Subtemporal Transtentorial Approach

To The Editor: Ammerman and colleagues (Ammerman JM, Lonser RR, Oldfield EH: Posterior subtemporal transtentorial approach to intraparenchymal lesions of the anteromedial region of the superior cerebellum. J Neurosurg 103:783–788, November, 2005) nicely describe a standard surgical approach in which they used the subtemporal transtentorial route to lesions of the superior cerebellum. In the editorial that accompanied their paper, Dr. Heros states that he subscribes to this approach and emphasizes that it is a shorter route than others to that region.

Abstract

Object. To overcome the limitations associated with surgical approaches that have been described for accessing intraparenchymal lesions of the anteromedial region of the superior cerebellum, the authors used a posterior subtemporal transtentorial approach to remove tumors in this region. In this paper they describe the surgical technique that they used as well as the operative findings and clinical outcomes observed in patients who underwent resection of tumors in the anteromedial superior cerebellum.

Methods. The consecutive patients with anteromedial superior cerebellar tumors who underwent resection performed using the posterior subtemporal transtentorial approach at the National Institutes of Health were included in this study. Clinical, neuroimaging, and operative results were analyzed.

Three patients (two men and one woman) with anteromedial superior cerebellar tumors (two hemangioblastomas and one pilocytic astrocytoma) underwent resection via this approach. All the tumors were larger than 3 cm in diameter (range 3.1–3.5 cm). This approach provided excellent surgical access and permitted complete tumor resection in each case. The patients remained neurologically unchanged compared with preoperative baseline findings at the last follow-up examination (conducted at 4, 18, and 42 months postoperatively). One patient displayed a mild transient confusion immediately after surgery, but it resolved within 6 days.

Conclusions. The posterior subtemporal transtentorial approach provides excellent access to the anteromedial superior cerebellar region. This approach permits resection of large lesions in this location, while avoiding many of the limitations associated with other approaches to this site.

Although this route is good for approaching lesions in this region, I do not believe that it is the best route. Having surgically treated several hundred lesions in this region, I greatly favor the supracerebellar infratentorial approach, which completely eliminates the risk to the vein of Labbé. This is an important point because the location of the vein of Labbé varies so much that the surgeon can never be certain that it is not at risk during a posterior subtemporal approach.

As we all recognize, a vein of Labbé infarct in the dominant hemisphere prevents patients from recovering completely to their preoperative state. With respect to the venous system, I prefer to avoid the posterior subtemporal approach when treating most of the lesions presented by Dr. Ammerman. Placing the patient prone with the head turned, and using an off-midline approach to the lateral or extreme-lateral supracerebellar infratentorial route offers the same working distance and obviates the risk of supratentorial injury. When the cerebrospinal fluid is drained, retraction is often not required. If retraction is needed, its extent is no more than that necessary when using the posterior subtemporal approach.

The lateral supracerebellar approach, which is nothing more than an extension of the retrosigmoid approach along the transverse sinus, is safe and well tolerated by patients. Furthermore, it provides excellent exposure in this same region. Clearly, we develop our own personal strategies for accessing lesions in deep locations, but I am convinced that, in my hands, the lateral supracerebellar infratentorial approach to lesions of the anteromedial region of the cerebellum is the preferred and safest route.

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To the Editor: We read with great interest the paper by Ammerman and colleagues concerning the posterior subtemporal transtentorial approach to lesions located in the anteromedial region of the superior cerebellum and the related editorial by Dr. Heros. Since we read the paper by Shirane and associates, we have routinely used the occipital transtentorial approach to treat metastatic lesions in that cerebellar area, which we identify as juxtatentorial (Fig. 1 left).

Between 2001 and 2004, we surgically treated nine consecutive patients within a series of 33 patients who were admitted to the hospital for infratentorial metastasis and surgically treated during the same period. The choice of this approach was dictated by the opinion that, in patients whose life expectancy was limited due to systemic malignancy, a good quality of life should be gained as soon as possible. Actually, the avoidance of cerebellar retraction and/or transection avoids any postoperative ataxia and consequent rehabilitation, and should allow these patients to undergo other therapies while in good neurological conditions. We found that this approach is rather easy to perform for experienced neurosurgeons; the culmen is well visualized, as is the superior portion of the fourth ventricle, which can be easily opened (Fig. 1 right). Compared with the subtemporal region, no important veins are encountered. The most important problem could be unexpected intracranial hypertension with a tense occipital lobe. In such cases frontal ventricular tapping should be performed before placing the patient in the prone position to avoid excessive trauma to the occipital lobe. One of our patients had a postoperative hematoma of the occipital lobe. In that patient the occipital horn had been tapped to release cerebrospinal fluid and to permit adequate retraction of the lobe. If this is done afterwards, retraction is probably too traumatic for the already transected brain tissue. Another complication was partial and transient homonymous hemianopia in all patients, which was quite well tolerated.

