



Epidermoid Cyst with Bilateral Premedullary Involvement Resected from Left Far-Lateral Approach

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Abstract

Keywords

- ▶ epidermoid cyst
- ▶ premedullary
- ▶ far-lateral approach
- ▶ resection

The patient is a 51-year-old woman with an epidermoid cyst extending bilaterally along the clivus and cerebellopontine angles from the level of the cisterna magna to the prepuncular cistern. Her presenting symptoms included hearing loss, tinnitus, and imbalance for 4 months. Near-complete resection of the epidermoid cyst was achieved via a left far-lateral approach. The patient did well after the procedure with no new permanent cranial nerve deficits and unchanged or slightly improved preoperative deficits.

In this operative video, we report a case of resection of an epidermoid cyst with bilateral premedullary involvement that was resected from a left far-lateral approach.

History and Presentation

The patient was a 51-year-old woman with right greater than left hearing loss for an approximate 4-month history. She had worsening right-sided tinnitus and imbalance over that same time period, and a distant history of trigeminal neuralgia that was well managed with carbamazepine. Of note, she did not have any double vision, dysphagia, facial weakness, or voice changes.

Exam

On neurological examination, the patient was essentially intact—apart from bilateral sensorineural hearing loss that was worse on the right than the left, with a Weber test that indicated air conduction louder than bone bilaterally.

Preoperative Imaging

Preoperative magnetic resonance imaging of the brain demonstrated a diffusion-restricted T2-hyperintense, T1-hypo-intense, nonenhancing mass lesion extending bilaterally along the clivus and cerebellopontine (CP) angles, from the cisterna magna to the prepuncular cistern—highly consistent with a giant epidermoid cyst.

Indications and Alternatives^{1,2}

Given the large symptomatic nature of the tumor with significant associated brainstem compression, surgical resection was recommended as the frontline therapy of choice.

Surgical Plan

In order to maximize the extent of resection and limit the number of long-term treatment stages required, a left-sided far-lateral craniotomy was planned with a wide bilateral

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exposure with the foramen magnum to optimize disease clearance at the cisterna magna, inferior CP angles, and left-sided basal cisterns.

Surgical Recording

After completion of the craniotomy and bilateral C1 laminectomy, the operating microscope is brought in and the occipital condyle—highlighted in green—is exposed and partially resected using a combination of hand rongeurs and drilling with diamond burrs (► **Supplementary Video**).

As the cancellous core of the condyles is cored out, the dura is carefully stripped with the Penfield 1 dissector and the inner table is removed, taking care to protect the dural venous sinuses throughout the dissection. As the condylar resection is carried anteriorly and medially, a condylar emissary vein is frequently encountered superior to the bony hypoglossal canal, which may require packing for hemostatic control. Once 50% of the condyle has been removed, anticipating an excellent visualization of the premedullary and prepontine spaces, the dura is opened sharply from inferiorly to superiorly, reflected ipsilaterally, and retained in place with 4–0 Nurodon suture. This provides wide access to the left-sided CP angle, where a sharp arachnoid dissection technique is then used to identify and skeletonize the lower cranial nerves and the facial–vestibulocochlear complex—all of which have been displaced laterally by the growing epidermoid cyst.

Supplementary Video

Epidermoid cyst resection from left-sided far-lateral approach. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/a-2424-2168>.

Here we see the first phase of the resection proper, which is carried out from inferior to superior, gently elevating the left cerebellar hemisphere to access the inferior pole of the mass and mobilize it free from the cisterna magna without excessive manipulation of the lower cranial nerves.

