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"Evaluation of Clinical and Etiological Profile of Non-traumatic Myelopathy Patients Attending in a Tertiary Care Hospital"

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Abstract
Background: *Non-traumatic myelopathies (NTM) have a broad and heterogeneous group of etiologies, can be divided into compressive and non-compressive myelopathies. Infections, demyelinating process, neoplastic, metabolic, vascular diseases and congenital malformations are frequently observed as etiologies of NTM. Considering scarcity of literature regarding this topic in our country context, the study was designed to evaluate the clinical and etiological profile of non-traumatic myelopathy patients attending in a Tertiary Care Hospital.*
Aim of the study: *The aim of this study was to evaluate the clinical and etiological profile of non-traumatic myelopathy patients.*
Methods: *This study was a hospital based cross-sectional observational study and conducted at the department of Neurology in Sir Salimullah Medical College & Mitford Hospital (MH), Dhaka, Bangladesh for one years. Peoples admitted in MH due to NTM were approached as selected according to prefix selection criteria. Written informed consents were taken from all the subjects and ethical issues were ensured according to the Helsinki declaration. Following clinical and imaging confirmation, total 384 individual were interviewed by researcher himself using a structured questionnaire. Data analysis was done by using SPSS version 20.0.*
Results: *The mean (±SD) age of the participants was 48.38±14.56 years. About 62.8% were male and 37.2% were female. Among the study population, 56% had compressive myelopathy and the rest 44% had non-compressive myelopathy. Other clinical presentations like pain-temperature sensory loss, dorsal column involvement, inability to walk, bladder involvement and radicular pain were in 64.6%, 62.5%, 52.3%, 50.3%, 32% cases respectively. MRI findings showed highest two areas of involvement: cervical (33.3%) and thoracolumbar (25.3%) region. Out of 215 compressive myelopathy, most frequent causes were TB of spine (32.55%) followed by disc herniation (20.93%), cervical spondylosis (14.88%), benign neoplasm (13.96%) and some others. Acute transverse myelitis was found in 46.20% patients followed by sub-acute combined degeneration of cord in 26.00%, anterior spinal artery occlusion in 8.90% and others were with the most frequent cause of non-compressive myelopathy.*
Conclusion: *The study revealed that besides some other causes, tuberculosis of spine and acute transverse myelitis was the two most common causes in both compressive and non-compressive type of myelopathy without history of trauma in our country.*
Keywords: *Clinical, Etiological profile, Non-traumatic, Myelopathy, Spondylosis.*

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I. Introduction

Myelopathy comprises neurologic deficits related to spinal cord injury (SCI) resultant from traumatic or non-traumatic causes [1]. Non-traumatic myelopathy (often referred to as non-traumatic spinal cord injury, NTSCI) constitutes one of the most common groups of neurological diseases in medical practice [2]. Prevalence data for NTSCI were located for only two countries, India and Canada. Indian prevalence data of 2310 NTSCI per million population were from the region of Kashmir [3] The incidence rate in Canada is estimated to be 68 per million, Australian estimate using data from Victoria reported an incidence of 26 per million. Data from Spain reported an incidence of 11.4 per million [4] and this is not nationally representative. The Canadian result of 1120/million population is 'Orange Zone' quality extrapolated from other studies; however, this was the only available national estimate [5]. Non-traumatic myelopathy has a broad and heterogeneous group of etiologies, summarily divided into compressive and non-compressive, among which include infectious, demyelinating,

