

ETIOLOGICAL PROFILE AND OUTCOME OF TRAUMATIC TYMPANIC MEMBRANE PERFORATION

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ABSTRACT

Background: Traumatic perforation of the tympanic membrane is one of the commonest cause of perforation that is encountered by otolaryngologists. This study was undertaken to study the etiological profile and outcome of traumatic tympanic membrane perforations.

Methods: A total of 60 patients were taken in this study who had perforation of tympanic membrane due to trauma. A detailed history was taken followed by general and ENT examination. Pure tone audiometry was done in all the patients. Tympanic membrane perforations were visualized using otoscope and under examination under microscope was done. A conservative management approach was adopted, except for those with bloody or watery discharge who received oral/systemic antibiotics to prevent infections. Patients were followed up

Results: Most of the affected patients fall in the age group of 31-40 years. Sex ratio(male:female) is 1.73:1. The chief complaints were tinnitus (86.7%) being the most common, ear pain (81.7%), hearing loss(63.3%), aural fullness(43.3%), ear bleed(25%) and vertigo(10%). Etiologically most common cause was assault(36.7%), followed by self ear cleaning(23.3%), road traffic accidents (15%), foreign body of the ear(10%), instrumentation (ear syringing and foreign body removal)(10%), fall(3.3%) and blast injuries(1.7%). In 42(70%) left ear was involved and 18(30%) right ear was involved. Among all the patients, spontaneous healing within 3 months was seen in 52(86.7%) patients and no healing with residual perforation was seen in 8(13.3%) of patients, who underwent tympanoplasty at the end of 3 months

Conclusion: Traumatic perforations have a really favourable prognosis rate if they're treated promptly and with the appropriate safeguards.

Keywords: tympanic membrane, perforation, trauma, assault

INTRODUCTION

Otolaryngologists routinely treat traumatic perforation of the tympanic membrane. The fragile, translucent, fibrous tympanic membrane divides the middle ear from the external ear. It has experienced substantially more trauma than the middle or inner ear.⁽¹⁾ Sharp or piercing wounds can cause traumatic perforation of the tympanic membrane. Tympanic membrane damage puts a person at risk for middle ear infections, which can cause facial nerve paralysis, cholesteatoma formation, perilymph fistulas, and intracranial infections.⁽²⁾ It may be necessary to explore the ear and the interior of the skull in order to treat these complications. Tympanic membrane perforations are becoming more common as a result of greater trauma, as well as the violence and accidents that are more common in modern life.⁽²⁾

In cases of explosions, blow with hand, rapid changes in aircraft cabin pressure and deep sea diving, etc. causes formation of compressed air column in external auditory canal which causes rupture of tympanic membrane. Penetrating wounds are typically self-inflicted, but they can also result from processes like wax removal or foreign body removal.⁽³⁾

Treatment options for traumatic tympanic membrane perforation include active surgical intervention as well as passive careful waiting.⁽⁴⁾ Otolaryngologists have been cautioned, nonetheless, to be careful in recommending surgical treatment in situations of traumatic tympanic membrane perforation without obvious symptoms since the majority of patients would recover on their own.⁽⁵⁾ Most studies show that within three months of damage, the tympanic membrane spontaneously heals in roughly 80% of instances. Therefore, the normal course of treatment for the first three months is to wait and see.⁽⁶⁾

AIM OF THE STUDY

To study the etiological factors of traumatic tympanic membrane perforation and the outcome of such perforation

METHOD

This hospital based prospective observational study was conducted in the Department of ENT, Dr.D.Y.Patil Medical College and Hospital, Pune from January 2021 to January 2022.

Inclusion criteria

- Patients with tympanic membrane perforation due to trauma.

