

Factors associated with prognosis of Guillain-Barre syndrome

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AIM OF WORK: To study the good and poor prognostic factors for this syndrome.

SUBJECTS AND METHODS: 40 patients diagnosed with GBS recruited from neuropsychiatry department of Nasser Institute Hospital. They were assessed clinically using the Hughes scale at onset and 3-6 months later. In follow up patients were divided into GBS with good and those with poor prognosis according to their score, Good prognostic group has only 2 or less in the Hughes score while above two patients were considered having poor prognosis At presentation, some lab studies were done to them including CSF examination. Nerve conduction study was done to all the 40 patients. They were treated with plasma pheresis sessions with different number of sessions (6 or less versus more than 6). Reassessment of patients using Hughes GBS disability scale, and nerve conduction study; done 3-6 months after onset.

RESULTS: 40 completed the study. In this prospective hospital based study the worse Hughes scores in follow up was found among patients with

worse scores at onset, antecedent GIT affection, those patients with cranial nerve affection, with autonomic dysfunction, those with hyponatremia, hypokalemia, Lower albumin level, higher CSF protein level and of course axonal affection in nerve conduction study. However, the degree of cytoalbuminous dissociation didn't show a significant difference between the two groups. While neither RBS rise nor elevated HbA1C had significant effect on prognosis.

CONCLUSION: The variables that were associated with poor prognosis in GBS patients are:

- High Hughes scores at onset.
- Cranial nerve affection, respiratory involvement or autonomic disturbances at first assessment.
- Lab abnormalities as hyponatremia, hypokalemia, and hypoalbuminemia.
- High CSF proteins.
- Presence of axonal affection in the nerve conduction study in the first presentation.

Key Words: *Guillain-Barre syndrome; AIDP; CSF; Neuromuscular disorder; Prognostic factors*

INTRODUCTION

Despite the use of plasma exchanges and intravenous immunoglobulins, Guillain-Barré syndrome (GBS) still carries non-negligible morbidity and mortality. Furthermore, the psychosocial consequences of GBS may persist longer than expected. Various aetiological, clinical, electrophysiological and immunological factors may carry prognostic predictive value the prognosis of GBS is generally considered favourable. Despite the demonstrated efficacy of plasma exchange (PE) and intravenous immunoglobulins (IVIg), GBS however remains a disabling disease in a significant proportion of patients, and these treatments have not improved mortality. Long-term function is compromised in a significant proportion of subjects. Prognosis and potential determinants of clinical outcome in the disorder have been studied by several investigators in more recent years. Although several review articles have considered the various aspects of GBS, a synthesis of the important question of prognosis and its determinants has not, to date, to our knowledge, been performed. In this article, we review the literature on the specific issue of outcome and its predictors in adequately treated, adult-onset GBS (1).

PATIENTS AND METHODS

This prospective observational study included 40 patients who are diagnosed with GBS and recruited from neuropsychiatry department of Nasser Institute Hospital.

Patients criteria

Inclusion criteria

- Both sexes are included.
- Age: any age.
- All patients met diagnosis of GBS (2)

Exclusion criteria

- Patients with severe organ failure
- Thyroid dysfunction

- Adrenal dysfunction
- Drug induced polyneuropathy

All patients were subjected to

Interviewing Structured Questionnaire: Full medical and neurological history including:

- Personal Data.
- Complaint.
- Past History

Clinical examination: Full neurological examination stressing on peripheral nervous system with Hughe's scale (3,4) done in the first assessment and in follow up 3-6 months from onset (Table 1 and Figure 1).

Investigations:

Laboratory

- CBC
- CRP
- Serum Na level
- Serum albumin level on admission and after treatment
- Random Blood Sugar
- HbA1C
- CSF examination on admission
- Nerve conduction study (NCS) on both ulnar, peroneal nerves from 0_3 weeks from symptoms and comment on MCV, SCV, F wave, amplitude.

RESULTS

The patients were divided into two groups:

- **Improved group:** 33 patients.
- **Non-improved group:** 7 patients.

