



ORIGINAL RESEARCH PAPER

ENT

A PROSPECTIVE CLINICO-PATHOLOGICAL STUDY TO ESTIMATE HEARING LOSS WITH DIFFERENT SIZE AND SITE OF TYMPANIC MEMBRANE PERFORATION IN PATIENT OF SAFE CHRONIC SUPPURATIVE OTITIS MEDIA

KEY WORDS: Safe CSOM, Pure tone audiometry, TM perforation, Hearing loss

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ABSTRACT

Aim - 1) To study the demography of safe CSOM. 2) To study the etiology of TM perforation in safe CSOM. 3) To study symptomatology of TM perforation. 4) Audiometric evaluation of patient with different size and site of TM perforation. 5) To determine the frequency maximally involved with size and site of TM perforation. 6) To compare our study with previously done studies. **Methodology** – The study group includes 50 patients with safe CSOM, who presented over a period of 18 months, who underwent audiometric evaluation (PTA) of different size and site of TM perforation. **Result and Conclusion** – The observation and results of study concluded that there is a significant correlation of hearing loss with TM perforation.

INTRODUCTION

Chronic suppurative otitis media (CSOM), is one of the most common ear disease in developing countries. It is defined as “a persistent disease, insidious in onset, often capable of causing severe destruction of middle ear structure with irreversible sequale which is clinically manifested with deafness and discharge from more than 3 months.”⁽¹⁾

CSOM can lead to conductive hearing loss upto 60 dB. Which constitutes a serious handicap.⁽²⁾

Tympanic membrane comprises 3 layers outer epithelial, middle fibrous and inner mucosal layer.⁽³⁾ Intact tympanic membrane has protective role of middle ear cleft from infections and shield round window.⁽⁴⁾

Tympanic membrane perforation represent loss of intactness in the ear drum and establishing a communication between middle and external ear.⁽⁵⁾

Pressure gradient between inner and outer surfaces of tympanic membrane virtually becomes insignificant. Thus transmits the sound wave to the ossicular chain is hampered.

Postero-inferior perforation abolish the sound protection of round window hence they will cause more hearing loss than perforation in other quadrants.⁽⁶⁾

The hearing loss will be proportional to the size of perforation. The larger the size of the perforation, greater the amount of sound waves which passes through it leading to nullifying effect.

AIMS AND OBJECTIVES

1. To Study the demography of Safe CSOM.
2. To determine the Etiologies of Tympanic Membrane Perforation for safe CSOM.
3. Symptomatology of Tympanic Membrane perforation.
4. Audiometric evaluation of patient with different size and site of perforation.
5. To determine the frequency maximally involved with size and site of perforation.
6. To compare our study with previously done studies.

MATERIALS AND METHODS

The present study entitled “A prospective clinico-pathological study to estimate hearing loss with different size

and site of TM perforation in patient of safe COM” will be carried out in 50 patients with safe COM attending to Outpatient department of ENT at GRMC & JAYAROGYA GROUP OF HOSPITAL during the study period from January 2021 to June 2022 based on our inclusion and exclusion criteria.

Inclusion Criteria:

1. Patient of both gender with ages ranging from 16-50 years.
2. Patient with dry perforation i.e. history of no ear discharge since three weeks (Inactive Mucosal CSOM)
3. Patient with good cochlear reserve.

Exclusion Criteria :

1. Age upto 16 year and above 50 years.
2. Patient with deformity of external auditory canal.
3. Known eustachian tube dysfunction.
4. Patient with previous failed myringoplasty.
5. Patient with active discharge. (Active Mucosal CSOM)
6. Patient with cholesteatoma, retraction pockets or associated mastoiditis. (Squamosal Active/Inactive CSOM)
7. Patient with ear malignancy and other debilitating diseases.

