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A study role of septoplasty in successful outcome of tympanoplasty.

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ABSTRACT

Title of the article: To study role of septoplasty in successful outcome of tympanoplasty.
Aim:
To study role of septoplasty in successful outcome of tympanoplasty.
Objective:
Our Study consists of 60 consecutively presenting adults with nasal septal deviation and otologic pathology who had undergone nasal and otologic procedure at an academic tertiary care medical center.
Method:
Surgical procedures included septoplasty and tympanoplasty with an interval of 6-8 weeks and follow-updone after 3 month with PTA.Our 30 patients were operated for tympanoplasty while remaining 30 patients underwent septoplasty followed by tympanoplasty. The primary outcome measures were tympanic membrane graft survival and hearing improvement. We found that 29 out of 30 tympanic membrane grafts survived at the most recent follow-up who had undergone septoplasty followed by tympanoplasty while 12 out 30 tympanic membrane grafts did not survive in patients whounderwent only Tympanoplasty.
Result:
In patients having nasal pathology were operated for septoplasty followed by tympanoplasty increased success rate of tympanoplasty.

KEYWORDS tympnoplasty, septoplasty

Introduction:
Nose and Middle ear are correlated entities which belong to a system called the rhinopharyngotubal unit or the "unified air space".[1]The key element to middle ear disease, in both physiological and pathological conditions, is the Eustachian tube(ET), whose functions are middle ear ventilation, clearance, and mechanical and immunological defense.[2] The ET opens during swallowing(once permit during waking hours and once every five mins during sleep), chewing and yawning to balance the mucosal reabsorption of air(0.5–1mm^3 per min). The drainage of secretions from the middle ear is carried out by the mucociliary transport (MCT) system, which is localized in the cartilaginous portion of the ET. The functioning of the MCT system of the ET is enhanced by the surface tension lowering substance (STLS), which allows the rolling of the mucus. The periodical opening of the ET fibro-cartilaginous portion prevents the aspiration of inflammatous or infectious secretions from the rhino pharynx.

Chronic suppurative otitis media is worldly prevalent disease with otorrhoea, hearingloss, otalgia causing psychological trauma and financial burden to the society. In an attempt overcome this menace, various techniques of Tympanoplasty have evolved out and from time to time improvisation was done based mainly in terms of hearing improvement and disease free ear.

CSOM is the main indication for tympanoplasty. Tympanoplasty is an operation to eradicate disease in the middle ear and reconstruct the hearing mechanism with or without tympanic membrane grafting.[2] this operation can be combined with either an intact canal wall (ICW) or a canal wall down (CWD). Mastoidectomy to eradicate disease from the mastoid area.

Since the fundamental principles of Tympanoplasty were introduced by Wullstein and Zollner, surgery of the ear has been directed toward the restoration of function as well as providing a stabilized trouble-free ear. This Prospective and observational study is focused on Tympanoplasty and reconstruction of the tympanic membrane and analyses the audiometric pattern of hearing loss in CSOM patients undergoing Tympanoplasty pre-operatively, and assess the outcome of the surgery in terms of improvement in hearing after 3 and 6 months later post- operatively. The Success rate is judged by the standard parameters like the Gain in A–B gap to within 20dB, Gain in Ai r Conduction and Gain in hearing more than15dB post-op-

eratively.

Septoplasty[3] is a surgical procedure to correct defect or deformities of the septum. Nasal septum is the structure between the two nostrils. It is composed of both cartilage and bone. The nasal septum has three functions

1. Support of nose
2. Regulate air flow
3. Support the mucous membrane of the nose.

Materials and Method:
The study was conducted in E.N.T. Department of Shardaben Hospital, Ahmedabad, Gujarat, which is a teaching institute attached to Smt.N.H.L. Municipal Medical College, Ahmedabad, Gujarat. The study was approved by the Institutional Ethics Committee of Smt. N.H.L. Municipal Medical College, Ahmedabad. The study subjects were admitted between June 2012 to May 2013in E.N.T. Department. A purposive sampling method was employed. The study population consists of 60 patients consecutively presenting adults with Nasal septal deviation and otologic pathology.The diagnoses were confirmed clinically by Otorhinologist Author2, Author3 and Author4 before final inclusion into the study. Only patients who consented to participate were included.

Only 60 patients are included in the present study. Our 30 patients operated only for tympanoplasty without deviated nasal septum correction while remaining 30 patients were operated by septoplasty followed by tympanoplasty.

Among the 60 patients, all the 60 patients had tubotympanic disease and had deviated nasal septum. Patient with dangerous perforation (attico antral disease), traumatic perforation,acute infection of nose, patient suffering from Hypertension and diabetes, patients with any malignancy sensorineural type or mixed type hearing were excluded from the study.

All the patients who presented signs and symptoms suggesting CSOM were submitted to an assessment protocol. Supervised by the same examiner based on a guided history, specific physical examination (otoscopy and rhinoscopy), audiogram, haemogram, x-ray B/L Mastoid, xray PNS water's view,nasal endoscopy and CT PNS (whenever indicated) done. Examination under Microscope done to better visualize the tympanic membrane perforation. During history taking the patients were questioned about disease onset, period of time spent without otorrhea, number of otologic infections per year and if they had undergone previous otologic surgery. Routine investigations apart from examination under microscope were done in every case which has provided useful information i.e. perforation size, location according to quadrant (antero-inferior and postero superior) all patients underwent diagnostic nasal endoscopy in order to check nasal conditions, looking for the proper functioning of the Eustachian tube.

