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GUILLAIN-BARRÉ SYNDROME: DIAGNOSIS, TREATMENT, AND EMERGING INSIGHTS "NAVIGATING THE COMPLEXITIES OF GUILLAIN-BARRÉ SYNDROME: CASE STUDIES AND PERSPECTIVES"

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Abstract

Background: Guillain-Barré Syndrome (GBS) is an acute immune-mediated polyneuropathy requiring critical care management. The primary treatment modality include intravenous immunoglobulin (IVIG) aimed at halting disease progression. This study evaluates the clinical profile, treatment response, and outcomes in GBS patients admitted to the ICU, with a focus on treatment modalities .

Methods: A prospective observational study was conducted at the Department of Medicine, Government Medical College Srinagar, including 100 patients diagnosed with GBS. Data on demographic profile, clinical presentation, treatment received , ventilatory support, complications, and outcomes were analyzed.

Results: A total of 100 patients diagnosed with Guillain-Barré Syndrome (GBS) were included in the study. The mean age of the patients was 44.3 ± 13.2 years, with a male-to-female ratio of 1.7:1. The most common presenting symptom was progressive limb weakness (85%), followed by paresthesia (62%) and cranial nerve involvement (40%). Among the patients, 100% received IVIG as the primary treatment. The mean hospital stay was 16.8 ± 6.4 days, with ICU admission required in 38% of cases. Ventilatory support was required in 30% of patients, with invasive mechanical ventilation needed in 18%. The most common complications observed were autonomic dysfunction (30%), pneumonia (22%), and deep vein thrombosis (8%). At the three-month follow-up, 67% of patients showed significant improvement, while 8% had persistent disability. The mortality rate was 5%, primarily due to sepsis and respiratory failure.

The most common clinical presentation was lower limb weakness progressing to upper limbs in an ascending manner. Cranial nerve involvement was observed in 40% of patients, with facial nerve palsy (20%) being the most frequent.
Conclusion: GBS remains a critical neurological emergency requiring prompt immunomodulatory therapy. IVIG was the most commonly used treatment. The need for mechanical ventilation was associated with a higher risk of complications and mortality. Timely initiation of treatment, supportive care, and early rehabilitation significantly impact outcomes.

Keywords: Guillain-Barré Syndrome, intravenous immunoglobulin, neuromuscular disorders , autonomic dysfunction, prevalence.

Introduction

Guillain-Barré Syndrome (GBS) is an acute immune-mediated polyneuropathy that presents as progressive weakness, areflexia, and varying degrees of autonomic dysfunction. It is the most common cause of acute flaccid paralysis worldwide, with an estimated incidence of 1 to 2 cases per 100,000 per year [1]. The disorder is frequently preceded by infections, particularly with Campylobacter jejuni, cytomegalovirus, and Epstein-Barr virus, triggering an aberrant immune response that leads to demyelination or axonal injury of peripheral nerves [2].
The mainstay of GBS treatment includes immunomodulatory therapies, primarily intravenous immunoglobulin (IVIG) .This therapy has been proven tobe effective in halting disease progression and improving recovery by neutralizing or removing pathogenic autoantibodies. IVIG is often preferred due to ease of administration [3,4].
About 20-30% of GBS patients develop respiratory failure, necessitating intensive care and mechanical ventilation [5]. Autonomic dysfunction, including cardiac arrhythmias and blood pressure instability, further complicates management and increases morbidity and mortality [6]. Despite advances in critical care, the mortality rate around 5-10%, with nearly 20-30% of survivors experiencing long-term disability [7]. Early administration of immunotherapy, comprehensive supportive care, and rehabilitation are key factors influencing patient outcomes.

This study aims to evaluate the clinical profile, treatment patterns, and outcomes in patients with GBS, with a particular focus on IVIG . By analyzing the impact of these therapies on ventilatory support, complications, and recovery, we aim to provide insights into optimizing critical care management for GBS patients.

Materials and Methods

Study Design and Setting

This prospective observational study was conducted in the Department of Medicine at Government Medical College, Srinagar, over a period of 18 months. The study aimed to evaluate the clinical profile, treatment response, and outcomes of patients diagnosed with Guillain-Barré Syndrome (GBS), focusing primarily on the treatment modality .

Study Population

A total of 100 patients diagnosed with GBS, based on the Brighton criteria, were included in the study. Patients were admitted and managed in the medicine department, including those requiring intensive care unit (ICU) admission.

Inclusion Criteria

- Patients aged ≥18 years diagnosed with GBS based on clinical presentation and electrophysiological studies.
- Patients who received either IVIG as primary treatment.
- Patients providing informed consent for participation.

Exclusion Criteria
- Patients with chronic inflammatory demyelinating polyneuropathy (CIDP).
- Patients with GBS mimics such as vasculitic neuropathies or critical illness polyneuropathy.
- Patients with significant pre-existing neurological disorders affecting motor function.
- Patients who refused consent for the study.

