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Examining the variables influencing traumatized tympanic membrane perforations

G Lakshmana Prasad¹ and G Sripavana Krishna Murthy^{2*}

1. Assistant Professor, Department of ENT, NRI Medical College & Hospital, Guntur, Andhra Pradesh, India
2. Associate Professor, Department of ENT, Sardar Rajas Medical College Hospital & Research Centre, Bhawanipatna, Odisha, India

Background: Tympanic membrane (TM) perforation caused by trauma is a common otological disorder that can lead to hearing loss and more serious complications.

Methods: An analytical, prospective study of the healing process following tympanic membrane damage. The study was conducted at Department of ENT, Sardar Rajas Medical College Hospital & Research Centre, Bhawanipatna, Odisha, India from January 2012 to December 2012. In this study, 25 patients—16 men and 9 women—between the ages of 15 and 45 who had traumatic perforations and who arrived at a tertiary care facility within three days of the injury were included. The what, where, how much, and whys of holes were being studied by researchers.

Results: There were a total of twenty patients, ranging in age from 15 to 45. The damage was incurred over the course of one to three days. One person in the group had an ear injury. Twenty percent of cases involve tympanic membrane perforations in the antero inferior quadrant. At 24%, the average size of a perforation was rather substantial. One prevalent cause of injury was trauma from being struck or from being the victim of domestic abuse.

Conclusion: Men in their 20s and 30s were more likely to experience TTMP, especially in one ear alone. The illness, which was frequently caused by marital violence, showed symptoms like ringing in the afflicted ear, discomfort in the ear, and difficulties hearing.

Keyword: Antero inferior, illness, quadrant, tympanoplasty, TTMP

Introduction

In the course of our daily ENT (ear, nose, and throat) practice, we frequently confront the issue of traumatic tympanic membrane perforation. Penetrating or blunt injuries can cause traumatic perforation. The tympanic membrane can implode due to a column of compressed air created in the external auditory canal by blows, slaps, fast airplane descents, or deep-water diving^[1]. Most penetrating injuries are self-inflicted, however they can also be the consequence of foreign body removal or wax treatments. The middle, inner, or outer ear may be impacted by

ear trauma or injury. Damage can be caused by contact sports injuries, loud noises, air pressure fluctuations, accidents, and foreign objects lodged in the ear^[2]. Trauma to the ear can result in vertigo, balance problems, hearing loss, and even external changes to the ear. Ear injuries can range in severity from trivial to catastrophic, and surgery may be required in extreme situations. If there is enough damage to the ears to harm the inner ear, it might cause hearing loss and trouble balancing. The TM is intended to improve hearing by producing vibrations whenever it is touched by sound waves and sending those

vibrations to the inner ear [3]. According to prior research findings, tinnitus, earaches, and hearing loss were the most common complaints among our patients.

Surgery for the reconstruction of a tympanic membrane perforation brought on by chronic otitis media is a complicated procedure that takes a long time and necessitates the harvesting of a graft. As a result, the situation has grown increasingly difficult. The sheer quantity of COM patients, particularly in emerging nations, makes the creation of simpler care approaches necessary. This is because the majority of these wounds are not self-healing or sealing [4]. If the problem isn't corrected, it may lead to irreversible harm to the parts of the hearing system and eventually result in a serious hearing loss. Therefore, a simple office operation is required, which, if successful, might seal or at least significantly reduce the bulk of COM's perforations. Our three-part study on the role of epidermal growth factor (EGF) in the healing of human tympanic membrane perforations comes to an end here [4].

Primarily, otologic impairment can arise from simple traumatic tympanic membrane perforation (TTMP), which was initially reported in. Treatment options for TTMP include surgical surgery and active intervention [5]. One method of passive treatment is to wait cautiously. The majority of individuals with TTMP will heal on their own in two months or less [9], hence otolaryngologists have been cautioned when recommending surgery when the sickness does not manifest any symptoms. Topically applied chemicals such as enoxaparin, ascorbic acid, and epidermal growth factor can all be utilized as active therapy [6]. By encouraging epithelization, these drugs help the perforated membrane repair more quickly or stop sclerotic plaques from forming.

Material and Methods

Examination of the healing period following tympanic membrane injury by prospective analytical techniques. Data from Department of ENT, Sardar Rajas Medical College Hospital & Research Centre, Bhawanipatna, Odisha, India

was collected by researchers between January 2012 to December 2012. This study comprised twenty-five patients who had suffered traumatic perforations; all of them had visited a tertiary care facility within 72 hours of the injury. Of the patients, seven were female and thirteen were male. The age range of the patients in the population was 15 to 45. An analysis was conducted on the perforation's origin, location, size, and the mechanisms underlying its repair.

