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Research Article

Hypoalbuminemia as prognostic indicator in GBS among patients presenting at a tertiary care hospital in Pakistan

Ayesha Aslam[1], Farheen Niazi[2] and Kiran Ramzan

[1]Department of Neurology King Edward Medical University (KEMU), Lahore.
[2]Department of Neurology PAEC Hospital.
[3]House Officer at Jinnah Hospital, Lahore

Corresponding Author: Dr Ayesha Aslam, Department of Neurology King Edward Medical University (KEMU), Lahore. **Contact:** 0320 2902573. Email: ayesharrq@gmail.com

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ABSTRACT

Introduction: Guillain–Barré syndrome (GBS), an acute immune-mediated disorder of peripheral nerves and spinal roots, is the most common peripheral nervous system disorder. Immune response is the major cause of GBS. **Aims and objectives:** The main objective of the study is to analyze the hypoalbuminemia as prognostic indicator in GBS among patients presenting at a tertiary care hospital in Pakistan. **Material and methods:** This cross sectional study was conducted in department of Neurology Mayo hospital Lahore during March 2018 to November 2018. This study was done with the permission of ethical committee of hospital. This study include 100 patients of GBS who were admitted in Neurology ward. Venous blood samples were drawn from all patients within the first 24 hours after admission. 5cc blood was taken for the analysis of serum albumin, CBC(Complete blood count), renal function test, and hepatic function test within 24 hours of hospital admission. **Results:** The data were collected from 100 GBS patients. The mean age was 41.69±20.35 years. No significant relationship was found between NLR, PLR, CRP, and albumin levels and the demyelinating and axonal subtypes in GBS patients. In GBS patients, the mean CRP and NLR levels at admission/discharge and third-month control were significantly higher, and the mean albumin level was significantly lower in the HDS≥3 group. In the GBS-P group, on the other hand, the mean NLR level at third month was significantly higher in the HDS≥3 group, but there was no significant difference with the other inflammatory markers. In the pediatric group, the mean age of the HDS≥3 group was significantly lower than that of the HDS<3 group. **Conclusion:** It is concluded that inflammatory markers including serum NLR, PLR, CRP, and albumin levels may be used as cheaper, more readily available, and more rapidly studied markers for the prediction of the prognosis of GBS.

Key words: Syndrome, Albumin, Level, Patients, Guillain–Barré syndrome

INTRODUCTION

Guillain–Barré syndrome (GBS), an acute immune-mediated disorder of peripheral nerves and spinal roots, is the most common peripheral nervous system disorder. Immune response is the major cause of GBS. In this syndrome, autoantibodies triggered by previous infections cross-react with gangliosides and result in peripheral nervous system injury[1]. Moreover, it

has been recently shown that inflammatory factors apart from cellular and humoral immunity play a role in the GBS pathogenesis. Recently, neutrophil–lymphocyte ratio (NLR) is known to be widely used as a marker of inflammation and a predictor of prognosis in various disorders[2]. Higher NLR values were shown to be an independent predictor of a worse prognosis among patients with acute ischemic stroke, cardiac disorders, and cancer[3]. Likewise, increased platelet–lymphocyte ratio (PLR) was shown to predict a poor prognosis in patients with acute stroke and malignancy[4].

A simple measurement of serum albumin concentration could represent a prognostic biomarker in patients with Guillain-Barré syndrome (GBS) treated with intravenous immunoglobulin (IVIG), a new study suggests. The study showed that 35% of patients with GBS developed hypoalbuminemia 2 weeks after IVIG treatment and that low albumin levels after treatment were strongly related to a severe clinical course and poor outcome[5]. GBS is a post infectious immune-mediated neuropathy causing rapidly progressive weakness of limbs, and respiratory failure in 25% of cases[6].

Theoretical background

GuillainBarre Syndrome (GBS) is the commonest acute predominantly motor neuropathy. It comprises of heterogeneous group of disorders of presumed autoimmune etiology. The overall incidence of GuillainBarre Syndrome (GBS) is found to be 1.1/100,00/year to 1.8/100,000/year[7]. The incidence of GBS increases with age after 50 years from 1.7/100,00/year to 3.3/100,000/year. Infection with *C. jejuni* often precedes the Guillain–Barré syndrome and is associated with axonal degeneration, slow recovery, and severe residual disability. Up to 70% cases of GBS are caused by antecedent infection. There is limited data regarding incidence of GBS in Pakistan. In a case series of 34 patients with GBS, described age range was between 3-70 years. Up to 45% cases were caused by antecedent infection[8].

AIMS AND OBJECTIVES

The main objective of the study is to analyze the hypo albuminemia as prognostic indicator in GBS among patients presenting at a tertiary care hospital in Pakistan.

MATERIAL and methods

This cross sectional study was conducted in department of Neurology, Mayo hospital Lahore during March 2018 to November 2018. This study was done with the permission of ethical committee of hospital. This study include the 100 patients of GBS who were admitted in Neurology ward.

Exclusion criteria

It included local or systemic infections, steroid use, malignancy, and chronic diseases such as hematological, autoimmune, renal, cardiovascular, and hepatic disorders.

