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Original Article

Frequency, Age, Gender Distribution, and Seasonal Variation of Guillain-Barre Syndrome in a Province of Pakistan: A Retrospective Study

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ABSTRACT

Characterized by the sudden onset of muscle weakness, Guillain-Barré Syndrome (GBS) is a rare autoimmune disorder which can progress to paralysis. GBS has different subtypes based on the clinical and electrophysiological characteristics, including acute inflammatory demyelinating polyradiculoneuropathy (AIDP), axonal GBS (AMAN and AMSAN), and Miller Fisher Syndrome (MFS). **Objective:** To study frequency of the disease in Khyber Pakhtunkhwa. **Methods:** In this retrospective study, medical records of 39 patients diagnosed with GBS at Lady Reading Hospital Peshawar, Pakistan, were analyzed to determine the prevalence of GBS subtypes in the country. **Results:** The results showed that the most prevalent subtype of GBS was AMAN, accounting for 59% of cases, followed by AMSAN at 25.6%, and AIDP at 15.3%. The axonal variety made up 84.6% of the total GBS cases in this study. On average, the patients with AMSAN were 39.2 years old, while patients with AMAN and AIDP were relatively younger, with mean ages of 30 and 28 years, respectively. There was a male predominance in all subtypes except for AIDP, which showed equal distribution. **Conclusions:** These findings provide valuable information on the distribution of GBS subtypes in Peshawar, Pakistan, which may have implications for the diagnosis and management of GBS in the country. Additionally, the study's results can contribute to the global understanding of GBS epidemiology and may help improve the diagnosis and treatment of GBS patients worldwide.

INTRODUCTION

Affecting the peripheral nervous system, GBS is a rare autoimmune disorder that has the potential to be life-threatening. It also affects the peripheral nervous system, causing muscle weakness, numbness, and in severe cases, paralysis [1]. The pathophysiology of GBS involves the immune system attacking the myelin sheath that surrounds the nerves, leading to demyelination and axonal damage [2]. Electrophysiological studies have been instrumental in comprehending the underlying mechanisms of GBS and in diagnosing and monitoring the disease [3]. Nerve conduction studies (NCS) and electromyography (EMG) are commonly used to assess the severity and distribution of nerve damage in GBS [4]. GBS is a worldwide disease with a reported incidence ranging from 0.4 to 4 cases per year for every 100,000 population [5]. However, the prevalence of GBS varies across different regions and populations [6]. Various reports have suggested that genetic, environmental, and infectious factors may play a role in the variability in GBS prevalence [7-9]. GBS has been associated with various infectious agents, including *Campylobacter jejuni*, cytomegalovirus, and Zika virus [10, 11]. Additionally, the implication of the pathogenesis of GBS has been attributed to the presence of specific antibodies against gangliosides [12, 13]. Understanding the epidemiology of GBS is crucial for effective management and prevention strategies [9]. Recent efforts have been made to refine the diagnostic criteria for GBS, including the development of the Brighton criteria and the GBS Classification Group criteria [14]. Treatment options for GBS include immunomodulatory

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therapies, such as intravenous immunoglobulin and plasma exchange, which have been shown to improve outcomes in patients [3, 15].

METHODS

Neurophysiological data of patients diagnosed with GBS and referred to the Neurophysiology Department at Lady Reading Hospital in Peshawar over a year-long period was collected. Specifically, we retrospectively analyzed the data from September 2017 to August 2018. The data about the age, sex and season of illness were also obtained. All these patients underwent a Standard Electrodiagnostic study utilizing surface electrodes and simulator for NCS. Standard antidromic sensory and motor NCS were performed. Median, ulnar and sural sensory nerves were selected whilst median, ulnar, tibial and peroneal nerves were selected for motor studies. Standard parameters including amplitude, compound muscle action potential (CMAP), distal latency, nerve conduction velocity (NCV), conduction block (CB), and temporal dispersion (TD) were measured. In sensory nerves, sensory nerve action potential (SNAP) and peak latency with NCV were evaluated. After reviewing the medical record of the GBS patients, patients with normal (n = 3) or near normal (n = 1) electrophysiological results were excluded. Patients with miller fisher syndrome and pure sensory axonal neuropathy were also excluded. Three groups were formed to classify the cases: AMAN, AIDP and AMSAN. Albers and Kelly criteria was used to diagnose AIDP [6].

