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Etiological Spectrum of Non-Traumatic Myelopathies in Adults Using MRI at a Tertiary Care Hospital in Jharkhand

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Abstract
Aims & Objectives: *1] To estimate the prevalence of Non-traumatic Myelopathy. 2] To estimate the percentages of various causes of non traumatic myelopathies. 3] To compare the various causes between different age groups, males and females.*
Materials & Methods: *50 Patients with a clinical diagnosis of non-traumatic Myelopathy referred to the Department of Radiology, RIMS, Ranchi during the study period from August 2017 to October 2018 were studied after obtaining consent. Age and sex of the patient were noted. Detailed history and neurological examination was obtained from all the patients. MRI of spine of all patients and MRI of brain of selected patients were carried out. Based on MRI findings alone causes of non-traumatic Myelopathies were categorized.*
Results: *Among 50 cases of Non-Traumatic Myelopathies, 29 cases (58%) were presented with Paraparesis and 21 cases (42%) were presented with Quadriparasesis. 27(54%) cases were grouped into cord compressive and 20 (40%) were grouped into Non compressive group, while in 3(6%) case no etiology could be found on MRI. Tuberculosis was the major cause in compressive group while Acute Transverse Myelitis was the major cause in Non compressive group.*
Conclusion: *Quadriplegia and paraplegia are conditions with considerable morbidity and regarded as a disease of constant misery to the patient, family and the society. It is difficult to conclude the diagnosis in spinal cord pathologies on clinical basis alone where imaging particularly MRI plays a major role in diagnosing and classifying the various causes of Non traumatic Myelopathies.*
Keywords: *Non-traumatic Myelopathies, MRI, Paraparesis, Quadriparasesis.*

Introduction

Diseases of the spinal cord are termed as *myelopathies*. Myelopathies can be either traumatic or non-traumatic. Non-traumatic myelopathies are of two types: compressive myelopathies and non-compressive myelopathies. The clinical presentation and causes of

compressive myelopathies characteristically differ from those of non-compressive myelopathies, although rare presentations in either category can mimic each other and pose a diagnostic dilemma to the clinician[1].

The history, neurological examination and the study of the cerebrospinal fluid guide the diagnosis of spinal cord injuries. However, imaging is of great importance in order to diagnose and classify the aetiology appropriately.

The management strategies between compressive and non-compressive myelopathies differ dramatically, as compressive lesions usually require urgent neurosurgical intervention, whereas non compressive myelopathies are usually amenable to medical treatment itself[2,3].

An apt diagnosis of non-traumatic etiological myelopathy at the right time can prevent any permanent damage or further damage to the spinal cord, thereby avoiding or reducing patient morbidity and mortality.

This study focuses on the various causes that triggers the genesis of non-traumatic myelopathies in males and females of different age groups with the aid of Magnetic Resonance Imaging in this particular geographic locale so that the information regarding their prevalence can be employed exhaustively during the suspicion of a non-traumatic myelopathy and for further studies in this loci.

Materials and Methods

Study Duration: from August 2017 to October 2018.

Source of Data: Patients with a clinical diagnosis of non-traumatic paraparesis and quadriparesis referred to the department of radiology, RIMS, Ranchi during the study period.

Study Sample: 50 cases of clinically diagnosed non traumatic myelopathies**.**

Inclusion Criteria

- Patients greater than 15 years of age with a clinical diagnosis of non-traumatic paraparesis and quadriparesis referred to the department of radiology, RIMS, Ranchi during the study period.
- Both the gender.

Exclusion Criteria

- Patient less than 15 years of age.
- post traumatic spinal cord injury patient.
- Patients with implanted pace-maker or other metal components e.g. osteosynthesis material, metal clips in operations on vessels, etc.
- Patients with clinical diagnosis of non-traumatic myelopathy presenting with symptoms other than paraparesis or quadriparesis.

Data Collection Techniques and Tools

Patients who were referred for MRI due to non-traumatic paraparesis and quadriparesis were studied after obtaining consent. Age and sex of the patient were noted. Detailed history and neurological examination was obtained from all the patients. For all patient's routine investigations and required specific investigations were carried out.

Routine Investigations: Haemogram with peripheral smear, Blood sugar and urea, Urine for routine microscopic and BJ protein, X-ray chest (PA), Tuberculin test, ESR, Sputum AFB, sonography of abdomen and pelvis, ECG, HIV screening.

Specific Investigations: MRI spine, MRI brain when required. Lumbar puncture for CSF microscopy ,sugar, AFB, gram stain, VDRL, serum B12 level, culture and sensitivity and antibodies when required.

