

Tandem Fenestration of the Lamina Terminalis and Membrane of Lilliequist During Microsurgical Aneurysm Repair Reduces Rates of Shunt Dependency Following Aneurysmal Subarachnoid Hemorrhage

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Introduction

Shunt-dependent hydrocephalus is an important contributor to neurologic morbidity following aneurysmal subarachnoid hemorrhage (aSAH). Whether variations in surgical technique at time of aneurysm treatment effectively decrease rates of shunt dependency remains controversial. Here, we describe our institutional experience with tandem fenestration of the lamina terminalis (LT) and membrane of Lilliequist (MoL) at time of microsurgical aneurysm repair to reduce rates of shunt dependency.

Methods

A total of 663 consecutive cases of aSAH undergoing open microsurgical treatment through a pterional or orbitozygomatic craniotomy by the senior author (M.T.L) were retrospectively reviewed from 2005 to 2015. Age, Hunt Hess grade, Fisher score, placement for an external ventricular drain, and opening pressure were collected. Groups were stratified into those undergoing no fenestration or tandem fenestration of the LT and MoL at the time of surgical repair. The need for a ventriculoperitoneal (VP) shunt and timing of shunt placement was recorded and statistically analyzed.

Results

Shunt dependent hydrocephalus was observed in 15.8 % of patients following aSAH. Tandem fenestration of the LT and MoL was associated with a statistically significant reduction in shunt dependency (17.9 % vs. 3.2%, $p < 0.01$). This effect was confirmed with multivariate analysis of collected variables (multivariate odds ratio 0.09, 95 % CI (0.03 to 0.30)). Number needed to treat analysis demonstrating that tandem fenestration was required in approximately 6.8 patients to prevent 1 VP shunt. A statistically significant prolongation of 28 days to VP shunt was also observed with tandem fenestration (26.6 ± 19.4 days vs. 54.0 ± 36.5 days, $p < 0.05$).

Conclusions

Tandem fenestration of the LT and MoL at the time of microsurgical clipping and/or bypass to is associated with significant reductions in shunt-dependent hydrocephalus following aSAH. Future prospective randomized multi-center studies are needed confirm this result.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe risk factors for shunt dependency following SAH; 2) Describe a novel surgical technique to fenestrate the lamina terminas and membrane of Lilliequist rates of shunt-dependency; following SAH; 3) To discuss refinements in surgical technique which may further augment CSF flow to reduce shunt dependency following SAH.

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