Original Research Paper

Volume -10 | Issue - 5 | May - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

ENT

EFFECT OF NASAL SEPTAL SURGERY ON MIDDLE EAR PRESSURE AND HEARING

Dr Gangadhara Somayaji*	MS (ENT) Professor, Department of ENT, Yenepoya Medical College, Mangalore, 575018*Corresponding Author
Dr Jerin Jacob	MS(ENT) Former resident in ENT, Yenepoya Medical College
Dr Nayana VG	Assistant Professor, Department of ENT, Yenepoya Medical College, Mangalore 575018

ABSTRACT **Objective:** This study was conducted in a tertiary care medical centre to find out the effect of septal deviation on hearing status and to know whether corrective procedures on the septum have any effect on the hearing. The study also assessed middle ear pressures before and after the procedure to look for any change. **Materials and methods:**52 patients, aged above 18 years, having symptomatic deviated nasal septum (DNS) were chosen for the study. Pure tone audiometry (PTA) and impedance audiometry were done before the surgery and 6 weeks after the surgery. **Results:** There was no statistically significant difference between the preoperative and postoperative values of PTA. However, the preoperative negative middle ear pressures became less negative or positive which was statistically significant. **Conclusion:** It was found that septoplasty did not affect the hearing status nor DNS can cause hearing loss. However, septoplasty does have an effect on the eustachian tube function.

KEYWORDS : Septoplasty, middle ear pressure, pure tone audiometry, impedance audiometry, Eustachian tube function

INTRODUCTION

Septal deviation presenting with nasal obstruction is a common scenario. It has been proposed that symptomatic deviated nasal septum(DNS) can affect hearing and middle ear ventilation by altering the eustachian tube (ET) function.[1]The dysfunction can be secondary to the sinonasal inflammation and increased secretion from nasal glands which can cause oedema around the tube. The role of ET is to ventilate the middle ear, to drain the secretions and to maintain air pressure in middle ear.[2]Reduced middle ear ventilation can lead to negative pressure development and can cause conductive hearing loss. Several studies have been done regarding this hypothesis and the confusion still persists. Some studies have reported improvement, but few have reported no change.[3,4]Hence, we took up this study to assess the status of patient's hearing and middle ear function by means of PTA and Tympanometry and improvement in patient's ear complaints after septoplasty.

MATERIALS AND METHODS

The study was a controlled prospective study conducted at a tertiary care medical centre over a period of 18 months.Approval was taken from the Institute Ethics Committee. 52 patients aged between 18 to 60years with symptomatic DNS requiring Septoplasty were included in this study after taking written consent from the patients. Patients with active COM, rhinosinusitis, history of ear or nasal surgeries in the past and other causes of nasal obstruction like nasal polyps and allergic rhinitis were excluded from the study.

All the patients included in this study underwent detailed history taking, ENT examination Diagnostic Nasal Endoscopy (DNE), otoendoscopy and other relevant investigations. All these patients underwent pure tone audiometry (PTA) using interacoustics clinical audiometer ac40 for hearing assessment and tympanometry using interacoustics titan series middle ear analyzer for assessment of middle ear function, one day prior to the procedure. These patients then underwent Septoplasty under General Anaesthesia. PTA and impedance audiometry were repeated 6 weeks postoperatively. The Data was transferred to the Microsoft excel sheet for analysis and then analysed with appropriate statistical test using SPSS software 23 version.

Pre operative and 6th week postoperative PTA and middle ear pressure values were compared using paired t test and CHI square tests respectively. p value < 0.05 was found to be statistically significant.

OBSERVATIONS

The youngest patient was 18 years and the oldest was 60 years. 35 patients were between the age group 31-50 years. (67.3%). 12 patients were in the age group 21 to 30 years (23.1%). 37 were males and 15 were females. 18 patients (34.6%) had an associated external deviation. 37 patients (71.1%) had 'S' type of deviation and the remaining had 'C' type of deviation. On otoendoscopy, 33 patients (63.5%) gad grade 1 retraction of the TM on both the sides. 7 (13.5%) cases had air fluid level suggestive of otitis media with effusion (OME), of whom 3 had bilaterally and the remaining 4 had on one side, 3 on the left and one on the right side. Rest of the patients had normal TM. The mean average PTA in the preoperative period was 16.6dB for the right ear and 16.2dB for the left ear. 12 patients with OME and 18 patients with retracted TM had C type of impedance with negative middle ear pressure (mean of -180daPa) and the remaining had normal curve with a mean pressure of 30daPa. There was no significant association with the type or side of DNS. 6 weeks postoperatively, PTA was 16.0 dB for the right ear and 15.7 dB for the left ear. The difference was not statistically significant. However, 9 out of 12 patients who had C type of curve on impedance preoperatively recorded A curve postoperatively which was statistically significant. The mean middle ear pressure was -50daPa in these patients. They had full ness in the ear and ringing sensation preoperatively, which disappeared after the procedure. Out of 4 patients who negative bilateral C curves, only one patient's impedance became normal. Out of 18 patients with retracted TM without any ear complaints who had C type of curve, 15 had A type of curve postoperatively which was again statistically significant. The mean middle ear pressure recorded in these patients was -20daPa.

DISCUSSION

Deviation of the nasal septum is a common cause of unilateral or bilateral nasal airway obstruction.The effect of septal deviation and septoplasty on Eustachian tube function and middle ear pressure is controversial and isn't clear.[5] Some of the studies have found a correlation and hence recommend septoplasty routinely before tympanoplasty. While, certain others do not advocate routine septal correction unless otherwise indicated.

