



## **What's new in Hydrocephalus? January and February 2012!**

Dear ISHCSF members.

The research in hydrocephalus is active and new findings constantly increase our knowledge in this field. From the ISHCSF we want to support this and we will try to follow the research, and periodically send out a letter to the members, where we will make brief comments on some important articles recently published. We have no ambition to be comprehensive or to make a critical review of what is published, the goal is to illustrate that there are significant research contributions in hydrocephalus field by acknowledging a few of these articles. We also encourage you as members to send your articles to us so that we are aware of them.

Regards,  
Anders Eklund  
Secretary ISHCSF

In this first letter, we conducted a literature search on hydrocephalus and noted that it so far has been 105 new publications this year.

### ***Pediatric and Obstructive Hydrocephalus.***

In a paper from Copenhagen the authors did a review of the literature on loculated hydrocephalus and found that the research is hampered by unclear and interchangeable nomenclatures and they suggest a new system for classification for loculated hydrocephalus. (Andresen and Juhler, 2012).

The problem of identifying obstructive hydrocephalus from fourth ventricle outlet obstruction and how it can be assisted by performing CT ventriculography or cisternography was investigated with promising results in a study from Tel Aviv. These methods can assist in deciding between treatment of hydrocephalus with a ventriculoperitoneal shunt or with an endoscopic third ventriculostomy. (Roth et al., 2012) In another study looking for MRI signs to guide treatment, it was shown that presence of preoperative third ventricular bowing is predictive of ETV success, with nearly a 3-fold likelihood of success compared with patients treated with ETV in the absence of such bowing. (Dlouhy et al., 2012)

Two recent studies have investigated the outcome of pediatric hydrocephalus and the transition into adulthood. Reddy et al investigated patients that received shunt as a child but now were over 17 years. They reported that the incidence of shunt failure was 83% (Reddy et al., 2012). Vinchon et al concluded that adults treated for hydrocephalus in childhood requires a life-long follow-up and that many need shunt surgery as adult. (Vinchon et al., 2012)



## ***Normal Pressure Hydrocephalus***

Leinonen et al have investigated the predictive value of brain biopsy for the long-term outcome of possible NPH. Their cortical biopsy findings from 468 subjects indicate that NPH a heterogeneous syndrome and has notable overlapping with AD. They concluded that brain biopsy did not predict survival but may open a novel research window to study the pathobiology of neurodegeneration. (Leinonen et al., 2012)

There are a number of Diffusion tensor imaging studies in hydrocephalus presented early this year. In a Japanese study Fornix damage was investigated with structural imaging and diffusion tensor imaging. They found Fornix damage in iNPH and suggested that it was due to mechanical stretching from lateral ventricular enlargement.(Hattori, Sato, Aoki, Yuasa and Mizusawa, 2012). In a more general DTI study they showed a various patterns of white matter damage and also evaluated a new promising tool for DTI analysis. (Hattori, Ito, Aoki, Yuasa, Sato, Ishikawa, Sawaura, et al., 2012). Koyama et al found that fractional anisotropy was reduced in forceps minor in INPH compared to healthy. (Koyama et al., 2012)

In Haifa, corticospinal excitability as a link between frontal lobe dysfunction and gait disturbance in INPH was studied with transcranial magnetic stimulation of the leg motor area before and one month after shunt surgery. The study both revealed a difference in excitability against healthy and a change from shunting in those that improved. The authors concluded that the results support the view of a reduced control of motor output, rather than impairment of central motor conduction.(Chistyakov et al., 2012)

In an interesting new biomechanical approach with Magnetic resonance elastography, Freimann et al found indication of altered viscoelastic properties of brain tissue during disease progression and tissue repair in NPH.

As a contribution to neuropsychology of INPH Hellström et al reported the neuropsychology findings from the European multicenter study. Among other things they found that INPH patients performed significantly worse than healthy on all of the neuropsychological measures and that the Grooved Pegboard and the Stroop test were most sensitive to treatment effects.(Hellström et al., 2012) In another study, Kanno et al proposed a new test for executive function, a counting-backward test. They concluded the test to be useful for evaluating executive dysfunction in INPH and for differentiating between INPH and AD patients.(Kanno et al., 2012)

In Uppsala the reliability, influence of pain and time dependence for the Tap test was evaluated on 40 patients under investigation for INPH. They found that the clinical effect of the Tap test could be evaluated any time within 24 hours after the tap and that pain correlated negatively with improvement in gait speed.(Virhammar et al., 2012)



### ***Idiopathic intracranial hypertension***

In a study from Ottawa it was shown that the specific signs on brain magnetic resonance imaging and magnetic resonance venography in the diagnosis of idiopathic intracranial hypertension significantly improved the diagnostic certainty. (Maralani et al., 2012)

### ***Experimental Hydrocephalus***

The increased CSF flow pulsatility in hydrocephalus is well documented and increased capillary flow pulsatility has been suggested as a cause. Rashid et al investigated this in a hydrocephalus rat model but could not detect an increased neocortical capillary pulsation in spite of a markedly increased pulsatile CSF aqueductal flow. (Rashid et al., 2012)

Another study with a rat model investigated infantile hydrocephalus with Diffusion tensor imaging and found evidence for white matter injury. (Yuan et al., 2012)

### ***Shunts***

The MRI safety of a programmable shunt assistance was tested in both 3 T and 7 T MR and it was found that the 3 T exposure did not cause change in valve settings while the 7 T exposure could cause changes and could even lose their functional capability. (Mirzayan et al., 2012)

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