RESULTS

The study comprised 39 patients, out of which, 26 (67%) were male and 13 (33%) were females. The mean age was 31.82, with a minimum age of 15 years and the maximum being 60 years. Based on electrodiagnostic criteria, 39 patients were grouped into AMAN (n=23, 59%), AMSAN (n=10, 25.6%) and AIDP (n=6, 15.3%) (Figure 1).

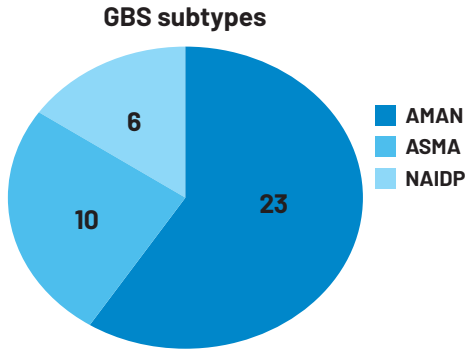

Figure 1: Pie chart showing frequency of GBS subtypes: AMAN, AMSAN, and AIDP

Patients with the AMAN group had reduced CMAP amplitudes with normal SNAPs. The results of median nerve conduction study among the different subtypes of GBS are summarized in Table 1. Patients with AIDP show prolonged distal motor latencies and slower conduction velocities compared to AMAN. The CMAP amplitudes are almost same in the two groups. Three AIDP patients showed conduction block and abnormal temporal dispersion. AMAN patients showed greater SNAP amplitudes. Four of the AIDP patients showed abnormal sensory nerve conduction which was normal in all the AMAN patients (Table 1).

Table 1: Comparison of means of Median nerve conduction study in patients with AMAN and AIDP

Motor	AMAN	AIDP
Distal latency (ms)	3.08	5.83
Conduction velocity (m/s)	50.32	35
CMAP Amplitude (mV)	3.04	2.9
Sensory	-	-
Conduction velocity (m/s)	60	43.2
SNAP Amplitude (uV)	31.24	19.2

Out of 39 patients, 26 (67%) were male and 13 (33%) females. Table shows the subdivision of different types of GBS based on gender. Among the AMAN group, 65% were male, 35% female. In AMSAN group, 80% were male and 20% female. In AIDP subtype, male and female were 50% each (Figure 2).

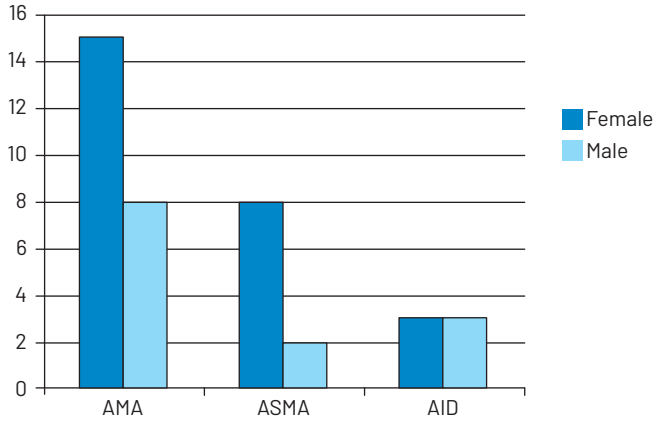

Figure 2: Gender wise distribution of subtypes of GBS

The mean age was 32, with a minimum age of 15 years and the maximum being 60 years. Table 2 shows age wise division of GBS subtypes. Among the AMAN group, the mean age was 30, AMSAN 39 and AIDP 28 years of age (Table 2).

