TREATMENT OPTIONS FOR GUILLAIN-BARRE SYNDROME (GBS) - A COMPARATIVE ASSESSMENT OF TREATMENT EFFICACY BETWEEN INTRAVENOUS IMMUNE GLOBULIN (IVIG) WITH PLASMAPHORESIS

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ABSTRACT

Objective: To compare the therapeutic efficacy of Intravenous immune globulin (IVIG) with Plasma exchange (plasmaphoresis) in patients of Acute Inflammatory Demyelinating Polyneuropathy i.e. Guillain-Barre syndrome (GBS).

Study design: Randomized Controlled Trial (RCT)

Place and duration of the study: The study was of 12 months duration conducted at Department of Medicine, Neurology Unit of Military Hospital Rawalpindi from Jun 2008 to Jun 2009.

Subjects and methods: 60 Patients of GBS were randomly assigned to two treatment groups. Group A received Intravenous immune globulin (IVIG) and Group B Plasma Exchange. Patient's functional status according to London scale grade was assessed at the time of admission and at 02 and 04 weeks after giving treatment. Improvement in mean London scale Grades in each group was calculated at different weeks from baseline and then both groups were compared to each other.

Results: In each group there was significant improvement (P-value< 0.001) from baseline-2weeks and baseline-4 weeks. But when compared to each other both the groups had comparable improvement (p-value> 0.05).

Conclusions: Both IVIG and Plasma Exchange have equal therapeutic efficacy in the treatment of patients ofGBS.

Keywords: Guillian Barre Syndrome, Intravenous immunoglobulin, Plasma exchange, Polyneuropathy

INTRODUCTION

The Guillain-Barre syndrome (GBS) is an acute monophasic illness causing a rapidly progressive polyneuropathy with weakness or paralysis.[1] The main stay of therapy for GBS includes plasmaphoresis or administration of intravenous immune globulin.[2] Both therapies are recommended for those patients who are unable to walk unaided, demonstrate worsening lung vital capacities and require mechanical ventilation who present within four weeks of symptom onset. Intravenous immune globulin (IVIG) appears to be as effective as plasmaphoresis for the treatment of GBS as per the American Academy of Neurology (AAN) practice guidelines[3]. Combining the two treatments is not beneficial and steroid treatment alone is not beneficial either. The time period to onset of recovery is shortened by about 40 to 50 percent by treatment with plasma exchange or IVIG. The choice between plasma exchange and IVIG depends upon cost of treatment, availability and condition of patient[4]. IVIG is used more commonly because of its ease of administration and availability despite its high cost. In our setup at Military hospital Rawalpindi facilities for both plasmaphoresis and IVIG are available and are free for entitled patients. But these treatments have not been compared to each other in our own patient population. We decided to conduct this study to evaluate which treatment option is more effective and suitable to our patients. The objective of the study was to compare the therapeutic efficacy of Intravenous immune globulin (IVIG) with plasma exchange in patients of acute post infectious polyneuropathy (Guillain-Barre syndrome).

PATIENTS AND METHODS

This study was conducted in the medical department of Military Hospital Rawalpindi. Total duration of the study was 12 months from June 2008 to June 2009. a total of 60 patients,

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both male and female were randomly allocated to two groups i.e Group A and B.

Sample Selection

All patients from both with genders, above the age of 12 years, diagnosed GBS were included. They were asked to sign an Informed Consent Form.

Those patients showing progressive weakness> 28 days (that fall in Chronic Inflammatory demyelinating neuropathy) were excluded. Also patients with Diabetes Mellitus, Chronic Renal Dysfunction, Drug Induced Peripheral Neuropathy, Cerebrovascular Accidents, porphyrias and hypokalemic periodic paralysis were excluded. After excluding the above cases randamization was carried out by assigining alternate cases to IV IG and plasma excahne group.

Data collection procedure

Patients were enrolled from Medical Out Patient Department, Specialist Offices and Emergency Departments of Military hospital Rawalpindi. Treatment was carried out indoor. Each patient was thoroughly examined with full neurological assessment and the clinical diagnosis of GBS was reviewed by two Consultant Neurophyscians. CSF RE was done for albumin cytological dissociation. EMG/ NCS were carried out to confirm the acute demyelinating pattern of the disease. Blood glucose, serum urea, creatinine and electrolytes were done, to rule out secondary causes of peripheral neuropathy. Informed written consent was obtained from the patient /next of kin about the treatment protocols. Patients were randomly and equally allocated to Group A and GroupB.

Group A received IVIG in a total dose of 2g/kg over 5 days and group B underwent Plasma Exchange as daily sessions for similar duration.

The patient's baseline functional grade was determined based on London scale on day 1 and reassessed at 02 and 04 weeks of treatment. London Scale was used as follows: O-Healthy; 1- Minor symptoms / signs; 2-Walk 5 meters without assistance; 3-Walk 5 meters with assistance; 4Bed/Chair bound; 5-Assisted respiration; 6-Dead

Improvement in mean London scale Grades in each group was calculated at different weeks from baseline and then both groups were compared to each other.

Data Analysis Procedure

SPSS version 15 was used for data analysis.

Descriptive statistics were used to describe the data i.e. mean and standard deviation (SD) for quantitative variables and frequency along with percentages were used for qualitative variables. Independent samples T - test was used to compare mean scores between the two groups and paired sample t-test was used for within group comparison. P-value<0.05 was considered as significant.

