EFFECT OF EUSTACHIAN TUBE OBSTRUCTION IN GRAFT UPTAKE RATE IN MYRINGOPLASTY

BIKRAM BUDHATHOKI[1]
AKASH MANI BHANDARI[2]
RAVINDER KUMAR SAXENA [3]
NIVA KANSAKAR[4]

Department of ENT- Head Neck Surgery
Rapti Academy of Health Sciences, Dang ,Nepal[1]

Department of ENT- Head Neck Surgery
Pokhara Academy of Health Sciences, Pokhara[2]

Department of ENT- Head Neck Surgery
Nepalgunj Medical College, Kohalpur, Nepal [3]

Khim Naresh Budhathoki Memorial ENT Dental Care Centre, Dang , Nepal [4]

Corresponding Author
Dr Bikram Budhathoki
Department of ENT- Head Neck Surgery
Rapti Academy of Health Sciences, Dang, Nepal
E-mail: bikki37@gmail.com

ABSTRACT

Objectives:

To observe the effect of eustachian tube obstruction in graft uptake/ rejection rate in myringoplasty.

Materials and methods:

This study was done in Nepalgunj Medical College Teaching Hospital, Kohalpur, Nepal over the period of one year including patients with COM mucosal inactive with age more than 10 years. Standard underlay myringoplasty technique with temporalis fascia graft was used.

Results:

There were total 60 cases, divided in two groups, 30 cases in each. Group 1 consists of patent eustachian tube and Group 2 consists of patients with eustachian tube dysfunction. Graft uptake was seen in 49 patients (81.7%) and rejected in 11 patients (18.33%). Out of 11 rejected cases 5 were from ET patent (GROUP 1) and 6 from ET obstructed (Group 2). Among 49 graft uptake cases, 25 (51.03%) were from Group 1 and 24 (48.97%) were from Group 2. In Group 1 graft uptake was 83% and was rejected in 17%, whereas in Group2 graft uptake was seen in 80% and rejected in 20% which was not statistically significant (p value 0.739).

Conclusions:

There was no significant difference between two groups regarding the graft uptake.

Keywords:

INTRODUCTION

Myringoplasty is a surgical procedure performed to repair tympanic membrane (TM) perforation which helps to prevent future complications of chronic otitis media (COM). Dysfunction of eustachian tube play a very important role in the pathogenesis of chronic suppurative otitis media. A properly functioning eustachian tube is an integral part of a normally functioning middle ear, tubotympanic mucocilliary drainage and constitutes a favorable prognostic factor in the outcome of reconstructive surgery of tympanic membrane, as well as long term prognosis[1]. Hence preoperative test of tubal function seems important for achieving good result of myringoplasty

MATERIAL & METHODS

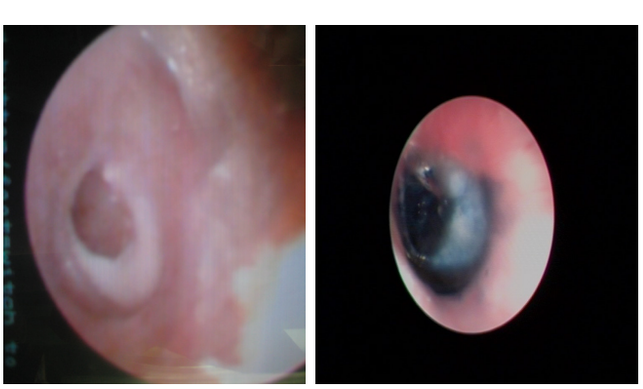
This descriptive cross-sectional study done in Nepalgunj Medical College Teaching Hospital, Kohalpur, Nepal. Ethical clearance was obtained from Institutional Review Board before conducting the study. The study was done for the period of one year from March 2014 to March 2015 including 60 cases, divided in two groups. Group 1: 30 cases with patent eustachian tube, Group 2: 30 patients with eustachian tube dysfunction.

Patients age more than 10 years with COM mucosal inactive were included in the study. Patients with history of myringoplasty in same ear in the past, condition with obvious eustachian tube dysfunction e.g. cleft palate, nasopharyngeal mass, chronic or acute rhinosinusitis and those who could not undergo myringoplasty due to medical or other problems were excluded from the study. The ear canal was cleaned for wax or debris and Otoscopic examination was done , finding was recorded in proforma designed for the purpose. Tuning fork test and pure tone audiometry was done. Informed consent was taken. Examination under microscope was done

on the day of operation in the operation theatre. 0.5ml of 0.25% of sterile Gention violet solution was introduced into the middle ear through the perforation under the microscope. Immediately after the instillation of the dye patent was asked to lie in lateral position with the testing ear upwards for exactly 16 minutes after which the patient was prepared for nasal endoscopy to see for the dye around the Eustachian tube orifice in the nasopharynx. If the Eustachian tube orifice was stained with dye it was labeled as patent and if not was labelled as obstructed cases. After the ET function test, cases were proceeded for myringoplasty.

