ORIGINAL ARTICLE

Determine Serum Albumin as an Independent Biomarker for Clinical Outcome in Plasmapheresis Treated GBS Patients

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ABSTRACT

Objective: The aim of this study is to determine the serum albumin as an independent biomarker for clinical outcome in plasmapheresis treated-GBS patients.

Study Design: Descriptive case study

Place and Duration: Conducted at department of Neurology Ayub Teaching Hospital, Abbottabad for two years duration from September, 2018to September 2020.

Methods: Total 90 patients of both genders were presented in this study. Patients detailed demographics were recorded after taking written consent age, sex and BMI were recorded after taking informed consent. Patients were equally divided into two groups, group I had 45 patients with low serum albumin and group II had 45 patients with normal serum albumin level. Plasmaphereses sessions were conducted and disability score was calculated among GBS patients. MRC (Medical Research Council) sum score was assessed in follow up of 4 months. Complete data was analyzed by SPSS 24.0 version.

Results: Total 60 patients (30 in each group) were males and 30 (15 in each group) were females. Mean age of the patients in group 34.6±0.63 years in group I and 34.6±0.85 in group II. There was no significant difference in mean BMI among both groups 25.6±4.36 kg/m^2. 32 (71.1%) had poor clinically outcome in group I and in group II 23 (51.1%) had poor clinically outcome on the basis of GBS disability score. More chances of having good prognosis were observed in normal albumin levels significantly with p value 0.05.

Conclusion: We concluded in this study that the albumine level in Guillain Barre syndrome patients treated with plasmapheresis as an independent consideration for short to long-term clinical production and forecasting. However, further studies are required to validate the results of this analysis of albumin level for GBS patients as a prognostic biomarker.

Keywords: Serum Albumin level, Guillain Barre Syndrome (GBS), Plasmapheresis

INTRODUCTION

The acute, autoimmune, polyradiculoneuropathy [1] is Guillain–Barre syndrome (GBS). It rises in the age range of GBS from 0.81 and 1.89 per 100,000 inhabitants [2]. Late puberty and young adulthood have two peaks of incidence[3].

GBS presents clinically as an acute progressive motor weakness, frequently with cranial and sensory diseases within one to two weeks of immune system stimulation and is at a clinical deficit peak within two to four weeks[4]. In 20% – 30% the patients, respiratory failure is life-threatening in the GBS[5].

The theory of GBS that is most important for this is focused on molecular imitation in which an immune response is produced in the body to incite factors, mainly infectious organisms such as Campylobacter jojuni[6], haemophilus influenza(7). In disease-pathogenesis, both cellular and humoral immunity play a potential role [9]. Antibodies which respond cross-referential with nerve membrane gangliosides that cause nerve damage [10] are produced by the immune response.

The number and subtypes of white blood cells are renowned markers for systemic inflammation. The key players in the innate immunity of neutrophils are supposed to be the lymphocyte count that reflects the host immune system's reaction degree [11].

Serum albumin is a protein binding to the neonatal Fc receptor (FcRn), which transfers them back into circulation and reduces their level in conditions other than GBS following high dose IVIG therapy. [12] In addition, serum albumin is established in the amyotrophic, lateral and IVIG treatment fault in Kawasaki disease as an independent factor linked to results. [13,14] Serum albumin, therefore, is an interesting alternative for an assessment of GBS' gravity to IgG, fitting the profile of a routine measured protein that has already been identified in a range of pathological conditions as a prognostic marker[15]. Although few studies on the interaction of serum albumin with intravenous guillain barre treated with immunoglobulins are available, no serum albumin association research has been carried out with Plasmapheresis-treated GBS outcome in Pakistan.

In this review, we wanted to find out whether levels of serum albumin could be a predictor for plasma pharesis-treated GBS patients. Following their initial presentation, e.g. before plasma phases, we tested serum albumin levels in GBS patients with routine tests. Finally, we examined the association of circulatory albumin concentrations with disease incidence and disease outcome.

MATERIAL AND METHODS

This descriptive case study was conducted at department of Neurology Ayub Teaching Hospital, Abbottabad for two years duration from September, 2018 to September 2020. The study comprised of 90 patients of both genders. Patients detailed demographics were recorded after taking written consent age, sex and BMI were recorded after taking informed consent. Patients with severe medical illness and those did not give written consent were excluded from this study.

Patients were aged between 15-80 years with GBS syndrome. Patients were equally divided into two groups, group I had 45 patients with low serum albumin and group II had 45 patients with normal serum albumin level. Plasmaphereses sessions were conducted and disability score was calculated among GBS patients. MRC (medical research council) sum score was assessed in follow up of 4 months. Categorical variables were assessed by percentages. Chi square test was also used. Complete date was analyzed by SPSS 24.0 version.

