Transpetrosal Extreme Lateral Suboccipital Approach for Extensive Posterior Fossa Epidermoid Cyst
—Case Report—

Ahmed DIRAZ, Shigeaki KOBAYASHI, Kazuhiko KYOSHIMA, Chuetsu NAGASAKI and Masanobu HOKAMA

Department of Neurosurgery, Shinshu University School of Medicine, Matsumoto, Nagano

Abstract

A new transpetrosal extreme lateral suboccipital approach was adopted to totally remove an extensive posterior fossa epidermoid cyst in a 36-year-old male. The pathological behavior of intracranial epidermoid cysts may impose surgical problems during removal of the tumor. However, planning based on neuroimaging allows optimum access to tumors and microsurgery achieves safer and more complete removal.

Key words: epidermoid cyst, diagnostic imaging, surgical approach

Introduction

Intracranial epidermoid cysts, also known as pearly tumors or cholesteatoma, usually arise in the cerebellopontine angle and parapituitary region. Epidermoid tumor tends to spread extensively and the tumor capsule adheres to adjacent structures, making complete surgical removal risky. We describe a new transpetrosal extreme lateral suboccipital approach and the successful total gross removal of a large posterior fossa epidermoid cyst.

Case Report

A 36-year-old male presented with the chief complaint of double vision on looking to the right in October, 1990. Two years earlier, he had noticed twitches in the right mandibular region which had gradually worsened, but he did not seek medical consultation until the chief complaint started. Neurological examination revealed hypesthesia in the territory of the third division of the right trigeminal nerve, and right abducens nerve paralysis. No other neurological signs were found.

Computed tomographic (CT) scans revealed a nonenhanced low-density mass located at the right parasellar region and the medial temporal fossa. There was no calcification (Fig. 1). Magnetic resonance (MR) images showed tumor extension from the level of the pontomedullary junction up to the parasellar region and the medial temporal fossa on the right. The T1-weighted image showed the tumor to be hypointense, but slightly hyperintense compared to cerebrospinal fluid (CSF). On the T2-weighted image, both the tumor and CSF were equal.

Received October 29, 1991; Accepted February 27, 1992

Fig. 1 Preoperative CT scans. left: Precontrast scan, showing a well-defined low-density area in the brainstem extending to the cerebellopontine angle. right: Postcontrast scan, showing nonenhancement of the lesion extending to the medial temporal fossa on the right.
ly hyperintense. The proton-weighted image showed the tumor as an isointense mass. MR imaging clearly showed the relationship between the tumor and surrounding important structures (Fig. 2). Cerebral angiograms showed dominance of the right transverse sinus. The basilar artery was pushed backwards by an avascular mass.

The posterior fossa mass extended rostrally to the parapituitary region and the medial temporal area. In January, 1991, a transpetrosal extreme lateral suboccipital approach was used to totally remove the tumor.

He was placed in the left lateral position with the head elevated 30 degrees, keeping the right temple in the horizontal plane with the vertex oriented anteriorly about 15 degrees. A curvilinear skin incision was made along the right auricular hair line extending from a point 3 cm below the mastoid process up to the frontal scalp (Fig. 3). Partial mastoidectomy was followed by a temporo-occipital en-bloc craniotomy removing the bone overlying the transverse sinus. The remaining mastoid bone was split into two laminae: the superficial lamina for reconstruction and the deeper one removed by rongeur and drilled away to expose the sigmoid sinus. Further rongeuring of the mastoid bone created a wider working space. Additional craniectomy included the foramen magnum downward and the posterior half of the occipital condyle laterally. Subtemporal drilling of the petrous bone started anteriorly just lateral to the trigeminal ganglion and extended posteriorly above the superior ridge to the cochlear system including the roof and posterior wall of the internal auditory meatus. The petrous bone was removed about 1 cm depth from the superior ridge on both sides. The dura was opened on both sides of the sigmoid sinus. The tumor was easily found, and was a typical epidermoid cyst with a smooth, irregular nodular surface. The lower part of the tumor had reached the level of the foramen magnum and extended to the contralateral side.

