Research Article

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Endoscopic Transcanal Management of Restricted Attic Cholesteatoma: A Retrospective Clinical Study

Pankaj Goyal[1]*, Kishan Kumawat[1], and Manisha Chouhan[2]

[1]*Apollo ENT Hospital, Pal road, Jodhpur, Rajasthan, India.*

[2]*JIET medical College, Jodhpur, Rajasthan, India.*

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***Correspondence:** Pankaj Goyal, Apollo ENT Hospital, Pal road, Jodhpur, Rajasthan, India.*

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ABSTRACT

Background: *A minimally invasive exclusive endoscopic transcanal technique, which offers wide-angled imaging of hidden epitympanic recesses, may be a successful treatment for restricted attic (epitympanic) cholesteatoma.*

Objective: *To assess the results of endoscopic transcanal treatment for attic cholesteatoma limited to the epitympanum.*

Methods: *45 patients (aged 15 to 37 years) with cholesteatoma limited to the epitympanum underwent exclusive endoscopic transcanal surgery in the absence of canaloplasty. Demographics, ossicular status, audiology, surgical findings, complications, and recurrence at one-year follow-up were among the information gathered.*

Results: *There were 23 men and 22 women in the cohort, with 27 right ears and 18 left. Every patient exhibited erosion of the incus, and 14 additionally had erosion of the malleus head. The average preoperative air-bone gap (ABG) was between 35 and 40 dB. ABG improved to 5–10 dB after surgery. There were no issues. One patient experienced a recurrence after 1-year otoendoscopic follow-up, which was successfully treated using an endoscopic transcanal technique.*

Conclusion: *For attic cholesteatoma limited to the epitympanum, comprehensive endoscopic transcanal surgery is safe and successful, with good vision, low morbidity, steady improvement in hearing.*

Keywords: *Endoscopic ear surgery; Attic cholesteatoma; Epitympanum; Minimally invasive; Transcanal approach.*

Introduction

Attic cholesteatoma, which often develops from a pars flaccida retraction in Prussak's space, is noted for its ability to erode the ossicles early, particularly the incus and malleus heads, even when the disease is limited to the epitympanum. Traditional microscopic techniques frequently necessitate canal wall-up or canal wall-down mastoidectomy to see critical recesses such as the anterior epitympanum, lateral attic, and aditus ad antrum. Despite excellent microscopic access, some concealed locations may remain difficult to evaluate due to the straight-line view of the microscope and the anatomic restrictions of the external auditory canal, frequently requiring more extensive mastoid surgery even for modest attic disease [1-3]. With the progress of endoscopic ear surgery (EES), the treatment of epitympanic cholesteatoma has evolved significantly. The endoscope provides wide-angled, panoramic views of the attic and its subsites, providing direct access to areas that are difficult to see with the microscope. Tarabichi was among the first to demonstrate the feasibility and benefits of transcanal endoscopic removal of limited attic cholesteatoma, which resulted in improved visualization and a reduced requirement for mastoidectomy [4]. Marchioni and colleagues' subsequent anatomical and clinical research provided extensive mapping of the epitympanum and confirmed the use of rigid endoscopes to identify important regions such as the anterior epitympanic recess, lateral epitympanic space, and supratubal recess [5-7]. These efforts helped to establish EES as a potent tool for safe and effective attic disease management. Multiple investigations have since demonstrated that

endoscopic transcanal methods can completely remove cholesteatoma in early or limited attic disease while conserving normal tissues, minimizing external incisions, and lowering morbidity [8-10]. Endoscopic techniques have produced comparable or better results than microscopic surgery in terms of disease clearance, postoperative hearing results, and recurrence rates [9,11]. Endoscopic approaches have also been linked to better identification of residual matrix, fewer blind patches, and a lower incidence of second-look procedures [8-11].

Given these benefits, endoscopic transcanal surgery has emerged as the recommended treatment for carefully chosen instances of attic cholesteatoma confined to the epitympanum. The current case series seeks to assess the outcomes of this minimally invasive method in 45 consecutive patients, focusing on surgical efficacy, safety, hearing improvement, and recurrence over a one-year follow-up period.

