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Original Research Article

COMPARATIVE STUDY ON THE EFFICACY OF THERAPEUTIC PLASMA EXCHANGE AND INTRAVENOUS IMMINUOGLOBULIN IN THE CLINICAL OUTCOME OF NEUROLOGICAL DISORDERS

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Abstract

Background: Therapeutic plasma exchange (TPE) has been employed to remove immunoglobulins and other immunologically active substances such as complements or cytokines from the blood for the treatment of autoimmune neurologic diseases .TPE is a standard treatment regimen for neurologic diseases such as Guillain-Barre syndrome, Myasthenia Gravis, Autoimmune encephalitis. High-dose IV immunoglobulin (IVIG) is an effective treatment for inflammatory and autoimmune neurological disorders. The objective is to compare the efficacy of therapeutic plasma exchange and intravenous immunoglobulin in the clinical outcome of autoimmune neurological disorders. **Materials and Methods:** To compare the efficacy of therapeutic plasma exchange and intravenous immunoglobulin in the clinical outcome of autoimmune neurological disorders. **Result:** In the present study, 23 of TPE group showed onset of one grade [Grade 4 – confined to bed to Grade 3 – able to walk 5 meters with assistance] of functional improvement in 23.3 days, 22 of IVIG group showed the same improvement within 20.1 days.27 of TPE group had a mean duration of 32.4 days to attain functional Grade of 2 from 4. 27 patients of IVIG showed the said grade in 28.4 days. The mean length of stay of patients in TPE group was 38 days and 32 days in IVIG group.T PE was found to be cost effective when compared to IVIG therapy. **Conclusion:** In our study, the therapeutic efficacy of TPE is almost same as that of IVIG, except for slightly prolonged length of stay with IVIG group of patients. In centers treating such diseases routinely, the cost factor for IVIG infusion is approximately 5 to 6 times that of TPE, in spite of initial expenditure incurred for purchasing apheresis machine.

INTRODUCTION

Therapeutic plasma exchange (TPE) is defined by the American Society for Apheresis (ASFA) 2019 guidelines as “A therapeutic procedure in which the blood of the patient is passed through a medical device which separates plasma from the other components of blood….”. Unlike plasmapheresis, TPE involves plasma removal and replacement with a solution such as a colloid solution (e.g., albumin and/or plasma) or a combination of a crystalloid/colloid solution. This is the most common therapeutic apheresis procedure performed.[1]

Even though it was initially conceived as a treatment for hematological diseases with presumed or demonstrated immune pathophysiology,[1] treatment using TPE has been extended to a variety of pathologies including kidney, autoimmune rheumatological, and neurological diseases, with the latter being the pathology most frequently treated by TPE2. Therapeutic plasma exchange (TPE) is a procedure that reduces circulating autoantibodies of the patients. TPE is commonly used in neurological disorders where autoimmunity plays a major role. The increased usage of TPE has likely followed an increased understanding of its mechanisms of action, which range from the removal of pathogenic

autoantibodies and immune complexes to improvement in monocyte function.[1] Among the autoimmune neurological diseases (ANDs) treated using TPE, chronic inflammatory demyelinating polyneuropathy (CIDP), Guillain–Barré syndrome (GBS), myasthenia gravis (MG), Neuromyelitis Optica spectrum disorders (NMOSDs), and Autoimmune Encephalitis (AE) are well described. TPE is typically used alone or in conjunction with other treatment options, such as intravenous immunoglobulin's (IVIG) and corticosteroids, as a first-line treatment for some of these disorders.[2]

IgG antibodies have been used therapeutically for over a century. In the pre- antibiotic era, IgG was used to treat numerous infectious diseases.[3] IVIG preparations are extracted from plasma pooled from more than 10,000 blood or plasma donations, and contain antibodies directed against a broad range of pathogens, as well as numerous foreign and self-antigens. Today, pooled polyclonal IgG from the serum of thousands of donors, delivered intravenously—so-called intravenous immunoglobulin, or IVIG—is used as replacement therapy for patients lacking immunoglobulins. At high doses, IVIG can act as an anti-inflammatory and immunomodulatory agent for the treatment of several autoimmune diseases.[4]

IVIG suppresses antibody-dependent cellular toxicity, decreases natural killer cell function, inhibits autoantibody production, neutralizes circulating pathogenic antibodies, and interferes with complement activation.[5]

