

**Research Article****A PROSPECTIVE STUDY OF PREVALENCE OF SENSORINEURAL HEARING LOSS IN CSOM WITH OR WITHOUT CHOLESTEATOMA IN MEDICAL COLLEGE, MMCH PALAMU****Dr Amit Kumar<sup>1</sup>, Dr Abhinav Paul Minj<sup>2\*</sup>**<sup>1</sup>Assistant Professor, Department of ENT, SBMCH, Hazaribagh.<sup>2</sup>Associate Professor and HOD, Department of ENT, Medinirai Medical College Hospital, Palamu, Jharkhand.**Corresponding Author: Dr Abhinav Paul Minj**<sup>2</sup>Associate Professor and HOD, Department of ENT, Medinirai Medical College Hospital, Palamu, Jharkhand.

Received date: 10-10-2026, Date of acceptance: 20-10-2026, date of Publication: 24-10-2026.

**Abstract**

**Introduction:** Chronic otitis media (COM) is a chronic inflammatory condition of the middle ear space with long-term and sometimes permanent tympanic membrane changes. It presents as hearing loss, otorrhea, otalgia or tinnitus. It is common in developing countries, attributed as one of the common causes of acquired hearing loss, which is mostly conductive hearing loss due to loss of tympanic membrane and ossicular dysfunction.<sup>1</sup>

**Materials and methods:** The present study was undertaken in the Department of ENT and Head/Neck Surgery at department of ENT, Medinirai Medical College and Hospital, Palamu. The study group included the patients who were operated in institute for CSOM. The patients had to meet the following criteria to become eligible for the study. The patient had to be suffering from unilateral CSOM with normal contra lateral ear. The normal ear was used as a control after ruling out the confounding factors such as presbycusis, noise induced or congenital hearing loss, etc. The patients between 10 and 50 years were included in the study.

**Results:** The age of the subjects in the study ranged from 12-50 years with a mean of 24.6 years, 36% being male and 64% female. There was no significant difference in the left or right ear. Around 52% of patients had history of otorrhea for less than 2 years where only 8% had history for more than 5 years. Atticoantral type of CSOM was found in 28% of the study ears. Tubotympanic type of CSOM was seen in the remaining 72% ears. Distribution of various size of central perforation was observed as in Table 1. Also, it was, observed that cholesteatoma was present in 28% of cases. However, ossicular chain was eroded in 20% of ears and in rest 80% it was intact. As expected mean AC threshold in CSOM group was significantly elevated (48.25 dB) as compared to mean AC threshold of the control group.

**Conclusion:** Though greater SN loss was seen in patients of CSOM with cholesteatoma it was not statistically significant. Whether an early surgery in CSOM can prevent SN loss or not needs further studies.

**Key Words:** Chronic otitis media, hearing loss, otorrhea, otalgia, tinnitus.

## INTRODUCTION

Chronic otitis media (COM) is a chronic inflammatory condition of the middle ear space with long-term and sometimes permanent tympanic membrane changes. It presents as hearing loss, otorrhea, otalgia or tinnitus.<sup>1</sup> It is common in developing countries, attributed as one of the common causes of acquired hearing loss, which is mostly conductive hearing loss due to loss of tympanic membrane and ossicular dysfunction.<sup>1</sup>

Sensorineural hearing loss (SNHL) is either due to failure in the cochlear transduction of sound or neural impulses of the vestibulocochlear nerve.<sup>2</sup> Recently, there have been studies showing the association of sensorineural hearing loss in patients of COM, as well as the correlation of degree of SNHL with the patient's age, disease duration, presence of ossicular dysfunction and cholesteatoma.<sup>3</sup> Inner ear damage leading to sensorineural hearing loss in COM patients may be due to the spread of inflammation to the inner ear, or direct spread of pathogens or ototoxic drugs.<sup>4,5</sup>

On reviewing the literature, it was evident that the issue of SNHL in CSOM with or without cholesteatoma still remains a matter of debate. Even the patients who have a definitive raised bone conduction threshold do not have any symptoms of labyrinthitis. Thus, 100 patients suffering from unilateral CSOM with chosen criteria were selected for further study. Otologic history and examination and audiometry finding were recorded and analysed statically.

## MATERIALS AND METHODS

The primary objective of this study was to evaluate the incidence and degree of sensorineural hearing loss in CSOM and also to find the correlation between SNHL

(if any) with age of the patient, duration of disease and surgical findings observed.

**PATIENT SELECTION:** The present study was undertaken in the Department of ENT and Head/Neck Surgery at department of ENT, Medinirai Medical College and Hospital, Palamu. The study group included the patients who were operated in institute for CSOM. The patients had to meet the following criteria to become eligible for the study. The patient had to be suffering from unilateral CSOM with normal contra lateral ear. The normal ear was used as a control after ruling out the confounding factors such as presbycusis, noise induced or congenital hearing loss, etc. The patients between 10 and 50 years were included in the study.

