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Towards a paradigm shift in diagnosing venous compression syndromes

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Nowadays venous compressions are diagnosed when typical clinical symptoms correspond to adequate imaging criteria. The fundamental ones are vessel size reduction and pressure gradient. Collaterals however introduce substantial uncertainties. Are they to be regarded as a natural solution, are they true collaterals or just enlarging since their wall is too weak and therefore are the source of complaints and thus to be tackled with embolization? Are they responsible for remote symptoms? Can they induce insufficiency of connected veins? In a nutshell: How to deal with them?

Observations from diagnosing venous compressions during 36 years teach that expanded criteria are required to understand their complexity. Diameters depends on pressure and wall distensibility. Collaterals reduce the pressure which thus can't be trusted as a diagnostic criterion and subsequently diameters are not helpful too. Symptoms need to be explained based on the functional impact of perfusion changes of the compressed vein but also along the collaterals.

Volume flow measurements are key to understand the volume effects of collaterals responsible for pain, congestive hypoxia and dysfunction. Tissue perfusion measurement quantifies the involvement of an organ and its congestion. This way symptoms even far from the compression can be understood and the correct treatment can be planned.

Illustrative examples explain the rationale of a new diagnostic concept to improve the outcome. It can help to understand why embolization and stenting can be inadequate treatment options. The proposed diagnostic workup starts at the symptoms and includes morphological and functional criteria. It uses color Doppler sonographic tissue perfusion measurement and 4D-PIXELFLUX perfusion volume measurements of affected vessels and includes not only the compressed vein but the complete route to the heart. It uses the observation that the spinal curvature often in combination with a flat thorax is promoting venous and organ compressions thus creating a sequence and combination of compressions which influence each other and stretch from knee to neck.

Moreover, taking into account the upright posture as the typical human one all examinations need to be repeated while standing. Postprandial exams complete the protocol since the uptake of food occupies relevant abdominal volumes thus increasing venous compressions.

Hundreds of allegedly outdiagnosed and outtreated but still severely ill mostly female patients benefitted from

an expanded examination protocol with tissue and 4D-PIXELFLUX volume flow, horizontal and upright as well as pre- and postprandial examinations. Therefore a paradigm shift from morphological to functional criteria in venous compressions is due.

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