IVIG has been established as a first-line therapy for GBS,CIDP and multifocalmotor neuropathy based on evidence from controlled clinical trials. IVIG is also an effective rescue therapy in some patients with worsening myasthenia gravis, and is beneficial as a second-line therapy for dermatomyositis and stiff-person syndrome. IVIG has been tested in some neurodegenerative disorders, but a controlled study in Alzheimer disease yielded disappointing results. Despite its widespread use and therapeutic success, the mechanisms of action of IVIG are poorly understood. Several hypotheses, based on the function of eitherthe variable or constant IgG fragments, have been proposed to explain IVIG's immunomodulatory activity.[6.7]

Subcutaneous rather than intravenous administration of IgG is gaining momentum because of its effectiveness in patients with primary immunodeficiency and the ease with which it can be administered independently from hospital-based infusions. The demand for IVIG therapy is growing, resulting in rising costs and supply shortages.[8]

FDA-approved indications for IVIG therapy are limited, but a large number of diseases seen by neurologists have shown potentially beneficial responses to this agent6. Strategies to replace IVIG with recombinant products have been developed based on proposed mechanisms that confer the anti-inflammatory activity of IVIG, but their efficacy has not been tested in clinical trials.[6]

Therapeutic Plasma Exchange and Intravenous Immunoglobulin have been widely used in the management of various autoimmune neurological disorders. The objective of this study is to compare the efficacy in the clinical outcome of the 2 treatment modalities and to evaluate their cost effectiveness in a developing country like ours.

MATERIALS AND METHODS

This Pragmatic Observational study was done among all the neurological patients who were indicated for TPE/IVIG therapy in the Tertiary care hospital, Madras Medical College and Hospital, Chennai, Tamil Nadu. Study period was one year.

Study Area:

- Institute of Neurology, Madras Medical College and Hospital, Chennai, Tamil Nadu.
- Department of Transfusion Medicine, The Tamil Nadu Dr. M.G.R. Medical University, Guindy , Chennai

Sample Size: 31 for each group.

Inclusion Criteria

All neurological patients indicated for TPE/IVIG with age more than 16yrs and onset of neurologic symptoms within the previous 14 days.

Exclusion Criteria

Those patients with atypical forms of GBS, previous episode of GBS, Myasthenia Gravis worsening secondary to concurrent medications or infection, known Immunoglobulin A deficiency, a previous allergic reaction to properly matched blood products, pregnancy, severe concurrent medical disease and those not available for follow up. Those not willing to participate in the study.

Informed Consent

The study details were completely explained to the patient's relatives who were included in this study at the Institute of Neurology, Madras Medical College and Hospital, Chennai.

Medical Research Council Sum Score (MRC)160

Summation of the strength of 6 muscle groups tested on both sides; it yields the so-called "MRC-sum score," ranging from 0 (paralysis) to 60 (normal strength). These muscle groups can easily be tested against gravity, and both proximal and distal muscle groups are represented in the MRC-sum score.

MRC sum score is calculated at the time of admission and improvement in scores correlates better outcome.

Erasmus GBS Respiratory Insufficiency Score

Modified Erasmus GBS Outcome Scores (mEGOS)

Nerve Conduction Studies

Hughes Gbs Disability Score

Ice pack test

Electro diagnostic Testing

The quantitative myasthenia gravis score (QMGS)

Therapeutic Plasma Exchange

After allocation, proper clinical and laboratory investigations like ECG, chest X-ray, cardiorespiratory status and serology were carried out before the TPE procedure. Informed consent

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was obtained from every patient prior to the procedure, and was explained about the procedure in detail with the probable complications. TPE was performed on every alternate day using a double lumen catheter Haemonetics MCS Plus machine. A formula for determining the needed volume of single PEX was suggested by A.A. Kaplan

Volume PEX = [0.065 x body weight(kg)] x (1 − Hct) Where kg: kilograms and Hct: hematocrit

Intravenous Immunoglobulin

Treatment with intravenous Immunoglobulin was started as soon as randomization of patient was done. During the 5 subsequent days 0.4gm of IVIG was given per kilogram per day.

RESULTS

Maximum number of the patients belonged to the age group 31-40 yrs which is 18 patients (29.0%) and the least is above 70 yrs which is 2 (3.2%). Maximum number of the participants were Males 34 patients (54.8%) and Females were 28 (45.2%).

maximum number of the participants were Males 34 patients (54.8%) and Females were 28 (45.2%).

Table 1: Comparison between Antecedent Events with Groups.

