



## Etiological Study of Traumatic Tympanic Membrane Perforation in Western UP.

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### ABSTRACT

**Objectives:** In this study we evaluate the various etiologies of traumatic tympanic membrane perforations of ear and their prognosis.

**Methods:** A prospective study of 50 case subjects was conducted from April 2016 till Dec 2016 at ENT OPD of Muzaffarnagar Medical College and Hospital, Muzaffarnagar, Uttar Pradesh.

**Results:** In this study, average time taken for healing was 34.78 days. The shortest time taken was 21 days and longest was 75 days. An improvement in hearing was noted by the audiometry report of both the groups, conservative treatment (18.375dB) and myringoplasty group (19.44 dB).

**Conclusion:** There was no significant difference in time taken for the tympanic membrane to heal completely in both the conservative (34.78 days) and myringoplasty group (33.83 days). It was concluded that there was an improvement in hearing in both groups, 18.375dB and 19.44 dB respectively.

### KEYWORDS

Traumatic perforation of tympanic membrane; Pure Tone Audiometry; Tympanometry.

### Introduction

The incidence of perforations of the tympanic membrane due to trauma is on an increase consequent to increased violence and accidents seen in present day life<sup>1</sup>.

It can also result from attempts of self-cleaning of the ear, scratching the ear with sharp objects and due to various iatrogenic causes. Traumatic perforation of the tympanic membrane is a common injury that is under reported, hence there is a need to educate on unskilled removal of foreign body, early identification, evaluation and referral of patients so as to reduce the morbidity. It is a source of great concern for otorhinolaryngologist to restore completely the functional integrity of tympanic membrane and associated structures<sup>23</sup>.

An unhealed perforation has got a definite impact on the lifestyle of the patient interfering with his occupational and recreational activities. The risk of failure of spontaneous healing is very real resulting in persistent perforation with its associated problems like infections, hearing loss and late developing cholesteatoma<sup>4</sup>.

Closing a perforation has the following advantages like improvement in hearing, that the patient can tolerate getting water in to the ear like swimming, taking shower etc. and that recurrent ear discharges is unlikely to occur during upper respiratory tract infections<sup>36</sup>.

Although traumatic tympanic membrane perforations have good prognosis, it is necessary to induce patients with profuse explanations for possible complications to visit the out-patient clinic until the wound has healed completely<sup>78</sup>.

### Aims of Study

1. To evaluate the various etiologies of traumatic tympanic membrane perforations.

2. To evaluate the prognosis and outcome of traumatic tympanic membrane perforations by various means of management.

### Methods of collection of data

**A. Study design:** Prospective study

**B. Study period:** April 2016 to December 2016.

**C. Place of study:** ENT Outpatient Department of Muzaffarnagar Medical College and Hospital, Muzaffarnagar, Uttar Pradesh.

**D. Sample size:** 50

### E. Inclusion Criteria:

1. Subjects 18-50 years of age and of both the sexes irrespective of socioeconomic status
2. Able to comply with study procedures.
3. Informed written consent in Hindi or English.

### F. Exclusion Criteria:

1. Subjects less than 18 years and above 50 years of age.
2. Subjects underwent any form of ear surgery involving tympanic membrane in the past.
3. Subjects having middle ear infections.

### G. Methodology:

After obtaining clearance and approval from the Institutional Ethical Committee, 50 patients fulfilling Inclusion/Exclusion who give Informed Consent were included in the study.

Data was collected from the patients presenting to the ENT Outpatient Department.

### H. Statistical analysis:

Quantitative or qualitative results were analyzed using Z-score or chi square test wherever applicable.

### Observation and Results

**Table 1: Conservative treatment group**

	No. of Cases	Healed	Avg. time taken (days)
<b>Infected</b>	0	0	0
<b>Uninfected</b>	32	32	34.78

In our study, none of the patients got infected in the conservative

treatment group. The average time taken for healing by the uninfected cases was 34.78 days. The shortest time taken was 21 days and the longest was 75 days.

