

Traumatic Tympanic Membrane perforation: An aetiological profile

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Abstract: *OBJECTIVE:* The purposes of this study were to determine the factors involved in the spontaneous healing and to profile the various etiologies of traumatic tympanic membrane (TM) perforation.

METHOD – A Prospective study was performed on 70 cases of traumatic perforation in Dept of ENT , J.L.N.M.CH BHAGALPUR from January 2010 to march 2013.

RESULTS: A total 70 patients with traumatic TM perforations were enrolled in the study. The group consisted of 46 male and 18 female patients. It affected all with the highest incidence among middle age group .. The types of trauma included compression injury, blast injury , and instrumental injury . The causes of conflict by a slap or a fist were spouse or lover (52%), parents and sibling (3%), school teachers (4%), schoolmate (12%), state police and prisoner (7%), and blow against the ear during street fight (22%).. Wet perforations with bloody or watery discharge significantly improved the healing rate) and shortened the average perforation closure time as compared with dry perforations. Although the perforation that involved malleus or umbo damage did not significantly affect the healing rate, a significantly prolonged closure time (41.6 vs 23.8 days) was observed as compared with no damage. However, the curled edges did not also affect the outcome of spontaneous healing; the healing rate was 91% and 88%, and the average closure time was 28.1 and 26.7 days, respectively, for with and without curled edges. By perforation size, the overall healing rate was 92% and 54%, and the average closure time was 22.8 and 47.3 days , respectively, for small and larger perforations. Moreover, 7 patients had neomembrane formation on follow-up, 2 developed cholesteatoma, 1 developed tympanosclerosis, and 1 developed facial paralysis.

CONCLUSION:

In our experience domestic violence and street flight were the most common cause of a traumatic TM perforation. Traumatic perforation have excellent prognosis. However ,preexisting tympanosclerosis and the perforation that involved malleus or umbo damage could lengthen the healing time of perforation. Wet perforation with bloody or watery discharge accelerate the healing but the curled edge did not affect the outcome of spontaneous healing.

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I. Introduction

Trauma generally is blight on our society and it is a major cause of morbidity and mortality in any society. This could be in form of assaults, road traffic injury, domestic, industrial and sports injuries. These are relatively on the increase in our society although it is difficult to know the economic impact on india, however it is estimated that the annual cost of dealing with this tragedy is more than billion in the india .In a 1999 study, it was found that the average personal injury in the workplace costs more than 8,00000 in lost.earnings . Trauma patients consume more health care resources than heart and cancer patients combined, and whereas mortality from heart disease and cancer is declining, the incidence from trauma is increasing . Trauma to the ear could be simple blunt trauma to the pinna; laceration of the pinna avulsion of part or the whole of the pinna; uncomplicated tympanic membrane perforation; dislocation of the ossicles; longitudinal and transverse fractures of the petrous temporal bone with associated loss of inner ear and facial nerve function. Trauma to the tympanic membrane and the middle ear can be caused by overpressure (slap, fight, assault from security agents and road traffic injury (RTI)), thermal or caustic burns, blunt or penetrating injuries such as instrumentations and barotraumas. Overpressure is by far the most common mechanism of trauma to the tympanic membrane. Traumatic perforation of the tympanic membrane may be caused by direct impact of fluids and direct pressure from outside. The aim of the study is to profile the various aetiologies of traumatic tympanic membrane perforation

II. Material And Method

The study was undertaken in the ENT Department of JLNMC Bhagalpurr, a tertiary care teaching hospital. The patients with a history of trauma (assault, pin prick, syringing, iatrogenic etc.) sustained not earlier than 2 weeks and with absolutely no previous history of any ear disease were included in the study. A detailed clinical and otoscopic examination was performed and associated symptoms such as vertigo and tinnitus were noted. Tuning fork test, and pure tone audiometry (PTA) was performed on all patients. Follow-up visits were scheduled at 1 week, 2 weeks, 4 weeks, 8 weeks, and 10 weeks and further follow-up was tailored to the needs of the individual patient. The PTA was repeated on 2nd and 4th visit. The data retrieved included the following parameters: sex, age and side, cause of injury and symptoms such as earache, hearing loss, tinnitus and vertigo were recorded. The eardrum appearance was assessed by otoscope/microscope. The following criteria were used to estimate the relative size of the perforations: small perforation, less than one-fourth of the TM, medium perforation less than one-half of the TM and large perforation, more than one-half of the TM. PTAs were determined for air and bone conductions at 500, 1000, 2000, and 4000 Hz. A conservative management approach was adopted, except for those with bloody or watery discharge who received oral/ systemic antibiotics to prevent infection. The patients were advised not to wet the ears and to antedate their appointments if discharge appeared. The assessment of follow-up visits was recorded at least 3 times for every patient.