Our results are discouraging if viewed in light of survival time, which is limited due to either intracranial recurrence or systemic diffusion. This has already been stressed in the

Neurosurgical forum
Letters to the editor

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Follow-up examination (conducted at 4, 18, and 42 months postoperatively) provided excellent surgical access and permitted complete tumor resection in each case. The patients remained neurologically unchanged compared with preoperative baseline findings at the last follow-up examination (conducted at 4, 18, and 42 months postoperatively). One patient displayed a mild transient confusion immediately after surgery, but it resolved within 6 days.

Conclusions. The posterior subtemporal transtentorial approach provides excellent access to the anteromedial superior cerebellar region. This approach permits resection of large lesions in this location, while avoiding many of the limitations associated with other approaches to this site.
Coronal Gd-enhanced magnetic resonance image. In the upper portion of the image, the position at which we define juxtatentorial. There are also signs of recent hemorrhage. Right: Intraoperative photograph obtained in the same patient after removal of the tumor. The retractor is on the right occipital lobe and the calvarium is in the upper part of the image. The white ependyma of the fourth ventricle is clearly evident.

few papers dealing with infratentorial metastases.\(^1\)\(^2\) The patients’ median survival time was 7 months, which is similar to that in our series of patients with cerebellar metastases, who underwent surgery performed via the traditional suboccipital approach (unpublished data).

Good results, that is maintenance or improvement in Karnofsky Performance Scale (KPS) scores, were obtained in four patients without complications, who had preoperative KPS scores of 70 or greater. The patient with the postoperative hematoma initially displayed worsening function but recovered to a KPS score of 80. Those patients whose preoperative KPS scores were less than 70 did not have good results in terms of quality of life.

We believe that the occipital transtentorial approach should be one choice for lesions located in the upper portions of the vermis cerebelli. In cases of metastatic tumors, as in our series, the patient’s preoperative neurological condition greatly influences the clinical results, given that surgery is uncomplicated.

**References**


**RESPONSE:** We thank Dr. Spetzler and Dr. Pompili and colleagues for their comments and for their interest in our recent publication in which we describe details of the posterior subtemporal transtentorial approach to intraparenchymal lesions of the anteromedial region of the superior cerebellum. The approach we used is a variation of the anterior subtemporal approach initially described nearly a century ago and popularized by Charles Drake in the early 1960s to access and successfully treat deep intracranial vascular lesions.\(^1\) Specifically, we described removal of anteromedial superior cerebellar tumors via a posterior subtemporal approach combined with splitting of the tentorium. Similarly, the approaches advocated to access lesions in this region by Drs. Spetzler and Dr. Pompili, et al., represent variations of the well-described and widely used lateral suboccipital infratentorial\(^1\) and occipital transtentorial\(^3\) approaches, respectively.

We have had the opportunity to evaluate and treat a large number of primary and metastatic posterior fossa tumors, including those located in the anteromedial superior cerebellum. Based on individual tumor properties and anatomy, we have used the lateral suboccipital infratentorial and occipital transtentorial approaches to remove lesions in and around the anteromedial superior cerebellum both safely and successfully. As we describe in our article, however, certain features of some anteromedial superior cerebellar tumors make them particularly suited to resection via a posterior subtemporal transtentorial approach; in the cases that we reported, the anterior and superior portions of the neoplasm were the only exposed surfaces. Subsequently, the posterior subtemporal transtentorial approach provided direct visualization of the tumor surface, permitting removal without resection or retraction of surrounding cerebellar tissue.

In each patient, a steeply angled tentorium enhanced the ease of dissection around the lateral and inferior poles of the tumors. Finally, in every case the insertion of the vein of Labbé was posterior to the junction of the transverse and sigmoid sinuses, on the side of the surgical approach, which permitted temporal retraction without undue tension on the vein.

Although these tumors could have been resected via a lateral suboccipital or an occipital transtentorial approach, the posterior subtemporal transtentorial approach provided advantages that enhanced the ease of complete tumor resection in the specific cases that we reported. Because of the superior anteromedial location of the tumors within the cerebellum and the steep angle of the tentorium in these patients, the lateral suboccipital infratentorial route would have been associated with a long and narrow surgical corridor, and might have required significant cerebellar retraction or resection to reach and expose the surfaces of these large, medially located tumors, which were surrounded posterolaterally by a significant amount of normal cerebellar tissue. As we emphasized in our article, the occipital transtentorial approach places the inferior pole of the tumor at a significant distance from the cranial opening and may require progressive occipital lobe retraction to expose the tumor adequately as the working distance deepens. This may cause a retraction injury to the occipital lobe, producing visual deficits similar to those described by Dr. Pompili and colleagues.

As we discussed in our article, potential complications associated with the posterior subtemporal transtentorial approach include retraction-related temporal lobe edema and...