

The Fully Endoscopic Acoustic Neuroma Surgery



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KEYWORDS

- Transcanal/Transpromontorial endoscopic approach • Acoustic neuroma
- Facial nerve • Internal auditory canal

KEY POINTS

- Transcanal/transpromontorial endoscopic approach is an effective surgical technique for small intracanalicular acoustic neuroma removal.
- The surgical approach must follow strict landmarks to identify and preserve facial nerve.
- Although there is no possibility for hearing preservation, facial nerve results are encouraging.
- Transcanal/transpromontorial endoscopic approach can be an alternative to wait and scan policy or radiosurgery in this kind of pathology.

INTRODUCTION

Fully endoscopic surgery is a surgical standard of care in minimally invasive neurosurgery of the anterior skull base. The successful implementation of the endoscope in pituitary surgery has allowed many surgeons to adopt the benefits of endoscopy such as panoramic view, brilliant illumination, and faster postoperative recovery. Endoscope use in other areas of the brain, such as the cerebellopontine angle (CPA) and the internal acoustic canal (IAC), however, has been limited.

At present, endoscopy in CPA surgery is primarily used as an adjunct to conventional microscopic surgical techniques, so called endoscope-assisted microsurgery

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(EAM) for removal of acoustic neuromas (ANs). The first introduction of the endoscopic technique in IAC surgery has been in combination with the retrosigmoid approach after removal of the CPA extension of the tumor.

The intracanalicular extension would be removed under endoscopic control, trying to avoid extensive drilling of the posterior aspect of the petrous bone.¹ More recently, a keyhole retrosigmoid approach has been proposed for surgical removal of ANs.²

EAM in CPA has been an excellent start for the use of the endoscope in the posterior fossa³ and the advances in the application of endoscopy in the surgical treatment of middle ear cholesteatoma⁴⁻⁶ with the natural evolution of the otologic/endoscopic techniques allowed the use of the endoscopes in lateral skull base surgery.

By studying and understanding the endoscopic anatomy and procedures, approaches of the middle ear have been gradually completed until endoscopic anatomy of the labyrinth and IAC were thoroughly known.⁷ Recently, a progression from EAM to a fully appropriate endoscopic technique in the internal auditory canal (IAC) surgery has been recorded and applied clinically^{8,9} for removal of AN in the IAC.

Retrosigmoid, transmastoid-translabyrinthine, and middle cranial fossa approaches are the most popular surgical approaches to treat pathology extending into the IAC, such as ANs.¹⁰

All these approaches are characterized by the fact that they are indirect approaches to the inner ear and require wide external incisions and a variable degree of temporal bone removal to access the IAC and CPA.

Hence, the technique outlined in this publication provides a safe and effective step-by-step way to perform CPA surgery using a fully endoscopic transcanal technique for the resection of ANs, as it has superior visualization of the neurovascular relationship allowing for successful resection of ANs.

TRANSCANAL TRANSPROMONTORIAL ENDOSCOPIC APPROACH TO THE INTERNAL AUDITORY CANAL

The transcanal transpromontorial endoscopic approach (TTEA) representing the first fully endoscopic approach for the acoustic neuroma, the external auditory canal (EAC) is used as a natural surgical corridor to reach the fundus of the IAC; passing through the cochlea and the vestibule, exposing the whole IAC from the external auditory canal (Fig. 1). From an anatomic point of view, this approach allows work on the medial wall of the tympanic cavity and lateral skull base dissecting the whole IAC from the fundus to the

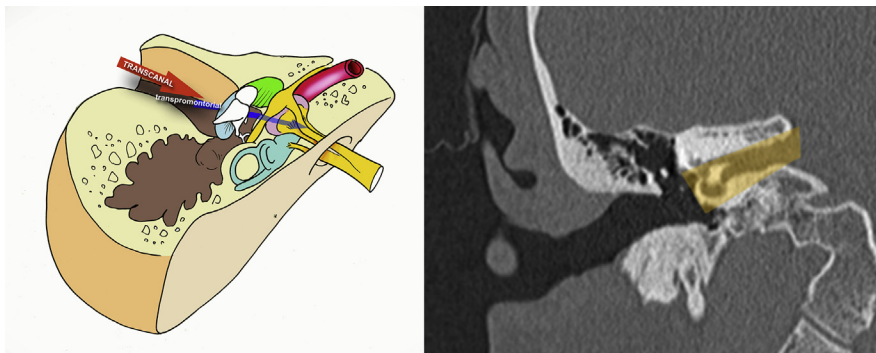


Fig. 1. Schematic drawing on the left representing the surgical corridors; the EAC is used as natural corridors so as to reach the IAC; on the right, a computed tomography scan in coronal view showing in yellow the working area.

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