

Retrospective Analysis of Guillain-Barré Syndrome: A Pharmaceutical Perspective

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ABSTRACT

One of the most common causes of flaccid paralysis, Guillain Barre Syndrome (GBS) has long been a major health problem around the world. Substantial evidence supports the autoimmune nature of this syndrome, with the autoantibody profile playing a crucial role in confirming the clinical and electrophysiological associations between GBS and various other peripheral nerve disorders. This research is aimed to assess the clinical features, electrophysiological, treatment pattern and functional outcome of a multi-centre cohort of GBS patients. Tertiary care hospitals in the Maharashtra region of India were the focus of the present retrospective observational cohort study. Data for the GBS cases admitted during June 2018 to Dec 2023 were included for the current study. Data collected were included clinical features, reported electrophysiological data, treatment and outcome. All the data were assessed with the help of statistical models. The study comprised a total of 25 participants diagnosed with GBS. Males made up the vast majority of the GBS patients (72%). An average age at presentation was 44 ± 13 years. The symptom that present most frequently was ascending or upward paralysis that happened in 20 patients (80%). The remaining common symptoms were sensory disturbances (40%), bladder and bowel complaints (28%) and difficulty in up-squatting. In this cohort analysis, COVID-19 infection was the most common antecedent event (44%). All the patients administered GBS-specific therapy of whom 84 % patients had given Intravenous Immunoglobulin (IVIG) along with Antibiotics, 12% of patients had given Plasmapheresis treatment along with IVIG and 4% of patients had given IVIG, Antibiotics, Plasmapheresis and ventilator. According to this research the maximum number of patients had a favourable functional outcome, i.e. 92% and 8% patients showed poor functional outcome.

Keywords: Guillain-Barresyndrome, Disability, Intravenous Immunoglobulin

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INTRODUCTION

The term Guillain-Barre syndrome is identified through the development of limb weakness, sudden languid paralysis and the presence of albuminocytological dissociation (ACD). Initially characterized in 1916, GBS has consistently been a leading global cause of flaccid paralysis. Substantial evidence supports the autoimmune nature of this syndrome, with the autoantibody profile playing a crucial role in confirming the clinical and electrophysiological associations between GBS and various other peripheral nerve disorders.¹ The term GBS can refer to a syndrome encompassing the previously mentioned AMAN, AIDP, and additional variants like AMSAN, along with the Miller-Fisher Syndrome [MFS]. MFS is specified by symptoms such asophthalmoplegia, ataxia and areflexia.² Guillain-Barre Syndrome is specified by a sudden appearance of weakness in all four limbs, with or without sensory loss, developing over a span of four weeks. Subsequently, a gradual clinical and electrophysiological recovery occurs.³ Geographical location significantly affects GBS clinical phenotype, disease severity, patient outcomes, and even electrophysiological subtype, according to new results from the International GBS Outcome Study [IGOS].⁴ Cases of GBS in Europe range

from 1.2 to 1.9 per 100,000 persons, according to carefully tracked population based studies; worldwide, the incidence was 0.6-4 per 100,000 people. The incidence of unusual presentations, such as the Fisher syndrome, is 0.1 per 100,000 people, which is somewhat lower. The incidence rate is 1.5 times higher in men than in women, and it rises with age, from 1 case per 100,000 in the under-30 age group to around 4 cases per 100,000 in the over-75 age group.⁵ According to study conducted by Kajumba MM et al. one possible cause of GBS is SARS-COV-2. Which is different in patients who have had previous COVID-19 symptoms, whether they are severe or not.⁶

Intravenous immunoglobulin [IVIG] and plasma exchange are the mainstays of GBS treatment.⁷ Uncertainty surrounds the exact workings of intravenous immunoglobulin (IVIG), however it is believed to neutralise autoantibodies, alter FC receptor expression and function, inhibit complement activation, and halt cytokine release and synthesis.⁸

MATERIALS AND METHODS

This study used a retrospective observational cohort design and was carried out in tertiary care facilities in the Maharashtra region of India. Data for the GBS cases

Table 1: Clinical and epidemiological Study of GuillainBarre Syndrome (n=25)