The left posterior inferior cerebellar artery (PICA) and its small perforating branches are identified, skeletonized, and protected throughout the resection. As the PICA is dissected and the cerebellar tonsil mobilized, the proximal hypoglossal rootlets are brought into view and noted to be entangled with additional epidermoid cysts. A very delicate microsurgical technique is then used to resect this in a piecemeal fashion, taking care to preserve a clean arachnoid plane that protects the nerves while also allowing for complete removal of the cyst capsule. Here we can see multiple hypoglossal rootlets individually skeletonized and freed from the capsule, using predominantly sharp technique with the microscissors and Rhoton #11 microdissector. As the arachnoid is released, the mass is slowly and gently mobilized into the deep CP angle, and

away from the overlying neurovascular structures, allowing further resection in a stepwise fashion.

Attention is returned to the lower cranial nerves where their proximal rootlets are dissected free from the cerebellum at the brainstem and the V4 segment of the vertebral artery can now be traced from proximal to distal, removing additional cyst materials along its length from the adjacent basal cisterns. This in turn creates a potential space for further mobilization of the cyst components still adherent along the hypoglossal rootlets, which can now be more fully mobilized and dissected.

A very gentle cerebellar retractor is placed as the dissection continues superiorly—now working within the glossopharyngeal–cochlear triangle where the cyst capsule is sharply dissected free from the clivus ventrally. A gentle suction technique is used to debulk this component of the mass centrally, which allows the capsule to be mobilized and sharply freed from the brainstem medially, as well as the lower cranial nerve margins inferiorly.

The suprahypoglossal section of the Vagal accessory triangle is then opened from below, allowing us to work in tandem between these two CP angle triangles to ensure a complete dissection of the cyst and its capsule free from the posterior fossa neurovascular structures.

As the dissection within the glossopharyngeal–cochlear triangle is carried medially, the abducens nerve is brought into view and noted to be densely involved with the cyst capsule. This then required a very extensive and delicate, sharp dissection along its full length until the nerve was completely freed from its entanglement with the epidermoid cyst.

The superior petrosal venous complex is then released to gain access into the superior compartment of the CP angle, opening a new corridor between the VII–VIII complex and the adjacent trigeminal nerve. The cyst capsule is then dissected free from the margin of the trigeminal nerve using sharp technique and the arachnoid layer between the tentorium, cerebellum, and cyst is released to carry the dissection into the supracerebellar plane.

Here we see the superior cerebellar artery and trochlear nerve being delicately skeletonized and mobilized to allow further dissection into the deep aspects of the perimesencephalic cistern. The capsule is sharply separated from the overlying arachnoid, mobilizing additional cyst fragments from the midbrain and trochlear nerve medially, and the trigeminal nerve laterally. After visualizing that the quadrigeminal cistern is free of disease, the dissection is carried down along the course of the superior cerebellar artery into the ambient cistern, removing an additional cyst from the lateral face of the midbrain.

The dissection is then carried superiorly along the distal aspect of the trochlear nerve, removing the last of the epidermoid cyst and its capsule from the left prepuncular cistern, completing the superior most component of the resection.

Along the cisternal segment of the trigeminal nerve, the capsule is noted to be densely adherent, requiring very delicate, sharp dissection in order to achieve a complete resection of the ipsilateral disease.

In the final overview, we see the cerebellum and distal brainstem are nicely decompressed with no evidence of residual disease noted on the patient's left side.

Postoperative Exam

The patient awoke with very mild diplopia from a left-sided abducens palsy, mild dysphagia, and hoarseness.

Postoperative Outcome

As of her 3-month postoperative follow-up, these deficits had all resolved, and her audiogram also showed modest ipsilateral improvement.

Postoperative Imaging

Postoperative imaging confirmed complete resection of all left-sided disease as well as the bilateral cyst components in the foramen magnum, prepontine cistern, and interpeduncular cistern, with a small expected residual in the inaccessible

aspect of the contralateral CP angle, just below the VII–VIII complex on the right.

Conclusion

In sum, the present case demonstrates the successful resection of a very large, bilateral, skull base epidermoid from a unilateral, far-lateral approach with no persistent worsening in the patient's postoperative neurological function.

Conflict of Interest

None declared.

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