

## A Study on The Role of Septoplasty in Tubotympanic Diseases And Its Outcomes

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### Abstract

**Introduction:** Chronic otitis media is classified as a tubotympanic disease and is characterized by central perforation. Eustachian tube is the principal focus in middle ear disease. Pathological findings in the nose or the nasopharynx are also responsible for inadequate tubal function.

**Objective:** To evaluate the outcomes of septoplasty followed by myringoplasty and myringoplasty without septoplasty in patients with tubotympanic diseases in terms of Graft uptake, audiological outcome and late complications.

**Materials and Methods:** The study was conducted from January 2012 - January 2014 in the E.N.T department of Gandhi Hospital, Secunderabad. A total of 70 patients who were suffering from tubotympanic diseases were treated with myringoplasty for the treatment of chronic suppurative Otitis Media. The patients were randomly divided in two groups of 35 each and were either treated with myringoplasty alone or septoplasty followed by myringoplasty after 6 weeks.

**Results:** In present study the graft take up was 83.8% in septoplasty preceding myringoplasty and 79.4% in myringoplasty group. Among the patients who underwent myringoplasty only, 88.2 % had a gain of 15 db and 90% had a gain of 15 db in septoplasty followed by myringoplasty group.

**Keywords:** Central Perforation, Hearing Improvement, Myringoplasty, Septoplasty, Tubotympanic CSOM

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### I. Introduction

In the gamut of otitis media, Chronic otitis media is serious as it causes persistent inflammation of mucosa in the middle ear and mastoid cavity and leads to some form of irreversible pathologic condition in the middle ear such as granulation tissue, ossicular changes, tympanosclerosis, tympanic membrane perforation and cholesteatoma.<sup>1</sup> Chronic otitis media is classified as a tubotympanic disease characterized by persistent discharge from middle ear through presence of a central perforation in tympanic membrane. Atticoantral type of otitis media disease is characterized by the presence of attic retraction pocket, marginal perforation with or without cholesteatoma.<sup>2</sup> The main functions of Eustachian tube are middle ear ventilation, clearance, mechanical and immunological defense.<sup>3</sup> Eustachian tube also facilitates communication of the middle ear with the nasopharynx, nasal cavity, and indirectly with paranasal sinuses and dysfunction of ET leads to chronic otitis media.<sup>4</sup> The diameter of Eustachian tube is about 3mm and its length in adults is approximately 36 mm, and is divided into 2 portions, a bony portion which forms the lateral third and is about 12 mm and a fibro cartilaginous part which forms the medial two-thirds. The Eustachian tube in human ear is directed downward, forward, and medially from the middle ear. The tube opens into nasopharynx about 1.25 cm behind and slightly below the posterior end of the inferior turbinate.<sup>5</sup> The fibro cartilaginous part of Eustachian tube which opens into nasopharynx drains the secretions from the middle ear through mucociliary transport (MCT) system and the frequent opening of the Eustachian tube prevents the aspiration of infectious secretions from the rhino pharynx into middle ear cavity.<sup>6</sup> The perforation due to chronic otitis media heals spontaneously in majority of cases. Surgical closure is essential if the perforation fails to heal spontaneously or by conservative therapy. The repaired perforation helps in improving hearing by restoring the vibratory area of the tympanic membrane and by protecting the round window.<sup>7</sup> Tympanoplasty, which is closure of perforation along with ossicular reconstruction of hearing mechanism is the main surgical treatment for tubotympanic disease.<sup>8</sup> Myringoplasty is

closure of perforation of pars tensa of tympanic membrane and this procedure is without manipulation of the ossicles or middle ear.<sup>9</sup>

Many researchers opine that surgery of the nose should be performed before tympanoplasty if septal deviation or hypertrophy of the conchae is seen in a patient with chronic otitis media as any pathology in nose or nasopharynx is responsible for poor tubal function and inadequate tubal function is associated with lower success rate of tympanoplasty in terms of achieving a stabilized trouble free ear.<sup>8</sup> Nasal Septum deviations can be corrected by septoplasty. In septoplasty deformities in the nasal septum are corrected and the nasal septum is straightened which allows better airflow through nose.<sup>9</sup> This study was carried out to corroborate the role of septoplasty in Tubotympanic type of Chronic Suppurative Otitis Media.

## **II. Objective**

To evaluate the outcomes of septoplasty followed by myringoplasty and myringoplasty without septoplasty in patients with tubotympanic diseases in terms of Graft uptake, audiological outcome and late complications.

## **III. Materials and Methods**

**3.1 Study design:** Randomized clinical study to evaluate outcomes of myringoplasty alone and septoplasty followed by myringoplasty. The comparative study was done on following parameters:

1. Graft uptake
2. Audiological outcome
  - a. Closure of AB GAP
  - b. SN hearing loss
3. Late complications
  - a. Re-perforation/ Residual perforation
  - b. Retraction

**3.2 Study area:** Department of Otorhinolaryngology (E.N.T.), Gandhi Hospital, Secunderabad, Telangana

**3.3 Study duration:** 2 years (January 2012 – January 2014). A post-operative follow up period of 2 years was given to each case. The study concluded in 2016.