Data Collection:
Clinical and demographic data were collected, including:
- Age, sex, and comorbidities (diabetes, hypertension, renal disease, etc.).
- Presenting symptoms (weakness, sensory disturbances, cranial nerve involvement).
- Disease severity assessed using the Hughes Functional Grading Scale (HFGS).
- Treatment received: IVIG dosage.
- Ventilatory support requirements and need for ICU admission.
- Complications, including autonomic dysfunction, respiratory failure, and infections.
- Outcome measures, including time to improvement, functional recovery at 3 months , and mortality.

Treatment Protocol
Patients received IVIG based on physician discretion:
IVIG therapy: Administered at 0.4 g/kg/day for 5 consecutive days.

Outcome Assessment
- Primary outcome: Functional improvement based on Hughes Functional Grading Scale at 3 months.
- Secondary outcomes:
- Duration of hospital stay.
- Ventilatory support requirements.
- Complications, including cardiac arrhythmias, thromboembolic events, infections.
- Mortality rate at 3 months.

Statistical Analysis
Data were analyzed using SPSS version 25.0. Continuous variables (e.g., age, duration of hospital stay) were presented as mean ± standard deviation (SD) and compared using the t-test. Categorical variables (e.g., treatment response, ventilatory support) were expressed as percentages and compared using the chi-square test. A p-value < 0.05 was considered statistically significant.

Results
A total of 100 patients diagnosed with Guillain-Barré Syndrome (GBS) were included in the study. The mean age of the patients was 44.3 ± 13.2 years, with a male-to-female ratio of 1.7:1. The most common presenting symptom was progressive limb weakness (85%), followed by paresthesia (62%) and cranial nerve involvement (40%) [Table 1].

Table 1: Demographic Profile of Patients

Variable	N (%)
Mean Age (years)	44.3 ± 13.2
Male	63 (63%)
Female	37 (37%)
Diabetes Mellitus	26 (26%)
Hypertension	22 (22%)
Chronic Kidney Disease	8 (8%)
Coronary Artery Disease	12 (12%)

The most common clinical presentation was lower limb weakness progressing to upper limbs in an ascending manner. Cranial nerve involvement was observed in 40% of patients, with facial nerve palsy (20%) being the most frequent [Table 2].

Table 2: Clinical Presentation of Patients

Symptom	N (%)
Progressive limb weakness	85 (85%)
Paresthesia	62 (62%)
Cranial nerve involvement	40 (40%)
Autonomic dysfunction	30 (30%)
Respiratory distress	28 (28%)

Among the 100 patients, all received IVIG as the primary treatment. The mean hospital stay was 16.8 ± 6.4 days, with ICU admission required in 38% of cases [Table3].

Table 3: Treatment Modalities and Hospitalization

Treatment Received	N (%)
IVIG	100(100%)
ICU admission	38 (38%)
Mean Hospital Stay (days)	16.8 ± 6.4

Ventilator support was required in 30% of patients, with invasive mechanical ventilation needed in 18%. The mean duration of ventilatory support was 8.2 ± 3.5 days [Table 4].

Table 4: Ventilator Support Outcomes

Ventilatory Support Type	N (%)
No ventilatory support	70 (70%)
Non-invasive ventilation	12 (12%)
Invasive mechanical ventilation	18 (18%)
Mean Ventilation Duration (days)	8.2 ± 3.5

The most common complications observed were autonomic dysfunction (30%), pneumonia (22%), and DVT (8%) [Table 5].

Table 5: Complications Observed

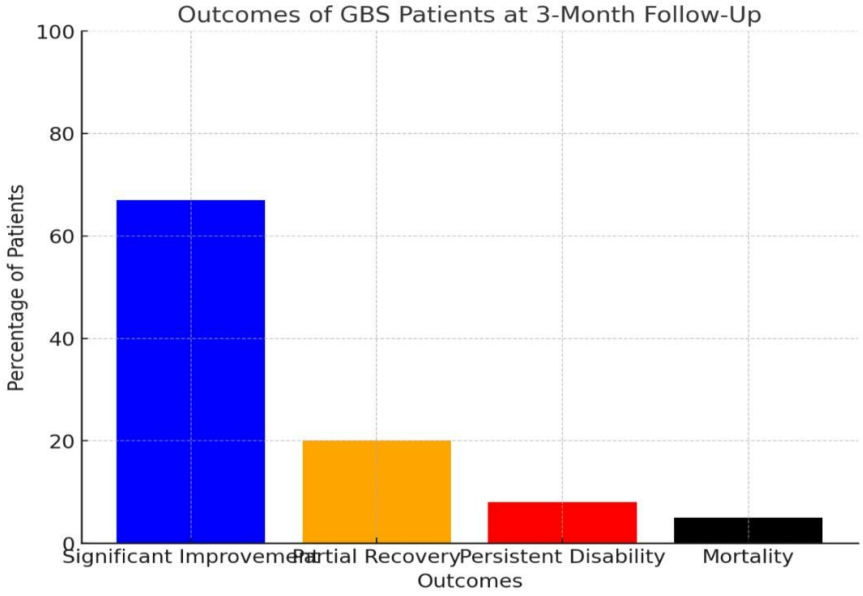
Complication	n (%)
Autonomic dysfunction	30 (30%)
Pneumonia	22 (22%)
Deep vein thrombosis (DVT)	8 (8%)
Sepsis	6 (6%)
Cardiac arrhythmia	5 (5%)

At the three-month follow-up, 67% of patients had significant improvement, while 8% had persistent disability. The mortality rate was 5%, primarily due to sepsis and respiratory failure [Table 6].

