

Study on Demographic Characteristics of Tympanic Membrane Defect in Tertiary Care Hospital

Nikesh Meghji Gosrani

MS ENT, Assistant Professor, Vedantaa Institute of Medical Sciences, Saswand, Dahanu (Palghar) Maharashtra

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Corresponding author: Dr. Nikesh Meghji Gosrani

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Abstract

Introduction: Tympanic membrane perforation is a condition in which the tympanic membrane that separates the middle ear from the external ear, tears. Hearing loss may occur in some cases whenever the tympanic membrane perforates because it can no longer produce vibrational patterns. Tympanic membrane rupture is most frequently seen in younger people and is linked to acute otitis media, though it can happen at any age.

Aims and Objectives: To analyze the demographic characteristics of Tympanic membrane defect in Tertiary care hospital.

Methods: A cross-sectional prospective study was conducted on 50 patients from whom thorough history was obtained, a general and systemic evaluation was completed, and any significant positive findings were noted. The analysis was conducted accordingly.

Results: The majority of the patients were male (66%) compared to females (34%) and the majority live in rural areas (66%). The main complaint of the patient in the study was otorrhoea (100%) followed by deafness (92%). Medium-size perforation (56%) is seen mostly followed by large size (46%) and then small size (18%) while the majority of perforations are seen in the central position (56%).

Conclusion: The study has concluded significant demographic characteristics like Patient ages ranged from 12 to 51 years with a mean age of 26.25 years. Again, males contributed to 40.51% cases while 59.49 % were females. the study concluded that the symptoms of ear discharge and reduced hearing were present in 100% cases.

Keywords: tympanic membrane, tertiary care, deafness, middle ear.

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Introduction

Tympanic membrane perforation is a condition in which the tympanic membrane (TM), which separates the middle ear from the external ear, tears. The external auditory canal is separated from the middle ear and ossicles by the TM, a layer of cartilage connective tissue with skin on the exterior and mucosa on the interior [1]. By generating vibrations whenever sound waves impact it and

sending such vibrations to the inner ear, the TM function helps with hearing. Hearing loss may occur in some cases whenever the tympanic membrane perforates because it can no longer produce vibrational patterns. Tympanic membrane rupture is most frequently seen in younger people and is linked to acute otitis media, though it can happen at any age. Trauma becomes an increasing main

reason for TM rupture as a participant's age rises [2,3].

Tympanic membrane rupture is most frequently seen in younger people and is linked to acute otitis media, though it can happen at any age. Trauma becomes an increasing main reason for TM rupture as a participant's age rises [4]. Regardless of what caused the rupture, the symptoms and signs of tympanic membrane rupture are the same. Otorrhea and rapid start of discomfort are frequently present together. Vertiginous sensations and tinnitus are possible side effects [5,6].

Although the overall incidence of TM perforations is unclear, it is not unusual to observe a perforated tympanic membrane in clinical practice because many of them mend on their own. In research of almost 1,000 patients conducted in the United States, it was discovered that men were 1.5 times more likely than women to experience a traumatic rupture [7]. In a study of 530 patients from Nigeria, the male-to-female ratio was found to be 2:1, which is close to American data. With minors comprising up to 25.5% of the sample size, a different study with 81 participants discovered that the average age of patients who had TM perforation was 26.5 +/- 14.7 years [8].

The etiology of the rupture alone determines the pathophysiology underlying it. For instance, substantial or abrupt increases in pressure distribution between the external and middle ears are associated with perforation secondary to barotrauma. For instance, when scuba diving, an air squeeze occurs because the pressure in the middle ear and the external auditory canal are not equal [9,10]. The rupture of the eardrum may eventually result from the differential across the membrane. The eardrum itself can be directly penetrated by a foreign body (FB) or ear cleaning, typically in the pars tensa region. The pars tensa, the largest and thinnest portion of the TM, is situated in the anterior and inferior region of the

eardrum and is only a few cell layers thick [11,12].

