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Comparison of Tympanoplasty Outcomes in Dry and Wet Ears

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ABSTRACT

Introduction: Chronic suppurative otitis media is an inflammatory condition of middle ear with a tympanic membrane perforation which is reconstructed by surgical procedure called tympanoplasty. Discharging ear puts a surgeon in dilemma whether to operate or not. Hence this study intends to compare the hearing outcome and graft uptake rate of tympanoplasty performed in dry and wet ears.

Methods: A prospective cross-sectional study design was conducted in the Department of ENT and HNS, Birat Medical Teaching Hospital, Morang over a 6-month period (January 2023 to July 2023). After approval from the Institutional Review Committee (Ref: IRC-PA-261/2023) and an informed written consent, 76 patients were evaluated, out of which 38 patients had dry ear and 38 had wet ear. Preoperative clinical details along with audiogram were recorded. After 3 months of tympanoplasty, otoscopy and audiogram were done to see the graft uptake and hearing improvement respectively. Data were entered into Microsoft Excel and analyzed using SPSS Version 23.

Results: Out of 38 cases with dry ear, graft uptake was seen in 35 cases (92.10%). Similarly, out of 38 cases with wet ear, there was graft uptake in 34 cases (89.47%). Mean preoperative hearing loss in cases with dry ears was 38.41 (±4.75) dB while 43.4(±5.0) dB in wet ears. Mean post-operative hearing loss was 25.6(±2.75) dB in cases with dry ears while 27.5(±2.25) dB in cases with wet ears. Hearing improvement was achieved in 35 (92.10%) in dry ear and 34 (89.47%) in wet ear. Irrespective of dry or wet ear there is significant change in hearing improvement.

Conclusions: There was no difference in graft uptake and significant improvement in hearing irrespective of dry or wet ear. So mucoid ear discharge or wet ear is not a reason to postpone tympanoplasty.

Keywords: *Hearing; outcomes; tympanoplasty.*

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INTRODUCTION

Chronic suppurative otitis media (CSOM) is an inflammatory lesion of middle ear characterized by recurrent middle ear discharge through a tympanic membrane perforation. [1] It is a common disease affecting 0.5%-30% of people with higher incidence in developing countries because of poor socioeconomic and nutritional status. [2,3] Tympanoplasty is a surgical treatment modality that reconstructs tympanic membrane defect.[4] There may be many factors that influence the success rate of tympanic membrane closure, like size of perforation, duration of ear discharge and presence or absence of infective discharge at the time of surgery. [5] It can be performed on dry or wet perforation. In dry perforation the ear should be dry for at least 6 weeks and tympanic membrane remnant should be in normal color while wet ear means congestion of drum remnants, middle ear mucosa and presence of mucoid. [4]

Controversy exists about the condition of the middle ear as a prognostic factor in tympanoplasty, however, it is believed that an actively draining perforation in tympanic membrane is not a contraindication for ear surgery but discharging ear puts a surgeon in dilemma whether to operate or not. [3]

Hence this study aimed to compare the hearing outcome and graft uptake of tympanoplasty performed in dry and wet ears.

METHODS

This is a prospective cross-sectional study design, conducted in the Department of ENT and HNS, Birat Medical Teaching Hospital, Morang over a 6-month period (January 2023 to July 2023). The approval of the study was taken from the Institutional Review Committee (Ref: IRC-PA-261/2023). Written informed consent was taken from all the patients.

The study population included all patients presenting for tympanoplasty during the study period.

Patient having mixed/sensorineural hearing loss, cholesteatoma, polyps, revision tympanoplasty, ossicular erosion, complications of chronic ear disease, such as meningitis, brain abscess, or lateral sinus thrombosis or any other malignant tumors were excluded from this study.

