

# SURGICAL MANAGEMENT OF ADHESIVE OTITIS MEDIA AND OUTCOME

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## **Abstract**

**Introduction:** Tympanic membrane forms an important part of middle ear hearing mechanism. Long standing middle ear inflammation leads to atelectasis of the membrane which gradually results in adhesive otitis media. **Material and methods :** This is a prospective research was done over 50 candidates of adhesive otitis media to study the outcome of the management of adhesive otitis media tympanoplasty with or without canal wall up mastoidectomy. **Results :** Both the group showed comparable results with improvement in hearing and state of middle ear on subsequent long term follow up. **Conclusions :** The outcome of surgical management of adhesive otitis media depends upon patient's factor and surgeon competency. Moreover it depends patient's benefit from different approaches

## **Introduction**

The tympanic membrane represents the lateral wall of the middle ear. It has a great impact on the mechanics of hearing relative to sound transmission and compliance. Due to the continuous inflammatory process in the middle ear, the tympanic membrane retraction ensues which gradually results in retraction pocket formation. When the whole membrane collapses it results in atelectasis. When the atelectatic membrane becomes adherent to the middle ear floor, it is known as adhesive otitis media. Retraction pocket is defined by a retraction of a fragile portion of the tympanic membrane, such as pars tensa or pars flaccida association of retraction pocket. When retraction pocket is present, it is often bilateral. Tympanic membrane retraction pockets are of clinical importance in the pathophysiology of cholesteatoma formation. Depending on several factors, a mild retraction may develop to a retraction pocket and possibly progress into a cholesteatoma. When the normal migration phenomenon of epithelial cells of the retracted area ceases, it predisposes to accumulation of keratin and therefore cholesteatoma formation. Therefore, correct examination and management of retraction pockets are essential in the prevention of middle ear cholesteatoma.

This study was done on 50 patients of adhesive otitis media who were selected after thorough examination. They were randomized by simple randomization method and were allotted two different sets of management plan. Patients were regularly followed up. Later the outcome was recorded after 6 months and results compared statistically in both the groups.

## **Materials and Methods**

All patients diagnosed with adhesive otitis media between 2017 and 2018 were evaluated prospectively. The patient's data were recorded. All patients underwent otomicroscopy, pure tone audiometry (PTA) average of 0kHz, .5kHz, 1kHz, 2kHz and 4kHz frequencies, tympanometry. A computerized tomography (CT) scan was obtained in all patients under-went surgery.

Those patients matching the following criteria were referred to surgery and were object of the study.

**Inclusion criteria:**

1. Adhesive otitis media
2. Grade 4 RP (Sade's classification) with bone erosion, non-controllable RP, non-self-cleansing RP, and recurrent otorrhea.
3. Patients complying for long term follow up

**Exclusion criterion**

1. Cholesteatoma
2. Active discharging ear
3. Patients not giving consent for study upon them.

All patient undersigned an informed consent to procedure and participation to the study. The patients were randomly assigned to two groups:

Group 1. Underwent tympanoplasty plus mastoidectomy

Group 2. Underwent only tympanoplasty

In both groups patients were treated with or without ossiculoplasty, if where there was requirement of ossicular reconstruction. Ossicular chain reconstruction was done with the help of concha graft. Random numbers were given and with the help of Microsoft Excel patients were randomly arranged into two groups. The sample size was calculated with confidence interval of 15% and confidence level of 95%. The result in our population was 50 subjects.

**Surgical technique**

- Tympanic membrane repair with underlay temporalis fascia graft
- Reconstruction using tragal cartilage or fascia graft alone as per the requirement.
- The ossicular chain interruption was restored by partial or total ossiculoplasty.
- A simple mastoidectomy with preservation of the ear canal wall was done in those patients included in the first group.

Clinical examination and medications of patients were done at periodic intervals. The minimum follow-up considered was 12 months.

The outcomes were recurrent Retraction pockets and air bone gap. Surgical operations were considered successful when the tympanic membrane was intact during the 6<sup>th</sup> month follow-up examinations, and ABG closure was considered as secondary outcome.

**Statistical analysis**

Continuous variables were compared using the Mann-Whit-Ney test, and categorical variables were compared by the Chi-Square test. Statistical tests were two-tailed, and a p-value < 0.05 was considered significant.

**Results**

This study was done on 50 patients. This sample size had a confidence level of 95% and a confidence interval of 15%.

The mean age of the patients was 29 years (range 16–50).

All the patients had their pars tensa with adhesion to the promontory and showed some extent of ossicular necrosis .The average pre surgical ABG of the sample was 22.1 dB .The ABG was evidently greater in those patients with greater ossicular chain interruption i.e. 29.3 dB  
The 2 groups of treatment were composed by 25 patients each .