Methods

Study Design

Retrospective case series of 45 consecutive patients treated at a tertiary otology center.

Inclusion criteria

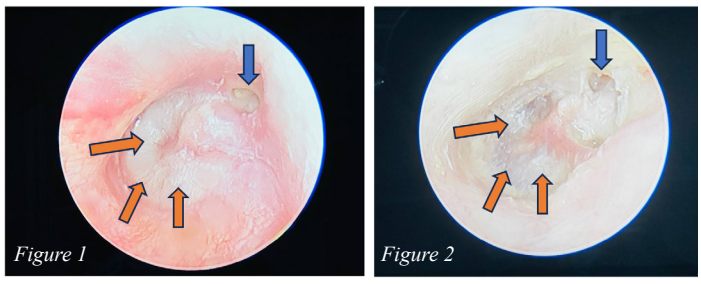
- Age 15–37 years
- Attic cholesteatoma confined to the epitympanum (Figures 1 and 2)
- No mastoid extension on high-resolution computed tomography scan
- No previous ear surgery
- Normal facial nerve function

Exclusion criteria

- Disease extending to the aditus or mastoid
- Labyrinthine fistula
- Recurrent cholesteatoma
- Pediatric retraction-pocket disease in patients aged less than 15 years

Preoperative Evaluation

- Otoscopy and otoendoscopy
- Pure-tone audiogram (PTA): ABG 35–40 dB
- High-resolution computed tomography scan (HRCT) of the temporal bone to confirm confinement to the epitympanum



Figures 1 and 2: *Otoendoscopic images showing attic perforation (blue downward arrows) due to cholesteatoma, with retraction of the pars tensa (orange arrows).*

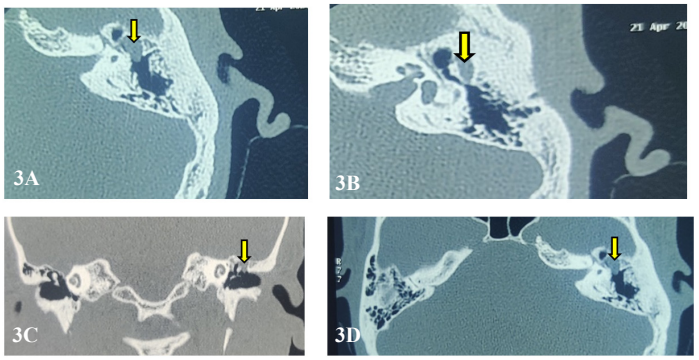


Figure 3 (A-D): *HRCT images of the temporal bone showing soft tissue in the epitympanum with ossicular erosion.*

Surgical Technique

- Local anesthesia, 0° and 30° rigid endoscopes
- No canaloplasty was required in this series
- Elevation of the tympanomeatal flap

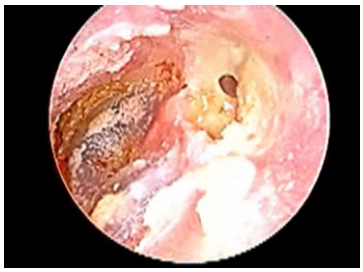


Figure 4: *Intraoperative endoscopic image showing attic destruction with cholesteatoma.*

