

Lack of Functional Patency of Lamina Terminalis after Fenestration following Clipping of Anterior Circulation Aneurysms

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Introduction

Cisternal lavage of subarachnoid blood from ventricular to cisternal spaces forms the basis of advocating ventriculocisternostomy as an adjunct procedure to aneurysm clipping (1,2). Moreover, it has theoretical implications for the administration of therapies into the cisternal space to prevent vasospasm (3). It is therefore crucial to verify that a dynamic flow of CSF does exist from the third ventricle into the chiasmatic cisterns after surgical fenestration of the lamina terminalis (FLT). Here we prospectively studied the patency of anterior third ventriculostomy after FLT during aneurysm surgery through CT cisternography.

Methods

Prospective analysis of 10 patients undergoing clipping of ruptured anterior circulation aneurysms followed by FLT during surgery. Flow of contrast into basal cisterns was assessed with CT imaging obtained 3-5 minutes following 1cc of intraventricular contrast injection (*Omnipaque 300*, 300mg organic iodine/mL), EVD closure and cranial maneuvering designed to position contrast adjacent to the lamina terminalis. Flow of contrast was documented by measuring Hounsfield Units in a pre-specified "region of interest" within the basal cisterns on the CT scan. This procedure was done using a standardized protocol designed in consultation with the Department of Radiology and approved by the institutional IRB.

Results

Ten patients consented to study participation. There was no evidence of contrast appearance within the basal cisterns on post-operative day one ventriculo-cisternograms. In all 10 subjects, contrast followed normal ventricular pathway from the lateral ventricles into the fourth ventricle (Figure 1).

Conclusions

Despite microsurgical FLT after aneurysm clipping, there was no radiological evidence of CSF flow into basilar cisterns one day following creation of a cisternostomy. Reports of beneficial effects of FLT in preventing vasospasm and shunt dependent hydrocephalus following aneurysmal subarachnoid hemorrhage should be taken with caution. Aggressive clot removal and manipulation of Circle of Willis vessels during surgery may instead be responsible for the observed beneficial effects.

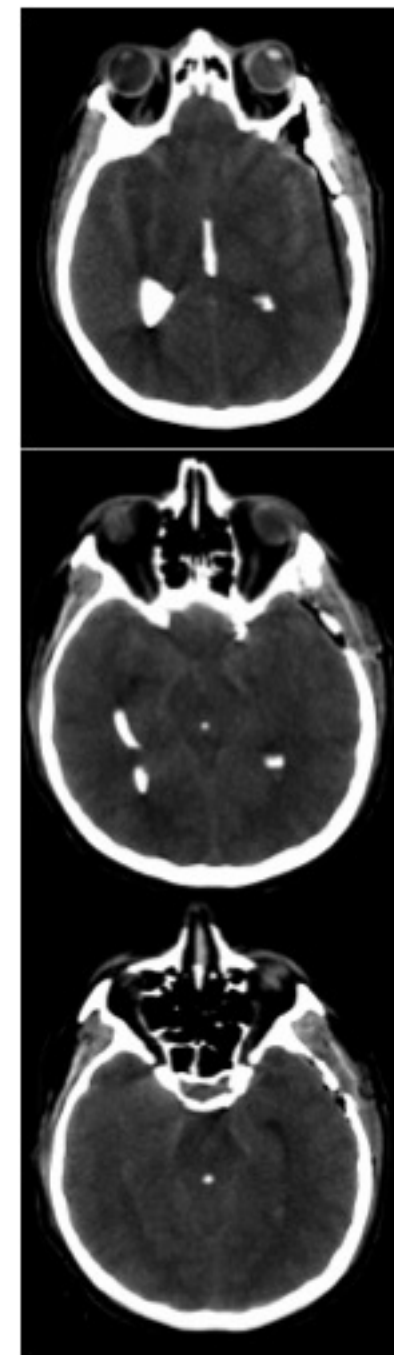
Learning Objectives

By the conclusion of this sessions, participants should be able to: 1) Describe the role of microsurgical fenestration of lamina terminalis after ruptured aneurysm clipping, 2) Describe the need to demonstrate the scientific validity of ventriculo-cisternostomy currently advocated by some as a necessary adjunct to clipping following aneurysmal subarachnoid hemorrhage.

References

1. Andaluz N, Zuccarello M: Fenestration of the lamina terminalis as a valuable adjunct in aneurysm surgery. **Neurosurgery 55:1050-1059, 2004**
2. Komotar RJ, Hahn DK, Kim GH, Starke RM, Garrett MC, Merkow MB, et al: Efficacy of lamina terminalis fenestration in reducing shunt-dependent hydrocephalus following aneurysmal subarachnoid hemorrhage: a systematic review. Clinical article. **J Neurosurg 111:147-154, 2009**
3. Barth M, Capelle HH, Weidauer S, Weiss C, Münch E, Thomé C, et al: Effect of nicardipine prolonged-release implants on cerebral vasospasm and clinical outcome after severe aneurysmal subarachnoid hemorrhage: a prospective, randomized, double-blind phase IIa study. **Stroke 38:330-336, 2007**

Figure 1



Intraventricular injection of Iohexol reveals lack of contrast flow into the basal cisterns