# **Original Research Article**

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# Paper patching in traumatic perforation of tympanic membrane

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#### **ABSTRACT**

**Background:** Traumatic perforations are not new for ENT surgeons. The dictum for treatment is to keep the ear dry and leave the tympanic membrane to heal by itself. Most of the time it heals completely, but if it does not, a tympanoplasty is required.

**Methods:** 144 patients of traumatic tympanic membrane perforation, who reported in the outdoor patient department of Otorhinolaryngology, at Dr. D. Y. Patil Medical college, DPU, Pune, were divided in two random groups; Group A was treated with standard treatment while Group B was treated with patching of perforation as an adjuvant to standard treatment. A simple paper, (from the envelop of gel foam) was used for this procedure. The standard taught and performed treatment for a tympanic membrane perforation is administering antibiotics, antihistaminic and anti-inflammatory drugs and keeping the ear dry; leaving the perforation for spontaneous healing.

Results: Group A 75% perforations had healed while in Group B 97.22% perforations healed completely.

**Conclusions:** Paper patching supports the healing tympanic membrane and significantly improves the chances of spontaneous healing thus reducing the requirement of surgical intervention.

Keywords: Paper patching, Traumatic tympanic membrane perforation, Trauma to ear

#### INTRODUCTION

Tympanic membrane has got a major role in hearing as well as in protection of middle ear from external environment. Any trauma to the tympanic membrane may cause a perforation, and if this perforation is not repaired; either spontaneously or by surgical intervention, it may develop into permanent perforation and render the ear prone to develop a suppurative otitis media. Traumatic causes include: penetrating injuries caused by insertion of objects into the ear canal purposely (cotton swabs) or accidentally, concussion caused by an explosion or openhanded slap across the ear, head trauma (with or without basilar fracture), sudden negative pressure (strong suction applied to the ear canal), barotrauma (during air travel or scuba diving), iatrogenic perforation during irrigation or foreign body removal. Spontaneous healing under antibiotic cover with precautions like avoiding entry of water in ear is the most preferred and practiced modality. Surgical repair of tympanic membrane is usually done for perforations which fail to heal by themselves after 2 months of trauma.

Patching of tympanic membrane perforation may enhance the healing process by providing it a support and also limit the chances of infection from external ear.

Some studies have been done for patching the traumatic perforation of tympanic membrane with different materials. In a study done by Camnitz et al on 50 consecutive traumatic perforations over a 3-year period, treated with paper tape patches (3M Micropore), the success rate was 92%. Simsek et al did a similar study and achieved 90.09% healed tympanic membranes with patching while only 74.5% without it. Lou et al in their study found the overall healing rate of 85% in the

spontaneous healing group, lower than that of gel foam patching group 97%.<sup>3</sup>

We have done a study on 144 patients to analyze and compare the use of patching as an adjuvant to the conservative management of traumatic perforation.

#### **METHODS**

A comparative study was done on 144 patients who presented with a traumatic tympanic membrane perforation to the outdoor patient department of Otorhinolaryngology, at Dr. D. Y. Patil Medical College, DPU, Pune during the period from 1st august 2016 to 1st March 2018.

#### Inclusion criteria

All cases who presented to with a traumatic perforation of tympanic membrane (within 5 days of trauma) and had minimal to mild conductive deafness on pure tone audiometry.

#### Exclusion criteria

Patients with discharging ear, patients with ossicular damage or discontinuity, patients who presented after 5 days of trauma, patients with severe head trauma and patients below age 5 years and above age 55 years.

These patients were divided alternately in two groups.

Group A was treated with antibiotics, anti-inflammatory and anti-histaminic medicines. These patients were advised to avoid entry of water in ear, abstain from swimming & avoid forceful blowing of nose. Those who had complaint of coughing were prescribed cough syrups.

Group B was subjected to an adjuvant procedure of patching over tympanic membrane. A sterile paper (of the "envelop" of gel foam) was used for patching.

