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Original Article

Sensorineural Hearing Loss In Patients With Chronic Otitis Media: A Retrospective Study

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ABSTRACT

Background: Chronic otitis media is one of the leading cause of childhood hearing loss, which is classified as mucosal (safe) and squamosal (unsafe), with higher risk in the latter. While hearing loss is mostly conductive, SNHL can result from inflammatory damage to the cochlea or auditory pathways.This study determines the percentage, pattern, and severity of sensorineural hearing loss (SNHL) in mucosal and squamosal types of chronic otitis media (COM).

Materials and methods: A retrospective study of 120 patients with unilateral COM was done where demographic data, disease duration, main symptoms, and pure tone audiometry results from patient records were collected. Bone conduction (BC) thresholds were checked to assess sensorineural hearing loss and compared with respect to age, gender, and disease duration.

Results: The bone conduction thresholds were found to be significantly higher in diseased ear as compared to the control ear mainly affecting the higher speech frequencies. A correlation was found between patients age and type of COM with no difference in males and females.

Conclusion: COM can cause SNHL that increases with increase in age and presence of squamosal type of disease mostly affecting the higher speech frequencies. Hence COM cases should be recognised early, with timely and effective treatment the chances of developing SNHL can be prevented.

Keywords*: Chronic otitis media, Sensorineural hearing loss, Squamosal, Mucosal, Speech frequencies.*

INTRODUCTION

Worldwide chronic otitis media (COM) is one of the most common infectious diseases in childhood and is a common cause of impaired hearing[1].

COM is of two types the mucosal and the squamosal. Mucosal type also known as tubotympanic is the safe type of COM with central perforation and lesser complications, where as the squamosal type also known as atticoantral is the unsafe type of COM with marginal perforation with more chances of complications.

The hearing impairment in patients with COM has generally been observed to be of conductive deafness and less of sensorineural type[2,3].

Sensorineural hearing loss (SNHL) in COM is well documented. In COM it can be induced by different mechanisms. SNHL is caused by failure in cochlear transduction of sound from mechanical energy in the middle ear to the neural impulses in the VIII cranial nerve, or by the malfunctioning in the central processing centre of the brain[4].

Inflammatory mediators can enter the inner ear through the round window membrane. Its permeability was demonstrated to increase in CSOM. These substances can reduce the blood flow in the cochlea[5].

When cholesteatoma or granulation tissue is present in the middle ear cleft (MEC), the degree of ossicular destruction is even greater. Many studies suggest that chronic inflammatory processes in the MEC damage the inner ear[6,7].

To find the right pattern and severity of sensorineural hearing loss and its relation with duration of Chronic Otitis Media will help to improvise treatment methods.

Taking proactive measures to control the disease where delay in treatment can lead to worsening of hearing loss.
To counsel patients with severe sensorineural hearing loss regarding correct choice of treatment ,as such patients may not improve with surgical measures.

AIMS AND OBJECTIVES

1. To determine the percentage of sensorineural hearing loss in mucosal and squamosal type of chronic otitis media.
2. To study the pattern and severity of sensorineural hearing loss in chronic otitis media.

MATERIALS AND METHODS

Study Design: A retrospective study

Study Setting and Study Subjects:

All the patients with unilateral chronic otitis media, presenting to the department of Otorhinolaryngology, Hassan Institute of Medical Sciences, Hassan, between August 2023 to July 2024. A total of 120 patients were included in the study.

Inclusion criteria:

Unilateral chronic otitis media (normal tympanic membrane in contralateral ear).

Exclusion criteria:

1) History of previous ear surgery
2) History of familial hearing loss
3) Previous exposure to ototoxic drugs, positive fistula test.
4) History of habitual exposure to noise, head trauma, meningitis

Study duration: 1 year

METHODOLOGY

Demographic variables, duration of the disease, main symptoms, and pure tone audiometry results were obtained from the patient's medical records

Bone conduction (BC) hearing thresholds at frequencies 500, 1000, 2000, and 4000 Hz was extracted to determine the SNHL.