The audiometry was done following standard protocol, Pure tone audiometry was done in every selected patient comprising the following frequencies 250, 500, 1000, 2000, 3000, 4000, 6000, 8000 Hz. In all the patients who presented satisfactory clinical control otorrhea and who were the candidates for the surgical procedure which gave an assessment of the degree of hearing loss and its type for calculating of average of hearing loss (air conduction threshold) three frequencies were selected. They were 500, 1000, and 2000 Hz. These frequency range and elevation of threshold in these frequencies will be clinically significant. Pure tone threshold audiometry has become the standard behavioral procedure for describing audiometry sensitivity. Therefore pure tone audiometry had been used for assessment of hearing level in this study.

The operation are performed under local or general anesthesia. In tympanoplasty surgery we used either the temporal muscle fascia or fascia lata graft. After clearing the disease from the middle ear and mastoid, as necessary the status of ossicular chain was assessed. Type of tympanoplasty procedure was planned according to the status of the middle ear and ossicular chain.

In patient with deviated nasal septum and otologic pathology were operated for septoplasty followed by tympanoplasty with interval between two surgeries of 6-8 weeks. Followupdone upto 3 month and after 3 months with PTA.

We used the criteria recommended by the Japan clinical otology committee for calculations of the hearing improvement (Tai, 1998) [4]

- Using the perforation of patients with a postoperative hearing within 40dB as the first criterion.
- Using hearing gain exceeding 15 dB as the second criterion.
- Using postoperative air bone gap within 20 dB asthird criterion.

Our 30 patients operated were operated only for tymanoplasty without deviated nasal septum correction while remaining 30 patients were operated for septoplasty followed by tympanoplasty.

All the results were tabulated and analyzed and compared with other standard studies.

Observation

A period of 12 months was taken in to study. The detailed information regarding age, sex, clinical findings, preoperative air bone gap findings, intra-operative middle ear and ossicular pathology, type of reconstruction and postoperative air bone gap findings were noted.

Table 1: Age distribution (total number of patients n=60)

S.no	Age group	Noof cases	Percentage
I	0-10	0	0
II	11-20	32	53
III	21-30	20	33
IV	31-40	8	13

As shown in table 1 majority of cases were between 11-30 years of the 60 patient.

Table 2:Symptomdistribution(n=60)

S.no	Symptoms	No of patients	Percentage
1	Otorrhoea	60	100
2	Hearing loss	60	100
3	Earache	12	20
4	Vertigo	00	00
5	Tinnitus	6	10

Commonest presenting complaints are ear discharge and hearing loss seen in all the (100%) patients shown in table 2

Table 3: Pre-operative hearing threshold (n=60)

S.no	Air bone gap (In dBs)	Nopatient	Percentage
1	30.1-35	14	23.3
2	35.1-40	17	28.3
3	40.1-45	19	31.6
4	45.1-50	8	13.3
5	>50	2	3.3

In the present study, we observe that 100% patients had hearing threshold more than 30 dB. Majority of patients have come with mild to moderate hearing loss as shown in table 4.

Table 4: Hearing gain in dB post operative (n=60)

S.no	Hearing gain in dB	No of patients
1	0-10	4(6.6)
2	10.1-15	7(11.6)
3	15.1-20	16(26.6)
4	20.1-25	22(36.7)

5	25.1-30	10(16.7)
6	30.1-35	1(1.7)

Majority of patients have been benefited by gaining 15.1-30dB of hearing as shown in table5

Table 5: Postoperative improvement in symptoms

S.no	Symptoms	No of Patients
1	Otorrhoea	47
2	Hearing Gain	47
3	Earache	9
4	Vertigo	00
5	Tinnitus	06

Table 6: Surgical success rate of septoplsty follwed by tympnoplasty(n=30)

S.no	Surgical success rate patient operated septoplasty + tympanoplasty	No of patient	Percentage
1	Perforation Closure only	29	96.67
2	Residual perforation	1	3.33

Table 7: surgical success rate of patients only operated tympanoplasty (n=30)

S.no	Patient only operated tymapnoplasty	No of patient	Percentage
1	Perforation closure	18	60
2	Residual perforation	12	40

Table 8:Result of patients operated Tympanoplasty only and septoplasty followed by Tympanoplasty

Result/ cases	Tympanoplasty only	Tympanoplasty after removal of nasal pathology	Post-operative treatment after tympanoplasty
After 4 weeks	30	30	Combination of antibiotics and decongestants
After 8 weeks	24	29	Decongestants (stop antibiotics after 4 weeks)
After 12 weeks	18	29	No treatment (stop decongest after 8 weeks)

Discussion:

It was observed that the greatest hearing loss was found in the big central perforation. Whereas least in those of the anterior central perforations which matched with other studies also. [5, 6]

Yuns[7] found similar findings that big central and posterior central; perforation had greatest hearing loss compared to other asites of perforation. Reimani[8] had also found similar findings in their study but they concluded it is seen that difference in hearing losses between antero and postero-inferior perforations is appreciable only at lower frequencies.

Many studies on tymanoplasty have found place in the literature with varying success rates[9, 10, 11,12,13,14] it is difficult to compare these studies because of different age groups and subgroups.

The primary outcomes measure were tympanic membrane graft survival and hearing improvement.

We found that 29 out of 30 tympanic membrane grafts survived at the most recent follow up who had undergoneseptoplasty followed bytymanoplasty.While 12 out of 30 grafts did not survive in patients following tymanoplasty in nasal pathology.

We found good results in patient operated for tympanoplasty with septoplasty.

Conclusion &Result:

Tympanoplasty is a beneficial procedure for hearing improvement and the eradication of the disease.There is potential interaction between the middle ear mucosa, Eustachian tube, pharynx and nasal cavities.

We conclude that septoplasty can be safely and effectively performed before tympanoplasty with no increase in the risk of surgical failure.

In patients having nasal pathology were operated for septoplasty followed by tympanoplasty increased success rate of tympanoplasty.

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