International Journal of Research in Medical Sciences
Malokar SS et al. Int J Res Med Sci. 2022 Jan;10(1):105-110
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20215039

Original Research Article

Study of clinical profile and outcome of patients with acute non-traumatic paraparesis

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Received: 14 December 2021
Revised: 26 December 2021
Accepted: 27 December 2021

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ABSTRACT

Background: The following study is about the clinical profile and outcome of patients with acute non traumatic paraparesis. It includes the aetiology, clinical presentation and the outcome of various cases of acute non traumatic paraparesis. Paraplegia or paraparesis could be defined as loss of function of both legs as a result of disease or injury of the spinal cord, spinal roots, peripheral nerves or myopathies. Acute non-traumatic paraparesis is a neurological emergency. Reversible causes of acute paraplegia can be treated successfully if diagnosed early.
Methods: The observational study was done in the department of general medicine at D. Y. Patil Hospital, Navi Mumbai with sample size of 75 patients over 1 year.
Results: With early diagnosis prognosis of acute non traumatic paraparesis can be improved which was evaluated over period of 3 months.
Conclusions: Acute non-traumatic paraparesis is a neurological emergency. Reversible causes of acute paraplegia can be treated successfully if diagnosed early. It is important to diagnose and classify all cases into compressive and non-compressive lesions based on presenting symptoms because the management of the two differs.

Keywords: Non traumatic, Paraparesis, Aetiology, Clinical presentation, Outcome

INTRODUCTION

American spinal injury association (ASIA) developed and published the international standards for neurological and functional classification of spinal cord injury patients.[1] ASIA defines paraplegia as an impairment of motor or sensory function in the thoracic, lumbar or sacral segments of the spinal cord secondary to damage to neural elements within the spinal cord. Many spinal cord diseases are reversible if recognized and treated at an early stage; thus, they are among the most critical of neurologic emergencies. The efficient use of diagnostic procedures guided by knowledge of the anatomy and clinical features of common spinal cord disease is required for a successful outcome. "Non-traumatic" or "medical" cord injury is most commonly due to neoplastic, vascular, inflammatory or spondylitic conditions, and, while it sometimes develops dramatically, it is more likely to develop gradually, and to be seen as a manifestation of a disease rather than as a primary problem in its own right.[2] The patient will usually be admitted to a general medical, surgical or neurological service where attention is primarily focused on the treatment of the disease. The patients are often older, with more complex associated problems, an uncertain prognosis, and are even more liable to experience problems with adjustment to their clinical condition. Indeed, the psychological reaction to the disability may overshadow and complicate all other management problems. Non-traumatic acute paraplegia is a true emergent condition. Without obvious antecedent injury, accurate diagnosis is considerably difficult. When evaluating a patient with such a condition, various etiologies should be kept in mind, including a parasagittal lesion in the brain, a pontine lesion involving the select

corticospinal fibers, and spinal cord lesions at any level. Additionally, disorders of muscle or neuromuscular junctions or psychogenia should also be considered. Studies of non-traumatic paraplegia from developing like India are relatively few and majority of the studies on paraplegia from India were carried out in the pre-magnetic resonance imaging era. These diagnoses were made solely on the basis of X-ray and myelography.

Nevertheless, with the advent of magnetic resonance imaging (MRI), which is a very sensitive modality for spinal lesions, the yield for positive diagnosis has greatly increased.[3]

Hence under the light of above mentioned data, we planned the present study to assess the clinical and etiologic outcome in patients with acute onset paraparesis.

METHODS

The study was an observational type of study. The study was conducted at the Dr. D. Y. Patil Hospital, Navi Mumbai. The period of the study was from March 2020-April 2021.

Selection criteria of patients

Patients with non-traumatic acute onset paraplegia were selected for the study.

Procedure

A total of 75 patients with acute non-traumatic paraplegia or paraparesis, admitted into the emergency department over a period of 1 year were studied.

Sample size

The size of the sample was 75.

Inclusion criteria

Patients who gave informed consent for the study, and patients with non-traumatic acute onset paraplegia were included.