			Groups		Total	χ2- value	p-value
			TPE	IVIG			
Antecedent Events	No	Count	8	10	18	0.327	0.567 #
		%	28.6%	35.7%	32.1%		
	Yes	Count	20	18	38		
		%	71.4%	64.3%	67.9%		
Total		Count	28	28	56		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							

There is no statistical significant association between Antecedent Eventsand Groups.

Table 2: Comparison of Time between Antecedent Event and Symptoms with Groups by Unpaired t-test

		N	Mean	S.D	t-value	p-value
Time between Antecedent Event and Symptoms	TPE	20	7.9	4.5		0.821
	IVIG				0.227	#
# No Statistical Significance at p > 0.05 level						

There is no statistical significant difference between Time between Antecedent Event and Symptoms and Groups.

There is no statistical significant difference between Onset of Symptoms to Admission and Groups.

Clinical Presentation distribution were 3.2% is (Fatiguability, Ptosis, Dyspnoea), 6.4 % is (Fatiguability, Ptosis), 51.6% is (Quadriparesis), 12.9% is (Quadriparesis+ Bulbar+ Extra Bulbar+ Respiratory), 3.2% is (Quadriparesis+ Bulbar+ Respiratory), 22.5% is (Quadriparesis+ Extra Bulbar).

Table 3: Comparison between Nerve Conduction Velocity with Groups

			Groups		Total	χ 2 - value	p-value
			TPE	IVIG			
Nerve Conduction Velocity	Axonal- AMAN	Count	6	6	12	0.458	0.795 #
		%	21.4%	21.4%	21.4%		
	Demyelinating- AIDP	Count	17	15	32		
		%	60.7%	53.6%	57.1%		
	Mixed -AMSAN	Count	5	7	12		
		%	17.9%	25.0%	21.4%		
Total		Count	28	28	56		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							

There is no statistical significant association between Nerve Conduction Velocity and Groups.

Table 4: Comparison between CSF Analysis-Albumin Cytological Dissociation with Groups

			Groups		Total	χ2-value	p-value
			TPE	IVIG			
CSF Analysis- Albumin Cytological Dissociation	Yes	Count	18	18	36	0.000	1.000 #
		%	64.3%	64.3%	64.3%		
	No	Count	10	10	20		
		%	35.7%	35.7%	35.7%		

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Total	Count	28	28	56		
	%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level						

There is no statistical significant association between CSF Analysis-Albumin Cytological Dissociation and Groups.

Table 5: Comparison of Single Breath Count with Groups by Unpaired t-test

Single Breath Count		N	Mean	S.D	t-value	p-value
At Admission	TPE	31	20.6	6.3	0.139	0.890 #
	IVIG	31	20.4	6.5		
On Discharge	TPE	31	38.0	5.4	1.116	0.269 #
	IVIG	31	39.5	5.5		
# No Statistical Significance at p > 0.05 level						

In comparison of Single Breath Count At Admission were t-value=0.139, p=0.890>0.05 which shows no statistical significant difference between Single Breath Count At Admission and Groups. Similarly in comparison of Single Breath Count On Discharge were t-value=1.116, p=0.269>0.05 which shows no statistical significant difference between Single Breath Count On Discharge and Groups.

Table 6: Comparison of MRC Sum Score with Groups by Unpaired t-test

MRC Sum Score		N	Mean	S.D	t-value	p- value
At Admission	TPE	28	25.2	7.5	0.033	0.974 #
	IVIG	28	25.1	8.7		
On 7 days	TPE	28	25.2	7.5	0.033	0.974 #
	IVIG	28	25.1	8.7		
On 28 days	TPE	27	32.7	8.8	0.372	0.711 #
	IVIG	27	33.5	7.3		
On Discharge	TPE	27	42.2	3.2	0.565	0.575 #
	IVIG	27	42.7	2.5		
3rd month	TPE	27	48.1	3.8	0.081	0.936 #
	IVIG	27	48.0	2.9		
6th month	TPE	27	54.4	2.4	0.689	0.494 #
	IVIG	27	53.9	2.4		
# No Statistical Significance at p > 0.05 level						

In comparison of MRC Sum Score At Admission were t-value=0.033, p=0.974>0.05 which shows no statistical significant difference between MRC Sum Score At Admission and Groups. In comparison of MRC Sum Score On 28 days were t- value=0.033, p=0.974>0.05 which shows no statistical significant difference between
MRC Sum Score On 28 days and Groups. In comparison of MRC Sum Score On Dischargewere t-value=0.565, p=0.575>0.05 which shows no statistical significant difference between MRC Sum Score On Discharge and Groups. In comparison of MRC Sum Score on 3rd monthwere t-value=0.081, p=0.936>0.05 which shows no statistical significant difference between MRC Sum Score on 3rd month and Groups. In comparison of MRC Sum Score on 6th monthwere t-value=0.689, p=0.494>0.05 which shows no statistical significant difference between MRC Sum Score on 6th month and Groups.
There is no statistical significant difference between Number of EGRIS and Groups.

