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EFFICACY OF SEPTOPLASTY FOLLOWED BY MYRINGOPLASTY IN PATIENTS PRESENTING WITH RECURRENT TUBOTYMPANIC CHRONIC SUPPURATIVE OTITIS MEDIA WITH SEPTAL DEVIATION

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Abstract

Objectives

To determine the efficacy of septoplasty followed by myringoplasty in patients presenting with recurrent tubotympanic chronic suppurative otitis media (CSOM) associated with nasal septal deviation, in terms of graft uptake, hearing improvement, and postoperative ear discharge.

Methodology

This descriptive study was conducted in the Department of ENT, Nishtar Hospital Multan, over six months. A total of 186 patients aged 18–60 years, of both genders, diagnosed with tubotympanic CSOM with septal deviation were included using non-probability consecutive sampling. All selected ears were dry for at least four weeks preoperatively. Patients with uncontrolled hypertension, anaemia, immune-compromised states, traumatic or acute perforations were excluded. All patients underwent septoplasty followed by myringoplasty after six weeks. Postoperative assessment at 12 weeks included graft uptake, hearing improvement measured by air–bone gap on pure-tone audiometry, and presence or absence of ear discharge. Data were analyzed using SPSS version 27.0, and chi-square tests were applied where appropriate.

Results

The mean age of patients was 35.2 ± 10.1 years. Successful graft uptake was achieved in 163 patients (87.6%), while hearing improvement was observed in 158 patients (84.9%). The mean air–bone gap improved from 33.1 ± 6.5 dB preoperatively to 18.9 ± 5.2 dB postoperatively. Overall surgical efficacy was noted in 155 patients (83.3%). Surgical efficacy showed a significant association with the site and size of perforation and duration of disease ($p < 0.05$), while no association was found with gender.

Conclusion

Septoplasty followed by myringoplasty is an effective surgical approach for tubotympanic CSOM with septal deviation, resulting in high graft success and significant hearing improvement. Correcting nasal septal deviation prior to myringoplasty enhances surgical outcomes and should be considered in appropriate patients.

INTRODUCTION

Chronic suppurative otitis media is a chronic inflammation of the middle ear and mastoid cavity, often caused by dysfunction of the Eustachian tube [1, 2]. It is characterized by chronic or persistent ear discharge through a perforated tympanic membrane and can cause acquired hearing loss if left untreated [3, 4]. Tubotympanic disease is characterized by the persistent discharge of fluid from the middle ear through a tear in the tympanic membrane [5]. Surgical closure of tympanic membrane perforations may be necessary if they do not heal spontaneously or through conventional therapy [6, 7]. Tympanoplasty/myringoplasty are surgical procedures that can be used to treat persistent otitis media [8, 9]. Septoplasty may also be necessary to correct any deformities in the nasal septum that can cause reduced tubal function and hinder the success of tympanoplasty. Septoplasty is a surgical procedure that involves correcting any deviations or deformities in the nasal septum to straighten it, allowing improved airflow through the nose. Researchers have found that correcting deformities in the nasal septum through septoplasty can improve the success rate of tympanoplasty in treating tubotympanic type of chronic suppurative otitis media [10, 11]. In the study conducted by Ramakrishna et al. [11] a total of 52 patients were included, and they were randomly divided into two groups with 26 patients in each group. The age range of the patients varied from 17 years as the youngest to 45 years as the oldest. The average age was 24 years for the myringoplasty-only group and 28 years for the septoplasty followed by the myringoplasty group. Among the patients undergoing only myringoplasty, 38.5% were males and 61.5% were females. For patients undergoing septoplasty followed by myringoplasty, 53.8% were males and 46.2% were females. The study reported a graft take-up rate of 84.5% in the septoplasty preceding myringoplasty group and 80.7% in the myringoplasty group. The air-bone gap was reduced to less than 20 dB in 92.3% of the cases. In terms of hearing assessment (efficacy), the septoplasty plus myringoplasty group demonstrated a significant improvement of 61.6%, while the myringoplasty-only group showed a significant improvement of 57.7% [11]. In the study conducted by Khabeer et al., [10] a total of 70 patients were randomly assigned to two groups, with 35 patients in each group. The average age was 24 years for the myringoplasty-only group and 26 years for the septoplasty followed by the myringoplasty group. The overall female-to-male ratio was 1.24:1. Among patients undergoing only myringoplasty, 41% were males and 59% were females. For patients undergoing septoplasty followed by myringoplasty, 48.6% were males and 51.4% were females. The graft success rate was found to be 83.8% in the septoplasty preceding myringoplasty group and 79.4% in the myringoplasty-only group. The myringoplasty-only group showed an 88.2% improvement of 15 dB in hearing, while the septoplasty followed by the myringoplasty group showed a 90% improvement of 15 dB. The septoplasty followed by the myringoplasty group demonstrated a significant improvement (efficacy) of 61.2% in hearing assessment, whereas the myringoplasty-only group showed a significant improvement of 55.9%.