Exclusion criteria

Traumatic acute onset paraplegic patients, chronic onset paraplegia, and patients who didn't give informed consent were excluded.

Sampling procedure

All patients with acute non traumatic paraparesis were taken as sample. Patients were clinically evaluated; all the patients had full neurological examination and even when a precise diagnosis could not be offered, the structure affected and the level of the lesion was identified. The diagnosis were made based on clinical evidence and laboratory confirmation in a majority of the patients.The laboratory investigations, depending on the suspected neurologic disease process, included full blood count, erythrocyte sedimentation rate (ESR), X-rays, Bence Jones protein, serological tests [HIV, venereal disease research laboratory (VDRL)], Mantoux test, cerebrospinal fluid (CSF) analysis and microbiology (c&s).

MRI contrast was suggested in the presence of a hyperintense spinal cord signal change in T2-weighted images which may extend over 3-4 vertebral segments or hyperintensity in the central two-thirds of spinal cord with a central dot. All the patients with suspected spinal cord disease had spinal X-ray. Patients were reviewed after discharge from the wards. All the results were compiled. The sample size was calculated using the following formula.

$$N = [Z\alpha + Z\beta/C(r)]2 + 3$$

Where Zα is the standard normal deviate for α, Zβ is the standard normal deviate for β and C (r)=employ Fishers Arctanhtrans formation

$$C\ (r) = 1/2log[1 + r/1 - r]$$

A test's probability of making a type I error is denoted by α. A test's probability of making a type II error is denoted by β.

Ethical approval

The study was approved by IECBH, Navi Mumbai.

Statistical analysis

All the results were analysed by statistical package for the social sciences (SPSS) software version 18.0. Chi- square test and Mann Whitney U test were used for assessment of level of significance. P value of less than 0.05 was taken as significant.

RESULTS

A total of 75 patients with acute non-traumatic paraplegia or paraparesis, admitted into the emergency department over a period of 1 years were studied (Table 1).

Table 1: Age-wise distribution of patients.

Age group (years)	Number of patients	Percentage
<30	5	6.67
30-40	19	25.33
41-50	21	28
51-60	20	26.67
>60	10	13.33

A total 26.67 percent of the patients belonged to the age group of 51 to 60 years while 25.33 percent of the patients belonged to the age group of 30 to 40 years respectively (Table 1).

A total 56 percent of the patients were males while the remaining were females (Table 2).

Table 2: Gender-wise distribution of patients.

Gender	Number of patients	Percentage
Males	42	56
Females	33	44
Total	75	100

Radicular back pain was present in 48 percent of the patients while paresthesia and fever was seen in 22.67 percent of the patients. Altered level of consciousness was present in 4 percent of the patients (Table 3).

Table 3: Clinical profile.

Clinical profile	Number of patients	Percentage
Radicular back pain	36	48
Paresthesia	24	32
Fever	17	22.6
Altered level of consciousness	3	4

A total 73.33 percent of the patients had complete inability to walk while difficult walking was present n 26.67 percent of the patients (Table 4).

Table 4: Distribution of patients according to walking status.

Walking status	Number of patients	Percentage
Complete inability to walk	55	73.33
Difficult walk	20	26.67
Total	75	100

Table 5: Distribution of patients according to location.

Location	Number of patients	Percentage
UMN	18	24
LMN	56	74.67
UMN+LMN	1	1.35

Upper motor neuron lesions and lower motor neuron lesions was seen in 24 percent and 74.67 percent of the patients respectively. In the remaining 1.33 percent of the patients, upper motor neuron and lower motor neuron lesion was seen (Table 5). Power was 1/5 in 24 percent of the patients while it was 2/5 and 3/5 in 25.33 percent and 28 percent of the patients respectively (Table 6).

Table 6: Distribution of patients according to power.

Power	Number of patients	Percentage
0/5	3	4
1/5	18	24
2/5	19	25.33
3/5	21	28
4/5 or 4+/5	14	18.67

On sensory system examination, sharp sensory level below which all modalities of sensations were loss was seen in 52 percent of the patients. Patchy sensory loss was seen in 18.67 percent of the patients (Table 7).

