VOLUME - 12, ISSUE - 01, JANUARY - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

ENT

A COMPARATIVE STUDY OF MICROSCOPIC TYMPANOPLASTY VERSUS ENDOSCOPIC TYMPANOPLASTY IN MANAGEMENT OF INACTIVE MUCOSAL VARIETY OF CHRONIC OTITIS MEDIA

Dr. Mainak Maitra — Medical Officer (Specialist), Department Of ENT & Head Neck Surgery, IPGMER & SSKM Hospital, Kolkata.

Prof.(Dr.) Indranath Kundu — Professor & HEAD, Department Of ENT & Head Neck Surgery, R G Kar Medical College & Hospital, Kolkata.

KEYWORDS : chronic otitis media, microscopic tympanoplasty, endoscopic tympanoplasty.

INTRODUCTION

Chronic Otitis Media (COM) is defined as the chronic inflammation of the middle ear cleft including the middle ear, mastoid air cell system and the eustachian tube in presence of a permanent abnormality of the pars tensa or flaccida, most likely as a result of earlier acute otitis media, negative middle ear pressure or otitis media with effusion. As COM is not necessarily a result of the gathering of pus, the classic term chronic suppurative otitis media (CSOM) is no longer advocated.

Repair of tympanic membrane perforation was attempted since as early as in the seventeenth century.[1] Several graft materials and techniques have been used with varying success over the centuries. The graft materials included fascia lata, split thickness skin graft, temporalis fascia, vein graft, duramater and tragal perichondrium.[2]

Tympanoplasty is one of the most common procedures among various surgeries for COM. COM can present with dry and wet ear (discharging ear). Operating microscopes have been traditionally used for performing of tympanoplasties and other ear surgeries. With the advent of endoscopes, more precisely tympanoscopes, and the demand for scarless surgeries on the part of the patients, endoscopes are being increasingly used for the above mentioned procedures.

AIMS & OBJECTIVES :

To compare microscopic tympanoplasty versus endoscopic tympanoplasty in terms of :-

1. Technical aspects – operative time, intra-operative findings, need for canaloplasty.
2. Graft uptake – presence of intact neotympanum
3. Hearing benefit in the post-operative period – difference between pre-op average air-bone gap and post-op average air-bone gap.
4. Complications (if any)

MATERIALS AND METHODS :

Inclusion Criteria:

1. Age between 18 to 60 completed years
2. Subjects with central perforation due to COM
3. Subjects with conductive hearing loss with perforated tympanic membrane as evident from pure tone audiometry.
4. Subjects with inactive mucosal COM
5. Duration of disease between 1 to 10 years.

Exclusion Criteria:

1. Subjects with active discharge from ear (mucoid, mucopurulent, purulent)
2. Subjects with squamous variety of COM
3. Subjects with complications of COM including extracranial complications (mastoiditis, mastoid abscess, facial nerve paralysis, labyrinthitis, petrositis) and intracranial complications (extradural abscess, subdural abscess, brain abscess, lateral sinus thrombosis, otitic hydrocephalus, meningitis.)
4. Subjects with mixed or sensorineural hearing loss as evident from pure tone audiometry.
5. Subjects with hypertension, diabetes mellitus, hypothyroidism, cardiac disease, history of cerebrovascular accident.

The patients attending the ENT OPD of a tertiary care hospital during the study period on OPD days of investigator team complying with the inclusion criteria and giving consent to participate in the study were included in the study. The investigator team surgeon planned the procedure type complying with the patient s choice. Investigator only observed the procedure and followed up the patients in the post-operative period. **Group 1** will include patients undergoing **microscopic tympanoplasty** and **Group 2** will include patients undergoing **endoscopic tympanoplasty**. The investigator team surgeon performed all the surgeries. All the surgeries were performed under local anaesthesia. Microscopic tympanoplasties were performed via post-aural approach and the endoscopic tympanoplasties were done via transcanal approach. The investigator kept account of the duration of the procedure. Account regarding intra-operative findings like ossicular status, condition of the incudo-stapedial joint were kept. Ossicular reconstruction was done with PORP/TORP in suitable cases. The patients were followed up in the ENT wards in the immediate post operative period till discharge and at 1 week, 4 weeks, 8 weeks and 3 months after surgery. Post operative pure tone audiometry was done after 3 months of surgery. All pre-operative datas were compared to post operative outcomes. Temporalis fascia graft was used for all the surgeries.

