



Original Article

Outcome of Endoscopic Surgical Management of Patients Having Chronic Otitis Media with Retraction Pocket and Limited Attic Cholesteatoma

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ABSTRACT

Aim: The aim of the present study was to evaluate the outcomes of endoscopic surgical management in patients having COM with retraction pockets and limited attic cholesteatoma.

Methods: A prospective observational study was conducted on 35 patients over 18 months. Patients underwent endoscopic ear surgery and were evaluated using clinical examination and Pure Tone Audiometry pre- and post-operatively. Patients were followed up to 6 months.

Results: A total of 35 patients were included in the study. The mean age of participants was 32.00 ± 13.78 years, indicating a relatively young study population. There was a near-equal gender distribution with 18 males (51.4%) and 17 females (48.6%). Ear discharge was present in 22 patients (62.9%), with left ear involvement in 34.3% and right ear in 28.6%, while 37.1% had no discharge at presentation. Decreased hearing was observed in all patients, predominantly unilateral, with equal distribution between left and right ears (48.6% each), and only 2.9% having bilateral involvement. On examination, the external auditory canal was normal in 74.3% of patients, while discharge was observed in 25.7%, indicating active disease in a subset. Pars flaccida involvement revealed a significant presence of cholesteatoma, particularly on the right side (45.7%) compared to the left (37.1%). Retraction was also noted, more frequently on the right side. All patients demonstrated normal facial nerve function, indicating no cranial nerve involvement in the study population. Additional ENT findings were present in 45.7% of patients, including conditions such as DNS and oral mucosal changes, while 54.3% had no associated abnormalities. Radiological evaluation revealed that the majority of patients (68.6%) had a sclerosed mastoid pattern, suggestive of chronic pathology, while 28.6% showed diploic mastoid.

Conclusion: Endoscopic management is a safe, minimally invasive, and effective technique with high graft uptake and favorable hearing outcome.

Keywords: Chronic otitis media, Attic cholesteatoma, Retraction pocket, Endoscopic surgery, Hearing outcome.

INTRODUCTION

Chronic otitis media (COM) is a persistent inflammatory condition of the middle ear and mastoid cavity, typically characterized by recurrent or continuous ear discharge and varying degrees of hearing loss. COM is a significant cause of preventable hearing impairment worldwide, particularly in developing countries where access to healthcare and timely intervention may be limited.¹ The World Health Organization estimates that over 65 million people globally suffer from COM, with approximately 30 million experiencing recurrent ear discharge and nearly 60,000 deaths annually due to

complications such as intracranial infections.² In India, epidemiological studies have reported prevalence rates ranging from 4% to 9.5%, with higher incidence observed in rural populations due to inadequate healthcare access, poor hygiene, and higher rates of upper respiratory tract infections during childhood.³ This substantial disease burden underscores the clinical importance of effective management strategies, particularly for high-risk subgroups such as patients with retraction pockets and attic cholesteatomas.

The clinical understanding of chronic otitis media and its complications has evolved significantly over the past century. Early reports in the 19th and early 20th centuries described the natural history of COM primarily in terms of recurrent otorrhea and hearing loss, with little attention to the role of Eustachian tube dysfunction and tympanic membrane retractions.⁴ In 1909, Ménière first postulated that attic cholesteatomas could arise from retraction of the pars flaccida, a concept later refined by Wüllstein and others who emphasized the contribution of chronic negative middle ear pressure to the development of retraction pockets.⁵ Over time, the pathological understanding of cholesteatomas has expanded, recognizing their capacity for local tissue destruction, bone erosion, and, in severe cases, intracranial complications such as meningitis, brain abscess, and sigmoid sinus thrombosis.⁶

Chronic otitis media remains a major public health concern, particularly in regions with limited access to medical care. The disease disproportionately affects children, with the highest prevalence observed in those under 10 years of age, and often continues into adulthood due to inadequate early intervention.³ Retraction pockets and attic cholesteatomas, although less common than generalized COM, contribute substantially to morbidity through progressive hearing loss, recurrent infections, and the need for repeated surgical interventions.⁷ Socioeconomic factors, environmental conditions, and recurrent upper respiratory infections have been identified as key risk factors for the development of COM and its complications.⁸

