

**EFFECT OF DRY AND WET TEMPORALIS FASCIA GRAFT ON TYMPANOPLASTY
EVENTS IN TERTIARY MEDICAL COLLEGE AND HOSPITAL****Obaidul Islam^{*1}, Md. Jaber-Al-Sayied², Monzurul Islam³ and Prof. Nazmul Islam⁴**¹Assistant Professor, Department of Otolaryngology & Head-Neck Surgery, M Abdur Rahim Medical College, Dinajpur.²Junior Consultant, Department of Otolaryngology & Head-Neck Surgery, Mugda Medical College & Hospital, Dhaka.³Assistant Professor, Department of ENT, M Abdur Rahim Medical College, Dinajpur.⁴Director (CDC), DGHS, Bangladesh.***Corresponding Author: Obaidul Islam**

Assistant Professor, Department of Otolaryngology & Head-Neck Surgery, M Abdur Rahim Medical College, Dinajpur.

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ABSTRACT

Background: Tympanoplasty is the well-established procedure for closure of perforations of tympanic membrane. **Objective:** In this study our main goal is to evaluate the results of dry and wet temporalis fascia graft on tympanoplasty. **Method:** A prospective, randomized, comparative study was carried out at the ENT and pathology departments of Tertiary medical college and hospital from 2017 to 2019. The study sample comprised 80 adult patients of either sex. These patients were selected from the ENT out-patient department, and randomly divided into 2 groups of 40 each for dry and wet graft. **Results:** During the study, in both group most of the patients belong to 32-42 years age group, 58% in dry graft and in wet graft it was 62.5%. According ear status, 70% cases reported ear discharged followed by 57% cases decreased hearing, 38% had ear pain, 20% had tinnitus and 22% cases had ear block. When it comes to fibroblast count findings demonstrate that fibroblast count was significantly higher in the wet graft group. Whereas, while evaluating perforations site in the dry graft group, out of 40 patients, none had anterior, 34 had inferior and 6 had posterior perforations. Success rates of 88.2 per cent and 83.3 per cent were recorded for inferior and posterior perforations, respectively. Where as in wet group Success rates of 66.7 percent, 97.14 per cent and 50 per cent were recorded for anterior, inferior and posterior perforations, respectively. And after evaluation performance in dry graft group successes' rate was 85% where as in wet graft it was 89%. **Conclusion:** From our findings it was found that, age, gender, and moist ear had no effect on tympanoplasty graft uptake. There was no difference in graft absorption between the dry and wet ears, and there was no statistically significant difference in hearing improvement between the dry and wet ears. These conclusions are based on our limited experience and are offered to stimulate debate and future study on the issue.

KEYWORDS: Tympanoplasty, temporalis fascia graft.**INTRODUCTION**

Tympanoplasty is a surgery to repair the eardrum. The eardrum is a thin layer of tissue that vibrates in response to sound.^[1]

In today's world temporalis fascia has become the most widely used graft for tympanoplasty, as it is strong, durable, and easy to procure and handle. History behind this issue quite usual then expected.

Tympanic membrane perforation is a sequela of otitis media, and results mainly from middle-ear infection, trauma or iatrogenic causes.^[2]

Traumatic tympanic membrane perforations tend to heal spontaneously, while tympanic membrane perforations associated with chronic suppurative otitis media usually fail to heal and may require tympanoplasty.^[3]

In 1960, Hermann introduced the use of a temporalis fascia graft in tympanoplasty. Since then, it has become the most widely used graft for tympanoplasty, as it is strong, durable, and easy to procure and handle.^[3,4]

It has the added advantages of a low metabolic rate and high collagen content.

However, the type of temporalis fascia graft to use (i.e. dry or wet) remains controversial. Some otologists prefer to harvest a temporalis fascia graft after elevating the tympanomeatal flap, just before graft placement in the middle ear.^[5]

One study has suggested that better rates of closure are achieved using fresh, undried (wet) fascia because it is more 'viable'.^[6]

Advocates of fresh fascia argue that the survival of cellular elements, notably fibroblasts, is important in improving the survival of the grafted area, postulating that they play an active role inlaying down collagen for the reparative process. The relative thickness and lack of form of fresh fascia, however, make it harder to position grafts precisely compared with parchment-like dried fascia.^[7]

Consequently, others favour harvesting the graft before the middle-ear procedure, and drying it with a hair dryer or via dehydration in anhydrous alcohol (dried fascia). Advocates of dried fascia argue that the fascia serves merely as a framework for the migration of epithelium over the perforation.^[8]

In this study our main goal is to evaluate the results of dry and wet temporalis fascia graft on tympanoplasty.

