Application of nasopharyngeal mirror for aneurysm operation

Technical note

KENICHIRO SUGITA, M.D., TOSHIYUKI HIROTA, M.D., AND RYUICHI TSUGANE, M.D.

Department of Neurosurgery, School of Medicine, Nagoya University, Nagoya, Japan

The authors report their application of a specially designed nasopharyngeal mirror to microsurgical operations for intracranial aneurysm.

KEY WORDS: aneurysm, nasopharyngeal mirror, operative microscope

ONE of the hazards of intracranial aneurysm surgery is that structures behind the aneurysm cannot be easily observed; the aneurysm or the parent vessel is therefore occasionally retracted so forcibly that additional arterial spasm or premature rupture of the aneurysm may occur.

In several cases of aneurysm with this potential operative problem we have used a nasopharyngeal mirror under an operative microscope to observe the structures behind the aneurysm or the parent vessel.

Material and Operative Technique

The smallest of the nasopharyngeal mirrors with a flexible handle was used. This is a neurosurgical mirror, 5 mm in diameter, designed for use in the narrow field under an operative microscope. Before the operation the mirror was warmed in a saline solution to more than body temperature to prevent the collection of moisture. The operative field should be kept as dry as possible with suction; observation through the operative microscope is essential.

Operations for aneurysms of the anterior part of the circle of Willis were carried out through a frontotemporal approach. In a typical case, a left frontotemporal craniotomy was carried out (Fig. 1). The aneurysm protruded laterally from the C1 portion of the left carotid artery whose junction with the left posterior communicating artery was discovered ventrally behind the aneurysm only by use of the mirror. The distal portion of the posterior communicating artery was seen with retraction of the C1 portion distally from the aneurysm. The fine anterior choroidal artery was also easily observed at the distal portion of C1. Direct clipping of the aneurysm neck was not performed until the risk of clipping the posterior communicating artery with the aneurysm neck had been eliminated. Under observation with the mirror, the ligature thread was carried through beneath
Nasopharyngeal mirror for aneurysm operation

FIG. 1. Operative photographs of the image seen in the mirror under operative microscope (left) with schematic drawings for identification (right). A and A' = aneurysm at junction of left posterior communicating and left carotid arteries; opt = left optic nerve; R and R' = silver microretractor; W = Weck hemoclip; p and p' = posterior communicating artery; a and a' = anterior choroidal artery. Each prime shows the image in the mirror.

the aneurysm neck near the dome at a safe distance from the origin of the neck. The aneurysmal neck was ligated and clipped with a Weck homoclip at the side of the dome. Finally, a Heifetz curved clip was applied to the remaining part of the neck, 2 mm in length between the ligation and the parent vessel, which had been located just above the origin of the posterior communicating artery. After the patency of the posterior communicating artery was confirmed, the tip of the Heifetz clip was fixed with a surgical adhesive to avoid slipping. The postoperative arteriogram showed patency of the posterior communicating artery and disappearance of the aneurysm.

Discussion

The application of a nasopharyngeal mirror is effective only in a field seen under the operating microscope. There are two reasons for this: 1) the unmagnified image in the mirror is smaller and less clear than the real structure; and 2) the reversed mirror image can confuse the operator. It is important that the surgeon be able to adjust to the reversed image by correlation with the neighboring structures seen under the operating microscope.

In earlier operations we had used a fiberglass observerscope with 4 × magnification without the operative microscope; structures behind an obstacle were observed through the small window at the lateral side of the tip. However, this had no practical value because of the confusing picture of a reversed mirror image without real neighboring structures.

Even the smallest of the ordinary nasopharyngeal mirrors is occasionally too large for the neurosurgical procedures. We therefore designed both plane and convex mirrors 5 mm in diameter with a flexible handle for fixation to a self-retaining retractor. The photograph of the case presented was
taken with the smallest regular nasopharyngeal mirror instead of the neurosurgical mirror to demonstrate the clear image. It is usually best to use a larger mirror initially while one gains experience in the orientation of the image.

One of the important details in operative procedures on the C₁ portion is to avoid clipping or ligating the posterior communicating or anterior choroidal artery with the aneurysmal neck.¹⁻² In the case illustrated, without the mirror there would have been great risk of ligating the posterior communicating artery along with the aneurysmal neck.

This technique has also been useful in operations for aneurysms of the anterior communicating or vertebrobasilar arteries. We have also used it in the excision of brain tumors, for coagulation of the bleeding points on the side wall in the operative field as well as for discovering remaining parts of the tumor behind some intervening obstacle.

References

Address reprint requests to: Kenichiro Sugita, M.D., Department of Neurosurgery, School of Medicine, Nagoya University, Tsurumai 65, Showa, Nagoya, Japan.