neoplastic, metabolic and vascular diseases and congenital malformations [6]. Albeit factors influencing the etiology of NTSCI have not been studied in detail, studies have been noted to be associated with age-related conditions [7]. Clinical presentation of spinal cord disease is variable and myelopathies affects motor, sensory and autonomic nervous system consequence significant functional impairment in the areas of mobility, self-care, bowel and bladder management, sexuality and also various psychosocial issues [8] such as, 25% of patients with myelopathy and impairment and disability associated with depression. Addition to these, fatigue is also present in up to 57% of patients with myelopathies in contrast to 4–9% of the general population and it is more common in patients with incomplete injuries which is more prevalent in NTSCI [9]. Besides clinical history and examination Magnetic Resonance Imaging (MRI) is the mainstay in evaluation of myelopathy [10]. Prompt and concise diagnosis of the etiologies and localization of the site of lesion are essential for prediction of neurological and functional outcomes [1]. However, NTSCI is an area of growing importance, as research suggests that the proportion of SCIs with a non-traumatic cause is increasing and will continue to become more prevalent, in part due to ageing populations [11] and patients with NTSCI are often very disabled. There is a high burden of care following the onset of NTSCI, and in numerous cases this persists after discharge from inpatient rehabilitation [12].

II. Methodology

This prospective cross sectional observational study was conducted in the Department of Neurology, Sir Salimullah Medical College & Mitford Hospital, Dhaka, Bangladesh during the period from July, 2016 to June, 2017. Formal ethical clearance was taken from the ethical review committee of the Mitford Hospital for conducting the study. In total 384 patients suffering from non-traumatic myelopathy evidenced by both clinically and by investigations were selected as the study subjects. As per the inclusion criteria, patients of age ≥18 years from both sex groups presented at the initial clinical examination with one or more clinical signs suggestive of possible myelopathy: sphincter dysfunction, paraparesis, tetraparesis, sensory level, clinical compromise of multiple ascendants or descendants' tracts and/or a specific spinal cord syndrome were included. On the other hand, as per the exclusion criteria of this study, patients of age <18 years with the history of trauma or severely ill and not willing to participate were excluded. Non-randomized purposive sampling technic was used in sample selection. After describing the aim, objectives, potential hazard and benefits of the study, written informed consent will be collected from each patient and interview will be taken by the researcher himself with a semi-structured questionnaire. Data collection sheet was formed focusing to find out socio-demographic characteristics, clinical features, examination findings, etiology of the myelopathy and findings of the investigations were recorded. All statistical data analyses were performed using the SPSS 20.0 (IBM Inc., Armonk, NY, USA). Statistical significance was set as 95% confidence level at 5% acceptable error level. In all cases, p value of <0.05 was considered significant.

III. Result

In this study, in total 384 cases of spinal cord injury of non-traumatic origin, had received medical care in Sir Salimullah Medical College & Hospital, Dhaka, Bangladesh was identified during this one-year study. Among 384 patients of non-traumatic myelopathy, 256 patients presented with paraplegia (66.67%) and 128 patients with quadriplegia (33.33%). In our study youngest patient was 18 years old and oldest patient was 80 years old with mean age of presentation of 48.38 years (±14.56) and median age of 48.0 years. Maximum incidence of myelopathy was found in 5th decade (25.8%) followed by 6th (21.1%) and 4th (17.2%). Out of 384 patients, 215 had compression on spinal cord (56%) and remaining 169 had non-compressive myelopathy. In analyzing the relation between age progression and compression on cord it was found that, the frequency of myelopathy due to compression on spinal cord gradually increases as the age progresses except for 6^{th} decade when slight lower frequency was noted and for non-compressive myelopathy, a reverse picture was found with significant relationship ($p<0.0001$). In our study 54% of the cases presented with acute onset of weakness, followed by 29% with sub-acute and 17% with insidious onset. On presentation, 36.2% had hypertonia of limbs while 30.5% had hypotonia and 33.3% had normal tone. On the other hand, 53% patients presented with less than grade 3 muscle power (Medical Research Council criteria for grading of power) and 44% with more than or equal to grade 3 muscle power. Deep tendon reflexes were brisk in 45.3%, sluggish in 26.6% and normal in 28.1% of patients. As clinical presentations, among more than 60% patients, dorsal column involvement, pain-temperature sensory loss and sensory upper level were found. Besides these, Bladder involvement, radicular pain and inability to walk were found among 50.3%, 32% and 52.3% patient respectively. As the location of lesion cervical (33.3%) and thoracolumbar (25.3%) regions of the spine were the commoner sites. In this study, TB of spine was the most prevalent cause of compressive myelopathy (32.55%) which was presented more as paraparesis (30.69% vs 1.86%); followed by disc herniation (20.93%) and cervical spondylosis (14.88%). In the present study, acute transverse myelitis formed the major bulk of non-compressive myelopathy (78 out of 169 cases, 46%). Among 78 cases paraplegia was seen in 46 patients and quadriplegia in 32. 48 cases were males

and 30 were females. Sub-acute combined degeneration of cord being the 2nd most prevalent group of patients in this study (26%).