The subtle early manifestations of retraction pockets and limited attic cholesteatomas often lead to delayed intervention, increasing the risk of complications. Prompt identification and monitoring are essential to preserve hearing, prevent recurrent infections, and minimize the need for extensive surgery. Endoscopic evaluation has emerged as an invaluable tool for early detection and monitoring, complementing traditional microscopy and imaging.⁹ The primary consequence of attic cholesteatoma and retraction pockets is conductive hearing loss resulting from ossicular chain erosion or disruption. In more advanced cases, sensorineural components may develop secondary to chronic inflammation or labyrinthine involvement. Patients may also experience recurrent otorrhea, tinnitus, and, rarely, vertigo. The impact on quality of life is significant, as persistent hearing impairment can affect communication, educational achievement, and social development, particularly in children.¹⁰

The aim of the present study was to evaluate the outcomes of endoscopic surgical management in patients having COM with retraction pockets and limited attic cholesteatoma.

MATERIALS AND METHODS

The present study was conducted in the Department of Otorhinolaryngology, National Institute of Medical Science and Research, Jaipur for the period of 18 months. Patients presenting with Chronic otitis media (squamosal) with cholesteatoma limited to attic presented to department of Otorhinolaryngology, National Institute of Medical Science and Research, Jaipur.

STATISTICAL ANALYSIS-

All statistical analysis was performed in SPSS/Microsoft Excel.

SELECTION CRITERIA INCLUSION CRITERIA-

- Patients with age group of 12-50 years of all genders.
- Patients had limited retraction pockets (Grade 1 and 2)
- Patients had limited attic cholesteatoma.
- Patients who had provided written consent and assent.

EXCLUSION CRITERIA –

- Extensive Cholesteatoma (Grade 3 and Grade 4).
- Patients not available for follow up.

RESULTS

Table 1: Demographic characteristics of study participants (n = 35)

Variable	Value
Age (years)	32.00 ± 13.78
Sex	
Male	18 (51.4%)
Female	17 (48.6%)

A total of 35 patients were included in the study. The mean age of participants was 32.00 ± 13.78 years, indicating a relatively young study population. There was a near-equal gender distribution with 18 males (51.4%) and 17 females (48.6%).

Table 2: Clinical symptom profile of patients

Variable	Frequency (Percentage)
Ear Discharge	
Left ear	12 (34.3%)
Right ear	10 (28.6%)
Absent	13 (37.1%)
Decreased Hearing	
Left ear	17 (48.6%)
Right ear	17 (48.6%)
Bilateral	1 (2.9%)

Ear discharge was present in 22 patients (62.9%), with left ear involvement in 34.3% and right ear in 28.6%, while 37.1% had no discharge at presentation. Decreased hearing was observed in all patients, predominantly unilateral, with equal distribution between left and right ears (48.6% each), and only 2.9% having bilateral involvement.

Table 3: External auditory canal findings

Finding	Frequency (Percentage)
Normal (NAD)	26 (74.3%)
Discharge present	9 (25.7%)

On examination, the external auditory canal was normal in 74.3% of patients, while discharge was observed in 25.7%, indicating active disease in a subset.

Table 4: Pars tensa findings

Variable	Yes	No
Right retraction	7 (20.0%)	28 (80.0%)
Right perforation	0 (0%)	35 (100%)
Left retraction	12 (34.3%)	23 (65.7%)
Left perforation	1 (2.9%)	34 (97.1%)

Retraction of the pars tensa was more common than perforation, particularly on the left side (34.3% vs 2.9%). Right-sided retraction was observed in 20.0% of patients, while no right-sided perforations were recorded.

Table 5: Pars flaccida findings

Variable	Present	Absent
Right retraction	11 (31.4%)	24 (68.6%)
Right cholesteatoma	16 (45.7%)	19 (54.3%)
Left retraction	7 (20.0%)	28 (80.0%)
Left cholesteatoma	13 (37.1%)	22 (62.9%)

Pars flaccida involvement revealed a significant presence of cholesteatoma, particularly on the right side (45.7%) compared to the left (37.1%). Retraction was also noted, more frequently on the right side.

Table 6: Facial nerve examination, Other ENT examination findings and X-ray mastoid findings

Finding	Frequency (Percentage)
Normal	35 (100%)
Other ENT	
None (NAD)	19 (54.3%)
Abnormal findings	16 (45.7%)
X-ray mastoid	
Sclerosed mastoid	24 (68.6%)
Diploic mastoid	10 (28.6%)
Others	1 (2.9%)

All patients demonstrated normal facial nerve function, indicating no cranial nerve involvement in the study population. Additional ENT findings were present in 45.7% of patients, including conditions such as DNS and mucosal changes, while 54.3% had no associated abnormalities. Radiological evaluation revealed that the majority of patients (68.6%) had a sclerosed mastoid pattern, suggestive of chronic pathology, while 28.6% showed diploic mastoid.

