Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i3.5076

TRANSCANAL ENDOSCOPIC INSIDE OUT MASTOID EXPLORATION FOR CHOLESTEATOMA: OUR EXPERIENCE

Achin Pant[1*], Richa Garg[2], Alka Negi[3]

[1*]Assistant Professor, Department of Otorhinolaryngology & Head and Neck Surgery, Government Medical College, Haldwani
[2]Senior Resident, Department of Otorhinolaryngology & Head and Neck Surgery, Government Medical College, Haldwani
[3]Junior Resident, Department of Otorhinolaryngology & Head and Neck Surgery, Government Medical College, Haldwani

***Corresponding Author:** Dr. Achin Pant,
* Assistant Professor, Department of Otorhinolaryngology & Head and Neck Surgery, Government Medical College, Haldwani Uttrakhand India Email: doctorachin30@gmail.com

Abstract:
Aim & objectives: To evaluate the morphological & functional outcomes (graft uptake & hearing improvement) of endoscopic inside out mastoidectomy for cholesteatoma.

Methodology: A prospective hospital based case study was conducted in patients attending ENT, Head & neck surgery department of Government Medical college hospital between December 2021 to June 2023 with the diagnosis of chronic otitis media active squamosal (cholesteatoma) that was extended to attic, aditus, antrum &mastoid cavity who underwent endoscopic transcanal inside out mastoidectomy under general anesthesia. Total 25 cases were taken with follow up of 1 year. Transcanal inside out mastoidectomy was performed in all the cases. The functional outcomes such as graft uptake and hearing improvement after surgery was analysed.

Result: Graft uptake and hearing improvement were significantly achieved in20 of 25 patients, that is 80%, 3 patients required revision surgery and 2 lost for follow up.

Conclusion: Endoscopic inside out mastoidectomy is a technique with excellent results. It is more functional, with less surgical time (Avg. surgical time- 1.5-2 hours), excellent outcome and minimally invasive procedure that avoids postauricular incision and tissue dissection.

Introduction

Chronic otitis media is one of the common ear problem encountered by otologist. It can be broadly divided as cholesteatomatous or non-cholesteatomatous.
It is classified according to Browning classification into various categories i.e. Healed, inactive mucosal, active mucosal, inactive squamous, active squamous (cholesteatoma). The management of cholesteatoma is still surgical to date. Canal wall down or up techniques for mastoidectomy are still debated widely. The preference depends on different factors such as the surgeon experience, belief and confidence.[1]

The concept of otological surgeries is gradually evolving after the introduction of endoscope.
Endoscope allows the surgeon-
-to address the target pathology transcanal
- reducing the need for post-auricular/endaural incision
- canaloplasty
- avoiding the associated morbidity leading to evaluation of minimally invasive ear surgery.
Our aim in this study is to evaluate the morphological & functional outcomes(graft uptake & hearing improvement) of endoscopic transcanal inside out mastoidectomy for cholesteatoma.

Review of literature

Transcanal endoscopic ear surgery is relatively a newer approach for middle ear and mastoid exploration. Various authors have described it in their respective studies.

Thomas NR et al.[1]studied 586 patients during 1992-2006 with the inside-out technique, in which cholesteatoma was eradicated from the epitympanum towards the mastoid. Small cholesteatoma is removed by a transcanal approach, and medium-sized cholesteatoma was removed by a retroauricularatticotomy and cartilaginous reconstruction of the canal wall. They reported a complete removal of cholesteatoma in 93% of adults and 87% of children (mean postoperative follow-up, 10 yr range, 2-15 yr) was achieved, with 95% dry ears and a mean air-bone gap of less than 30 dB in 78% postoperatively.

In a study done by **Muaaz Tarabichi**[2]in 2004 for limited attic cholesteatoma in which Seventy-three ears with limited attic cholesteatoma underwent endoscopic transcanaltympanotomy and extended atticotomy to access and completely remove the sac. Disease was dissected off the tegmen, the medial and lateral attic walls, and the ossicles. Appropriate ossicular reconstruction was performed. The defect was reconstructed with a composite tragal graft.

Migirov L et al[3]did a study during July 2008 to May 2010 in which a wide posterior tympanomeatal flap was elevated transmeatally, and the scutum was removed with a bone curette or was drilled until visualization of cholesteatoma extension and the mastoid antrum. They concluded that minimally invasive endoscopic ear surgery allowed complete eradication of cholesteatoma from the middle ear and its extensions, with minimal morbidity and good functional results. **Kakehata S et al**[4] in 2014 did endoscopic ear surgery using ultrasonic bone curette and reported excellent results.

Materials and methods

Study design: Prospective hospital based case study

Study setup: Department of ENT, Head & Neck surgery, Government Medical college Haldwani, Uttrakhand, India

Study duration: over a period of one & half years from December 2021 to june 2023. Patients with active squamosal COM were recruited in the study after taking informed written consent and ethical clearance.