Table 7: Distribution of patients according to sensory system examination.

Sensory system examination	Number of patients	Percentage
Sharp level below which all modalities of sensation were lost	39	52
Patch sensory loss	14	18.67
Normal	22	100

A total 29.33 percent of the patients had acute inflammatory demyelinating polyradiculo neuropathy as the main etiologic factor, while 26.67 percent of the patients and 21.33 percent of the patients had tuberculosis and Hypokalemic periodic paralysis as the main etiologic factor. Acute transverse myelitis and cerebrovascular accident was the main etiologic factors in 9.33 percent of the patients each (Table 8).

Table 8: Distribution of patients according to aetiology.

Etiology	Number of patients	Percentage
Tuberculosis	20	26.67
Acute transverse myelitis	7	9.33
AIDP	22	29.33
Hypokalemic periodic paralysis	16	21.33
CVA	2	2.67
Others	8	6.67

MRI was done in 93.33 percent of the patients. Among these patients, compressive myelopathy was seen in 53.33 percent of the patients while non-compressive myelopathy was seen in 26.67 percent of the patients. Normal MRI findings were seen in 13.33 percent of the patients (Table 9).

Table 9: MRI findings.

MRI findings	Number of patients	Percentage
Compressive myelopathy	40	53.33
Non compressive myelopathy	20	26.67
Normal MRI	10	13.33
MRI not done	5	6.67

Table 10: Overall outcome.

Outcome	Number of patients	Percentage
Improved	55	73.33
Worsen	7	9.33
Static	11	14.67
Death	2	2.67

DISCUSSION

Paraplegia or paraparesis could be defined as loss of function of both legs as a result of disease or injury of the spinal cord, spinal roots, peripheral nerves or myopathies. However, it could also result from certain parasagital intracranial lesions. Paraplegia due to non-traumatic myelopathy is a disabling and distressing neurological disease with protean clinical presentations.[4]

Acute onset paraparesis or weakness of both lower limbs affects not only the motor, sensory and autonomic functions but also has serious psychosocial sequelae. The development of paraplegia in a patient in a developing country is particularly ominous. In a poverty-stricken community the patient is likely to delay seeking medical advice, and the ultimate loss of working and earning capacity has an especially serious impact. Even if he succeeds in reaching a hospital he is unlikely to find skilled medical and nursing care, and satisfactory follow-up care will seldom be available. Hence, under the light of above mentioned data, we planned the present study to assess the clinical and etiologic outcome in patients with acute onset paraparesis.

Age group

A total 28 percent, 26.67 percent and 25.33 percent of the patients belonged to the age group of 41 to 50 years, 51 to 60 years and 30 to 40 years respectively. Mean age of the patients was 46.69 years. In a study conducted by Vaishnav et al, the age of presentation varied, but the most commonly affected age groups were between 26 and 50 years (36%) and between 51 and 65 years (34%). The mean age was 45.66 years (with a standard deviation of 19.26). This showed that all age groups were affected by acute non-traumatic paraparesis. Rajendra et al in their study, reported that majority of cases belonged to productive age groups of 2, 3 and 4 decade of life. Thangaraj et al in their study, reported that 32 percent and 22.67 percent of the patients belonged to the age group of 40 to 50 years and 20 to 30 years respectively.[5-7]

Gender

A total 56 percent of the patients were males while the remaining were females. In a study conducted by Vaishnav et al, 54 percent of the patients were males while the remaining were females. Rajendra et al, in their study, reported male preponderance with male: female ratio of 1.7:1. In a study conducted by Thangaraj et al, 61.33 percent of the patients were males while the remaining were females.[5,6]

Clinical profile

Radicular back pain was present in 48 percent of the patients while paresthesia and fever was seen in 22.67 percent of the patients. Altered level of consciousness was present in 4 percent of the patients. In a study conducted by Vaishnav et al, 48 percent of the patients showed presence of radicular back pain, 38 percent showed paraesthesia and 22 percent showed associated fever. Only 4% of cases had an altered level of consciousness.[6]

Location

Upper motor neuron lesions and lower motor neuron lesions was seen in 24 percent and 74.67 percent of the patients respectively. In the remaining 1.33 percent of the patients, upper motor neuron and lower motor neuron lesion was seen.