Exclusion criteria

- Patients with hearing loss
- Patients with previous history of ear surgery
- Patients with chronic otitis media
- Patients with diabetes mellitus
- Patients who are on any immunosuppressant

DATA COLLECTION METHOD

All the patients who met the criteria of the study were taken into consideration. Their history was taken in details and a general physical examination and ENT examination was done. Pure tone audiometry was done for all patients. Examination was also done under otomicroscope. The data that were collected are: chief complaint, age of the patient, sex of the patient, site and cause of injury. In most of the patients conservative treatment was given, except in cases where there was bloody/watery discharge where they were given oral antibiotics to prevent development of infection. The patients were strictly advised to take precaution to not wet the ears and to follow up if discharge appeared. They were followed up to see the healing of the tympanic membrane perforation.

Data was entered in Microsoft excel and analysis was done using SPSS version 22. Results on categorical measurements are presented as percentages.

RESULTS

In our study 60 patients were included. The following were the observation and results were seen in our study.

Age and sex distribution

Most of the affected patients fall in the age group of 31-40 years. In our study there were 38 males and 22 females. Thus the sex ratio(male:female) is 1.73:1. Among males the most affected age group is 31-40 years and among females the most affected age group is 21-30 years.

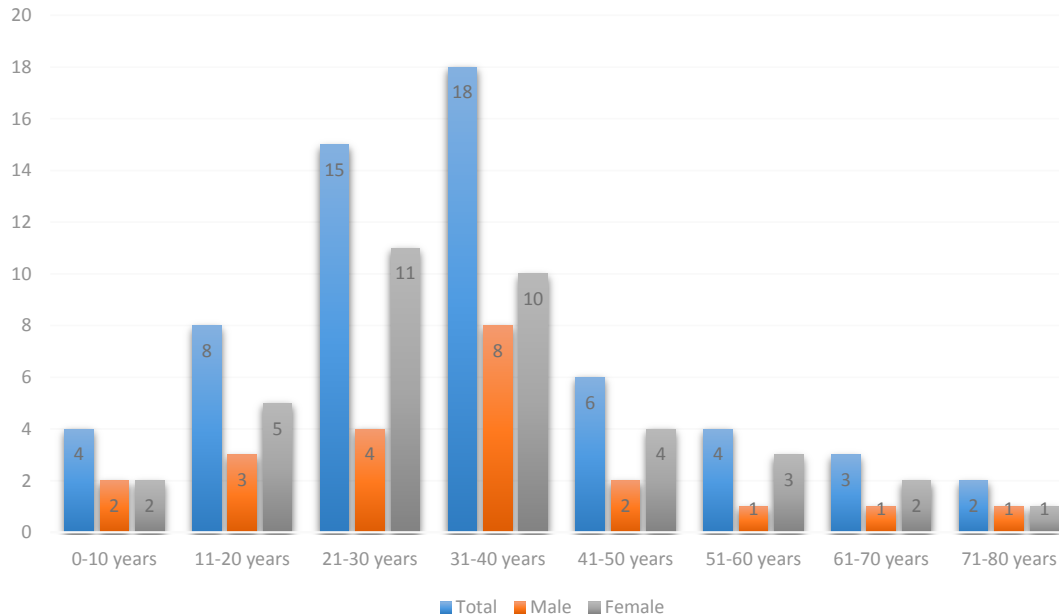


Figure 1-Age and Sex wise distribution

Chief complaints

In our study most the following complaints were presented by the patients. They were tinnitus (86.7%) being the most common, ear pain (81.7%),hearing loss(63.3%),aural fullness(43.3%),ear bleed(25%) and vertigo(10%).(Table 1)

Complaints	Number of Patients	Percentage
Tinnitus	52	86.7
Ear pain	49	81.7
Aural fullness	26	43.3
Ear bleed	15	25.0
Vertigo	6	10.0
Hearing loss	38	63.3
Infection	3	5.0

Table 1-Percentage wise distribution of Patient's complaint

Etiological distribution of patients

According to etiology, in our study, the most common cause of traumatic tympanic membrane perforation was assault(36.7%), this was followed by self ear cleaning(23.3%), road traffic accidents (15%), ,foreign body of the ear(10%),instrumentation (ear syringing and foreign body removal)(10%),fall(3.3%) and blast injuries(1.7%). (Figure 2)