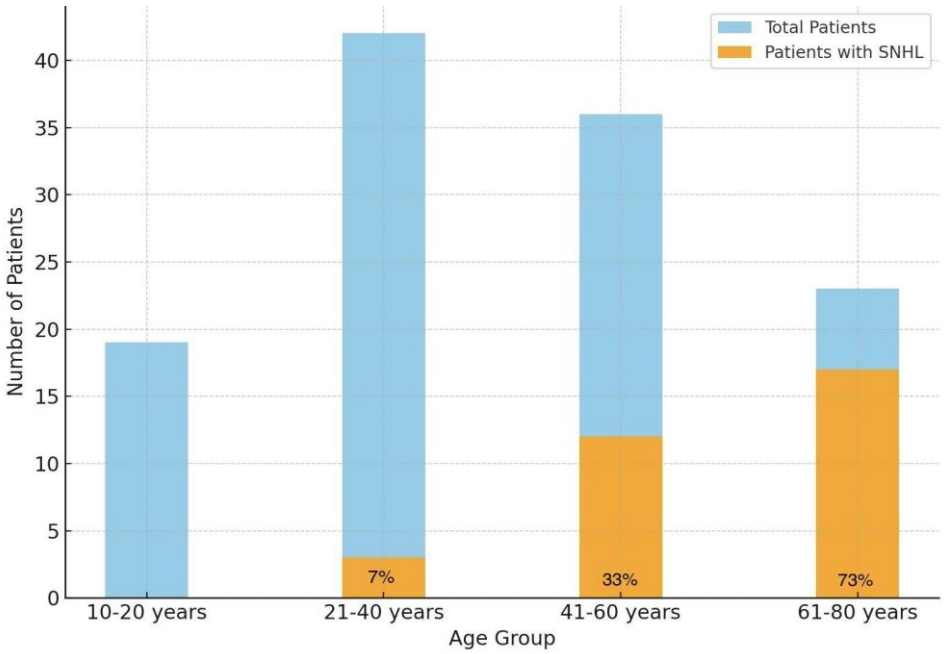
Comparison of sensorineural hearing loss in mucosal and squamous type with respect to factors like age, gender and duration of chronic otitis media was done.

RESULTS

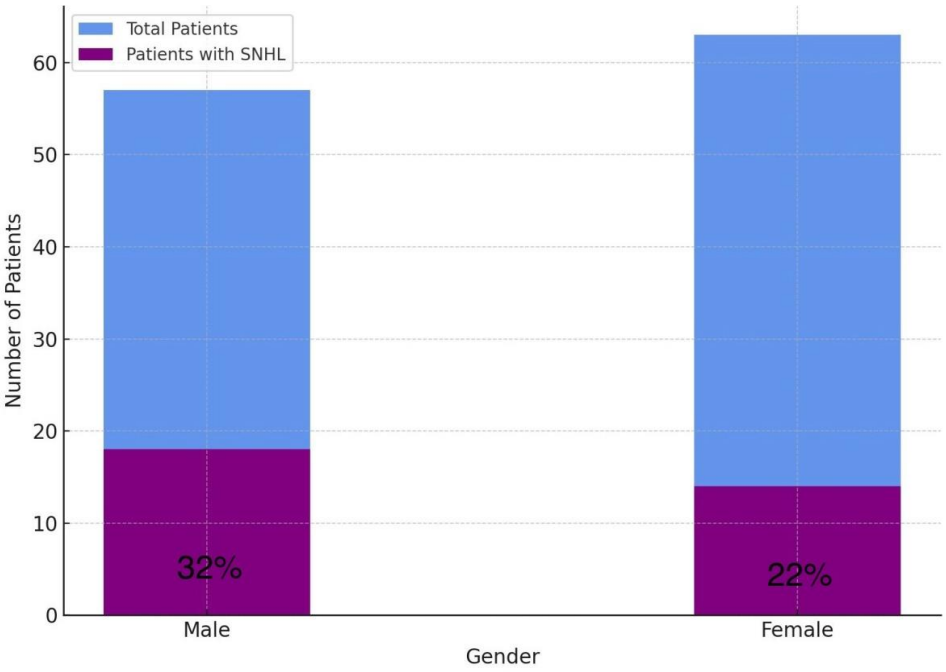
120 patients with unilateral COM were taken up for this study and all the patients were above the age of 10 years and below the age of 80 years.