The children below 10 years was excluded as they were expected to be uncooperative for accurate testing. Also those above 50 years were not included as there is a possibility of an element of presbycusis. Subject with a history suggestive of systemic disease like diabetes, meningoencephalitis, head injury, and familial hearing loss, prolonged noise exposure, previous otologic surgeries were excluded from study.

### Inclusion Criteria:

Unilateral CSOM.

- Age-10-50 yrs.
- With no comorbidity.

### Exclusion Criteria:

- Bilateral CSOM.
- Age below 10 and above 50 yrs.
- With comorbidity.

Detailed otolaryngological history including hearing impairment, ear discharge, vertigo, tinnitus, etc. was taken. Detailed ENT examination was done in all subjects to look for status of otorrhea, site and size of perforation, ossicular disruption and presence of cholesteatoma. Tuning fork test (Rinne's, Weber's and

Absolute bone conduction test) was carried out in all the cases. Pure tone audiometry was done in all subjects using an audiometer in a fully sound attenuated room. Air conduction and bone conduction thresholds were tested by a trained audiologist. Narrow band masking was used whenever applicable. The surgical finding of all the patients were observed and documented. Special observation regarding presence and absence of cholesteatoma and ossicular chain status was noted. All these findings were documented as per the study proforma.

### RESULTS

The age of the subjects in the study ranged from 12-50 years with a mean of 24.6 years, 36% being male and 64% female.

There was no significant difference in the left or right ear. Around 52% of patients had history of otorrhoea for less than 2 years where only 8% had history for more than 5 years. Atticoantral type of CSOM was found in 28% of the study ears. Tubotympanic type of CSOM was seen in the remaining 72% ears. Distribution of various size of central perforation was observed as in Table 1. Also, it was observed that cholesteatoma was present in 28% of cases. However, ossicular chain was eroded in 20% of ears and in rest 80% it was intact. As expected mean AC threshold in CSOM group was significantly elevated (48.25 dB) as compared to mean AC threshold of the control group

| Duration of discharge             | Percentage |
|-----------------------------------|------------|
| <2 years                          | 52%        |
| 2-5 years                         | 40%        |
| >5 years                          | 8%         |
| Types of CSOM                     |            |
| Atticoantral Tubotympanic         | 28%        |
| Perforation Small                 | 32%        |
| Perforation Medium                | 24%        |
| Perforation Large                 | 16%        |
| Surgical Assessment Cholesteatoma |            |
| Present                           | 28%        |
| Absent                            | 72%        |
| Ossicular Chain Eroded            | 20%        |
| Ossicular Chain Intact            | 80%        |

Table 1: Disease Profile in CSOM group

|                 | Control group | CSOM Group |
|-----------------|---------------|------------|
| Air Conduction  | 28.99 dB      | 48.25 dB   |
| Bone conduction | 12.00 dB      | 15.04 dB   |

Table 2: Mean Audiometric Threshold

| Variables                    | Mean Bone Conduction Threshold CSOM Group in dB |
|------------------------------|-------------------------------------------------|
| <b>Duration of discharge</b> |                                                 |
| <2 years                     | 15.75                                           |
| 2-5 years                    | 14.47                                           |
| >5 years                     | 13.12                                           |
| <b>Age</b>                   |                                                 |
| 10-20                        | 13.40                                           |
| 21-30                        | 15.28                                           |
| 31-40                        | 17.50                                           |
| 41-50                        | 19.16                                           |
| <b>Cholesteatoma</b>         |                                                 |
| <b>Present</b>               | <b>17.82</b>                                    |
| <b>Absent</b>                | <b>13.94</b>                                    |

**Table 3: Mean Conduction Values in Relation to Duration of Discharge, Age of the Patient and Presence of Cholesteatoma**

| Frequency | BC-Control | BC-CSOM   | Difference | P-Value |
|-----------|------------|-----------|------------|---------|
| 500Hz     | 12.0±1.66  | 14.6±2.64 | 2.6        | 0.05    |
| 1KHz      | 11.8±1.45  | 15.2±2.84 | 3.4        | 0.01    |
| 2KHz      | 12.8±1.92  | 17.2±3.84 | 4.4        | 0.05    |
| 4KHz      | 11.4±1.70  | 13.2±2.97 | 1.8        | 0.05    |

**Table 4: Comparison of Bone Conduction Threshold at Various Frequencies Between control and CSOM Group**

## DISCUSSION

Conventionally, a conductive hearing loss is expected in a patient suffering from CSOM. Occasionally, elevated BC threshold has been observed in audiometric recording in patients suffering different from CSOM indicating a SN element. On reviewing, the literature results from different authors on this issue have been variable. Our aim was to find out whether there is any relation between CSOM and SN hearing loss. And if any, does the presence of cholesteatoma, duration of discharge, or the age of the patient affect the degree of SN element. Present study was done in 100 patients of unilateral CSOM. The normal ears formed the control group and 100 ears suffering from CSOM formed the CSOM group. Detailed otologic history, clinical, surgical,

and audiometric findings were recorded and analysed. The mean difference in the preoperative BC threshold in the normal ear (Control Group) and ear suffering from CSOM (CSOM group) was around 3 dB. MacAndie and O'Reilly in their study observed that this difference was 5.24-9.02 across the frequency range.

