

Assessment of Cases of Tympanic Membrane Perforation

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ABSTRACT

Background: To assess cases of tympanic membrane perforation.

Materials and Methods: One hundred ten patients with dry perforations of tympanic membrane with no history of active middle ear disease were enrolled and the type, degree and frequency of hearing loss was determined by tuning fork test and pure tone audiometry. Clinical parameters such as cause of injury, side, site, complaints and type was recorded. The duration of disease was also recorded.

Results: Out of 110 patients, males were 65 (59.0%) and females were 45 (41%). Cause of perforation was RTA in 52, domestic assault in 38 and armed robbery in 20. Type was penetrating in 66 and non-penetrating in 44. The difference was significant ($P < 0.05$). Side involved was left in 46 and right side in 64. Site was anterior in 53, posterior in 41 and undefined in 16. Complaint was otalgia in 62, otorrhoea in 75, vertigo in 27 and tinnitus in 27. The difference was non-significant ($P > 0.05$). The mean hearing loss in 0-9 mm³ perforation was 24.1 dB, in 9-30 mm³ was 36.7 dB and >30 mm³ was 47.5 mm³. The difference was significant ($P < 0.05$).

Conclusion: Common cause of perforation was RTA, domestic assault and armed robbery. Type was penetrating and non-penetrating. Complaint was otalgia, otorrhoea, vertigo and tinnitus.

Keywords: tympanic membrane, otalgia, Hearing loss.

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INTRODUCTION

Tympanic membrane is a membranous partition separating the external auditory meatus from the tympanic cavity, measuring 9-10 mm vertically and 8-9 mm horizontally.^[1] It plays a major role in middle ear transformer mechanism. Tympanic membrane perforation is caused by variety of causes such as trauma and infections.^[2] Trauma comprise of Barotrauma, temporal bone fracture, infections such as acute otitis media, chronic otitis media, TB and intragenic like ventilation tubes. Tympanic membrane perforation leads to varying degree of conductive hearing loss. Loss of hearing is a national health problem with significant physical and psychosocial problem.^[3]

Ear buzzing, earache, and hearing loss are the major symptoms of TM perforation. In addition, TM perforation can increase the risk for middle ear infection or otitis media.^[4] Although most small perforations of the eardrum can be spontaneously healed, large TM perforations should be treated with myringoplasty. Simple traumatic tympanic membrane perforation (TTMP) remains the most common type of trauma-induced otologic dysfunction.^[5] Treatment of TTMP range from inactive watchful waiting, active intervention to surgical intervention. Otolaryngologists have however been advised to be reluctant in offering surgical intervention in cases of TTMP without significant symptoms as most

patients will heal spontaneously within two months.^[6] We performed this study to assess cases of tympanic membrane perforation.

MATERIALS & METHODS

After obtaining approval from ethical review committee and considering the utility of the study and we selected one hundred ten patients with dry perforations of tympanic membrane with no history of active middle ear disease, unilateral or bilateral of both genders. Written consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. A detailed examination and investigations was performed. The type, degree and frequency of hearing loss was determined by tuning fork test and pure tone audiometry. Clinical parameters such as cause of injury, side, site, complaints and type was recorded. The duration of disease was also recorded. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table I Patients Distribution

| Total- 110 | | |
|------------|------------|----------|
| Gender | Male | Female |
| Number (%) | 65 (59.0%) | 45 (41%) |

Out of 110 patients, males were 65 (59.0%) and females were 45 (41%) (Table I).

Table II Assessment of cause and type of perforation

| Parameters | Variables | Number | P value |
|------------|------------------|--------|---------|
| Cause | RTA | 52 | 0.62 |
| | Domestic assault | 38 | |
| | Armed robbery | 20 | |
| Type | Penetrating | 66 | 0.05 |
| | Non- penetrating | 44 | |

Cause of perforation was RTA in 52, domestic assault in 38 and armed robbery in 20. Type was penetrating in 66 and non- penetrating in 44. The difference was significant ($P < 0.05$) (Table II).

