Retrolabyrinthine Endoscopic Assisted Approach for Resection of Vestibular Schwannoma



Arman Saeedi MPH¹, Lawrance Lee MD¹, Nauman F. Manzoor MD¹

¹Department of Otolaryngology - Head and Neck Surgery, Virginia Commonwealth University, Richmond, VA; ²Virginia Commonwealth University School of Medicine, Richmond, VA; * **Presenter**

Background

Vestibular schwannomas (VS) are slow-growing benign tumors of the vestibular nerve that can cause significant morbidity if left untreated due to cochleovestibular symptoms such as progressive tinnitus, imbalance, and sensorineural hearing loss. ^{1,2}

Current options for VS include observation, microsurgical resection, radiosurgery, and an emerging field of biologic therapies and anti-inflammatories.³ Traditional hearing preservation approaches to the internal auditory canal (IAC) include middle fossa and retrosigmoid approaches, while nonhearing preservation approaches include translabyrinthine and transpromontorial approaches. Hearing preservation approaches provide excellent exposure, however, accompany risks associated with prolonged intracranial retraction of brain tissue, such as edema, hematoma, seizures, and meningitis.^{2,4,5}

Figures



Figure 1: Preoperative T1 Axial MRI

Preoperative Imaging



Figure 2: Preoperative T2 Axial MRI, Tumor filling the entire IAC with some CPA extension and a small fundal fluid cap



The retrolabyrinthine (presigmoid) approach has traditionally been limited in vestibular schwannoma (VS) surgery due to challenges in visualizing the lateral internal auditory canal (IAC) and cerebellopontine angle (CPA). While commonly used for endolymphatic sac pathology, hemifacial spasm decompression, and vestibular nerve section, its broader application has been constrained.

With the advancements in endoscopic assistance in other IAC/CPA approaches, we propose its use in the retrolabyrinthine corridor to improve access for tumor resection and provide a potential hearing preservation option, tailored to individual patient anatomy.⁶

Objective

We present a case of an endoscopic assisted

Figure 3: T1 Contrast MRI showing near total resection of the tumor

Postoperative Imaging

Figure 4: T1 Contrast Coronal View

Figure 5: Axial CT showing postoperative bone resection of the posterior petrosal bone and IAC exposure with complete labyrinth preservation

Discussion

Vestibular schwannomas, while benign, carry significant morbidity due to their proximity to critical neurovascular structures and their mass effect. Postoperatively, the patient had House-Brackmann Grade 1 function, an uncomplicated hospital course and was discharged on day four in stable condition. With regards to the approach, several operative challenges are worth noting:

• The IAC fundus cannot be fully exposed in an approach with complete labyrinth preservation. For facial nerve dissection, a lateral to medial dissection plane was not feasible. In this patient, the tumor almost encompassed the entire IAC. A small amount of residual tumor is appreciable on the lateral end of the IAC on postoperative

retrolabyrinthine approach to the IAC for vestibular

schwannoma resection with complete labyrinthine preservation to demonstrate that such an approach can be utilized for hearing preservation surgery.

Case Presentation

A female patient in her 60s with past medical history of hypertension, diabetes, and BMI of 38.9 presented with unilateral hearing loss, otalgia, and episodic vertigo of six months. Otomicroscopic and vestibular exams were unremarkable. Audiogram one month preoperatively revealed serviceable hearing, sensorineural hearing loss with word recognition score of 92%. Outside MRI findings were suggestive of vestibular schwannoma.

We performed an endoscopic assisted

retrolabyrinthine approach for the resection of the acoustic neuroma. In this patient, after retrolabyrinthine corridor drill out with a microscope, endoscopic assisted dissection was T1 contrast MRI.

• Sidewise dissection on the facial nerve is potentially more useable in such an approach with early identification of nerve in the CPA.

Conclusion

We demonstrate the feasibility and approach to the retrolabyrinthine resection of a vestibular schwannoma with endoscopic assistance as a potential novel hearing preservation surgery. Careful patient selection and risk-benefit discussions regarding this surgical approach are paramount and intraoperative auditory monitoring can be used for guidance.⁷

Patient anatomical factors, tumor characteristics, tumor extension, small retrolabyrinthine corridor, and high jugular bulb likely influence success and warrant further investigation. Additional research could also reveal insights regarding the long-term hearing and facial nerve outcomes of patients treated via this approach.

References

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able to expose the lateral aspect of the IAC and a near-total

resection was achieved.



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Arman Saeedi, MPH

VCU Department of Otolaryngology – Head & Neck Surgery 1200 East Broad Street, West Hospital, Richmond, VA, 23298