Power

Power was 1/5 in 24 percent of the patients while it was 2/5 and 3/5 in 25.33 percent and 28 percent of the patients respectively.

Sensory system examination

On sensory system examination, sharp sensory level below which all modalities of sensations were loss was seen in 52 percent of the patients. Patchy sensory loss was seen in 18.67 percent of the patients. In a study conducted by Vaishnav et al, in most cases, a loss of joint position and sense of vibration (74 percent) were observed. 50 percent of cases had a sharp sensory level below which all modalities of sensation were lost. 22 percent cases had patch sensory loss and 28 percent had normal sensory system examination. Rajendra et al, in their study, reported that all the modalities of sensation were lost with definite upper level in 67 percent while sensory loss was patchy in 10 percent, impaired in 7 percent and no sensory disturbance in 17 percent of the patients.[6,7] In another study conducted by Owolabi et al, the commonest symptoms included weakness of the lower limbs, impairment of sensation with sensory level and sphincteric disturbance.[8]

Etiology

A total 29.33 percent of the patients had acute inflammatory demyelinating polyradiculoneuropathy as the main etiologic factor, while 26.67 percent of the patients and 21.33 percent of the patients had tuberculosis and hypokalemic periodic paralysis as the main etiologic factor. Acute transverse myelitis and cerebrovascular accident was the main etiologic factors in 9.33 percent of the patients each. In a study conducted by Vaishav et al, tuberculosis the etiologic factor in 47.5 percent of the patients while ATM and AIDP were seen in 32.5 percent and 20 percent of the patients respectively.[6]

In the studies conducted by Chaurasia et al, Scrimgeour et al and Owolabi et al, tuberculosis was the etiologic factor in 33.33 percent, 54 percent, and 44.4 percent of the patients with acute onset non-traumatic paraparesis.[8-10]

Incidence of ATM, in a study conducted by Chaurasia et al, was found to be 13.1 percent. In their study, a majority of the cases with ATM had primarily viral or post-infectious myelitis. This was confirmed by various biochemical investigations on CSF and blood. The remaining cases were diagnosed as idiopathic ATM.10

In another study conducted by Rajendra et al, transverse myelitis was the commonest cause of paraplegia accounting for 60%, followed by TB spine 20%, spinal neoplasm and disc prolapse 3.33% each. In studies reported in the developing nations, tuberculosis was the leading cause of paraplegia accounting for between 29.69 and 47% cases.[7,11-14]

MRI findings

MRI was done in 93.33 percent of the patients. Among these patients, compressive myelopathy was seen in 53.33 percent of the patients while non-compressive myelopathy was seen in 26.67 percent of the patients. Normal MRI findings were seen in 13.33 percent of the patients. An MRI of spine clinched the diagnosis in most cases and helped in confirming compressive lesions of the spinal cord. In a study conducted by Vaishnav et al, 50 percent cases had compressive myelopathy while 30 percent had non-compressive myelopathy as brought out by the MRIs. 10 percent cases had normal MRI of spine while the remaining 10 percent did not undergo an MRI as they were already diagnosed with the help of other investigations. Availability of MRI for cases in the present study was very important for diagnosis, as in similar studies carried outelsewhere and/or in earlier times, unavailability of MRI equipment or the patient's financial constraints led to a few patients remaining undiagnosed at the end of all other investigations.[6]

Outcome

Outcome was evaluated at 3 months.

