

# Intracranial venous abnormalities at MRI with venous angiography (MRV) in intractable chronic migraine patients: occasional finding or co-causal elements?

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**Aim:** to evaluate the role of brain MRI with venous angiography (MRV) in the assessment of chronic migraine (CM) in a young patient with nearly daily attacks unresponsive to analgesic and prophylactic therapies.

**Materials and methods:** a 16 years old woman affected by CM (according to ICHD-III criteria) was evaluated in the last 2 years at the headache center of L. Sacco Hospital. She suffered from the age of 7 from a primarily CM refractory to adequate acute and prophylactic therapies. She underwent a complete neurological examination with ocular fundus inspection and a complete brain MRI scan with MRV. A lumbar puncture (LP) with measurement of opening pressure (OP) was performed. We assessed the eventual presence of idiopathic intracranial hypertension without papilledema (IIHWOP) by applying the revised Friedman criteria<sup>1</sup>.

**Results:** Neurological examination, ocular fundus inspection and standard brain MRI were normal. No clinical or MRI signs of intracranial hypertension were found. MRV showed right transverse sinus stenosis and bisection. LP showed a normal OP (12 cmH<sub>2</sub>O) and liquor parameters. Therefore, she didn't meet Friedman criteria for IIHWOP.

Table 2 Diagnostic criteria for pseudotumor cerebri syndrome

<b>1. Required for diagnosis of pseudotumor cerebri syndrome<sup>a</sup></b>
A. Papilledema
B. Normal neurologic examination except for cranial nerve abnormalities
C. Neuroimaging: Normal brain parenchyma without evidence of hydrocephalus, mass, or structural lesion and no abnormal meningeal enhancement on MRI, with and without gadolinium, for typical patients (female and obese), and MRI, with and without gadolinium, and magnetic resonance venography for others; if MRI is unavailable or contraindicated, contrast-enhanced CT may be used
D. Normal CSF composition
E. Elevated lumbar puncture opening pressure ( $\geq 250$ mm CSF in adults and $\geq 280$ mm CSF in children [ $\geq 250$ mm CSF if the child is not sedated and not obese]) in a properly performed lumbar puncture
<b>2. Diagnosis of pseudotumor cerebri syndrome without papilledema</b>
In the absence of papilledema, a diagnosis of pseudotumor cerebri syndrome can be made if B-E from above are satisfied, and in addition the patient has a unilateral or bilateral abducens nerve palsy
In the absence of papilledema or sixth nerve palsy, a diagnosis of pseudotumor cerebri syndrome can be suggested but not made if B-E from above are satisfied, and in addition at least 3 of the following neuroimaging criteria are satisfied:
i. Empty sella
ii. Flattening of the posterior aspect of the globe
iii. Distention of the perioptic subarachnoid space with or without a tortuous optic nerve
iv. Transverse venous sinus stenosis

<sup>a</sup> A diagnosis of pseudotumor cerebri syndrome is definite if the patient fulfills criteria A-E. The diagnosis is considered probable if criteria A-D are met but the measured CSF pressure is lower than specified for a definite diagnosis.

**Discussion:** Patients with CM and refractoriness to standard therapies have recently been found to show IIHWOP more frequently than patients with episodic migraine. Moreover, venous sinuses stenosis, a radiological marker of IIHWOP, is more prevalent in patients with CM with poor response to treatment than in those with episodic migraine. It has recently been suggested that the presence of an undiagnosed IIHWOP could be a risk factor for chronicization of migraine<sup>2</sup>. Even if we found no suggestive signs of IIHWOP at standard MRI in our patient, we reassessed the case by performing a MRV study. MRV study showed venous sinus abnormalities and stenosis but criteria for IIHWOP were lacking. The review of this case and a search for similar ones in the current scientific literature open a new question: we know that intracranial hypertension may facilitate the progression of migraine towards a chronic form, and that the presence of significant venous sinuses stenosis was always thought to be in relation with intracranial hypertension. May venous intracranial discharge abnormalities alone, even without intracranial hypertension, have an influence on cerebral vasomotor response that may constitute an independent risk factor for migraine transformation?



<sup>1</sup>Friedman DI et al. (2013) Revised diagnostic criteria for the pseudotumor cerebri syndrome in adults and children. *Neurology* 81(13):1159–1165

<sup>2</sup>De Simone R. et al. (2015) The role of intracranial hypertension in the chronification of migraine. *Neurol Sci* 36 (Suppl 1):S23–S28