Table 7: Comparison of MEGOS with Groups by Unpaired t-test

MEGOS		N	Mean	S.D	t-value	p-value
At Admission	TPE	28	5.6	1.3	0.000	1.000 #
	IVIG	28	5.6	1.3		
At Day 7	TPE	28	8.1	1.8	0.000	1.000 #
	IVIG	28	8.1	1.8		
# No Statistical Significance at p > 0.05 level						

Comparisonof MEGOS with Groups by Unpaired t-test. In comparison of MEGOS At Admission were t-value=0.000, p=1.000>0.05 which shows no statistical significant difference between MEGOS At Admission and Groups. Similarly in comparison of MEGOS At Day 7 were t-value=0.000, p=1.000>0.05 which shows no statistical significant difference between MEGOS At Day 7 and Groups.

Table 8: Comparison of HGBS with Groups by Unpaired t-test

HGBS		N	Mean	S.D	t-value	p- value
At Nadir	TPE	28	4.0	0.5	0.000	1.000 #
	IVIG	28	4.0	0.5		
1 week	TPE	28	4.0	0.5	0.000	1.000 #
	IVIG	28	4.0	0.5		

ISSN (O): 2687-5365; ISSN (P): 2753-6556

4 weeks	TPE	27	2.4	0.9	0.973	0.335 #
	IVIG	27	2.2	0.7		
Discharge	TPE	27	1.9	0.3	0.000	1.000 #
	IVIG	27	1.9	0.3		
3 months	TPE	27	0.2	0.4	0.331	0.742 #
	IVIG	27	0.2	0.4		
6 months	TPE	27	0.1	0.3	0.754	0.454 #
	IVIG	27	0.2	0.4		
# No Statistical Significance at p > 0.05 level						

Comparison of HGBS with Groups by Unpaired t-test were all the HGBS durations (At Nadir(t-value=0.000,p=1.000>0.05), 1 week(t-value=0.000,p=1.000>0.05), 4 weeks(t-value=0.973,p=0.335>0.05),Discharge(t-value=0.000,p=1.000>0.05), 3 months(t-value=0.331,p=0.742>0.05), 6 months(t-value=0.754,p=0.454>0.05) which shows no statistical significant difference between HGBS and Groups.

Comparison between Assisted Ventilation with Groups by Pearson's chi-squared test were $\chi 2=0.000$, p=1.000>0.05 which shows no statistical significant association between Assisted Ventilation and Groups.

Comparison of Duration of Ventilation with Groups by Unpaired t-test were t-value=0.369, p=0.717>0.05 which shows no statistical significant difference between Duration of Ventilation and Groups.

Comparison between Ventilator Associated Pneumonia with Groups by Pearson's chi-squared test were $\chi 2=0.254$, p=1.000>0.05 which shows no statistical significant association between Ventilator Associated Pneumonia and Groups.

comparison between Relapsewith Groups by Pearson's chi- squared test were $\chi 2=0.350$, p=1.000>0.05 which shows no statistical significant association between Relapseand Groups.

comparison between Complication with Groups by Pearson's chi-squared test were $\chi 2=2.657$, p=0.103>0.05 which shows no statistical significant association between Complication and Groups.

Complications distribution were 3.2% is Catheter Block, 1.6% is Chills during the procedure- so stopped and the Injection DEXA and Injection AVIL given to continue, 4.8% is (Chills,Nausea), 1.6% is Hyponatremia, 4.8% is Hypertension, 4.8% is (Hypertension, Hypocalcemia), 4.8% is Muscle Pain, 1.6% is Nausea, 3.2% is Palpitation, 1.6% is Palpitation, Catheter Block, 1.6% is Recurrence, 67.7% is No Complications.

