Study of Motor Nerve Conduction Parameters in Guillain Barre Syndrome Patients of Central India

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ABSTRACT

Introduction: Guillain Barre Syndrome is a life threatening disorder with about a quarter of patients requiring admission to intensive care unit for mechanical ventilation. The diagnosis of GBS is usually made on clinical grounds, supported by features of polyneuropathy on electrophysiology and examination of the cerebrospinal fluid. The prognosis of patients depends on early diagnosis and prompt treatment because the early diagnosis aid good outcome after treatment. Electrophysiological tests are very much helpful in early diagnosis of such patients.

Material and Methods: Total 7 (4 male and 3 female) subjects from central India between 6-71 yrs of age were recruited in the study. The subjects were selected according to preset inclusion and exclusion criteria. Motor nerve conduction parameters were studied by on RMS EMG EP Mark-II machine. Parameter studies were DML, CMAP and CV from bilateral median, ulnar, tibial and peronel nerves

Results: Increased distal motor latency (DML) was seen in all patients for median, ulnar, tibial and peroneal nerves. Amplitude was decreased in all patients in B/L ulnar, tibial and peroneal nerve whereas amplitude was reduced bilaterally in (85.71%) in median nerve. Conduction velocity was reduced in median (42.85%), Ulnar (57.14%), Tibial (57.14%) and Peroneal (42.85%) of patients.

Conclusion: Motor nerve conduction study plays an important role in the early detection and characterization of inflammatory demyelinating polyneuropathy in the first week of symptoms and assumes importance in treatment of this syndrome as timely intervention reduces morbidity and disability.

Keywords: Guillain Barre Syndrome, Motor nerve conduction, polyneuropathy

INTRODUCTION

Guillain Barre Syndrome (GBS) is a condition in which there is a rapid-onset weakness of the limbs as a result of an acute polyneuropathy. The disease is usually triggered by an infection, which incites immune-mediated nerve dysfunction. During the acute phase, the disorder can be fatal requiring admission to intensive care unit for mechanical ventilation. Some patients are affected by variations in the function of the autonomic nervous system, which can lead to dangerous abnormalities in heart rate and pressure. The diagnosis of GBS is usually made on clinical grounds, supported by features of polyneuropathy on electrophysiology and examination of the cerebrospinal fluid.[1-3] The recorded incidence rates for GBS are 1–2 per 100,000 population and the the lifetime possibility of any individual acquiring GBS is 1:1000.[4-6] Incidence and and prevalent subtype of Guillain-Barre syndrome (GBS) differs geographically.[7] The prognosis of patients depends on early diagnosis and prompt treatment because the early diagnosis aid good outcome after treatment.[8]

Electrophysiological tests are very much helpful in early diagnosis of such patients. Although literature is available regarding the prevalence of clinical GBS and diagnostic utility of electrophysiological tests in GBS, it is insufficient in Indian context. Therefore, the present study is designed to find out the motor nerve conduction profile of GBS patients among GBS patients attending a rural hospital in Central India.

MATERIAL AND METHODS

Study Design: The study included all age group subjects residing in rural area of Wardha (Central India). The study was approved by the Institutional Ethics Committee and written informed consent was obtained from each study participant.

Study population and sample size: The study was conducted on 7 clinically diagnosed patients of Guillian Barre Syndrome referred to us from the department of Medicine and Paediatrics. All the subjects were asked detailed history and thorough clinical examination was documented.

Inclusion criteria: Clinically diagnosed GBS patients of all age groups and of both genders were included in the study.

Exclusion criteria:

- Those patients with cardiac pacemakers or cardiac pathology
- Myelopathy, Myopathy and Neuromuscular junction disorders like myasthenia gravis.

Procedure and instruments: The present study was performed on RMS EMG EP Mark-II machine in the Clinical Neurophysiology Unit, Department of Physiology, and MGIMS Sevagram. All tests were performed by the same investigator and under constant room temperature (30^0C) to shortlist the errors. History and clinical examination were recorded in structured format.

Electrophysiological Evaluation of Gullian Barre Syndrome

a) Motor Nerve Conduction Studies

Motor nerve conduction studies (MNCS) involve stimulation

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of motor nerve at two different sites with maximum stimulus and calculation of conduction velocity. Nerves tested were median, ulnar, tibial and peroneal nerves. Setting was kept at sweep speed 5 ms/D, intensity 2 mV, frequency 2 Hz, filter between 2 Hz to 5 Hz and stimulus strength duration was 100 µs.

RESULTS

We recruited 7 clinically diagnosed patients of GBS in our study. Out of this 4 (57.14%) were male and 3 (42.85%) were female. The youngest patient was 6 years of age whereas the eldest patient was 71 years of age.

Distal motor latency: Increased distal motor latency (DML) was seen in all (100%) of the patients for both ulnar and median nerves. In lower limbs, increased distal motor latency was seen in bilateral tibial and peroneal nerves in all the patients.

Conduction velocity and amplitude: Amplitude was decreased in all patients in B/L ulnar, tibial and peroneal nerve whereas amplitude was reduced bilaterally in (85.71%) in median nerve. Conduction velocity was reduced in median (42.85%), Ulnar (57.14%), Tibial (57.14%) and Peroneal (42.85%) of patients.