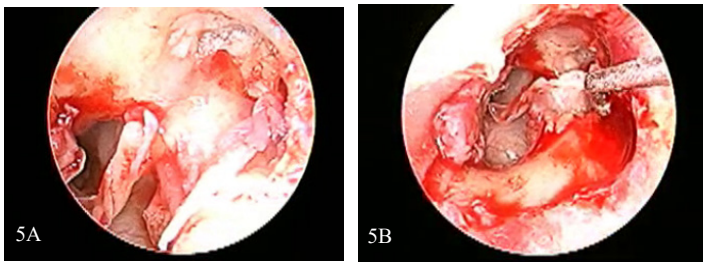
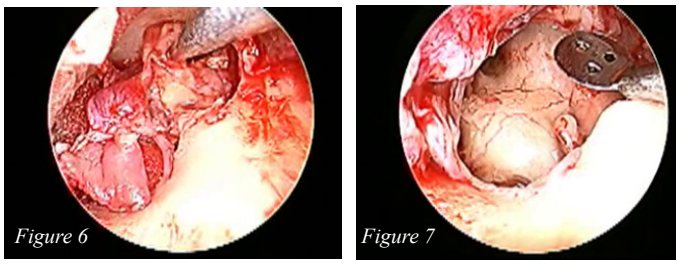


Figure 5 (A-B): *Intraoperative endoscopic images showing elevation of the tympanomeatal flap from the attic region using a round knife. Squamous epithelium is seen around the head of the malleus.*

- Visualization of Prussak's space, lateral attic, and anterior attic
- Removal of the matrix and keratin with angled instruments



Figures 6 and 7: *Intraoperative endoscopic images showing removal of the cholesteatoma sac and the appearance of the middle ear after sac removal.*

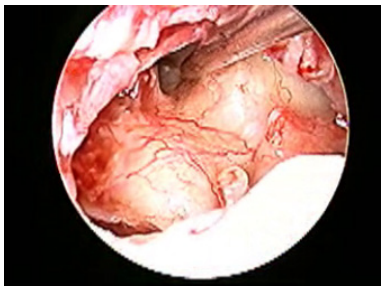


Figure 8: *Intraoperative endoscopic image showing Eustachian tube clearance.*

- Ossicular status assessed; all patients had incus erosion, and 14 had malleus head erosion
- Reconstruction with tragal cartilage and perichondrium as indicated

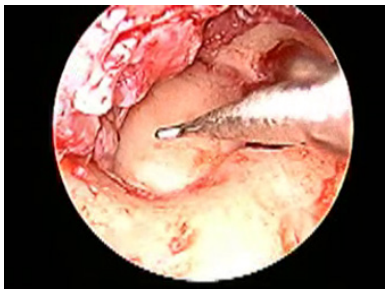


Figure 9: *Intraoperative endoscopic image showing tragal cartilage graft placement.*

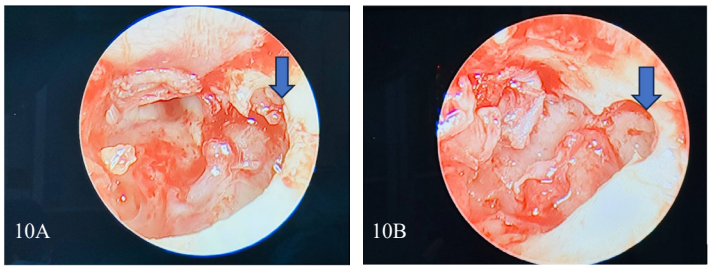


Figure 10 (A-B)*: Intraoperative endoscopic images showing another case of attic cholesteatoma.*

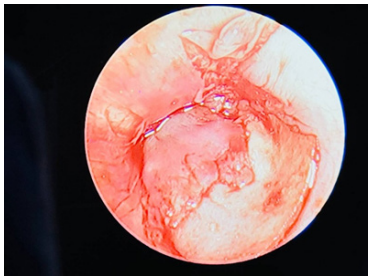


Figure 11: *Intraoperative endoscopic image showing graft placement.*

- Closure without postoperative packing complications

Results

Table 1: Demographic characteristics of the study patients.