Chronic suppurative otitis media is a common inflammatory condition of the middle ear, which if left untreated can lead to acquired hearing loss. Some patients may have underlying nasal septal deformities, which can lead to reduced tubal function. Studies have shown that correcting these deformities through septoplasty can improve the success rate. Therefore, this study aims to determine the efficacy of septoplasty followed by myringoplasty in treating patients with recurrent tubotympanic chronic suppurative otitis media with septal deviation. The utilization of this study will be to guide surgeons in determining the most effective surgical approach for patients with chronic suppurative otitis media and nasal septal deformities, ultimately improving the overall success rates of the surgical interventions and reducing the risk of acquired hearing loss. To determine the efficacy of septoplasty followed by myringoplasty, in patients presenting with recurrent tubotympanic chronic suppurative otitis media with septal deviation.

It is an inflammatory condition of the middle ear cleft characterized by recurring episodes of significant mucopurulent otorrhea and a progressively developing conductive hearing impairment, persisting for more than 12 weeks. This condition is further characterized by the presence of a deviated

nasal septum (an ENT specialist will visually inspect the nasal passages using a nasal speculum to identify any obvious deviation or irregularities in the nasal septum). The air-bone gap will be measured in decibels by conducting pure-tone audiometry by an Audiologist.To assess graft success, the surgeons would have visually inspected the graft after 12 weeks of the surgical procedure to ensure that it is properly placed and has good contact with the surrounding tissue.

By comparing the pre-intervention and post-intervention audiograms (after 12 weeks of the surgical procedure), an audiologist will determine using PTA whether there has been improvement in hearing (improvement in hearing refers to a positive change in the patients auditory ability following an intervention) as a result of the intervention [12].

Category	%age Improvement
Significant Improvement	>60% Improvement in Hearing
Moderate Improvement	30-60% Improvement in Hearing
Mild Improvement	<30% Improvement in Hearing
No Improvement	No Difference
Worsened	Negative change in Hearing

To assess discharge, the researchers will perform a physical examination of the ear (after 12 weeks of the surgical procedure) to observe any signs of discharge, such as fluid or pus draining from the ear canal. The success would be determined by the absence of any discharge or otorrhea after the surgical procedure. If there is a significant improvement in hearing, the treatment will be considered effective. The size of the perforation will be measured by a consultant ENT specialist having more than five years of experience using thin and transparent plastic paper with imprinted graphs of 1 mm^2 [13].

Methodology

This was a descriptive study conducted in the Department of ENT, Nishtar Hospital Multan, over a period of six months after approval of the synopsis. The sample size of 186 patients was calculated using the WHO sample size calculator, keeping a prevalence of 61.6%, a 95% confidence level, and 7% absolute precision (Annexure). Non-probability consecutive sampling was used. Patients aged 18–60 years, of both genders, who were diagnosed with chronic suppurative otitis media (tubotympanic type) with septal deviation within the last three months were included in the study. Only those patients whose ear to be operated on had been dry for at least four weeks before surgery were selected. This was assessed by an ENT specialist through a thorough clinical examination and review of medical history.