The above table shows comparison between Classification of Antecedent Events with Groups by Pearson's chi-squared test were $\chi 2=1.682$, p=0.795>0.05 which shows no statistical significant association between Classification of Antecedent Events and Groups.

comparison of Duration of Hospital Staywith Groups by Unpaired t-test were t-value=2.001, p=0.051>0.05 which shows no statistical significant difference between Duration of Hospital Stayand Groups.

comparison of Mean Duration to Attainment of Grade 2 on Functional Grade with Groups by Unpaired t-test were t-value=1.844, p=0.072>0.05 which shows no statistical significant difference between Mean Duration to Attainment of Grade 2 on Functional Grade and Groups.

comparison of Onset of Improvement in Functional Grade with Groups by Unpaired t-test were t-value=3.09, p=0.003>0.05 which shows no statistical significant difference between Onset of Improvement in Functional Grade and Groups.

DISCUSSION

Sonawale A et al. in their study on 34 GBS patients had a similar demographic profile and found the mean age of the patients included was 35.24 years with a standard deviation of 15.61. Most patients were present in the age group of 15-45 years (young adults (73.52%)). The age of the youngest patient in their study was 15 years and eldest 68 years.[7]

GBS is an autoimmune disease, caused by mechanism of molecular mimicry after an infection. Prior history of infection was seen in 67.9% of GBS patients in our study, which included upper respiratory tract infection in 58.9% and diarrhea in 5.4%. The role of infections by Campylobacter Jejuni, Cytomegalovirus (CMV), Epstein-Barr virus (EBV) and Mycoplasma pneumoniae in causing GBS is well established and the infective agent may determine the electrophysiological subtypes of GBS. Jaydip Ray Chaudhuri et al reported similar findings in their study with prior history of infection in 68% of their patients, which included upper respiratory tract infection in 38%, diarrhea in 27%, and non-specific fever in 2%.[8]

In the present study in patients with GBS, the most common clinical presentation at the time of admission was Quadriparesis (51.6%).

ArchanaSonawale et al in their study on GBS patients, reported similar clinical presentation with Paraparesis (23.53%) as the most common presentation, followed by Quadriparesis (20.58%).[7]

GBS subtypes

In the present study AIDP (57.1% of all patients) was the most common variant of GBS. AMAN and AMSAN were each found in 21.4% of the patients.

Similar findings were reported by Jaydip Ray Chaudhuri et al in their study in which AIDP (56.7% of all patients) was the most common variant of GBS followed by AMSAN(24.3%) and AMAN(17.5%) respectively. The prevalence of AMSAN is similar in Israel and Bangladesh, but the

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Japanese had very low prevalence of AMSAN (1–4%). The prevalence of AMAN is similar to studies from the West. This is in contrast to China and other Asian countries. AMAN was the commonest subtype of GBS reported from North China.[8] The difference could be partly accounted by variations in the environmental factors, pathogenic mechanisms, genetic susceptibility, other triggering factors like different infections operating in different populations.

In the present study, GBS patients in both groups had the following parameters, mean MRC (out of 60) sum score 25.2 and 25.1 respectively, mean SBC of 38 and 39.5,mean EGRIS and mean mEGOS of 4.4 and 5.6 in both groups respectively. The mean mEGOS after 7 days of admission was 8.1 in both groups.

Similarly Jaydip Ray Chaudhuri et al in their study of GBS patients had a mean MRC of 22.1±11.1 in TPE group and 20.8±7.4 IVIG group at the time of admission.[8]

In the present study the mean SBC at the time of admission were 20.6 in TPE group and 20.4 in IVIG group. ArchanaSonawale et al,[7] in their study had similar SBC at the time of admission 17.67 and 24.2 in TPE and IVIG group respectively.

Mechanical Ventilation

In the present study 14 GBS patients (25%) were mechanically ventilated. Mean duration of ventilation was 15 days in TPE group and 12.75 days in IVIG group. The duration of ventilation was more in TPE group than IVIG group. In the present study 5 out of 14 ventilated patients developed ventilator associated pneumonia. Similar efficacy was seen in both groups in mechanically ventilated patients.

Jaydip Ray Chaudhuri et al in their study of GBS patients had a higher proportion of mechanically ventilated patients with 33.3% in TPE group and 42% in IVIG group respectively.[8]

With regards to clinical efficacy, BoubakerCharra et al in their study of 41 mechanically ventilated GBS patients found that early weaning from mechanical ventilation and motility recuperation was found in IVIG group than TPE group.[9]

Mohammed A El-Bayoumi et al in their study on 41 GBS children found that in mechanically ventilated patients TPE is better than IVIG.[10]

Similarly V Bril et al in their study found a mean time to improvement by one functional grade of 36±10 days in TPE group and 39±12 days in IVIG group.[11]

F.G.A.Van Der Meche et al in their study had a median time to improvement by one functional grade of 41 days in TPE group and 27 days in IVIG group.[12]

In the present study with GBS patients, the mean time to recovery of independent locomotion was 32.4 days in TPE group and 28.4 days in IVIG group with TPE group slightly prolonged than IVIG. Similarly F.G.A.Van Der Meche et al in their study had a median time of 69 days in TPE group and 55 days in IVIG group for recovery of independent locomotion.[12]

In the present study, the mean MRC sum score at the time of discharge was 42.4 in TPE group and 42.6 in IVIG group.

