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"Outcome of the Type I Tympanoplasty in dry and wet ear: A comparative study"

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Abstract:
CSOM is very common disease encountered by every otorhinolaryngologist. Inspite of medical management the proper cure is obtained by surgery in almost all cases. Tympanoplasty is the standard surgery which is performed to cover the perforated drum with or without ossiculoplasty. In present study we have compared the results of type 1 Tympanoplasty in 62 patients of dry and wet ears. The success rate was compared in terms of graft uptake, hearing improvement and postop complications. We found that there is insignificant difference in results of both groups, which means the condition of middle ear is not the deciding factor of success in tympanoplasty.

Key words: *Tympanoplasty, CSOM, dry ear, wet ear.*

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I. Introduction:

Chronic Suppurative Otitis Media is chronic inflammation of mucoperiosteal lining of middle ear cleft. It is still a major health problem in developing countries due to poor socioeconomic conditions and nutrition, resulting in higher number cases. It is manifested by recurrent ear discharge, permanent perforation and impaired hearing which may be present for 6 weeks or longer.

Dry central perforation means remnant of Tensa is normal and middle ear mucosa is dry for at least 6 weeks or more. Wet perforation means congested margins, presence of discharge with congestion of middle ear or polypoidal mucosa. Repairing the tympanic membrane perforations by tympanoplasty provides many benefits like closure of perforation, improvement in hearing, cure of recurrent infection and elimination of need to take water precautions.

Tympanoplasty is the most common surgical procedure in treating CSOM but there is always a dilemma to perform it on wet or dry ear. This is due to widespread belief that the success rate is more in dry ears. This study compares the results of tympanoplasty in relation with graft uptake, hearing improvement and post-operative complications etc in wet and dry ears.

II. Material and methods:

Total 62 patients of chronic Otitis media of either sex were selected for the study, over the period of 18 months in the department of otorhinolaryngology from Dr B R A M Hospital Raipur, Chhattisgarh. The inclusion criteria were:

1. Patients of 16 to 50 years of age of both sex, with small, medium and large central perforation were included.
2. 31 patients with dry and 31 with wet ear were selected.
3. Patients with mild to moderate conductive hearing loss without any sensory neural component were included.
4. Patients having good general physical and mental health were included.
5. Patients not having any evidence of active infection in nose, throat and paranasal sinuses were included.

The selected patients were subjected to clinical examination, audiological, radiological and laboratory investigations as required.

The pattern of examination was as follows:

1. Detailed history.
2. General physical and systemic examination.
3. Ear and vestibular examination along with examination of ear under microscope and hearing evaluation using 512 Hz tuning fork.
4. Examination of nose, throat and paranasal sinuses specially for any source of chronic infection.

5. Pure tone audiogram for preoperative hearing assessment with proper masking.
6. Radiological investigations include X Ray mastoid and X Ray paranasal sinuses.
7. Relevant laboratory investigations.
8. Pre-anaesthetic check-up and clearance for surgery.

All the patients with informed and written consent underwent post aural Type 1 Tympanoplasty using temporalis fascia graft by underlay technique. Postoperatively these patients were given oral antibiotic and analgesic for 10 days and antihistaminic and topical nasal decongestant for a period of two weeks. Patient were instructed to avoid heavy weight lifting, use of air plug and Air travel for 4 weeks after surgery. Seventh day after removal of post aural suture cases were followed up on OPD basis on 2^{nd}, 4^{th} and 6^{th} week postoperatively. Otoscopic examination was done to assess the graft status and presence of any infection. Postoperative hearing assessment with pure tone audiometry was done on 12^{th} post-operative week. The presence of any complication was noted and treated simultaneously and accordingly.

III. Results:

Total 62 patient, 31 cases had dry and 31 cases had wet ears. Among them 26 were males and 36 were females. The Maximum number of cases i.e. 25 (40.32%) belonged to age group of 21 to 30 years.

Maximum number of patients 70.96% belonged to middle class, 16.12% and 12.9% patients were from lower and upper socio-economic group respectively. 59.6 8% have unilateral CSOM while 40.32 % had bilateral disease. The chosen side of surgery was worse ear in bilateral diseases.

Maximum number of cases i.e. 35 (56.45%) had medium size perforation out of that 17 (27.41%) were dry and 18 (29.03%) were wet. Large size perforation was present in 10 (16.12%) cases in each dry and wet group. Small size perforation was present in 3 (4.82%) cases in wet and 4 (6.45%) in dry group.

In wet group (31) congestion of perforation margin was present in 18 (29.3%) patients. Mucoid discharge in 9 (14.51%) patients and mucosal hypertrophy of middle ear in 4 (6.45%) patients.

Pre-operatively maximum patients i.e. 43 (in which 22 from dry and 21 from wet group) had hearing threshold between 41-50 dB while 19 patients (9 from dry and 10 from wet group) had 26-40 dB hearing threshold. None had hearing threshold less than 25 dB and more than 55 dB.

More than 25 dB air bone gap was seen in 60 patients i.e. 30 patients in each group and less than 25 dB was seen only in one patient from each group.

After 12 week of postoperative day, 10 patients (5 patients from each group) achieved normal hearing. 44 patients had hearing threshold between 26-40 dB. 24 patients (38.70 %) in dry ear group and 20 patients (32.27%) in wet ear group. Remaining 2 patient from dry ear and 6 patients from wet ear group had hearing loss more than 40 dB.