DISCUSSION

The Guillain-Barre syndrome (GBS) is an acute inflammatory demyelinating essentially motor polyradiculo-neuropathy. GBS is a selflimiting disorder, nonetheless, up to 30% of the patients may require temporary artificial ventilation; about 15% become disabled and mortality is likely to be up to 5%. Hence, GBS must be considered as a serious disease. Plasma exchange (PE) and recently high dose immunoglobulin's have been found to be successful in curtailing the duration of the disease, the duration of artificial ventilation and to improve outcome at 6 months.[9] The prognosis of the patients is dependent on the early diagnosis and prompt treatment. Electrophysiologic studies are very useful in diagnosis and differentiation of demyelinating variety of GBS which responds better to treatment and has a good prognosis. Electrophysiological findings of early demyelination include increased distal motor latencies, prolonged or absent F wave latencies mainly in the lower limbs, decreased motor conduction velocities or conduction block with absent F wave, and abnormal upper extremity sensory nerve action potential as compared to the sural nerve.[10,11]

Our study results are in accordance with that of Ropper et al. They studied 41 patients of GBS who had undergone electro-diagnostic studies within a week of onset of symptoms, 16 patients had abnormalities of compound muscle action potentials including dispersion, delayed latency, low amplitude, conduction velocity slowing, conduction block or abnormal F-waves. Similar results have been reported by Clouston et al.[12,13]

Gender	No of patients	Percentage (%)
Male	4	57.14
Female	3	42.85
Total	7	100

Table-1: Gender wise distribution of patients

CONCLUSION

The global incidence of Guillain Barre Syndrome has been estimated to be 1 to 2 per 100,000 populations. It is a life threatening disease if prompt diagnosis and treatment is not done. Electro-diagnostic techniques plays an important role in the early detection and characterization of inflammatory demyelinating polyneuropathy in the first week of symptoms and assume importance in treatment of this syndrome because timely intervention reduces morbidity and disability.

REFERENCES

1. Asbury AK and Cornblath DR. Assessment of Current Diagnostic Criteria for Guillain-Barré syndrome. Ann Neurol. 1990; 27(suppl):S21-4.
2. Cornbalth DR. Electrophysiology in Guillain-Barré syndrome. Ann Neurol. 1990;27(suppl):S17-20.
3. Albers JW and Kelly JJ. Acquired inflammatory demyelinating polyneuropathies: clinical and electrodiagnostic features. Muscle Nerve. 1989;12:435-51.
4. Chiò A, Cocito D, Leone M, Giordana MT, Mora G, Mutani R. Guillain–Barré syndrome: A prospective, population based incidence and outcome survey. Neurology. 2003;60:1146–50.
5. Hughes RA, Rees JH. Clinical and epidemiologic features of Guillain–Barré syndrome. J Infect Dis. 1997;176:S92–8.
6. Willison HJ. The immunobiology of Guillain–Barré syndromes. J Peripher Nerv Syst. 2005;10:94–112.
7. Samira Yadegari, Shahriar Nafissi, Neda Kazemi. Comparison of electrophysiological findings in axonal and demyelinating Guillain-Barre syndrome. Iran J Neurol. 2014;13:138-143.
8. Sharma Geetanjali, Sood Sushma and Sharma Sudhir. Early Electrodiagnostic Findings of Guillain Barre Syndrome. J Neurol Neurophysiol. 2013;4:1000142.

NCS parameters	Median Nerve		Ulnar Nerve		Tibial Nerve		Peroneal Nerve	
	Right	Left	Right	Left	Right	Left	Right	Left
Distal motor latency (DML)	8.76± 5.26	6.29 ± 1.71	7.89 ± 3.66	6.14 ± 1.59	12.27 ± 3.87	10.34 ± 3.02	11.54 ± 3.57	10.31 ± 2.67
Compound motor action potential (CMAP)	2.57 ± 2.26	3.36 ± 2.30	1.7 ± 0.97	1.54 ± 1.00	1.88 ± 1.37	2.32 ± 1.38	2.5 ± 1.66	1.18 ± 1.09
Conduction Velocity (CV)	49.36 ± 17.43	61.46 ± 11.32	51.89 ± 18.71	61.04 ± 7.47	37.91 ± 6.69	43.36 ± 8.69	39.17 ± 9.39	43.43 ± 4.71

Table-2: Distribution of Motor nerve conduction Parameters in study subjects

9. Jan Meulstee. Electrodiagnostic studies in Guillain-Barre syndrome. 1994.13-14.
10. Nadir ZK, Narullah M. Electrodiagnostic study of 40 cases presenting as Guillain Barre Syndrome. Pak J Neurol. 1998;4:50-54.
11. Sharma Geetanjali, Sood Sushma, Sharma Sudhir. Early Electrodiagnostic Findings of Guillain Barre Syndrome. J Neurol Neurophysiol. 2013;4:1.
12. Ropper AH, Wijdicks EF, Shahani BT. Electrodiagnostic abnormalities in 113 consecutive patients with Guillain-Barré syndrome. Arch Neurol. 1990;47:881- 887.
13. Clouston PD, Kiers L, Zuniga G, Cros D. Quantitative analysis of the compound muscle action potential in early acute inflammatory demyelinating polyneuropathy. Electroencephalogr Clin Neurophysiol. 1994;93: 245-254.

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