RESULTS

Age description of both the groups has been given in the table. In-group A there were 80% (24) males and 20% (06) females. In-group B there were 74% (22) males and 26% (08) females. Both groups were comparable with respect to age (P>0.05) and gender (P>0.05).

Each group was compared to the other at baseline, 2 weeks and 4 weeks. (Table-1) Both had comparable London scale grades at baseline (P value> 0.461), 2 weeks (P-value> 0.580), and 4 weeks (P-value> 0.122).

Then improvement within each group was assessed. In group A there was significant improvement (Pvalue< 0.001) from baseline-2weeks and baseline-4 weeks. (Table-2) Similarly in group B there was significant improvement (P-value< 0.001) from baseline-2weeks and baseline-4 weeks (Table-2). Thus group A with receiving IVIG, and group B receiving plasmaphoresis had significant improvement from baseline to 2 weeks and then to 4 weeks in their own respective groups. Meaning thereby that each treatment was highly effective in treatment of GB patients within its own group.

When improvement between both the groups was compared with each other it was observed that there was insignificant difference

in improvement of London scale grades at 2 weeks (p = 0.391) and at 4 weeks (p = 0.722).

Finally the study results clearly show that Intravenous immune globulin (IVIG) is as effective as plasma exchange for the treatment of GBS. (Figure)

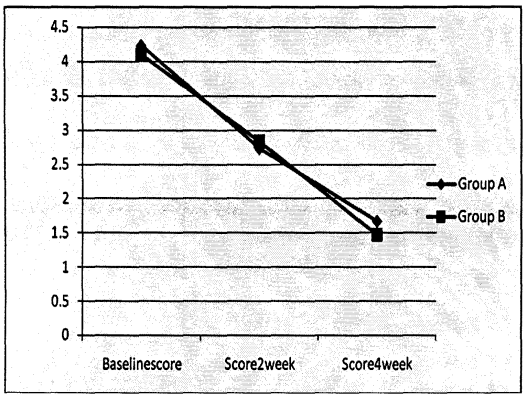

Fig. 1: Description of Mean London Scale Grades of both groups at Baseline, 2 weeks, 4 weeks

Table-1: Comparison of Mean London Scale Grades of both groups at Baseline, 2 weeks and 4 weeks

	Group A (n=30)		Group B (n=30)		p-value
	Mean change	SD	Mean change	SD	
Baseline	4.23	0.626	1.10	0.759	0.461
2 Weeks	2.73	0.691	2.83	0.699	0.580
4 Weeks	1.67	0.479	1.47	0.507	0.122

DISCUSSION

The main modality of therapy, also known as disease modifying treatment for Guillain-Barre syndrome (GBS) includes plasma exchange (also called plasmaphoresis) and administration of intravenous immune globulin (IVIG).[3] The other aspect of management is supportive care. Plasmaphoresis is thought to remove circulating antibodies, complement, and soluble biological response modifiers.[5] The exact mechanism of action for intravenous immune globulin (IVIG) in GBS is unknown but may include providing anti-idiotypic antibodies, interfering with activation of complement and effector functions of T and B cells.[6] Individually both these methods of treatment have been proven effective in trials. In a 2002 metaanalysis of six randomized controlled trials and 649 patients with GBS, treatment with plasma exchange was superior to supportive care[6]. There are no randomized controlled trials comparing IVIG with placebo for the treatment of GBS; rather, the trials have compared IVIG with plasma exchange. In the two largest trials[7,8], patients assigned to IVIG were significantly less likely to discontinue treatment than patients assigned to plasma exchange (relative risk 0.11, 95% CI 0.04-0.32)[11,12].

Our study results have been validated by many international studies. Intravenous immune globulin (IVIG) is as effective as plasma exchange for the treatment of GBS. This conclusion was reached by a 2003 practice parameter from the American Academy of Neurology (AAN) on immunotherapy for GBS[3], and is supported by several later studies, comparing IVIG with plasmaphoresis for the treatment of GBS patients, a 2006 meta-analysis of five trials involving mostly adult non ambulatory patients[6], and a 2007 systematic review of immunotherapy for GBS[4].

As an example of these reports, the 2006 metaanalysis found no significant difference in the primary outcome measure, the change in a seven-grade disability scale at four weeks, with IVIG compared with plasma exchange[8].

There was no significant difference in disease outcome in patients treated with either plasmaphoresis or intravenous immunoglobulin a study conducted by Khan and colleagues in Pakistan[9].

Limitations of the study

The authors wish to acknowledge that this study did not have a randomized double blind

Table-2: improvement in mean London scale grades in each group at different weeks from baseline.

	Group A (n=30)			Group A (n=30)		
	Mean change	SD	p-value	Mean change	SD	p-value
Baseline – 2 Weeks	1.50	0.62	<0.001	1.27	0.621	<0.001
Baseline – 2 Weeks	2.57	0.61	<0.001	2.63	0.634	0.001

controlled design which would have been ideal to make a good assessment of the therapeutic efficacy of the two interventions. Also the findings of the study cannot be generalized to all patient population since this was not conducted on population representation. More focused and controlled studies would be required in future to fill in the gaps left in the index research.

CONCLUSION

Plasma exchange and immunoglobulin have equal therapeutic efficacy in the treatment of patients with Guillain-Barre syndrome, hospitalized in Military Hospital Rawalpindi during the 1 year period.

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