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GUILLAIN-BARRE' SYNDROME: A REVIEW OF CLINICAL SPECTRUM AND DIAGNOSTIC PITFALLS

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Abstract

Introduction:
Guillain-Barre' syndrome is a rare, monophasic autoimmune neurological disorder that can be life-threatening. It mainly affects peripheral nerves. It is often characterized by symmetric ascending weakness, motor dysfunction, and occasionally can be pure sensory.

Objectives:
This study aimed to analyze the clinical features of Guillain-Barre' syndrome i.e. most common variant, antecedent infections, comorbidities, and treatment, etc.
Besides the nerve conduction studies test performed and the most common nerves were reviewed. Additionally, diagnostic pitfalls were examined based on clinical or electrophysiological evaluations. Plasma exchange was also observed as a pitfall.

Method:
This descriptive cross-sectional study was conducted at the Neurology Departments of Hayatabad Medical Complex and Lady Reading Hospital, along with several neurophysiological diagnostic centers in Peshawar. Participants with Guillain-Barré Syndrome were recruited during their third or fourth session of Plasmapheresis.

Results:
In a study of 75 GBS patients, 57.3% were male and 42.7% female. The most common variant was AMAN (53.3%), followed by AIDP (24.0%) and AMSAN (17.3%), with rare cases of Sensory GBS, AMCBN, and SAIDP. Dysphagia occurred in 10.7%, and respiratory distress in 25.3%. Comorbidities included hypertension (13.3%) and diabetes (8.0%). Plasmapheresis was the primary treatment (92.0%), with minimal use of IVIG. Diagnosis was delayed in 36.0% and misdiagnosed in 14.7%. Antecedent infections, mainly gastrointestinal (38.7%), were found. Upper limb motor nerves were affected in 48.0%, lower limb in 84.0%, and sensory involvement in 36.0%. Mild to moderate improvement was seen in 62.7%, with respiratory compromise (12.0%) and hemodynamic effects (18.7%).

Conclusion:
Our study found that Guillain-Barré Syndrome occurred slightly more often in men than in women, with gastrointestinal and upper respiratory infections

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being the most frequent precursors. Early treatment significantly improved outcomes. Moreover, GBS presented significant pitfalls in diagnosis that included delayed diagnosis usually due to patient-related factors, and misdiagnosis resulting from GBS mimicry.

INTRODUCTION:

CLINICAL MANIFESTATION OF GBS:

Guillain-Barré Syndrome (GBS) is a rare immune-mediated neuropathy often triggered by infections. It presents with acute flaccid paralysis, starting as tingling in the extremities and progressing to symmetric limb weakness. Early signs include hyporeflexia or areflexia, with severity ranging from mild weakness to complete paralysis, potentially causing respiratory failure or bulbar involvement.(1)

DIAGNOSTIC PITFALLS IN GBS:

Diagnosing Guillain-Barré Syndrome (GBS) is difficult due to its varied symptoms, overlap with other conditions, and limits of tests like nerve studies and spinal fluid analysis. Atypical signs, such as preserved reflexes, uneven weakness, or nerve pain, can delay diagnosis. GBS often mimics disorders like CIDP or myasthenia gravis, requiring careful differentiation. Misclassification of subtypes, like axonal forms mistaken for AIDP, adds complexity. Delayed diagnosis can postpone treatment, while therapies like plasmapheresis carry risks such as DVT or heart issues, ememphasizing the need for close monitoring.(2)(3)(4)(5)

MATERIALS AND METHODS:

This descriptive cross-sectional study was conducted in the Neurological departments of Hayatabad Medical Complex (HMC), Lady Reading Hospital (LRH), and diagnostic centers in Peshawar, Pakistan, from July to October 2024. Using non-probability convenience sampling, we calculated a sample size of 67 based on previous GBS studies and prevalence rates, which was increased to 75 to avoid under-power analysis. Our study included individuals of all ages and genders, with patients assessed based on medical history, clinical examination, and electrophysiological tests.

Exclusion criteria included individuals with poliomyelitis, botulism, toxin neuropathy, demyelinating disorders, diabetic neuropathy, spinal cord lesions, or other causes of flaccid paralysis.

RESULTS

Demographics And Variants Of GBS:

The total number of patients examined during this study were 75. Among these, there were 43 males (57.3%) and 32 females (42.7%) of the total sample size. The mean age of patients was 47.27 . The youngest patient we observed was 2 years old and the oldest one was 86 years of age. The highest frequency of GBS patients was found in Peshawar making 33.3% followed by swat having the frequency percentage of 18.7%. Lowest ratio noticed in D-I-Khan and Swabi.The most common variant of GBS observed was acute motor axonal neuropathy (AMAN) in 53.3% of patients, followed by acute inflammatory demyelinating polyradiculoneuropathy (AIDP) in 24.0%, and acute motor-sensory axonal neuropathy (AMSAN) in 17.3%. Rare variants included sensory GBS (2.7%), acute motor conduction block neuropathy (1.3%), and sub-acute inflammatory demyelinating polyradiculoneuropathy (1.3%). Miller Fisher Syndrome (MFS) was not reported.