**3.4 Sample size:** A total of 70 patients were admitted in the hospital requiring myringoplasty for tubotympanic disease during the study period. All the 70 patients were included in the study.

**3.5 Study Population:** All the patients with complaints of ear discharge were screened for otitis media. Patients with tubotympanic disease requiring myringoplasty were included in the study after taking informed consent.

### **3.6 Inclusion Criteria:**

1. Chronic Suppurative Otitis Media - tubotympanic type with central perforation of unilateral and bilateral type with intact ossicular integration and deviated nasal septum.
2. II. Pure tone average between 20-45 db hearing losses.
3. Ear to be operated should be without discharge for at least 4 weeks before surgery.
4. No Sensorineural Hearing Loss (Patient with Adequate Cochlear Reserve)
5. Patients in the age group of 14 – 60 years.

### **3.7 Exclusion Criteria:**

1. Active discharging ear, patient with uncontrolled hypertension, and severe anemia.
2. Perforation caused due to ASOM or Traumatic rupture.
3. Patient with immune compromised states like Diabetes, HIV and/or on Immunosuppressant drugs.
4. Patients <14 years and > 60 years of age

**3.8 Sampling technique:** All the patients requiring myringoplasty were randomly divided into 2 groups by using lottery technique. Group A participants (n=35) were operated by myringoplasty alone using temporalis fascia. Group B participants (n=35) were operated by Septoplasty initially and then after 6 weeks were operated by myringoplasty using temporalis fascia.

**3.9 Examination of study subjects:** In all the study subjects detailed history was elicited and clinical examination of ear, nose and throat was done with special reference to the ear and nose. An otoscopic examination was done to record the site and size of perforation. All findings were confirmed with examination of the ear under microscope. Pure tone Audiometry was performed in the frequencies of 500, 1k, 2k, and 4k. Nose examination was conducted in detail about the septum and turbinate's. Functional nasal examination was

done. X-ray paranasal sinuses were taken. Broad spectrum antibiotics were given to all cases. Dry aural toilet was done to remove debris and wax from the ears.

**3.10 Data analysis:**Data was analyzed using MS excel and SPSS v 17.0. Results are interpreted in terms of percentages and chi square tests of significance was applied wherever required.

**3.11 Ethical Considerations:**Ethical clearance from institutional ethics committee was obtained prior to start of study. Informed consent was taken from all the participants before including them in study.

### III. Observations And Discussion

In the present study 70 cases were enrolled initially of which 5 cases were lost to follow up. Hence, they were excluded from the final results. Of the 65 cases, 34 of the participants belonged to group A (Myringoplasty alone) and 31 belonged to group B (Septoplasty followed by Myringoplasty).

**Table -1 Age Distribution**

AGE GROUP	GROUP I		GROUP II	
	MYRINGOPLASTY		SEPTOPLASTY+MYRINGOPLASTY	
	NUMBER	%	NUMBER	%
14-20 YEARS	5	14.8	8	26
21-30 YEARS	13	38.2	11	35.4
31-40 YEARS	10	29.4	6	19.3
>40 YEARS	6	17.6	6	19.3
<b>TOTAL</b>	<b>34</b>	<b>100</b>	<b>31</b>	<b>100</b>

The youngest patient in our study was 15 years old while the oldest patient was 55 years old. The average incidence was 24 years for only myringoplasty group and 26 years for septoplasty followed by myringoplasty group. The present study findings are similar to a study conducted by Venugopal et al<sup>10</sup> where maximum incidence of Chronic otitis media was found in 21 -30 years of age group. Similar findings were found in a study conducted by S Dhanasekaran et al<sup>11</sup> where maximum incidence of disease was found among 20-30 years of age group.

**Table - 2: Gender Distribution**

Gender	Group I		Group II	
	Myringoplasty		Septoplasty+Myringoplasty	
	Number	%	Number	%
Male	14	41	15	48.4
Female	20	59	16	51.6
<b>Total</b>	<b>34</b>	<b>100</b>	<b>31</b>	<b>100</b>

The overall female to male ratio was 1.24:1. Among the patients undergoing only tympanoplasty, 41% were males and 59% were females. Among the patients undergoing septoplasty followed by myringoplasty, 48.6% males and 51.4% females. Almost equal incidence of disease was found among males and females in a study conducted in Chennai.<sup>10</sup> In another study conducted by Dhanasekaran et al<sup>11</sup> higher incidence was found among males when compared to females in a ratio of 3:2 respectively

