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EXPERIENCE OF THERAPEUTIC PLASMA EXCHANGE IN NEUROLOGICAL DISORDERS IN A SUPERSPECIALITY HOSPITAL OF NORTH INDIA.

Neurology

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ABSTRACT

Background : Therapeutic plasma exchange is an emerging modality of treatment in many immunological diseases and in particular neurological diseases. Our study aims to evaluate its effectiveness, tolerance and cost-effectiveness in our part of the world.

Materials and methods: Patients admitted under neurology department and referred to blood bank for plasmapheresis during a period of 7 months from August 2018 to February 2019 in GMC (Government Medical College) Srinagar were included in the study.

Results: A total of 73 procedures were conducted during this period on a total of 15 patients, which included one pediatric case of 13 years as well. Most common entity encountered was GBS. Very low complication rates were encountered in this study.

Conclusion: TPE is an excellent modality for autoimmune neurological diseases especially in our resource limited setup.

KEYWORDS

Plasmapheresis, Guillain-barre Syndrome, Autoimmune, Fresh Frozen Plasma

INTRODUCTION

Plasmapheresis or therapeutic plasma exchange is defined as the removal or exchange of blood plasma.[1] In this the separation of components of blood is done by centrifugation and membrane filtration. It began as a manual procedure, however, now automated machines with disposable equipment are used.[2]. Filtered plasma is discarded and replacement of volume is done by fresh frozen plasma (FFP), 5% albumin or normal saline (NS).[3]

Therapeutic plasma exchange [TPE] is currently used in many neurological conditions where usually an immunoglobulin needs to be removed eg. Guillain-Barre Syndrome (GBS), Myasthenia Gravis(MG), Neuromyelitis optica (NMO), chronic inflammatory demyelinating polyneuropathy (CIDP), Multiple sclerosis (MS)[1] etc.

AIM

The aim of our study was to establish the indications, effectiveness and complications of TPE in patients admitted under neurology in our hospital.

METHODS

73 procedures of TPE were done in the blood bank of SMHS hospital during a period of 7 months from August 2018 to February 2019 on 15 patients from neurology. Prior to starting the procedure all patients underwent investigations including CBC, LFT, KFT, serum calcium and albumin analysis. All our patients received 1000mg calcium citrate tablets prophylactically before starting the exchange.

RESULTS

In our study, patients who underwent plasmapheresis , 11 were diagnosed as GBS (Guillain-Barre Syndrome), 2 patients as Acute transverse myelitis, 01 as CIDP(Chronic Idiopathic Demyelinating Polyneuropathy) and 01 as MG(Myasthenia Gravis)[Table 1]. Males constituted 10 cases and females 5. Age range of our patients was 13 – 52 years with a mean age of 36.33 years. Total of 73 sessions were done, each patient subjected to 3 to 5 exchanges over a period of 7 to 10 days, with a time gap of 48 hours between each exchange. Average volume of plasma extracted during each exchange ranged from 1100 ml to 2500 ml depending on body weight and venous accessibility. Around 300 ml of anticoagulant (ACD) was used in each exchange. Replacement fluid used was group specific FFP in 10 patients, and 5% albumin in normal saline (NS) in 4 and both in 1 patient. FFP was used more frequently than albumin due to its low cost.

All neurological patients except one case of GBS experienced appreciable recovery following TPE. Mild to moderate recovery was seen after one to two exchanges and optimal recovery after 5 exchanges. However one patient who was a young male, 35 years old, diagnosed with GBS having bulbar involvement, did not respond even after completing 5 sessions, and he also did not respond to a complete dose of immunoglobulin. He was finally sent to ICU and ventilated and breathed his last after nearly a month.

Complete 5 sessions of TPE were done in all our patients except one who was a male child, 13 years, diagnosed with transverse myelitis. He had very thin veins and he developed block in both cubital veins, so only 3 incomplete sessions were performed in him, hence considerable improvement could not be seen in him.

Few complications were noted during the procedures [Table 2]. Paraesthesias and cramps were seen in 4 patients, however they were mild and managed by oral calcium except one patient who required i.v. calcium gluconate. 3 patients developed mild hypotension which was managed by elevating lower limbs. One patient developed moderate hypotension requiring saline infusion. One patient from our series developed severe reaction to FFP in the form of laboured breathing, eruption of hives on skin and itching. Immediate administration of i.v. histamine and hydrocortisone after stopping FFP relieved the symptoms. TRALI (transfusion related acute lung injury) was ruled out on chest X-Ray and patient was subsequently put on 5% albumin in NS as replacement fluid in next session.

Table 1 Neurological conditions received for plasmapheresis

Clinical diagnosis	Male	Female	Total
GBS	8	3	11
CIDP	1	1	2
Transverse myelitis	1	0	1
Myasthenia gravis	0	1	1
Total	10	5	15

Table 2 Complications during the procedure

Complication	Number
Dizziness	4
Paraesthesia, cramps	4
Venous inadequacy	1
Allergy to FFP	1
Total	10

DISCUSSION

Our study shows that considerable improvement can be achieved in neurological patients by performing TPE. Certain other studies carried out in the Indian subcontinent have made similar observations e.g., Mittal M. et al[4] and Nizar O. T. A. et al.[5] These findings are very

crucial in our setting as majority of patients admitted with us are unable to afford a full course of immunoglobulins which amounts to around 2 to 3 lac rupees. On the contrary TPE kit costs Rs.8500 per exchange. Even if a costly replacement fluid like albumin is used, it amounts to an extra of Rs.2000 per procedure. So the overall cost effectiveness of TPE makes it the first choice in our setting when free supply of IVIG is not available in government hospital.

Most of the patients in our study belonged to a younger age group, with our youngest patient being a 13 year old male diagnosed with transverse myelitis. Our age groups correlate with a few other studies in the subcontinent e.g., Qureshi et al [6] and V Abdul Gafoor et al [7]. This finding is of public concern for the society as a whole.

GBS was the primary indication for TPE encountered during the period of study followed by transverse myelitis. Then CIDP and myasthenia gravis were the other conditions seen. Most other studies found GBS, MG and CIDP as indications for TPE. [7,8,9]

Males were seen in our study more than females in a ratio of 2:1. In most other studies males outnumbered females in neurological autoimmune diseases e.g., Qureshi H. et al and Kanyar L. et al [6,9].

The spectrum of complications seen in our study matches that of Stegmayr B. et al and Shemin D. et al.[10,11]. The low frequency and mild nature of complications indicate that TPE is an extremely safe procedure and should be carried out more frequently. However, inadequate vascular access is a major impediment especially in pediatric age group. Such a problem was encountered in studies carried out elsewhere e.g., Bobati S. S. et al.[12]

CONCLUSION

Our study has shown encouraging results, and reaffirmed the efficacy of TPE in autoimmune neurological diseases. It has provided a platform for trying TPE as first line modality in patients not affording IVIG and expecting favourable results.

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