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## **Use of platelet rich fibrin in tympanoplasty: A prospective study**

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**Abstract**---An observation study was undertaken at Department of Otorhinolaryngology, AIMSR from Jan 2021 – Aug 2022. The aim of my study the efficiency of use of autologous platelet rich fibrin membrane along with temporalis fascia in closure of tympanic membrane perforation during tympanoplasty. All the patients attending ENT OPD

at AIMS within the age group of 11-60 years, irrespective of sex with tubotympanic CSOM either unilateral or bilateral were included in this study. In our study of 50 patients, 42 patients had graft uptake and 8 had failure of graft. Through this study we concluded that. The outcome of tympanoplasty does not depend on age and sex, dry ear of more than 6 month has a better graft.

**Keywords**---tympanoplasty, prp, otitis media, dry ear.

## Introduction

Chronic suppurative otitis media is defined as chronic inflammation of the mucoperiosteal lining of the middle ear cleft. It is associated with a persistent or intermittent infected discharge through a non-intact tympanic membrane. It is prevalent in developing countries like India and is more common in lower socioeconomic groups. The incidence is very high among rural population than in urban population. <sup>1</sup> The overall prevalence rate is 46 and 16 persons per thousand in rural and urban population.

Chronic otitis media (COM) is the term that equates with classic term “chronic suppurative otitis media” which is no longer advocated as there is no pus in all case of chronic otitis media. They are now divided into active COM where there is production of pus and inactive COM where there is no pus but can become active at times. <sup>2</sup>

The diagnosis of chronic otitis media implies that there is permanent abnormality of pars tensa or flaccida which results from previous acute otitis media or negative middle ear pressure or otitis media with effusion. The clinical presentation of chronic otitis media varies with severity of infection, host response, and the time course over which it manifests. <sup>3</sup>

Chronic otitis media (COM) is classified as follows:

| Types                  | Synonyms                                | Findings  |
|------------------------|---|---|
| Healed COM             | Tympanosclerosis/<br>healed perforation | Thinning or opacification of pars tensa without perforation or retraction.  |
| Inactive (Mucosal) COM | Perforation                             | Permanent perforation of pars tensa without inflammation of middle ear mucosa.  |
| Inactive(Squamous) COM | Retraction                              | Retraction of pars flaccida or tensa (in the posterosuperior quadrant) that can become active with retained debris.                         |
| Active (Mucosal) COM   |   | Permanent defect in the pars tensa with inflammation of middle ear mucosa that can discharge mucopus  |
| Active (squamous) COM  | Cholesteatoma                           | Retraction of pars flaccida and tensa which has retained squamous epithelial debris and associated with inflammation and production of pus. |

Platelet concentrates have been used extensively by maxillofacial surgeons, plastic surgeons, and orthopedic surgeons to augment wound healing. The different platelet concentrates that have been studied are platelet-rich plasma and platelet-rich fibrin.<sup>4</sup>

Platelet-rich fibrin is a second-generation platelet concentrate, which is rich in platelets, cytokines, growth factors, and leukocytes that are trapped and released over a period. It serves as a resorbable membrane that offers both mechanical and inflammatory protection to the tympanic membrane. It accelerates cell proliferation and matrix remodeling. Being an autologous biomaterial, it does not induce any undesirable tissue reactions. Moreover, it is easy, quick and cheap to produce, and can easily be manipulated during surgical procedures. The role of platelet-rich fibrin in the repair of traumatic tympanic membrane perforation has been studied as well. As it has strong elastic fibers rich with growth factors, it is considered an ideal patch material for tympanic membrane perforation. Leukocytes embedded in the platelet-rich fibrin scaffold also play a role in the release of growth factors, immune regulation, antimicrobial response and matrix remodeling in wound healing.

**Aim:** To study the efficiency of use of autologous platelet rich fibrin membrane along with temporalis fascia in closure of tympanic membrane perforation during tympanoplasty.

### **Material and Methods**

**Setting:** Tertiary Care Hospital

**Duration:** 1 year and 6 months (1 year of data collection and 6 months of follow up) from approval of the Research Committee and Ethics Committee, Adesh University.

**Type of study:** Observational Prospective study.

**SUBJECT:** All the patients presenting to the ENT OPD, AIMSRS with meeting the inclusion criteria.

**Sample size:** All the patients presenting to the ENT OPD, AIMSRS with tympanic membrane perforation within a period of 1 year from the approval of Research committee and Ethics Committee, Adesh University, Bathinda.

**Place:** Department of Otorhinolaryngology

**Inclusion criteria:** Patients presenting to the ENT OPD at AIMSRS, Bathinda with

1. Age 11-60yrs.
2. Sex: Male and Female.
3. Tubotympanic type of Chronic Suppurative Otitis Media [DRY]
4. Unilateral or Bilateral disease.

