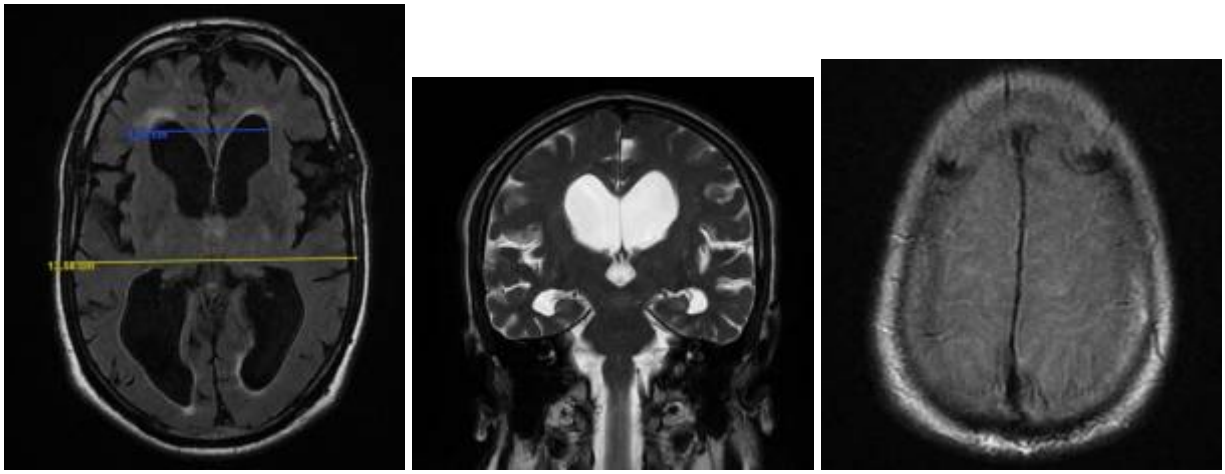
DESH score

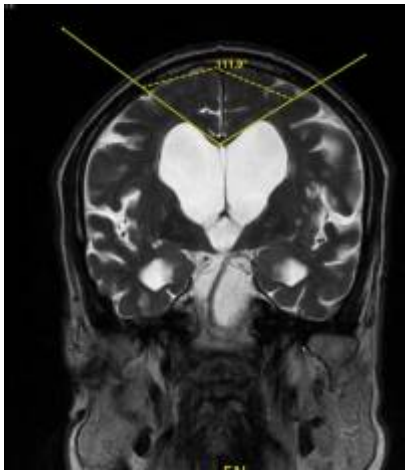
Disproportionately enlarged subarachnoid space hydrocephalus (DESH) on MR imaging or CT is now accepted as a useful diagnostic marker [1) 2)].

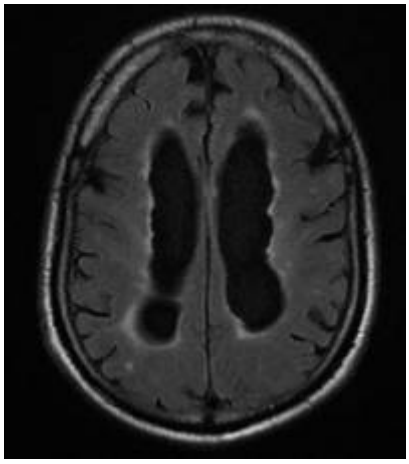
The aim of a study was to evaluate the utility of MRI-based Disproportionately enlarged subarachnoid space hydrocephalus scoring for predicting prognosis after surgery.

