COLOUR DOPPLER IN CCSVI-MULTIPLE SCLEROSIS : DIAGNOSTIC ACCURACY AND REPRODUCIBILITY

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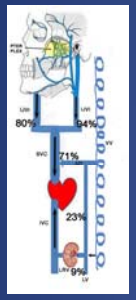
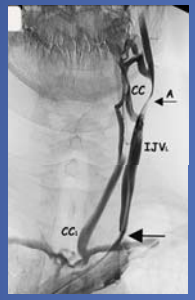
INTRODUCTION:

It has been recently described a new vascular picture defined as chronic cerebrospinal venous insufficiency (CCSVI), characterized by multiple stenosies or obstruction of the internal jugular veins (IJVs), and/or the Azygous system (AZY). In CCSVI patients, venous stenosies in the main cerebrospinal outflow pathways were never found to be isolated. Rather, they were combined in the IJVs, AZY and lumbar systems, defining four main patterns of distribution.[1]





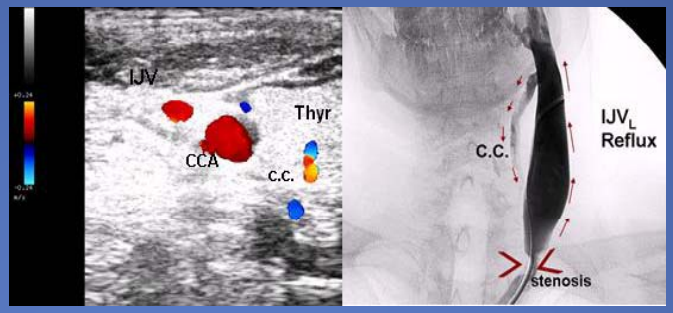
Left: The location of malformative venous stenosing lesions and the relative prevalence in CCSVI-MS.[2] Right: Two closed stenosis in the left IJV (arrows), with activation of substitute circles (CC and CC1)

Echo-colour Doppler (ECD) examination seems to be an ideal screening tool for CCSVI associated to MS.[3] However, the diagnostic accuracy in detecting the pattern of distribution respect to venography, as well as the reproducibility of the proposed investigation were never been assessed. The aims of this study are: I) to compare ECD to venography in screening CCSVI in 68 consecutive relapsing remitting and secondary progressive MS patients, and in 48 healthy controls (HC), matched for age and gender. II) to assess the diagnostic accuracy of ECD in recognizing the pattern of CCSVI respect to gold standard venography. III) to calculate the inter-observer variability rate by comparing respectively trained vs not trained, and trained vs trained operators. The study was conducted by using the same ECD equipment (Esaote MyLab VINCO, Genoa,Italy). IV) to calculate the intra-observer variability rate in trained operator.

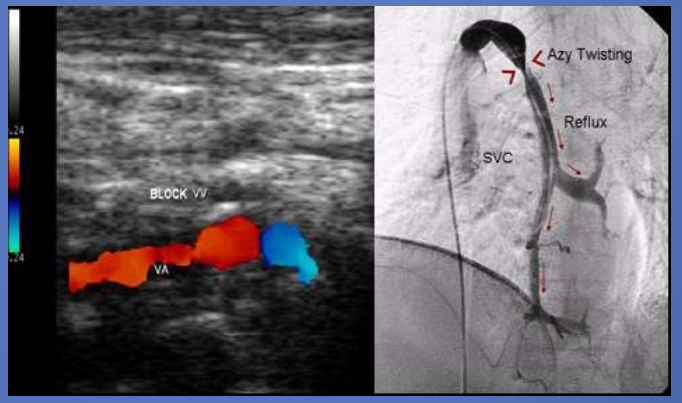
RESULTS:

I) In screening patients with CCSVI-MS number of ECD false positive and negative rate respect to venography, were both 0%;

II) The correct identification of the pattern of CCSVI-MS using ECD vs gold standard venography demonstrated high specificity (100% 95% CI: 82-100), and low sensitivity (51% 95% CI: 47-55), p<0.0001.



Left. ECD: Reflux in the IJV with severe reduction of the cross sectional area suggesting distal venous stenosis and activation of thyroid veins collateral circulation (C.C.). Right. Selective venography confirming a closed stenosis in the left IJV (arrow) with thyroideal C.C.[2]



Left: Blocked outflow through the vertebral vein (VV) and normal inflow through the vertebral artery (VA), this finding suggests obstruction of the AZY. Right: Malformative twisting of the AZY in selective venography confirming the ECD.[2] A reflux with congestion of the extravetebral veins is clearly depicted.

III) The inter observer variability rate between trained and not trained ECD operators were unsatisfactory (K coefficient 0.47; 95% CI 0.27-0.68). To the contrary, the K value between trained operators demonstrated a good agreement (K coefficient 0.8; 95% CI 0.59-1.01).

IV) The intra observer variability rate in trained operator shows a K 0.93; 95% CI 0.80-1.06, indicating a highly satisfactory agreement of the technique under estimation.

DISCUSSION:

Our results confirm that ECD is a powerful, non-invasive and reproducible tool for screening CCSVI-MS. It is highly specific in correctly detecting the pattern of distribution of the extracranial and of the extra vertebral venous stenosies, with a negligible sensitivity. However, the assessment of the intra and inter observer rate clearly indicates how the ECD diagnosis reproducibility is strictly dependent from a specific training.

LITERATURE:

1. Zamboni P, Galeotti R, Menegatti E, Malagoni AM, Tacconi G, Dall'Ara S, Bartolomei I, Salvi F. Chronic cerebrospinal venous insufficiency in patientswith multiple sclerosis. J Neurol Neurosurg Psychiatry. 2009 Apr;80(4):392-9.

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