al*[3]. The spinal cord abnormalities demonstrated by MR imaging were cord compression and abnormal signal intensities within the spinal cord. Spinal cord compression was observed in all the 12 cases of spinal injury. The causes of spinal cord compression included subluxation of vertebral body in 6 patients and epidural hematoma in 5 patients. Abnormal signal intensities from the spinal cord were observed in 11 of 12 patients and 1 patient had no cord changes.11 patients showed hypointensity on T_1WI and hyperintensity on T_2WI and FLAIR images suggestive of cord edema / contusion. These signal changes are in consistent with studies done previously by Hackney *et al*[4]. The cord signal intensity has the prognostic implication where patient with cord edema[8] recovered completely / partially. This has also been shown by studies done by Hackney *et al*[4] and Flanders *et al*[5]. Of the 5 cervical injury patients, 4 patients expired during the period of hospitalization. This may be attributed to severity of cord compression and multisegment involvement of the cord changes. In our study of 30 cases, 6 (20%) are of metastatic disease of the spine as a cause of compressive myelopathy. Intraspinal extradural masses that caused cord compression extended from an abnormal part of the vertebra in all the 6 patients. This is substantiated by a study conducted by Lien *et al*[6] in which 100% showed extradural masses extended from an abnormal part of a vertebra. Out of 6 patients, 4 (66.67%) showed more than one lesions. This is in comparison to study done by Lien *et al*[6] in which 78% had more the one lesions which include vertebral metastases in addition to those compressing the cord. In our study most common site of involvement was the thoracic spine (66.67%). This is in comparison to the study done by Livingston *et al*[7] where site of epidural tumor in thoracic spine was 68%. The three most common primary tumors with metastases to the spine and extradural space were lung carcinoma (33.33%), breast (carcinoma 16.67%) and prostate (16.67%). In our study we had 2 patient with primary carcinoma bronchus, 1patient had breast carcinoma,1 case had lymphoma, 1 carcinoma prostate, and 1 patients with unknown primary. We used T_1WI, T_2WI and STIR sequence and post contrast to image spinal metastases. T_1WI was useful in the detection of bone marrow metastases and STIR helped in picking up more marrow lesions. IV Gd-DTPA was used in 5 out of 6 patients which showed mild Homo-to-Heterogeneous enhancement. Observation have shown that post- contrast MR does not improve the detection of extradural spinal metastases even though it has great value in intradural disease. We had 4 cases of primary intradural extramedullary neoplasms, among which 2 were neurofibroma and 2 was meningioma. All the 4 cases showed spinal cord compression. Of the 2 cases of neurofibromas MR diagnosed 1 case as neurofibroma. In 1 case MR could not differentiate between meningioma and neurofibroma. In our study, 8 cases of infective spondylitis were associated with compressive myelopathy. Seven cases were in the thoracic region and 1 in the lumbar region. X-ray showed some abnormality in 5 cases. MRI showed vertebral body destruction with pre and para vertebral collection in 1 cases.Cord edema was associated with 1 case. Study by Roos DEA *et al*[8] showed thoraco – lumbar junction as the most common affected site as in our cases. They showed rim enhancement around the intra – osseous and paraspinal soft tissues abscess.

We had one case of epidural abscess compressing the spinal cord who presented with sudden onset of weakness in both lower limbs. MRI showed extradural soft tissue posterior to the cord extending from T_4-T_9 level causing compression on the spinal cord. It was isointense on T_1WI and hypointense on T_2WI and showed peripheral minimal enhancement. The study conducted by Namaguchi *et al*[9] showed thoracic region as the most common site of involvement and signal intensities of the abscess as comparable to our study. We had one case of chronic hypertrophic pachymeningitis as a rare cause of compressive myelopathy. X-ray was normal and MRI showed diffuse irregular, thickened leptomeninges from T_7 – T_9 level which was isointense to cord on T_1WI, hypointense on T_2WI and FLAIR. Post contrast showed homogenous intense enhancement.

Table 3: Causes according to various compartment

Causes	Number of patients (n =30)	Extradural (n=26)	Intradural Extramedullary (n=4)
Spinal injury	12(40%)	12(46.15%)	0
Infective/TB	8(26.67%)	8(30.78%)	0
Primary neoplasms	4(13.33%)	0(0%)	4(100%)
Secondary neoplasms/ metastasis	6(20%)	6(23.07%)	0
Spinal Epidural Abscess	1(3.3%)	1(3.8%)	0

Table 3: Causes according to various compartment

Causes	Number of patients (n =30)	Extradural (n=26)	Intradural Extramedullary (n=4)
Spinal injury	12(40%)	12(46.15%)	0
Infective/TB	8(26.67%)	8(30.78%)	0
Primary neoplasms	4(13.33%)	0(0%)	4(100%)
Secondary neoplasms/ metastasis	6(20%)	6(23.07%)	0
Spinal Epidural Abscess	1(3.3%)	1(3.8%)	0