Grade	Definition
Ventriculomegaly	
0	Normal (Evans' index <0.3)
1	Slight dilatation (Evans' index ≥0.3 & ≤0.35)
2	Dilatation (Evans' index >0.35)
Dilated sylvian fissures	
0	Normal or narrow
1	Slight dilatation or unilateral
2	Bilateral dilatation
Tight high convexity	
0	Normal or wider than normal
1	Slight compression
2	Definitive compression
Acute callosal angle	
0	Obtuse angle (>100°)
1	Not acute, but not obtuse angle (≥90° & ≤100°)
2	Acute angle (<90°)
Focal sulcal dilation	
0	Not present
1	Some present
2	Many present

see Callosal angle







Evans 0,41 DSF 1 THC 2 ACS 0 FSD 2

In a single-center, retrospective cohort study, the DESH score was determined by consensus between a group of neurosurgeons, neurologists, and a neuroradiologist based on the preoperative MRI findings of the patients with suspected iNPH. The DESH score was composed of the following 5 items, each scored from 0 to 2 (maximum score 10 points): ventriculomegaly, dilated sylvian fissures, tight high convexity, acute callosal angle, and focal sulcal dilation. The association between the DESH score and improvement of the scores on the modified Rankin Scale (mRS), iNPH Grading Scale (iNPHGS), Mini-Mental State Examination (MMSE), Trail Making Test-A (TMT-A), and Timed 3-Meter Up and Go Test (TUG-t) was examined. The primary end point was improvement in the mRS score at 1 year after surgery, and the secondary outcome measures were the iNPHGS, MMSE, TMT-A, and TUG-t scores at 1 year after surgery. Improvement was determined as improvement of 1 or more levels on mRS, ≥ 1 point on iNPHGS, ≥ 3 points on MMSE, a decrease of > 30% on TMT-A, and a decrease of > 10% on TUG-t. RESULTS The mean DESH score for the 50 patients (mean age 77.6 ± 5.9 years) reviewed in this study was 5.58 ± 2.01. The mean rate of change in the mRS score was -0.50 ± 0.93, indicating an inverse correlation between the DESH score and rate of change in the mRS score (r = -0.749). Patients who showed no improvement in mRS score tended to have a low DESH score as well as low preoperative MMSE and TMT-A scores. There were no differences in the areas of deep white matter hyperintensity and periventricular hyperintensity on the images between patients with and without an improved mRS score (15.6% vs 16.7%, respectively; p = 1.000). The DESH score did differ significantly between patients with and without improved scores on the iNPHGS (6.39 ± 1.76 vs 4.26 ± 1.69, respectively; p < 0.001), MMSE (6.63 ± 1.82 vs 5.09 ± 1.93; p = 0.010), TMT-A (6.32 ± 1.97 seconds vs 5.13 ± 1.93 seconds; p = 0.042), and TUG-t (6.48 ± 1.81 seconds vs 4.33 ± 1.59 seconds; p < 0.001). CONCLUSIONS MRI-based DESH scoring is useful for the prediction of neurological improvement and prognosis after surgery for iNPH [3].

1)

Malm J, Graff-Radford NR, Ishikawa M, Kristensen B, Leinonen V, Mori E, Owler BK, Tullberg M, Williams MA, Relkin NR. Influence of comorbidities in idiopathic normal pressure hydrocephalus - research and clinical care. A report of the ISHCSF task force on comorbidities in INPH. Fluids Barriers CNS. 2013 Jun 10;10(1):22. doi: 10.1186/2045-8118-10-22. PubMed PMID: 23758953; PubMed Central PMCID: PMC3689166.

2)

Williams MA, Relkin NR. Diagnosis and management of idiopathic normal-pressure hydrocephalus. Neurol Clin Pract. 2013 Oct;3(5):375-385. PubMed PMID: 24175154; PubMed Central PMCID: PMC3806933.

3)

Shinoda N, Hirai O, Hori S, Mikami K, Bando T, Shimo D, Kuroyama T, Kuramoto Y, Matsumoto M, Ueno Y. Utility of MRI-based disproportionately enlarged subarachnoid space hydrocephalus scoring for

predicting prognosis after surgery for idiopathic normal pressure hydrocephalus: clinical research. J Neurosurg. 2017 Dec;127(6):1436-1442. doi: 10.3171/2016.9.JNS161080. Epub 2017 Feb 3. PubMed PMID: 28156249.