Because TM perforations typically heal on their own, supportive care is the mainstay of treatment [13]. The ear should indeed be kept as dry as possible because getting the ear wet can increase the risk of infection. According to a prospective study on traumatic perforations, individuals who used ofloxacinotic drops had a faster rate of healing and shorter time to closure than those who did not [14]. It was also discovered that ofloxacin drops had no impact on the rate of AOM caused by significant perforations or the results of hearing tests. Regular antibiotic use is frequently unnecessary. Surgery would be recommended and the patient should be sent to otolaryngology since perforations in the posterosuperior quadrant, induced by penetrating trauma or existing for less than 2 months are known to have poor routine healing [15,16].

Materials and methods

Study design

A cross-sectional prospective study was conducted on 50 patients who came to the E.N.T. department of our hospital from July 2021 to June 2022. Only perforation-containing cases that were dry at the operation time were chosen. An effort was made to only choose patients who had been dry for at least four weeks before surgery, were over the age of 10 and were under the age of 60. A thorough history was obtained, a general and systemic evaluation was completed, and any significant positive findings were noted. Investigations including a full hemogram, urinalysis, pure tone audiometry, tuning fork test, and patch test was carried out. Pure tone audiometry was conducted in all patients. It formed base line investigation for the level of preoperative hearing with the help of an advanced Digital AD 2000 ALPS Audiometer. In each case, the pre and post-operative pure tone audiogram was evaluated and pure tone average

improvement at 500, 1000, and 2000Hz was noted.

In each case, the improvement in pure tone audiometry Air Bone Gap was also calculated in three frequency (500, 1000, 2000Hz).

Inclusion and exclusion criteria

Inclusion Criteria:

1. All patients having chronic suppurative otitis media with subtotal to total tympanic membrane perforation.
2. Patient must have good cochlear reserve with normal functioning Eustachian tube.
3. Atelectatic ear
4. Big, tough tympanosclerotic patch involving major part of tympanic membrane preventing normal vibratory function of tympanic membrane.
5. Previously failed tympanoplasty
6. Retraction pocket.

Exclusion Criteria:

1. Patients of chronic suppurative otitis media with extensive active infection with complications like facial palsy, labyrinthitis or any intracranial complications.

2. Patients with sensorineural hearing loss.

3. Patients with uncontrolled recurrent upper respiratory tract affections.

Statistical Analysis

Data entry and analysis were done using MS Excel software. The continuous data was expressed as mean±standard deviation while the discrete data was expressed as count and its respective percentage.

Ethical Approval

The patients were given a thorough explanation of the study by the authors. The patients' permissions have been gotten. The concerned hospital's ethical committee has accepted the study's methodology.

Results

Table 1 shows the demographic characteristics of patients where the maximum number of patients were in the age group of 21-30 (40%) followed by 10-20 (28%). The majority of the patients were male (66%) compared to females (34%) and the majority live in rural areas (66%). The main complaint of the patient in the study was otorrhoea (100%) followed by deafness (92%).

Table 1: Demographic characteristics of patients

Parameters	No. of cases	% of cases
Age		
10-20	14	28
21-30	21	42
31-40	11	22
41-50	2	4
51-60	2	4
Gender		
Female	17	34
Male	33	66
Residence		
Urban	17	34
Rural	33	66
Chief complaints		
Deafness	46	92
Itching	2	4
Otorrhoea	50	100
Tinnitus	6	12

Table 2 shows that characteristics of perforations of the tympanic membrane. Medium-size perforation (56%) is seen mostly followed by large size (46%) and then small size (18%) while the majority of perforations are seen in the central position (56%).

Table 2: Characteristics of perforation of the tympanic membrane

Parameters	No. of cases	% of cases
Size perforation		
Small	9	18
Medium	28	56
Large	23	46
Shape and position		
Central	28	56
Posterior	7	14
Marginal	4	8
Anterior	3	6
Kidney shape	4	8
Subtotal	4	8

Table 3 shows the hearing impairment in the study population. Most of the hearing loss is seen in 31-40 dB (52%) and the conductive type is mostly seen in the group (27). Flat type of hearing loss is seen in 22 members.

