

**On-line Table**

Imaging Modality	Protocol
Ultrasound evaluation	<p>Using gray-scale, Doppler and color Doppler, images of the IJV were recorded in the upper neck (below the facial vein), mid neck, and in the lower neck. The cross-sectional area was measured where the IJV was narrowest in the supine position and marked. The CSA was then re-measured in this location when the participant was sitting. If the CSA of the IJV was higher in the sitting position than in the supine position, <b>criterion 5</b> was considered positive. VV evaluation was performed in the mid to lower neck between C3–4 and C5–6.</p> <p>Reflux in the IJVs and VVs (<b>criterion 1</b>) was defined as a flow reversal from its physiologic direction (i.e. away from rather than toward the heart) for a duration of 0.88 seconds or longer.<sup>32</sup></p> <p>Deep cerebral veins were evaluated using transcranial Doppler with the transducer at the level of the transtemporal or subcondylar bone window, optimized for depth to the circle of Willis. A basal vein of Rosenthal or an internal cerebral vein was evaluated in the supine and sitting positions. Reflux was defined as flow recorded in a direction opposite to the physiologic one for a duration of 0.5 seconds (<b>criterion 2</b>). The IJVs were also evaluated for stenosis, noncompliance, or B-mode anomalies that may cause impairment of venous flow including abnormal valves, flaps, septums, and webs (<b>criterion 3</b>).</p> <p><b>Criterion 4</b> was considered to be present if flow was not detected by Doppler in the IJVs or VVs in either the supine or sitting positions.</p>
Standardized MRI protocol	<p>All MR imaging was performed using a TrioTim 3T scanner (Siemens). Multiplanar, multisequence MR imaging of the brain was performed including sagittal 3D T1 MPRAGE, axial DTI, axial DWI, axial FSE T2, axial FSE PD, axial FLAIR, coronal T2, and 2D TOF MRV sequences for all participants and postgadolinium sagittal 3D T1 MPRAGE, 2D TOF MRV, and axial T1 3D FLASH sequences of the brain in pedMS only.</p> <p>Cor 2D TOF MRV was performed using TR 19 ms, TE 4.83 ms, 90 sections with 2.5 mm section thickness with an elliptical filter, 90 concatenations, 1 average, and phase-encoding direction RL with FOV read 250mm and FOV phase of 100%.</p>
Phase-contrast MRI protocol	<p>All PC-MRI data were acquired on a single 3T MRI scanner according to the following protocol applied to a single section of data at the level of C2: spatial resolution 0.6 mm x 0.6 mm, section thickness 5 mm, field of view 150 mm x 122 mm, matrix 256x207, TE/TR 5.6/8.45 ms, segments 3, temporal resolution 50.7 ms, flip angle 15 degrees, bandwidth +/-50 kHz through-plane, velocity encoding 50 cm/s, and with ECG gating.</p>

**Note:**—VV indicates vertebral veins; CSA, cross-sectional area; ICV, internal cerebral vein; R, right; L, left; PD, proton attenuation; MRV, MR venography; Cor, coronal; ECG, electrocardiogram.