

# **Hypoperfusion of brain parenchyma in CCSVI**

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Chronic cerebrospinal venous insufficiency (CCSVI) is a vascular condition described in multiple sclerosis (MS) patients, characterized by multiple intra-luminal stenosing malformations of the principal pathways of extra-cranial venous drainage. Several studies have reported hypoperfusion of the brain parenchyma in MS patients, also preceding the disease onset. Changes in perfusion MRI parameters are relevant in MS pathogenesis, because represents the necessary step inducing a status defined as hypoxia like condition.

The hemodynamic abnormalities detected on perfusion MRI in patients with MS are currently interpreted as being a consequence of chronic inflammatory events related to local blood congestion and secondary hyperemia of the brain parenchyma. Furthermore, at this time it is not clear whether reduced perfusion of the brain parenchyma in MS patients is a sign of vascular pathology or decreased metabolic demand. Alternatively, it can be hypothesized the presence of a disorder that involves the major vasoactive substances. Increased perfusion in the area of lesion formation could be a sign of vessel dilation mediated by pro-inflammatory cytokines.

An altered perfusion pattern may not only be a consequence of local circulatory disturbances due to inflammatory mechanisms in acute or chronic phases, but rather could result from an outflow blockage situated far away from the lesions. CCSVI may impact local haemodynamics at places distant from the location of the mechanical stenosis, as in any condition of venous obstruction of the major trunks. Such a mechanism may lead to

capillary hypertension and leakage, consistently contributing to inflammation. Preliminary findings from pilot study investigating the relationship between the severity of CCSVI and hypoperfusion in the brain parenchyma will be presented.