

SERUM ALBUMIN: AN INDEPENDENT INDICATOR IN GUILLAIN–BARRE SYNDROME PATIENTS RECEIVING TREATMENT OF PLASMAPHERESIS

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Abstract: This study aimed to assess the role of serum albumin as an independent indicator in Guillain–Barre Syndrome patients receiving plasmapheresis treatment. This descriptive case series was conducted at Hayatabad Medical Complex Peshawar, Pakistan, from December 2022 to May 2023. Total 80 patients with GBS syndrome. Patients were divided into two groups equally. Group A patients had lower serum albumin, and group B had normal serum albumin. In both groups, serum albumin as an independent indicator was assessed. Chi-square and Independent T-tests were applied in both groups, keeping the P value less than 0.05. The mean age of the patients was 31.90±8.63 years. The frequency of male patients was 62.5%, while female patients were 37.5%. In group A, 27.5% of patients had good outcomes, while 75.5% had poor outcomes, while in group B, 57.5% had good outcomes, and 42.5% had outcomes. The outcome in group B was significantly better than in group A (P = 0.007). In the normal serum albumin group, the Guillain-Barre syndrome disability score was significantly lower after receiving plasmapheresis treatment than in patients with low serum albumin levels.

Keywords: Serum Albumin, Guillain–Barre Syndrome, Plasmapheresis

Introduction

In the United States, Guillain-Barré syndrome (GBS) represents the leading cause of acute flaccid neuromuscular paralysis (Yuki and Hartung, 2012). Over a century has passed since the initial description of GBS (Govoni and Granieri, 2001). Research into the disease's immune-mediated pathogenesis, recognition of the disease's diversity of presentations, improvements in diagnostic modalities and prognostic models, and the conduct of randomized trial therapies have all contributed to better patient outcomes in the last century. Given the potential for morbidity without therapy, all doctors should be familiar with this unusual condition (Frenzen, 2008; Guillain et al., 1999; Shahrizaila et al., 2021).

Post-infectious immune-mediated neuropathies include GBS, including its subtypes. Studies have shown that molecular mimicry has a significant impact. *Campylobacter jejuni* gastrointestinal infections contain a lipooligosaccharide structurally similar to gangliosides found in the membranes of the nerves' peripheral branches (Yuki et al., 1993). As a result, a cross-reaction on host nerves can result from an immune response generated to fight infection. GBS has been linked to a wide variety of illnesses. The majority of people suffer from respiratory or digestive disorders. Seventy percent or more of those diagnosed with GBS say they were ill within the previous six weeks (Fokke et al., 2014). During the Zika virus epidemic, several instances of GBS were reported (Dirlikov et al., 2018).

In situations beyond GBS, high-dose IVIG therapy can be counteracted by binding serum albumin to the neonatal Fc receptor (FcRn), which returns them to circulation and lowers their level (Fokkink et al., 2017). Serum albumin has also been associated with positive outcomes in studies of amyotrophic lateral sclerosis and intravenous immunoglobulin for treating Kawasaki disease (Chiò et al., 2014; Kuo et al., 2010). Serum albumin, fitting with the characteristics of a routinely measured protein previously determined in a range of clinical situations as a prognostic marker, is thus an appealing alternative to IgG for an assessment of the gravity of GBS (Hughes, 2017).

Despite the limited literature on the topic, no studies have been conducted in Pakistan on the association between serum albumin and the outcome of plasmapheresis treatment for GBS. This study aimed to determine if serum albumin levels were a useful predictor of response to plasma pheresis in individuals with GBS. We performed routine studies on blood albumin levels in GBS patients after their initial presentation, i.e., before plasma phases. Finally, we looked at how albumin levels in the blood were associated with the development and progression of illness.

Methodology

This descriptive case series was carried out at Hayatabad Medical Complex Peshawar, Pakistan, from December

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2022 to May 2023 after obtaining ethical approval from the ethical board of the hospital. The research was carried out on 80 individuals of both genders.

After receiving the patient's written consent, full demographic information, including age, gender, serum albumin levels, GBS, and MRC scores, was recorded for each patient. Patients who were suffering from serious medical conditions or who did not provide their written consent were not included in this study.

GBS syndrome affects people of all ages, ranging from 18 to 45 years old. Patients were randomly assigned to one of two groups: group A included 40 patients whose albumin levels in their serum were low, and group B had 40 patients whose albumin levels in their serum were normal.

Sessions of plasmapheresis were carried out, and individuals diagnosed with GBS had their impairment scores determined. After six months of follow-up, an MRC (Medical Research Council) sum score and GBS disability score were calculated. Inn patients with GBS scores > 2 were labeled poor outcomes, while scores < or equal to 2 were labeled a. In addition, a Chi-square test and Independent Samples T-test were performed. The most recent version of SPSS, 24.0, was used for the analysis.