Patients were asked to follow-up after 2, 4 and 8 weeks for an otoendoscopic examination to access the condition of the tympanic membrane.

#### **RESULTS**

Total 144 patients of age group 5 to 55 years were considered in this study. There were 74 males and 70 females. These patients were divided alternately in two groups.

### After 2 weeks

Group A: 4 patients had discharge in middle ear, while other 68 had a healing tympanic membrane.

Group B: 2 patients had discharge in middle ear. The patch was displaced in 1 which was repositioned. This patient had a deviated nasal septum and complaints of chronic cough. While other 69 had no pathology in external auditory canal and the patch was in position.

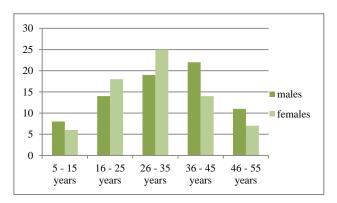


Figure 1: Age and sex distribution of study participants.

These 6 patients might had an infective foci in the ear, which was dormant at the time of their first visit.

#### After 4 weeks

Group A: 3 new patients presented with discharge in middle ear, these patients had developed upper respiratory tract infection. While those 4 patients who previously had discharge were now dry. 43 (59.72%) patients had a completely healed tympanic membrane, while 29 patients still had a healing tympanic membrane (Figure 2).

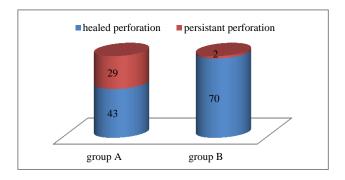


Figure 2: 4 weeks after treatment.

Group B: 2 patients who previously had discharge now had a dry ear; a patch was applied again in these patients, while the other 70 (97.22%) patients had a completely healed perforation (Figure 2).

Group A: 11 more patients of group A had a completely healed tympanic membrane making it to a total of 54 patients (75%). 18 patients had a perforation, including those 7 who had developed ear discharge. These patients had fibrosis along the margins of perforation (Figure 3).

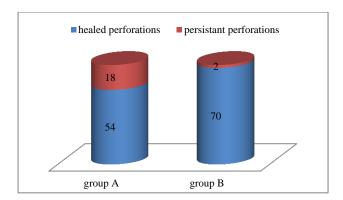


Figure 3: 8 weeks after treatment.

Group B: 2 patients, who had ear discharge, now had a perforation with fibrosis along its margins. Other 70 patients (97.22%) who had a completely healed tympanic membrane in 4<sup>th</sup> week had an intact tympanic membrane (Figure 3).

All of these patients, who had persistent perforation, were subjected to tympanoplasty.

#### **DISCUSSION**

In our study, group B 70 (97.22%) patients had a completely healed tympanic membrane after 4 weeks of the procedure. While in group A, after 4 weeks only 43 (59.72%) patients had a healed tympanic membrane, for another 11 (15.28%) patients, it took almost 8 weeks to heal; making it to a total of only 54 (75%) patients.

Patching provides support to the healing epithelium of tympanic membrane, thus enhancing the healing process. It also protects the middle ear from any infection through the external auditory canal.

One patient of group B, who came with a displaced patch on follow up after 2 weeks, gave history of forceful blowing of nose and coughing. Increased air pressure in the nasopharynx could have caused the air to escape through the Eustachian tube into the middle ear, thus displacing the patch. The patch was repositioned and that perforation too, healed completely.

It was also noted that tympanic membrane failed to heal in 7 patients of group A and 2 patients of group B, who had developed ear discharge. Re-patching was done on 4<sup>th</sup> week in these 2 patients of group B, but still the tympanic membrane didn't healed. Infection hampers the healing process, thus it is necessary to avoid any upper respiratory tract infection.