METHODS

All patients will be assessed by detailed history and clinical examination. The site and size of the perforation will be recorded. Hearing assessment will initial be performed clinically by tuning fork test and then by pure tone audiometry (interacoustic clinical audiometer AC-40) at the frequency of 250,500, 1000,2000,4000 and 8000 Hz both for air and bone conduction.

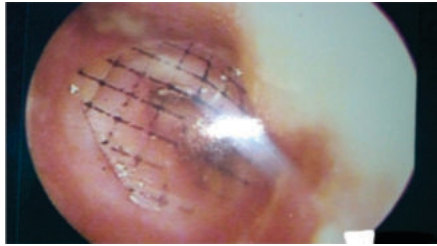
The tympanic membrane is divided into 4 segments-

- Anterio-superior (AS)
- Posterio-superior (PS)
- Anterio-inferior (AI)
- Posterior-inferior (PI)

A thin and transparent plastic paper were used and over it graphs of 1mm square were drawn, oval pieces of about (9mm x 8mm) size is cut and sterilized by keeping in Cidex.

It is kept over the TM perforation will be directly counted by

otoscope with magnification 3X, if half or more of any square is within the perforation, it is taken to be one square and if less than half of a square is within the perforation, it is not counted.



Measurement of size of perforation of tympanic membrane

The total effective surface area of the tympanic membrane was taken to be 55 mm² and the size of perforation were categorized as:

- 1-14mm² (Single Quadrant involved) – Small Perforation. (<25%)
- 15-27mm² (Two Quadrant Involved) – Medium Perforation.(25-50%)
- 28-41mm² (>Two Quadrant Involved)- Large Perforation.(50-75%)
- 42-55mm² (All Four Quadrant involved)-Total Perforation.>75%)

RESULTS

Table 1. Age distribution

Age group (years)	Frequency	Percent
10-19	6	12
20-29	23	46
30-39	12	24
40-49	7	14
50-59	2	4

Maximum patients were in the age group of 22-29 years (46%) followed by 30-39 years (24%) age group. Minimum patients were in age group 50-59 years (4%). Mean age of the patient in the age in the study was 28.58±9.08.

In the present study of 50 patients there were 30 females (60%) and 20 males (40%). The female to male ratio 1.5:1.

Graph 1 : Gender distribution

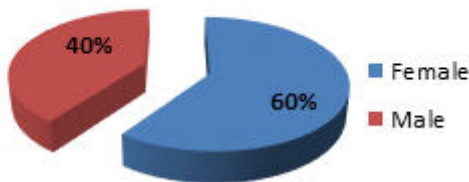


Table 2. Etiological factors

Variable	Frequency(n=50)	Percent
Infective	40	80
Traumatic	6	12
Idiopathic	4	8
Total	50	100

Infection was the most common etiological factor in our study (40 i.e. 80%) followed by traumatic (6 i.e. 12%) and idiopathic (4 i.e. 8%).

Table 3. Duration of disease

Duration	Frequency	Percent
0-3 months	6	9.6
3-6 months	12	19.35
6 months to 1 year	22	35.48
1 to 5 years	15	24.19
5 to 10 years	4	6.4
> 10 years	3	4.83
Total	62	100

Maximum number of patients had duration of disease between 6 months to 1 year were 22(35.48%) while only 3 patients had a duration of disease > 10 years i.e. 4.83%.

Table 4. Presenting symptoms

Variable	Frequency	Percent
Hearing loss	56	90.32
Tinnitus	24	38.70
Otalgia	9	14.51

Major symptoms of CSOM is Otorrhoea but as we have taken only dry ear, So otorrhoea was not presenting symptom. However 95% patients had otorrhoea sometimes during the course of disease. Most common presenting complaint in this study was hearing loss seen in 56 (90.32%) patients followed by tinnitus 24(38.70%). The least common symptom was Otalgia reported by only 9 (14.51%) patients.

