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Normal Pressure Hydrocephalus: A Simple Hypothesis

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ABSTRACT

Normal pressure hydrocephalus is a devious phenomenon. It is a disease that is difficult to diagnose and difficult to treat, the only treatment being a ventriculo-peritoneal shunt, though good shunting results rarely pass a 70% level of effectiveness. We need to understand its pathophysiology better before things will improve. Although some colleagues know it as a possible "reversible dementia" others hardly know about its existence. Solutions would also have value for the general understanding of hydrocephalus of other types. Many theories have been published recently in the search for the missing pieces in this puzzle and I feel that my own postulations could turn out to be useful. After years of diagnosing and operating on hydrocephalus patients I propose that: 1) There is reason to believe that patients with the Apoprotein E3/3 genotype and a high head size percentile are particularly vulnerable to developing idiopathic normal pressure hydrocephalus (iNPH). 2) The classical theory that the arachnoid granulations (AG) transport cerebrospinal fluid (CSF) into the venous circulation is wrong. I postulate, that the AG essentially are sensors, registering the pressure differences between the CSF in the subarachnoidal space at the top of the skull and the venous pressure in the sagittal sinus. The AG's endothelium produces nitric oxide (NO) as a messenger that is received by the vagus nerve at the jugular foramen. 3) The disease has its fundamental pathology in the subpial space in the large cisternas and along the large vessels under the brain. Here the intravenous absorption of cerebrospinal fluid (CSF) takes place. Cerebrospinal fluid is transported into the subpial venules and veins, driven by the pulse pressure of the subpial arteries. Morphological changes in the pial/subpial anatomy explain the existence of acquired normal pressure hydrocephalus (aNPH).

KEYWORDS

Normal Pressure Hydrocephalus; ApoE3; Head Size; Arachnoid Granulations; Subpial Absorption

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