

Original Research Article

## **INSIDE OUT MASTOIDECTOMY A NOVEL APPROACH FOR LIMITED CHOLESTEATOMA: A CROSS SECTIONAL STUDY IN CENTRAL INDIA**

**Dr. Kritika Nigam<sup>1</sup> (Senior Resident), Dr. Santosh Kumar Jaiswal<sup>2</sup> (Senior Resident) & Dr. Aditya Gargava<sup>3</sup> (Associate Professor)**

Department of Otolaryngology (ENT), Atal Bihari Vajpayee Government Medical College  
Vidisha, (Madhya Pradesh)<sup>1,2&3</sup>

Corresponding Author: Dr. Kritika Nigam

### **ABSTRACT**

A cross sectional prospective observational study was conducted in department of ENT at an institute in central India. Patients of all age and gender with unsafe csom and limited cholesteatoma (attic and antrum) willing for regular followup were included, patients with malignancy and extensive cholesteatoma with complications were excluded from this study. After history and otoendoscopic examination, Pure tone audiometry and CT scan of temporal bone were done to evaluate hearing, extent of cholesteatoma preoperatively. Patients underwent inside out mastoidectomy and were followed up postoperatively at 1 month and 3month.

Out of 40 patients included in this study, 35 had improvement in hearing postoperatively and presented with a small dry postoperative cavity, 3 patients had reduced hearing but cavity was clean and 2 patients had wax accumulation in cavity with decreased hearing.

It was concluded that inside out mastoidectomy is an approach which can be used in patients with limited cholesteatoma as it offers successful eradication of disease from middle ear with less postoperative complications.

**Keywords-**PTA-pure tone audiometry, CT-Computed Tomography, csom-chronic suppurative otitis media.

### **1. INTRODUCTION**

Chronic otitis media is one of the major ear disease in a developing country like India. Often due to lower socio economic status, poor personal hygiene, overcrowding, negligence, paucity of healthcare facilities<sup>1</sup> patients usually present with unsafe ear characterized by foul smelling, scanty, blood stained discharge known as cholesteatoma. Mastoidectomy which is opening of mastoid bone for eradication of disease in mastoid and middle ear is one of the major modality for treatment of this condition. Earlier canal wall down procedures such as modified radical mastoidectomy and radical mastoidectomy were used as treatment tools. But now with technical advancements like CT scans extent of cholesteatoma can be clearly

identified. Epitympanic cholesteatoma are most commonly encountered finding in CT scan. Inside out mastoidectomy is an emerging approach for limited epitympanic cholesteatoma. This technique combines the advantage of canal wall down in respect of radicality of cholesteatoma removal and canal wall up procedure in respect to functional results.<sup>1</sup>

**Aims and objective-**The aim of study was evaluate benefits of inside out mastoidectomy for limited cholesteatoma on hearing and postoperative cavity problems.

## 2. MATERIAL AND METHODS

This study was conducted as a prospective observational cross sectional study in the Department of ENT, head and neck surgery in a tertiary care centre in Central India after ethical approval on inpatients admitted with unsafe csom at the centre.

**Duration of study-**This study was conducted for a period of 6 months from March to August 2022.

**Inclusion criteria-** Patients of all age and gender with unsafe csom and limited cholesteatoma (attic and antrum) willing for regular followup were included in this study.

### **Exclusion criteria-**

1. Patients with malignancy and extensive cholesteatoma with complications were excluded.
2. Patients with congenital cholesteatoma.
3. Patients with comorbid conditions such as diabetes, hypertension, tuberculosis were excluded.

40 patients who fulfilled the inclusion criteria were enrolled in this study. These patients were subjected to a thorough history including demographic details, complaints, personal history, history of any comorbidities. A complete general examination was done alongwith otoscopic and otoendoscopic ear examination and tuning fork test. Examination of nasal cavity and paranasal sinus was done to rule out any foci of infection. Pure tone audiometry was performed preoperatively at 500Hz to 8kHz ,air bone gap and pure tone average were calculated .HRCT temporal bone with contrast was done to evaluate the extent of cholestetoma. Patients were then subjected to all routine blood investigations including complete blood picture, renal function tests.

A well informed consent was taken from patients for complications such as facial nerve palsy, labyrinthine fistula postoperatively.

All patients underwent inside out mastoidectomy via postauricular approach using William Wildes incision under General anaesthesia. Using postauricular approach temporalis fascia graft was harvested. The postaural incision was deepened upto bone mucoperiosteal flaps were elevated and mastoid exposed, meatotomy was done. Vascular strip incisions were given over posterior canal wall and tympanomeatal flaps were elevated. Using 4mm cutting burr canaloplasty was performed whereby the posterior canal wall and superior canal wall were drilled in order to widen the meatus. The attic opening was also enlarged using adequate size burr inorder to expose the cholesteatoma fully. Anteriorly adequate drilling was done to expose the cholesteatoma sac fully .The posterior canal wall was lowered to

adequate depth after identifying the incus,taking care of the facial canal. The entire cholesteatoma sac was removed completely, adequate size meatoplasty was done and after placing graft the ear was packed with medicated gelfoam. Matoid dressing was done and patient was subjected to intravenous antibiotics for 7 days. The dressing was removed after 7 days and patients were discharged on oral antibiotics and ear drops were followed up after 1 month and 3 months.