Group 1:Tympanoplasty with Canal wall up mastoidectomy

Group 2:Tympanoplasty

There were no cases of early postoperative complications. Patients were discharged the day after the surgical treatment .Patients were followed up for one ear.

The ABG for all patients changed from a preoperative average of 22.1 dB to a postoperative average of 5 dB, a mean improvement of 13.5 dB.The first subgroup reached a postoperative average ABG of 6 dB, with an average ABG improvement of 13.8 dB. In the second subgroup, a postoperative average ABG of 6.3 dB was obtained, with an average ABG improvement of 13.1 dB .The percentage of ABG improvement was assessed at 60% in those patients treated with mastoidectomy, and 63.3% in those without it; the Chi-squared test did not show a statistically significant difference  $p>0.5$ .Table 1

	Post op ABG	Average ABG improvement
Group A	6	13.8
Group B	6.3	13.1

**Table 1. Post operative ABG averages in decibels**

The tympanic membrane status during follow-up was good in all patients but one patient, from the second group, showed long term complications (14 months) presenting cholesteatoma . In 3 patients, a small tendency to retraction was observed at 20 months of follow-up, but the tympanic membrane was stable over time .

### Discussion

The first staging system proposed by Sade and Berco in 1976, different authors have proposed several other systems [1]. Despite these numerous classifications, there is still a confusing methodology between otologists for the physical assessment of retraction pockets.[2]

In adhesive otitis media, the tympanic membrane is bound partially or totally to the medial wall of the middle ear by fibrous adhesions; consequently, there is no possibility of reversing the retraction by reerating the middle ear. In cases with partial adhesions, there may be serous or mucous effusion in the middle ear. In mild cases, only few adhesions may be present, while in more severely affected ears, the space area of the ME cavity has vanished and the tympano-ossicular system is no longer functional .Adhesive otitis accounts for 3–5 % of operated chronic otitis media [ 3,1]. Bilateral disease is found in 8–21 % of cases [ 5]. Adhesive otitis media is frequently .Bilateral or associated with a contralateral pre-adhesive process. Sometimes, it is Associated with a contralateral cholesteatoma [ 6,7 ]. Cleft palate is associated with an adhesive process in 20 % of cases [ 8,9 ].Recurrent infection of middle ear fluid leads to a progressive destruction of the lamina propria of the tympanic membrane rendering it atrophic and prone to retraction [ 1 ]. Middle ear global dysventilation due to Eustachian tube dysfunction and

inflammatory mucosa leads to a retraction of the whole atrophic TM towards the tympanic cavity with consequent loss of middle ear space, representing adhesive otitis media .

Once adhesions between the TM and middle ear mucosa and ossicles have formed ,treatment is quite difficult. There is no consensus in literature as to the best treatment strategy of adhesive otitis media. Medical treatment is ineffective, and its side effects outweigh any benefit surgical treatment in adhesive otitis media is controversial. It consists of lifting of the adherent skin from the medial wall of the middle ear and reinforcing the ea drum by cartilage after reconstructing the ossicular chain aiming to maintain an air filled tympanic cavity. This procedure carries high risk of inducing iatrogenic cholesteatoma and hearing loss and carries a high rate of failure and it is not advised by most otologists. The improvement of the hearing function is not easy to achieve; therefore, the surgery is not indicated in asymptomatic adhesive otitis with normal hearing. Some clinicians prefer watchful waiting, with their rationale to avoid the potential risk of iatrogenic hearing loss or cholesteatoma in an ear that is often otherwise relatively asymptomatic. Others prefer early intervention in order to limit the risk of ossicular erosion or progression of disease towards cholesteatoma [ 10-15 ].

### Conclusion

The presence of recurrent otorrhea is an absolute indication for intervention . Hearing loss is considered less as an indication to surgery . The risks and benefit of surgery and hearing aid should be discussed with the patient. The surgical treatment of severe cases of end-stage adhesive otitis media is generally not satisfying, and the use of a hearing aid in those patients with extensive ossicular fixation remains the most practical form of therapy. Nevertheless, in cases of adhesive otitis media associated with cholesteatoma, surgery is necessarily indicated. In our study we took to surgical management for repair of grade four tensa retracted tympanic membrane as per Sade 'classification .The hearing outcome was comparable in both the groups . The patients who were gone through mastoidectomy were more satisfied with the results and were have less post operative complications as compared to the ones who underwent just a tympanoplasty ,both the surgeries has its own pros and cons and should be chosen as per patients benefits and surgeon competency in disease removal .

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