

Oral Presentation

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## Cerebrovascular pressure-reactivity in normal pressure hydrocephalus

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### Clinical background

We investigated the possible relationship between vascular reactivity and the resistance to CSF outflow in a group of shunted and non-shunted NPH patients.

### Materials and Methods

Sixty eight patients (47 non-shunted and 21 shunted) with NPH have been examined. During the examination ICP was measured in the ventricles (using a needle inserted into a pre-implanted Ommaya reservoir) at baseline and in response to a constant rate infusion (1.5 ml/min) of normal saline. Resistance to CSF outflow ( $R_{csf}$ ) was measured as an increase of ICP divided by the infusion rate. During the test, arterial pressure was monitored continuously using a Finapres finger cuff. Cerebrovascular pressure-reactivity was assessed as a moving correlation coefficient between coherent 'slow waves' of ICP and spontaneous fluctuations of arterial blood pressure (PRx index). This variable has been demonstrated previously to correlate with autoregulation of CBF [1]. Positive value of PRx reveals impaired cerebrovascular pressure-reactivity, whereas negative values indicate normal reactivity.

### Results

In non-shunted patients impaired pressure reactivity was associated with lower resistance to CSF outflow: (PRx versus  $R_{csf}$ :  $R = -0.5$ ;  $P < 0.0005$ ). This relationship was inverted in shunted patients: PRx was positively correlated with  $R_{csf}$  ( $R = 0.51$ ;  $P < 0.03$ ).

### Conclusion

Cerebrovascular pressure-reactivity is disturbed in patients with normal resistance to CSF outflow, suggesting underlying cerebrovascular disease. After shunting the

pressure-reactivity strongly depends on shunt function and may deteriorate when the shunt malfunctions.

### References

1. Czosnyka M, et al.: *Neurosurgery* 1997, **41**:11-19.