Variable		Value	Percentage (%)
Age		44 ±13	
Gender	Male	18	72
	Female	7	28
Outcome of patient	Survived	25	100
	Leave against medical advice	5	20
Disability Score upon presentation	1	2	8
	2	6	24
	3	11	44
	4	5	20
	5	1	4
Clinical Profile	Sensory Disturbances	10	40
	Ascending paralysis	20	80
	Dropping of eyelid	5	20
	Difficulty in up-squatting	5	20
	Bifacial Palsy	5	2
	Autonomic dysfunction	2	8
	Dysphagia	4	16
	Bladder and bowel complaints	7	28
Past Medical History	Covid-19	11	44
	Recent Vaccination	3	12
	Other Viral/ bacterial Infection	5	20
	Surgery	2	8
	Unidentified	8	32
Treatment Applied	IVIG+ Atibiotics	21	84
	IVIG+ Atibiotics+ Plasmapheresis	3	12
	IVIG+ Atibiotics+	1	4
	Plasmapheresis+Ventilator		
NCV	AIDP	5	20
	AMAN	1	4
	Not Done	19	76

Abbreviations: IVIG-Intravenous immunoglobulins, AMAN- Acute motor axonal neuropathy, NCV- Nerve conduction velocity, AIDP- Acute inflammatory demyelinating polyradiculoneuropathy

admitted during June 2018 to Dec 2023 were included for the current study.

Study Population: IPD patients diagnosed with GBS.

Sample size and justification: 25

Globally, The median yearly incidence of GBS is 1.3 incidences per 100,000 persons. This disease considered as a rare condition.

Inclusion Criteria

1. Patients from Both Gender.
2. Patients with age 18 years and above.
3. Patient diagnosed with GBS along with other co-morbidities.
4. Patient who are prescribed with Anti-Microbial Agents as well as Antibodies.

Exclusion Criteria

1. Lactating Women and Pregnant Women.
2. Patients who are younger than 18 years old.

Study Methodology

Older data were obtained from physical record files, and information regarding recent hospitalisations was culled from electronic health records. Patient related data like such age, gender, past medical history, nerve conduction data and medications administered were collected. Using the scale from 0 (Normal) to 6 (Death), as illustrated in Figure

01, this study aims to compare the degree of improvement in GBS impairment grades, 4 weeks after initial of IVIG treatment and also to classify and compare outcome according to the functional scale. A good functional outcome is consider as the ability to walk without support [GBS disability score ≤ 2], poor functional outcome, as the inability to walk independently [GBS disability score ≥ 3].⁹

Statistical Analysis

Data was captured in a spreadsheet document and analysed using Microsoft Excel and Prism Graph Pad software and was presented as descriptive statistics.

RESULTS

Symptoms Particularly Clinical

Table 1 shows that the majority of the GBS patients included in this retrospective cohort analysis were male (72%). The patients' ages ranged from 18 to 70 years old, with an average of 44 ± 13 years. Twenty individuals, or 80% of the total, experienced ascending paralysis as their primary symptom. Sensory disturbances (40%), problems with the bladder and bowels (28%), and trouble with up-squatting were the remaining typical symptoms.

Triggering Events

Score	Description
0	A healthy state
1	Minor symptoms and capable of running
2	Minor symptoms and capable of running
3	Able to walk 10m or more without assistance but unable to run
4	Able to walk 10m across an open space with help
5	Bedridden or chairbound
6	Death

Figure 1: GBS disability scale⁹

According to Table 1, in this study, the most common antecedent event was the infection of COVID-19 (44%) followed by other viral/ bacterial infection (20%), recent vaccination (12%). Surgery as an antecedent event was seen in only 2/25 patients (8%) However, for 32% patients, the antecedent events were unclear.

Nerve Conduction Velocity Findings

According to table 1 leading GBS variations as determined by nerve conduction velocity studies was AIDP (20%) and AMAN (4%). Nevertheless, 76% of the study sample had unknown nerve conduction investigation.

Treatment

With reference to the figure 2, 84 % patients had given IVIG Treatment along with Antibiotics, most of the patient treated with Ceftriaxone followed by meropenam, doxycycline and ofloxacin (eye drop) mostly given to patient of miller fischer variant of GBS for ophthalmic symptomatic relief. 12% of patients with Plasmapheresis along with IVIG and 4% of patients with IVIG treatment, Antibiotics, Plasmapheresis and ventilator.

Functional Outcome of the Study Population

In this study, the inpatient death rate for GBS patients was zero.

According to Table 1, out of the 25 patients with GBS, 100 percent of the patients survived. In this study the inpatient death rate of GBS Patient was zero. According to current research the most patients experienced a favourable functional outcome, i.e. 92% and 8% patients showed poor functional outcome. Patients with a good functional outcome from GBS were found to be 45 years old on average, compared to 50 years old for patients with a poor functional outcome (p: 0.465), however this difference was not statistically significant. As shown in figure 3 disability score is significantly reduced after one month than the time of presentation.