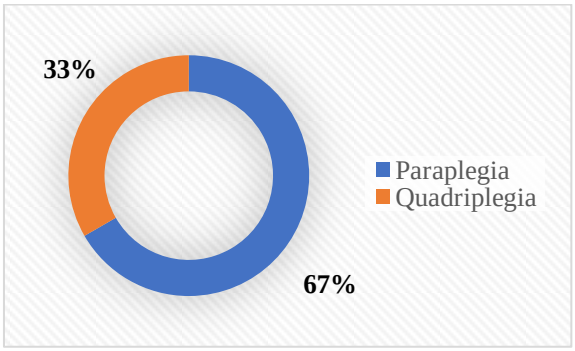

Figure 1: Distribution of patients according to involvement of limbs (N=384)

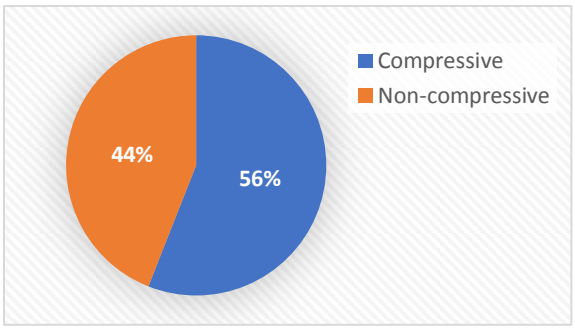

Figure 2: Distribution of patients according compression on cord (N=384)

Table 1: Relation between age progression and compression on cord (N=384)

Compression on cord		Age group							P
		18-20	21-30	31-40	41-50	51-60	61-70	71-80	
Yes	n	0	5	40	61	49	45	15	<0.0001
	%	0.00%	11.60%	60.60%	61.60%	60.50%	62.50%	100%	
No	n	8	38	26	38	32	27	0	
	%	100%	88.40%	39.40%	38.40%	39.50%	37.50%	0.00%	
Total		8	43	66	99	81	72	15	

Table 2: Distribution of patients according to mode of onset of weakness (N=384)

Onset of illness	Cases	
	n	%
Acute	209	54
Sub-acute	111	29
Chronic	64	17
Total	384	100

Table 3: Distribution of patients according to various clinical presentation (N=384)

Major clinical features	Present	%
Dorsal column involvement	240	62.5
Pain-temperature sensory loss	248	64.6
Sensory upper level	249	64.8
Bladder involvement	193	50.3
Radicular pain	123	32
Inability to walk	201	52.3

Table 4: Etiological profile of non-traumatic compressive myelopathy (n=215)

Diagnosis	Paraparesis		Quadriparesis		Total
	n	%	n	%	%
TB of spine	66	30.69%	4	1.86%	32.55%
Cervical spondylosis	0	0%	32	14.88%	14.88%
Benign neoplasm	23	10.70%	7	3.26%	13.96%
Metastasis	4	1.86%	1	0.46%	2.32%
Multiple myeloma	2	0.93%	3	1.39%	2.32%
Cranio-vertebral junction anomaly	0	0%	10	4.65%	4.65%
Syringomyelia	4	1.86%	0	0%	1.86%
Meningomyelocele	5	2.32%	0	0%	2.32%
Arterio-venous malformation	3	1.39%	2	0.93%	2.32%
Epidural abscess	4	1.86%	0	0%	1.86%
Disc herniation	37	17.21%	8	3.72%	20.93%
Total	148	68.84%	67	31.16%	100%

Table 5: Etiological profile of non-compressive myelopathy (n=169)