Data collection

The data was collected from 100 patients of GBS. Venous blood samples were drawn from all patients within the first 24 hours after admission. Complete blood count, renal function test, and hepatic function test were performed within 24 hours of hospital admission and before the treatment, and serum CRP, albumin, neutrophil, lymphocyte, thrombocyte, CRP, NLR, and PLR levels were recorded.

Statistical analysis

The data were collected and analyzed by using SPSS version 21.0. All the values were expressed in mean and standard deviation. Descriptive statistics included mean ± SD, number, and percentage.

RESULTS

The data were collected from 100 GBS patients. The mean age was 41.69±20.35 years. No significant relationship was found between NLR, PLR, CRP, and albumin levels and the demyelinating and axonal subtypes in both the GBS-A and GBS-P patient groups. In GBS-A patients, the mean CRP and NLR levels at admission/discharge and third-month control were

significantly higher, and the mean albumin level was significantly lower in the HDS≥3 group. In the GBS-P group, on the other hand, the mean NLR level at third month was significantly higher in the HDS≥3 group, but there was no significant difference with the other inflammatory markers. In the pediatric group, the mean age of the HDS≥3 group was significantly lower than that of the HDS<3 group.

Table 01: Demographic and laboratory characteristics of GBS patients

	Admission		**Discharged**		**Control**		***p***	***p*1**	***p*2**
	HDS-A<3	**HDS-A≥3**	**HDS-D<3**	**HDS-D≥3**	**HDS-C<3**	**HDS-C≥3**			
GBS	**n=19**	**n=17**	**n=18**	**n=28**	**n=3**	**n=15**			
Age, years	43.66±19.66	50.11±18.80	44.66±18.67	52.33±18.96	45.46±19.70	47.33±13.98	0.405	0.230	0.783
NLR	2.29±0.88	4.10±1.72	2.92±1.69	4.38±1.49	2.80±1.29	4.25±1.39	0.000	0.009	0.010
PLR	163.83±63.17	166.92±65.63	172.58±67.40	159.71±61.97	180.44±71.06	156.40±52.21	0.902	0.555	0.513
CRP, mg/dL	0.12±0.12	1.03±1.66	0.34±0.36	1.27±1.99	0.34±0.35	0.76±0.46	0.000	0.001	0.036
Albumin, gr/dL	3.97±0.20	3.45±0.65	3.99±0.45	3.15±0.49	3.92±0.53	3.17±0.52	0.007	0.000	0.003

Table 02: Comparisons of inflammatory markers between GBS patients with control groups

	GBS	***p-value***
Age, years	48.50±18.95	0.200
NLR	3.65±1.73	0.000
PLR	166.15±64.14	0.000
CRP, mg/dL	0.80±1.48	0.000
Albumin, gr/dL	3.52±0.63	0.026

DISCUSSION

GBS is one of most common cause of acute flaccid paralysis which mostly occurred in subjects with history of an antecedent infection and with a complication of bariatric surgery which occurred in subjects of all ages[9]. Despite its common sporadic presentation, familial cases have also been reported. Various treatment strategies have been implicated on the subjects which resulted in slow recovery. In developing countries, less immunogenic vaccines are preferred over highly immunogenic vaccines to reduce vaccination costs[10]. This act as a major barrier in GBS management in Pakistan. Wali Muhammad et al. compared the therapeutic efficacy of Intravenous immune globulin (IVIG) with Plasma exchange (plasmapheresis) in patients of Acute Inflammatory Demyelinating Polyneuropathy i.e., Guillain-Barre syndrome (GBS)[11]. They found that both IVIG and Plasma Exchange have equal therapeutic efficacy in the treatment of patients of GBS[12].

GBS is usually diagnosed on the basis of a patient's signs and symptoms with the assistance of laboratory cerebrospinal fluid findings and electrophysiological criteria[13]. Among GBS patients, the role of some biomarkers such as myelin basic protein, neurofilaments, anti-ganglioside antibodies, neuron-specific enolase, hypocretin-1, tumor necrosis factor, chemokines, and complements in disease pathology and prognosis has been examined[14]. There is a limited number of studies in the literature which have explored the correlation between GBS-A patients and serum inflammatory markers[15]. To date, no study has assessed the association between GBS-P

patients and serum NLR, PLR, CRP, and albumin levels.

Recent studies have indicated that NLR and PLR are novel markers that are able to predict the prognosis of various disorders. In a study by Ozdemiron GBS-A patients, there was no significant correlation between NLR and PLR and admission and discharge disability[16]. In another study, Geyik et al reported that NLR level at hospital admission showed a significant negative correlation with the post treatment HDS[17]. In this study, we found higher NLR levels at admission, discharge, and third-month control in the GBS-A group, whereas it was higher only at the third-month control in the GBS-P group. Furthermore, increased NLR levels were significantly correlated with worse prognosis[18].

CONCLUSION

It is concluded that inflammatory markers including serum NLR, PLR, CRP, and albumin levels may be used as cheaper, more readily available, and more rapidly studied markers for the prediction of the prognosis of GBS.

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