Results

This study was conducted on 80 patients. The mean age of the patients was 31.90±8.63 years. The frequency of male patients was 62.5%, while female patients were 37.5%. The mean GBS score at admission recorded in group A patients

with lower serum albumin levels was 4.08±0.79, while in group B patients with normal serum albumin levels was 2.83±1.35. The mean MRC sum at admission recorded in group A was 24.33±7.39 while 32.30±9.34 in group B. GBS score in the 6th month in group B (2.20±1.32) was significantly lower than group A (3.50±1.56) (P = 0.0001). Similarly the mean MRC sum in group B (51.30±5.78) was significantly higher than group A (40.73±9.004) in group A (P = 0.0001). We observed that in group A, 27.5% of patients had good outcomes while 75.5% had poor outcomes, while in group B, 57.5% of patients had good outcomes while 42.5% had bad outcomes. In group B, the outcome was significantly better than that of group A (P = 0.007).

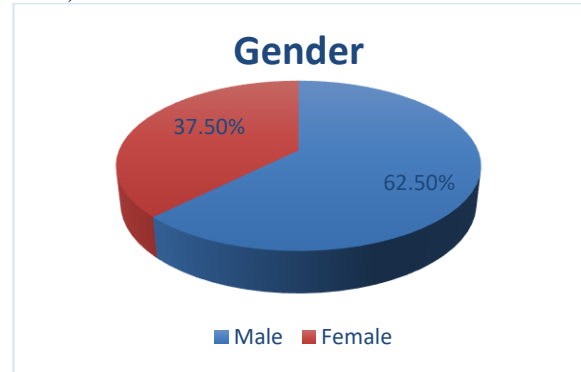


Figure 1 Gender distribution

Table 1: Comparison of GBS and MRC in the 6th month between both groups

	Groups	N	Mean	Std. Deviation	P value
GBS score at 6 months	Group A	40	3.50	1.569	0.0001
	Group B	40	2.20	1.324	
MRC sums at 6 month	Group A	40	40.73	9.004	0.0001
	Group B	40	51.30	5.783	

Table 2: Comparison of outcome between both groups

Groups	Outcome	Outcome		Total	P value
		Good	Poor		
Group A		11	29	40	0.007
		27.5%	72.5%	100.0%	
Group B		23	17	40	
		57.5%	42.5%	100.0%	
Total		34	46	80	
		42.5%	57.5%	100.0%	

Discussion

The vital protein serum albumin, produced in the liver, is essential for maintaining oncotic pressure and transporting different molecules through the bloodstream. Its potential as an independent signal in Guillain-Barré Syndrome (GBS) patients receiving plasmapheresis treatment has come to light recently. Plasmapheresis is frequently used as an aggressive therapeutic strategy for GBS, an uncommon but dangerous autoimmune illness that affects the peripheral nerve system. Because of its possible predictive usefulness and therapeutic monitoring, the relationship between serum

albumin levels and therapeutic results has drawn interest (Willison et al., 2016).

During a plasmapheresis technique, blood components are separated, plasma (including pathogenic antibodies) is removed, and the remaining components are reinfused. Maintaining colloid osmotic pressure by serum albumin is essential for controlling fluid distribution between intravascular and extravascular regions (Wakerley and Yuki, 2015). Low serum albumin levels in GBS patients undergoing plasmapheresis could indicate reduced colloid osmotic pressure, which could impact fluid balance and tissue perfusion. Throughout the therapy, measuring blood albumin levels may reveal information about the patient's

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general fluid state, enabling clinicians to modify treatment plans as necessary. Additionally, as serum albumin is a marker of nutritional health, a decline in it could indicate potential difficulties and necessitate urgent care (Bernsen et al., 1999).

Additionally, serum albumin may be used as a marker for the severity and development of GBS. GBS symptoms such as inflammation and tissue damage might affect the synthesis and metabolism of albumin. Reduced albumin levels may indicate the degree of continuous inflammation and tissue damage, assisting in disease monitoring and forecasting recovery trajectories. Additionally, serum albumin's interactions with different substances, such as medicines, may affect how well a treatment works. Lower albumin levels may affect drug metabolism and distribution, affecting the therapeutic effects of plasmapheresis and other drugs taken simultaneously. Understanding these relationships could help patients receive individualized care and improve results (Rajabally and Uncini, 2012).

In our study, we included 80 Guillain Barre Syndrome patients divided equally into two groups: group A patients had lower serum albumin levels, and group B patients had normal serum albumin levels. The mean age of the patients was 31.90 ± 8.63 years. Male patients were 62.5%, while female patients were 37.5%.

We observed that the mean GBS score was significantly lower in group B in the 6th month compared to group B; these findings are similar to a study that reported similar findings¹⁷. We found that the frequency of good outcomes was significantly higher in group B compared to group B. Different studies reported similar findings, which reported significantly higher good outcomes in the normal serum albumin group (Badshah et al., 2018; HUSSAIN et al., 2018).

Conclusion

From our study, we conclude that in the normal serum albumin group, the Guillain-Barre syndrome disability score was significantly lower after receiving plasmapheresis treatment than patients with low serum albumin levels.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned.

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

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