Idiopathic normal pressure hydrocephalus diagnosis

Patients often present to the neurosurgeon frustrated and desperate after a long preoperative course. It is important to acknowledge the uncertainty regarding idiopathic normal pressure hydrocephalus diagnosis 

There is no accurate test for diagnosing normal pressure hydrocephalus or for screening for patients who will benefit from shunt surgery.

Shunting is possibly effective in iNPH (96% chance subjective improvement, 83% chance improvement on timed walk test at 6 months) (3 Class III). Serious adverse event risk was 11% (1 Class III). Predictors of success included elevated Ro (1 Class I, multiple Class II), impaired cerebral blood flow reactivity to acetazolamide (by SPECT) (1 Class I), and positive response to either external lumbar drainage (1 Class III) or repeated lumbar punctures. Age may not be a prognostic factor (1 Class II). Data are insufficient to judge efficacy of radionuclide cisternography or aqueductal flow measurement by MRI.

There is limited Class I evidence that impaired cerebral blood flow (CBF) reactivity to acetazolamide is a predictor of successful CSF shunting, but single photon emission computed tomography (SPECT) is not a practical screening tool for NPH.

Imaging

see Disproportionately enlarged subarachnoid space hydrocephalus.

There remains a lack of consensus about the role of individual imaging modalities in characterizing specific features of the condition and predicting the success of CSF shunting. Variability of clinical presentation and imperfect responsiveness to shunting are obstacles to the application of novel imaging techniques. Few studies have sought to interpret imaging findings in the context of theories of NPH pathogenesis 

Although attempts at predictive methodology, such as highvelocity aqueductal flow rate measurement on MRI, have achieved widespread acceptance in clinical practice, there is no Class I evidence (only 1 Class II study and 2 Class III studies) available to support this 

MRI

see Idiopathic normal pressure hydrocephalus MRI
SPECT

see SPECT for idiopathic normal pressure hydrocephalus diagnosis

Psychomotor Tasks

Although gait is the primary indicator for treatment candidacy and outcome, additional monitoring tools are needed. Line Tracing Test (LTT) and Serial Dotting Test (SDT), two psychomotor tasks, have been introduced as potential outcome measures.

Ancillary test for NPH

see Lumbar puncture for Idiopathic normal pressure hydrocephalus diagnosis.

Pressure recording

see Idiopathic normal pressure hydrocephalus intracranial pressure monitoring.

Alzheimer disease (AD)-related pathology was assessed in cortical biopsy samples of 111 patients with idiopathic normal-pressure hydrocephalus. Alzheimer disease hallmark lesions amyloid beta (Aβ) and hyperphosphorylated tau protein (HPtau)-were observed in 47% of subjects, a percentage consistent with that for whole-brain assessment reported postmortem in unselected cohorts. Higher-immunostained area fraction of AD pathology corresponded with lower preoperative mini mental state examination scores. Concomitant Aβ and HPtau pathology, reminiscent of that observed in patients with AD, was observed in 22% of study subjects. There was a significant correlation between Aβ-immunostained area fraction in tissue and Aβ42 (42-amino-acid form of Aβ) in cerebrospinal fluid (CSF). Levels of Aβ42 were significantly lower in CSF in subjects with concomitant Aβ and HPtau pathology compared with subjects lacking pathology. Moreover, a significant correlation between HPtau-immunostained area fraction and HPtau in CSF was noted. Both HPtau and total tau were significantly higher in CSF in subjects with concomitant Aβ and HPtau pathology compared with subjects lacking pathology. The 42-amino-acid form of Aβ (Aβ42) and HPtau in CSF were the most significant predictors of the presence of AD pathology in cortical biopsies. Long-term follow-up studies are warranted to assess whether all patients with idiopathic normal-pressure hydrocephalus with AD pathology progress to AD and to determine the pathologic substrate of idiopathic normal-pressure hydrocephalus.

Biopsy

Biopsy for Idiopathic normal pressure hydrocephalus diagnosis

Subramanian HE, Mahajan A, Sommaruga S, Falcone GJ, Kahle KT, Matouk CC. The subjective experience of patients undergoing shunt surgery for idiopathic normal pressure hydrocephalus. World
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