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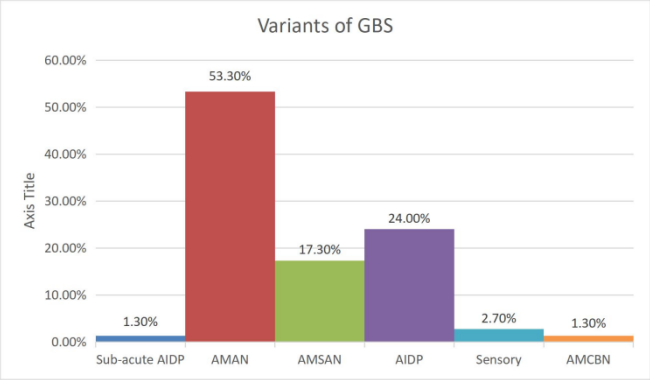


Figure 1: Variants of GBS

Antecedent Infections:

Gastrointestinal infections were most prevalent (38.7%), followed by respiratory infections (10.7%). Simultaneous GIT and respiratory infections occurred in 10.7% of cases. No infections were reported in 24.0% of patients.

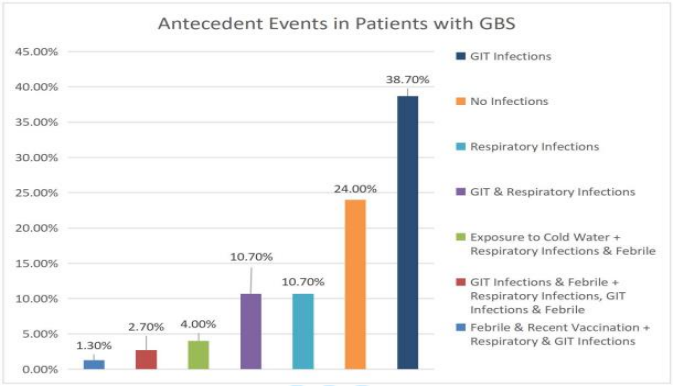


Figure 2: Antecedent Events in Patients with GBS in our Study (n = 75)

Clinical Features:

Among 75 patients, involvement of both limbs was observed in 65 patients making
86.7% the most commonly affected. However, all patients presented symmetric ascending weakness. We observed distinct reflex responses across various subtypes: overall, hyporeflexia was noted in 34 patients (45.3%), areflexia in 27 patients (36.0%), and normal reflexes in 14 patients (18.7%). Specifically, in the AMAN variant (40 patients), 15 exhibited hyporeflexia, 11 had areflexia, and 14 displayed normal reflexes. The AIDP subtype (18 patients) showed hyporeflexia in 10, areflexia in 6, and only 2 had normal reflexes. In the AMSAN group (13 patients), 8 showed hyporeflexia and 5 were areflexic, with none having normal reflexes. Among the rare Sensory GBS (2 patients), both were areflexic. The single case of Sub-Acute AIDP presented with hyporeflexia, while the AMCBN (1 patient) exhibited areflexia.Dysphagia occurred in 10.7%, and respiratory distress in 25.3%.

Comorbidities:

Among 75 patients, 57.3% had no comorbidities. Hypertension was the most common comorbidity (13.3%), followed by diabetes and a combination of diabetes with hypertension, each at 8.0%. Other comorbidities, each affecting 1.3% of patients, included jaundice, arthritis, cardiovascular disease with diabetes, chest problems, cognitive issues, hemorrhoids, post-natal edema, stroke, chronic kidney disease with diabetes, diabetes with hepatitis-C, and urinary infections.

Mild to moderated improvement observed and Treatment taken:

Plasmapheresis was the primary treatment (92.0%), with minimal IVIG use (1.3%). Mild to moderate improvement was seen in 62.7% of patients.

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Diagnostic Pitfalls: Atypical Presentations, Delayed Diagnosis,Misdiagnosis And PE:

Atypical sensory ataxia was observed in 2.67% of patients, while 97.33% showed no atypical presentation. Delayed diagnosis occurred in 50.7% of cases, with 36.0% delayed by 1 week, 12.0% by 10-15 days, and 2.7% by 3 weeks. Timely diagnosis was achieved in 49.3%. Misdiagnoses included paralysis (8.0%), body weakness (2.7%), and isolated cases of stroke, hyperuricemia, and hypoglycemia (1.3% each). Despite these challenges, 85.3% of patients had favorable outcomes. While 57.3% of patients experienced no adverse effects, 42.7% reported complications. Hemodynamic effects were the most common (18.7%), followed by respiratory compromise (12.0%). Less frequent effects included DVT from a double lumen (4.0%).