Patients with a history of uncontrolled hypertension or anaemia, as documented in medical records, were excluded due to the potential risk of compromised tissue healing, increased infection rates, and poor postoperative wound healing. Patients with perforations caused by acute suppurative otitis media or traumatic rupture were also excluded. In addition, patients with a history of immune-compromised states, including diabetes mellitus, HIV infection, or use of immunosuppressive drugs, were excluded based on medical records.

After obtaining approval from the hospital ethical committee, informed consent was obtained from all patients or from parents or legal guardians where applicable. Basic data including the patient's name, age, gender, ear involved (left or right), site and size of perforation, pre-operative air–bone gap, and duration of disease were recorded. All patients underwent septoplasty initially, followed by myringoplasty after six weeks. All surgeries and procedures were performed according to standard operating protocols by a single surgical team. All patients received broad-spectrum antibiotics, and a dry aural toilet was performed to remove debris and earwax. Postoperative assessment was carried out 12 weeks after the surgical procedure. The postoperative air–bone gap, hearing assessment, graft success, and

presence or absence of ear discharge were evaluated by a consultant ENT specialist with more than five years of clinical experience. All data were documented on a predefined proforma.

The collected data were entered and analyzed using SPSS version 27.0. Categorical variables, including gender, site of perforation, postoperative hearing assessment, postoperative graft success, postoperative discharge, and efficacy, were presented as frequencies and percentages. Numerical variables, including age, size of perforation, duration of disease, and air–bone gap, were presented as mean ± standard deviation. The Chi-square test was applied to assess the association of efficacy with gender and site of perforation. The data were stratified according to gender, site, size of perforation, and duration of symptoms, and post-stratification comparisons of efficacy, graft success, and postoperative discharge were also performed using the Chi-square test. A p-value of ≤0.05 was considered statistically significant.

RESULTS

A total of 186 patients fulfilling the inclusion criteria were enrolled in this descriptive study conducted in the Department of ENT, Nishtar Hospital Multan over a period of six months. All patients underwent septoplasty followed by myringoplasty after six weeks and were followed up for 12 weeks postoperatively. The mean age of the patients was 35.2 ± 10.1 years, ranging from 18 to 60 years. Males constituted the majority of the study population. The right ear was more frequently involved than the left. Central perforations were the most common, followed by posterior and anterior perforations. The mean size of perforation was 38.6 ± 11.9%, while the mean duration of disease was 15.1 ± 7.3 months. The mean pre-operative air-bone gap was 33.1 ± 6.5 dB.

Table 1: Baseline Demographic and Pre-operative Clinical Characteristics (n = 186)

Variable	n (%) / Mean ± SD
Age (years)	35.2 ± 10.1
Gender	
Male	110 (59.1%)
Female	76 (40.9%)
Ear Involved	
Right	102 (54.8%)
Left	84 (45.2%)
Site of Perforation	
Anterior	52 (28.0%)
Posterior	61 (32.8%)
Central	73 (39.2%)
Size of Perforation (%)	38.6 ± 11.9
Duration of Disease (months)	15.1 ± 7.3
Pre-operative Air-Bone Gap (dB)	33.1 ± 6.5

At 12 weeks postoperatively, successful graft uptake was observed in 163 patients (87.6%), while 23 patients (12.4%) experienced graft failure. Post-operative ear discharge was absent in 170 patients (91.4%). Hearing improvement, defined as a significant reduction in air-bone gap, was noted in 158 patients (84.9%). The mean post-operative air-bone gap improved to 18.9 ± 5.2 dB, showing marked hearing gain compared to the pre-operative status.

Overall surgical efficacy—defined by successful graft uptake, absence of discharge, and improvement in hearing—was achieved in 155 patients (83.3%).

Chi-square analysis showed a statistically significant association between surgical efficacy and site of perforation (p = 0.032), with higher efficacy observed in patients with central perforations. No statistically

significant association was found between gender and efficacy (p = 0.417).

Stratification based on size of perforation and duration of disease revealed that patients with smaller perforations (≤40%) and shorter disease duration (≤12 months) had significantly higher graft success and efficacy ($p < 0.05$). Post-operative discharge was significantly more common in patients with larger perforations and longer disease duration.