MRI of Cervical, Dorsal and Lumbar spine was carried out in the study using 1.5 Tesla MRI machine. Siemens, symphony, 2004 model. Standard surface coils and body coils were used for Cervical, Dorsal and Lumbar spine for acquisition of images. Conventional spin echo sequences T1WI & T2WI Sagittal, FLAIR Sag, STIR sag, T1WI & T2WI axial. In selected cases post contrast T1WI axial, Sag and coronal were done with a FOV: Sagittal: 30cm, Axial: 18cm;

Matrix size: 256x 256; Slicet hickness: 4.5mm x 5mm; Contrast: Gd – DTPA at a dose of 0.1 mmol/kg body wt.

Based on MRI findings causes of paraparesis and tetraparesis were divided into two main categories. All those patients in whom there was evidence of compression of thecal sac and spinal cord were grouped together as cord compression. All those patients in whom there was no evidence of cord compression and no intracranial cause were identified for their symptoms were grouped together as non-compressive myelopathies. Age, gender, and MR disease category were recorded and these variables were analyzed.

Results

Among 50 cases, 29(58%) cases were of paraparesis and 21(42%) cases of quadriparesis. Out of 50 cases 27(54%) were grouped into compressive and 20(40%) cases were grouped into non-compressive myelopathies while in 3(6%) cases etiology could not be found.

In this study maximum incidence was found in males 29(58%) while in females 21(42%) with male to female ratio is 1.3:1, Maximum number of patients is from the range of 36-45 years followed by 26-35 years range (figure 1).

Age of presentation varied from 15 to 74 years. The mean age is 40.18 years and the median age is 40.5 years.

Maximum patients had lesions in the cervical region (32%) followed by the cervico-dorsal region (22%) (figure 2).

Out of 50 cases 24% had acute presentation, 26% had subacute presentation while majority 50% had chronic presentation.

Among compressive group, 16 cases were paraparesis and 11 were quadriparesis, while in non-compresive groups 11 were paraparesis and 9 were quadriparesis.

Various etiologies of compressive myelopathies in our 27 cases include: Pott's spine 12 (44.4%), Spondylosis 6 (22.2%), Tumors 5 (18.5%), CV Jn anomalies 2 (7.4%), Syringomyelia 1(3.7%), and AVM 1(3.7%) (table 1).

Tuberculous spondylitis was the major cause of compressive myelopathies, among 12 cases 7 were male and 5 were female. 6 cases presented in subacute stage while 6 cases had chronic presentation.

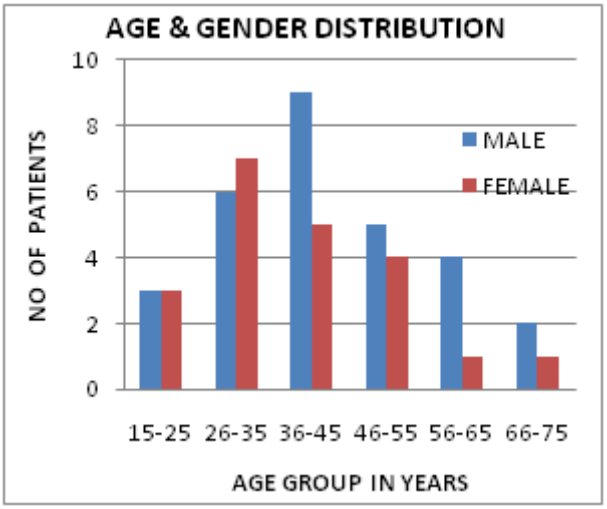

Figure 1: Age & Gender distribution

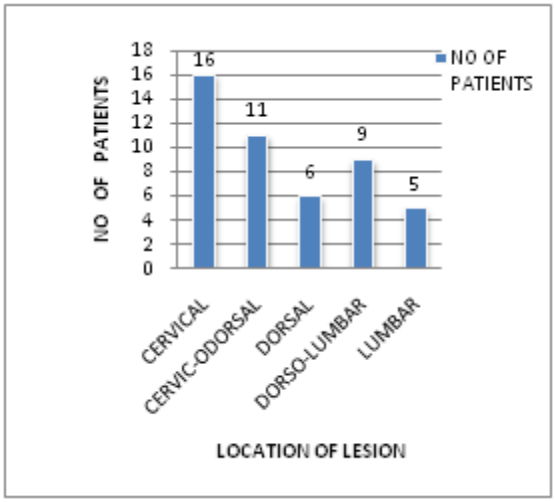

Figure 2: Lesion location in spinal cord.

Spondylosis was the second common cause after TB causing cord compression. Among 6 cases 4 were male and 2 were female, all cases had chronic presentation.

Spinal tumors were the third most common cause of compressive myelopathies. Among 5 cases of tumor 2 were in males and 3 were in females. 2 cases were in intramedullary, 1 case in extramedullary intradural and 2 cases were extradural in location.