Sample size: A total of 25 cases were taken

Inclusion criteria:
Attic cholesteatoma extending into mastoid cavity with or without involvement of mesotympanum as evident in HRCT temporal bone.

Exclusion criteria:
All patients who refused to give consent and needing microsopic assistance during surgery were excluded from the study.
The data retrieved included the following parameters age, sex, side & tympanic membrane status, extension of cholesteatoma, ossicular chain status, middle ear status-granulation tissue, chorda tympani and facial nerve status, graft uptake, hearing improvement after surgery. The patients were followed up for a period of 1 year. The data collected was entered and processed in IBM SPSS version 23.0 program.

Patients history and complete ENT examination was done along with pre-op PTA (pure tone audiogram) and HRCT Temporal bone was done in all patients. Transcanal endoscopic middle ear and mastoid exploration was done by inside out technique using powered instrument (micromotor & drill) and cutting and diamond burrs of adequate sizes wherever required according to the need along with micro ear surgical instruments. Attic was reconstructed in some cases using cartilage graft and neotympanum was formed using temporalis fascia graft. PTA was taken after 3months post op follow up.

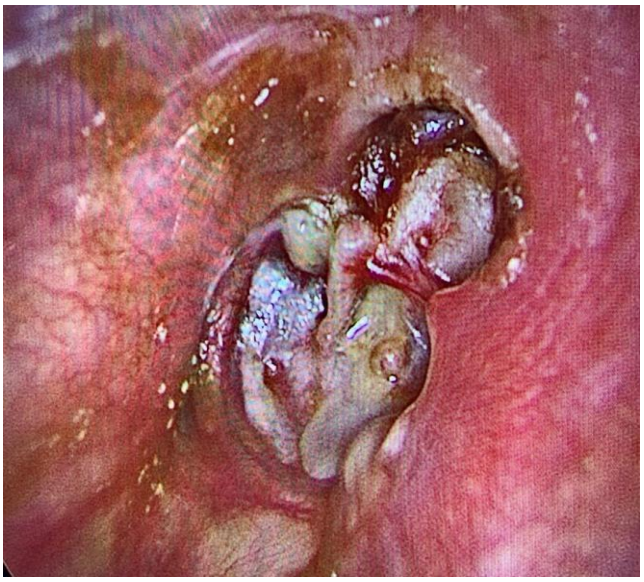

FIG1: showing pre op endoscopic picture

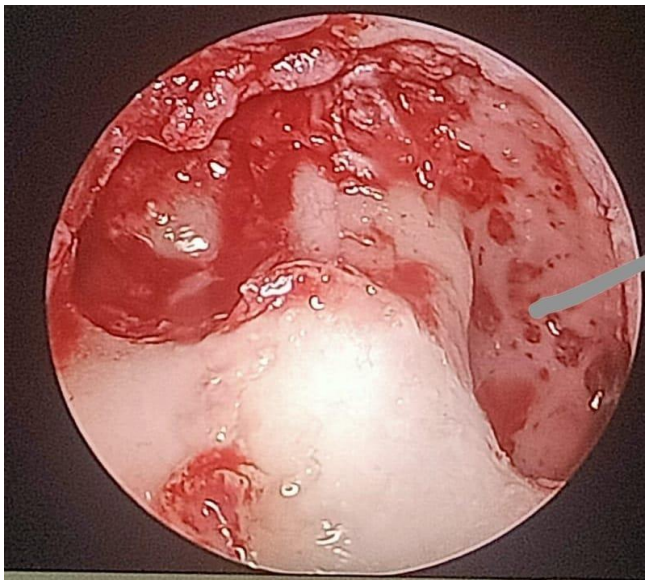

FIG2: intra op middle ear and mastoid cavity after drilling till tip of mastoid

FIG3: intra op graft placement

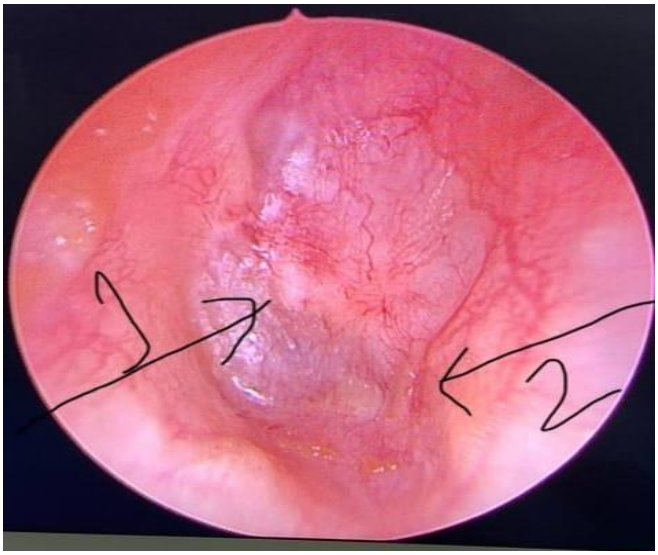

FIG4: post op endoscopic picture after 6 months

Results

A total of 25 patients underwent endoscopic transcanalinside out mastoidectomydone for cholesteatomatous chronic otitis media. Out of 25 patients 15(60%) were male &10 (40%) female. The mean age of patients was 24.25+6.46 age ranged from 16 to 45 years. As for laterality of disease, 11(44%) patients had disease on the right ear, 14(56%) had on left side ear. Tympanic membrane perforation in 14(56%) patients, intact in 6(24%),retracted in 5(20%) patients. The outer attic wall that is scutum was destroyed in 18(72%) & intact in 7(28%) patients. The epitympanic cholesteatoma extending to mastoid cavity only was observed in 10(40%) patients & in 15(60%) patients cholesteatoma involved both the mesotympanum & epitympanum. The most common ossicular defect was long process & lenticular process of incus in 19(76%) patients & all ossicles absent except footplate of states in 6(24%) patients.18(72%) patients had active discharge during surgery & 7(28%) patients had no discharge,19(76%) patients had granulation tissue &6(24%) were devoid of any granulation. Chorda tympani nerve could not be preserved in 8(32%) patients & it was kept in 17(68%) patients. Graft uptake & disease free status were seen in 22(88%) patients & failure that required revision surgery in 3(12%) patients. Facial nerve as intact in all the cases.