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TABLE 1
Showing Comparison between the 2 groups as regards baseline clinical data using Mann-Whitney's U and Chi square tests

Variables		Improved group (33)	Same or Worsened group (7)	Mann-Whitney's U test
		Median (IQR)	Median (IQR)	p value
Disability score (on admission)		3.4 (3 – 4)	4.4 (4 – 5)	= 0.0016**
Variable		Improved group (33)	Same or Worsened group (7)	Chi square test
				p value
DM	No	31 (93.9)	6 (85.7%)	= 0.968
	Yes	2 (6.1%)	1 (14.3%)	
HTN	No	29 (87.9%)	7 (100%)	= 0.781
	Yes	4 (12.1%)	0 (0%)	
Disease onset	Acute	10 (30.3%)	3 (42.9%)	= 0.841
	Subacute	23 (69.7%)	4 (57.1%)	
Type of antecedent infection	No infection	19 (57.6%)	0 (0%)	= 0.0004**
	GIT infection	7 (21.2%)	7 (100%)	
	URT infection	7 (21.2%)	0 (0%)	
Clinical presentations	Motor weakness	22 (66.7%)	0 (0%)	<0.0001**
	Cranial N. affection	10 (30.3%)	2 (28.6%)	
	Need ventilation	0 (0%)	5 (71.4%)	
	Autonomic symp.	1 (3%)	0 (0%)	

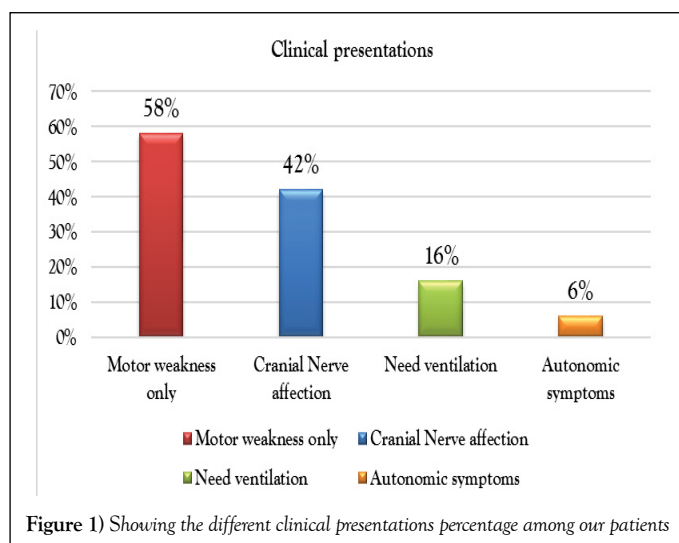


Figure 1) Showing the different clinical presentations percentage among our patients

In this study highly significant increase in disability score (on admission) was found in the worsened group; compared to the improved group; with highly significant statistical difference (p=0.0016).

Meanwhile there was a highly significant increase in the incidence of GIT infection in worsened group; compared to the improved group; with highly significant statistical difference (p=0.0004).

A highly significant increase in the presence of cranial nerve affection and the need for ventilation in the worsened group; compared to the improved group; with highly significant statistical difference (p< 0.0001).

There was a non-significant difference as regards DM, HTN and disease onset (p>0.05) between the 2 groups (Table 2).

The results of this study showed highly significant decrease in Na and albumin levels (on admission) in worsened group; compared to improved group; with highly significant statistical difference (p<0.01 respectively). Also the study revealed non-significant difference as regards RBS and HbA1C (p>.05) between the two groups (Table 3).

Our study revealed; a marked increase in the CSF protein in worsened group; compared to improved group; with highly significant statistical difference

TABLE 2
Shows a comparison between the 2 groups as regards baseline laboratory data using Mann-Whitney's U test

Variables	Improved group (33)	Same or Worsened group (7)	Mann-Whitney's U test
	Median (IQR)	Median (IQR)	p value
Na (on admission) (mEq/L)	138 (135 – 145)	119 (117 – 121.75)	= 0.000037**
Albumin (on admission) (g/dL)	3.7 (3.4 – 3.9)	2.6 (2.3 – 2.8)	= 0.0001**
RBS (mg/dL)	130 (109 – 166)	75 (70.7 – 231.5)	= 0.454
HbA1C (mg/dL)	5.1 (4.6 – 5.4)	5.2 (4.4 – 8.1)	= 0.544

TABLE 3
Shows a comparison between the 2 groups as regards baseline CSF data using Mann-Whitney's U and Chi square tests

Variables	Improved group (33)	Same or Worsened group (7)	Mann-Whitney's U test	
	Median (IQR)	Median (IQR)	p value	
CSF Protein (gm/dL)*	57 (16.5 – 91.5)	163 (149.2 – 182)	= 0.000072**	
Variable	Improved group (33)	Same or Worsened group (7)	Chi square Test	
			p value	
Cyto-albuminous Dissociation*	Present	10 (41.7%)	0 (0%)	= 0.106
	Absent	14 (58.3%)	7 (100%)	

CSF: Cerebro-Spinal Fluid

TABLE 4
Shows comparison between the 2 groups as regards baseline NCS data using Chi square test