Various etiologies of non-compressive myelopathies in our 20 cases include: Acute

transverse myelitis 10 (50%), Subacute combined degeneration in 4 (20%), Multiple sclerosis in 2 (10%) and each case of ADEM, HIV myelopathy, NMO and Ischemic myelopathy (table 2).

In 3 (6%) cases no MRI findings were noted and could not be grouped into either of the groups.

Acute Transverse Myelitis was the major cause in non compressive group, Out of 10 cases of ATM, 6 were male 4 were females. 6 cases had acute presentation while 4 cases had subacute presentation. Subacute combined degeneration was the second common in non compressive group, out of 4 cases in our study 2 were male and 2 were female.

Table 1: Etiological Profile of Nontraumatic Compressive Myelopathy [n = 27]

Etiology	Qudriparesis		Paraparesis		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Pott's Spine	0	0%	12	44.44%	12	44.44%
Spondylosis	4	14.81%	2	7.40%	6	22.22%
Tumors	4	14.81%	1	3.70%	5	18.52%
Cv Jn Anomalies	2	7.40%	0	0%	2	7.40%
Syringomyelia	1	3.70%	0	0%	1	3.70%
Dural Av-Malformation	0	0%	1	3.70%	1	3.70%
Total	11	40.74%	16	59.26%	27	100%

Two case of Multiple sclerosis, one case of Neuromyelitis optica and ADEM each had a additional brain findings. Other causes in non compressive group include one case of Ischemic and HIV myelopathies.

Discussion

The present study was conducted in the Department of Radiology, Rajendra Institute of Medical Sciences, Ranchi for a period from August 2017 to October 2018. The study involved 50 Patients diagnosed clinically having non-traumatic paraparesis or quadriparesis. Based on MRI they were grouped into compressive and non-compressive myelopathies.

In our study, number of cases in paraparesis(58%) were more than quadriparesis(42%), myelopathy due to cord compression (54%) was more common than non-compressive(40%), which is similar to the study conducted by Chaurasia et al and Birender joshi et al[4,5].

Among compressive myelopathies, Tubercular spondylitis was the most common cause followed by spondylosis, which correlates well with various Indian studies[4–6]. In contrast to Indian studies, western studies done by moore et al[7] shows spondylosis as the commonest cause in compressive group. Lekoubou Looti et al[8] in Cameroon showed, primary or secondary spinal tumors as the major cause of compressive myelopathy.

In tubercular spondylitis there is loss of height of the disc with decrease in signal on T1WI and increase in signal on T2WI. There is disappear-rance of low signal intra-nuclear cleft on T2WI. Decrease in marrow signal is present in T1WI and increase in T2WI. Marrow signal becomes isointense after gadolinium administration.

Bulging of annulus fibrosis, herniation of nucleus pulposus, hypertrophy of spinal ligaments, spinal canal stenosis, abnormal signal in spinal cord at compression site and atrophy are present in spondylotic myelopathy.

The third most common cause in compressive group in present study is spinal tumors which accounts for 18.5 % which is also similar to study done by chaurasia et al[4] in which spinal tumors accounts for 19.84%. while a study done by Mehrotra et al[9] shows 20.1%.

Among the spinal tumors in our study two cases are intramedullary which includes astrocytoma and ependymoma each, one case is extramedullary intradural which includes meningioma and two case of extra dural metastasis.

In present study, among non compressive group Acute transverse myelitis was the most common cause followed by Subacute combined degeneration which is similar to studies done by Chaurasia et al[4] and Prabhakar et al[10]

Table 2: Etiological Profile of Non-Compressive Myelopathy [n= 20]

Etiology	Quadriparesis		Paraparesis		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Acute Transverse Myelitis	4	20%	6	30%	10	50%
Subacute Combined Degeneration	1	5%	3	15%	4	20%
Multiple Sclerosis	1	5%	1	5%	2	10%
ADEM	1	5%	0	0%	1	5%
HIV Myelopathy	0	0%	1	5%	1	5%
Neuromyelitis Optica	1	5%	0	0%	1	5%
Ischemic Myelopathy	1	5%	0	0%	1	5%
Total	9		11		20	100%

In present study most common location of ATM is in cervicodorsal region while in a study done by Dawson et al[11] showed most common location is in dorsal segment of spinal cord. Bakshi et al[12] described ATM as a longitudinal myelitis involving multiple segments, whereas MS plaques are more focal and involve only 1-2 segments. In a study done by Austin GS et al[13] showed long segment involvement in 80% of his ATM cases, While in our present study out of 10 cases of ATM 4 cases involved short segment while 6 (60%) cases showed long segment involvement. Further in Austin GS et al study showed in ATM, the centrally located high signal intensity was more likely to occupy more than 2/3rd of cross section in all cases, which is similar to our study where all cases showed lesion occupying more than 2/3rd of cross section.