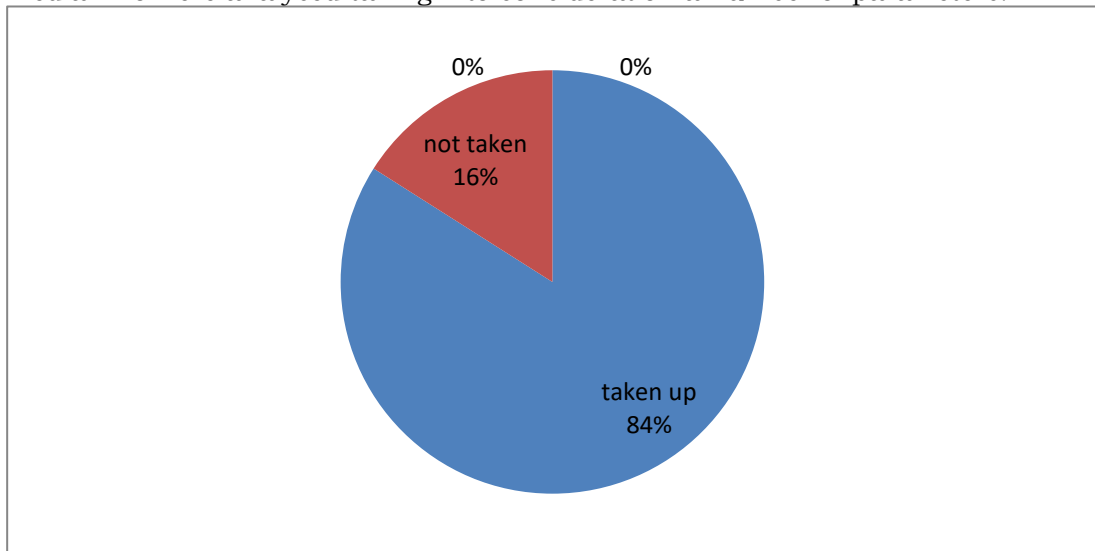
### **Exclusion criteria:**

1. Revision Mastoidectomies.
2. Active mucopurulent discharge.
3. Patient with unsafe or squamosal/Atticoantral type of disease.
4. Patients with external and middle ear abnormalities (congenital or acquired).

5. Patients with SNHL.
6. Medically and surgically unfit patients.
7. Patients unwilling to take part in the study.
8. Patients lost to follow up.
9. Children below 11 years of age as adenoid hypertrophy has significant correlation with COM.<sup>12</sup>
10. Age above 60 years (as there are high chances of comorbid conditions which can effect the results)
11. Active ear disease.
12. Atopic ear conditions.
13. Diabetes mellitus.
14. Other systemic illness like autoimmune disease, active neoplastic disease.
15. Patient on immunosuppressant drugs.

## Results

The study consists of 50 patients with tubotympanic chronic suppurative otitis media who were analysed taking into consideration a number of parameters.



The following are the observations made during our study:

Of the 50 cases who were operated, the age of the patient varied between 18 and 46 years, i.e. the youngest of the patient was 18 years and the eldest was 46 years. 50 cases 30 (60%) patients were female, and 20 (40%) were male, with the ration of 1.5:1 in favour of female. study of 50 cases, 35 cases (70%) belonged to low-income group and 15 cases (30%) belonged to middle income group. None of the patients were in the high-income group. The incidence of bilateral ear discharge was, seen in 26% of the patient, in right ear it was 40%, and in left ear it was 34%. In our study, 22 patients (44%) had mild deafness (26-40 dB) 17 patients(34%) had very slight deafness (16 – 25 dB) and 11 patients (22%) had moderate to severe deafness (> 40 dB).

Out of 50 cases, who had undergone tympanoplasty in our hospital, there was graft take up in 42 cases (84%) and in 8 cases (16%) graft did not take up.

(a) Postoperative hearing gain

| Hearing gain | No. of patients |
|--------------|-----------------|
| < 10 dB      | 03              |
| 10 – 20 dB   | 25              |
| > 20 dB      | 10              |