SimilarlyJaydip Ray Chaudhuri et al8 in their study had a mean MRC sum score of37.9 +17.3 in the TPE group and 41.5+ 14.7 in the IVIG group at the time of discharge.

In contrast Y. Ye et al13in their study showed MRC score significantly better in PE group than in the IVIg group at 2 weeks after completion of treatment.

In the present study, the mean SBC at the time of discharge was 38 in TPE group and39.5 in IVIG group. ArchanaSonawale et al in their study had similar SBC at the time of discharge 23.17 and 37.3 in TPE and IVIG group respectively.[7]

Jaydip Ray Chaudhuri et al in their study had infections (50% in TPE & 42.1% in IVIG) and hypotension (27.7% in TPE & 15.7% in IVIG) as the most common complications.[8]

In the present study, mortality rate was 3.22% (1 patient in TPE group and 1 patient in IVIG group). All 3 patients had diarrhoea as the antecedent illness and presented with Hughes GBS disability grade of 5 on admission, so they had poor prognosis. Both the patients required ventilator support,developed sudden cardiac arrhythmias and expired.

Similarly Naglaa Mohamed El-Khayat et al in their study found that presence of antecedent diarrheal illness related to disease severity and poor outcome with high significant level.[13,14]14

L.H. Visser et al in their study concluded that diarrhea is an important poor predictor of outcome in GBS patients.[15]

Jaydip Ray Chaudhuri et al in their study found a mortality rate of 8.1% (two patients in plasmapheresis group and one patient in IVIG group).[8]

In the present study the mean duration of hospital stay was 37.5 days in TPE group and32.4 days in IVIG group. Similar to other studies, the duration of hospital stay was slightly prolonged in TPE group compared to IVIG groupJaydip Ray Chaudhuri et al in their study had a mean hospitalization of 20.5±2.9 days in TPE group and 15.1±2.2 days in IVIG group.[8]

Khaled Saad et al in his study on comparing the clinical efficacy in 62 GBS children found that the duration of hospital stay was 15.7±8 days in TPE group and 29.4±14.7 days in IVIG group.[16]

Y. Ye et al,[13] in their study showed that both MRC score and Hughes score were significantly better in PE group than in the IVIg group at 2 weeks after completion of According to the results of this research, PE can effectively improve the nerve function defect in patients with GBS; the degree of improvement related to time and improvement of neurologic deficits significantly increased along with the extension of time.

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In contrast ArchanaSonawale et al in their study on GBS patients found that significant improvement in MRS and MBS scores in IVIG group.[7]

In Plasma Exchange/SandoglobulinGuillain-Barré Syndrome Trial Group there was no significant differences between the groups in the mean disability-grade improvement after 4 weeks.[17]

D.Barth et al in their study found that IVIG and TPE reduced the QMGS, and IVIG was comparable to PLEX in efficacy. The post intervention status revealed that the duration and proportion of patients improved were the same in both group (69% in IVIG & 65% in TPE). They concluded that IVIG has comparable efficacy to PLEX in the treatment of patients with moderate to severe MG.[11]

Sadiye et al in their study on efficacy of TPE and IVIG in MG patients concluded similarly that even though initial Osserman scores of the patients receiving TPE treatment were higher than those receiving IVIG treatment, the Osserman scores after 3 months of admission did not differ significantly.[18]

CONCLUSION

In our study, the therapeutic efficacy of TPE is almost same as that of IVIG, except for slightly prolonged length of stay with IVIG group of patients.

In centres treating such diseases routinely, the cost factor for IVIG infusion is approximately 5 to 6 times that of TPE, in spite of initial expenditure incurred for purchasing apheresis machine. Since TPE offers the same therapeutic outcome as that of IVIG in these cases, considering the cost factor it shall be the preferred option in developing countries like India.

Hence, it is advantageous to establish facilities in advanced neurology centres to perform TPE for the treatment of diseases like GBS and MG.

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