

Original article:

Is there any correlation between duration of CSOM and development of SNHL?

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ABSTRACT:

This prospective study was done to find out correlation between duration of CSOM and development of SNHL in 180 patients between 15-45 years of age from Jan 2016 to June 2017 in opd of ENT, NIMS Jaipur. Audiometric evaluation was done in all cases.

In this study there was a significant increase in the incidence of SNHL with increase duration of ear discharge. 75% of patients with ear discharge for more than 10 years developed SNHL. In cases where duration of ear discharge was 0-5 years and 6-10 years, CHL was more often encountered than SNHL. The incidence was 22% and 29.16% respectively.

INTRODUCTION:

CSOM is defined as chronic inflammation of middle ear cleft with discharge and perforation in tympanic membrane¹. It is most common condition encountered by otologist in day to day practice. Acquired hearing loss is the leading cause in children due to CSOM². One of the main effects of CSOM is hearing loss (80%). It has been documented that about 13.8-36.2% of the people have hearing loss due to CSOM^{3,4}. It has been suggested that toxins in COM can damage the cochlea. The presence of SNHL has been ascribed to contribution of the middle ear in hearing mechanism by bone conduction which is also known as Carhart's effect and/or cochlear damage resulting from extension of the inflammation in the middle ear cleft through round window membrane⁵. According to WHO, developing countries has high prevalence of 7% and it is due to overcrowding and poor economic status⁶. There is considerable difference in the rate of prevalence of CSOM between developing and developed countries (in India 2-15%)⁷. Traditionally, CSOM is mainly classified as atticointral (unsafe) and tubotympanic (safe) type. In unsafe type, there is foul smelling scanty discharge, marginal perforation and associated with cholesteatoma, granulation tissue and other complications. In safe type, there is recurrent profuse ear discharge with central perforation of tympanic membrane⁸.

Most common cause of hearing loss is CSOM. Hearing loss caused by safe type of CSOM is mainly conductive⁹. SNHL is mainly seen in unsafe type of CSOM due to labyrinthitis.

Middle ear and inner ear is separated by round window and this window is semi-permeable membrane. Round window membrane is the main portal for the passage of noxious substance to the labyrinth. The thickness in round window membrane in CSOM changes to 3-5 times as compared to control¹⁰. The possibilities of SNHL in CSOM helps the surgeon to counsel the patients to have a realistic knowledge about the hearing improvement after surgical intervention and about forestall of occurrence of SNHL by early surgical intervention.

METHODOLOGY:

This study is a time bound cross sectional study.

A pre-designed proforma will be used to record relevant information (patient data, clinical findings, investigation reports) from the individual selected patient

a) Inclusion criteria.

All the cases of CSOM of age group 10 to 50 years who are willing for the study.

Patients having unilateral diseased ear.

Patients having reliable audiometric evaluation.

b) Exclusion criteria:

Patients having bilateral diseased ear.

Patient in whom hearing loss can be attributed to reasons other than CSOM – eg: history of long term intake of systemic ototoxic drugs, traumatic perforation, previous ear surgery, meningitis due to other causes, enteric fever, head injury, diabetes mellitus, familial hearing loss, or any other systemic disease contributing to hearing loss were excluded from the study.

Patients below 10 years and above 50 years of age are excluded.

Patients not willing to participate in the study and who does not have reliable audiometric report.

Special investigation:

Audiometric tests: Pure tone BC (BC) and pure tone air conduction (AC) threshold was done. According to WHO classification, normal hearing is considered when hearing loss is upto 20 Db, 21-40 db mild, 40-55db moderate, 55-70db moderately severe, 70-90 db severe and above 90db as profound. Parameters for SNHL are when air bone gap is less than 20db and BC threshold of 20db or more.

RESULT:

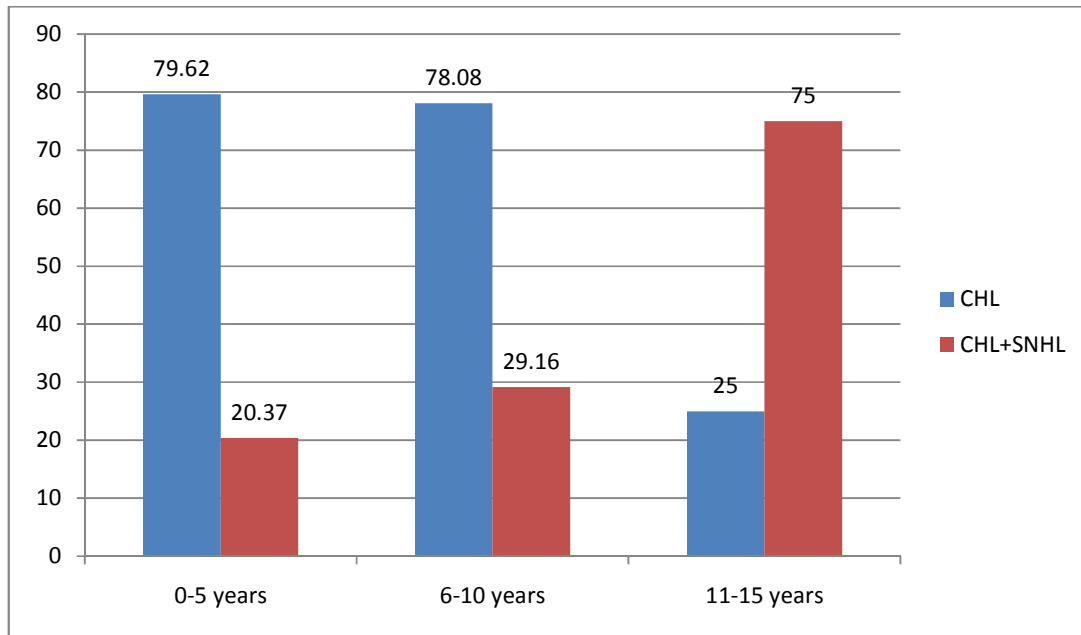
A cross sectional study was done on 180 patients who came to department of Otorhinolaryngology, National institute of medical science and research centre and hospital, Jaipur with CSOM for a period of 18 months.

It is observed that there is a steady increase in the incidence of SNHL with the duration of ear discharge. Incidence is 20.37% in the cases where the duration was 0-5years and the incidence was 29.16% when the duration was 6-10years. However, the incidence was highest when the duration of ear discharge was 11-15 years with SNHL in 75% of cases.

TABLE: DURATION OF DISEASE

PTA Type	AGE group (years)			Total
	0-5	6-10	11-15	
CHL	86 (79.62%)	34 (78.08%)	6 (25%)	126
SNHL+CHL	22 (20.37%)	14 (29.16%)	18 (75%)	54
Total	108	48	24	180

GRAPH: DURATION OF DISEASE



DISCUSSION:

CSOM is most common disease encountered by otolaryngologist in routine in India. It is most common cause of deafness in India and occupies a considerable amount of clinic and operating time of otolaryngologist.

The mechanism for the occurrence of SNHL has been studied by many researchers. One of the study mentioned that cochlear damage in patients with CSOM might be due to bacterial toxins that diffuse through the round window membrane.

These toxins might then cause damage to the hair cells especially those at the cochlear base : the reason why high frequency sounds are more affected¹¹. In this study there was a significant increase in the incidence of SNHL with increase duration of ear discharge. 75% of patients with ear discharge for more than 10 years developed SNHL. In cases where duration of ear discharge was 0-5 years and 6-10 years, CHL was more often encountered than SNHL. The incidence was 22% and 29.16% respectively.

There results were supported by studies done by Handa et al¹², in which it was reported that patients with the longer disease duration had more chances of developing SNHL in CSOM.

Similar correlation between duration of disease and SNHL was observed by Paparella et al (1970), English et al (1973), Cusimano et al (1989) and Kholmatov (2001). However, Noordzig et al (1995) and MacAndieet al¹³ (1999) did not find significant correlation between SNHL and duration of CSOM.

In a study by Gulatiet al¹⁴, all patients with duration of disease for 16-20 years had SNHL. Studies by Azevedo AF et al, also found that development of SNHL in CSOM could be correlated to longer duration of ear disease.

In a study by Kaur et al, the incidence of SNHL was found to be 13.64% when the duration of disease was <5 years and progressively increased to 33.33% when the duration of disease (>26 years). Paperella et al¹⁵ and Dumich et al¹⁶, in their studies, it was observed that increase in bone conduction thresholds increased with duration of the disease. In a study by Sharma Karan et al¹⁷, as the duration of disease increased there was

increase in incidence and severity of SNHL. However in studies by Levine et al¹⁸, no correlation was found between the amount of relative SNHL and symptom duration. It can be hypothesized from the present study that as the duration of disease increase, there is prolonged exposure of the inner ear (cochlea) to toxins that diffuse through round window membrane, resulting in SNHL.

CONCLUSION:

This study attempts to correlate duration of disease (CSOM) with development of SNHL. In this study, it has been shown that the sensorineural hearing loss increases with the duration of disease (chronic suppurative otitis media) due to endotoxins.

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