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CORRELATION OF BASELINE SERUM ALBUMIN LEVELS WITH PROGNOSIS OF GUILLAIN-BARRÉ SYNDROME

Neurology

Shubhakaran Khichar Professor and Head, Dr. S N Medical College, Jodhpur, Rajasthan

Amita Bhargava Professor, Dr. S N Medical College, Jodhpur, Rajasthan

Pankaj Awasthi* Senior Resident, Dr. S N Medical College, Jodhpur, Rajasthan *Corresponding Author

Ankita Bajpai Assistant Professor, GSVM Medical College, Kanpur, Uttar Pradesh

ABSTRACT

INTRODUCTION: Guillain-Barre syndrome (GBS) is a polyradiculoneuropathy characterized by a rapidly progressive bilateral paresis of the limbs. There is a limited number of studies in the literature which have explored the correlation between prognosis of GBS patients and serum albumin levels. So the present study was carried out.

MATERIAL AND METHODS: Prospective Longitudinal study was conducted among 60 patients admitted in the Neurology Department of MDM Hospital, Dr.SN Medical College, Jodhpur over a period of two years from January 2017 to December 2018.Serum albumin levels were determined. Patients were assigned into two groups. One with low albumin level (GROUP1) and other with normal albumin level (GROUP 2). And the groups were compared based on Hughe's disability scores.

RESULTS: The albumin levels were negatively correlated with the Hughes' scores (admission/discharge). After treatment mean of the disability score in group 1 was significantly higher($p<0.05$) as compared to group 2.The difference of means of disability score {end line - baseline} was significantly higher in group 1 (0.09) as compared to group 2 (-0.92).

CONCLUSION: This study determined albumin level as an independent factor for assessing the prognosis of GBS.

KEYWORDS

Guillain-Barré Syndrome; polyradiculoneuropathy; Serum albumin levels; Prognosis.

INTRODUCTION:

Guillain-Barré syndrome(GBS) is a disorder of the peripheral nerves typified by rapidly ascending weakness evolving usually over days to one to four weeks.

Type of GBS are acute inflammatory demyelinating polyradiculoneuropathy (AIDP). acute motor axonal neuropathy (AMAN) and acute motor sensory axonal neuropathy (AMSAN).

The reported mortality of GBS in whole population ranged from 0.89 to 1.89 cases (median 1.11) per 100,000 people [1]

Prognosis can be determined with serum albumin, glucose, cortisol and sodium levels as well as neutrophil / lymphocyte (N/L) ratio which is reported to be an inflammatory biomarker [2-7].

No prognostic biomarkers are available for GBS. Determining the albumin level at initial stage has advantage as its level may change with disease progression and procedure i.e plasmapheresis, related fluctuations.Very few studies have been carried out in the past to show serum albumin level as the prognostic marker of GBS.Thus the current study was carried out with the above aim.

MATERIAL AND METHODS

A hospital based Prospective Longitudinal study was conducted among 60 cases of Guillain-Barre syndrome admitted in the Neurology Department of MDM Hospital, Dr.SN Medical College, Jodhpur over a period of two years i.e. January 2017 to December 2018.

Demographics, age, sex, clinical features, electrophysiology subtype, and treatment-related outcomes were assessed. A diagnosis was based on the criteria of the Brighton Collaboration GBS Working Group[8].

Each patient was evaluated according to Hughes et al.'s disability score at the time of hospital admission and discharge[9].

According to HDS, stage 1–3 was considered to represent good prognosis, and stage 3 or higher was considered to represent poor prognosis.

All the patients underwent physical and neurological examinations, complete blood count, electrolyte levels liver and kidney function tests, and lipid profile.

At our hospital, a serum albumin range of 3.4–5.4 gm/dL is considered normal.

To find out the prognostic value of serum albumin level in case of GBS the patients were divided into two groups. GROUP 1 with patients having S.albumin level <3.4 and GROUP 2 S.albumin levels ≥3.4

The disorder was grouped into AIDP, AMAN, and AMSAN subgroups.The patients were categorized into the demyelinating form (AIDP) and axonal form (AMAN and AMSAN)

Patients criteria

Inclusion criteria

- Both sexes are included.
- Age: any age.
- All patients met diagnosis of GBS

Exclusion criteria

- severe organ failure
- Thyroid dysfunction
- Adrenal dysfunction
- Drug induced polyneuropathy.

Statistical analyses

All statistical analyses were performed using the SPSS 22.0 software package and Instat graphpad software. Descriptive statistics included mean ± SD, number, and percentage. Student's *t*-test was used to compare continuous variables. A *p*-value of <0.05 was considered statistically significant for all comparisons and correlations.

RESULT

Sixty patients were enrolled in this study. Of all the patients with GBS, 38 were men (63.33%), and 22 were women (36.66%). The mean age of the patient group was 34.57 ± 15.72. Two patients died. Intravenous immunoglobulin was administered to all the patients except those having Hughe's disability score of 2.

