

3D SPACE technique=

Contrast-enhanced 3D fast [spin echo](#) (sampling perfection with application-optimized contrasts by using different flip angle evolutions [SPACE])

The [3D SPACE technique sequence](#) can quantitatively determine the content of [CSF](#). The change of [cerebrospinal fluid volume](#) has nothing to do with gender but with age. It is feasible to use the SPACE sequence to evaluate the spatial distribution and volume of intracranial CSF ¹⁾.

Twenty-six patients with [endoscopic third ventriculostomy](#) (ETV) were examined using 3 [Tesla MRI](#) units. Sagittal-plane 3D-SPACE with variant flip-angle mode, 3D T1-weighted (T1W), and 3D heavily T2-weighted (T2W) images were obtained with [isotropic voxel](#) sizes. Also, sagittal-axial plane phase-contrast cine (PC)-MR images were obtained. The following findings were evaluated: diameters of stoma and third ventricle, flow-void sign on 3D-SPACE and PC-MR images, integrity of the third ventricle on heavily T2W images, and quantitative PC-MRI parameters of the stoma. Obtained sequences were evaluated singly, in combination with one another, and all together. The mean area, flow, and velocity values measured at the level of stoma in patients with patent stoma were significantly higher than those measured in patients with closed stoma ($p < 0.05$). There was significant correlation among PC-MRI, 3D-SPACE, and 3D heavily T2W techniques regarding assessment of ETV patency ($p < 0.001$). The 3D-SPACE technique provided the lowest rate of ambiguous results.

The 3D-SPACE technique seems to be the most efficient one for determination of ETV patency. Algin et al. suggest the use of 3D-SPACE as a stand-alone first-line sequence in addition to routine brain MRI protocols in assessing patients with ETV, thereby decreasing scan time and reserving the use of a combination of additional sequences such as PC-MRI and 3D heavily T2W images in suspicious or complex case ²⁾.

¹⁾

Wu X, Richard SA, Xiangdong X, Lirong Z, Min W. Intracranial Cerebrospinal Fluid volume Evaluation in Healthy People and Hydrocephalus Patients using SPACE Sequence. Curr Med Imaging. 2021 May 3. doi: 10.2174/1573405617666210504093557. Epub ahead of print. PMID: 33949937.

²⁾

Algin O, Ucar M, Ozmen E, Borcek AO, Ozisik P, Ocakoglu G, Tali ET. Assessment of third ventriculostomy patency with the 3D-SPACE technique: a preliminary multicenter research study. J Neurosurg. 2015 Jun;122(6):1347-55. doi: 10.3171/2014.10.JNS14298. Epub 2015 Apr 10. PubMed PMID: 25859808.

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