(j) OUTCOME DEFINITION AND PARAMETERS :

1. TECHNICAL ASPECT ---Operative time, intra-op findings like need for canaloplasty, ossicular chain status, condition of incudo-stapedial joint, etc.

2. GRAFT UPTAKE --- Presence of Intact Neotympanum

3. HEARING IMPROVEMENT ---- Difference between pre-op Average Air-Bone(A-B) gap and post-op average Air-Bone(A-B) gap. 48

4. POST-OP COMPLICATIONS (if any)-----vertigo, nausea, vomiting, wound gaping etc.

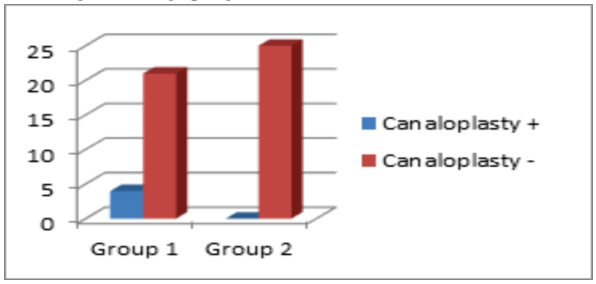

Figure 1

RESULTS AND ANALYSIS :

The mean age of patients in Group 1(undergoing microscopic tympanoplasty) was (35 ± 7.78) years while the mean age of patients in Group 2 (undergoing endoscopic tympanoplasty) was (33.32 ± 6.37) years.

Figure 1 shows that 4 patients in Group 1 needed canaloplasty during the surgery whereas none of the patients in Group 2 needed canaloplasty.

Table 1

Group	Mean ± SD	p-value
1	62.4 ± 4.74	< 0.05*
2	49.96 ± 4.42	

Table 1 shows that the average operative time for patients in Group 1 (undergoing microscopic tympanoplasty) was (62.40 ± 4.74) minutes and that for patients in Group 2 (undergoing endoscopic tympanoplasty) was (49.96 ± 4.42) minutes respectively. This difference was statistically significant (p-value < 0.05).

Wound infection was the most common post-op complication in Group 1 patients (8%) whereas vertigo was the most common post-op complication in Group 2 patients (12%). The differences were statistically insignificant (p-value=0.136).

8% patients (2/25) in Group 1 had a perforation in the neotympanum at 4 weeks in the post-op period whereas all patients in Group 2 had intact neotympanum at 4 weeks post-op period. This difference is statistically insignificant (p-value=0.149).

16% patients in Group 1 and 4% patients in Group 2 had perforation in the neotympanum at 8 weeks follow up in the post-op period. The difference was however statistically insignificant (p-value = 0.157).

80% (20/25) of patients in Group 1 and 88% (22/25) of patients in Group 2 had a successful graft uptake at the end of 12 weeks in the post-op period. The difference between the two groups was statistically insignificant (p-value = 0.440).

The average post-operative hearing gain in Group 1 patients was (6.47 ± 3.86) dB with a median value of 6.67 dB. Moreover post-operative average hearing gain in Group 2 patients was (7.93 ± 3.95) dB with a median value of 6.67 dB. However, the difference between the two groups was statistically insignificant (p-value = 0.267).