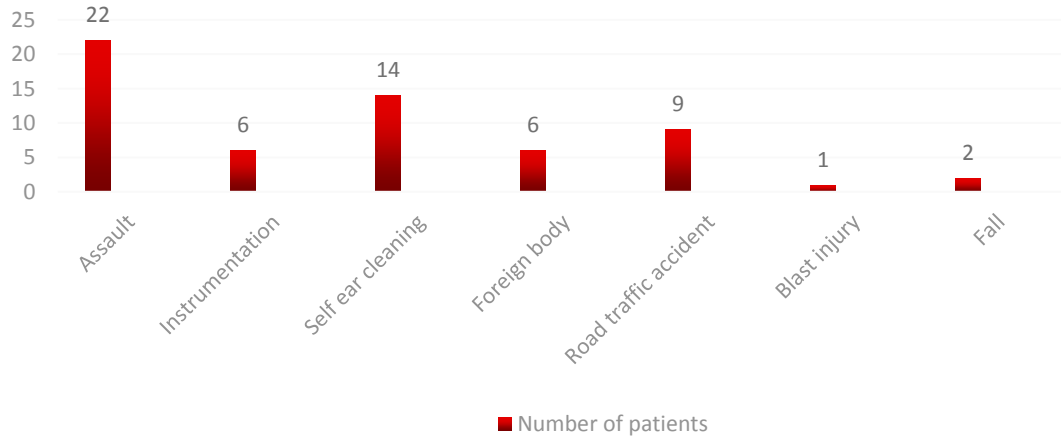


Figure 2-Distribution of patients according to etiology

Laterality

In our study, 42(70%) had tympanic membrane perforation of left ear and 18(30%) had tympanic membrane perforation of right ear.(Figure 3).

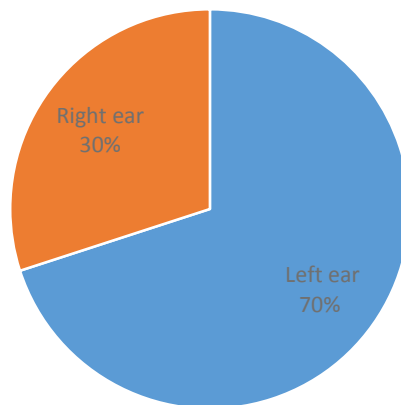
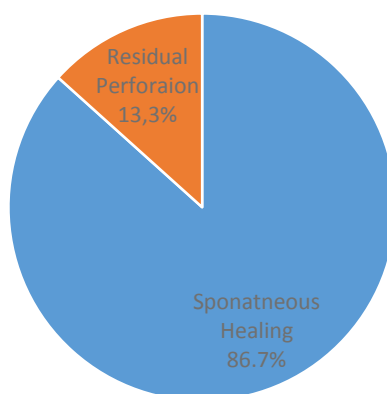


Figure-3:Laterality of trauma

Outcome

In this study, we see that in 1-4 weeks spontaneous healing of tympanic membrane perforation was seen in 53.4% of patients, in 4-8 weeks another 20% of the patients showed healing and in 8-12 weeks another 13.3% of the patients showed healing (Table-2). Among all the patients, spontaneous healing within 3 months was seen in 52(86.7%) patients and no healing with residual perforation was seen in 8(13.3%) of patients ,who underwent tympanoplasty at the end of 3 months(Figure-4).

Healing time	Number of patients	Percentage
1-4 weeks	32	53.4
4-8 weeks	12	20.0
8-12 weeks	8	13.3

Table-2 Patient distribution according to healing time**Figure-4 Outcome****DISCUSSION**

In India, the prevalence of trauma in all of its manifestations is increasing exponentially. This could occur in the form of an attack, a car accident injury, a domestic violence injury, a work injury, or a sports injury. Simple to complex cases of ear trauma can include loss of inner ear and facial nerve function as well as blunt trauma, laceration, or avulsion of the pinna in whole or in part, uncomplicated tympanic membrane perforation, ossicular dislocation, and longitudinal and transverse petrous temporal bone fractures.^(7,8)

