Individual planning of the entry point and the use of navigation has become more relevant in intraventricular neuroendoscopy. Navigated neuroendoscopic solutions are continuously improving.

see Neuroendoscopy for intraventricular tumor.

Augmented reality-enhanced navigated endoscopy was tested for accuracy in an experimental setting. Therefore, a 3D-printed head model with a right parietal lesion was scanned with a thin-sliced computer tomography. Segmentation of the tumor lesion was performed using Scopis NovaPlan navigation software. An optical reference matrix is used to register the neuroendoscope's geometry and its field of view. The pre-planned ROI and trajectory are superimposed in the endoscopic image. The accuracy of the superimposed contour fitting on endoscopically visualized lesion was acquired by measuring the deviation of both midpoints to one another. The technique was subsequently used in 29 cases with CSF circulation pathologies. Navigation planning included defining the entry points, regions of interests and trajectories, superimposed as augmented reality on the endoscopic video screen during intervention. Patients were evaluated for postoperative imaging, reoperations, and possible complications. RESULTS:

The experimental setup revealed a deviation of the ROI's midpoint from the real target by 1.2 ± 0.4 mm. The clinical study included 18 cyst fenestrations, ten biopsies, seven endoscopic third ventriculostomies, six stent placements, and two shunt implantations, being eventually combined in some patients. In cases of cyst fenestrations postoperatively, the cyst volume was significantly reduced in all patients by mean of 47%. In biopsies, the diagnostic yield was 100%. Reoperations during a follow-up period of 11.4 ± 10.2 months were necessary in two cases. Complications included one postoperative hygroma and one insufficient fenestration. CONCLUSIONS:

Augmented reality-navigated neuroendoscopy is accurate and feasible to use in clinical application. By integrating relevant planning information directly into the endoscope's field of view, safety and efficacy for intraventricular neuroendoscopic surgery may be improved [1].

1)
Finger T, Schaumann A, Schulz M, Thomale UW. Augmented reality in intraventricular neuroendoscopy. Acta Neurochir (Wien). 2017 Apr 7. doi: 10.1007/s00701-017-3152-x. [Epub ahead of print] PubMed PMID: 28389876.