Occipitotranstentorial Approach for Lesions of the Superior Cerebellar Hemisphere: Technical Report

Ronald H.M.A. Bartels, M.D., Joost de Vries, M.D.,
Jacobus J. Van Overbeeke, M.D., Ph.D.,
J. André Grotenhuis, M.D.
Department of Neurosurgery, University Hospital Nijmegen, Nijmegen,
The Netherlands

OBJECTIVE: The occipitotranstentorial approach is well accepted for lesions of the pineal region, superior cerebellar vermis, or mesencephalon. Although evidently suitable, this approach has not, to our knowledge, been reported for lesions of the superior cerebellar hemisphere in adults. Experience with this approach is reported.

METHODS: Four patients underwent surgery between August 1995 and March 1997. The findings obtained are evaluated.

RESULTS: All lesions were situated in the quadrangular lobules (one extending into the vermis), and all were completely removed. Postoperative deficits, especially visual field deficits, did not occur.

CONCLUSION: Lesions of the superior cerebellar hemispheres are easily approached by an occipitotransotentorial route. The major advantages over a supracerebellar approach are that the surgical route is nearly perpendicular to the lesion and to the tentorium instead of parallel, and a wider exposure is thereby possible. (Neurosurgery 41:1127–1129, 1997)

Key words: Cerebellar lesions, Occipitotranstentorial

The occipitotranstentorial approach is frequently used for lesions of the pineal region, superior cerebellar vermis, or brain stem (1, 3–5). Although evidently suitable, this method has not, to our knowledge, been described before for lesions in the superior cerebellar hemisphere in adults. We report our experience in four patients using the occipitotransotentorial approach for superior cerebellar lesions.

PATIENTS AND METHODS

Clinical data, radiographic findings, operative and postoperative results, and pathological examinations of the patients operated on between June 1995 and March 1997 are presented in Table 1.

SURGICAL TECHNIQUE

The patient is placed prone over well-padded rolls in a 20-degree reversed Trendelenburg position. The head is slightly flexed, rotated 20 to 30 degrees (operation side down), and fixed in a three-point fixation clamp. In the case of lesions extending to the midline, the patient is placed three-quarter prone with the operation side down. On the side of the lesion, a straight incision is performed 3 cm out of the midline and parallel to the superior sagittal sinus. The incision is approximately 12 cm long and should start at a point 3 cm caudally from the external occipital protuberance. An occipital craniotomy is performed. The superior sagittal sinus, torcular Herophili, and transverse sinus should be able to be visible. The dura is opened in a cruciate fashion toward the superior sagittal sinus and transverse sinus. The occipital lobe is retracted superiorly, and cerebrospinal fluid is aspirated generously from the interhemispheric and ambient cisterns. After aspiration of sufficient cerebrospinal fluid, retraction of the occipital lobe is usually unnecessary, and a spatula is only used for protection of the brain. Gravity also assists in brain retraction. The inferior occipital vein is dissected, but not divided. The tentorium is incised just lateral from and parallel to the straight sinus and later partially excised (as much as needed), exposing the superior cerebellar surface. Bridging veins from the cerebellar surface are sacrificed. The lesion is either directly seen or localized by ultrasound. Removal is straightforward using standard microsurgical techniques and standard equipment. The tentorium is not repaired. The craniotomy is closed in a standard fashion.

DISCUSSION

The occipitotransentorial approach is frequently used for lesions of the pineal region, superior cerebellar vermis, or
TABLE 1. Clinical Characteristics, Radiographic Findings, Operative and Postoperative Results, and Pathological Examinations of Four Patients

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Sex/Age (yr)</th>
<th>Signs and Symptoms</th>
<th>Radiographic Findings$^a$</th>
<th>Operative Findings</th>
<th>Postoperative Deficit</th>
<th>Pathological Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F/81</td>
<td>Gait disturbance; cognitive disturbance</td>
<td>Supratentorial hydrocephalus; cystic lesion in left cerebellar hemisphere and vermis with small enhancing nodule, 3.5 cm$^b$</td>
<td>3/4 prone, complete resection</td>
<td>None</td>
<td>Hemangioblastoma</td>
</tr>
<tr>
<td>2</td>
<td>F/49</td>
<td>Headache; right-sided cerebellar syndrome</td>
<td>Cystic lesion in right superior cerebellar hemisphere adjacent to tentorium, 3.5 cm$^b$</td>
<td>3/4 prone, complete resection</td>
<td>None</td>
<td>Metastasis of adenocarcinoma, unknown primary</td>
</tr>
<tr>
<td>3</td>
<td>M/68</td>
<td>Headache</td>
<td>Lesion in right cerebellar hemisphere adjacent to tentorium, 2.8 cm$^b$</td>
<td>Prone, complete resection</td>
<td>None</td>
<td>Metastasis of known lung carcinoma</td>
</tr>
<tr>
<td>4</td>
<td>F/51</td>
<td>Headache, gait disturbance</td>
<td>Lesion in the left cerebellar hemisphere adjacent to tentorium, 4.5 cm$^b$</td>
<td>Prone, complete resection</td>
<td>None</td>
<td>Metastasis of known adenocarcinoma of colon</td>
</tr>
</tbody>
</table>

$^a$ Magnetic resonance imaging.
$^b$ Maximum diameter in centimeters.

brain stem (1, 3–5). In 1984, Barba and James (2) described this approach for lesions in the superior cerebellum in children (2). After an extensive search of the literature, we did not find any other reports regarding this approach, and, although the superior surface of the cerebellar hemisphere is very well visualized, to our knowledge, the occipitotransientorial approach has not yet been described for lesions of this region in adults.