Inclusion Criteria

- Patient age 15-45.
- Written and informed consent was taken

Exclusion Criteria

Those who got oral or systemic antibiotics to prevent infection and had bloody or watery discharge.

Results

This study comprised twenty-five people who had traumatic perforations and showed up at a tertiary care hospital three days after the perforation. A total of 25 patients—16 men and 9 women—were present were people present ranging in age from fifteen to forty-five. The circumstances surrounding the appearance, location, and size of the hole, as well as the subsequent repair, were investigated.

Table 1: Age range

| Sr. No. | Age Range | Mean Age |
|---------|-----------|----------|
| 1. | 15-45 | 21±13.4 |

Our analysis indicates that the average age is 21 years old, with a standard deviation of 13.4.

Table 2: Sex Ratio

| Sex | Number | Percentage (%) |
|--------|--------|----------------|
| Male | 16 | 64 |
| Female | 9 | 36 |

We included 25 patients in our study, 16 of whom were male (64%) and 9 of whom were female (36%).

Table 3: Side of Ear Affected

| Side of ear affected | Number | Percentage (%) |
|----------------------|--------|----------------|
| Right Ear | 15 | 60 |
| Left Ear | 10 | 40 |

Ten patients experienced problems with their left ear, whereas 15 of the 25 patients had problems with their right ear.

Table 4: Discussing perforations of tympanic membrane

| Parameter | Nature | Percentage (%) |
|-------------------------|--------|----------------|
| Size of perforation | 06 | 24 |
| Quadrant involved | 05 | 20 |
| Healing spontaneously | 08 | 32 |
| Healing by intervention | 06 | 24 |

Eight were healing naturally, six were healing as a consequence of intervention, five had an involved quadrant, and six out of the twenty-five patients examined had a big perforation.

Discussion

Depending on how big or small they were, perforations were categorized as such. Large perforations had more than two quadrants and a maximum diameter of more than five millimeters, while small perforations had more than one quadrant or a maximum diameter of less than three millimeters [7]. Large perforations had more than one but fewer than two quadrants. Between one and two months were spent tracking the TM patch's development. Recovery periods were evaluated and contrasted with the extent of the affected area. It was determined that the perforation had healed partially if its size had decreased and that it had healed fully if it had completely closed [8]. Treatment was deemed ineffective if the size of the perforation did not decrease following it.

Lou and his colleagues found that some cases of perforation of the tympanic membrane healed in six months. Rather, the patient received EGF in the form of ear drops, which were used every day for six months as the perforation healed. The effectiveness of utilizing extracellular matrix-derived growth factor (EGF) in conjunction with

amniotic membrane scaffold in voids was investigated by Benjamin and colleagues [9]. The researchers came to the conclusion that the EGF group's perforation diameter shrunk more quickly. Researchers Lou *et al.* found that patients treated with the protein had a higher rate of complete healing and faster wound healing in two randomized experiments on the effects of EGF on traumatic perforations. However, EGF drops were utilized in place of a scaffolding element on a daily basis. According to Ramsay *et al.*, individuals showed good tolerance to EGF; nonetheless, greater dosages were required for hole closure. Furthermore, Jian-Yang *et al.* discovered in a retrospective analysis that EGF treatment promotes faster healing of traumatic perforations.

Since EGF therapy worked in a few cases, we repeated it. Even while the perforation remained, it was far less serious than before. Djamin *et al.* discovered that EGF contributed to the perforation's closure, if only by reducing its diameter. Similar phenomena was observed by us, and although EGF did not totally seal the gap, it did help to minimize its size. The tympanic membrane's delicate membranous and fibrous makeup makes it prone to tearing when the ear is struck. Patients with traumatic TM perforation typically recover fully in four weeks, making it a frequent medical disease. Surgical repair is necessary for large, painful TM perforations.

Conclusion

TTMP was prevalent in young, middle-aged men, particularly in one ear only, and was frequently brought on by marital abuse. Patients experienced ringing in the ear and ear pain. The majority of the affected tympanic membrane quadrant was antero inferior. Antero inferior quadrant, small perforation size, and early presentation without home intervention were factors favoring good healing; however, some perforations, particularly large perforations involving the posterior quadrant, showed poor healing and necessitated tympanoplasty intervention in such cases.

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Conflict of interest

None

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