Parameter	Value
Sample size	45
Age range	15–37 years
Sex	23 males / 22 females
Side	27 right / 18 left
Extent	Epitympanum only

Ossicular Status

- Incus erosion: 45/45 (100%)
- Malleus head erosion: 14/45 (31%)
- Stapes superstructure: Intact in all patients

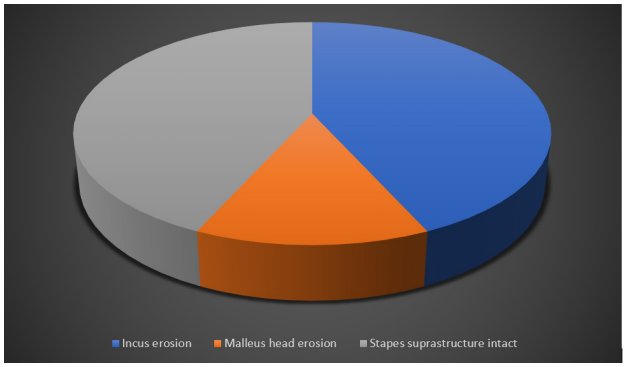


Figure 12: *Distribution of ossicular status among the study patients.*

Table 2: Preoperative and postoperative audiological outcomes.

Outcome	Value
Preoperative air-bone gap	35–40 dB
Postoperative air-bone gap	5–10 dB
Hearing improvement	25–30 dB

Significant postoperative ABG closure was consistent across the cohort.

Intraoperative Findings

- Disease limited to the epitympanum in all cases
- No mastoid extension
- No sinus tympani involvement
- No need for canaloplasty

Complications

- No facial nerve injury
- No tympanic membrane reperforation
- No sensorineural hearing loss

Recurrence

One patient experienced a recurrence after a 1-year otoendoscopic follow-up, which was successfully treated using an endoscopic transcanal technique.

Discussion

Exclusive endoscopic transcanal surgery is a very successful treatment for attic cholesteatoma confined to the epitympanum, as the current case series shows. At a one-year follow-up, the 45-patient group had only one recurrence, no problems, and continuous hearing improvement. These results are consistent with the increasing amount of evidence that endoscopic ear surgery (EES) for restricted cholesteatoma is beneficial. Surgeons can examine hidden recesses such as the anterior epitympanic space, lateral epitympanum, and supratubal recess thanks to rigid endoscopes' improved visibility. These recesses are often missed by microscopic procedures because of their straight-line optical restrictions [1-3]. The remarkable clearance rates seen in endoscopic surgery are probably a result of this enhanced access. By showing that angled endoscopes permitted full view of Prussak's space and the epitympanum without the requirement for mastoidectomy, Tarabichi's seminal work first demonstrated the viability of endoscopic removal of attic cholesteatoma [4]. Marchioni and associates built on these discoveries by providing thorough endoscopic mapping of the epitympanum and stressing the significance of examining the anterior attic and supratubal recess, regions that are frequently in charge of residual disease when treated with conventional microscopy [5-7].

The study's hearing results were good, with postoperative ABG closure to 5–10 dB. Similar gains have been documented in a number of EES series, where improved disease clearance and middle ear structural preservation lead to improved functional results. [8,11,12]. The endoscopic technique allowed for the atraumatic dissection of the matrix and ossicular chain, allowing for the best repair when necessary, despite the fact that all patients showed incus erosion and one-third had malleus head erosion. Strong postoperative audiometric outcomes were probably also influenced by the preservation of the stapes superstructure in all instances. The minimally intrusive nature of the endoscopic approach is one of its key advantages. No patient in this series needed postauricular access or canaloplasty. This is in line with research by Ayache and others that support the transcanal endoscopic technique as a tissue-sparing substitute that improves cosmetic results and lowers postoperative morbidity [9,13]. The safety profile of EES for limited attic disease is further supported by the lack of sequelae such as tympanic membrane reperforation, facial nerve damage, and postoperative infection. Compared to microscopic surgery, endoscopic cholesteatoma surgery often has similar or lower recurrence rates. In a systematic review, Hunter et al. showed that endoscopic methods lessen residual disease by enabling examination of previously unreachable areas [10]. In a similar vein, Kuo and Shiao highlighted the importance of EES in spotting tiny residual pearls that could otherwise go unnoticed [14]. This series' primary drawback is its one-year follow-up. Longer-term observation, preferably with diffusion-weighted MRI, is recommended since cholesteatoma recurrence may appear later. A comparison microscopic arm, which would confirm the endoscopic method's superiority, is also absent from the study. However, with 45 consecutive patients and a consistent surgical technique, the results provide compelling evidence that endoscopic transcanal surgery is the best treatment option for confined attic cholesteatoma.