Standard Underlay myringoplasty were performed. Temporalis fascia was used as graft material. All the patients were discharged on 2nd postoperative day and external auditory canal pack was removed on 6th POD. On the fourth week of surgery patients were called for evaluation of graft uptake. The results were statistically analysed by S.P.S.S. 21 system.

Figure 1: 0.25% Gentian Violet and 18 G Intravenous Cannula fitted over 5ml syringe



BEFORE AFTER

Figure 2: Tympanic membrane perforation before and after instillation of dye.

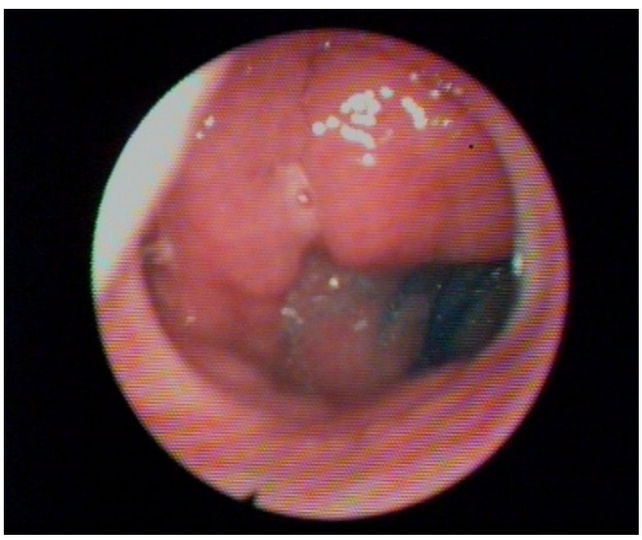


Figure 3: Nasopharyngeal end of eustachian tube stained by Gentian violet

Figure 4: Nasopharyngeal end of obstructed eustachian tube after instillation of dye.

RESULTS

There were total 60 cases included in our study. Thirty patients in each group. Out of 60 patients 33 (55%) were females and 27 (45 %) males. Age of the patients ranged from 10 years to 55 years. Thirty nine (65%) patients had disease in right ear and 21 patients(35%) in left. There were 30 patients in each group with eustachian tube patent (Group 1) and eustachian tube obstructed (Group 2). Graft was seen well uptake in 49 patients (81.7%) and rejected in 11 patients (18.33%). Out of 11 rejected cases 5 were from ET patent (GROUP 1) and 6 from ET obstructed (Group 2). Among 49 graft uptake cases, 25 (51.03%) were from Group 1 and 24

(48.97%) were from Group 2. In Group 1 graft uptake was 83% and rejected in 17% cases , whereas in Group2 graft uptake was seen in 80% and rejection in 20% which was not statistically significant (p value 0.739).

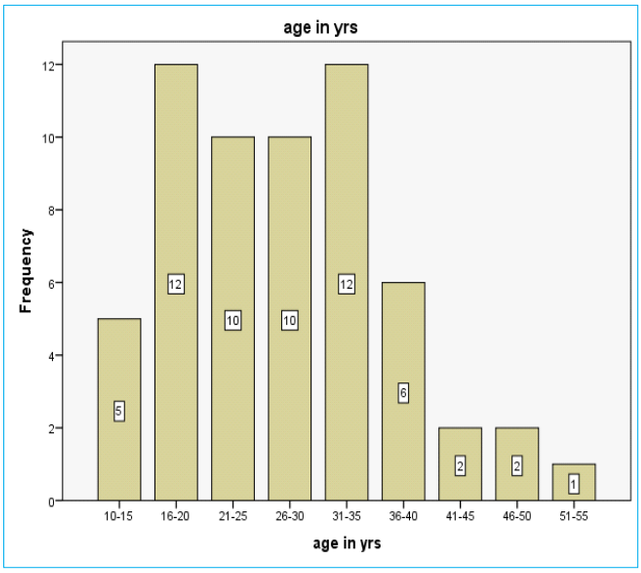


Figure 5 : Age Distribution of patients involved in stud

Table. 1: ET function & graft outcome

Eustachian Tube status	Graft Outcome		Total	P Value
	Rejected	Uptake		
Obstructed	6	24	30	
Patent	5	25	30	0.739
Total	11	49	60	