Table 2: Post-operative Outcomes and Association with Surgical Efficacy (n = 186)

Outcome Variable	Frequency n (%)	p-value
Graft Success		
Yes	163 (87.6%)	<0.001
No	23 (12.4%)	
Post-operative Discharge		
Absent	170 (91.4%)	0.018
Present	16 (8.6%)	
Post-operative Hearing Improvement		
Improved	158 (84.9%)	<0.001
Not Improved	28 (15.1%)	
Post-operative Air-Bone Gap (dB)	18.9 ± 5.2	—
Overall Surgical Efficacy		
Effective	155 (83.3%)	—
Not Effective	31 (16.7%)	—

Significant improvement in air-bone gap after surgery.High graft success and hearing improvement rates.Site and size of perforation significantly influenced surgical efficacy.Gender had no significant impact on outcomes

DISCUSSION

A total of 186 patients who met the inclusion criteria were enrolled in this descriptive study conducted in the Department of ENT, Nishtar Hospital Multan, over a period of six months. All patients underwent septoplasty followed by myringoplasty after six weeks and were followed for 12 weeks postoperatively. The mean age of the patients was 35.2 ± 10.1 years, with an age range of 18 to 60 years. Males constituted the majority of the study population. The right ear was more commonly affected than the left. Central perforations were the most frequently observed, followed by posterior and anterior perforations. The mean size of perforation was 38.6 ± 11.9%, while the mean duration of disease was 15.1 ± 7.3 months. The mean pre-operative air–bone gap was 33.1 ± 6.5 dB. A study conducted in 2023 reported that failure in tympanoplasty depends on several factors, including persistent upper respiratory tract infection, surgical technique, and patient-related comorbidities. The authors emphasized that proper clinical evaluation is essential to identify and address potential causes of primary surgery failure before revision, and that combining a simple mastoidectomy with revision tympanoplasty can improve success rates [14].In the present study, at 12 weeks postoperatively, successful graft uptake was observed in 163 patients (87.6%), whereas 23 patients (12.4%) experienced graft failure. Post-operative ear discharge was absent in 170 patients (91.4%). Hearing improvement, defined as a significant reduction in the air–bone gap, was noted in 158 patients (84.9%). The mean post-operative air–bone gap improved to 18.9 ± 5.2 dB, indicating a marked hearing gain compared to the pre-operative status. Overall surgical efficacy—defined by successful graft uptake, absence of discharge, and improvement in hearing—was achieved in 155 patients (83.3%). A

study published in 2017 reported that underlay myringoplasty is an effective surgical technique for the repair of tympanic membrane perforations, with favorable outcomes in terms of graft uptake and hearing improvement [15]. Chi-square analysis in the present study demonstrated a statistically significant association between surgical efficacy and site of perforation ($p = 0.032$), with higher efficacy observed in patients with central perforations. No statistically significant association was found between gender and surgical efficacy ($p = 0.417$). Stratification based on size of perforation and duration of disease revealed that patients with smaller perforations (≤40%) and shorter disease duration (≤12 months) had significantly higher graft success rates and overall efficacy ($p < 0.05$). Additionally, post-operative discharge was significantly more common in patients with larger perforations and longer disease duration. A study conducted in 2019 reported that the outcome of myringoplasty does not depend on sex or site of perforation, and that a dry ear for more than six months is a favorable prerequisite for successful surgery. The study also noted that graft uptake was adversely affected in cases of sclerotic mastoid and post-operative infection [16].

CONCLUSION

Septoplasty followed by myringoplasty was found to be an effective surgical approach in patients with tubotympanic chronic suppurative otitis media associated with septal deviation. The procedure resulted in high graft uptake rates, significant improvement in hearing outcomes, and minimal postoperative discharge. Surgical efficacy was significantly influenced by the site and size of tympanic membrane perforation, as well as the duration of disease, while gender had no impact on outcomes. Correcting nasal septal deviation prior to myringoplasty may enhance middle ear ventilation and improve overall surgical success.

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