

# **The limits of magnetic resonance venography for diagnosis of chronic cerebrospinal venous insufficiency**

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Chronic cerebrospinal venous insufficiency (CCSVI) was recently described in patients with multiple sclerosis (MS). CCSVI is diagnosed non-invasively by Doppler sonography (DS) and invasively by catheter venography (CV). The role of conventional magnetic resonance venography (MRV) for detection of venous anomalies in patients with MS diagnosed with CCSVI, and in healthy controls (HC) was investigated in recent studies. Two types of MRV approaches were proposed: conventional and non-conventional. Conventional MRV approaches include assessment of venous anomalies on 2D-Time-Of-Flight venography (TOF) and 3D-Time Resolved Imaging of Contrast Kinetics angiography (TRICKS), whereas non-conventional MRV approaches include phase-contrast MRV with flow quantification and multi-directional TOF sequences.

Advantages of the MRV in assessment of venous anomalies reflective of CCSVI are: it is non-invasive, can easily depict intra- and extra-cranial venous system, blinding procedures are non-operator dependent, it is relatively not time consuming and flow and velocity studies can add to accuracy. Disadvantages include: not use of real-time dynamic information from upright position, low resolution for detection of vessel wall and intraluminal abnormalities, false positive and negative results in scan-rescan studies, lack of standardized guidelines for interpretation of the findings, and difficulty in the assessment of the azygous vein. Recent studies using conventional and non-conventional MRV techniques found no significant differences between the extra-cranial venous

systems characteristics of MS patients and HC. A limited value of conventional MRV for assessing venous anomalies for both diagnostic and post-treatment purposes was found against gold standard CV.