Out of 120 patients 32 patients that is 27% of them were found to have sensorineural hearing loss where the bone conduction threshold was more than 25db in the speech frequencies.

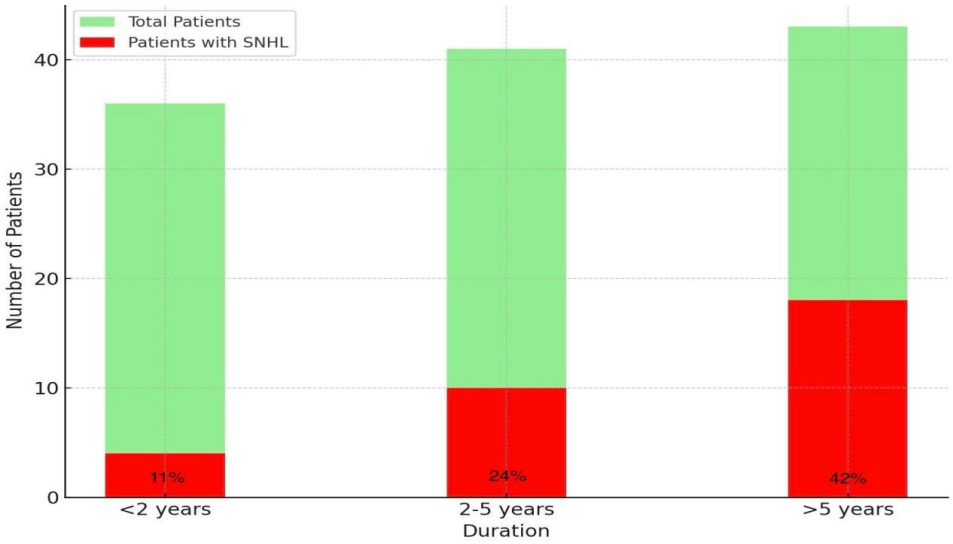
Age Group	Total No. Of Patients	Patients with SNHL	% of patients with SNHL
10 to 20 years	19	0	0%
21 to 40 years	42	3	7%
41 to 60 years	36	12	33%
61 to 80 years	23	17	73%
Total	**120**	**32**	**27%**



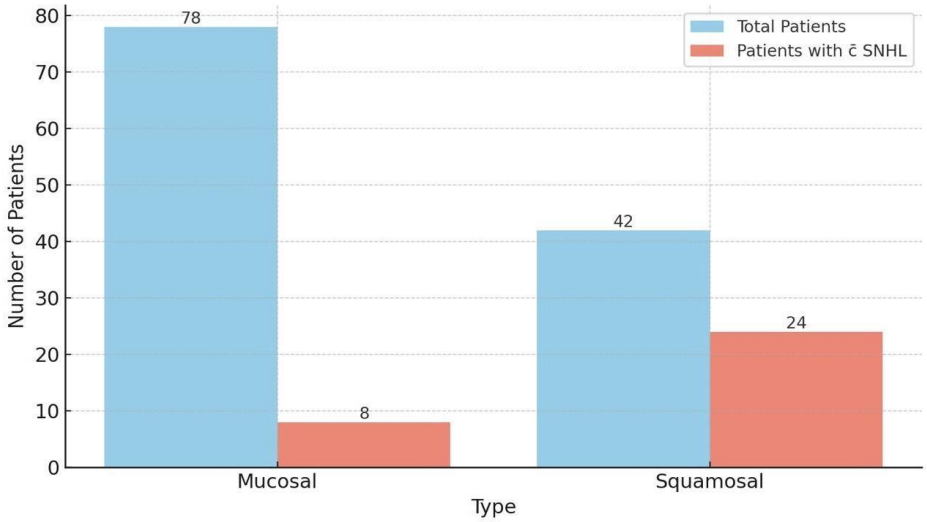
Graph 1: This bar graph implies that the incidence of SNHL increased with increasing age of the patient.



