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Original Article

Guillain-Barre Syndrome in North-Eastern population of Bangladesh: Electrophysiologic Pattern from the largest local cohort

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Abstract:

Objective: To determine the pattern of electrophysiologic findings in Guillain-Barre Syndrome (GBS) patients in north-eastern Bangladeshi population.

Methods: This observational study was carried out at neurophysiology laboratory in a specialized center of Sylhet with the diagnostic facility for nerve conduction study, from July 22- July 2024, Total patient was 248. Data were collected from the patients who underwent NCS with a provisional diagnosis of GBS.

Result: A total of 248 patients, mean age of 43 ± 13.24 years and a slightly male dominance (57.4%) were evaluated. Alost half of the patients (43%) reported a preceding diarrheal illness. Ascending motor paralysis was observed in majority of the patients (86%), and 2% were identified as Miller Fischer variant. In the nerve conduction study, majority (36.7%) were found to have motor Axonal polyneuropathy involving both Peroneal nerves, followed by Motor Sensory Axonal Polyneuropathy among 34.3%. Acute motor axonal polyneuropathy (AMAN) was the most frequent subtype (60.9%), followed by Acute motor sensory axonal polyneuropathy (AMSAN) in 34.3% and Acute inflammatory demyelinating polyneuropathy (AIDP) in only 4.8%.

Conclusion: GBS might have some regional variations despite having the demographic as well as clinical similarity. With AMAN being the predominant subtype, AIDP is much less common in north eastern Bangladeshi population.

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Introduction:

Guillain-Barré syndrome (GBS) is an acute, mostly fulminant polyradiculoneuropathy that manifests with symmetrical muscle weakness with or without sensory symptoms and signs, resulting from immune-mediated nerve damage[1,2]. Electrodiagnostic studies helps in classifying the disease which also have prognostic implications[2]. The electrophysiologic evidence of loss of axon or myelin not only have immunologic implications but also have subsequent therapeutic decision making and prognosis of the patient.

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An insight into electrophysiologic pattern of GBS for Bangladeshi population has already been provided by Badrul Islam et al[1]. But the cohort in that study was taken only from in tertiary hospital in Dhaka city which might not reflect the regional variation in disease pattern. The International GBS Outcome Study (IGOS) has provided enough evidence that factors related to geography have a major influence on clinical phenotype, disease severity, electrophysiological subtype, and outcome of Guillain-Barre ´ syndrome[3]. This IGOS group had classified three regional patterns; namely European/ American, Asian and Bangladeshi. It is well recognized that acute inflammatory demyelinating polyneuropathy (AIDP) variant is frequent in Europe and the USA, whereas, acute motor axonal polyneuropathy (AMAN) in Asia[3].

But they did not sub classify the pattern in different regions of Bangladesh[3].

Mathew et Al have shown the influence of climate on occurrence of GBS[4]. There has been variation in climate in north eastern part of Bangladesh from the rest[5]. So, in this study we tried to explore the regional pattern of GBS in north eastern part of the country.

Methods:

Patient

This study included a cohort of 248 GBS patients presenting between July 2022 to June 2024 in a tertiary care hospital in Sylhet, Bangladesh (Mount Adora Hospital). All patients who matched the inclusion criteria were enrolled. Informed written consent was taken and ethical approval were obtained from institutional review board. Each patient was reviewed by the first author. Relevant history and proper physical examination was done. Later the patients were finally evaluated and classified by consultant neurologist. A diagnosis of GBS was made according to the National Institute of Neurological Disorders and Stroke criteria for GBS[6,7]. Clinical and electrophysiologic data were recorded according to standardized protocol.

Nerve conduction Studies (NCS)

NCS was done using a standardized protocol on one side, using a Cadwel EMG system (USA). Motor nerve study and F waves analysis with 10 distal stimuli were recorded for the median nerve (wrist and elbow elbow-abductor pollicis brevis muscle), ulnar nerve (wrist, below elbow, above elbow-abductor digiti minimi), Deep branch of fibular nerve (below head of Fibula, popliteal fossa- extensor digitorum brevis muscle), and tibial (ankle, popliteal fossa-abductor hallucis muscle). antidromic Sensory nerve study was evaluated in the median nerve (wrist-second digit), ulnar nerve (wrist-fifth digit), and sural nerve (at lower lateral calf-behind lateral malleoli). Amplitude, area, duration of negative portion of compound muscle action potential (CMAP), distal motor latency (DML), motor conduction velocity (MCV) per segment, F-latency, amplitude of the negative portion of the sensory nerve action potential (SNAP). Cut-off values of different parameters were defined according to the requirements for each criteria. Criteria of Hadden and Uncini, requirements evaluated as ''at least one of the following in at least two nerves" was interpreted where relevant feature was to be present in at least two nerves.

Data interpretation and Analysis

Demographic information and disease profile were assessed properly. Data analysis was performed with the help of Statistical Package for the Social Sciences (SPSS) version 19. Appropriate statistical methods were applied for data analysis. We compared different variables with 95% confidence interval (CI) where p value $\leq 0.05$was considered as significant.