Comparison between GBS Subtype and Gender

GBS is mainly classified into three types AIDP, AMAN and Miller fischer. As shown in Figure 4, 71% male and females were equally affected by AIDP type of GBS, in this study it was seen that the miller-fischer variant of GBS is more likely to affect in females as compared to males, i.e. 29% of females and 18% males are affected. And in the case of the

AMAN type of GBS, it was seen that only males are affected, i.e. 12% of males were affected.

Comparison between the Duration of Diagnosis and Past Medical History of COVID

As illustrated in Figure 5 it was seen that 40 % patients diagnosed within one week and out of that 16% patient had a medical history of COVID-19 and 60% patient diagnosed within two weeks, out of that, 28% of patients had a medical history of COVID-19. Total 44% of patients had medical history of COVID-19.

DISCUSSION

GBS is a condition that affect peripheral nerves, causes acute flaccid paralysis. In this investigation, the average age of the 25 GBS patients was 44 ±13 years, a finding similar to the previous studies¹⁰, which was greater than that reported in the research of KalitaJ et al. (25years) which was conducted at Institute of Medical Science (Sanjay Gandhi Post Graduate institute) in lucknow, India.¹¹ This difference in the results is due to the exclusion of the paediatric age group in current study, which was included in that study. With 18 cases (72%), men were the predominant gender in our study. Numerous earlier investigations that demonstrated a male predominance confirm this findings.^{12,13} The infection rate of GBS is shown higher in adult population as compared to young population. According to meta-analysis, the incidence of GBS increases with advancing age.¹⁴ This was also noted in the International GBS outcome study (IGOS) which included total 925 patients worldwide.¹⁵

The most common presenting symptoms was upward directional paralysis (80%). The remaining symptoms observed they were, sensory disturbances (40%), bladder and bowel complaints (28%) and difficulty in up-squatting. In our research, the frequency of ascending paralysis was comparable to the data of MateenJ F et al. in India (100%)¹⁶ and Xiaowen Li et al. (83.33%) in China.¹⁷

In our study, the in-hospital death rate for GBS was 0%, which was significantly lower than that reported by KalitaJ et al. (6.8%) at Lucknow, India. Current data slightly support Alshekhlee A et al.'s findings (2.58%) from their investigation in the US population.¹⁸