Air bone gap was less than 25 dB was found in maximum 52 patients i.e. 28 patients in dry and 24 patients in wet ear group. Remaining 10 patients i.e. 3 in dry ear and 7 in wet ear had more than 25 dB air bone gap.

There was statistically insignificant difference between two groups in terms of success rate of graft. (p-value = 0.182). In dry group there was 3 graft failure and in wet group there was 8 graft failure cases. Persistent ear discharge and inflamed post aural stitch were seen in 2 cases from dry and 6 cases from wet group.

Table no. 1 - Size of perforation

Size of perforation	No. of cases		Total
	Dry ear	Wet ear	
Small	04 (6.45%)	03 (4.83%)	07 (11.29%)
Medium	17 (27.41%)	18 (29.03%)	35 (56.45%)
Large	10 (16.12%)	10 (16.12%)	20 (32.26%)
Total	**31**	**31**	**62**

Table no. 2 - Graft Uptake results

Group	Graft uptake Rate	Residual perforation	Total
Dry	28 (90.32%)	03 (9.68%)	31
Wet	23 (74.19%)	08 (25.81%)	31
Total	**51 (82.26%)**	**11 (17.74%)**	**62**

Table no. 3 - Postoperative air bone gap

HL in dB	No of cases		Total
	Dry	Wet	
< 25	28 (90.32%)	24 (77.41%)	52 (83.87%)
> 25	03 (9.68%)	07 (22.58%)	10 (16.13%)
Total	**31**	**31**	**62**

Table No. 4 – Post operative complications

Group	No of cases	
	Dry	Wet
Residual Perforation	03 (9.68%)	08 (25.81%)
Ear Discharge	02 (6.45%)	06 (19.35%)
Stich abscess	02 (6.45%)	06 (19.35%)

IV. Discussion:

Type of tympanoplasty is an established procedure for chronic suppurative otitis media. With advanced microsurgical techniques and equipment, the graft uptake success rate was reported 92- 97%. There are multiple factors which influence the success of surgery. In this study we have compared the results of type 1 Tympanoplasty in dry and wet ear in chronic otitis media patients.

Age is an important non-mastoid factor influencing the outcome of surgery. Failures in children are attributed to adenoid or eustachian tube dysfunction. In our study patients below age of 16 years were excluded and the largest group (40.32%) comprises of patient between 21-30 years of age. The chief complaint was difficulty in hearing.

In our study successful graft uptake was seen in 74.19% cases in wet ears and 90.32% in dry ears and there was no statistically significant difference.

Nagle et al (3) observed 88% success in dry ear while 74% in wet ears giving statistically insignificant P value (0.07). They concluded that presence of discharge at the time of surgery does not interfere with the results.

Hatice Emir and Ceylan et al (4) found 88% success in dry ears and 88.6 % in the discharging ears.

Palva and Ramsay (5) found the success rate by Palva's hand was 97% while with others it was 74%. Hence showing successful closure depends on the expertise of the surgeon.

Shankar et al (6) observed success rate of 88% in dry ear and 80% in wet ear group showing p-value of 0.324. These results are very similar to results of our study.

Adkins WY et al (7) reported overall success rate of 89% and concluded that age of the patient and duration of dry ear had no bearing on the success rate.

Md Zakharia Sarker et al showed that graft uptake in dry ear was 89.36% and in wet ear it was 53.85% and concluded that graft uptake is better in dry ears as compared to wet ear which is contrast to present study.

Nagle SK et al (3) showed primary closure rate of 88% in dry ear and 74% in wet ear. In this study 15 cases had excellent (<10 dB) hearing results, 8 from dry and 7 from wet ears. 66 cases had good (10 - 20 dB) hearing results, out of which 36 were dry and 30 were wet ears. 19 patients had fair (20-30 dB) hearing results, of which 9 were from dry and 10 from wet cases. The hearing improvement between two groups was statistically insignificant. This is comparable with the our study where 9 cases (6 from dry and 3 from wet group) had excellent hearing results, 19 cases (8 from dry and 11 from wet group) have good hearing results 29 cases (16 from dry and 13 from wet group) had fair hearing results and five cases (1 from dry and 4 from wet group) had poor hearing improvements, which are also statistically insignificant.

Hosny et al (8) found hearing gain of 10.3 +/- 6.4 dB in active group while 11.2 +/- 7.8 in inactive group with statistical P value of 0.635 and concluded that discharge has no adverse effect on outcome of surgery which is similar to our study.

Mathai et al (9) noticed a definitive improvement of hearing in all cases that underwent surgery in range of 20 - 30 dB with closure or narrowing of air bone gap except 3 cases where conductive loss persisted.

On 6^{th} and 12^{th} week post-operative follow up, 11 failure cases i.e. 3 in dry and 8 in wet ear had residual perforation due to medialization of graft, it was more frequent in large central perforations.

Vartiainen et al (10) analysed 44 failure cases in 417 myringoplasties. He concluded that necrosis and anterior blunting were the main cause whereas infection were the most common causes of residual perforation. Residual perforation was more frequent in larger perforation. The success rate of tympanoplasty in terms of graft uptake rate and hearing improvement as found in our study was consistent with the results of more studies in the literature.

V. Conclusion:

Type 1 tympanoplasty is the standard surgery to treat chronic otitis media either in active or inactive stage. In our study we found that P value is insignificant in surgical outcomes of both dry and wet ears i.e. graft update rate and hearing improvement. So, the presence of discharge in the ear does not affect the success rate of the surgery.

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