III. Result

Seventy patients (70) were found to have traumatic tympanic membrane perforation however 6 were excluded because of incomplete data thus only 64 were analyzed and formed the basis for this study. Age range 6 months to 50 yrs with a mean age of 29.2 yrs and modal age of 35 years. About 5 (7.9%) of them were ≤ 5 years and majority of the patients were between 35 and 50 years of age. There are 46 (71.9%) males and 18 (28.1%) females with a male to female ratio of 2.5:1 and cross tabulation and predisposition male were mostly affected in most of the aetiologies except in fall where no male was recorded. The commonest aetiology recorded was from slaps, then road traffic injury (RTI) in 35.9% and 23.5% respectively. Majority of the slap injury were from fights, security agents, senior students and cultists at schools in 30.5%, 17.4% and 17.4% respectively. Traumatic tympanic membrane perforation showed that 36 left ears and 28 right ears were affected. Majority of the patients (95%) had associated sudden hearing loss, tinnitus in 52% while 24 (37.5%) of the patient had progression to chronic suppurative otitis media and it was observed that majority of the patient defaulted from the follow up once the symptoms of bleeding and pain subsided mostly after an average of three follow up visits. Out of the few that came for follow up only 7.8% had neomembrane formation.

IV. Discussion & Conclusion

The TM is an important component of sound conduction as its vibratory characteristic is necessary for sound transmission in human beings. Trauma to TM can be caused by over pressure, blunt or penetrating injuries and barotraumas.] In our study, over pressure was the most common cause of trauma to TM similar to various studies elsewhere. Traumatic TM perforations are seen in all age groups. In our study, middle age group (20–40 years) has the highest incidence similar to studies undertaken by Gacek and Gacek and Berger *et al.* Male to female involvement was 1.94:1.00. This result is not in accordance with various studies. Lindeman *et al.*] reported greater prevalence among females similar to study reported by Lou *et al.*] However, a higher male involvement was reported by Gacek and Gacek] and da Lilly-Tariah and Somefun] The higher prevalence among males, in our study, can also be explained by the fact that study was undertaken in a conflict zone. In our study, 98% of patients had unilateral involvement. The right ear involvement was seen in 26.85% of patients and left ear was involved in 71.10% patients. This could be associated with the fact that most assailants were right handed and likely that most of the acts of trauma such as slap occurred with the assailant and the victim facing each other making the left ear more vulnerable to trauma. Lindeman *et al.* and Berger *et al.* reported a similar predilection for left ear. Attempts at removal of foreign bodies from external auditory canal, self-ear cleaning with a variety of objects and wax removal in an unskilled manner either by parents, quacks or primary care physician are other important causes of trauma as are also reported in various other studies. Thus, there is a need for the primary care physician to draw the red lines and routinely consider the referral in all such cases. In our study regardless of mechanism of injury, tinnitus was the most common complaint (90.90%). The next common complaint was aural fullness (87.10%), followed by reduced hearing (56.60%), aural pain (30%), bleeding from ear (6.30%), and vertigo (1.40%). In the study by Berger *et al.* and da Lilly-Tariah and Somefun hearing loss followed by tinnitus and otalgia were common complaints. In our study, hearing loss increased with increase in size of perforation at each frequency. It is due to hydraulic action arising from the difference in area

of foot plate, the most important factor in impedance matching. When the surface area is decreased, there is decrease in amplification and hearing loss will be proportional to the size of perforation. Most traumatic perforation have a tendency to heal spontaneously, there was 91.80% healing in our study similar to other studies. Residual perforation was observed only in 2.50% patients. The data strongly suggests that prolonged observation remains an excellent option for patients presenting with traumatic TM perforation. Traumatic perforations often occur in community and generally the prognosis is excellent. The two main factors that predispose to failure of perforation to heal area, loss of tissue, and secondary infection.

References

- [1]. Griffin WL Jr. A retrospective study of traumatic tympanic membrane perforations in a clinical practice. *Laryngoscope* 1979;89 (2 Pt 1):261-82.
- [2]. Ott MC, Lundy LB. Tympanic membrane perforation in adults. How to manage, when to refer. *Postgrad Med* 2001;110:81-4.
- [3]. Peter JK, Paul HK. Principle of trauma In Byron J Bailey Head and Neck Surgery - Otolaryngology. (3rd edn), Lippincott Williams and Wilkins Publishers; 2001.
- [4]. Ritenour AE, Wickley A, Ritenour JS, Kriete BR, Blackbourne LH, Holcomb JB, *et al.* Tympanic membrane perforation and hearing loss from blast overpressure in operation enduring freedom and operation Iraqi freedom wounded. *J Trauma* 2008;64 2 Suppl:S174-8.

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