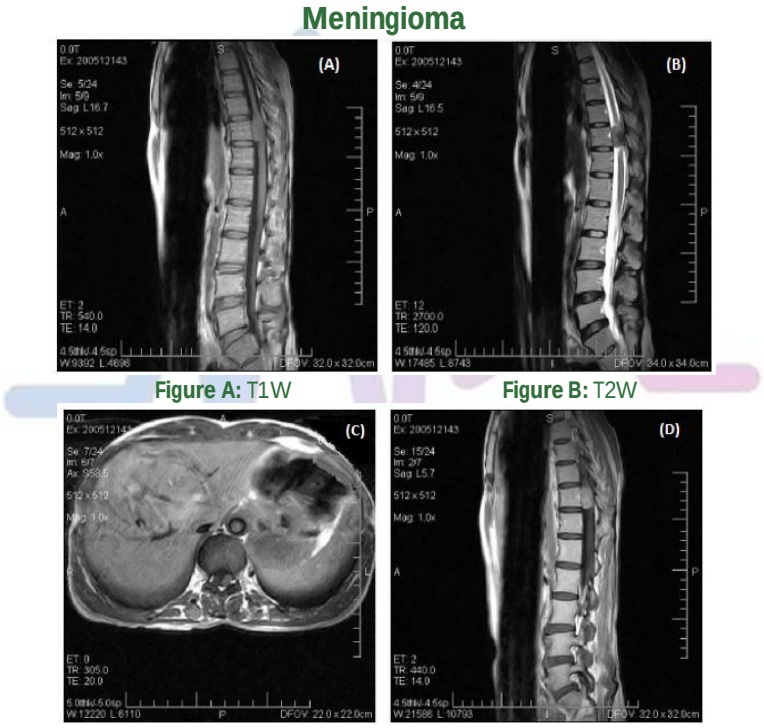

Figure A: T1W **Figure B:** T2W

Figure C: Post Contrast Axial **Figure D:** Post Contrast Sagittal

Figure 1a: intradural extramedullary lesion showing isointense to cord on sagittal T1W (A), hypointense on sagittal T2W (B) and avid enhancement on post contrast axial and sagittal image(C and D).

CONCLUSIONS

MRI is the definitive modality in assessing soft tissues of the spine and spinal cord abnormalities. It is the best modality to evaluate cord edema/contusion and integrity of the intervertebral discs and ligaments. MRI is very sensitive and considered the imaging modality of choice to detect and characterize the spinal tumors and spinal infections. MRI I could successfully characterize the spinal tumor based on location into Extradural / Intradural and assess the integrity of spinal cord, intervertebral discs and ligament after acute spinal trauma. So in the end I can conclude that MRI is very definitive, sensitive, accurate, though costly but very specific, non invasive, radiation free modality for evaluation of Compressive myelopathy.

REFERENCES

1. Kulkarni MV, McArdle CB, Kapanicky D, Miner M, Cotler HB, Lee KF, *et al*. Acute Spinal Cord Injury. MR Imaging at 1.5 T: Radiology. 1987; 164: 837-843.
2. Yamashita Y, Takahashi M, Matsuno Y, Kojima R, Sakamoto Y, Oguni T, *et al*. Acute Spinal cord Injury. Magnetic resonance Imaging correlated with myelopahty: The British Journal of Radiology. 1991; 64:201-209.
3. Kerslake RW, Jaspan T, Worthington BS. Magnetic resonance Imaging of Spinal trauma: The British Journal of Radiology. 1991; 64:386-402.
4. Hackney DB, Asata R, Sci DM, Joseph PM, Carvlin MJ, McGrath JT, Grossman RI, *et al*. Hemorrhage and edema in Acute spinal cord compression. Demonstration by MR Imaging: Radiology. 1986; 161:387-387-390.
5. Flanders FD. Enhanced MR Imaging of hypertrophic pachymeningitis: Am J Roentgenol. 1997; 169: 1425-1428.
6. Lien HH, Blomlie V, Heimdal K. Magnetic Resource Imaging of malignant extradural tumors with acute spinal cord compression: Acta Radiologica. 1990; 31:187-190.
7. Livingston KE, Perrin RG. The Neurosurgical management of spinal metastases causing cord and cauda equine compression: J. Neurosurg. 1978; 49: 590-594.
8. Roos DEA, Persijn V, Meerten EL, Bloem JI. MRI of Tubercular spondylitis: AJR. 1986; 146 :79-82.
9. Numaguchi Y, Rigamonti D, Rothman MI. Spinal epidural abscess. Evaluation with Gd enhanced MR Imaging: Radiographics. 1993; 13:545.

Source of Support: None Declared
Conflict of Interest: None Declared