Consecutive sampling technique was used where all 76 patients undergoing tympanoplasty for perforated tympanic membrane and those that came for follow up after 3 months duration were included in the study. In patients who had bilateral hearing loss, the ear with the greater hearing loss was included in the study. Each case was well examined with otoscope where patient with discharging ear was kept in wet ear group and patients with dry ear was kept in dry ear group. 38 patients were included in dry group and 38 were included in wet group. Preoperative clinical details along with

audiogram was recorded. In patients with multiple complains the first presenting complain that caused the patient to visit the hospital was prioritized and selected. Tympanoplasty was done by the researchers. Post aural approach using underlay technique and temporalis fascia graft was used in all the cases.

Post operatively all patients were given IV Ceftriaxone 1 gm. on first post-operative day following oral Ciprofloxacin 500 mg twice daily, Tab Levocetrizine 5mg per oral HS along with oxymetazoline (0.05%) nasal drop for one week. Mastoid dressing was done on first and third postoperative day as per hospital protocol. Suture removal and umbilical tape pack out was done on seventh postoperative day. Otoscopy and audiogram were done after 3 months of follow up to note the graft uptake and hearing improvement respectively.

Findings were recorded in specifically designed proforma. Data was entered into Microsoft Excel and analyzed using SPSS Version 23, with descriptive and bivariate analyses performed.

RESULTS

A total of 76 patients with age ranging from 9 to 62 years was evaluated out of which 48 (63.2%) were female and 28 (36.8%) were male.

Patients presented to the hospital with complain of ear discharge, decrease hearing, ear pain and tinnitus [Table 1].

Table 1: Presenting symptoms of the patients (n=76)

Symptoms	Frequency	Percentage (%)
Decrease hearing	38	50
Ear discharge	24	31.58
Ear Pain	10	13.16
Tinnitus	04	5.26
Total	76	100

Thirty-eight patients with dry ear and the same number with wet ear were evaluated. Based on the size of tympanic membrane perforation, most of the cases had moderate size perforation. [Table 2].

Table 2: Condition of ear and size of Tympanic membrane perforation (n=76)

Cases	Small	Moderate	Large
Dry Ear	06	22	10
Wet Cases	05	24	09
Total	11	46	19

Slight predominance for right sided disease was noted in 40 cases in comparison to 36 cases that had left sided ear disease. Bilateral perforation was noted in only 4 cases and ear with the greater hearing loss was included in the study.

Graft uptake was assessed after 3 months of surgery. In the present study, out of 38 cases with dry ears, graft uptake was seen in 35 cases (92.10%). Three cases had residual perforation. They also had post-operative secondary infection.

Similarly, out of 38 cases with wet ear, there was graft uptake in 34 cases (89.47%) with four patients having residual perforation. Out of these four cases two had post aural incision site infection. Thus, graft uptake was almost similar in both the cases.

Preoperative hearing loss in cases with dry ears ranged from 30 dB to 49 dB, (mean-38.41±4.75dB) while 32 to 52 dB (mean 43.4±5.0dB) for cases with wet ears.

Post-operative hearing assessment was also done after 3 months by pure tone audiometry (PTA) Hearing loss ranged from (20 to 31 dB) mean 25.6±2.75dB in cases with dry ears while (22 to 31 dB) mean 27.5±2.25dB in cases with wet ears. Success in terms of hearing (hearing at least 10dB) was achieved in 35 (92.10%) in dry ear and 34 (89.47%) in wet ear. Irrespective of dry and wet ear there is significant change in hearing improvement [Table 3].

Table 3: Pre-and post-operative PTA evaluation between wet and dry ear (n=76)

Variables	Mean Pre-operative PTA (SD)	Mean Post-Operative PTA (SD)	p value
Dry ear	38.41(±4.75) dB	25.6(±2.75) dB	p<0.01
Wet ear	43.4(± 5.0) dB	27.5(±2.25) dB	p<0.01

DISCUSSION

There has been uncertainty about successful tympanoplasty, in regards to the condition of the ear. It is commonly believed that the surgery must be done in completely dry ear. As patients commonly present with ear discharge the hassle encountered by patients to postpone surgery. This study was conducted to evaluate the effectiveness of surgery in both dry and wet ears, as well as to compare the outcomes between the two conditions.

