Cerebrospinal fluid tap test

- Idiopathic normal pressure hydrocephalus: A sulcal morphometry approach to brain phenotype and clinical response
- Determinants of clinical response in possible normal pressure hydrocephalus
- Prevalence and clinical impact of alpha-synuclein pathology in idiopathic normal pressure hydrocephalus: Insights from RT-QuIC assay
- Progressive ataxia, cognitive decline, urinary incontinence, and unexplained hydrocephalus: a rare case of idiopathic normal pressure hydrocephalus in epileptic patient
- Tms-evoked potentials: Neurophysiological biomarkers for diagnosis and prediction of response to ventriculoperitoneal shunt in normal pressure hydrocephalus
- Serial Assessment of Gait Changes After Interventions Using Smart Insole in a Patient With iNPH: A Proof-of-Concept Case Report
- Long-term gait improvement following a CSF tap test in idiopathic normal pressure hydrocephalus patients: an analysis of clinical outcomes
- Temporary Drainage of Cerebrospinal Fluid for Diagnosis and Treatment of Hydrocephalus

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There is no accurate test for diagnosing normal pressure hydrocephalus or screening patients who will benefit from shunt surgery. Additional tests, such as cerebrospinal fluid tap test (CSF-TT), are often used in practice to provide further predictive value in detecting suitable patients for shunting.

Protocol

It involves the removal of a specific volume of CSF via lumbar puncture, followed by clinical assessments to determine potential symptomatic improvement.

Standardized Tap Test Protocol

1. **CSF Removal:**

    1. Perform a lumbar puncture to remove **30–50 mL** of CSF.

2. **Clinical Assessments:**

    1. **Gait Evaluation:** Assess walking speed, stride length, and balance both before and after CSF removal. Improvements in these parameters can indicate a positive response.
    1. **Cognitive Testing:** Conduct neuropsychological tests focusing on memory, attention, and executive functions to identify any cognitive enhancements post-procedure.
    1. **Urinary Symptoms:** Monitor any changes in urinary urgency or incontinence following the tap test.☹

3. **Timing of Assessments:**

1. Re-evaluate the patient's symptoms **2–3 hours** after CSF removal to detect immediate improvements.

Purpose and Interpretation

The primary goal of the tap test is to predict the patient's responsiveness to CSF shunting procedures. A notable improvement in gait, cognitive functions, or urinary symptoms after the test suggests that the patient may benefit from shunt surgery. However, it's important to note that a lack of immediate improvement does not definitively rule out potential benefits from shunting. 😲cite😖turn0search9😖☹

Considerations:

- **Variability in Protocols:** There is significant variability in tap test protocols across different medical centers, including differences in CSF volume removed and the timing of post-procedure assessments. - **Alternative Testing:** In cases where the tap test results are inconclusive, extended CSF drainage methods, such as continuous lumbar drainage, may be considered to further evaluate shunt responsiveness.

Adherence to a standardized tap test protocol is crucial for accurate diagnosis and optimal management of iNPH. Such standardization ensures consistent evaluation and improves the reliability of test outcomes.

Systematic reviews

Using PRISMA guidelines, a systematic review of PubMed and Embase identifying studies of the tap test in iNPH was performed, centered on four clinical questions (volume of CSF to remove, type of needle for lumbar puncture, which clinical assessments to utilize, and timing of assessments). A modified Delphi approach was then applied to develop a consensus standardized tap test protocol for the evaluation of idiopathic normal pressure hydrocephalus.

Evidence synthesis: Two hundred twenty-two full-text articles encompassing a total of 80,322 participants with iNPH met eligibility and were reviewed. Variations in the tap test protocol resulted in minimal concordance among studies. A standardized protocol of the tap test was iteratively developed over two years by members of the International Parkinson and Movement Disorders Society Normal Pressure Hydrocephalus Study Group until expert consensus was reached.

The literature shows significant variability in the procedural methodology of the tap test. The proposed protocol was subsequently developed to standardize clinical management, improve patient outcomes, and better align future research in idiopathic normal pressure hydrocephalus [1)].

A search retrieved 8 articles explicitly addressing the topic.

There was a very high positive predictive value of CSF-TT: 92% (range from 73% to 100%) but a low negative predictive value: 37% (18%-50%). Also, the CSF-TT has high specificity: 75% (33%-100%) but average sensitivity: 58% (26%-87%). The overall accuracy of the test was 62% (45%-83%).

The systematic review did not provide unambiguous validity of the CSF-TT in screening patients for

shunting. The validity of the CSF-TT is good for patient inclusion for shunting because the positive response to the test is very reliable. Unfortunately, the negative response to the test does not reliably make these patients ineligible for shunting. Further studies are needed to improve and standardize the methodology to optimize the detection power of the test [2].

Case series

see Cerebrospinal fluid tap test case series.

1)
Bluett B, Acosta LM, Ash E, Bloem BR, Espay AJ, Farheen A, Fasano A, Higinbotham A, Krauss JK, Lang AE, Mostile G, Aviles-Olmos I, Quattrone A, Tipton PW, Tang-Wai DF; International Parkinson and Movement Disorders Society Normal Pressure Hydrocephalus (MDS-NPH) Study Group. Standardizing the large-volume “tap test” for evaluating idiopathic normal pressure hydrocephalus: a systematic review. J Neurosurg Sci. 2025 Feb;69(1):46-63. doi: 10.23736/S0390-5616.24.06368-9. PMID: 40045804.

2)
Mihalj M, Dolić K, Kolić K, Ledenko V. CSF tap test - Obsolete or appropriate test for predicting shunt responsiveness? A systemic review. J Neurol Sci. 2016 Mar 15;362:78-84. doi: 10.1016/j.jns.2016.01.028. Epub 2016 Jan 22. Review. PubMed PMID: 26944123.