

Therapeutic Plasma Exchange for the treatment of Neurological conditions

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Therapeutic Plasma Exchange (TPE) is a well-established immunomodulatory therapy which can effectively treat patients with inflammatory diseases of the central and peripheral nervous system e.g.: Acute Disseminated Encephalomyelitis and Acute Autoimmune Encephalitis; Neuromyelitis Optica; Guillain-Barré Syndrome; Myasthenia Gravis.

The Immunomodulatory Effect of TPE¹

Removal of pathological antibodies

Correction of altered T helper cell type ratio favouring Th1

Changes in Lymphocyte numbers \updownarrow T-cells

Increased T regulatory cells and T suppressor activity

\uparrow Regulatory T-cells
 \uparrow Suppressor T-cells



Stimulated proliferation of B-cells and plasma cells, sensitizing them to immunosuppressants

Removal of immune complexes, enhancing macrophage/monocyte function

\rightarrow Removal of cytokines

\leftarrow Replacement of missing plasma components

Treatment Time and Venous Access

The average TPE procedure takes approximately 1 hour 45 minutes.

The majority of TPE treatments (provided by NHSBT teams) are completed using peripheral access.

If the patient is acutely unwell they may require treatment at the bedside. NHSBT teams provide both outpatient treatment within the therapeutic unit (if the disease allows) or treatment at the bedside as required may require treatment at the bedside; NHSBT teams provide treatment at the patient bedside as required.

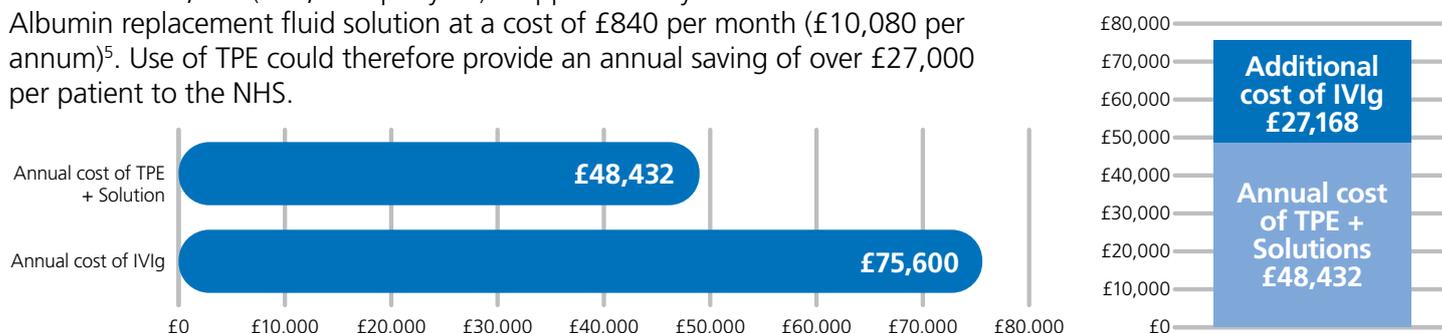


TPE v IVIg

TPE is an alternative or adjunct therapy to Intravenous Immunoglobulin (IVIg) and is a cost-effective solution for the NHS.

The cost of IVIg for a male Myasthenia Gravis (MG) patient of average weight² receiving monthly infusions is approximately £6,300 per month, or £75,600 per year based on an average dosing frequency of 1.5g/kg.³

The same patient receiving TPE as an alternative therapy would require approximately four TPE sessions per month at a cost of £3,196 (£38,352⁴ per year) + approximately five bottles of Human Albumin replacement fluid solution at a cost of £840 per month (£10,080 per annum)⁵. Use of TPE could therefore provide an annual saving of over £27,000 per patient to the NHS.



Treatment Guidelines

The journal for the clinical applications of therapeutic apheresis, published by the American Society for Apheresis, categorises indications for the evidence-based use of therapeutic apheresis in human disease. TPE therapy for Neurology conditions are categorised as below⁶:

Category I	<ul style="list-style-type: none">• Guillain-Barre Syndrome• Chronic Inflammatory Demyelinating Polyradiculoneuropathy• Myasthenia Gravis• NMDA Encephalitis
Category II	<ul style="list-style-type: none">• Polyneuropathy with IgG and IgM• Multiple Sclerosis (Acute Demyelinating)• Neuromyelitis Optica (Acute)
Category III	<ul style="list-style-type: none">• Paraneoplastic Neurologic Syndromes (Limbic Encephalitis)• Multiple Sclerosis (Chronic Progressive)• Stiff-Person Syndrome

Accessing TPE

NHSBT has provided therapeutic plasma exchange services to Neurology patients for over 20 years. Fully managed regional services are provided by specialist clinical teams based across eight sites in England in: Liverpool, Manchester, Oxford, Sheffield, Leeds, London, Birmingham and Bristol.

NHSBT provides approximately 9,000 apheresis procedures per year, supporting over 1,500 patients. Of these approximately 1,000 are TPE procedures for patients with a range of Neurological conditions.

NHSBT apheresis teams provide access to:

- Routine services between 8:00–17:00 Monday to Friday
- Access to 24/7, 365 days a year for emergency patient referrals
- Experienced clinical teams that deliver adult and paediatric apheresis services across a range of clinical specialities
- Extensive quality management system and regulatory expertise
- Access to a comprehensive range of apheresis procedures including; stem cell collection, plasma exchange, automated red cell exchange, leucodepletion and more infrequent procedures such as platelet depletion

For more information on services provided by NHSBT's therapeutic apheresis teams or to discuss a patient referral please visit our webpages: <http://hospital.blood.co.uk/patient-services/therapeutic-apheresis-services/tas-units/>

Or e-mail: therapeuticapheresisservices@nhsbt.nhs.uk

References

- 1 Reeves HM and JL Winters, "The Mechanisms of Action of Plasma Exchange." *British Journal of Haematology* 2014; 164: 342-351.
- 2 The average weight of a male in the UK (June 2018) is 84kg.
- 3 The average cost (as per DH guidelines 2018) of IVIg is £50.00 per gram. The average dosing frequency of IVIg for a patient with MG is 1-2mg/body weight infused on a monthly basis.
- 4 The average frequency of TPE treatment for a patient with MG is 4x TPE per month (based on 3x regular MG patient treatment regimens averaged out to provide a monthly figure).
- 5 The cost of HAS used for costing model = £42 per bottle.
- 6 The journal of clinical apheresis, volume 31, number 3, 2016.



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