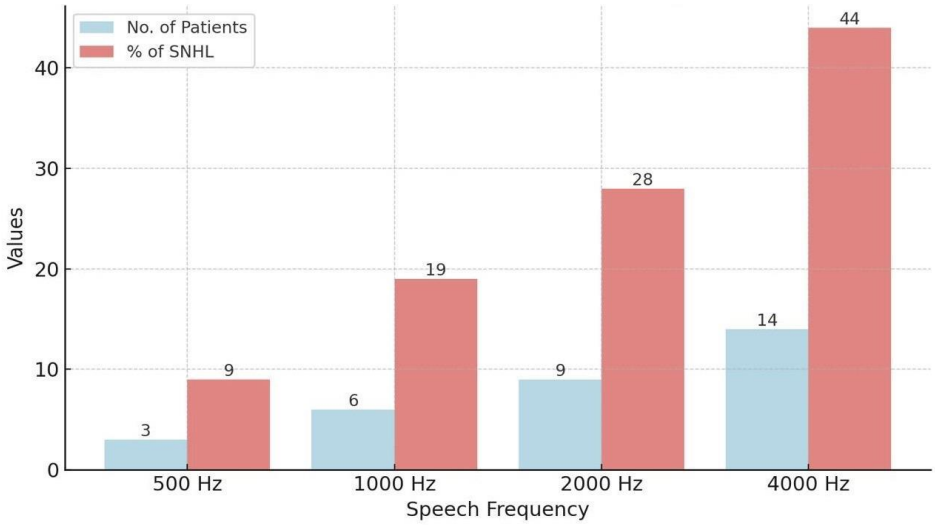
Graph 2: There was an increased incidence of SNHL in males than in females



Graph 3: This bar graph implies that with increasing duration of the disease the incidence of SNHL as well increases



Graph 4: Squamosal type of COM presented with more number of SNHL as compared to mucosal type.



Graph 5: It was observed that larger number of patients had bone conduction threshold, more than 25 dB at higher speech frequency (44% at 4000Hz) as compared to lower speech frequency.

DISCUSSION

COM is one of the most common ear infections mostly being the disease of the lower socioeconomic group due to poor hygienic conditions. It is of two types the mucosal(safe) and squamosal(unsafe) type. In this study we have observed a definitive correlation between duration of disease, age of the patient, type of COM and sensorineural hearing loss.

Therefore implying that these could be the probable risk factors for developing SNHL. Nanda MS et al (2015) observed that there was SNHL (21%) compared to control contralateral ears without infection (5%). The incidence also increased with age of patient and duration of disease. There was no difference among males and females[3].

R. Kaur et al (2018) said that mean BC thresholds were significantly higher in the diseased ears as compared to the control ears[4].

In Z. Papp et al (2003) study bone conduction threshold at either the speech frequencies or at 4 kHz increased gradually according to the duration of the chronic suppurative otitis media The threshold shift was more accentuated as age increased[5].

CONCLUSION

Chronic suppurative otitis media (CSOM) is significantly associated with sensorineural hearing loss (SNHL), particularly at higher frequencies. Risk factors include advanced age, prolonged disease duration, and active disease stages with chronic otorrhoea. While cholesteatoma and ossicular chain erosion are linked to SNHL, their association is not always significant.

Chronic inflammation in the middle ear may lead to cochlear damage, potentially caused by increased permeability of the round window membrane, allowing bacterial endotoxins to affect the inner ear, highlighting damage near the high-frequency.

There is a bad impact on bone conduction thresholds in patients with recurrent infections, emphasizing the need for early diagnosis and management, including timely surgical intervention, to prevent progressive hearing loss.

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