Diagnosis	Paraparesis		Quadriparesis		Total
	n	%	n	%	%
Acute transverse myelitis	46	27.20%	32	18.90%	46.20%
Multiple sclerosis	4	2.40%	2	1.20%	3.60%
ADEM	1	0.60%	9	5.30%	5.90%
Sub-acute combined degeneration of cord	29	17.20%	15	8.90%	26.00%
Anterior spinal artery occlusion	13	7.70%	2	1.20%	8.90%
SLE vasculitis	6	3.60%	0	0%	3.60%
Hereditary spastic paraplegia	3	1.80%	0	0%	1.80%
Unclassified	6	3.60%	1	0.60%	4.10%
Total	108	63.90%	61	36.10%	100%

IV. Discussion

The aim of this study was to evaluate the clinical and etiological profile of non-traumatic myelopathy patients. Spinal cord pathologies with quadriplegia and paraplegia are common neurological diseases with high morbidity and mortality that affect people of all ages and genders having tremendous social repercussions [13]. In this study, men represented 62.8% of the sample and patients of both sexes suffer more from compressive myelopathy with a non-significant relationship (p=0.821). Agarwal in a hospital-based study in India had a similar finding [14]. This study demonstrates that the patients in their 5th decade affected most (25.8%) with non-traumatic spinal cord injury which is in agreement with the study conducted in SDM Medical College, Dharwad, Karnataka, India in 2016 by Hemamalini et al [8]. The current study also shows that 69.5% of the sample size were 40 years and above, which is in tandem with the finding in previous studies [15, 16]. Misra et al. [17] in their study conducted in Institute of Medical Sciences, Banaras Hindu University, Varanasi between 2002-2004 found that majority of patients with nontraumatic myelopathy were presented with paraparesis (53%) which is in harmony with our study that shows the prevalence of paraparesis being 66.67%. In this current study, 54% of patients presented with acute onset weakness, followed by 29% with subacute onset and remaining with insidious onset. Of those with acute onset myelopathy 55.5% had compressive cause and 65% presented with paraparesis unlike former studies [8]. Furthermore, our study shows, 50.3 % of patients had bladder symptoms which is also similar to another study [8]. The second commonest cause of cord compression in our study was disc herniation. Its incidence was 20.93% unlike previous study conducted by Onwuchekwa et al [1], in which disc herniation was found to be the leading cause of non-traumatic compression myelopathy with 46.6% incidence. In the present study, acute transverse myelitis formed the major bulk of non-compressive myelopathy (78 out of 169 cases, 46%). In another study [18] the most common cause for non -compressive myelopathy was acute TM also (26%). The overall incidence of ATM causing quadriparesis and paraparesis was 20.30%. 32 cases (18.90%) were of quadriparesis and 46 cases (27.20%) were of paraparesis which is similar to Chaurasia et al. [13]. This study brings out other causes of non-traumatic myelopathy like ADEM, Anterior

spinal artery occlusion, Multiple sclerosis., CV junction anomaly, AVM, Syringomyelia, epidural abscess. Previous studies also support our findings of the other causes of compressive and non-compressive myelopathies [19]. Magnetic resonance imaging is an essential tool in the diagnosis of myelopathy which helps in early and accurate detection of etiology which is crucial in early treatment to prevent irreversible damage.

Limitation of the study:

This was a cross-sectional study in nature, samples were collected in only one center and long term follow ups were not performed. So, findings of this study may not reflect the exact scenario of the whole country.

V. Conclusion & Recommendation

Myelopathy is a devastating condition that causes a wide range of impairments and activity restriction. Irrespective of etiology, it results in quality of life of an individual, as well as increases burden of family, and society at well. Prompt diagnosis and early measurement can alleviate the suffering of the patient and hence, MRI is sensitive tool in detecting and localizing the spinal cord lesion responsible for myelopathy. In this study, the commonest cause of non-traumatic myelopathy are TB of spine and acute transverse myelitis. However, this study findings may not the reflection of the country as this study was confined into a tertiary level hospital and therefore, larger cohort is suggested to finalize the comment. Further Population based study is necessary to infer the findings over the general population.

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