



A Study of Sensorineural Hearing Loss in Chronic Suppurative Otitis Media

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Abstract

Chronic suppurative otitis media (CSOM) is defined as chronic ear discharge (i.e. lasting > 6-12 weeks) through a tympanic membrane perforation. It is generally associated with some degree of conductive hearing loss because of perforated tympanic membrane or ossicular destruction. However, recurrent ear infections due to perforated eardrum may result in absorption of toxins and macromolecules in the cochlea leading to sensorineural hearing loss (SNHL). This study was done to evaluate the frequency of SNHL in CSOM. Average threshold of speech frequencies was calculated via pure tone audiogram. The frequency was found to increase with increasing duration of the disease. Patients with CSOM should be counselled regarding the risk of developing SNHL if left untreated.

Keywords: Hearing loss, Chronic suppurative otitis media, sensorineural

Introduction

Chronic suppurative otitis media (CSOM) is the leading cause of acquired hearing loss. The hearing impairment is attributed to tympanic membrane rupture and ossicular chain changes resulting in conductive hearing loss¹. Recently many studies have reported sensorineural hearing loss in CSOM showing impaired cochlear function. So, this study was taken up to evaluate the incidence of sensorineural hearing loss in CSOM and to assess the correlation with patients' age and duration of the disease².

Materials and Methods

Prospective observational study was carried out on 100 patients, with unilateral CSOM, who attended our ENT OPD in KIMS Hospital, Bangalore and between June 2016 to December 2016. Patients aged between 10-50 years, of both the sexes with previous history of unilateral ear discharge, for at least 2 months and who gave informed consent for the study were included in the study³. Only patients with normal hearing on contralateral ear were included in the study. Patients were excluded if they had history of head trauma, prior ear surgery,

familial history of hearing loss, previous exposure to ototoxic drugs, chronic exposure to loud noise or uncontrolled systemic conditions (diabetes mellitus, hypertension, hypothyroidism, dyslipidemia etc.)^{3,4}. Detailed history was taken and age, sex, duration of the disease with audiometric evaluation were recorded.

Results

72 patients had purely conductive hearing loss while 28 patients had mixed hearing loss. Out of 28 patients, 3 patients had disease duration of 4-6 years and 25 patients had the disease for more than 6 years.

As the duration of the disease increased, the degree of hearing loss also increased. Patients with 4- 6 years of disease duration had maximum 60 dB mixed hearing loss, while the patients with more than 6 years of CSOM had maximum 65dB mixed hearing loss (MHL). 19 patients were in the age group of 10-20 years. 21 patients were in 21-30 years of age, 33 patients were in the age group of 31-40 years and 27 patients were in the 41-50 years of age group as shown in figure 3.

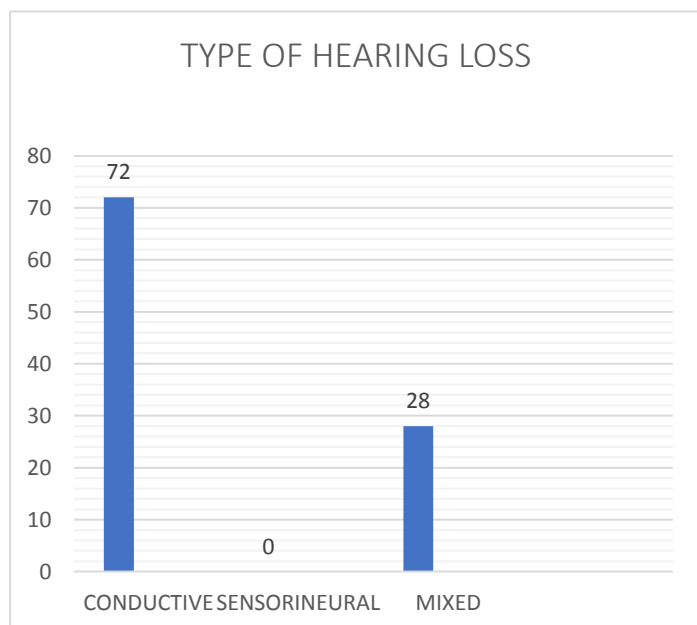


Figure No 1. Types of Hearing Loss

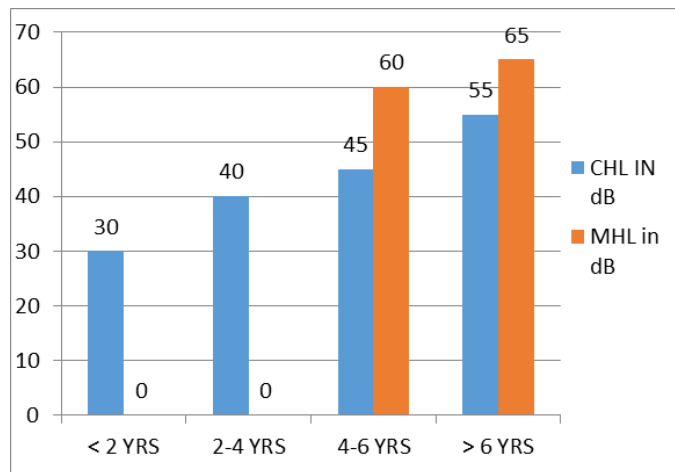


Figure No 2. Degree of Hearing Loss (CHL: Conductive hearing loss, MHL: Mixed hearing loss)