OBJECTIVE

To evaluate the results of dry and wet temporalis fascia graft on tympanoplasty.

METHODOLOGY

A prospective, randomized, comparative study was carried out at the ENT and pathology departments of Tertiary medical college and hospital from 2017 to 2019.

The study sample comprised 80 adult patients of either sex. These patients were selected from the ENT out-patient department, and randomly divided into 2 groups of 40 each for dry and wet graft.

Patients in one group underwent underlay tympanoplasty with a dry graft, whereas those in the other group underwent underlay tympano-plasty with a wet graft.

The following inclusion criteria were adopted in this study: the provision of informed consent, patients with chronic suppurative otitis media (mucosal type), those with a perforation in the pars tensa for a minimum period of six months, patients with a dry ear for a period of at least four weeks and an air–bone gap below 30 dB. Patients with cholesteatoma, granulation tissue in the ear, a history of previous ear surgery, only one hearing ear or hearing loss not in proportion to the perforation size were excluded from the study. All the cases were subjected to a detailed clinical investigation. Specifically, relevant history and clinical examination were meticulously recorded in a proforma. Hearing was evaluated using pure tone audiometry, at frequencies of 0.5, 1, 2 and 3 kHz. All patients under-went routine tests for pre-anesthetic check-up.

All collected data were coding and input in SPSS-25 for further analysis. Both descriptive and inferential statistics done. Descriptive statistics included frequency distribution, percent, mean, standard deviation; graph, tables, figures and inferential statistics.

RESULTS

In table-1 shows age distribution of the patients where in both group most of the patients belong to 32-42 years age group, 58% in dry graft and in wet graft it was 62.5%. The following table is given below in detail:

Table-1: Age distribution of the patients.

	Dry graft group, n=40	Wet graft group, n=40
21-31 years	24%	20.8%
32-42years	58%	62.5%
>43years	18%	16.7%
Total	100.0	100.0

In figure-1 shows gender distribution of the patients where in dry graft group male and female percentage was

54% and 46% whereas in wet graft group it was 52% and 48%. The following figure is given below in detail:

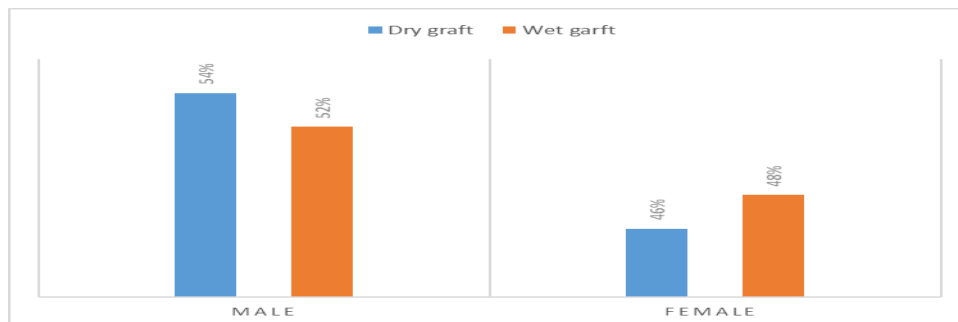


Figure-1: Gender distribution of the patients.

In figure-2 shows distribution of the patients according ear status where 70% cases were ear discharged followed by 57% cases decreased hearing, 38% had ear pain, 20%

had tinnitus and 22% cases had ear block. The following figure is given below in detail:

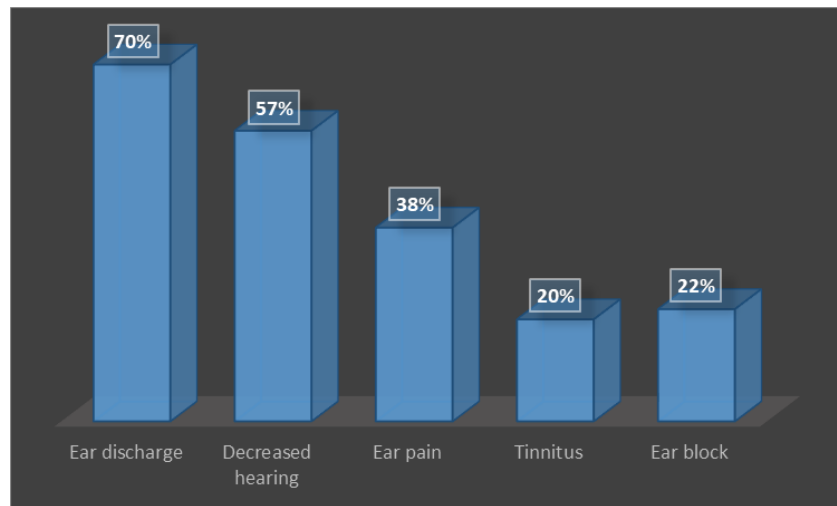


Figure-2: Distribution of the patients according ear status.

In table-2 shows Perforation size where In the dry graft group, 28 patients had large perforations, with 22 having successful graft uptake (75.7 per cent); 10 patients had medium-sized perforations, with 8 showing successful uptake(80 per cent); and 1 patient had a small perforation with successful uptake post-operatively (100 per cent). Where as in wet graft group 31 patients had large perforations, with 29 having successful graft uptake (93 per cent); 6 patients had medium-sized perforations, with 4 showing successful uptake(66.7 per cent); and 3 patient had a small perforation with 2 having successful uptake post-operatively (66.7 per cent).

The following table is given below in detail:

Table-2: Perforation size of the patients.

	Dry graft, n	Dry graft, n (%)
Large (>50)	29	22(75.7%)
Medium (25–50)	10	8 (80%)
Small (<25)	1	1(100%)
	Wet graft, n	Wet graft, n (%)
Large (>50)	31	29 (93%)
Medium (25–50)	6	4(66.7%)
Small (<25)	3	2 (66.7%)

Table-3: Distribution of the patients according fibroblast count.

	Total	Dy graft group, surgical success number	Total	Wet graft group, surgical success number
0 fibroblast nuclei	1	1	1	0
1–4 fibroblast nuclei	2	0	3	2
5–9 fibroblast nuclei	2	1	2	2
≥10 fibroblast nuclei	35	34	34	34
Total	40	36	40	38

In table-4 shows distribution of the patients according perforation site where the impact of perforation site was also evaluated, with the perforations classified as anterior, inferior or posterior with respect to the handle of the malleus. In the dry graft group, out of 40 patients, none had anterior, 34 had inferior and 6 had posterior perforations. Success rates of 88.2 per cent and 83.3 per

In table-3 shows distribution of the patients according fibroblast count where these findings demonstrate that fibroblast count was significantly higher in the wet graft group. However, no morphological degenerative changes were observed in the fibroblast nuclei, irrespective of the nature of the graft. The following table is given below in detail:

cent were recorded for inferior and posterior perforations, respectively. Where as in wet group Success rates of 66.7 per cent, 97.14 per cent and 50 per cent were recorded for anterior, inferior and posterior perforations, respectively. The following table is given below in detail:

Table-4: Distribution of the patients according perforation site.

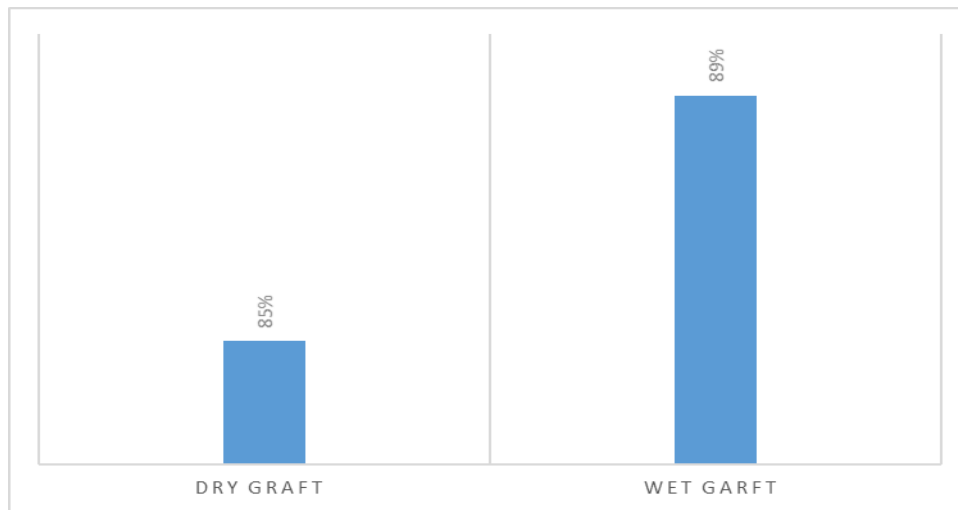
Dray graft group	Total cases	Surgical success rate, n (%)
Anterior	0	0
Inferior	34	30 (88.2%)
Posterior	6	5 (83.3%)
Total	40	35 (87.5%)
Wet graft group	Total cases	Surgical success rate, n (%)
Anterior	3	2(66.7%)
Inferior	35	34 (97.14%)
Posterior	2	1(50%)
Total	40	37 (92.5%)