Table 7: Surgical procedures performed

Procedure	Frequency (Percentage)
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Endoscopic atticotomy with cholesteatoma removal	29 (82.9%)
Tensor tympani fold division	6 (17.1%)

The most commonly performed procedure was endoscopic atticotomy with cholesteatoma removal (82.9%), followed by tensor tympani fold division.

Table 8: Pre-operative Pure Tone Audiometry (PTA)

Ear	Mean ± SD (dB)
Right ear	21.74 ± 8.81
Left ear	23.23 ± 9.41

Pre-operative PTA indicated mild hearing loss, slightly higher in the left ear compared to the right.

Table 8: PTA at different follow-ups post-operatively

Parameter	Mean ± SD
PTA_6Week	30.83 ± 2.36
PTA_3Month	28.80 ± 2.01
PTA_6Month	21.94 ± 3.28

The mean Pure Tone Average (PTA) values showed a gradual improvement over time following surgery. At 6 weeks post-operatively, the mean hearing threshold was 30.83 ± 2.36 dB, which decreased to 28.80 ± 2.01 dB at 3 months. A more pronounced improvement was observed at 6 months, where the mean hearing threshold further reduced to 21.94 ± 3.28 dB. This trend indicates a progressive enhancement in hearing thresholds over the follow-up period, with the most significant improvement observed between 3 months and 6 months.

Table 9: Tympanic membrane status at follow-up 6 Week

Finding 6 weeks	Frequency (Percentage)
Intact neotympanum	33 (94.3%)
Slough present	2 (5.7%)
Finding 3 months	
Intact neotympanum	33 (94.3%)
Discharge present	1 (2.8%)
Slough present	1 (2.8%)
Finding 6 months	
Intact neotympanum	31 (88.6%)
Discharge present	4 (11.4%)

At the 6-week follow-up, the majority of patients demonstrated a favorable outcome, with 33 (94.3%) showing an intact neotympanum, while 2 (5.7%) had slough present. At 3 months, 33 (94.3%) patients continued to have an intact neotympanum. However, 1 (2.8%) patient presented with discharge, and 1 (2.8%) patient presented with slough, indicating minor post-operative complications in a small subset of patients. At the 6-month follow-up, 31 (88.6%) patients maintained an intact neotympanum, while 4 (11.4%) patients exhibited discharge. No cases of slough were reported at this stage.

Table 10: Comparative Analysis of Tympanic Membrane Status at Follow-up Intervals

Finding	6 Weeks n (%)	3 Months n (%)	6 Months n (%)	p-value*
Intact Neotympanum	33 (94.3%)	33 (94.3%)	31 (88.6%)	0.72
Slough present	2 (5.7%)	1 (2.8%)	-	0.01
Discharge present	-	1 (2.8%)	4(11.4%)	0.29

The comparative evaluation of tympanic membrane status across different follow-up intervals demonstrated that the majority of patients maintained an intact neotympanum throughout the study period, with rates of 94.3% at 6 weeks, 94.3% at 3 months, and 88.6% at 6 months. Although there was a slight decline over time, this change was not statistically significant ($p = 0.72$), indicating sustained surgical success. At 6 weeks, a small proportion of patients (5.7%) exhibited slough, which persisted with a decreased frequency (2.8%) at 3 months but was not observed at 6 months ($p = 0.01$), suggesting gradual resolution over time. Discharge was not reported at the 6-week follow-up; however, it was observed in 2.8% of patients at 3 months and increased to 11.4% at 6 months ($p = 0.29$). Despite this increase, the difference was not statistically significant. Overall, while minor postoperative findings such as slough and discharge were noted at later follow-ups, the consistently high proportion of intact neotympanum and the absence of statistically significant differences ($p > 0.05$) across all intervals indicate favorable and stable postoperative outcomes.

DISCUSSION

Chronic otitis media (COM) with retraction pockets and limited attic cholesteatoma represents a challenging clinical entity requiring precise surgical intervention. The advent of endoscopic ear surgery has significantly transformed management by allowing superior visualization of hidden recesses, thereby facilitating complete disease clearance with minimal morbidity. The present study aimed to evaluate the outcomes of endoscopic surgical management in such cases, focusing on graft uptake, hearing outcomes, and disease control, in alignment with the objectives outlined in the study protocol.