Though this was on lower side in our study it was significant. A number of authors studied the BC threshold in CSOM across various frequency ranges. Redaelli et al. stated that differences in mean BC threshold varied from 0.6 dB at 500 Hz to 3.7 dB at 4 KHz.<sup>5</sup> In the series by Noordzig et al., it was found that these values were small.

They were -0.5 dB at 500 Hz, 0.9 dB at 1 KHz, 4.4 dB at 2 KHz and 3.6 at 4 KHz.

Paparella et al. came to conclusion that SN hearing loss does occur in CSOM, especially at higher frequencies. BC threshold was also elevated in the CSOM group in our study. The mean difference across the various frequency ranges was 2.6 dB at 500 Hz, 3.4 dB at 1 KHz, 4.4 dB at 2KHz, and 1.8 at 4 KHz. The difference in mid frequencies i.e. 1 and 2 KHz were statically significant but not at 500 Hz and 4 KHz.

The relationship between duration of discharge and mean BC threshold in CSOM group was passed. BC threshold did not show any rise when ears with different ranges of duration of discharge were analysed. In a similar assessment, de Azavedo et al. did not find any significant difference in the BC threshold in patients having prolonged history of ear discharge. In contrast, Handa et al. found that the relative SN loss varied significantly with the duration of disease. Papp et al. in their study concluded that BC threshold shift was more accentuated as the age increased.

### CONCLUSION

In the analysis of SN hearing loss in CSOM with or without cholesteatoma, the following conclusions were drawn. Chronic otitis media appears to be associated with SN hearing loss, but the degree of SNHL is small in majority of patients. The degree of SNHL did not bear any correlation with the duration of ear discharge. Greater SN hearing loss is present in the ears suffering from CSOM with cholesteatoma, but is not significant. Although we have concluded that there is an association of CSOM with SN loss, still a study with large sample size is needed to evaluate the role of cholesteatoma. Also, further studies, whether an early surgery in CSOM can prevent an added SN loss or not is desirable.

### REFERENCES

1. Amali A, Hosseinzadeh N, Samadi S, Nasiri S, Zebardast J. Sensorineural hearing loss in patients with chronic suppurative otitis media: Is there a significant correlation? *Electronic Physician*. 2017;9(2):3823.
2. Jha S, Singh RK. The evaluation of the incidence of sensorineural component of hearing loss in chronic suppurative otitis media. *Int J Res Med Sci*. 2022;10(12):2898.
3. Subramaniam V, Ashkar A, Rai S. Cochlear dysfunction in chronic otitis media and its determinants. *Iran J Otorhinolaryngol*. 2020;32(109):79.
4. Kaur K, Sonkhya N, Bapna AS. Chronic suppurative otitis media and sensorineural hearing loss: Is there a correlation? *Indian J Otorhinolaryngol Head Neck Surg*. 2003;55:21-4.
5. Thakur CK, Gupta A, Kumar A. Does mucosal chronic otitis media leads to sensorineural hearing loss. *Indian J Otolaryngol Head Neck Surg*. 2019;8:1-3.
6. Azevedo AF, Pinto DC, Souza NJ, Greco DB, Gonçalves DU. Sensorineural hearing loss in chronic suppurative otitis media with and without cholesteatoma. *Revista Brasileira de Otorrinolaringologia*. 2007;73:671-4.
7. Kasliwal N, Joshi S, Pareek SM. Determinants of sensorineural hearing loss in chronic middle-ear disease. *Indian J Otolaryngol Head Neck Surg*. 2004;56:269-73.
8. Rosito LS, Netto LS, Teixeira AR, da Costa SS. Sensorineural hearing loss in cholesteatoma. *Otol Neurotol*. 2016;37(3):214-7.
9. Elzinga HB, van Oorschot HD, Stegeman I, Smit AL. Relation between otitis media and sensorineural hearing loss: a systematic review. *BMJ Open*. 2021;11(8):e050108.

10. Olusanya BO, Davis AC, Hoffman HJ. Hearing loss grades and the International classification of functioning, disability and health. Bull World Health Organiz. 2019;97(10):725