

## OP19

### **Influence of CSF protein content on revision rate in neonatal hydrocephalus**

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Initial CSF diagnostics have been available for 19 patients with a very longterm follow-up of >25 years and shunt surgery performed between 1972 and 1987. Mean age of the patients was 32 years at last available follow-up. All microbiological CSF examinations proved sterile conditions at time of primary insertion. Average protein content was 1283 mg/dl (range 160-6180mg/dl).

13 patients with a low protein level (<1000mg/dl, mean 544) required 12 shunt revisions within the first year whereas the 6 patients with a high protein level (>1000 mg/dl, mean 2887) needed 22 revisions. All 6 patients with high CSF protein levels had received valveless shunts at first surgery. 8 patients did not need first-year revision and all had CSF protein concentrations below 1700 mg/dl. 3 patients had protein concentrations over 2000 mg/dl and each received 4 or more revision operations in their first year.

From a statistical point of view, the number of patients needing a shunt revision during the first year after shunt implantation (low: 7 (54%), high: 4 (67%)) is not significantly different between the two groups, nor the number of patients who got along with only one revision during the first year (low: 4, high: none, two tailed chi square test). This is probably due to the small size of these subgroups.

When considering the number of revision operations in each group (low: 12 in 13 patients, high: 22 in 6 patients) or the number per patient of revisions (low: 1.7, high: 5.5) and re-revisions per patient (low: 0.7, high: 4.5) the difference is statistically highly significant ( $p < 0.0003$  for the three items, two tailed chi square test).

This means, among the children who have to undergo a shunt revision in the first year, the risk to need multiple operations is higher when the CSF protein concentration is 1000 mg/dl or more, even when a valveless system has been implanted. Protein content did not influence social, educational or neurologic outcome between the two groups.