A total of 76 patients, out of which 38 with dry ear and 38 with wet ear were evaluated.

In our study, commonest presentation was decrease hearing in contrast to study by Pothala et al, Santhosham et al and Varshney et al where commonest presentation was ear discharge. [4,6,7] This difference may be due to the selection method used as the first presenting complain that caused the patient to visit the hospital was prioritized and selected. These patients in their study including our study had moderate sized perforation in ear.

In our study female predominance was noted, similar to study by Kumararama and Santhosham, along with study by Varshney et al. [6,7] Their study also showed slight predominance of right ear disease similar to that of ours. However, they encountered bilateral disease in about 42% of cases. This side predominance could not be justified.

In our study graft uptake was seen in 92.1% in dry ear and 89.5%in wet ear. However, success of graft uptake was higher (98.5%)in study done by Pothala et al and equal in both dry and wet ears.[4] Study by yang et al showed 92.8% graft success with higher rate in dry ear as compared to wet ear.[8] In contrast , Caylan et al study

showed better healing in discharging ears (100%) as compared to dry ear (75%).[9] This difference may be due to the sample population, as they included only children up to 16 years in their study. Our finding correlated well with the study by Kumararama and Santhosham with success rate of 92% in dry ear and 90% in wet ear as well as with study by Honry et al with success rate of 90.4% and 87.4% respectively. [6,10] The difference in these studies is not statistically significant. The graft used may have affected these minor differences as they used cartilage while we used temporalis fascia.

We evaluated the graft uptake simply by otoscopic examination. However, there are studies where the graft uptake was evaluated by the percentage of fibroblast count like in study by Naveen et al which showed slightly higher graft intake in wet ear compared to dry ear. [11] However the difference in success rate was not significantly different. They attributed the discharging ears to have better results probably due to discharging ears have increase in vascularity of middle ear which could have favored better healing and uptake. Other studies also highlighted the importance of good vascularization and angiogenesis of graft and the ear for better outcomes.[12]

This could explain the better graft uptake in wet ear in study done by Vijayendra et al. [13]

Hearing loss and its improvement was assessed by pure tone audiometric evaluation (PTA) Preoperatively, mean PTA threshold in cases with dry ear was 38.41db and 43.4 db in cases with wet ear. At third month PTA was 25.6 in dry and 27.5 in wet ear. Similar results were seen in study by Naveen et al. [11]

Hearing improvement was achieved in 92.1% in dry and 89.5% in wet ear. As described in many literatures, these results fall within the range of successful tympanoplasty rates (71-96%) as well as successful postoperative hearing improvement (72-97%).[4,14–17]

The limitations of our study was that long term follow up was not done in these patients, so the success rate and hearing outcome may have been affected. The findings cannot be generalized as it was done in limited number of patients and in a limited geographical area. Study done in larger number of patients with follow up at least for year would be better to evaluate the outcomes in both the conditions.

CONCLUSIONS

There was no difference in graft uptake and the difference in hearing improvement in cases of dry and wet ear was also not statistically significant. So, mucoid ear discharge or wet ear is not a reason to postpone tympanoplasty as it has no adverse outcome of operation in regard to graft uptake and hearing improvement.

CONFLICT OF INTEREST

None

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None

REFERENCES

1. Indorewala S, Adedeji TO, Indorewala A, Nemade G. Tympanoplasty Outcomes: A Review of 789 Cases.

Iran J Otorhinolaryngol. 2015 Mar;27(79):101–8. [FULL TEXT]

2. Merchant SN, McKenna MJ, Rosowski JJ. Current status and future challenges of tympanoplasty. Eur Arch Otorhinolaryngol. 1998 May 1;255(5):221–8. [DOI]

3. Bhise SV, Hippargekar P, Kamble SS, Rohe D. Comparative study of type I tympanoplasty in dry and wet ear. MedPulse Int J ENT. 2017;3(2):10–3. [DOI]

