

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.