Magnetic resonance imaging cisternography

Magnetic resonance imaging cisternography is a noninvasive technique, which does not involve the use of contrast material or spinal puncture. It can detect Cerebrospinal fluid fistula by inherent bright signal of CSF on T2 weighted images.

Algın et al. retrospectively reviewed 3-tesla contrast-material enhanced MR cisternography exams of 22 patients with suspected CSF leakage in 4 years. The presence of the artifacts on 3D-T1W data was evaluated using a 4-point scale (0: none; 1: minimal; 2: moderate; 3: prominent). Agreements between CSF leakage results of the 3D-T1W sequences and consensus decisions were evaluated via kappa values. Artifact scores were analyzed by Fisher's exact test.

The most compatible techniques with the consensus diagnoses were fat-saturated 3D-T1W-SPACE and 3D-T1W-VIBE sequences. The most artifact containing the 3D-T1W sequence was 3D-MPRAGE.

Fat-saturated 3D-T1W-SPACE and 3D-VIBE are more successful in evaluating CSF leakages compared to 3D-MPRAGE. 3D-SPACE has lower artifact scores compared to 3D-VIBE and 3D-MPRAGE sequences ¹⁾.

In a study, Roth et al., described the experience with MRI cisternography (MRIC) or ventriculography (MRIV) for diagnosing or excluding intra- and extraventricular obstructions. Such a differentiation may have a significant impact on choosing the optimal surgical solution.

They retrospectively collected data on patients undergoing MRIC/MRIV for diagnosing or excluding obstructions in patients with ventriculomegaly. All patients had MRI suggesting an obstruction, but without a clear cause.

Five children aged 1-17 years were included (3 females). Four underwent an MRIV, and 1 underwent an MRIC. Three children presented with headaches and had a suspected prior endoscopic third ventriculostomy (ETV) failure, and 2 presented with macrocephalus and increasing head circumferences. MRIV showed a patent ETV stoma in 2 cases, one of which had a T2 SPACE MRI showing no flow void through the stoma, and a closed stoma in 1 case with a flow void above and below the stoma on T2 SPACE MRI. MRIV and MRIC differentiated between two cases with panventriculomegaly, one of which had an obstruction at the level of the Liliequist membrane, and another with no identifiable obstruction.

MRIC and MRIV have a complementary role to MRI in assessing selected patients with hydrocephalus suspected of being secondary to an obstruction, but with no clear obstruction location ²⁾.

The aim of this study was to compare a new MRI method for detecting the existence of cerebrospinal fluid (CSF) fistulae, i. e. MR cisternography, with CT cisternography. In a prospective study, 30 patients with post-traumatic CSF fistulae were examined. The MR examinations were performed with a 1.0-T whole-body MR system, using two T2(*)-weighted sequences, a 3D PSIF (time-inversed fast imaging with steady-state precession, FISP) and a 3D constructive interference steady-state (CISS)

sequence. The results of MRI and CT cisternography were compared with the surgical findings. The sensitivity in detecting CSF fistulae with MR cisternography (PSIF: 89.9 %; CISS: 93.6 %) was higher than with CT cisternography (72.3 %). The sensitivity of CT cisternography at detecting CSF fistulae in patients with a size of dural lesion less than 2 mm or in patients with multiple dural lesions is significantly lower compared with the MR method. Although the localization of CSF fistulae always proved possible with MR cisternography, this could only be accomplished wih CT in 70 % of cases. The MR cisternography technique is a new examination method with a higher sensitivity for the detection of CSF fistulae than CT cisternography. The CISS technique is superior compared with PSIF and should be used in patients with high-flow CSF fistulae ³.

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