Endoscopic Management of Third Ventricular Arachnoid Cysts in Children

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Introduction

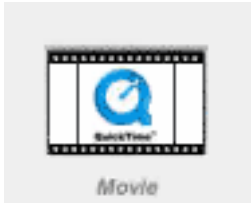
The use of VP shunts in the management of third ventricular arachnoid cysts as opposed to endoscopic fenestration alone, remains questionable. Also, until recently the “slit-valve” phenomenon remained a largely speculative mechanism for the formation of these cysts. Here we retrospectively review our cases of third ventricular cyst that underwent endoscopic fenestration. In addition we report our intraoperative observation of the “slit-valve” mechanism.

Methods

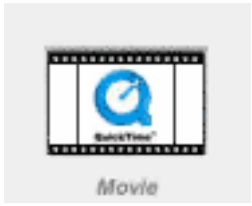
A retrospective review was performed and identified 25 patients that underwent endoscopic fenestration of their third ventricular cyst. The patients’ demographics, as well as, follow-up period, the presence of hydrocephalus, the need for a VP shunt, recurrence of the cyst, and any complications were recorded. The intra-operative technique used and the presence of the “slit-valve" were also noted (1,2).

Results

There were 14 males in our series with a mean age of 45 months (± 36 months). The mean follow-up time was 38.0 months (± 29.7 months). Seven patients presented with third ventricular dilation and hydrocephalus. Three patients (12%) required post-fenestration VP shunts from increased hydrocephalus and/or a CSF leak. A total of 5 (20%) patient had VP shunts in addition to the fenestration of the cyst, all of which had pre-operative hydrocephalus ($p < 0.01$). All cysts had both the outer cyst wall and inferior cystic portion fenestrated (Video 1). There were no recurrence of the cyst in the series. Sixteen patients were noted to have the “slit-valve” at the level of the mid basilar artery in the prepontine cistern (Video 2). Three patients (12%) had post-operative meningeal irritation and two (8%) had CSF leaks.



Video 1. Demonstration of operative technique.



Video 2. Demonstration of "slit-valve" mechanism.

References

1. Schroder HW, Gaab MR. Endoscopic observation of a slit-valve mechanism in a suprasellar prepontine arachnoid cyst: case report. *Neurosurgery.* 1997;40(1):198-200.
2. André A, Zérah M, Roujeau T, Brunelle F, Blauwblomme T, Puget S, et al. Suprasellar arachnoid cysts: toward a new simple classification based on prognosis and treatment modality. *Neurosurgery*. 2016;78(3): 370-9.

Conclusions

The presence of hydrocephalus pre-operatively makes the need for VP shunting more likely, but not absolutely. Endoscopic fenestration is a safe and effective initial treatment, and may prevent the need a VP shunt.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) determine the effectiveness of endoscopy in treating third ventricular arachnoid cysts, 2) understand the technique used in treating third ventricular arachnoid cysts endoscopically, and 3) understand the potential mechanism in arachnoid cyst formation.