Our results support the safety, efficacy, and low invasiveness of exclusive endoscopic transcanal treatment of attic cholesteatoma limited to the epitympanum. Excellent visibility is made possible, total disease removal is made easier, middle ear structures are preserved, and dependable hearing results with minimal morbidity and recurrence are produced. EES is the best approach for early attic cholesteatoma when used on carefully chosen patients.

Conclusion

Exclusive endoscopic transcanal surgery is an excellent treatment option for attic cholesteatoma limited to the epitympanum. It provides minimal morbidity, wide vision, low recurrence, and satisfactory hearing outcomes. For some patients, it might be the suggested first course of action.

Compliance with Ethical Standards

The procedure performed in this case series was in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Ethical Approval

The study was conducted with the written consent of the patient.

Conflict of interest and Funding

The author declares no conflict of interest and received no specific funding for this work.

References

1. Tos M. Manual of middle ear surgery. Vol. 1: Approaches, myringoplasty, ossiculoplasty and tympanoplasty. Stuttgart: Thieme; 2013.
2. Sade J, Berco E. Atelectasis and secretory otitis media. Ann Otol Rhinol Laryngol. 1976; 85: 66-72.
3. Palva T, Ramsay H. Attic cholesteatoma: reappraisal of clinical presentation, pathology, and management. Ann Otol Rhinol Laryngol. 1995; 104: 479-486.
4. Tarabichi M. Endoscopic management of limited attic cholesteatoma. Laryngoscope. 2004; 114: 1157-1162.
5. Marchioni D, Piccinini A, Alicandri-Ciufelli M, Presutti L. Endoscopic anatomy and ventilation of the epitympanum. Otolaryngol Clin North Am. 2013; 46: 165-178.
6. Marchioni D, Mattioli F, Alicandri-Ciufelli M, Presutti L. Endoscopic approach to tensor fold in patients with attic cholesteatoma. Acta Otolaryngol. 2009; 129: 946-954.
7. Marchioni D, Molteni G, Presutti L. Endoscopic anatomy of the middle ear. Indian J Otolaryngol Head Neck Surg. 2011; 63: 101-113.

8. Kuo CL, Shiao AS, Yung M, Sakagami M, Sudhoff H, et al. Updates and knowledge gaps in cholesteatoma research. Biomed Res Int. 2015; 2015: 854024.

9. Pollak N. Endoscopic and minimally-invasive ear surgery: A path to better outcomes. World J Otorhinolaryngol Head Neck Surg. 2017; 3: 129-135.

10. Hamela MAA, Abd-Elnaseer O, El-Dars MM, El-Antably A. Comparison of the outcomes of endoscopic versus microscopic approach in cholesteatoma surgery: a randomized clinical study. Egypt J Otolaryngol. 2023; 39: 128.

11. Marchioni D, Villari D, Mattioli F, Alicandri-Ciufelli M, Piccinini A, et al. Endoscopic management of attic cholesteatoma: a single-institution experience. Otolaryngol Clin North Am. 2013; 46: 201-209.

12. Choi N, Noh Y, Park W, Lee JJ, Yook S, et al. Comparison of endoscopic tympanoplasty to microscopic tympanoplasty. Clin Exp Otorhinolaryngol. 2017; 10: 44-49.

13. Mikahail PM, Fawaz SA, Elbagory MM, et al. Microscopic versus endoscopic stapes surgery-a meta-analysis study. Egypt J Otolaryngol. 2024; 40: 112.

14. Lianou A, Bizoglou M, Simou D, Psychogios G. Cholesteatoma: diagnosis, management and follow-up, and an interesting case report. Folia Med (Plovdiv). 2025; 67.

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