Results:

Table-1: Demographic and clinical features of the GBS patients (N= 248)

Demographic/Clinical Feature	Value/ Percentage
Age	
Mean	43 ± 13.24 years
Gender	
Male	52.4
Female	47.6
Preceding Illness	
Diarrheas	43%
Respiratory Infection	14%
Presentation at onset	
Ascending paralysis	86%
Descending paralysis	12%
Miller Fischer	2%
Autonomic dysfunction	13%
Cranial Nerve deficit	56%
Sensory deficit	7%

The study included a cohort of 248 GBS patients, with mean age of 43 ± 13.24 years and a slightly male dominance (57.4%) (Table-1). All most half of the patients (43%) reported a preceding diarrheal illness while only 14% had respiratory infection. Ascending type of motor paralysis was observed in majority patients

(86%), whereas only 12% had a descending pattern and 2% were identified as Miller Fischer variant (Table-1). More than half of the patients had associated cranial nerve palsy, while only 13% had autonomic dysfunction and 7% had objective sensory deficit (Table-1).

Table-2: Findings in nerve conduction studies (N= 248)

Findings	Percentage
Motor Sensory Axonal Polyneuropathy	34.3%
Left Peroneal Motor Neuropathy	1.2%
Motor Neuropathy involving both Peroneal nerves	2.4%
Motor Axonal polyneuropathy involving both Peroneal nerves	36.7%
Bilateral Axonal Peroneal Neuropathy	12.9%
Demyelinating Motor Neuropathy	4.8%
Motor Axonal Polyneuropathy	8.5%

In the nerve conduction studies, majority (36.7%) were found to have motor Axonal polyneuropathy involving both Peroneal nerves, followed by Motor Sensory Axonal Polyneuropathy among 34.3% (Table-2). Bilateral Axonal Peroneal Neuropathy (12.9%), Motor Axonal Polyneuropathy (8.5%), Demyelinating Motor Neuropathy (4.8%), Motor Neuropathy involving both Peroneal nerves (2.4%), Left Peroneal Motor Neuropathy (1.2%) were also reported (Table-2).

Table-3: Electrophysiologic types of GBS (N= 248)

Findings	Percentage
Acute inflammatory demyelinating polyneuropathy (AIDP)	4.8%
Acute motor axonal polyneuropathy (AMAN)	60.9%
Acute motor sensory axonal polyneuropathy (AMSAN)	34.3%

Acute motor axonal polyneuropathy (AMAN) was the most frequent subtype (60.9%), followed by Acute motor sensory axonal polyneuropathy (AMSAN) in 34.3% and Acute inflammatory demyelinating polyneuropathy (AIDP) in only 4.8% (Table-3).

Discussion:

This is the only study reporting a GBS cohort from North Eastern part of Bangladesh. We have found a considerable difference in several characteristics of GBS patients in North Eastern region than the data reported from the center. Although the demographic characteristics are similar to the reports of Islam B et al[1], Hossain et al[2], Islam MR et al[8]. But there was considerable difference in history and clinical presentation across different studies conducted in Bangladesh.

Our reports coincided more with the findings of Islam B et al[1]. Out cohort had a H/O of preceding diarrheal illness among almost half of the patients whereas Islam MR et al[8] reported only among one third of the patients. Similarly, the percentage of patients presenting with ascending paralysis were two times higher than those of the above mention study. This might be attributable to the lower number of study population and selection bias from a single center. The pattern of cranial nerve involvement, autonomic dysfunction and sensory involvement were more or less similar across different studies.

In line with the reports of largest cohort of GBS patients of Bangladesh, AMAN was the commonest subtype of GBS in North Eastern population[1]. But surprisingly enough, Hossain et al[2] and Islam MR et al[8] reported a higher burden of AIDP (51% AND 54%) in their cohort. The probable explanation would again be center specific selection bias and much smaller number of the study population.

In this study, electrophysiologic pattern of nerve involvement were also investigated and reported. Motor Axonal polyneuropathy involving both Peroneal nerves were the commonest electrophysiologic sign of involvement. But other studies have not reported this specific signs of involvement.

This study has some limitations. The major limitation would be lack of involvement of all

the regional clinics. Secondly, there was no long term follow up data. But this is the only study that focused on specific regional population which the actual strength of the study along with the considerable number of GBS patients in the cohort.

Conclusion:
Although the demographic and clinical presentations are similar, GBS might have some regional variations. There are some variations in preceding history and mode of clinical presentations in different reported studies. Similar to the largest reported cohort AMAN was the predominant subtype, while AIDP is much less common in north eastern Bangladeshi population.

Conflict of interest: This research project was not funded by any group or any institution and there was no conflict of interest.

Authors Contribution:
Rahat Amin Chowdhury was involved in planning the study, setting the methodology, performing NCS and data collection for this study. ATM Hasibul Hasan was involved in data analysis, interpretation and manuscript writing. Others involved in consultation and data collection. All the authors have read and approved the manuscript.

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