Table 2: Age wise distribution of GBS subtypes

	Motor	AMAN	AIDP
All patients	30	39.2	28
Male	29	39	28
Female	31	40	28

Seasonal preponderance was found. 13 (33%) cases were diagnosed in spring (March to May), 12 (31%) in autumn (September to November), 7 each in (18%) in summer (June

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to August) and winter (December to February) (Figure 3).

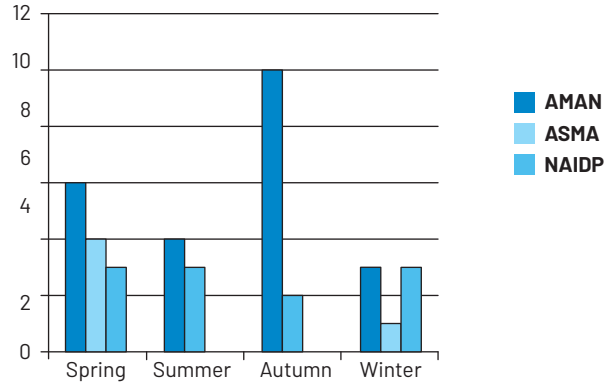

Figure 3: Seasonal variation of GBS subtypes

DISCUSSION

In our study, we evaluated 39 patients with Guillain-Barré Syndrome (GBS). There were twice as many males as there were females (2:1), which is in line with previous studies indicating a higher incidence of GBS among males [16]. On average, the patients were 31.8 years at the time of onset, which is relatively young compared to the increasing incidence of GBS with age observed in North America and European countries [17]. In terms of GBS subtypes, male predominance was observed in both AMAN and AMSAN groups. However, among AIDP patients, the male to female ratio was 1:1. Patients with AMSAN had a higher mean age compared to other forms, while AMAN and AIDP had a lower mean age. These findings correlate with previous studies, which demonstrated an increased incidence of AMSAN in the aged population [18]. In terms of age, there was no significant difference between genders among GBS subtypes. GBS is a heterogenous disorder with several subtypes, including AIDP, AMAN, and AMSAN [19]. The subtypes exhibit striking geographical variation, with AIDP more common in Europe and North America (69% demyelinating vs. 3% axonal, 23% equivocal) [20]. In our study, axonal variants (AMAN followed by AMSAN) were more frequent than the demyelinating pattern. Thus, the frequency of axonal-type GBS in Khyber Pakhtunkhwa is comparable to that reported in other Asian countries such as Iran, India, China, and Japan [18-21]. Jacobs *et al.*, reported 31% axonal vs. 46% demyelinating in Pakistan, and our study also found a higher frequency of the axonal variant compared to the Western population. There is also seasonal variation in GBS, with clustering of cases observed in autumn and spring in our study (64% of the total cases, mostly axonal variants). This is likely due to the increased frequency of viral and upper respiratory infections during these seasons. One study conducted in Iran showed increased prevalence in autumn and winter [18]. The difference in seasonal variation may be since cases sought opinions in different tertiary care hospitals. Thus, to determine the precise seasonal variations of GBS, multicentre studies are required. In a study by Ansari *et al.*, 64 patients diagnosed with GBS were evaluated. The male to female ratio was 1.8:1, which is similar to our findings. However, the mean age of GBS onset in their study was 45 years, which is higher than our study [22]. Another study evaluated 187 patients with GBS. Their findings showed a male to female ratio of 1.3:1, which is lower than our study. Additionally, they found that the mean age of GBS onset was 51 years, which is much higher than both our study and the study by Koga *et al.*, [23]. Overall, these studies demonstrate that the incidence, male to female ratio, and mean age of GBS onset can vary depending on the population being studied.

CONCLUSIONS

The axonal variant of GBS was more frequent than demyelinating variety as shown in the studies performed in Asian countries. Our study demonstrated the frequency, age and sex distribution similar to the previous studies. Seasonal variation was noted among the different types of GBS.

Conflicts of Interest

The authors declare no conflict of interest.

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