4. Pothala H, Shukla S, Khan W, Ramalingam R, Ramalingam K. A Prospective Comparative Study between Dry and Wet Tympanoplasty. Ann Otol Neurotol. 2018 Sep;01(02):083–8. [DOI]

5. Ravishankar C, Dhanapala N, Rajput R. A Review of Results of Type I Tympanoplasty in Active and Inactive Tubotympanic Chronic Suppurative Otitis Media. Res Otolaryngol. 2014;3(5):77–80. [DOI]

6. Kumararama SB, Santhosham KS. A comparative study of the outcome of tympanoplasty in dry and wet ear. Int J Otorhinolaryngol Head Neck Surg. 2021 Mar 24;7(4):603–8. [DOI]

7. Varshney S, Nangia A, Bist S, Singh R, Gupta N, Bhagat S. Ossicular chain status in chronic suppurative otitis media in adults. Indian J Otolaryngol Head Neck Surg Off Publ Assoc Otolaryngol India. 2010 Oct ;62(4):421-26. [DOI]

8. Yang J, Lyu J, Wang Y, Chen B, Xu J, D R. Comparison of Endoscopic Cartilage Myringoplasty in Dry and Wet Ears With Chronic Suppurative Otitis Media. Ear Nose Throat J 2023 Apr;102(4):NP182. [DOI]

9. Calyan R, Titiz A, Falcioni M, De Donato G, Russo A, Taibah A, et al. Myringoplasty in children: factors influencing surgical outcome. Otolaryngol--Head Neck Surg Off J Am Acad Otolaryngol-Head Neck Surg. 1998 May;118(5):709-13. [DOI]

10. Hosny S, El-Anwar MW, Abd-Elhady M, Khazbak A, Feky A. Outcomes of Myringoplasty in Wet and Dry Ears. J Int Adv Otol. 2015 Feb 2;10(3):256–9. [DOI]

11. Naveen K, Jyothi Swarup R, Mohan M, Mereen Susan Roy, Sanjana P. Comparative study of use of dry and wet temporalis fascia Graft in type-1 Tympanoplasty. Res J Med Allied Health Sci. 2019 Dec 31;02(02):6–10. [DOI]

12. Noh H, Lee DH. Vascularisation of myringo-/tympanoplastic grafts in active and inactive chronic mucosal

otitis media: a prospective cohort study. Clin Otolaryngol Off J ENT-UK Off J Neth Soc Oto-Rhino-Laryngol Cervico-Facial Surg. 2012 Oct;37(5):355–61. [DOI]

13. Vijayendra H, Rangam CK, Sangeeta R. Comparative study of tympanoplasty in wet perforation v/s totally dry perforation in tubotympanic disease. Indian J Otolaryngol Head Neck Surg. 2006 Apr;58(2):165–7. [DOI]

14. Sergi B, Galli J, De Corso E, Parrilla C, Paludetti G. Overlay versus underlay myringoplasty: report of outcomes considering closure of perforation and hearing function. Acta Otorhinolaryngol Ital Organo Uff Della Soc Ital Otorinolaringol E Chir Cerv-facc. 2011 Dec;31(6):366–71. [FULL TEXT]

15. Onal K, Uguz MZ, Kazikdas KC, Gursoy ST, Gokce H. A multivariate analysis of otological, surgical and patient-related factors in determining success in myringoplasty. Clin Otolaryngol Off J ENT-UK Off J Neth Soc Oto-Rhino-Laryngol Cervico-Facial Surg. 2005 Apr;30(2):115–20. [DOI]

16. Mills R, Thiel G, Mills N. Results of myringoplasty operations in active and inactive ears in adults. The Laryngoscope. 2013 Sep;123(9):2245–9. [DOI]

17. Mohamad SH, Khan I, Hussain SSM. Is Cartilage Tympanoplasty More Effective Than Fascia Tympanoplasty? A Systematic Review. Otol Neurotol. 2012 Jul;33(5):699. [DOI]