

## Impact of Veins Endovascular Procedures on the Quality of Life in Patients with Multiple Sclerosis

Marjeta Zorc<sup>1</sup>, Miro Denislic<sup>2</sup>, Zoran Milosevic<sup>3</sup>, Rok Zorec<sup>1</sup>, Dean Ravnik<sup>1</sup>, Ruda Zorc Pleskovic<sup>1</sup>, Ales Pleskovic<sup>3</sup>, Oscar Mendiz<sup>4</sup>,<sup>1</sup>University of Ljubljana, Medical Faculty, Ljubljana, Slovenia<sup>2</sup>Medical Centre Medicor, Ljubljana, Slovenia<sup>3</sup>University Clinical Centre Ljubljana, Ljubljana, Slovenia<sup>4</sup>Favaloro foundation, Buenos Aires, Argentina

**Background:** Chronic cerebrospinal venous insufficiency (CCSVI) is a new challenge of extracranial venous pathway, which provides at present still controversial insight into the vascular role of multiple sclerosis (MS). The aim of our open-label study was to evaluate quality of life (QoL) of MS patients after endovascular procedures.

**Materials and Methods:** MS patients diagnosed by revised McDonald criteria who fulfilled Doppler sonography criteria for CCSVI. To evaluate the efficacy of the vascular procedures on QoL Multiple Sclerosis Impact Scale (MSIS-29), Fatigue Severity Scale (FSS), Modified Fatigue Impact Scale (MFIS) and Overactive bladder self-administered questionnaire (OAB-V8) were used. MSIS-29, FSS, MFIS and OAB-V8 were evaluated at baseline, 3, 6, and 12 months after vascular angioplasty.

**Results:** In our study 72 consecutive MS patients were included. FSS ( $p < 0.001$ ) and MFIS scores - total score, as well as three subscales scores (physical, psychosocial and cognitive) significantly improved after vascular procedures ( $p < 0.05$ ). The physical subscale correlated with the degree of pyramidal impairment. The important improvement of the bladder function using OAB-V8 ( $p < 0.01$ ) and QoL assessed by MSIS-29 questionnaire ( $p < 0.01$ ) were obtained.

**Conclusions:** The endovascular procedure demonstrated a beneficial effect on the quality of life of MS patients. The amelioration of cerebral venous drainage significantly reduced the perception of fatigue, increased the mental health and emotional stability, respectively. Additionally, important improvement of the bladder dysfunction even in MS patients with the progressive course of disease was achieved. Also, the sexual function improved. The relationship between CCSVI and hypoperfusion was demonstrated. The role of better cerebrospinal fluid flow after vascular procedures is discussed. It seems that the endovascular procedures in MS patients may influence the clinical picture of MS patients. Further investigations also in other neurodegenerative diseases are recommended.