In table-5 shows post operative hearing improvements where hearing was improved in dry and wet graft 83% and 89%. The following table is given below in detail:

Table-5: Post operative hearing improvements.

	Dray graft, %	Wet graft, %
Yes	83%	89%
No	17%	11%

In figure-3 shows overall success rate of dry and wet graft where in dry graft group successes' rate was 85% where as in wet graft it was 89%. The following figure is given below in detail:

**Figure-3: Overall success rate of dry and wet graft.**

DISCUSSION

During the study, the impact of dry and wet grafts on perforation site was also examined in this study. Anterior perforations have a poor graft uptake. The plausible explanation for this is that physiologically the posterior half of the tympanic membrane is better infused than the anterior half, as blood supply to the posterior half is from the malleal artery, whilst the anterior half is perfused by branches of the annular ring. However, it could also be are result of inappropriate graft placement below the anterior margin or inadequate Gelfoam support to the graft.^[10]

Temporalis fascia graft shrinkage could be a contributory factor. However, to state that the use of a wet graft would improve graft uptake in anteriorly placed perforations would be too simplistic an assumption.

A comparison of the anterior perforation results for dry and wet grafts revealed no statistical difference

($p=0.142$), implying that the nature of the graft (dry or wet) has no impact on the outcome of tympanoplasty for anterior perforations.^[11]

It has been argued that better closure rates are obtained by using a wet graft, on account of increased fibroblast count. This is based on the assumption that fibroblasts lay down collagen for a reparative process in the wound, with formation of a granulation tissue matrix to allow the spread of epithelialization, which thereby promotes successful graft uptake.^[12-15]

However, in this study, findings demonstrate that fibroblast count was significantly higher in the wet graft group. However, no morphological degenerative changes were observed in the fibroblast nuclei, irrespective of the nature of the graft.

The only other study to take fibroblast count into consideration, reported similar results.^[16]

Another study failed to grow fibroblasts (in vitro) on any of the temporalis fascia grafts, and found equal graft uptake success rates for both wet and dry grafts.^[17]

Other study also failed to grow fibroblasts from temporalis fascia in their respective studies.^[18]

However, one study managed to grow fibroblasts on both dry and wet fascia grafts, giving credence to the theory that there are no pathological differences between the two types of temporalis fascia grafts.^[11]

In this study, hearing was improved in dry and wet graft 83% and 89%. These results are comparable with the studies in the literature. Another study reported that, the mean postoperative air bone gap is 11.34 dB in dry ears and 14.4 dB in wet ears, which were comparable with the study by others. Although there is statistically significant improvement in hearing in both wet and dry ears separately, on comparison, there is no statistically significant difference between the two groups of wet and dry tympanoplasty.

Overall success rate of dry and wet graft where in dry graft group successes' rate was 85% where as in wet graft it was 9%. Which was again quite similar to other study.

LIMITATION

Small sample size and as a single-institution study, the data reflected experience of our geographical area, and may not be generalizable.

CONCLUSION

From our findings it was found that, age, gender, and moist ear had no effect on tympanoplasty graft uptake. There was no difference in graft absorption between the dry and wet ears, and there was no statistically significant difference in hearing improvement between the dry and wet ears. These conclusions are based on our limited experience and are offered to stimulate debate and future study on the issue.

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