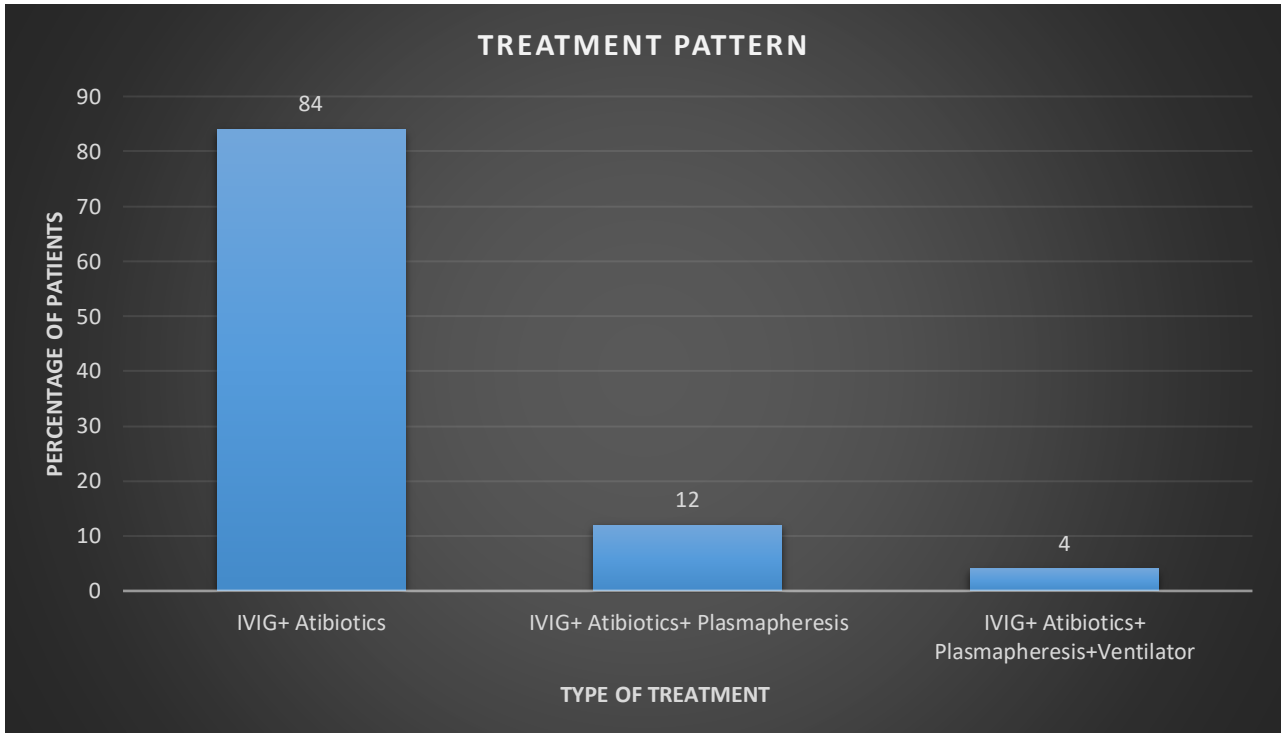


Figure 2: Treatment Pattern for GBS

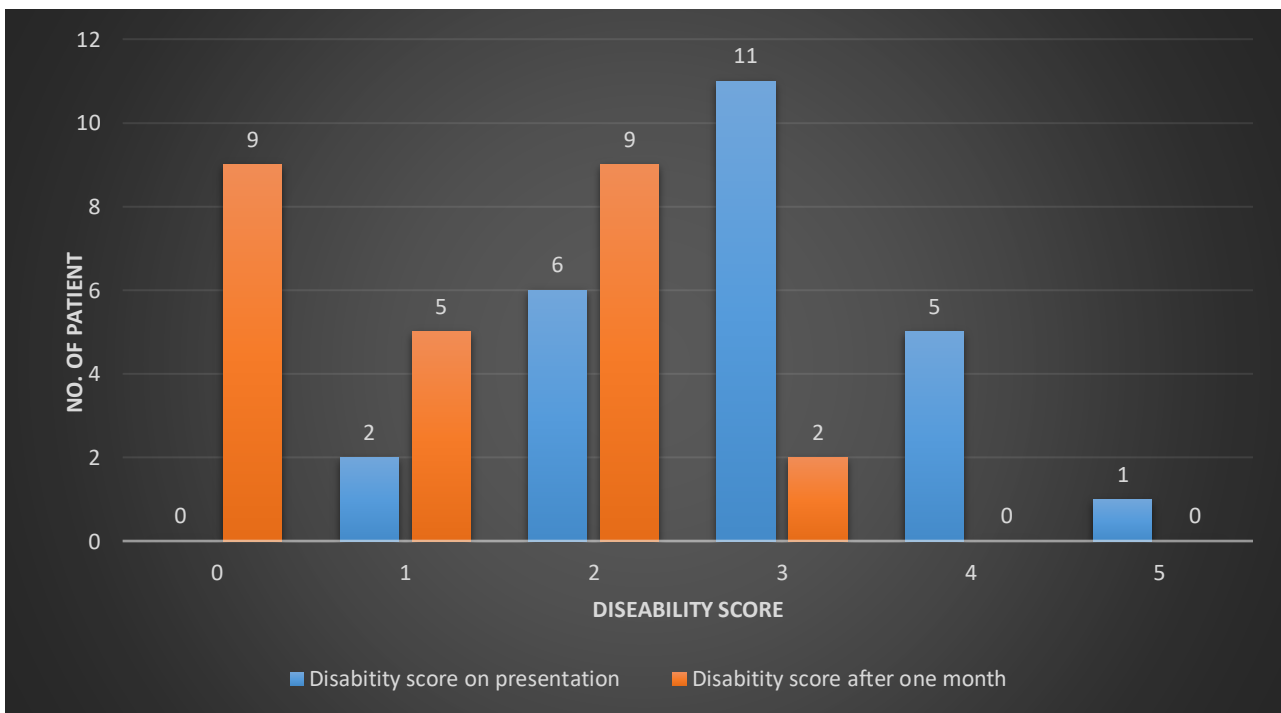


Figure 3: Disability Score on presentation and after One month (N=25)

In our present research the maximum no of patients hadfavourable functional outcome (92%), which matched the finding ofBhagat SK et al. (92.8%) in Nepal¹⁹ and Rees JH et al. (88%) in Southeast England.²⁰ The average age of the GBS patients having a good functional outcome is smaller than that of the poor functional outcome [45vs.50, p:0.465], nevertheless, the variation was not statistically significant. This matched a finding made by the researcher ZhangB et al. which indicated the poor prognosis among

GBS patients of older age [69 vs.39, p-0.008].²¹ To identify age as one of the prognostic factor for GBS, more research is needed.