Overall death occurred in 2 patients (2.67 percent) while improvement occurred in 55 patients (73.33 percent). Worsening of the condition occurred in 7 patients (9.33 percent) while condition remained static on follow-up in the remaining 11 patients (14.67 percent). Among the 20 tuberculosis patients, death occurred in 1 patient (5 percent) while improvement occurred in 80 percent of the patients. Condition worsened and remained static in 10 percent and 5 percent of the patients respectively. Among the 7 acute transverse myelitis patients, improvement occurred in 100 percent of the patients. Among the 22 acute inflammatory demyelinating polyradiculone-uropathy patients, improvement occurred in 86.36 percent of the patients. Condition worsened and remained static in 9.09 percent and 4.55 percent of the patients respectively. Among the 16 hypokalemic periodic paralysis patients, improvement occurred in 37.5 percent of the patients. Condition worsened and remained static in 6.25 percent and 56.25 percent of the patients respectively. Among the 7 patients with cerebrovascular accident, death occurred in 1 patient (14.29 percent) while improvement occurred in 71.42 percent of the patients. Condition worsened in 1 patient (14.29 percent). Scrimgeour in their study, reported that mortality occurred in 12 percent of the patients. In tuberculosis patients, in their study, death occurred in 11.1 percent of the patients.[15]

The burden of tuberculosis is enormous in India. Approximately 1-2% of all tuberculosis patients have skeletal system involvement. The vertebral column is the most common site accounting for nearly 40% of all skeletal tuberculosis. Early diagnosis and treatment of tuberculosis of spine (Pott's paraplegia) is imperative for full recovery of the patient.[16,17] Srivastava et al studied the aetiological and clinical profile of 40 non-traumatic paraparesis and radiological correlation with newer aids of diagnosis like CT scan and MRI. Spinal tuberculosis was commonest cause (30%) of paraparesis followed by acute transverse myelitis (20%) and then by primary spinal cord tumours (10%). Incidence of paraparesis was highest (32.5%) in third decade. Backache (75%), parasthesias (62.5%) were common symptoms accompanying paraparesis. Spasticity was present in 57.5% patients. Myelography showed block in 58.5% patients. CT scan following myelography exactly delineated the primary spinal cord tumours and confirmed diagnosis in spinal TB, arachnoid cysts and other compressive myelopathies. MRI showed plaques of demyelination in two patients, and epidermoid cyst in one patient.Tuberculosis of the spine was the commonest cause of paraparesis followed by acute transverse myelitis. CT scan and MRI are important diagnostic aids in patients of paraparesis.[18] Paraparesis and its sequelae have serious and lasting effects on an affected person's life. It also has tremendous psychosocial repercussions on the patient and his/her family. Therefore, rapid diagnosis and early treatment of acute non-traumatic paraparesis are crucial determinants of long term recovery and favourable prognosis of a patient.

Thus, it becomes very important for the treating physician to be well-acquainted with various clinical presentations and diagnostic aids for paraparesis of non-traumatic origin.

Present study results compared with other studies: acute non-traumatic paraparesis - a comprehensive analysis of aetiology and clinical profile in an Indian subpopulation in which tuberculosis was found to be the most common cause and how early diagnosis improves the prognosis; and the study of clinical profile of non-traumatic paraplegia in a tertiary care hospital in North Andhra concluded tuberculosis was the commonest cause of non-traumatic paraplegia. Transverse myelitis of probable viral aetiology was the second commonest cause.[19,20]

CONCLUSION

Under the light of above obtained data, following conclusion can be withdrawn. Acute non-traumatic paraparesis is a neurological emergency. Reversible causes of acute paraplegia can be treated successfully if diagnosed early. It is important to diagnose and classify all cases into compressive and non-compressive lesions based on presenting symptoms because the management of the two differs. With early diagnosis, it can be managed medically and surgical intervention can be avoided.

ACKNOWLEDGEMENTS

Authors would like to thank department of general medicine, D. Y. Patil Hospital, Navi Mumbai, Dr. Ravindra Nath Sahay, MD-Medicine, guide and HOU (department of general medicine), and Dr. Nivedita Maulik, MD-Medicine, HOD (department of general medicine).

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Malokar SS, Kothari SV, Nadgouda OH. Study of clinical profile and outcome of patients with acute non-traumatic paraparesis. Int J Res Med Sci 2022;10:105-10.