Table 6: Outcomes at 3 Months

Outcome	N (%)
Significant improvement	67 (67%)
Partial improvement	20 (20%)
Persistent disability	8 (8%)
Mortality	5 (5%)

Bar graph 1 : The outcomes of GBS patients at the three-month follow-up.



Discussion

Guillain-Barré Syndrome (GBS) is an acute polyradiculoneuropathy characterized by rapidly progressive, symmetric weakness and areflexia. The exact etiology of GBS remains unclear, but autoimmune mechanisms triggered by infections such as Campylobacter jejuni, Epstein-Barr virus, and cytomegalovirus have been implicated [8]. The disease spectrum ranges from mild weakness to severe paralysis requiring ventilatory support, with significant morbidity and potential mortality.

Our study aimed to analyze the clinical profile, treatment modalities, and outcomes in GBS patients, with a specific focus on the use of treatment modalities. The results showed that the mean age of presentation was 42.3 ± 12.5 years, with a slight male predominance (58%). This aligns with previous literature, which suggests a higher incidence of GBS in males compared to females [9]. A preceding infection was reported in 65% of cases, which is consistent with studies emphasizing post-infectious immune-mediated pathogenesis [10].

Regarding treatment, all patients received IVIG, which remains the mainstay therapy for GBS. IVIG has been shown to reduce disease progression and improve functional recovery, particularly when administered early in the disease course. The mean hospital stay was 16.8 ± 6.4 days, which is comparable to previously published data indicating an average hospitalization duration of 14-20 days in severe cases [11].

Ventilatory support was required in 28% of our cohort, consistent with other studies reporting mechanical ventilation rates of 20-30% in severe GBS cases [12]. Patients requiring ventilation had a longer hospital stay (mean duration: 18.7 ± 6.2 days) and a higher rate of complications such as pneumonia and sepsis. The need for intensive care admission significantly impacted overall recovery, with prolonged weaning from mechanical ventilation noted in 8 patients. Early recognition of respiratory involvement is crucial, as timely initiation of IVIG can improve outcomes [13].

Electrophysiological studies revealed acute inflammatory demyelinating polyneuropathy (AIDP) in 56% of cases, acute motor axonal neuropathy (AMAN) in 32%, and acute motor-sensory axonal neuropathy (AMSAN) in 12%. These findings are consistent with global trends, where AIDP is the predominant subtype in Western populations, while AMAN is more common in Asian countries [14]. The differentiation of GBS subtypes is essential, as AMAN and AMSAN variants often correlate with more severe disability and slower recovery [15].

Co-morbidities such as diabetes mellitus (18%) and hypertension (22%) were prevalent among patients, with a significant correlation between diabetes and prolonged hospital stay ($p = 0.03$). The presence of comorbid conditions has been reported to influence recovery rates, possibly due to underlying microvascular and metabolic factors affecting nerve regeneration [16].

The overall functional outcome at discharge was assessed using the Hughes GBS disability scale. At discharge, 40% of patients had a score of 2 or less, indicating good recovery, while 26% remained severely disabled (score of 4 or more). A 3-month follow-up showed significant improvement, with 68% achieving a Hughes score of 2 or less. These findings are in line with existing literature reporting recovery rates of 60-70% within 6 months of onset [17].

Our study highlights the importance of early diagnosis and timely intervention in improving outcomes in GBS. Use of IVIG is an effective treatment option and appears to have a slightly better safety profile and is easier to administer. Mechanical ventilation remains a critical determinant of prognosis, emphasizing the need for early respiratory monitoring. Further large-scale studies are needed to refine treatment protocols and explore potential biomarkers for predicting disease severity and response to therapy [18].

Conclusion

Guillain-Barré Syndrome (GBS) remains a significant neurological disorder requiring prompt diagnosis and appropriate management to optimize patient outcomes. In our study, a higher prevalence was observed in middle-aged males, with limb weakness being the most common presenting symptom. CSF analysis revealed albuminocytologic dissociation in a majority of cases, consistent with classical GBS findings.

IVIG was the primary treatment modality and a substantial proportion of patients required mechanical ventilation, highlighting the need for vigilant monitoring in severe cases. The overall recovery rate was favorable, with 60% of patients regaining functional independence at three months. However, persistent disability in some cases and a mortality rate of 5% underscore the importance of early intervention and supportive care.

This study provides valuable insights into the clinical profile, management strategies, and outcomes of GBS patients in a tertiary care setting. Further multicenter studies with larger cohorts are recommended to enhance the understanding of disease patterns and optimize therapeutic approaches.

Conflict of interest: Nil

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