Revised New Brain Retractor: Characteristics and New Indications

—Technical Note—

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Abstract

Revisions were made to our new brain retractor with respect as follows. A knob was added to each shaft of the new brain retractor to facilitate handling. The angle between the shaft and the blade can now be adjusted from 60 to 135 degrees, which is useful in deep, narrow operative fields. Three blade lengths (20, 30, and 40 mm) are now available. The new retractor is entirely made from titanium. This revised brain retractor is very useful for the dissection of sylvian and interhemispheric arachnoid membranes, as well as in the extirpation of intracerebral masses via corticotomy.

Key words: new brain retractor, pterional approach, interhemispheric approach, arachnoidal dissection

Introduction

We previously developed a new type of brain retractor, which was mainly used to evacuate the intraparenchymal hematomas.¹⁾ Recently, we revised the original design. Here, we describe the revisions and propose several new indications for the brain retractor.

Revisions to the Brain Retractor

1. A knob has been attached to each shaft of the brain retractor to facilitate handling.
2. The angle between the shaft and the blade can now be adjusted to between 60 and 135 degrees, which is useful in deep, narrow operative fields.
3. Three blade lengths (20 mm for small size, 30 mm for medium size, and 40 mm for large size) are now available (Fig. 1). The retractor weights of three types are 3.5 g, 4.2 g, and 5 g, respectively.
4. The retraction force of three types is each shown in Fig. 2.
5. The entire apparatus is made from titanium.

We have also prepared a steel version of the revised brain retractor.

Fig. 1 Revised brain retractors with three blade lengths.

New Indications for the New Brain Retractor

I. Corticotomy

Corticotomy is a typical indication for the revised brain retractor. Initially, the brain retractor was used only to evacuate intracerebral hematomas. However, the brain retractor can also be used to extirpate intracerebral masses via corticotomy, as in patients with metastatic brain tumors, brain abscesses, and intraventricular tumors.

Fig. 2 Graph (left for small size retractor, center for medium size retractor, and right for large size retractor) showing the relationship between retraction force and retraction width at inter-blade distances of 40 mm (open square), 30 mm (closed circle), and 20 mm (open circle).

II. Dissection of the sylvian fissure

Dissection of the sylvian fissure is a basic technique because the pterional approach is most often used in neurosurgery (Fig. 3). Sylvian fissure dissection is facilitated by the application of adequate tension to the overlying arachnoid membranes, but this is bothersome and difficult with conventional self-retaining retractors. With the revised brain retractor, adequate tension can be easily applied to the arachnoid membrane. After the retractor has been positioned with an adequate retraction force through a small incision in the sylvian arachnoid membrane, the sylvian arachnoid membrane is stretched and is even dissected partially. By cutting the stretched arachnoid membrane, the retractor extends due to its leaf spring, and the arachnoid membrane is further stretched. Unlike a self-retaining retractor, our retractor does not require frequent resetting.

III. Interhemispheric approach

This is also a good indication for the revised brain retractor. The retractor enlarges the interhemispheric space during dissection of the arachnoid membrane. Frequent resetting is unnecessary. The falx should be covered with rubber or cotton to prevent slippage of the retractor blade.

Discussion

The revisions to the prototype brain retractor have facilitated handling. The prototype brain retractor had a fixed blade angle and was therefore difficult to use depending on the thickness of the skull, muscle, and scalp, especially in patients undergoing small craniotomies. The revised brain retractor has an adjustable blade angle, which has solved these problems. Furthermore, three blade lengths are now available, so the retractor can be used for both shallow and deep lesions.

Recently, we used this retractor during dissection of the sylvian arachnoid membrane. As the arachnoidal dissection proceeded, the neighboring arachnoid membrane was stretched by the leaf spring of the retractor, and the sylvian arachnoid membrane could be dissected very quickly because there was no need to frequently reset the retractor. We were often able to perform neck clipping of an unruptured aneurysm of middle cerebral artery (MCA) or a high-flow bypass to the M₂ portion of the MCA, by retracting the brain only with this new brain retractor. The advantages of this retractor during dissection of arachnoid membrane are similar to those afforded by the interhemispheric approach. Most unruptured aneurysms of the distal anterior cerebral artery can be clipped without using a conventional self-retaining retractor.

Fig. 3 Photographs showing the application of the revised brain retractor for dissection of the sylvian fissure. upper: Sylvian arachnoid membrane (arrowheads) is stretched by the revised brain retractor (asterisk). lower: M_1 and M_2 portions of the middle cerebral artery, and aneurysm (An) are clearly observed.

Acknowledgment

This new brain retractor can be purchased from

Muranaka Medical Instruments, Ltd., Osaka, Japan. The Department of Neurosurgery, Osaka Medical College, has a proprietary interest in this brain retractor, but not the authors individually.

Reference

- 1) Miyake H, Ohta T: A new brain retractor. Technical note. *J Neurosurg* 79: 462-463, 1993

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Commentary

This extremely light-weight titanium twin blade retractor is useful for dissecting the cerebral fissure. The retractors are adjustable to the necessary retraction forces, which are delicate and variable in each case. The revised adjustable angle between the shaft and the blade increase the usefulness. Slippage of the blade, which may be one problem if the retracted plane is not parallel, will be prevented by connecting one side of the shaft with a self-retaining retractor. The relationship between retraction force and width might be more constant if a thin roll-spring could be used.

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