Lou et al did a similar study, where they used gel foam, the overall healing rate was 85% in the spontaneous healing group, lower than that in the two gelfoam patching groups (97%).while in our study spontaneous healing rate was 75% while with patching it was 97.22%.

result variation might be due to demographic conditions, but patching definitely gives better result.<sup>3</sup>

Various materials have been used for patching, like 3 mm micropore, gel foam, HA ester, growth factor-containing gelfoam etc.; but we preferred to use the simple paper from an envelope of gel foam which we kept in sterile containers when we used gel foam in any ear surgery.<sup>1,3-5</sup>

Sayin et al in their study, used HA ester patching and found that it resulted with earlier closure time but not resulted with higher closure rates.<sup>4</sup>

Paper patching should be tried; at least in perforations smaller than 5 mm before a patient is referred for surgery. Steroid-containing ear drops can inhibit healing and are therefore contraindicated in the treatment of traumatic perforations.

The rate of healing of traumatic tympanic membrane perforation varies inversely with age of patient and size of perforation. But, it is independent of the location of the perforation.<sup>8</sup>

Lou et al did a study & found that patching of traumatic perforation within 1 week after injury did not affect the perforation closure rate.<sup>9</sup>

Healing of the traumatic perforations of tympanic membrane should not invariably be left to chance. A penetrating injury in the postero-superior quadrant may cause damage to the ossicular chain or a perilymphatic leak. Therefore, a careful middle ear examination is necessary to access the damage before starting the treatment.<sup>7</sup>

Even for cases of chronic perforations, the procedure of chemical cautery and patching the tympanic membrane perforation is a very simple and economical technique. <sup>10</sup>

## **CONCLUSION**

Paper patching for a traumatic perforation, dramatically increases the chances of spontaneous healing, significantly limiting the requirement of surgical intervention. It is a very simple OPD procedure; relatively safe, simple and cost effective. A Gel foam is used in every ear surgery and its sterile envelop can be used for this procedure.

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Institutional Ethics Committee

#### **REFERENCES**

1. Camnitz PS, Bost WS. Traumatic perforations of the tympanic membrane: early closure with paper tape

- patching. J Ame Academy Otolaryngol Head Neck Surg. 1985;93(2):220-3.
- 2. Simsek G, Akin I. Early paper patching versus observation in patients with traumatic eardrum perforations: comparisons of anatomical and functional outcomes. J Craniofac Surg. 2014;25(6):2030-2.
- 3. Lou ZC, He JG. A randomised controlled trial comparing spontaneous healing, gelfoam patching and edge-approximation plus gelfoam patching in traumatic tympanic membrane perforation with inverted or everted edges. Clin Otolaryngol. 2011;36(3):221-6.
- 4. Sayin I, Kaya KH, Ekizoğlu O, Erdim I, Kayhan FT. A prospective controlled trial comparing spontaneous closure and Epifilm® patching in traumatic tympanic membrane perforations. Eur Arch Otorhinolaryngol. 2013;270(11):2857-63.
- 5. Lou ZC, Xu L, Yang J, Wu X. Outcome of children with edge-everted traumatic tympanic membrane perforations following spontaneous healing versus fibroblast growth factor-containing gelfoam patching with or without edge repair. Int J Pediatr Otorhinolaryngol. 2011;75(10):1285-8.

- Golz A, Goldenberg D, Netzer A, Fradis M, Westerman ST, Westerman LM, et al. Paper patching for chronic tympanic membrane perforations. Otolaryngol Head Neck Surg. 2003;128(4):565-70.
- 7. Armstrong BW. Traumatic perforations of the tympanic membrane: Observe or repair? The Laryngoscope. 1972;82(10):1822–30.
- 8. Orji FT, Agu CC. Determinants of spontaneous healing in traumatic perforations of the tympanic membrane. Clin Otolaryngol. 2008;33(5):420-6.
- 9. Lou ZC, Hu YX, Tang YM. Effect of treatment at different time intervals for traumatic tympanic membrane perforation on the closure. Acta Otolaryngol. 2011;131(10):1032-9.
- Santhi T, Rajan KV. A Study of Closure of Tympanic Membrane Perforations by Chemical Cauterisation. Indian J Otolaryngol Head Neck Surg. 2012;64(4):389–92.

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