The baseline mean serum albumin levels at the time of admission were 3.57±0.29 and 18.33% of the patients (n = 11) had hypoalbuminemia.

The albumin levels were negatively correlated with the Hughes' scores (admission/discharge).

Fourty four of the patients had AIDP, 9 had AMAN, and 7 had

AMSAN. The Table 1 shows the comparisons of the demographic features and laboratory findings among the subgroups.

No significant relationship was found between S.uric acid, disability score before and after treatment However the mean albumin levels were significantly higher in axonal subtype as compared to AIDP **(Table 1).**

Table1:Comparisons of age, serum markers and disability score between AIDP and axonal subgroups

	AIDP (n=)	Axonal	p value
Age	3.11±13.9	38.56±19.9	0.24
Serum Albumin levels	3.51±0.3	3.73±0.21	0.009
Serum Uric acid	4.53±0.98	4.89±0.63	0.17
CSF protein	81.22±62.76	120.32±90.31	0.06
Disability score before	3.18±0.54	3.38±0.5	0.22
Disability score after	2.55±0.87	2.38±0.5	0.97

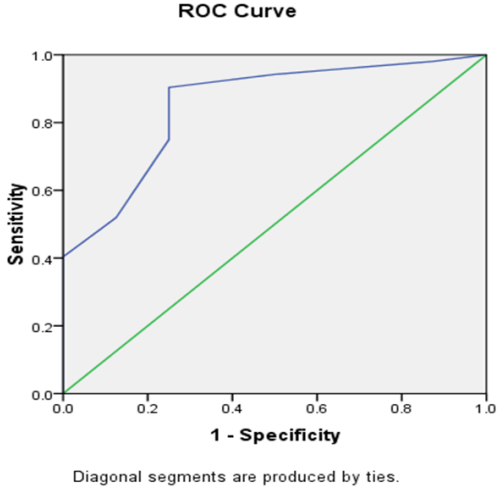
After treatment mean of the disability score in group 1 was significantly higher($p<0.05$) as compared to group 2.The difference of means of disability score {end line - baseline} was significantly higher in group 1 (0.09) as compared to group 2 (-0.92). **(Table2)**. This showed the negative correlation of S.albumin level and Hughe's disability score.

Table2: Comparison of means of Hughe's disability score in relation to S. albumin levels

Disability score	GROUP 1 (S.albumin<3.4 gm/dl)	GROUP 2 (S.albumin≥3.4 gm/dl)	p value
Baseline	3.18±0.75	3.24±0.48	0.73
Endline (After treatment)	3.27±1.10	2.33±0.59	0.0002
Score difference	0.09±1.04	-0.92±0.40	<0.0001

A cut-off S.albumin level of 3.35 predicted GBS, with 90% sensitivity and 75% specificity (ROC area under the curve [AUC] of 0.852, 95% CI, 0.712–0.992, $p < 0.001$). **Fig:1**

Figure 1: Receiver Operating characteristic Curve (ROC) analysis of S. albumin for prediction of GBS



DISCUSSION

Our study demonstrated that there was a negative correlation between albumin levels and Hughes'scores (admission/discharge). With normal albumin level the disability score was less as compared to high Hughe's disability score with patients having low albumin level .

Albumin is a late-reacting negative acute-phase protein[10].

In a study it was determined that a low serum albumin level is a strong marker of poor outcome in the setting of acute illness[11,12].GBS is also an acute illness and needs a prognostic marker so we tried to find out albumin as an independent model for clinical outcome in GBS.The present study demonstrated that hypoalbuminemia is common in patients with GBS and there is a negative correlation between albumin levels and GBS disability. At time of admission there was no significant difference in the means of disability score. The results of our study are comparable with an international study, Willem-Jan R.et al[13] that established an association of low albumin level with poor outcome in Intravenous Immunoglobulins treated GBS.

The results of our study are again corroborated by the outcomes of studies done by Ozdemir HH et al[14], Naglaa Mohamed El-Khayat et al[15], Ozlem Ethemoglu et al [16], Yitao Zhang et al [17] and Ghulam Shabbir et al [18].

A study,done by Vincent JL et al[19], SapijaszkoMJ et al[20] and Mamary AJ et al[21] focusing on ICU and critically ill patients identified serum albumin as a biomarker for survival and the need for mechanical ventilation.

In this study, the most common Nerve Conduction Study pattern was demyelinating type, and this was comparable to the previous studies by Tavee and coauthors[22]. The infectious event is described to appear in 40-70% of patients [23-29]. In our series up to 43.5% of cases have had the infectious event, and respiratory infection was the most frequent one among all these infections.

In a nutshell, decreased albumin levels at the time of presentation of patient are associated with worse outcomes according to our study. However even now larger prospective studies are needed to support the findings of the present study.

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