

Endoscopic Management of Middle Ear and Temporal Bone Lesions



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KEYWORDS

- Endoscopic ear surgery • Paraganglioma • Glomus tympanicum
- Middle ear adenoma • Cholesterol granuloma • Petrous apex • Temporal bone
- Skull base

KEY POINTS

- Middle ear paraganglioma is a benign neoplasm that typically presents with vascular tinnitus and progressive hearing loss depending on the size and location of the tumor.
- Petrous apex cholesterol granuloma is a cystic, inflammatory lesion typically resulting from hemorrhage into a mucosalized space; they can be managed with marsupialization into the middle ear or mastoid in symptomatic patients.
- Middle ear adenoma is a benign but locally aggressive lesion that has a high incidence of recurrence without complete surgical excision.
- Transcanal endoscopic ear surgery is a means of managing temporal bone neoplasms given the unparalleled visualization of the tumor's relationship to the critical anatomic structures within the lateral skull base.

INTRODUCTION

Lesions involving the temporal bone, although rare, are often a challenge to manage given the adjacent critical structures that are localized within the skull base. Fortunately, most lesions involving the middle ear and mastoid are benign, thus obviating the need to obtain the wide tissue margins that would typically result in significant morbidity. The microscopic transcanal or postauricular approaches are the traditional means to excise lesions of the middle ear and mastoid. Transcanal endoscopic ear surgery (TEES) is a relatively new option that can be used to address pathology of

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Abbreviations

CT	Computed tomography
MEA	Middle ear adenoma
MEP	Middle ear paraganglioma
PACG	Petrous apex cholesterol granuloma
TEES	Transcanal endoscopic ear surgery

the middle ear and mastoid.¹ TEES uses the ear canal as the access point to address pathology of the temporal bone. The endoscope, unlike the microscope, is not limited by line of site issues and allows for improved illumination of the surgical field. The endoscope provides a wide field view that allows the surgeon to examine areas not typically visible with the microscope without removal of bone lateral to the area of interest.² The endoscope also does not require a postauricular incision, which results in less postoperative pain and allows for a faster recovery. Disadvantages of TEES include moving from 2-handed to 1-handed tissue dissection, and the lack of depth perception. This article describes the usefulness of TEES for the management of temporal bone lesions including middle ear paragangliomas (MEPs), adenoma, petrous apex cholesterol granuloma (PACG), and other lesions.

TECHNIQUE

The patient is positioned 90° to 180° away from anesthesia after induction and intubation. Total intravenous anesthesia is the technique of choice because it reduces the chance of patient movement, does not require muscle relaxants, and is reported to reduce intraoperative bleeding. A 3-mm diameter 14-cm length endoscope with varying degrees of angulation (0°, 30°, 45°, 70°) and a high-definition 3-chip camera are the ideal equipment for TEES. Local anesthesia with lidocaine or bupivacaine with epinephrine is infiltrated into the membranous canal skin, tragus, and postauricular area, which can be done with the microscope and a speculum or with the endoscope without a speculum. Excess hair in the membranous canal is trimmed to prevent smearing of blood and irrigation on the tip of the endoscope. Topical 1:1000 epinephrine on cotton or 0.025- by 0.25-inch cottonoids can be placed on the medial canal skin and tympanic membrane, which helps to reduce bleeding. The extent and location of middle ear pathology dictates the type of canal incisions that are made.

A standard tympanomeatal flap is elevated for pathology located posterior to the annulus, which typically entails incisions that are just anterior to the level of the lateral process of the malleus superiorly and at the 6 o'clock position inferiorly. The inferior and posterior osseous annulus can be removed with a drill or curette to provide additional exposure of the hypotympanum and retrotympanum. Angled endoscopes permit visualization of anterior, superior, posterior, or inferior extensions of disease that often obviates the need for additional bone removal. Bone removal may be required in some cases to allow for instrument and suction access to the pathology.³

Three TEES approach options are available for lesions localized anterior to the malleus, or within the petrous apex. Malleus degloving necessitates a wider tympanomeatal flap with elevation of the tympanic membrane off the malleus lateral process, handle, and umbo. Malleus degloving provides excellent exposure to the anterior and posterior mesotympanum, but limited exposure of the protympanum if there is a prominent anterior canal wall bulge. This approach can also be used for the infracochlear approach to the petrous apex. Disadvantages of this approach are that a myringoplasty may be required, because a tear in the tympanic membrane may be difficult to avoid when elevating the drum off the umbo.³

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