Plasmapheresis in Neurological Disorders

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Received date: October 24, 2016; Accepted date: December 06, 2016; Published date: December 12, 2016

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Short communication

During the history of medicine, the specialty of Neurology was, sometimes, stigmatized or labelled as a science of brilliant diagnoses, but reserved prognosis and limited treatments. Today, it is known that the technological development has changed this scenario, largely, due to spectacular advances in studies of molecular medicine, with excellent methods of diagnostic through imaging, molecular biology, muscle biopsy with electron microscopy, single fiber electromyography, digital electroencephalogram, video-electroencephalogram and more recently with the large number of antibodies [1].

Due to a large number of neurological syndromes associated with antibodies with increasing identification, it's been observed new potential therapeutic targets for neurological diseases, which they were formerly considered progressive diseases, degenerative or purely psychiatrics [1].

Today, there is a solid concept accepted by the international community and the literature that there are several neurological disorders of the central nervous system (CNS) and the peripheral nervous system (PNS) mediated by antibodies and they have several therapeutic strategies, with increasing options depending about the immune mechanism involved. Among the immunotherapy strategies for such diseases, we can use: corticosteroids (methylprednisolone, prednisone), immunosuppressant's (azathioprine, methotrexate, mycophenolate mofetil, cyclosporine, cyclophosphamide), monoclonal antibodies (natalizumab, rituximab, ocrelizumabe), anti-TNF alpha (infliximab, adalimumab, golimumab, etanercept), anti-DNA (anti-14.5), interferon alpha, intravenous immunoglobulin are the best treatments [1,3].

Several studies have demonstrated significant improvement in symptoms with the use of plasmapheresis in immune-mediated neurological diseases. The clinical decision is unique, according to availability and adverse effects profile of these treatments [1,3].

Plasmapheresis is a procedure which is used therapeutically or just to collect material for transfusion. When therapeutic, it separates the patient's blood components replacing the plasma removed from a donor fluid, colloid or crystalloid, usually albumin or saline solution [2,3]. Historically, large amounts of plasma could only be exchanged via manual phlebotomy followed by centrifugation, a slow and complicated technique, which generally only allowed an exchange of 500 ml per session [3]. It is today a highly complex procedure, often available only in reference centers.

The availability allows the physician can offer the patient an effective proven treatment of high impact from the clinical point of view. The pathogenic substance is an autoantibody, circulating immune complexes, lipoproteins, endotoxins, among others. The molecule large and long half-life for a faster removal than its endogenous clearance, and it’s acutely resistant to conventional therapies so that the procedure is suitably indicated [4]. The most common adverse effect is hemodynamic instability. A careful evaluation of impact of this procedure recommended before treatment with clinical and laboratory tests. There are various immune-mediated neurological pathologies belong to the group of diseases in which plasmapheresis indicated [5].

In the article: “Plasmapheresis therapy for immune-mediated diseases in neurology: literature review”, we can find a good review of the topic discussed, focusing on therapy indications with plasmapheresis or apheresis therapy [6].

Morgan et al. identified the neurological diseases considered of great response to the use of therapeutic apheresis (Optic...
Neuromyelitis, anti-MuSK positive Myasthenia Gravis, acute disseminated encephalomyelitis- ADEM, anti-NMDA encephalitis, Multiple Sclerosis relapsing-remitting, Polymyositis) and with high chance of new advances in therapeutic response in the next 5 to 10 years. Most neurological disease treatments with beneficial use of therapeutic apheresis (TA) are mediated by a humoral immune response, and these beneficial effects probably occur through the removal of pathogenic autoantibodies and associated inflammatory mediators [7-10].

The good therapeutic response is most often observed in diseases with an acute course against those of chronic evolution. This is probably secondary to the slow equilibrium between vascular and interstitial spaces, which influences in a complete removal of antibodies unlikely in chronic cases. The rate of antibodies removal by TA may express a first order reaction with respect to the peripheral blood; however, in the CNS this is not a rule because it involves more complex mechanisms [11-13].

The issue of ideal time for initiation of TA in relation to the development of symptoms is an important factor. TA is often an option after other treatments such as steroids in high doses. Besides, a major obstacle in achieving experimental works for further clinical studies is that there are no TA animal models to test hypotheses and so it’s necessary to rely on human studies. Whereas many neurological conditions are rare, this becomes even more difficult to study [11-13].

In the last 5 years, significant advances have been made in the development and study of alternatives beyond TA, including IVIG and monoclonal antibodies (e.g., rituximab), so many studies will emerge in the coming years in relation to immunomodulatory therapies, demonstrating the importance of being up to date and to knowing each therapeutic modality [11-13].

References