

Prognostic Value of MRI-CSF Flowmetry for Shunt Responsiveness in Patients with Idiopathic Normal Pressure Hydrocephalus

Abstract

Background: Idiopathic normal pressure hydrocephalus (iNPH) is considered a treatable cause of dementia. MRI-CSF flow study is a non-invasive investigation for qualitative and quantitative CSF flow analysis to be used for the diagnosis of normal pressure hydrocephalus (NPH). The degree of clinical improvement of NPH symptoms post CSF diversion and shunting; was better in patients with higher pre-operative CSF stroke volume; allowing MR-CSF flowmetry to be a promising prognostic tool.

Aim of Study: To evaluate the prognostic value of MRI- CSF flowmetry for shunt responsiveness in patients with idiopathic normal pressure hydrocephalus and its usefulness as a predictor of post CSF diversion favorable outcome.

Patients and Methods: This study is a prospective study. 38 patients with clinical diagnosis of iNPH, ventriculomegaly and hyper dynamic CSF flow on PC MRI were included in our study. We used two protocols of PC MRI-CSF flowmetry examination; one assessing CSF flow dynamics qualitatively using a sagittal plane and one quantitatively using an axial plane perpendicular to the aqueduct. All patients underwent ventriculo-peritoneal shunt (VPS). Patients were followed up after shunting surgery for average 10 months at neurology and neurosurgery outpatient clinics for improvement of clinical symptoms & categorized into well responsive to shunt or not.

Results: We found that aqueductal CSF stroke volume (>42 microL) shows sensitivity of about (93.4%) & specificity of about (75.1%) with total accuracy of about (89.6%) in predicting shunt responsiveness and favorable outcome in iNPH patients.

Conclusion: MRI-CSF flowmetry is a promising non- invasive prognostic tool for iNPH. It had a high predictive value for shunt responsiveness. Our study enhances the utility of PC MRI-CSF flowmetry in selection of iNPH patients who are likely to benefit from VPS (shunt responsive); thus reducing the rate of unnecessary previously used invasive procedures as external lumbar drainage.