The standard route for lesions in the superior part of the cerebellar hemispheres is supracerebellar, either in a prone or sitting position. Apart from the possible complications related to a sitting position, the surgical field is narrow, especially for more centrally located lesions. A greater problem is the direction of the surgical route, which is parallel to the cerebellar cortex and to the lesion.

A wider surgical exposure can be achieved with the occipitotransientorial approach and a better angle of vision in a supero-inferior direction. Instead of parallel, the route is nearly perpendicular to the cerebellar surface and to the lesion (Fig. 1). A better and easier access to a lesion at the superior cerebellar surface is gained. Retraction of the occipital lobe is practically unnecessary if an adequate amount of cerebrospinal fluid is aspirated. With the operation side down, gravity also assists. This is important, because the major risk of retraction of the occipital lobe is a visual field deficit. For the same reason, the inferior occipital vein must always be preserved. This vein forms the lateral border of the corridor, but it is always possible to work around it after adequate dissection. None of our four patients suffered from postoperative deficits, especially visual field deficits.

In conclusion, the idea of using a occipitotransientorial approach for lesions within the superior cerebellar hemisphere is not new. Although it has not received any attention in the literature since its description in 1984, this approach is

FIGURE 1. Computed tomographic scan (A) of Patient 4 disclosing a hyperdense lesion in the superior part of the left cerebellar hemisphere. Using magnetic resonance imaging, a hypointense lesion was detected at the T1- (B) and T2- (C) weighted images. The sagittal T1-weighted (D) image shows a process with a hypointense center and enhancing rim after gadolinium administration. The location within the superior part of the cerebellar hemisphere and the relation of the lesion with the tentorium is clearly demonstrated. A schematic drawing (E) discloses the occipitotransientorial and the supracerebellar approach toward a lesion in the superior cerebellar hemisphere. The wider angle of vision in the supero-inferior direction (arrows) is especially clearly visible.
a good (and perhaps better) alternative to the standard supracerebellar approach for lesions in the superior cerebellum.

ACKNOWLEDGMENT

We express our gratitude to Marlu de Leeuw for drawing Figure 1E.

REFERENCES


COMMENTS

The occipitotranstentorial approach is a time-tested method for removing lesions of the pineal region and dorsal midbrain. Bartels et al. reinforce the usefulness of this approach for lesions of the superior cerebellar hemisphere centered off of the midline. This is an excellent approach for these lesions, because it provides a wide exposure with minimal risk of retraction injury. I have used it several times for similar lesions with good results. It is especially useful for tentorial meningiomas that project inferiorly into the hemispheres, because it enables the tentorial origin of the tumor to be divided circumferentially around the tumor to interrupt the blood supply before debulking and dissecting the tumor from the cerebellum.

The value of this technical report is in reminding the neurosurgical community of the availability of the occipitotranstentorial approach for lesions of the tentorial surface of the cerebellum. Most neurosurgeons are quite familiar with this approach and use it with frequency for lesions of the pineal region or of the superior cerebellar vermis. Additionally, I am sure that many neurosurgeons have also used this approach for lesions of the tentorial surface of the cerebellum, such as the ones operated on by the authors. However, the authors are right in pointing out that the literature has not emphasized the usefulness of this approach for the latter type of lesion.

I prefer to use this approach with the patient in the lateral or semiprone position, with the ipsilateral side down. This position recruits the aid of gravity in retracting the occipital lobe laterally and away from the falx. In this manner, one can expose the tentorium for several centimeters lateral to the midline, which should be sufficient for most medial and paramedial lesions of the cerebellar hemisphere. I prefer not to elevate the occipital lobe, such as indicated by the authors in Figure 1E of their article. This degree of elevation, of course, may be necessary for dealing with relatively lateral lesions of the cerebellar hemisphere, and, in these cases, I would prefer to use the traditional supracerebellar infratentorial approach, rather than elevating the occipital lobe as much as is indicated in Figure 1E of their article. In other words, it is my opinion, unsubstantiated by any scientific evidence, that lateral or slightly superolateral retraction of the occipital lobe is better tolerated than straight elevation of the occipital lobe, such as is indicated in Figure 1E of their article.

Roberto C. Heros
Miami, Florida

The main advantage of the occipitotranstentorial approach described by the authors is the direct perpendicular approach to lesions of the superior cerebellar hemisphere. The approach, therefore, avoids the oblique-tangential visualization of the superior cerebellar hemisphere of the infratentorial approach. The main disadvantage of the occipitotranstentorial approach, however, is that it potentially places the occipital lobe, its blood supply, and drainage into jeopardy. Although the authors did not encounter any complications, the possibility of a homonymous hemianopia needs to be seriously considered when choosing this approach.

Ivan Ciric
Evanston, Illinois

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