Therapeutic Plasma Exchange in Guillain Barre Syndrome: An experience of Bangabandhu Sheikh Mujib Medical University, Bangladesh

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ABSTRACT

Background: Therapeutic plasma exchange (TPE) has been used as one of the treatment modalities of neurological diseases. Intravenous Immunoglobulin (IVIG) and Therapeutic Plasma Exchange (TPE) are treatment options in Guillain Barre syndrome (GBS). In developing countries IVIG is not easily available and it is also expensive, TPE is preferred for treatment of GBS as it is affordable. Study on TPE for GBS are scarce here. Most of the study regarding TPE in GBS has been conducted in high-income countries as it is expensive treatment modality. Reports on TPE in GBS is very scarce from Bangladesh.

Materials and Methods: A retrospective analysis of TPE with a standard hemolysis equipment for the treatment of Guillain Barre syndrome (GBS) was conducted. A 50 patients of GBS who received TPE conducted between January 2017 to December 2018 in the department of Transfusion Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh were analyzed. All patients had undergone at least 2 cycles of plasma exchange. Volume exchanged in each cycle was one plasma volume.

Results: Out of 50 cases there were 43 (86%) male and 7 (14%) female. Age range of patients was from 11 – 50 years. Approximately 40% improved clinically of first cycle of PE & 85% after second cycle, 95% after third cycle and 95-100% after 5 cycle. 1(2%) patient died, and 49(98%) patients survived and recovered.

Conclusion: The treatment is cost affection in Compassion to IVIG. TPE is and affection, safe and affordable treatment modality for GBS.

Keywords: Guillain Barre Syndrome, immunoglobulin, plasma exchange.

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I. INTRODUCTION

Guillain Barre syndrome (GBS) is sub-acute inflammatory demyelinating polyneuropathy may be succeeded to severe quadriplegia & respiratory failure which may require ventilation. Approximately 20% of patients needed ventilation [1], [2].

Approximately one third of the patients with GBS will require mechanical ventilation and most GBS related death is due to respiratory failure [3]. The annual incidence of GBS is 0.4-4 per 100,000 in the world. Men are more frequently affected than women [4].

GBS is an autoimmune disease of the peripheral nervous system. Campylobacter jejuni, cytomegalovirus, Epstein Barr virus and Mycoplasma pneumoniae may cause GBS [5].

Molecular emulation between infectious agents and gangliosides plays a pivotal role [6].

Plasma exchange (PE) should be performed as early as possible in the course of GBS which may shorten the course and severity of GBS.

In plasma exchange there is withdrawing of the patient's blood, passing through an instrument where different types of

blood components are separated and returning all the cellular components (red cell, white cell & platelets) along with either donor plasma and/or a manufactured replacement solution. Patient's plasma is collected in a plasma collection bag for removal. This is thought to rid the blood of substances that are attacking myelin of patient causing neuropathy [7].

High doses of intravenous Immunoglobulin may be same helpful as plasmapheresis. There is also noted that although corticosteroid medication (such as prednisolone) is mainstay of anti-autoimmune disease treatment, are not only unhelpful, but may sometimes be harmful to patient with GBS [8].

II. METHODS

TPE in 50 GBS patients having age between 11-50 years was performed in Department of Transfusion Medicine, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka, Bangladesh during January 2017 to December 2018. Cobe spectra flow cell separator was used to perform plasma exchange of Guillain Barre syndrome.

Patients of GBS having Quadriplegia, difficulty in breathing and no bowel, bladder or any sensory involvement

were included in this study. TPE was performed within seven days of diagnosis.

In each procedure, one volume of plasma was exchanged and FFP, sterile saline in combination with albumin was used as replacement fluid.

Two cycles of TPE were performed for each patient i.e., 2 cycles received by 50 GBS patients.

40 patients received 3 cycles and 5 cycles were received by 25 GBS patients.

A femoral catheter was inserted in all patients before procedure.

Blood pressure, heart rate and heart rhythm were monitored clinically during the procedure.

Complications such as hypotension, nausea, vomiting, dizziness, perioral tingling, abdominal pain was recorded during or immediately after procedure.

No fatal complication was observed. For tingling oral calcium, fluid for hypotension and intravenous calcium for abdominal pain was given as treatment.

III. RESULTS

TABLE I: DISTRIBUTION OF PATIENTS BY AGE

Age range (year)	Percentage (%)	Frequency (n)
11-20	5	10
21-30	28	56
31-40	12	24
41-50	5	10

TABLE II: DISTRIBUTION BY SEX

Sex	Frequency (n)	Percentage (%)
Male	43	86
Female	7	14

TABLE III: COMPLICATIONS AND CLINICAL IMPROVEMENT USING DIFFERENT CYCLES

Number of cycles	Number of patients	Complications during procedure	Clinical Improvements
1	40	None	More Than (40%)
	10	Oral tingling (n=7)	Abdominal Pain (n=3)
	25	Hypotension (n=3)	More than 85%
2	15	Vomiting (n=2)	
	8	Vomiting (n=2)	
	2	Oral tingling (n=1)	
3	40	None	More than 95%
5	25	None	Almost 100%

TABLE IV: DISTRIBUTION BY SURVIVAL/RECOVERY

Death/recovery	Percentage (%)	Frequency (n)
Death	1	2
Recovery	49	98

IV. DISCUSSION

Improvement of patients with GBS depends on fall of antibody titers by TPE. The pathogenic antibodies are not identified by TPE.

Plasma exchange (PE) is a nonspecific procedure that removes all the non-formed substances in plasma including cytokines, immunoglobulins, and other serum factors.

Specific factor removal is crucial in therapeutically successful plasma exchange. There is data scarcity of plasma exchange effect on different diseases [12]-[14].

Results of this study were comparable to other studies for GBS.

Two or more cycles are more beneficial than one cycle.

Plasma exchange (PE) for GBS started early is more beneficial specially started within 7 days of disease onset. It was also beneficial in patients treated up to 30 days after the onset of disease.

Reference [15] performed a similar study on 6 patients with acute GBS. In that study all patients were reported improved in motor strength as well as sensory symptoms. Before plasma exchange all patients were found to have high titer of immune complexes, which was reduced after plasma exchange which is in accordance with this study [15]. Similar study reports were shown by [16].

Plasma exchange is more beneficial if started within seven days of onset of GBS but may respond within 30 days of onset. The possible cause may be due to removal of complement dependent myelinotoxic antibodies [17].

Reports by [8] was similar in his review.

One cycle of plasma exchange with FFP as replacement fluid costs approximately Tk.20000.00, with albumin and normal saline is around Tk.35000.00 and 1 dose of Intravenous Immunoglobulin (IVIG) is about Tk.1 Lac. So, plasma exchange (PE) is comparatively less expensive than Intravenous Immunoglobulin (IVIG).

Reference [7] in his review reported cost effectiveness of PE in intensive care unit (ICU) and hospital expenditure.

V. CONCLUSION

Therapeutic plasma exchange is an ideal treatment modality of Guillain Barre syndrome as it is found that the procedure is safe with negligible complication, and it is cost effective.

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