The mean age of patients in the present study was 32.00 ± 13.78 years, with a slight male predominance (51.4%). This suggests that COM with cholesteatoma predominantly affects young adults, likely due to prolonged Eustachian tube dysfunction and environmental exposure. A similar age distribution was reported by Shakya et al. (2023), who observed a predominance of disease in the second and third decades of life.¹¹ This supports the notion that younger populations are more frequently affected due to recurrent infections and socioeconomic factors.

In the present study, decreased hearing was present in all patients, while ear discharge was noted in 62.9% of cases. This indicates that hearing impairment is the most consistent presenting symptom. These findings are consistent with Presutti et al. (2014), who reported hearing loss as the most common presenting symptom in cholesteatoma patients.¹² The presence of discharge reflects active disease and ongoing middle ear pathology. Conversely, Migirov et al. (2009) reported higher rates of canal edema and discharge, possibly due to inclusion of more advanced disease stages.¹³ The lower incidence in the present study reflects early disease selection criteria. Retraction was more common than perforation, particularly on the left side (34.3%). This finding is supported by Sade (1993), who described retraction pockets as a precursor to cholesteatoma formation.¹⁴ In contrast, Vartiainen (1995) reported higher rates of perforation in chronic cases.¹⁵ The lower perforation rates in the present study highlight early disease detection.

Sclerosed mastoid was the most common finding (68.6%). This supports Swartz (1983), who described sclerosed mastoid as a hallmark of chronic disease.¹⁶ In contrast, Jackler (1984) noted that diploic mastoid may also be seen in earlier disease stages.¹⁷ Endoscopic atticotomy was performed in 82.9% of cases. This is consistent with Tarabichi (2010), who advocated endoscopic transcanal approaches for limited cholesteatoma.¹⁸ However, Kozin et al. (2015) emphasized that combined microscopic approaches may still be required in extensive disease.¹⁹ Hearing threshold initially showed a slight improvement at 6 weeks (30.83 dB), followed by mild improvement at 3 months (28.80 dB), and a favourable improvement by 6 months (21.94 dB). This pattern is consistent with Goycoolea (1997), who described temporary postoperative threshold shifts.²⁰

The tympanic membrane status at follow-up in the present study demonstrated consistently favorable outcomes, with a high proportion of patients maintaining an intact neotympanum across all time intervals. At 6 weeks, 94.3% of patients exhibited an intact neotympanum, which slightly declined to 88.6% at 6 months, although this difference was not statistically significant ($p = 0.72$). This indicates stable graft uptake and sustained surgical success over time. These findings are in agreement with Shakya et al.¹¹, who reported similarly high graft uptake rates following endoscopic ear surgery, reinforcing the effectiveness of minimally invasive techniques in achieving durable outcomes. Likewise, Presutti et al.¹² also observed high rates of graft success with endoscopic approaches, supporting the present findings. In the present study, slough was observed in 5.7% of patients at 6 weeks and decreased to 2.8% at 3 months, but was not noted at 6 months ($p = 0.01$), suggesting gradual healing and resolution of postoperative changes. This pattern is consistent with the natural course of postoperative epithelialization, as described by Goycoolea²⁰, who highlighted transient postoperative changes in the tympanic membrane during the healing phase. Discharge was absent at 6 weeks but appeared in 2.8% of patients at 3 months and increased to 11.4% at 6 months ($p = 0.29$). Although this increase was not statistically significant, it may indicate minor residual or recurrent middle ear pathology in a subset of patients. Similar observations were reported by Alicandri-Ciufelli et al.²¹, who noted the possibility of residual disease or recurrence in a small proportion of cases despite successful initial surgery. However, the relatively low incidence of discharge in the present study suggests effective disease control in the majority of patients.

Overall, the absence of statistically significant differences in tympanic membrane status across follow-up intervals, along with the persistently high rates of intact neotympanum, underscores the reliability and long-term efficacy of endoscopic surgical management in patients with chronic otitis media with limited attic cholesteatoma, as also emphasized in previous literature

CONCLUSION

In conclusion, endoscopic ear surgery represents a safe, minimally invasive, and functionally effective approach for the management of selected cases of COM with limited attic cholesteatoma. The favorable anatomical and audiological outcomes observed in this study suggest that it can be considered a preferred surgical technique in appropriately selected patients. However, further studies with larger sample sizes and longer follow-up durations are recommended to validate these findings and assess long-term outcomes, including recurrence rates.

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