DISCUSSION:

In this study, 16 % patients in Group 1 needed canaloplasty during the intra-operative period for proper visualisation of the annulus and the ossicles. But, none of the patients in Group 2 needed canaloplasty. This difference between the two groups was statistically significant (p-value < 0.05). The result was consistent with the study by Jyothi AC et al. where 13.33% (8/60) patients undergoing microscopic tympanoplasty needed canaloplasty during the surgery for removal of the canal wall bulge and none of the patients who underwent endoscopic tympanoplasty required canaloplasty. (p-value<0.05)[3]. These figures also support a study by El Guindy A et al. which revealed that endoscopes can be easily negotiated through tortuous canal thus obviating the need for canaloplasty.[4]

Our study revealed an average operative time of (62.40 ± 4.74) minutes in Group 1 patients undergoing microscopic tympanoplasty. The average operative time in Group 2 patients undergoing endoscopic tympanoplasty was (49.96 ± 4.42) minutes. The difference between the two groups was statistically significant (p-value < 0.05). This result is consistent with the previous studies. Jyothi AC et al[3]. the average time taken for surgery was less in the endoscopic group (1 h) as compared to the microscopic group (2 h). Lakpathi G et al[5] the mean operative duration in endoscopic group (96.32 min) was significantly lower than that in microscopic group (136.09 min). Choi N et al[6] mean operation time of Microscopic Tympanoplasty(MT) (88.9±28.5minutes) was longer than that of the Endoscopic Tympanoplasty(ET) (68.2±22.1minutes) with a statistical significance (*P*=0.002).

In this study, it is seen that majority of the patients in either of the groups did not suffer from any post-operative complications (88% in Group 1 v/s 80% in Group 2). In Group 1, 8% patients suffered from post-operative wound infection whereas 12% patients in Group 2 experienced post-operative vertigo as the main complication. Nonetheless, the numerical difference between the two groups was statistically insignificant (p-value = 0.136).The results were consistent with earlier performed studies. Harugop AS et al[7] differences between the two groups were statistically insignificant in terms of complication rate.

This study shows that 8% of patients in Group 1 suffered from perforation of the neotympanum at 4 weeks in the post-operative period. However, all of the patients in Group 2 had intact neotympanum at 4 weeks in the post-operative period. This numerical difference between the two groups did not carry any statistical significance (p-value =0.149). At 8 weeks post-operative follow up, 4 out of 25 patients(16%) in Group 1 and 1 out of 25 patients(4%) in Group 2 had perforated neotympanum, the difference being statistically insignificant(p-value = 0.157). Moreover, at the end of 12 weeks post-operative follow up, it was seen that the overall successful graft uptake rate of Group 1 patients was 80% and that of Group 2 patients was 88%, the numerical difference being statistically insignificant (p-value = 0.440).Overall when both the two groups were combined, 84% patients (42 out of 50) had a successful graft uptake at the end of 3 months after surgery. The results are consistent with earlier studies. Andersen SA et al.The graft uptake rate was found to be 93.0% at 2 to 6 months[8].Fukuchi I et al. the perforation closure rate was 65%[9]. Jyothi AC et al[3] graft uptake rate was equal between endoscopic and microscopic technique. Plodpai Y et al[10].graft take rates were 96.7% in endoscopic group and 91.2% in the microscopic group. Nassif N et al[11].the intact graft success rate was 82.6% in microscopic and 90.9%in endoscopic approaches. Patel J et al[12].in endoscopic group 72.72% patients while in microscopic group 90% patients showed complete graft uptake. Harugop AS et al[7]82% patients had a successful outcome in endoscopic group and 86% patients had successful outcome in microscopic group.

In this study, it was found that the average post-operative hearing gain in Group 1 was (6.47 ± 3.86) dB and that in Group 2 was (7.93 ± 3.95) dB. The median values in both the goups were 6.67 dB each. The difference in values between the two groups was statistically insignificant (p – value = 0.267). The result was consistent with a study performed by Kaya I et al[13] which revealed that the improvement in air-bone gap for endoscopic and microscopic surgery was (9.48 ± 5.23) dB and (9.89 ± 2.79)dB respectively.