Table III Assessment of side, site and complaint

| Parameters | Variables | Number | P value |
|------------|-----------|--------|---------|
| Side | Left | 46 | 0.05 |
| | Right | 64 | |
| Site | Anterior | 53 | 0.73 |
| | Posterior | 41 | |
| | Undefined | 16 | |
| Complaint | Otalgia | 62 | 0.85 |
| | Otorrhoea | 75 | |
| | Vertigo | 81 | |
| | Tinnitus | 27 | |

DISCUSSION

The tympanic membrane (TM) is a delicate translucent fibrous membrane which separates the external from the middle ear, and it produces a rupture, tear or perforation when traumatized.^[7] The TM injury can predispose to middle ear infection which has grave consequences including facial nerve paralysis, formation of cholesteatoma, perilymph fistula, intracranial infections and may require ear and intracranial exploration.^[8] Significant morbidity or mortality can occur when traumatic ear injuries are associated with damage to contiguous facial structures and the brain. Effective management is expedient while prevention and reduction of complications must be given utmost attention to achieve a good outcome.^[9,10] We performed this study to assess cases of tympanic membrane perforation.

Our results showed that out of 110 patients, males were 65 (59.0%) and females were 45 (41%). Gao et al^[11] studied 370 patients with traumatic TM perforations of different sizes. These patients were randomly assigned to control group and treatment group. In the treatment group, a sterile cotton patch with sea buckthorn oil was used to cover the TM perforations. In the control group, patients were treated with a sterile cotton patch. The healing rate and time were compared between the two groups. They found that the overall healing rate was significantly higher in the treatment group than in the control group. For middle and large TM perforations, sea buckthorn oil treatment led to a significant increase in the healing rate. At 2 months after injury, the duration of healing was, generally, shorter in the treatment group than in the control group.

Cause of perforation was RTA in 52, domestic assault in 38 and armed robbery in 20. Type was penetrating in 66 and non- penetrating in 44. In a study by Pannu et al^[12], patients were divided into three groups according to size; group I (0–9 mm²), Group II (9–30 mm²), Group III (≥ 30 mm²); according to site into anterior and posterior group; according to involvement of malleus into malleolar and non- malleolar and according to duration into Group A (<1 year), Group B (1–5 years), Group C (≥ 5 years). Hearing loss was measured in each case with pure tone audiometry. Hearing loss increased as the perforation size increased. Hearing loss was more in posterior quadrant perforation than anterior quadrant perforation but difference was not significant statistically. Hearing loss was more in malleolar perforation. Hearing loss increased as the duration of disease increased.

Side involved was left in 46 and right side in 64. Site was anterior in 53, posterior in 41 and undefined in 16. Complaint was otalgia in 62, otorrhea in 75, vertigo in 27 and tinnitus in 27. We observed that the mean hearing loss in 0-9 mm³ perforation was 24.1 dB, in 9-30 mm³ was 36.7 dB and >30 mm³ was 47.5 mm³. Darad et al^[13] correlated the size and site of perforation with hearing loss in chronic suppurative otitis media (CSOM). Infection was the most common etiology of tympanic membrane perforation in 92 (92%) cases and trauma in 08 (08%) with otorrhea as the most common presenting complaint. Half of the cases were in the age group of 20– 30 years. Seventy-nine percentage cases had mild hearing loss whereas 19% had moderate hearing loss. Anterior quadrant perforations on an average had 31.4 dB hearing loss, whereas there was 43.9 dB average hearing loss in posterior quadrant perforations.

Ahmad and Ramani^[14] stated that the hydraulic action arising from the difference in area of TM and of the stapedial footplate is the most important factor in impedance matching. When the surface area is decreased, there will be decrease in amplification and hearing loss will be proportionate to size of perforation.

Shambaugh^[15] in a study of 42 ears with tympanic membrane perforation classified group C perforation (size 20–30% of surface area of TM) into anterior and posterior groups and found that there was no statistically significant difference between two means at any frequency. Gulati et al^[16] in a study of 21 patients with safe otitis media reported a linear relation between size of perforation and amount of hearing loss.

CONCLUSION

Common cause of perforation was RTA, domestic assault and armed robbery. Type was penetrating and non- penetrating. Complaint was otalgia, otorrhoea, vertigo and tinnitus.

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