Figure: 1

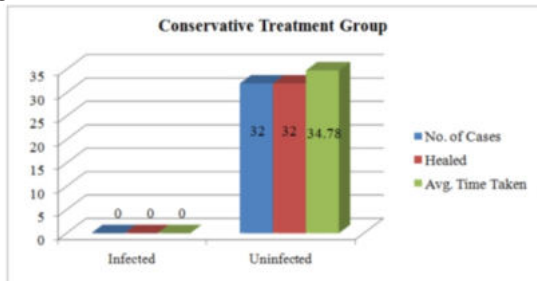


Table 2: Myringoplasty surgical treatment group

	No. of Cases	Healed	Avg. time taken (days)
Infected	17	0	33.83
Uninfected	1	0	26

In our study, out of 18 cases in the myringoplasty group 17 cases (34%) were infected. Only 1(2%) case was uninfected. The average time taken by the uninfected case to heal was 33.83 days. Uninfected ear took an average time of 26 days for complete healing

Figure: 2

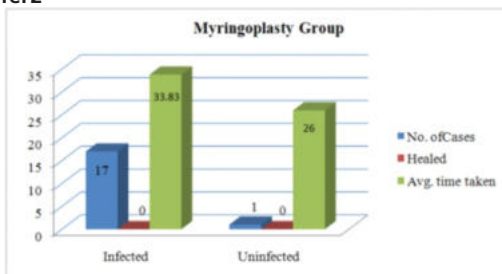
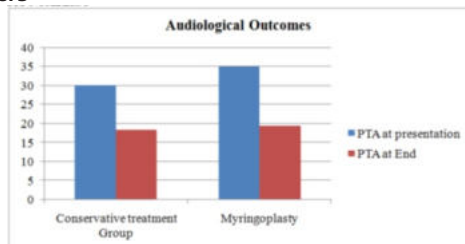


Table 3: Audiological Outcomes

	PTA Avg. at presentation (dB)	PTA Avg. at end (dB)
Conservative treatment Group	30.1563	18.375
Myringoplasty Group	35	19.44

In our study, it can be concluded the improvement in hearing as shown by the audiometry report in both the groups, conservative treatment (18.375dB) and Myringoplasty group (19.44 dB)

Figure: 3



**Discussion**

**1. Age**

The incidence of traumatic perforation was reported to be higher among the young, active females, 72% of the patients were in the age group of 18-40 years. Out of this, the maximum incidence (48%) was among 21-30 years age group. The youngest patient was a 19 year old girl who sustained traumatic perforation of the right tympanic membrane as a result of slap injury. The oldest patient was a 50 year old man who had a right tympanic membrane perforation as a result of scratching the ear canal by a

match stick.

**2. Sex Distribution**

In our study the incidence of traumatic perforation of the ear drum was found to be more among females (58%).The females formed the majority, the most common reason being domestic violence by their family members. Traumatic perforation of tympanic membrane among females were mainly caused by slap injury.

**3. Hearing Loss**

In our study, majority of patients (62%), presented with conductive hearing loss in the range of 26-35dB, 22% of patients with  $\leq 25$ dB and only 8% of patients presented with  $\geq 36$ dB hearing loss.

This study showed that, in majority of the patients, perforation of tympanic membrane results in minimal hearing loss in the range of 26-35dB.

**4. Mode of Injury**

In our study, the most common etiology for traumatic perforation of tympanic membrane was injury caused due to slapping (50%). Direct trauma accounted for 28% of cases. Iatrogenic i.e. during removal of foreign body accounted for 6% of cases. Blast injury leading to rupture of tympanic membrane was rare and contributed to 4% of cases.

**5. Laterality Distribution**

In our study left eardrum was found to be more commonly affected (66%). The right eardrum was affected in 34% cases and there were no cases of bilateral perforations.