In current study, AIDP was the most often mentioned electrophysiological subtype as compared to AMAN, which is similar to the findings of Kuwait who had reported a maximum proportion of AIDP and a minimum proportion of axonal subtype.²² In contrast, one study from the Northern region of China stated thatvarying frequencies of

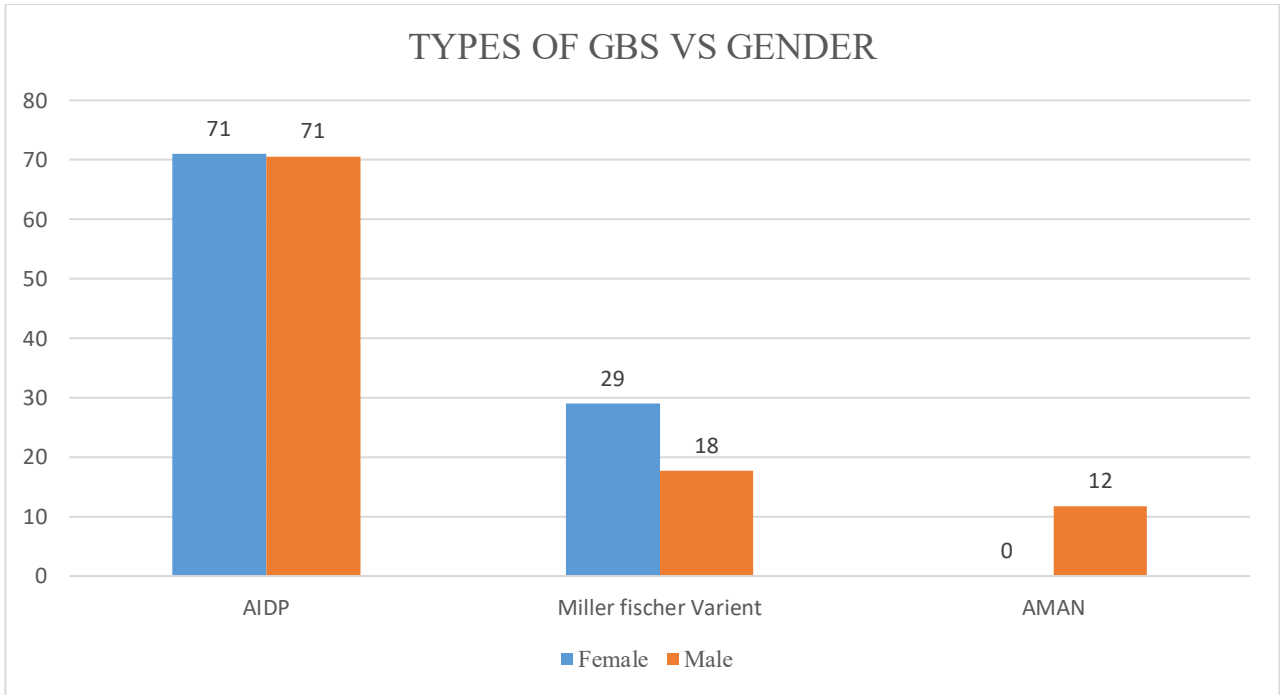


Figure 4: Comparison between GBS subtype

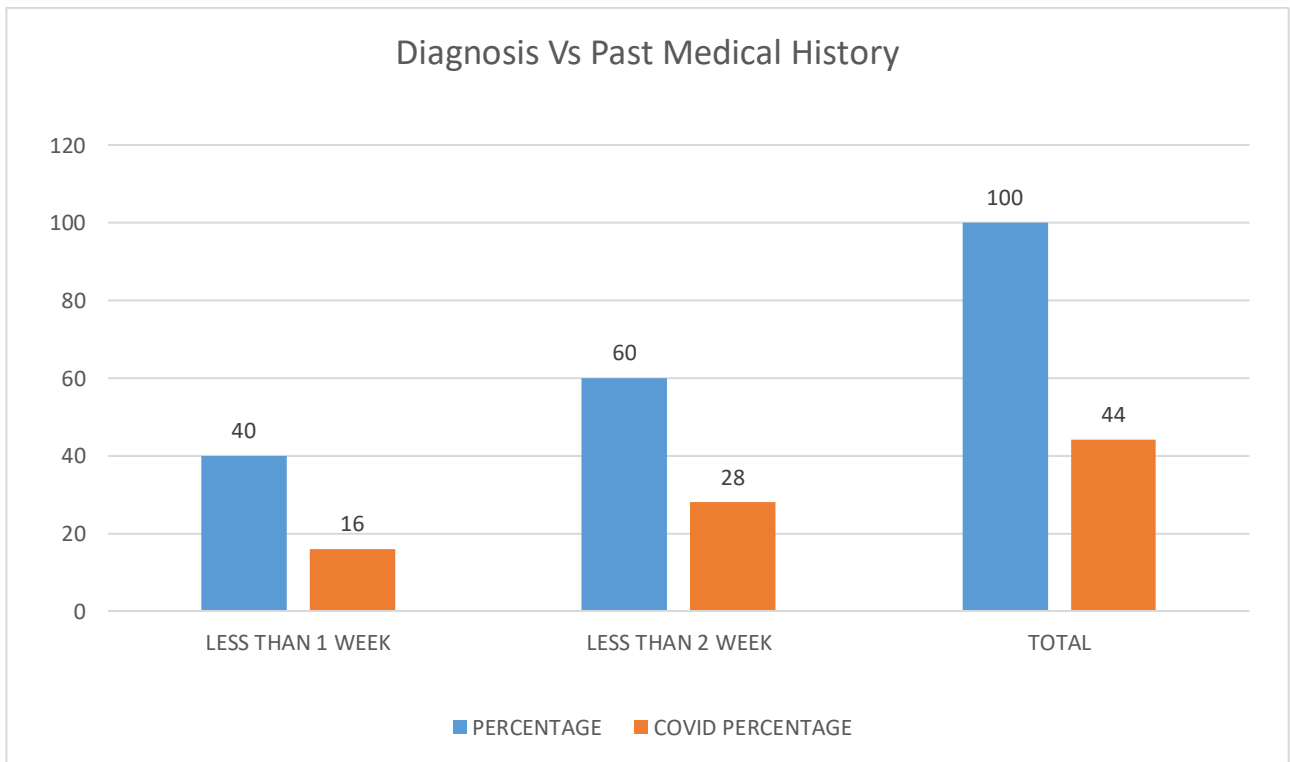


Figure 5: Comparison between the duration of Diagnosis and Past Medical history

the electro-physiological subtype of GBS, in that study AMAN was the dominant subtype as compared to AIDP which shows the geographical discrepancies may be influenced by environmental factors.²³ According to our study it was seen that 40 % patients diagnosed within one week and out of that 16% patients had a medical history of COVID-19 and 60% patient diagnosed within two weeks, out of that 28% of patient had medical history of COVID-19. Total 44% of patients had medical

history of COVID-19 which means the COVID-19 increases the frequency of the complications of GBS. All the patients administered GBS-specific therapy of whom 84 % patients had given Intravenous Immunoglobulin (IVIG) along with Antibiotics, 12% of patients with Plasmapheresis treatment along with IVIG and 4% of GBS patients with IVIG treatment, Antibiotics, Plasmapheresis and ventilator which is identical to the study done by Shangab M et al. As per our research, there are

no statistically significant variables for both good and poor functional outcome. This might be the result of small sample size which is used in this current study.

Limitations

The multi-centre and Retrospective design of the study and unavailability of total Nerve conduction velocity raw information hampered our capacity to independently validate the GBS subtypes that neurologists have documented. Assessment of Antiganglioside antibodies data were not included in our study because this parameter was not examined in almost every hospital.

CONCLUSION

GBS was observed in all age groups, with a major male dominance and minor female predominance. Most of the patients had past medical history of COVID 19 and other viral / bacterial infection. A frequent set of symptoms included sensory problems, ascending paralysis, difficulty in up-squatting and dysphagia. In all age group patient were treated with IVIG along with antibiotics and plasmapheresis. The in-hospital death or mortality rate of GBS patient was 0%. Most GBS patient experienced good functional outcomes. Assessing the incidence and burden of the disease across the country will be made easier with the help of perspective research that collects data more rigorously.

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