Mean pre- & post-operative AC threshold were 46.23±16.20 and 32.32±12.06 respectively. Mean pre- & post-operative ABG was 30.34±10.66 and 19.44±10.01 respectively. The difference was statistically significant(P=.000).

Pre- & post-operative hearing outcomes

		Mean	N	SD	P value
Pair 1	Pre-op ACT	46.2331	24	16.2043	.000
	Post-op ACT	32.3126	24	12.0647	
Pair 2	Pre-op ABG	30.34461	24	10.6682	.001
	Pre-op ABG	19.4461	24	10.0132	

Paired t test, ACT- Air conduction threshold, ABG- Air bone gap

	Pre-op hearing		Post-op hearing	
ABG	Frequency	Percent(%)	Frequency	Percent(%)
0-10	0	0	3	12
11-20	6	24	10	40
21-30	8	32	7	28
31-40	7	28	4	16
>40	4	16	1	4
Total	25	100	25	100

Air-Bone Gap Range

Discussion

Transcanalendoscopic ear surgery is a novel technique used alone or an adjunct to microscopic ear surgery. As evident from various studies done by Roth, Tarabichi and Mehta et al. In our study we found out improvement in post operative hearing outcome in patients which was statistically significant. The mean pre op ABG threshold was about 30.34 which was reduced to about 10.11 after surgery. Thomas NR et al also reported about less than 30db ABG in 78% of their cases.

The air conduction thresholds were also reducted in post operative period which was also statistically significant p<.00. Also there was adequate graft uptake in 22 patients out of total 25 patients which is almost 88% and is consistent with study done by Tarabichi. In our study the average surgical time was calculated and it was about 1.5-2hrs for limited attic disease whereas in extensive cholesteatomas it was approximately 2.5 hrs.

Conclusion

Endscopic inside out mastoidectomy is a technique with excellent results.It has more functional outcomes (Graft uptake & hearing improvement), with less surgical time(Avg. surgical time- 2.5 hrs). It is a minimally invasive procedure that avoid post-auricular incision and tissue dissection and faster wound healing.

Refrences

1. Roth TN, Haeusler R. Inside-out technique cholesteatoma surgery: a retrospective long-term analysis of 604 operated ears between 1992 and 2006. Otol Neurotol 2009;30(1):59-63.
2. Tarabichi M. Endoscopic management of limited attic cholesteatoma. Laryngoscope 2004;114(7):1157-62.
3. Migirov L, Shapira Y, Horowitz Z, Wolf M. Exclusive endoscopic ear surgery for acquired cholesteatoma: preliminary results. Otol Neurotol 2011;32(3):433-6.

4. Kakehata S, Watanabe T, Ito T, Kubota T, Furukawa T. Extension of indications for transcanal endoscopic ear surgery using an ultrasonic bone curette for cholesteatomas. Otol Neurotol 2014;35(1):101-7.
5. Mehta R, Mankekar G, Mayland E, Melder K, Arriaga MA. Endoscopic inside–out mastoidectomy with the ultrasonic bone aspirator. OTO Open 2019;3(1):2473974.
6. Shakya D, Arun KC, Nepal A. A comparative study of endoscopic versus microscopic cartilage type I tympanoplasty. Int Arch Otorhinolaryngol 2020;24(1):80-5.