Table 3: Characteristics of hearing impairment in study group

Parameters	No. of cases	% of cases
Assessment of hearing		
Hearing loss (DB)		
0-10	-	-
11-20	4	8
21-30	8	16
31-40	26	52
41-50	8	16
>50	4	8
Type of hearing loss	Conductive type	Mixed type
0-40	27	-
41-50	2	9
>50	-	5
Pattern of hearing loss (graph/HL)	Conductive	Mixed
Flat type	22	5
MID	6	3
Zigzag type with maximum HL at low	7	2
High	3	4

Discussion

People frequently belittle chronic otitis media, which is a major public health issue. The study's objective was to ascertain the clinical-epidemiological trend of tympanic membrane perforation at a tertiary care facility in the Bundelkhand

region. According to a recent study, health awareness campaigns, better health education, and easy access to medical facilities can lower the morbidity and fatality rates associated with tympanic membrane perforation [16,21].

Hearing loss is a frequent otological disease associated with tympanic membrane perforation. In a tertiary hospital in Nigeria, the study sought to identify the clinical-epidemiological pattern, etiology variables, clinical manifestations, and treatment of tympanic membrane perforation. The study comes to the conclusion that middle ear infections and traumatic experiences are the main causes of tympanic membrane perforation. The location and size of the hole vary depending on whether the infection has been present for a long time or was caused by trauma [17]

To assess the traumatic tympanic membrane perforation's etiology, clinical characteristics, and therapy at the University of Port Harcourt Teaching Hospital. Clinical evaluations were performed on patients who had traumatic tympanic membrane perforations to identify the origin and location of the perforation. They underwent pure tone audiometry. treated non-surgically and monitored after treatment [18].

To assess the traumatic tympanic membrane perforation's etiology, clinical characteristics, and therapy at the University of Port Harcourt Teaching Hospital. Clinical evaluations were performed on patients who had traumatic tympanic membrane perforations to identify the origin and location of the perforation. They underwent pure tone audiometry. treated non-surgically and monitored after treatment. The report claims that street fights, domestic disputes, instruments, and state security agents were the main causes of traumatic perforation. Common complaints included tinnitus, otalgia, and hearing loss. In the lower portion of the pars tensa, 64% had perforations. 42.8% of people reported mild conductive hearing loss. The primary physical cause of tympanic perforation was an ear blow [19].

Recently, a study was carried out. Conductive hearing loss occurring in the

speaking frequency was the most prevalent type of hearing impairment in this group of individuals with non-explosive blast injury to the ear, according to an assessment of the prevalence and type of hearing impairment in non-explosive blast injury to the ear. Several nearby high frequencies were primarily influenced by the accompanied sensorineural loss. Significant conductive loss recovery was favored by perforation healing, although sensorineural loss recovery was less successful [20].

The middle and external ears are separated from one another by an intact tympanic membrane. One of the most prevalent causes of conductive hearing impairment is tympanic membrane perforation. The most crucial element in determining hearing loss is perforation size. The study's objective was to determine the frequency of tympanic membrane perforation in patients who were admitted to a tertiary care hospital's otorhinolaryngology department. According to the study, tympanic membrane perforation is more common than it is in other studies of a comparable nature. In all patients, hearing loss was evident, with the majority having a modest loss. Larger and posterior perforations had more hearing loss overall [21].

In a tertiary care hospital, a study was done to find out the frequency and features of traumatic Tympanic Membrane perforation. According to the study, young males frequently suffer from traumatic tympanic membrane perforation. The most frequent cause of traumatic perforation, which affects the left ear more than the right ear, is a slap. Mild degrees and conductive types of hearing loss were frequently present, and the inferior quadrant of the tympanic membrane was frequently affected [22,23].

Conclusion

The study has concluded that maximum numbers of patients were in the age group

of 11-20 years (39.24%). Patient ages ranged from 12 to 51 years with a mean age of 26.25 years. Again, males contributed to 40.51% cases while 59.49% were females.

Further, the study concluded that the symptoms of ear discharge and reduced hearing were present in 100% cases. About 45.57% cases had healthy middle ear mucosa, 24.05% cases had cholesteatoma, 12.66% cases had tympanosclerosis, and 17.72% cases had granulations.

Hence, the study has brought forward important findings on demographic characteristics of Tympanic membrane defect in Tertiary care hospital which would contribute in the building epidemiological data and further helps in early management of tympanic membrane defect in Tertiary care hospital.

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