Figure 1: Canaloplasty

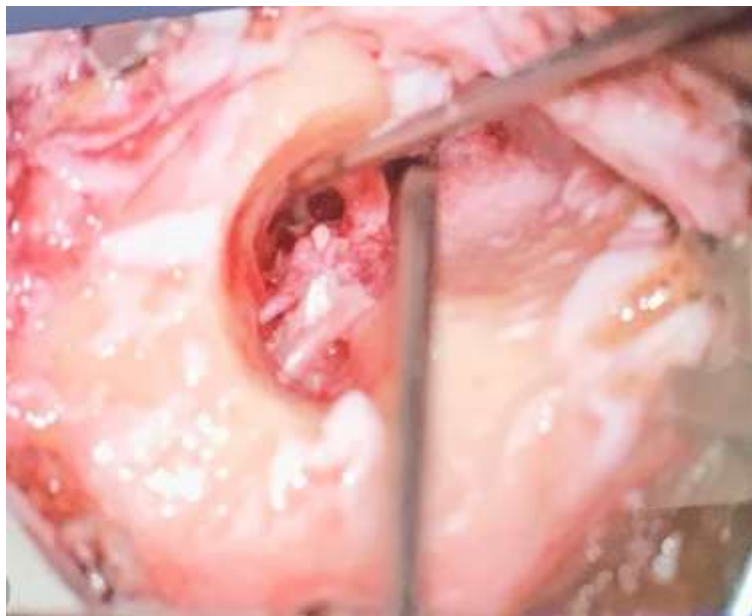


Figure 2: Opening of attic and antrum

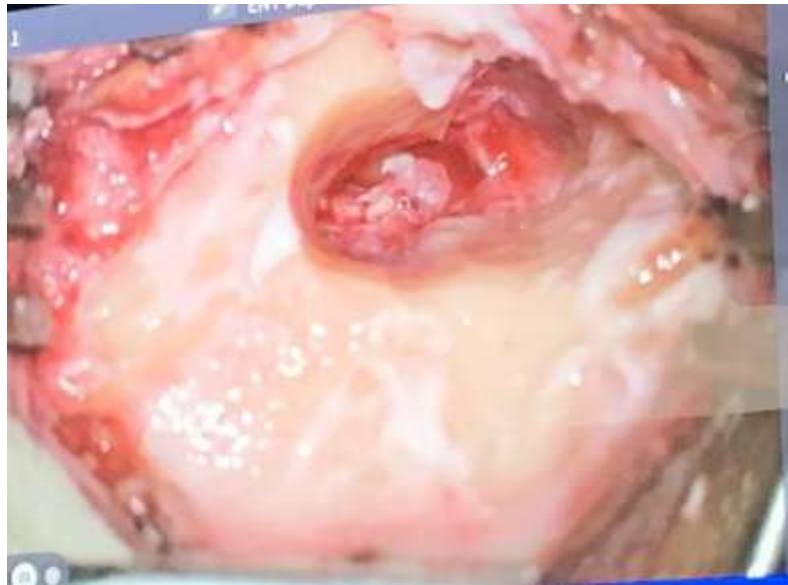


Figure 3: Intra operative mastoid cavity .

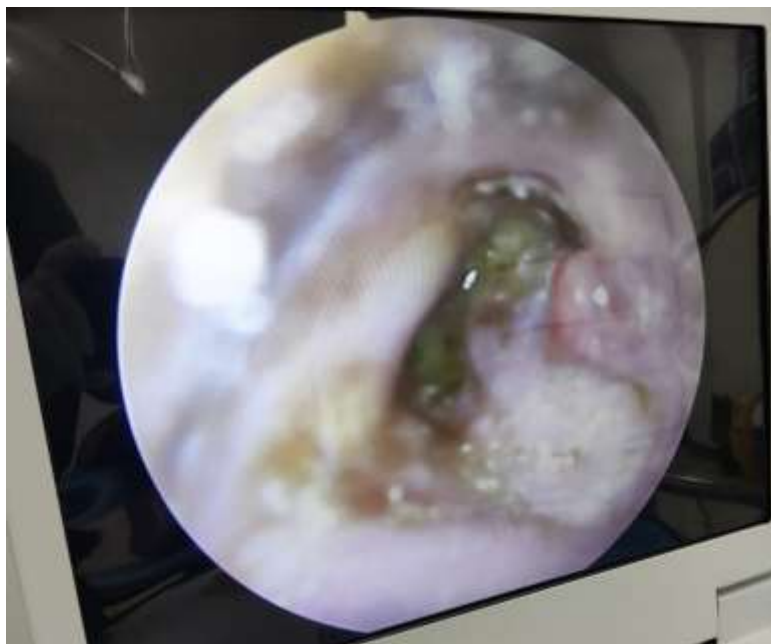


Figure 4: postoperative followup picture showing wax in mastoid cavity.