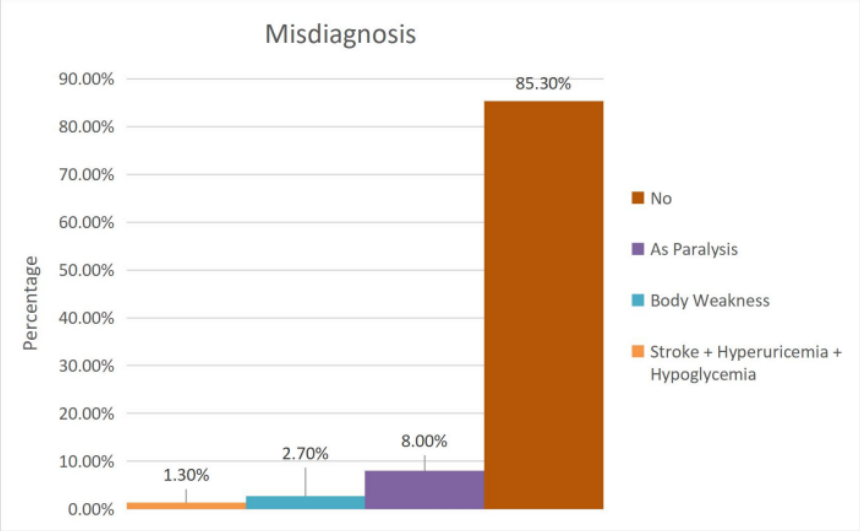


Figure 3: Misdiagnosis Observed Amongst Patients

Nerve Conduction Study/ Velocity (NCS/NCV) Findings:

Nerve conduction studies for demyelinating variants showed prolonged distal latencies, slowed conduction velocities, and normal CMAP amplitudes, while axonal variants revealed reduced CMAP amplitudes with normal latencies and conduction velocities for AMAN, and reduced CMAP and SNAP amplitudes for AMSAN. In the upper limbs, the most commonly affected motor nerves were the bilateral median and ulnar nerves (48.0%), while sensory nerves were spared in 56.0% of patients. In the lower limbs, bilateral peroneal and tibial nerves were most commonly involved (84.0%), with only 2 patients showing normal lower limb motor nerves (2.7%).

DISCUSSION

This study included slight male predominance (57.3% males, 42.7% females), and ages ranging from 2 to 86 years (mean age: 47.27). The most common variant was AMAN, followed by AIDP, while AMSAN, Sensory GBS, and AMCBN were less frequent. This aligns with Dr. Ayaz et al.'s study, though our findings placed AIDP as the second most common variant, contrasting with their classification of AMSAN. Gastrointestinal infections were the primary antecedent factor, with 18 patients

reporting no prior infection.(6)(7)Reflex responses varied across subtypes: hyporeflexia (45.3%), areflexia (36.0%), and normal reflexes (18.7%). This variability mirrors Hughes et al.'s observations, particularly in AMAN, and aligns with regional trends. Hypertension was the most common comorbidity, followed by

diabetes, similar to studies by AlKahtani et al. A significant majority (92%) of patients received plasmapheresis, with 62.7% showing improvement.(8)(9)(10)(11)Diagnostic delays occurred in 50.7% of cases, often due to misdiagnosis or lack of awareness. Atypical presentations like pure sensory GBS contributed to these delays. 57.3% of patients experienced no side effects from plasmapheresis, while 42.7% reported complications, mainly

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hemodynamic effects. Vigilant monitoring is crucial for critically ill patients undergoing treatment.(12)(13).

Study Limitations:

This study has few limitations. As this was an undergraduate study with a confined time frame, patients' follow up could not be conducted. Electromyography was also not performed. Furthermore, relatively small sample size of 75 may limit the generalizability and accuracy of the findings.

Future Research Directions:

Further, research can be performed with a large sample size and extended follow up periods, to get more clarity on GBS and its pitfalls. Additionally, raising public awareness and improving diagnostic precision could help patients receive timely and effective care for this challenging condition. Moreover, complications caused by plasmapheresis among GBS patients should be closely observed to reduce these few adverse effects too. Besides, future studies should try to investigate rare GBS variants such as AMCBN, sensory GBS, etc.

Conclusion:

In conclusion, our study found a slight male predominance (43 males vs. 32 females) and identified gastrointestinal and upper respiratory infections as the most common antecedents to Guillain-Barré Syndrome (GBS). While the exact cause remain unclear, these infections may be influenced by environmental and hygienic factors. Timely treatment initiation led to favorable outcomes. However, the heterogeneous clinical presentation of GBS posed diagnostic challenges, including delays due to patient-related factors, misdiagnosis from symptom overlap, and complications from plasmapheresis. These findings stress the need for greater awareness and improved diagnostic accuracy to enhance patient outcomes.

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