Table 5. Type of hearing loss

Type	No. of Cases	%
Conductive hearing loss	59	95.16
Mixed hearing loss	3	4.83

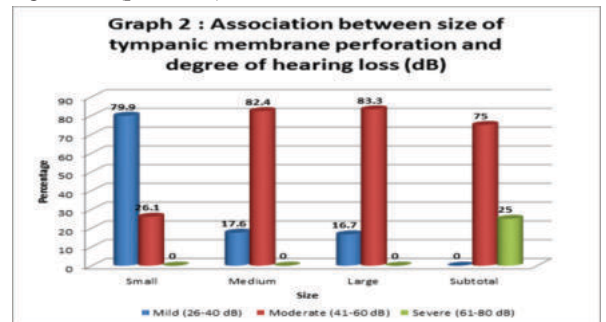
Tympanic membrane perforation was more associated with conductive hearing loss i.e. 59 (95.16%) while only 3 patients had mixed hearing loss i.e. 4.83%.

Table 6. Comparison of mean range of hearing loss in identical size of AI and PI quadrant perforation

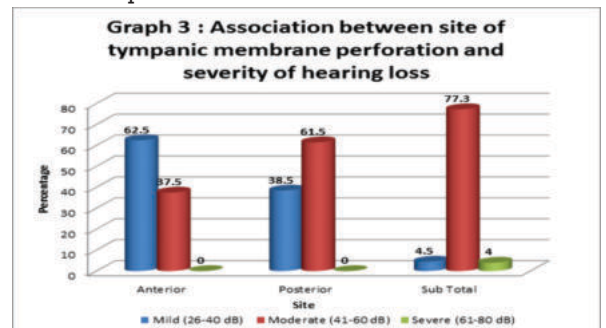
Size of TM Perforation	Mean range of hearing loss (dB) in anteroinferior (AI)quadrant	Mean range of hearing loss(dB) in posteroinferior (PI)quadrant
Small	39.79 ± 4.28	42.86 ± 6.47

Greater mean range of hearing loss reported in PI quadrant perforation i.e. 42.86±6.47 dB than AI quadrant perforation i.e. 39.79±4.28 dB.

The larger size of the tympanic membrane perforation, the degree of the hearing loss increases. There were 16 patients in the subtotal perforation, out of which 12 (75%) had moderate hearing loss i.e. 41-60 dB and 4 (25%) patients had severe hearing loss i.e. 61-80 dB. This was statistically significant (p<0.0001).



The subtotal perforation reported severe form of hearing loss i.e. 4 (18.20%) had 61-80 dB. This was statistically significant (p<0.0001). Posterior perforation has more hearing loss than the anterior perforation of same size.



DISCUSSION

- Ediale et al. noted that high proportion of study participants were within the younger age group of 10-39 years which is in agreement to our study.
- Similar findings were reported by Sood et al. in which 79% pt. were <40 years of age.
- Bhushal et al. observed that 70% pt. were from age group 15-24 years.
- Singh et al. in her study observed that hearing loss was slightly greater in Posterior perforation than the anterior perforation.
- Conductive hearing loss is the most common finding in our study. High prevalence of conductive hearing loss was seen by studies done by Maharajan et al. and Bhushal et al.
- Maharajan et al. and Nepal et al. showed statistically significant relationship between site of perforation and hearing loss.
- Kaur et al. had studied 38% perforation in anterior half whereas 28% perforation were present in posterior half.

CONCLUSION

Young and middle aged population of low socio-economic class are the most common sufferers of suppurative otitis media. Tympanic membrane perforations are long standing and they are poorly treated by general practitioners in this group.

Hearing losses as on PTA in dry TM perforations range from 16 to 46 dB (conductive) and roughly 2/3rd of the cases have mild conductive hearing loss. Average hearing loss has been observed to be greater at lower frequencies than at higher frequencies.

Hearing loss increases with the increase in the size of tympanic membrane perforation.

Site of perforation is also an important factor as posterior quadrant pars tensa perforations have greater hearing loss than anterior quadrant perforations.

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