**FOLLOWUP-**

Patients were subjected to otoendoscopic examination and repeat PTA at 1 month and 3 months interval.

**STATISTICAL ANALYSIS-**

The data were evaluated using Chi square test and level of significance was 95%.The p value<0.05 was considered significant.

### 3. RESULTS

**TABLE 1:**

<b>SOCIO ECONOMIC STATUS</b>	<b>UPPER CLASS</b>	<b>UPPER MIDDLE CLASS</b>	<b>LOWER MIDDLE CLASS</b>	<b>UPPER LOWER CLASS</b>	<b>LOWER CLASS</b>
	<b>0</b>	<b>3</b>	<b>5</b>	<b>18</b>	<b>14</b>

Patients belonging to upper lower class have the highest incidence of CSOM>patients belonging to lower class>lower middle class>upper middle class in this study(as per Kuppaswamy scale).

**TABLE 2:**

<b>GENDER</b>	<b>NUMBER OF PATIENT</b>	<b>PERCENTAGE</b>
MALE	27	67.5
FEMALE	13	32.5

Out of 40 patients enrolled in this study 27 were male and 13 were female who presented with CSOM.

**TABLE 3:**

<b>OSSICULAR STATUS</b>	<b>NUMBER OF PATIENTS</b>	<b>PERCENTAGE</b>
OSSICLES INTACT	38	95%
INCUS ERODED	2	5%

Intraoperative incus was found eroded in 2 cases whereas in rest 38 cases ossicles were found intact.

**TABLE 4:**

<b>IMMEDIATE POSTOPERATIVE COMPLICATIONS</b>	<b>NUMBER OF PATIENTS</b>	<b>PERCENTAGE</b>
OTORRHOEA	2	5
DECREASED HEARING	5	12.5
VERTIGO	1	2.5
NONE	32	80

In our study in immediate postoperative period out of 40 patients 2 presented with otorrhoea, 5 presented with reduced hearing, 1 patient presented with vertigo, 32 patients had no complaints

**TABLE 5**

HEARING STATUS AT 3 MONTHS	NUMBER OF PATIENTS	PERCENTAGE
IMPROVED HEARING	35	87.5
REDUCED HEARING	5	12.5

At followup of 3 months 35 patients presented with improved hearing and 5 patients presented with reduced hearing.

**TABLE 6**

Mastoid cavity at 3 months	Number of patient	Percentage(%)
Dry and clean	38	95
Wax in cavity	2	5

At followup of 3 months 38 patients presented with a dry clean mastoid cavity and 2 patients presented with wax in cavity.

**TABLE 7: PURE TONE AUDIOMETRY RESULTS**

MEAN AIR BONE GAP	PREOP	AT FOLLOWUP 3 MONTHS	STANDARD DEVIATION	P VALUE
	30	25.8	12	<.05

#### 4. DISCUSSION

Our study included 40 patients with unsafe com with limited cholesteatoma in attic and antrum who were subjected to inside out mastoidectomy and outcome of mastoid cavity was assessed based on otoendoscopic examination and pure tone audiometry.

It was found that unsafe com was more prevalent in upper lower socio economic group of population similar to the study done by Sandeep et al in 2018 for prevalence of csom which concluded highest cases in 42.1% cases followed by lower socioeconomic group.<sup>2</sup>

In our study 27 patients were male and 13 patients were female sex ratio was 2.07.

In our study incus was found eroded in 2 patients intraoperatively and ossicular chain was found intact in 38 patients similar to study done by similar to study conducted by Manrique et al<sup>3</sup> who found incus lesion in 69% of cases.

Most common immediate postoperative complication was decreased hearing in 12.5% of cases followed by otorrhoea 5% of cases followed by vertigo in 2.5% of cases similar to study conducted by Edelstein et al<sup>4</sup> which noted hearing loss in 85% of cases, otorrhoea in 73% of cases.

87.5% of patients presented with improved hearing after procedure and 12.5% presented with reduced hearing and mean air bone gap was 25.8 dbHL similar to Kao study<sup>5</sup> which was 22.25 dbHL.

After 3 months mastoid cavity was dry and clean in 95% of cases and 5% of patients had wax in cavity similar to study conducted by Priyanka chamoli et al<sup>1</sup> who found that 95% had dry self cleaning cavity and 2 cases had accumulation of wax and debris, Roth et al<sup>6</sup> in their study found 89.2% of cases with dry cavity postoperatively, a study conducted by Shah et al<sup>7</sup> in inside out mastoidectomy found 89% of cavities to be dry.

## 5. CONCLUSION

Our study comprised 40 patients who were having cholesteatoma limited to attic and antrum and were subjected to inside out mastoidectomy and were then followed up for 3 months in order to assess the functional outcome of the procedure in terms of improvement in hearing and mastoid cavity postoperatively. It was concluded that 87.5% of the patients had an improvement in hearing after 3 months of the procedure and 95% had a self cleaning dry mastoid cavity thus proving the efficacy of inside out mastoidectomy as an effective procedure for limited cholesteatoma.

## 6. REFERENCES

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