Interhemispheric approach for carotid-ophthalmic artery aneurysm clipping

Case report

NOBUHIKO AOKI, M.D.
Department of Neurosurgery, Tokyo Metropolitan Fuchu Hospital, Tokyo, Japan

The author reports a case in which a subchiasmal carotid-ophthalmic artery aneurysm was clipped through a bifrontal interhemispheric approach. This approach is feasible for carotid-ophthalmic artery aneurysms with a variety of anatomical correlations between the optic nerve and the aneurysmal neck.

KEY WORDS
aneurysm • ophthalmic artery • operative approach • interhemispheric approach • subarachnoid hemorrhage

The direct surgical approach to a carotid-ophthalmic artery aneurysm is still a difficult problem. At present, the pterional and the subfrontal approaches are commonly employed to clip such aneurysms.1-3,7 Successful treatment using a contralateral pterional approach has also been reported.4,5 Because of the anatomical relationship between the optic nerve and the internal carotid artery, however, clipping of the aneurysmal neck is not infrequently associated with excessive retraction of the frontal lobe or inadequate mobilization of the optic nerve.

The author has recently had the opportunity to explore a subchiasmal carotid-ophthalmic artery aneurysm through a bifrontal interhemispheric approach. Although in Japan, Suzuki, et al.,6 have elaborated upon the application of this approach to carotid-ophthalmic artery aneurysms, it has not been described in the English literature, prompting the author to present the following case report.

Case Report

This 50-year-old man with no significant medical history suddenly experienced a severe headache on August 5, 1986. He was brought to a nearby hospital, where a diagnosis was made of subarachnoid hemorrhage associated with an anterior communicating artery (ACoA) aneurysm and a right carotid-ophthalmic artery aneurysm (Fig. 1). On August 7, he underwent exploration of the ACoA aneurysm through a bifrontal interhemispheric approach. At surgery, the aneurysm was observed to be unruptured and lacking a clippable neck, so it was treated with muscle wrapping. Because direct surgery to the carotid-ophthalmic artery aneurysm at an acute stage was judged to be difficult, the patient was transferred to our institution on August 13 for an intentionally delayed operation.

Operation. On August 29, the patient was placed in a supine position with his head fixed in a neutral position. The previous scalp incision and the craniotomy were reopened. The dural incision disclosed that the superior sagittal sinus and the falx cerebri had been incised at the anterior bone edge. Ventricular drainage via the right anterior horn of the lateral ventricle made the brain quite slack. Mild adhesions of both medial aspects of the frontal lobes were encountered. On dissection of the interhemispheric fissure, the genu of the corpus callosum and the frontal base were observed. After a wide exposure of the planum sphenoidale, the optic nerves and optic chiasm emerged bilaterally. The chiasm was noted to be of a pre-fixed type. Dissection was extended laterally to the right internal carotid artery. Evacuation of the surrounding clot and exposure around the medial and lateral aspects of the optic nerve failed to identify the aneurysm (Fig. 2 left). Unroofing of the optic canal followed by incision of the dura propria disclosed the ophthalmic artery (Fig. 2 center). At this stage, exploration along the lateral aspect of the optic nerve and slight tilting of the microscope permitted identification of the proximal and distal sides of the aneurysmal neck. With retraction of the optic nerve
FIG. 1. Right retrograde brachial angiography, anteroposterior view (left) and lateral view (right), showing a carotid-ophthalmic artery aneurysm with medial projection (arrowheads).

FIG. 2. Operative photographs. Left: Wide exposure of the planum sphenoidale (PLS), right optic nerve (OPN), and right internal carotid artery (ICA, arrows). Center: Exposure of the ophthalmic artery after unroofing of the optic canal. Asterisks indicate a retractor. Right: Neck clipping after identification of the proximal (1) and distal (2) sides of the aneurysmal neck.

medially, the neck was clipped using a Sugita clip (Fig. 2 right).

Postoperative Course. There were no complications due to optic nerve compression and no postoperative visual field defects. Right carotid angiography after surgery confirmed complete clipping of the aneurysmal neck (Fig. 3).

Discussion

Because the present patient had undergone a bifrontal interhemispheric approach to the ACoA aneurysm at another hospital, it was decided to use this approach to the carotid-ophthalmic artery aneurysm as well. The carotid-ophthalmic artery aneurysm in this patient projected medially, suggesting that a contralateral pterional approach would be suitable. At surgery, however, the pre-fixed chiasm and the aneurysmal dome prevented exploration for the neck along the medial aspect of the optic nerve, thus the contralateral pterional approach would have proved to be difficult for the clipping of the neck. In order to minimize mobilization of the internal carotid artery and the optic nerve, the present approach was preferable to the pterional approach conventionally used for clipping subchiasmal aneurysms.

The precise anatomical correlation between the optic nerve and the aneurysmal neck is often hard to identify preoperatively even with cerebral angiography and computerized tomography scanning. In such circumstances, it seems appropriate to use an interhemispheric approach, with the aneurysmal neck clipping along.
Interhemispheric approach to carotid-ophthalmic aneurysm

Fig. 3. Postoperative internal carotid angiography, anteroposterior view (left) and lateral view (right), showing the aneurysmal neck clipping.

Fig. 4. Operative drawings showing a subchiasmal type of carotid-ophthalmic artery aneurysm approached via the lateral (left) and the medial (right) aspects of the optic nerve.

either the medial or the lateral aspect of the optic nerve (Fig. 4). Indeed, in a second patient with an aneurysm that had quite similar angiographic features to those in the present case, aneurysmal neck clipping was achieved with an approach only along the medial aspect of the optic nerve. Thus, the bifrontal interhemispheric approach is promising because it allows aneurysms under the optic nerve to be approached from various directions, and it is applicable to patients with bilateral lesions.

Acknowledgment

The author wishes to express his appreciation to Dr. Kenji Wakiya for his cooperation in the management of this patient.

References


Manuscript received December 1, 1986.
Address reprint requests to: Nobuhiko Aoki, M.D., Department of Neurosurgery, Tokyo Metropolitan Fuchu Hospital, 2-9-2 Musashidai, Fuchu-Shi, Tokyo 183, Japan.