CONCLUSIONS

Tympanoplasty is one of the most common surgeries performed by otolaryngologists on a regular basis because the burden of chronic otitis media in a developing country like India is quite high. Operating microscopes have been traditionally used since the earlier days of the surgery. In this modern era of natural orifice surgeries, endoscopic procedures are gaining more and more popularity. In this study, it was found that microscopic tympanoplasty and endoscopic tympanoplasty yielded similar outcomes. Although , endoscopic tympanoplasty needed less operative

time and no canaloplasty, outcomes with respect to graft uptake, pre-operative A-B gap, post-operative A-B gap and hearing gain were similar with no significant statistical difference. Thus, endoscopic ear surgeries might serve as an equivalent alternative to microscopic ear surgeries in the near future.

REFERENCES:

1. Manolidis S. Closure of Tympanic Membrane Perforations. In: Gulya A J, editor. Glasscock & Shambaugh's Surgery of the ear. 5th ed. BC Decker; 2003. p. 400.
2. Perkins R. Grafting materials and methods in reconstructive ear surgery. Ann Otol Rhinol Laryngol. 1975;84(4 Pt 1):518–26.
3. JyothiAC, ShrikrishnaBH, KulkarniNH, Kumar A.Endoscopic Myringoplasty versus Microscopic Myringoplasty: A comparative study of 120 cases. Indian J Otolaryngology Head Neck Surgery 2017 Sep;69(3):357-362.
4. El-Guindy A. Endoscopic Transcanal Myringoplasty, The Journal Of Laryngology and Otology 1992;106:493-5.
5. Lakpathi G, Sudarshan Reddy L. Comparative study of endoscope assisted myringoplasty and microscopic myringoplasty. Indian J Otolaryngol Head Neck Surg. 2016 Jun;68(2):185–90.
6. Choi N, Noh Y, Park W, Lee JJ, Yook S, Choi JE, et al. Comparison of endoscopic tympanoplasty to microscopic tympanoplasty. Clin Exp Otorhinolaryngol. 2017 Mar;10(1):44–9.
7. Harugop AS, Mudhol RS, Godhi RA. A comparative study of endoscope assisted myringoplasty and micrsoscope assisted myringoplasty. Indian J Otolaryngol Head Neck Surg. 2008 Dec; 60(4):298–302.
8. Andersen SA, Aabenhus K, Glad H, Sorensen MS. Graft take-rates after tympanoplasty: results from a prospective ear surgery database. Otol Neurotol. 2014 Dec;35(10):e292-7.
9. Fukuchi I; Cerchiari DP; Garcia E; Rezende CEB; Rapoport PB.Tympanoplasty: surgical results and a comparison of the factors that may interfere in their success. Rev. Bras. Otorrinolaringol. vol.72 no.2 São Paulo Mar./Apr. 2006.
10. Plodpai Y, Paje N. The outcomes of overlay myringoplasty: endoscopic versus microscopic approach. Am J Otolaryngol. 2017 Sep-Oct; 38(5):542–6.
11. Nassif N, Berlucchi M, Redaelli de Zinis LO. Tympanic membrane perforation in children: endoscopic type I tympanoplasty, a newly technique, is it worthwhile. Int J Pediatr Otorhinolaryngol. 2015 Nov;79(11):1860–4.
12. PatelJ, AiyerRG, GajjarY, GuptaR, RavalJ, SutharPP. Endoscopic Tympanoplasty vs Microscopic Tympanoplasty in Tubotympanic CSOM: a comparative study of 44 cases. Int J Res Med Sci 2015;3(8):1953-7.
13. KayaI, SezginB, SerginD, OzturkA, EraslanS, GodeS, BilgenC, KirazziT; Eur Arch Otorhinolaryngol Jul2017.doi :10.1007/s00405-017-4661-1.