

Intracranial Hypotension: A Brief Review of the Pathophysiology and Diagnostic Algorithm

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Abstract : The aim of this review is to explain what is the intracranial hypotension and its main causes, and also to approach to the diagnostic management in the different clinical situations, understanding radiological findings, and physiopathological substrate. An approach to the diagnostic management is presented: what are the guidelines to follow, the different tests available, and the typical findings. We review the myelo-CT and myelo-RM studies in patients with suspected CSF fistula or hypotension of unknown cause during the last 10 years in three centers. Signs of intracranial hypotension (subdural hygromas/hematomas, pachymeningeal enhancement, venous sinus engorgement, pituitary hyperemia, and lowering of the brain) that are evident in baseline CT and MRI are also sought. The intracranial hypotension is defined as a lower opening pressure of 6 cmH₂O. It is a relatively rare disorder with an annual incidence of 5 per 100.000, with a female to male ratio 2:1. The clinical features it's an orthostatic headache, which is defined as development or aggravation of headache when patients move from a supine to an upright position and disappear or typically relieve after lay down. The etiology is a decrease in the amount of cerebrospinal fluid (CSF), usually by loss of it, either spontaneous or secondary (post-traumatic, post-surgical, systemic disease, post-lumbar puncture etc.) and rhinorrhea and/or otorrhea may exist. The pathophysiological mechanisms of hypotension and CSF hypertension are interrelated, as a situation of hypertension may lead to hypotension secondary to spontaneous CSF leakage. The diagnostic management of intracranial hypotension in our center includes, in the case of being spontaneous and without rhinorrhea and/or otorrhea and according to necessity, a range of available tests, which will be performed from less to more complex: cerebral CT, cerebral MRI and spine without contrast and CT/MRI with intrathecal contrast. If we are in a situation of intracranial hypotension with the presence of rhinorrhea/otorrhea, a sample can be obtained for the detection of b2-transferrin, which is found in the CSF physiologically, as well as sinus CT and cerebral MRI including constructive interference steady state (CISS) sequences. If necessary, cisternography studies are performed to locate the exact point of leakage. It is important to emphasize the significance of myelo-CT / MRI to establish the diagnosis and location of CSF leak, which is indispensable for therapeutic planning (whether surgical or not) in patients with more than one lesion or doubts in the baseline tests.

Keywords : cerebrospinal fluid, neuroradiology brain, magnetic resonance imaging, fistula

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