A negative intratympanic pressure as detected by tympanometry has been considered a sign of impairment in tubal function.[6] Our study looked at a possible correlation between septoplasty and middle ear pressure and also at any effect on hearing. From our study, it was clear that septoplasty does not have any effect on hearing. However, it does improve the middle ear pressure and brings it to the normal range.

Diseases of the nose, PNS and nasopharynx can disrupt the functions of the ET[7]. According to Buchman et al, middle ear pressure changes only with bilateral nasal obstruction.[8] In our study, on the contrary, we have observed that even with unilateral nasal obstruction, the pressure was in the negative range with few cases showing 'C'type of curve and the same improving after septoplasty. On the contrary,Sahin et al showed that the middle ear pressure in patients with septum deviation

was within the normal range prior to the operation and remained so after the procedure and that ET function did not change by establishing nasal patency.[7]

Osama S et al showed that there was a positive effect of nasal surgery for nasal obstructionat 30 days postoperatively. There was no significant relation between the laterality of nasal obstruction and the results of middle ear pressure and ET function.[6]These results are similar to that obtained by Salvinelli et al. who did not find a correlation between the side of nasal obstruction and the tympanometry findings.[9]

Nasal obstruction can cause ET dysfunction in three ways. Turbulence in the airflow can cause deposition of microorganisms and air pollutants around the tubal opening, resulting in peri tubal inflammation and mechanical obstruction. The viscosity and surface tension of the mucus may increase because of the drying effects of altered air currents,leading to increased tubal opening pressure. Altered air currents may stimulate the postnasal mechanical receptors around the Eustachian tube, leading to a reflex alteration intubal function[10]

The results of our study showed that septoplasty has an effect on the middle ear pressure which became less negative. These results are similar to those reportedby Low and Williatt[11]However, these results differ from those of Salvinelli et al.[12]who found that there were no significant differences between the results of middle ear pressure in the preoperative and postoperative periods up to the 90th day. In the study done Osama S et al, abnormal type C tympanogram indicative of poor middle ear function which was seen initially in 36% of patients was reduced to 12% after 12weeks post operatively.[6] which correlated with our study.Similar results were obtained by Bonding et al in 1981 and Grady D et al who showed 70% patients had improvement after septoplasty.[13,14] In the study by Nanda et al, septoplasty improved the hearing status which was not the case in our study.[4]

From the above results, it is clear that chronic nasal obstruction is a frequent cause of eustachian tube dysfunction that can lead to middle ear hypoventilation and that surgery for nasal obstruction improves tubal function and middle ear ventilation after the surgical procedure. Hence septoplasty may be performed before tympanoplasty if the middle ear pressures are negative and impedance shows 'C' type of graph.

CONCLUSION

Nasal obstruction has a definite relationship with the tubal function.Septoplasty has a favourable effect on the middle ear pressure. However, there is no correlation with hearing loss. If the preoperative middle ear pressure is negative, septoplasty may be considered before tympanoplasties. Type A tympanogram does not always mean a good tubal function.

REFERENCES

1. González GF, Garabal GT, Torres LT, Guerrero GD, López AD. The Toynbee's phenomenon effect on the middle ear during nasal tamponade. In Analesotorrinolaringologicosibero-americanos 1997;24(4):393-400
2. Bonding P, Tos M. Middle ear pressure during brief pathological conditions of the nose and throat. ActaOtolaryngol1981; 92:63-9
3. Lildholdt T, Courtis J, Kortholm B. The diagnosis of negative middle ear pressure in children. ActaOtolaryngol1980; 89:459-64
4. Nanda MS, Kaur M, Bhatia S. Impact of septoplasty on hearing and middle ear function. Int J Res Med Sci 2018;6(1):1-4
5. Davari R, Behnoud F.Study the Effect of Nasal Obstruction Surgery (Septoplasty) on EustachianTube Function and Middle Ear Pressure.Journal of Ardabil University of Medical Sciences2014;14(4):322-30
6. Osama G, Awada AN, Salamaa YM, El-Badryb M. Effect of nasal obstruction surgery on middle ear ventilation.Egypt J Otolaryngol2014; 30:191-5
7. Şahin MI, Güleç S, Perişan U, Külahlı I. Does Septoplasty Affect Middle Ear Pressure and Eustachian Tube Function?Erciyes Med J 2014;36(3):115-8
8. Buchman CA, Doyle WJ, Swarts JD, Bluestone CD. Effects of nasal obstruction on Eustachian tube function and middle ear pressure. ActaOtolaryngol 1999; 119(3): 351-5.
9. Salvinelli F, Casale M, Greco F, et al. Nasal surgery and Eustachian tubefunction: effects on middle ear ventilation. ClinOtolaryngol 2005; 30:409–13.
10. Farenti G Denaro E. Rhino-pharyngeal disease and tubal disease.Relations and influences. Middle Ear Dis Surg 1992; 12:199–204
11. Low WK, Williatt DJ. The relation between middle ear pressure anddeviated nasal septum. ClinOtolaryngol Allied Sci 1993; 18:308–10
12. Salvinelli F, Casale M, Greco F, et al. Nasal surgery and Eustachian tubefunction: effects on middle ear ventilation. ClinOtolaryngol 2005; 30:409–13
13. Bonding P, Tos M. Middle ear pressure during brief pathological conditions of the nose and throat. ActaOtolaryngol. 1981; 92:63-9.
14. Grady D, Mathias P, Anderson R, Snider G, Sprinkle PM. Improvement of middle ear disease following septoplasty. Am J Otol. 1983; 4:327-31.