Jacobi et al[14] found that on MR imaging, the MS plaques in spinal cord are characteristically less than 2 vertebral segments in length, peripherally located and occupy less than 2/3rd of cross section. Which is similar to our study where the two MS case showed short segment spinal involvement and occupied lateral part within the cord. One case of NMO showed long segment spinal involvement and occupying more than 2/3rd of cord. Both NMO and MS case showed additional brain findings.

SACD and ischemic myelopathy in our study showed long segment involvement, while in location within spinal cord SACD occupied posterior part of the cord whereas ischemic myelopathy occupied anterior part of the cord. which is similar to the findings noted in study done by prabhakar et al and turner et al[15].

Conclusion

Non-traumatic myelopathies is a condition with significant morbidity and cause problem not only to patients but also his family. As the management differs considerably between compressive and non compressive groups, correct diagnosis and immediate treatment reduce the morbidity and further damage. Clinically it is difficult to diagnose these conditions, thus MRI plays a crucial role in differentiating various causes of non-traumatic myelopathies.

The various etiologies vary between the developed and developing countries and it even varies between the different locales of same country. This study has some limitations. This is a hospital based study and small study duration. So further studies should be done in this locale to widen the spectrum of etiologies of non-traumatic myelopathies, so the referring physician might get the clear idea on the other possible etiologies without confusion and helps him on giving the apt treatment without delay.

References

1. Kelley BJ, Erickson BJ, Weinshenker BG. Compressive myelopathy mimicking transverse myelitis. Neurologist. 2010;
2. Jankowitz BT, Gerszten PC. Decompression for cervical myelopathy. Spine Journal. 2006.
3. Schmalstieg WF, Weinshenker BG. Approach to acute or subacute myelopathy. Neurology. 2010;
4. Chaurasia RN, Verma A, Joshi D, Misra S. Etiological spectrum of non-traumatic myelopathies: Experience from a tertiary care centre. J Assoc Physicians India. 2006;
5. Joshi BR. Role of MRI in Non-Traumatic Paraparesis and Tetraparesis. 2015;2(7):2–4.
6. Yadav RK, Agarwal S, Saini J. Profile of compressive myelopathy as evaluated by magnetic resonance imaging. J Indian Med Assoc. 2008;
7. Moore AP, Blumhardt LD. A prospective survey of the causes of non-traumatic spastic paraparesis and tetraparesis in 585 patients. Spinal Cord. 1997;
8. Looti AZL, Kengne AP, Djientcheu VDP, Kuate CT, Njamnshi AK. Patterns of non-traumatic myelopathies in Yaoundé (Cameroon): A hospital based study. J Neurol Neurosurg Psychiatry. 2010;
9. Mehrotra AN, Khosla SN, Pathak LR, Singh B. Spinal paraplegias. J Assoc Physicians India [Internet]. 1966 Feb [cited 2018 Nov 27];14(2):121–5. Available from: http://www.ncbi.nlm.nih.gov/pubmed/5905980
10. Prabhakar S, Syal P, Singh P, Lal V, Khandelwal N, Das CP. Non-compressive myelopathy: clinical and radiological study. Neurol India. 1999;
11. Dawson DM, Potts F. Acute nontraumatic myelopathies. Neurol Clin [Internet]. 1991 Aug [cited 2018 Nov 27];9(3):585–603. Available from: http://www.ncbi.nlm.nih.gov/pubmed/1921948
12. Bakshi, Kinkel, Mechtler, Bates, Lindsay, Esposito, et al. Magnetic resonance imaging findings in 22 cases of myelitis: comparison between patients with and without multiple sclerosis. Eur J Neurol [Internet]. 1998 Jan [cited 2018 Nov 27];5(1):35–48. Available from: http://www.ncbi.nlm.nih.gov/pubmed/10210810
13. Austin SG, Zee CS, Waters C. The role of magnetic resonance imaging in acute transverse myelitis. Can J Neurol Sci [Internet]. 1992 Nov [cited 2018 Nov 27];19(4):508–11. Available from: http://www.ncbi.nlm.nih.gov/pubmed/1423048
14. Jacobi C, Stingele K, Kretz R, Hartmann M, Storch-Hagenlocher B, Breitbart A, et al. Neuromyelitis optica (Devic's syndr-ome) as first manifestation of systemic lupus erythematosus. Lupus. 2006;
15. Turner MR, Talbot K. Functional vitamin B12 deficiency. Pract Neurol. 2009;