Chronic Cerebrospinal Venous Insufficiency in Multiple Sclerosis: The Hydrostatic-Immune Paradigm and the Flow Cytometry as a Diagnostic Tool
Tsamopoulos NG\textsuperscript{1,*}, Kalodimou VE\textsuperscript{2}, and Vlachos S\textsuperscript{3}

\textsuperscript{1} Mediterraneo Hospital, Department of Interventional Neuroradiology, Athens, Greece
\textsuperscript{2} IASO Maternity & Research Hospital, Department of Flow Cytometry-Research & Regenerative Medicine, Athens, Greece
\textsuperscript{3} Department of Anesthesiology, Naval and Veterans’ Hospital of Athens, Greece

Corresponding Author: N.G. Tsamopoulos, MD, PhD
Mediterraneo Hospital - Department of Interventional Neuroradiology
8-12 Ilias str. Glyfada, 166 75 Greece
Tel: +302109117010
E-mail: tsamopoulos@gmail.com

Received March 21, 2014; Accepted April 22, 2014; Published April 26, 2014

Abstract

In recent years, chronic cerebro-spinal venous insufficiency (CCSVI) has been associated with multiple sclerosis (MS). Balloon angioplasty of the affected veins (internal jugulars, azygos) has been proposed as a treatment method, with controversial results. The conflict is based on how a primarily immune disease can be affected by a primarily hydrostatic condition and its reversal. In our paper we briefly review novel paradigms in multiple sclerosis pathogenesis and propose a mechanism by which CCSVI could theoretically lead to blood brain barrier disruption, altered neuronal microenvironment, astrocyte and oligodendrocyte loss and demyelination. Altered antigen transfer to regional lymph nodes, affecting antigen presentation and processing could also contribute, affecting the sensitive balance between tolerance and immunity. Thus, a combined hydrostatic-immune paradigm of MS emerges, which may explain the potential role of CCSVI in MS pathogenesis and provide a theoretical framework for future research.