*P <0.05, Statistically significant

DISCUSSION

Exact cause of failure in myringoplasty performed is not known. However, abnormal eustachian tube function is perhaps most important cause of COM and is the most common cause of failure of middle ear reconstruction procedures.[2] Though the ventilatory function is of paramount importance in determining outcome of surgery for chronic otitis media , the mucocilliary clearance function is also important.[3] Valsalva, politzerization, inflation deflation test mainly evaluate ventilatory function of eustachian tube, but are nonphysiological. Adequate clearance of middle ear hastens healing of the mucosal epithelium; poor drainage yields poor results.[4] Middle ear clearance rests primarily on functionally intact muscular and mucocilliary functions of the eustachian tube.[3] Many research have been done in different parts of the world to evaluate the function of eustachian tube in graft uptake rate in myringoplasty in different age group but the results are variable as per the study.

Several methods have been used in the past to access tubal function, but most of the methods used were complicated, time consuming and expensive. The simpler methods, which are available, are non-physiological and more or less quantitative, indicating anatomical patency of the tube, which does not necessarily mean normal mucocillary function. [5]

We have used Gentian violet 0.25% for the study since it does not have any adverse effect in the middle ear cavity, eustachian tube & pharynx. Gentian Violet has been used in this study because it has been used in other previous studies.[5,6] It is generally considered safe for use even in children and breastfeeding mothers and its property of staining the tissue makes easy detection in nasopharynx. It is used as a medication in middle ear as antifungal and also in granulation tissue. The dilution in present study used was (0.25%) ; less than reported therapeutically(1-2%) hence side effect of the dye is minimal. Besides Gentian violet, other dyes used in different studies were Methylene blue (Prasad et al,2009 [7]), Indigo (Takahashi et al, 2007 [8]) and Flourescein sodium (Sethi et al,2005[9]).

In our study endoscopy was performed 16 minutes after instillation of the dye in the middle ear cavity before labeling as obstructed tube. Same time was used in the study done by Bhatt et al[6]. Prasad et al[7] found the clearance time for methylene blue was 8.1 minutes, while average time appearance of dye in Sen et al[10] study was 2 min 45 sec. Time allowed for dye to reach nasopharynx before labelling "obstructed" in different studies ranges from 10-30 mins. Allowance of longer time however has possibility of getting more false positive result where rather than mucociliary function, the gravity plays role. This is evident if we compared those studies using interval time as 30 min. Obstruction rate was only 5.12% in study done by Takahashi et al [8] where 30 minutes have been used as compared to 32% in Sethi et al [9] study where 10 minutes have been used.

In the present study the graft uptake was in 49 out of 60 patients and 11 had graft rejection in both groups as a whole making uptake rate 81.7%

which was comparable to Yadav et al[11] 81.4% in age group 11-50. Slightly higher success rate of 90% was found in the study done by Niteshore et al[12] in adult age group more than 18 years. Graft uptake rate was 83% among eustachian tube patent group & 80% in obstructed group which are comparable to study by Niteshore et al[1] where graft uptake was seen in 89.3% in patent group.

Definition of successful myringoplasty varies from author to author. We have taken 4 weeks as the follow up period. Yadav et al[11] used period of 4 week to see for the uptake/rejection of graft which is less as compared to 6 months in Singh et al [13] and Kessler et al [14]. Long term outcome could have been commented better and could show better uptake rate . Assessment of hearing related to the myringoplasty surgery was not included as an outcome measure in this present study, which were used by other studies like Niteshore et al[12], Sethi et al.[9]

There were exact no of patient with patent ET tube & obstructed ET Tube in our study. It is in contrast to Sen et al study[10] where 9 out of 50 (18%) patients had obstructed tube. Roychowdhury et al [15] study also had similar result i.e 7/30 (23.3%) Where patient were serially taken for the study and dividing them in obstructed & patent group. The number of cases in both groups were not same as in our study. Methodology was similar with same dye used in all these cases . Obstructed tube was found in 22.1% in Prasad et al [7] and 32% in Sethi et al.[9] Their studies were performed in adults. But in our study we have taken patients of all age groups to eliminate biasness and to compare exact no of cases in either group for statistical significance. Evaluation done by test other than dye tests however shows high proportion of obstructed eustachian tube. Yuceturk et al[16] observed eustachian dysfunction in 71.7% of the CSOM group and it was present only in 34.9% of the control group using pressure equalization test and toynbee test.

