The Dissecting Microscope for Intracranial Vascular Surgery

J. Lawrence Pool, M.D., and Robert P. Colton, M.D.*

Department of Neurological Surgery, Columbia University College of Physicians and Surgeons, and Service of Neurological Surgery, Columbia-Presbyterian Hospital Neurological Institute, New York, New York

In the past year we have used 1-3 a Zeiss dissecting microscope (Fig. 1) during surgery in 17 cases: 13 intracranial aneurysms, 3 arteriovenous malformations and for studies of vasospasm during one hemispherectomy. We believe it is helpful in the following ways.

1. An aneurysmal neck and its junction with the parent vessel can be seen more clearly than with the naked eye (Fig. 2). The surgeon can therefore apply an aneurysm clip more accurately and with less chance of traumatizing or compromising the lumen of the parent vessel (Fig. 3). The microscope has proved especially useful for aneurysms of the anterior communicating and middle cerebral artery.

2. The small but vital perforating vessels that arise from major arteries of the circle of Willis can be clearly identified with the aid of the microscope. Injury to these vessels can therefore be avoided during dissection or during the application of temporary clips. For example, branches from the proximal or A-1 portion of the anterior cerebral artery, which are distributed to the anterior hypothalamic, septal region, and adjacent structures of the brain can be visualized so well that injury to them can be avoided during the surgical treatment of anterior communicating artery aneurysms (Fig. 4).

3. Changes in the circulation of small partly transparent vessels can be observed during some procedures. We have occasionally noted, for example, circulatory slowing with clumping of red cells within some of the small semi-transparent arteries of the optic chiasm while they were being exposed.

4. The laminar flow in arterialized veins of intracranial arteriovenous malformations can also be plainly seen and studied. Changes in these vessels can therefore be effectively appraised after feeding vessels are tested by temporary occlusion.

5. Vasospasm induced by mechanical stimuli of cortical as well as larger cerebral arteries can be studied and the results of topical application of 3% Papaverine documented.

6. The bright, well-focussed light from the microscope lamp affords superb illumination of the surgical field.

Fig. 1. The microscope with camera at top, sidearm viewer at right, transformer for light mounted on the stand and foot switch on the floor.

7. A small built-in camera enables the surgeon to take moving pictures in color. Subsequent study of the films has proved extremely useful in evaluating and improving surgical techniques.

Technical Details

The Zeiss microscope† may be obtained with various objective lenses so that the distance from


† Obtainable from Storz and Co., St. Louis, Missouri (Model No. M8020).
**Fig. 2.** Internal carotid artery (C) with aneurysm (A) extending below the tentorial edge (T). Enlargement of microscopic magnification $\times 5$.

**Fig. 3.** Carotid artery aneurysm after suboptimal placement of a Mayfield-Kees clip (C) that partly indented the wall of the internal carotid artery (IC). T = tentorium. Enlargement of microscopic magnification $\times 6$. 