**Table - 3: Pre Operative Air- Bone Gap**

pure tone average (db)	Group I		Group II	
	Myringoplasty		Septoplasty +Myringoplasty	
	Total Number	%	Total Number	%
20-25	15	44.2	16	51.6
26-30	12	35.2	10	32.2
>30	7	20.6	5	16.2
<b>Total</b>	<b>34</b>	<b>100</b>	<b>31</b>	<b>100</b>

Among the patients who underwent myringoplasty, 44.2% had air bone gap <25db while 35.2% had a gap of 26 -30db and 20.6% had a gap of more than 30db. In the septoplasty followed by myringoplasty group, 51.6% had <25db air bone gap while 32.2% had gap of 26 -30 db and 16.2% had more than 30 db air bone gap. This findings are different when compared to a study conducted by Grishma Katara, et al<sup>12</sup> where 100% of study population had pre- operative bone gap of >30db.

**Table- 4:** Post Operative Air- Bone Gap

AIR-BONE GAP CLOSURE	GROUP I		GROUP II	
	MYRINGOPLASTY		SEPTOPLASTY + MYRINGOPLASTY	
	TOTAL NUMBER	%	TOTAL NUMBER	%
<10 db	17	50	16	51.6
10-15 db	13	38.2	12	38.7
>15 db	04	11.8	03	9.6
<b>TOTAL</b>	<b>34</b>	<b>100</b>	<b>31</b>	<b>100</b>

p >0.05, NS for UPTO 15 DB and >15 DB

Among the patients who underwent myringoplasty only 88.2 % had a gain of 15 db while 11.8 % had a gain of > 15 db. Of the patients who underwent septoplasty followed by myringoplasty 90% had a gain of 15 db while 10 % had a gain > 15 db. The difference in the post -operative air bone gap among 2 groups was not found to be statistically significant using chi square test of significance. (p >0.05). The present study findings concurred with a study by Girishma Katara et al<sup>12</sup> where majority of patients had a gain of >15db.

**Table-5:** Post Operative Graft Status

Graft Status	group i		Group li	
	myringoplasty		Septoplasty+Myringoplasty	
	total number	%	Total Number	%
Intact (Normal)	15	44.1	18	58.1
Intact (Retracted)	12	35.3	08	25.8
Persistent Perforation	07	20.6	05	16.1
<b>Total</b>	<b>34</b>	<b>100</b>	<b>31</b>	<b>100</b>

p >0.05, NS

The graft uptake rate was 79.4% for myringoplasty only and for septoplasty followed by myringoplasty it was 83.9%. Persistent perforation was seen in 7 cases of myringoplasty only group and 5 cases of septoplasty followed by myringoplasty group. Around 12 cases of myringoplasty only group had retracted tympanic membrane where as in septoplasty followed by myringoplasty group had 8 cases only. The difference in the graft uptake among both the groups was found to be statistically not significant using chi square test of significance. (p>0.05). The present study findings are similar to a study conducted by Aditya MY, Dasgupta KS et al<sup>13</sup> where graft uptake was found to be 84.5% in myringoplasty done after septoplasty.

**Table - 6:** Post Operative Subject IVE Hearing Assessment

Hearing Assessment	Group I		Group II	
	Myringoplasty		Septoplasty+Myringoplasty	
	Total Number	%	Total Number	%
Significant Improvement	19	55.9	19	61.2
Mild Imporvement	10	29.4	9	29.2
No Change	05	14.7	3	9.6
Worsened	0	0	0	0
<b>Total</b>	<b>34</b>	<b>100</b>	<b>31</b>	<b>100</b>

P>0.05, NS

Almost55.9% patients who underwent myringoplasty only had significant subjective improvement in hearing while 29.4% patients had mild improvement. Around 61.2% patients who underwent septoplasty followed by myringoplasty had significant subjective improvement in hearing while 29.2% had mild improvement. The difference in the subjective hearing improvement was not found to be statistically significant using chi square test of significance. (p>0.05). Similar findings were found in a study by Cevat Ucar et al<sup>14</sup> where 92% study participants had hearing improvement following myringoplasty preceded by septoplasty.

#### IV. Conclusions

1. The graft take up was 83.8% in septoplasty preceding myringoplasty and 79.4% in myringoplasty group.

2. In our study success rate was found to be 83.8% in septoplasty preceding myringoplasty and Air bone gap was reduced to <20db in 90% of cases.
3. In present study there was neither worsening of existing conductive hearing loss or development of fresh sensorineural hearing loss after surgery.

### **V. Recommendations**

1. Septoplasty preceding Myringoplasty at least six weeks ahead is effective in tubotympanic disease for achieving dry ear due to good uptake of the graft as well as improvement of hearing.
2. The average period gap between septoplasty and myringoplasty should be at least six weeks.
3. Elimination of Sino nasal disease before ear surgery yields better results.
4. The role of Septoplasty in Tubotympanic Diseases is more fetching in bilateral ear diseases.

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