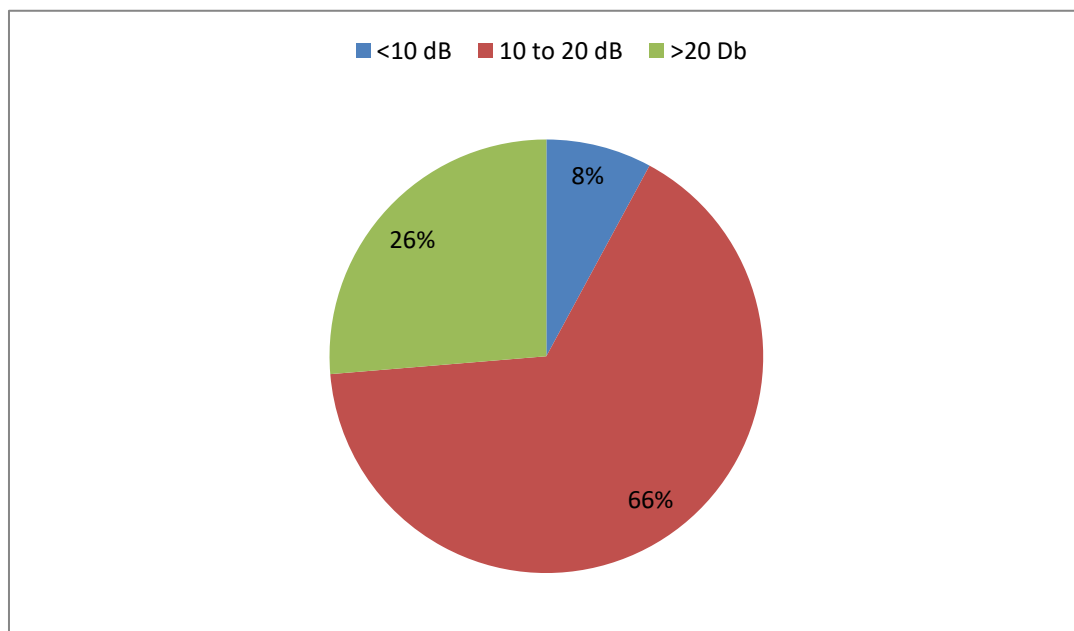


Figure 17: Postoperative hearing gain

(b) Hearing gain

| Pure tone average (mean) |               | Hearing Gain |
|--------------------------|---------------|--------------|
| Preoperative             | Postoperative |              |
| 33.20                    | 16.87         | 16.33        |

### Discussion

Michael and Glasscock et al. (1982)<sup>5</sup> report in their study of 1556 tympanic membrane grafting that there was no difference in take rate of graft based upon age of the patient. In our study of 50 cases, the age of patient varied between 18 and 46 years, the take up rate of graft for different age group was the same, which suggests that age did not make any difference in take rate. This is in keeping with observations of existing literature.

Browning GG (1991)<sup>6</sup> states that there is a close relationship of chronic otitis media and low socio-economic group. Higher incidence is because of poor general

health, malnutrition and overcrowding. In the present study of 50 cases, 35 cases (70%) belonged to low income group. Low income group in our country is associated with ignorance and illiteracy, and thus there is more prevalence of chronic otitis media in this group. Caye–Thomassen et al. (2007)<sup>7</sup> in their study of 26 cases, noted that the mean preoperative pure tone average to be 20.1 dB, the mean postoperative pure tone average of 11.5 dB and thus the mean hearing gain of 8.6 dB. Brown C et al. (2002)<sup>8</sup> in their study of 193 cases of Myringoplasty, the mean pre operative air conduction average was 35 dB while the mean postoperative air conduction average was 25 dB, thus average air conduction improvement was 10 dB. Yung MW (1983)<sup>9</sup> in his review of 100 cases of myringoplasty, showed that the site of perforation affects the degree of hearing loss and the degree of subsequent improvement after myringoplasty. Marginal and malleolar perforations had a greater hearing loss and less postoperative hearing improvement than central and non- malleolar perforations. In our study of 50 cases, the preoperative pure tone average showed that 22 cases (44%) had PTA of 26-40 dB, 17 cases (34%) had PTA of 16 – 25 dB and 11 cases (22%) had PTA of more than 40 dB. The mean being 33.20 dB. The post operative PTA was taken 3 months after the surgery, which shows that, 46 cases (92%) of the total cases in which graft was taken had PTA average gain of more than 10 dB. The postoperative pure tone average mean was 16.87 dB. Thus that hearing gain in our study was 16.33 dB. Michael E Glasscock (1973)<sup>10</sup> in his study of 189 cases of underlay tympanic membrane grafting, there were 173 takes (96%) and seven failures. Michael E Glasscock (1982) in his study of post auricular undersurface tympanic membrane grafting, showed the graft take rate with fascia to be 93%.

Palva T and Vistanen H (1982)<sup>1</sup> in their study of 172 cases, found a number of successfully repaired tympanic membrane of 153 (89%). Albera R et al. (2006) in their study of 212 patients, found a graft take rate of 86% (182 cases). Robert K Jackler, Robert A Schindler (1984)<sup>11</sup> in their study of 48 cases reported a graft take rate of 85.4%. Gibb AG, Chang SK (1982) in their study of 206 cases of myringoplasty employing the underlay technique with temporal fascia reported a Graft take rate of 89.3%. John Mathai (1999) in his study of 200 cases of Myringoplasty, reported 10 cases failure.

In our study of 50 cases of tympanoplasty, all patients underwent postauricular underlay platelet rich fibrin grafting, in which the graft take up was seen in 42 cases and so the graft take rate in our study was 84 %, which very nearly correlates with the quoted literature.

## **Conclusion**

The conclusions drawn from this study are as follows:

- The outcome of tympanoplasty does not depend on age and sex.
- Dry ear of more than 6 months has a better graft take up rate.
- Tympanic membrane with perforation of more than 50% have poor take up rates.
- Site of perforation did not have relevance with graft take up.
- Sclerotic mastoid has poor graft take up.
- Postoperative infection and faulty technique are common reasons for graft failure.

**Informed Consent:** written informed consent was taken from patients.

**Ethical Approval:** ethical committee approval was taken from the Institutional Committee of Ethics (AIMSR/2021/34)

**Source Of Funding:** funding source was self

**Conflict Of Interest:** there was no conflict of interest

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