

## 8.SUMMARY

By evaluating the effect of treatment of patients with idiopathic normal pressure hydrocephalus (iNPH) indicated for surgery based on positive supplementary tests, we determined their positive predictive value. Both the lumbar infusion test and the tap test have a high positive predictive value for the clinical response to shunt surgery. A patient with a typical symptomatology, a radiological examination finding, and a positive supplementary test will most likely benefit from surgery. Supplementary tests are a valid part of the diagnostic algorithm regardless their invasiveness.

Using diffusion tensor imaging on the MRI performed in patients with iNPH prior to surgery, one year after surgery and in healthy controls, we found changes in diffusion parameters in the periventricular white matter. Patients had a higher MD in ALIC, PLIC and CC compared to healthy controls, reflecting a higher degree of axonal degeneration in patients with iNPH. Patients in comparison with healthy controls had higher FA only in a PLIC. This area is affected by compression in patients with iNPH more severe. After the shunt surgery, we recorded a significant decrease in PLIC, which corresponds to the decompression after derivation of the CSF. However, the drop in value was not to the value of healthy controls.

In patients with iNPH and in healthy controls we evaluated the occurrence the signs of hydrocephalus with disproportionately enlarged subarachnoid spaces (DESH), we also evaluated the relationship between DESH finding and treatment outcome. We found that the DESH is present only in iNPH patients, not in healthy controls. DESH patients achieved better treatment outcomes than patients without DESH. DESH therefore has a high positive predictive value. The negative predictive value is low, however, it is higher than in the supplementary tests. DESH assessment should be a part of the iNPH diagnostic algorithm.

Using the FA parameter of the diffusion tensor imaging, we observed the differences between DESH group, non-DESH group and healthy controls. In patients with DESH, we recorded higher white matter compression in PLIC compared to non-DESH patients. It confirms the hypothesis that the DESH is associated with the higher compression of the periventricular white matter. Both groups had a higher FA in PLIC than healthy volunteers. After the surgery FA in PLIC decreased in both groups, in patients with DESH FA was still higher than in healthy controls. In the non-DESH group, the FA decreased almost to the healthy controls level. This phenomenon did not correlate with the treatment results, as DESH patients showed better postoperative improvement in clinical status, than non-DESH patients.

*Key words:* idiopathic normal pressure hydrocephalus, disproportionately enlarged subarachnoid spaces, tap test, lumbar infusion test, magnetic resonance, diffusion tensor imaging