The youngest and oldest patients were aged as 4 and 76 respectively. Males aged 31 to 40 were most frequently impacted, whilst females aged 21 to 30 were most frequently impacted. 55% of patients were in the age range of 21 to 40, which was the most common. These results concur with research by Gacek & Gacek and Berger et al.^(9,10) There were 22 women and 38 men. The ratio of men to women was 1.73:1. The results of this study agree with those of Gacek & Gacek, da Lilly-Tariah, and Somefun.^(9,10,11) The young age group, between the ages of 21 and 40, was shown to be more affected in this series, which is equivalent to the study by Sogebi et al., which had a mean age of 33.8 years.^(12,13) There were more females than males in the population.

The left ear was affected in 42 cases (70%) while the right ear was affected in 18 cases (30%).

It is unclear why there was a modest tendency for the left ear to predominate over the right ear in this investigation. However, Sarojamma et al suggested that it might be because a right-handed person tended to slap the victim over the left ear and assault was a significant etiological element.⁽²⁾

Tinnitus was the most often reported ailment in the current study, with an 86.7% prevalence rate, followed by ear pain (81.7%), hearing loss (63.3%), auditory fullness (43.3%), ear bleed (25%) and vertigo (10%). Hearing loss was the most frequent complaint in the study by Berger et al., da Lilly-Tariah, and Somefun, followed by tinnitus and otalgia.^(14,15)

An analysis of the mechanisms and causes of traumatic tympanic membrane perforations revealed a pattern that is consistent with findings from other investigations.^(2,16) In our study, assault (36.7%) was a frequent and significant contributor to traumatic tympanic membrane perforation. The injury mechanisms varied significantly between the sexes of the individuals. While assault and traffic accidents were frequent among the male patients, domestic violence was more prevalent among the female patients. In their study, Lou et al. found that more than half of instances of traumatic tympanic membrane perforation were caused by a slap or a fist from a spouse or lover.⁽¹³⁾

Out of 60 cases, physical assault by slaps and blows to the ear was the most frequent aetiology leading to tympanic membrane perforation. This was followed by self-ear cleaning with ear buds and pointed

objects (23.3%), car accidents (15%), foreign bodies in the ear (10%), instrumentation (syringing and foreign body removal) (10%), falls (3.3%), and blast injuries (1.7%).

According to numerous studies by da Lilly-Tariah and Somefun, Lindeman et al, Ijaduola and Okeowo, Ahmad and Ramani, and others, the other significant causes are attempting to remove foreign bodies from the external auditory canal, cleaning one's own ears, and removing wax in an unskilled manner.^(11,17,18,19)

The majority of traumatic perforations often heal on their own. In our study, spontaneous healing of the tympanic membrane perforation occurred in 53.3% of patients between 1-4 weeks, 20.0% within 4-8 weeks, and 13.3% between 8-12 weeks. In total, 52 patients (86.7%) experienced spontaneous healing within three months, while 8 patients (13.3%), who had tympanic membrane perforations that had not healed, required tympanoplasty at the conclusion of the three-month period. Studies by Sarojamma et al, Jellinge et al, Ologe et al, Gacek & Gacek demonstrate these conclusions.^(6,9,20,21)

Loss of tissue and subsequent infection are the two main risk factors for the perforation not healing. Smaller perforations are more likely than bigger ones to spontaneously shut.⁽¹²⁾ In our study, we found that prophylactic antibiotic coverage and rigorous adherence to the advice not to let water or any other fluid into the ear helped the tympanic membrane to recover on its own.⁽¹³⁾

CONCLUSION

We'd like to draw the conclusion that traumatic perforations have a really favourable prognosis rate if they're treated promptly and with the appropriate safeguards.

We want to underline how crucial ear dry precautions are for the healing of perforations and how necessary it is to explain them to patients. We also want to underline that domestic violence is still a problem in our culture and that it must stop if we are to see a decline in the number of incidents. Tympanic membrane perforations caused by trauma are more likely to heal on their own, therefore the cornerstone of treatment is still to wait and watch while giving patients water precautions.

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