RESULTS

Total 60 patients (30 in each group) were males and 30 (15 in each group) were females. Mean age of the patients in group 34.6±0.63 years in group I and 34.6±0.85 in group II. There was no significant difference in mean BMI among both groups 25.6±4.36 kg/m^2. (table 1)

Table 1: Baseline detailed demographics of cases

Variables	Group I (n=45)	Group II (n=45)
Sex		
Male	30	30
Female	15	15
Mean age	34.6±0.63	34.6±0.85
Mean BMI	25.3±4.36	25.5±4.36

32 (71.1%) had poor clinically outcome in group I and in group II 23 (51.1%) had poor clinically outcome on the basis of GBS disability score. In group I GBS disability score at admission was 4.62±0.63 and after 4 months of follow up disability score was 2.41±2.8 and in group II at admission GBS score was 4.26±0.36 and after follow up of 4 months disability score was 1.56±3.42. (table 2)

Table 2: Comparison of GBS disability score among both groups

Variables	Group I	Group II
Clinical outcome		
poor	32 (71.1%)	23 (51.1%)
good	13 (28.9%)	22 (48.9%)
GBS Follow up		
at admission	4.62±0.63	4.26±0.36
2nd month	3.67±2.10	2.62±5.08
4th month	2.41±2.8	1.56±3.42

Table 3: Comparison of MRC sum score among both groups

Variables	Group I	Group II
Follow up		
at admission	27.48±14.8	33.49±14.2
2nd month	35.55±12.14	45.32±11.17
4th month	41.16±17.22	52.16±7.12

Medical research council sum score was also calculated among both groups and was higher among normal serum albumin levels. (table 3)

Complications observed among both groups, 6 (13.33%) patients were underwent for ventilation in group I because of respiratory disease and 1 (2.22%) patient was only went for ventilation in group II. (table 4)

Table 4: Complication outcomes among patients in both groups

Variables	Group I (n=45)	Group II (n=45)
Mechanical Ventilation		
Yes	6 (13.33%)	1 (2.22%)
No	39 (86.67%)	44 (97.78%)

DISCUSSION

A laboratory cerebrospinal fluid finding and electrophysiological criteria for GBS is normally diagnosed based on patient's signs and symptoms. [16]. Some GBS diseases have studied their function in disease pathologies and forecasts of certain biomarkers, such as myelin base protein, neurofilament, antiganglioside antibodies, neuron-specific enolase, hypocretin-1, tumor necrosis factor, chemokines and supplements. [17,18] GBS is regarded as among the most frequent and debilitating paralytic neuropathies of 5% – 10%. In order for clinicians to change supporting care for patients, it is important to anticipate clinical intensity and results because of a broad range of clinic manifestations of GBS [2].

In present study total 90 patients of both genders were presented. Majority of the cases were 66.7% males. Mean age of the patients were 34.6±0.63 with mean BMI 25.5±4.36. These findings were comparable to the some previous studies. [19,20] Intravenous immunoglobulins are the most preferable treatment for the syndrome of Guillain Barre. However, affordability is an important challenge in resource-limited countries like Pakistan and GBS patients receive plasma pharesis regularly due to its cost-effectiveness and easy availability in most medical centres. The serum albumin levels and clinical outcomes of GBS have been positive. In groups 132 (71.1%) showed low health outcomes as compared to group II 23 (51.1%), because of the GBS impairment scores. Patients with a normal level of albumin showed a strong clinical improvement, suggesting that the level of albumin is an independent prognostic factor for GBS. The findings are comparable to Willem-Jan R.et al., an international review. [21]

For GBS, an acute and debilitating condition, no prognostic biomarkers are available. Biomarkers are so important that they indicate clinical results early and provide optimal treatment. Increased catabolism, reduced production and extravasation due to increased capillarity in the setting of inflammation or serious illness are the key reasons for a drop in serum albumin. [22,23] One of the above causes of low levels of albumin can be seen in isolation or in combination in patients with Guillain Barre Syndrom. In various diseases a pronostic and health-care albumin predictor was explored.[24] In one study, a low level of serum albumin was determined to be a powerful indicator of poor results in acute disease. [25]

GBS is also an acute disease and requires a prognosis indicator to intervene and give full medical

treatment, so we tried to find albumin in guillain barre syndrome as an independent clinical outcome model. The need for ventilatory support and survival can also increase due to the progression of the disease and related ventilation complications in patients who are low in the albumin. Prognostic markers for acute illnesses like GBS are extremely important to avoid such morbidities and mortality. In a study on ICU and critically ill patients serum albumin was identified as a biomarker for survival and a need for mechanical ventilation.

New biomarkers of inflammation, according to some reports, are the NLR and PLR. The occurrence and severity of Behçet's syndrome can be linked to the NLR and PLR, Alan et al. [26,27] This study found that in patients treated with plasmapheresis with Guillain Barre Syndrome, Albumin level as part of a complete metabolic profile was an independent factor for the short and long term clinical outcome. Future trials are necessary, however, to validate the results of the albumin level study as a predictive biomarker for GBS patients.

CONCLUSION

We concluded in this study that the albumine level in Guillain Barre syndrome patients treated with plasmapheresis as an independent consideration for short to long-term clinical production and forecasting. However, further studies are required to validate the results of this analysis of albumin level for GBS patients as a prognostic biomarker.

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