

# Five Years Experience with Gravitational Shunts in Chronic Hydrocephalus of Adults

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## Summary

**Objective.** Gravitational shunts for management of chronic hydrocephalus are supposed to avoid or at least to reduce the risk of overdrainage. In order to find out if this hypothesis is correct, we did a prospective study and analysed the results of a series of 185 hydrocephalic adults, treated by using gravitational shunts. For the few cases in whom overdrainage occurred, we wanted to establish the reason for it. Especially it should be proven or excluded that overdrainage was caused by shortcomings of the principle of gravitational shunts. Another goal was to compare post-shunting changes of the ventricular size with clinical outcome. A comparably large study has not yet been published.

**Methods.** 185 adult patients who suffered from chronic hydrocephalus were shunted between 1996–2000, either using the combination of an adjustable Codmann Hakim Valve & Miethke Shunt Assistant (35 patients) or a Miethke Dual Switch Valve (150 patients). The clinical course of each patient has been followed until the end of 2000. Average follow-up time was 26 months (range 6–60 months).

**Results.** 88% of our patients were shunt responders, 70% had a good or excellent outcome. Overdrainage occurred in only 4%. It turned out that this complication was not a failure of the concept of gravitational shunts, but the result of a wrongly estimated intraperitoneal pressure. After shunting the ventricular size was reduced only marginally. In 92% of the patients the Evans-Index decreased less than 20% after the shunt insertion, but 69% of these patients had a good or excellent outcome. The most obvious difference comparing pre- and postoperative imaging was a better visibility of the high apical sulci after shunting.

**Conclusion.** In our series gravitational shunts proved to be effective in preventing overdrainage. The 4% negative exceptions are mainly avoidable. There was no correlation between outcome and ventricular size reduction, and as a rule ventricular size was only marginally reduced.

**Keywords:** Hydrocephalus; normal pressure hydrocephalus; NPH; longstanding overt ventriculomegaly in adults (LOVA); CSF-shunts; gravitational shunts; complications; overdrainage.