**6. Size of Perforation**

In our study out of the 50 patients with single perforation, 28 patients had grade I perforations involving only one quadrant of the tympanic membrane.

19 patients had larger grade II perforations involving two quadrants of the eardrum. 3 patients had grade III perforations involving three quadrants of the tympanic membrane. No patients had grade IV perforation.

**7. Quadrants Involved**

In our study, out of the 50 cases, 29 (58%) had perforation in the posteroinferior quadrant. In 19 cases, the anteroinferior quadrant was involved (38%).

**8. Large Perforations – Quadrants Involved**

In our study in the case of large perforations, posterior half of the eardrum was found to be most commonly affected. Out of 6 grade II perforations, 4 were involving the posterosuperior and posteroinferior quadrants.

**9. Presenting Complaints**

In our study, impaired hearing was the commonest complaint (48%), the next common complaint was tinnitus (18%) followed by bleeding from ear (14%) and earache (12%).

**10. Margins of Perforation**

In our study, ragged margins of perforations were found in 33 cases (66%), followed by inverted margins in 13 cases (26%) and everted margins in 4 cases (8%).

**11. Hearing Loss**

In our study, majority of patients (62%), presented with conductive hearing loss in the range of 26-35dB, 22% of patients with  $\leq 25$ dB and only 8% of patients presented with  $\geq 36$ dB hearing loss.

**12. Conservative Treatment Group**

In our study, none of the patients got infected in the conservative treatment group. All the uninfected cases healed spontaneously. Repeat audiogram was advised every week.

The average time taken for healing by the uninfected cases was 34.78 days. The shortest time taken was 21 days and the longest was 75 days.

### 12. Myringoplasty Group

In our study, out of 18 cases in the myringoplasty group 17 cases (34%) got infected. Infected ears took an average time of 33.83 days for complete healing after the surgery. This is statistically significant ( $p < 0.01$ ) implying that infection delayed the healing process. All the cases healed completely with an overall rate of closure being 100%.

The average time taken by the uninfected ears in the two groups were statistically not different from each other implying that the treatment modality offered did not influence the rate of healing. There was no significant difference between the two groups in relation to the overall healing rate.

### 13. Audiological Outcomes

In our study, improvement in hearing was seen in both the groups, conservative treatment (18.375dB) and Myringoplasty group (19.44 dB).

### 14. Total Cases

In our study 17 (34%) of cases got infected and 33 (66%) remained uninfected. Average time taken for uninfected cases (66%) to undergo spontaneous healing was 34.78 days. Infected ears who underwent myringoplasty took an average time of 33.83 days for complete healing after the surgery.

### Conclusion

1. Traumatic perforation was found to be more common among females in the age group of 21-30 years.
2. The most common presenting complaint was hearing loss.
3. Most common cause for the perforation was slap injury.
4. Majority of the patients had single grade I perforation.
5. Majority of patients presented with conductive hearing loss in the range of 26-35dB.
6. Majority of the traumatic perforations of the tympanic membrane was noted in the left ear.
7. Posteroinferior quadrant was found to be affected most commonly.
8. Most of the perforations were having ragged margins.
9. Treatment modality employed did not seem to influence the time taken for complete healing.
10. Infected ears took more time for complete healing (33.78 days) compared to the uninfected ears (26 days).
11. In our study all the infected cases which remained unhealed even after 21 days of conservative treatment, underwent myringoplasty using temporalis fascia graft using underlay technique.
12. In our study, the cases presenting with grade II and grade III perforation underwent myringoplasty.
13. Overall healing rates in both the conservative group as well as myringoplasty group were 100%.
14. There was no significant difference in the time taken for the tympanic membrane to heal completely in both the conservative (34.78 days) as well as myringoplasty group (33.83 days).
15. In our study, it can be concluded the improvement in hearing as shown by the audiometry report in both the groups, conservative treatment (18.375dB) and Myringoplasty group (19.44 dB).

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