



CLINICAL STUDY OF ETIOLOGICAL FACTORS, CLINICAL COURSE AND OUTCOME OF TRAUMATIC PERFORATION OF TYMPANIC MEMBRANE IN RURAL TERTIARY CARE CENTRE

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ABSTRACT

Background: Traumatic perforation of the tympanic membrane may be due to direct or indirect trauma. The aim of this study was to determine the various etiological factors of traumatic perforation of tympanic membrane and their clinical presentation, observation and the treatment modalities in tertiary care centre.

This prospective study was performed on 156 cases of traumatic tympanic membrane perforation in the Department of ENT and Head & Neck Surgery, Government Villupuram medical college and Hospital from May 2016 to February 2017 from various causes.

The data collected include the bio-data, the symptoms, nature of injury, the clinical findings, hearing loss and the treatment outcome.

Findings: 164 ears were analyzed, Age ranged from 3 years to 65 yrs. The group consisted of 75 (48%) male and 81(52%) female patients. Commonest aetiology (66%) was from slaps, followed by road traffic accidents and solid object injuries.

Conclusion: In our study majority of the traumatic perforation heal spontaneously without any intervention and only few patients require surgical intervention if the perforation persists even after 3 months. Systemic or topical antibiotics are not indicated unless the ear is secondarily infected.

KEYWORDS : Traumatic TM perforation, Hearing loss. Tympanoplasty

INTRODUCTION

Tympanic membrane is the very thin and delicate structure, forming the lateral boundary of middle ear. It often get perforated by various causes. As expected the incidence of perforation of TM is on rise, consequent to increased violence and accidents seen in the present day life¹.

Causes of traumatic TM perforation include

- Insertion of sharp or blunt objects into the ear canal accidentally or purposefully
- open-handed slap across the ear
- Road traffic accidents
- Barotrauma
- Iatrogenic perforation during syringing or foreign body removal
- Blast injuries
- Penetrating injuries of the TM -may result in fracture or dislocation of the ossicular chain, fracture of the stapes footplate, bleeding, a perilymph fistula from the oval or round window and facial nerve injury.
- The incidence traumatic perforation has been estimated at 8.6/1000 persons².

Traumatic perforation of the tympanic membrane may cause pain, bleeding, hearing loss, tinnitus, and vertigo. Some patients may report audible whistle like sounds during sneezing and nose blowing. Diagnosis is confirmed by otoscopy. Treatment is often unnecessary. Antibiotic aural drops were of no use in the absence of active infection and may introduce infection resulting in persistence of perforation. Surgical intervention may be needed for perforations persisting for more than 3 months, disruption of the ossicular chain, or injuries affecting the inner ear and facial nerve.

Although traumatic TM perforations have good prognosis, patients to be instructed regarding regular follow up until the perforation healed completely. Most studies suggest that upward of 90% of traumatic perforations heal spontaneously within 3 months of injury². However, small perforations are more likely to close spontaneously than large ones³.

Aims and Objectives

- 1) To evaluate the various etiologies of traumatic tympanic membrane (TM) perforations.
- 2) To evaluate the prognosis and outcome of traumatic tympanic membrane perforations.

Materials and Methods:

A prospective study was performed on 156 cases of traumatic TM perforation in Department of ENT and Head & Neck Surgery, Government Villupuram medical college from May 2016 to February 2017

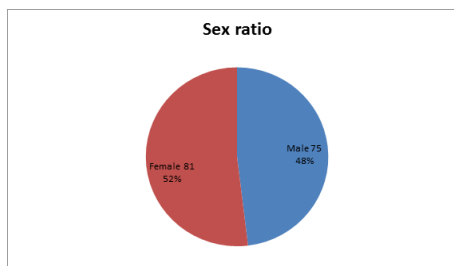
Result and analysis

A total of 156 patients with the traumatic tympanic membrane perforation were included for this study. The group consisted of 75 (48%) male and 81(52%) female patients.

1. Sex distribution (n=156)

The group consisted of 75 (48%) male and 81(52%) female patients.

Fig.1

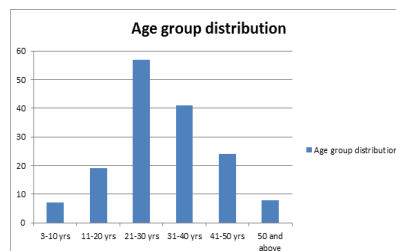


In our study the incidence of traumatic perforation of the tympanic membrane was more among females (52%). The females are affected in more number; the most common reason may be the increased violence in the family. Traumatic perforation of tympanic membrane in females is mainly caused by slap injury.

2. Age distribution

The incidence of traumatic perforation was reported to be higher among young females, in this series, 63% of the patients were in the age group of 21-40 years. Out of this, the maximum incidence (37%) was among 21-30 years age group and minimum incidence seen in age group 50 and above (5%).

Fig: 2



3. Hearing Loss

Majority of patients in our study 92 (59%), presented with conductive hearing loss in the range of 21-35dB, 29% of patients with ≤ 21dB,

10% of patients presented with ≥ 36 dB hearing loss and 2% patients were having moderate degree of mixed hearing loss. This study shows that, in majority of the patients, perforation of tympanic membrane results in minimal hearing loss in the range of 21-35dB.

4. Etiology of injury

In our study, the most common etiology for traumatic perforation of tympanic membrane was injury caused due to slapping (66%). Direct trauma like RTA, by solid instruments accounted for 26% of cases. Blast injury leading to rupture of tympanic membrane was rare and contributed to 8% of cases.