We have included only those patients who had regular follow up. The follow up ranged from 3 to 8 weeks. 4 out of 11 rejection cases had infection at follow up (p value =0.01) which points that infection is a cause but not solely responsible for graft failure. Some other factors may play role in the rejection of the graft.

In present study the success rate of graft uptake in patent ET cases was 83% and that in obstructed ET cases was 80% which shows no statistical difference in contrast to Niteshore et al[12] where nonfunctioning of the eustachian tube were a significant determinant for the failure of type 1 tympanoplasty. Another study done by Shreyas. et al[17] in which Eustachian tube function was tested by impedance audiometer, the prognosis of the middle ear reconstructions surgery had direct correlation with Eustachian tube functions. Good Eustachian tube functions are definite prerequisite for obtaining the good prognostic value and vice versa.[17]

Results of the present study to some extent corresponds to the conclusion made by Prasad et al[7] in which stated that the outcome of middle ear surgery would be a success in physiologically normal eustachian tube function, whereas in partial dysfunction the outcome need not necessarily be a failure.

CONCLUSION

There was not significant difference between two groups regarding the graft uptake. To make a routine procedure of eustachian tube function test before performing myringoplasty, further study with larger sample size and long term follow up to access graft uptake is recommended.

REFERENCES

1. Gimenez F, Algarra M (1993)The prognostic value of mucociliary clearance in predicting success in tympanoplasty. J Laryngol Otol 107:895–897
2. Browning G.G. Aetiopathology of inflammatory conditions of the external and middle ear. In: Kerr AG editor. Scott-Brown's Otolaryngology. 6th edition. Oxford: Butterworth-Heinemann, 1997;3/3/8-3/3/26.
3. Nuutinen J, Karja J and Karjalainen P. Measurement of mucociliary function of the eustachian tube. Arch Otolaryngol Head Neck Surg 1983;109(10):669 –72.
4. Bylander GA and Stenstrom C. Eustachian tube function and otitis media in children. Ear Nose Throat J 1988;77(9):762-4.
5. Sheehy JL. Testing eustachian tube function. Indian Journal Of Otology 2000;6(1):3-5.
6. Prasad KC, Hegde MC, Prasad SC and Meyappan H. Assessment of eustachian tube function in tympanoplasty. Otolaryngol Head Neck Surg 2009;

140(6): 889-93

7. Takahashi H, Sato H, Nakamura H, Naito Y and Umeki H. Correlation between middle-ear pressure-regulation functions and outcome of type-I tympanoplasty. Auris Nasus Larynx 2007;34(2):173-6.
8. Sethi A, Singh I, Agarwal AK and Sareen D. Pneumatization correlated to myringoplasty and tubal function. Indian Journal of Otolaryngology and Head and Neck Surgery 2005;57(4):283-6
9. Bhatta R , Guragain R ,Bhusal CL. Evaluation of mucilliary function of eustachian tube in children with chronic otitis media mucosal type.Nepalese Journal of ENT Head & Neck Surgery. Jan-Jun.2011;Volume 2 No1 Issue1
10. Sen S, Guha S, Biswas A and Ghosh LM. A comparative study of methods of evaluating eustachian tube function in chronic suppurative otitis media. Indian J Of Otol 1999; 5(2):67-70.)
11. Yadav L.K. ,Pradhananga J. A stydy of graft uptake rate of myringoplasty in Bir Hospital. Journal of College of Medical Sciences-Nepal. 2011;Vol-7.No-1. 24-27
12. MS Niteshore, Z Rita, Th D Kalpana, NC Mohonish, CL Nicola, H D Priyosakhi. Influence of eustachian tube function in outcome of endoscopic type 1 tympanoplasty. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. March 2014; Volume 13, Issue 3 Ver. II. PP 26-28.
13. A Kessler, WP Potsic and RR Marsh.Type 1 tympanoplasty in children. Arch Otolaryngol Head Neck Surg 1994; 120(5):487-90.
14. Raychowdhury R, Guha S and Ghosh LM. Nasal Endoscopic assessment of eustachian tube patency in chronic suppurative otitis media with central perforation. Indian Journal Of Otology 2000; 6(1): 22-4
15. Joshi ShreyasS.,Jagade Mohan,Agarwal Saurabh, Ahire Dnyaneshwar. Tympanometry, a Prognostic Indicator of Myringoplasty with Assessment of Eustachian Tube Function. International Journal of Otolaryngology and Head & Neck Surgery. 2012; 1. 105-108