Variables	Improved group (33)	Same or Worsened group (7)	Chi square Test	
			p value	
NCS (on admission)	Normal	0 (0%)	0 (0%)	= 0.027*
	AIDP	19 (57.6%)	0 (0%)	
	AMAN	5 (15.2%)	4 (57.1%)	
	AMSAN	4 (12.1%)	1 (14.3%)	
	Mixed	5 (15.2%)	2 (28.6%)	

AMAN: Acute Motor Axonal Neuropathy; AIDP: Acute Inflammatory Demyelinating Polyradiculoneuropathy; AMSAN: Acute Motor and Sensory Axonal Neuropathy

(p<0.01), and also marked increase in the cyto-albuminous dissociation in the worsened group; compared to the improved group; but not reaching statistical significant difference (p<0.05) (Table 4).

The study showed a significant increase in the AMAN type at baseline NCS assessment; in worsened group; compared to improved group; with significant statistical difference (p=0.027).

DISCUSSION

In this study, the presence of Antecedent diarrheal illness was found to be related to disease severity and poor outcome with high significant level. Most studies show Antecedent diarrhea is a predictor of poor outcome (5).

Cranial nerve involvement was found in 12 patients (30. 3%) and the most cranial nerve involved was facial nerve, most studies report cranial nerve involvement ranging from 30-60 % with facial and bulbar nerves being commonly involved, in a study by Sejvar and coauthors (6), 40% patients had cranial nerve affection. In another recent study by Khan and coauthors (7) one third of patients had cranial nerve involvement.

Ophthalmoparesis was noted in one case of Miller Fisher Syndrome (MFS _GBS), autonomic dysfunction was seen in 3% of our patients who had Cardiac arrest from the incidence of autonomic dysfunction has varied in previously reported studies from 17% by Ashok et al., to 66% in (8), 5(71.4%)

patients in group II need ventilation and this is associated with disease severity and poor outcome. Compared to previous studies, our patients had a higher GBS disability scale at treatment initiation. Most of our patients had a GBS disability scale greater than 4 in group II before treatment initiation, this was similar to the study by Koningsveld and coauthors, a higher score on admission seen to predict a poor outcome (p 0.0016) (9).

In this study, the most common Nerve Conduction Study pattern was axonal, and this was different from the previous studies by Tavee and coauthors. They found that demyelinating pattern was most commonly seen followed by axonal. Higher prevalence of Acute Motor Axonal Neuropathy (AMAN) has been reported from China (10). This difference may be because study was done in tertiary center which most severe cases referred to.

Our study showed that Hyponatremia was related to disease severity and poor outcome with significant p value 0.000037, also correlation study done by multiple regression model found hyponatremia had an independent effect on increasing follow up disability score and thus was consistent with most results that found hyponatremia as an important predictor of outcome in GBS patients (11,12).

Also, hypoalbuminemia assessed by correlation study by multiple regression model found hypoalbuminemia had an independent effect on increasing disability score, also by logistic regression analysis, hypoalbuminemia had an independent effect on increasing of probability of NCS worsening. Samukawa found that serum albumin levels decreased in GBS patients in the subacute period and that there was a negative correlation between albumin levels and Hughes' scores (admission/discharge) (10).

Chen found that impaired lab markers hyponatremia, hypoalbuminemia, hyperglycemia poor predictors of outcome and occur more in elder (13).

In this study, marked increase in CSF protein in group II with high significant value and this result consistent with Kuitwaard that found protein level in CSF was an independent prognostic factor. As regard cytoalbuminosis dissociation, So far, no previous studies discussed this result before. No significant difference was found as regard RBS, HbA1C levels as predictors of outcome.

Khan, studied the relation between Fasting Blood glucose (FBG), HbA1C and disease severity and short-term prognosis (14), found that FBG positively correlated to disability score, no relation with HbA1C. As regard RBS, so far no previous studies discuss this result before.

CONCLUSION

Antecedent infection is common and presence of diarrheal illness associated with axonal subtype which is associated with poor outcome. The most common electrophysiological subtype was axonal followed by demyelinating. High GBS score on admission associated with poor outcome. Hyponatremia, hypoalbuminemia were associated with poor outcome. RBS, HbA1C level were not related to outcome. High CSF protein level is correlated with poor prognosis. CSF cytoalbuminosis dissociation are independent predictors of poor outcome.

RECOMMENDATIONS

- Early identification of poor outcome predictors that negatively affect the functional outcome.

- Early intervention with appropriate treatment if possible to achieve better functional outcome, reduce level of disability.

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