On opening the supratentorial dura, the rostral part of the tumor could be exposed in continuity with the caudal part (Fig. 3). The caudal tumor was removed with preservation of the vertebral artery and the lower cranial nerves. Mobilization of the sigmoid sinus and approach through the presigmoid dural opening achieved better visualization of the
tumor.

Lowering his vertex and approaching the tumor from the caudal side allowed piecemeal removal of the tumor in the subtemporal and medial temporal regions. Cutting the superior petrosal sinus and mobilizing the sigmoid sinus freely without injuring the vein of Labbé allowed safe removal of the tumor in the supratentorial compartment. The extensive removal of the petrous bone also provided a wide space for complete tumor removal. After removal of the cyst contents, the adjacent cisterns were irrigated with a large volume of saline solution to remove any potentially irritating debris and then hydrocortisone solution was instilled. Closure was made as usual.

Postoperatively, he was observed in the intensive care unit and intubation maintained for 3 days until the expected postoperative bulbar manifestations resolved. However, during extubation, he developed severe dyspnea with signs of lower cranial nerve pareses. A tracheostomy was performed and maintained for 2 weeks until the bulbar signs and symptoms disappeared. In the immediate postoperative period, he showed mild facial weakness and mild left hemiparesis which gradually recovered on follow-up. He now has very mild right abducens nerve pareses and slight hoarseness of voice. Follow-up CT scans and MR images showed complete removal of the tumor. MR images precisely showed the disappearance of the brainstem shift and complete tumor removal (Fig. 4).

Discussion

Intracranial epidermoid cysts are generally benign but tend to occur in intracranial locations and, through contiguous spread along normal cleavage planes, may extend through the tentorial incisura and occupy more than one site. The area most often involved is the basal subarachnoid cisterns and the parasellar region. In our case, the tumor had extended from the prepontine cistern to the parapituitary and medial temporal regions passing through the tentorial incisura. Intracranial epidermoid tumors isolated in the posterior fossa or extending through the incisura cause symptoms by gradually compressing and eventually surrounding cranial nerves, vessels, and the adjacent brainstem.

Complete surgical removal of an intracranial epidermoid cyst is risky due to the wide extension and adherence of the tumor capsule to adjacent structures. However, planning based on neuroimaging allows optimum access to tumors and microsurgery achieves safer and more complete removal.

Operative approaches to tumors with supratentorial extension use a skin incision designed to allow retraction of the skin flap anteriorly which may block the surgical view. In our case, the skin incision along the auricular hair line with posterior retraction of the skin flap avoided this.

Access to transtentorial tumors is facilitated by a combined supra- and infratentorial approach to use a skin incision designed to allow retraction of the skin flap anteriorly which may block the surgical view. In our case, the skin incision along the auricular hair line with posterior retraction of the skin flap avoided this.

Intracranial epidermoid cysts are generally benign but tend to occur in intracranial locations and, through contiguous spread along normal cleavage planes, may extend through the tentorial incisura.
used to approach skull base lesions. The extent of the petrous bone removal differs.\textsuperscript{2,4,9,11} We think that extensive tumors may require more radical removal of the petrous bone, even at the sacrifice of the cochlear function, to achieve adequate exposure for complete tumor removal. The transpetrosal approach allowed minimal temporal lobe retraction without tension on the vein of Labbé. Complete tumor removal was possible by lowering the patient's vertex and approaching the tumor from the caudal side.

Our approach did not require low access to the floor of the middle fossa and the petrous bone anterolaterally by temporary excision of the lateral and superior walls of the orbit and the zygomatic arch, as in the subtemporal-preauricular infratemporal approach\textsuperscript{11} for large lateral and posterior cranial base neoplasms. This approach achieves similar exposure to that obtained by ours, but tumor removal from the medial temporal region would be difficult. Additionally, the present approach required no dislocation or excision of the mandibular condyle which might cause postoperative malocclusion of teeth. The defect created by our approach was not so large to require tedious reconstruction.

Recently, a more radical approach to epidermoid cysts has achieved total removal without recurrence.\textsuperscript{3,10,11,15} We consider that complete removal of the epidermoid cyst is necessary to prevent postoperative recurrence and minimize the occurrence and severity of postoperative meningitis.

References