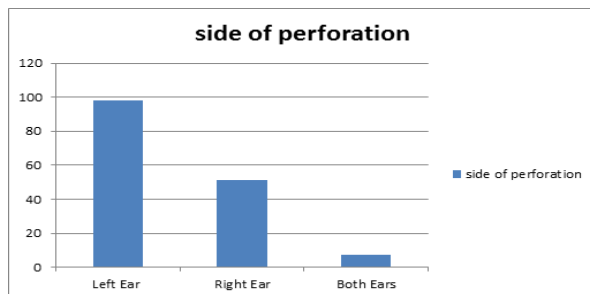
Table. I

Sl. no	Etiology of perforation	number	percentage
1	Slap injury	103	66
2	Solid objects	21	13
3	Road traffic accident	20	13
4.	Blast injury	12	8

5. Laterality

Left eardrum was found to be more commonly affected 98 (63%) in our series. The right eardrum was affected in 51(31%) cases and there were 7 (4%) cases of bilateral perforations. The increased incidence for the left ear may be due to the fact that slap was a major etiological factor in our study and a right handed person tends to slap the victim over the left ear.

Fig.3



6. Size of Perforation

In our study out of the 156 patients, 115 patients had small perforations involving only one quadrant of the tympanic membrane. 27 patients had medium perforations involving two quadrants of the eardrum. 11 patients had large perforations involving three quadrants of the tympanic membrane. 3 patients had subtotal perforation

Table.II

small	medium	large	Sub total
115	27	11	3

7. Quadrants Involved

Posteroinferior quadrant of the tympanic membrane was found to be affected most commonly. Out of the 156 cases, 89 (57%) were in the posteroinferior quadrant. The anteroinferior quadrant was involved in 51 (32%) patients. Thus the inferior half of the eardrum was found to be involved in 89% of the cases.

8. Outcome

In our study, complete healing was observed within 3-6 weeks in 122 (78%) patients and within 7-9 weeks in 14(9%) patients. 8 (5%) patients showed complete healing within 10-12 weeks. 12 (7%) patients had residual perforation even after 3 months. The minimum time taken to heal was 21 days and maximum time 84 days. Complete healing was observed in 144 (92%) patients. Type 1 tympanoplasty done to the 12 patients who are having residual perforation even after 3 months.

IV. Discussion

The tympanic membrane (TM) is an important component of sound conduction as its vibrating mechanism is necessary for sound transmission in human beings⁴. Traumatic perforations can occur from blows to the ear, sudden changes in atmospheric pressure, exposure to excessive water pressure and improper attempts during wax removal or ear cleaning with cotton buds, syringing of the ear canal for wax removal can lead to perforation.

In our study the incidence of traumatic perforation of the ear drum was found to be more among females (52%). This is similar to studies by Lindeman et al (1987) who reported a greater incidence among females. But Camnitz (1985) and Olushola A Afolabi⁵. (2009) reported prevalence more among males.

The incidence of traumatic perforation was reported to be higher among the young females, Lindeman (1987), Kirstenson (1992), Berger (1994) and Dr Sarojamma (2014)⁶. In this series, 63% of the patients were in the age group of 21-40 years. Out of this, the maximum incidence (37%) was among 21-30 years age group. Left eardrum was found to be more commonly affected 98 (63%). The right eardrum was affected in 51(31%) cases and there were 7 (4%) cases of bilateral traumatic perforations. The more incidences for the left ear may be due to the fact that slap was a major etiological factor in this series and a right handed person tends to slap the victim over the left ear. Lindeman (1987) Berger (1994)⁷ reported a similar predilection for the left ear. In our study out of the 156 patients, 115 patients had small perforations involving only one quadrant of the tympanic membrane, 27 patients had larger perforations involving two quadrants of the eardrum, 11 patients had perforations involving three quadrants of the tympanic membrane and 3 patients had subtotal perforation. Most of the studies on traumatic perforations done by Friedman (1948), Jordan (1952), Lindeman (1987)⁸, Berger (1994) have reported a prevalence of small sized perforations involving only one quadrant of the tympanic membrane. Posteroinferior quadrant of the tympanic membrane was found to be affected most commonly in our study. Out of the 156 cases, 89 (57%) were in the posteroinferior quadrant. In 19 patients, the anteroinferior quadrant was involved 51 (32%). Thus the lower half of the eardrum was found to be involved in 89% of the cases. Regarding the presenting complaint impaired hearing was the commonest complaint (55%) in our study, the next common complaint was tinnitus (18%) followed by bleeding from ear (12%) and earache (15%), Friedman (1948) reported impaired hearing as the commonest symptom in his series. In Berger's (1994) series, hearing loss was the most common presenting complaint (69.5%) followed by tinnitus (45.1%). Complete healing was observed within 3-6 weeks in 122 (78%) patients and within 7-9 weeks seen in 14(9%) patients in our series. 8 (5%) patients showed complete healing within 10-12 weeks. 12 (7%) patients had residual perforation even after 3 months. The minimum time taken to heal was 21 days and maximum time 84 days. Complete healing was observed in 144 (92%) patients. Korkis (1946) reported 29.4 days and 38 days as the mean time taken for healing in the case of uninfected and infected perforations respectively. Berger (1994) reported 94.8% spontaneous healing and in our study the spontaneous healing observed in 92%. The data strongly suggests that prolonged observation remains an excellent option for patients presenting with traumatic TM perforation. Surgical intervention (type 1 tympanoplasty) done to the 12 patients who are having residual perforation even after 3 months. Regarding the hearing improvement in our study except 12 patients all the 144 patients regained the hearing completely and the A-B gap was less than 10 db.

Conclusion

From this study we conclude that the majority of the traumatic perforation heal spontaneously without any intervention and only few patients require surgical intervention if the perforation persists even after 6 months. And also there was no significant difference between the etiology and spontaneous closure of traumatic TM perforation. Systemic or topical antibiotics are not indicated unless the ear is secondarily infected

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