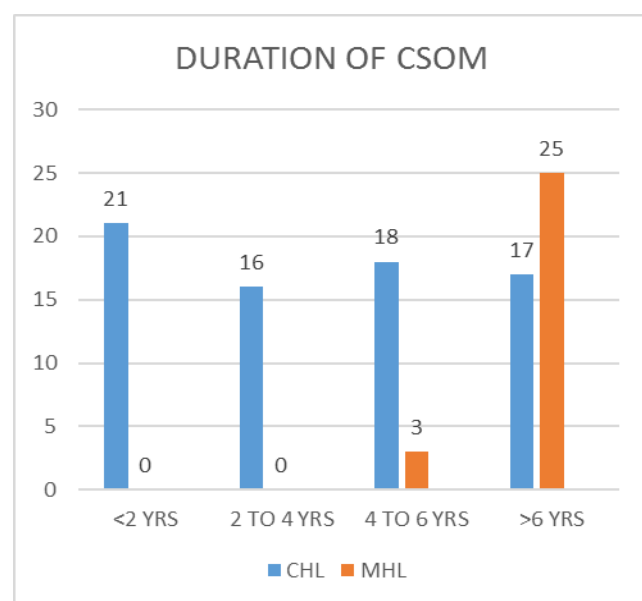


Figure No 3. Duration of CSOM In Years (CHL: Conductive hearing loss, MHL: Mixed hearing loss)

Discussion

CSOM is one of the major causes of conductive hearing loss. The incidence of SNHL in CSOM is still a matter of debate. The correlation between SNHL and CSOM has been shown in literature⁵. According to a study by Paparella et al, CSOM can cause SNHL by passage of inflammatory agents through round window, as the anatomical position and characteristic of round window encourages this passage². Levine et al found SNHL in 34% of ears undergoing tympanoplasty for various reasons. He also stated that there is a small but statistically significant relation between SNHL and age of the patients suffering from CSOM⁶. According to him,

with the increasing age, percentage of patients suffering from SNHL also increased.

According to a study by Kholmatov in 2001, a progressively increased incidence of SNHL was seen as the duration of disease increased². Similarly, in our studies we found much higher incidence of SNHL when the duration of disease was more.

Incidence of SNHL is maximum in the active stage of the disease as compared to the inactive stage and quiescent stage of the disease. Presence of active discharge in middle ear will cause more damage to inner ear as compared to absence of discharge as fewer toxins will enter the inner ear through round window. Passage of toxins through round window can result in damage to the hair cells^{7,8}.

Paparella et al also showed that chronic otorrhea has deleterious effects on inner ear². He also studied the role of round window in transmitting inflammation from middle ear to the labyrinth and showed effects of speech frequency in bone conduction thresholds in CSOM⁹. Similar results were obtained by MacAndie who showed more higher frequency loss than at lower frequencies¹⁰. The hair cells at the base of cochlea are responsible for higher frequency hearing. They are located closer to the round window and are likely to be affected more, because more toxins will reach these hair cells in larger concentrations. Verhoeven (1961) and Thorburn (1965) made anecdotal observations at cochlear losses resulting from CSOM².

Some studies have shown SNHL associated with CSOM is more in patients from low socioeconomic status due to delayed treatments, lack of education, poor hygiene and inadequate follow up. Linder et al mentioned that, there are possible ototoxic side effects of ototopical preparation due to continuous use beyond 2 weeks, in patients with CSOM which the causes of SNHL are. But other investigators have hardly given any evidence that topical drops can cause SNHL. The parameters like socioeconomic status and topical drops are not included in our study for assessment of SNHL in safe CSOM.

Conclusion

SNHL was found in this series, particularly involving the higher frequencies. Moreover, the incidence of SNHL progressively increased with the increase in duration of CSOM.

On the basis of the data obtained, we observed consistent co-relation between severity of SNHL and duration of the disease, presence of ossicular erosion and subtotal perforations. These findings suggest that more severe middle ear disease may result in SNHL and thus early intervention in cases of CSOM is desired.

So, we conclude that there is an association between CSOM and SNHL. There is scope for further studies also involving the parameters of socioeconomic status and ototoxic topical ear drops.

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