

Temporalis Fascia versus Tragal Mucoperichondrium Graft in Myringoplasty

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) constitutes a major public health problem in children and adults in the developing world. It is an infection characterized by recurrent middle-ear discharge through a persistent tympanic membrane perforation.

Objective: the aim of the present study is to compare the surgical and audiological results of temporalis fascia versus tragal perichondrium in myringoplasty

Patient and Methods: a randomized prospective study concerned with 60 patients for whom myringoplasty was done. Patients were randomly assigned into two groups; in the first group temporalis fascia graft was used (30 patient) and tragal perichondrium graft was used in the second group (30 patients).

Results: our study included 60 patients, 27 males and 33 females with a range from 19- 45 years. Surgical success rates for the first and second groups are 80% and 73.3%, respectively. There was 10.5 dB improvement in mean hearing threshold in fascia group, compared to 8.16 dB improvement in perichondrium group, giving an average of 9.33 dB improvement in mean hearing threshold of the total series.

Conclusions: mean value of gain among temporalis fascia graft group was higher than tragal perichondrium graft group. There was statistically significant difference between the two groups regarding gain and no significant difference in surgical success rate between the two groups.

Keywords: Temporalis Fascia, Perichondrium Myringoplasty.

INTRODUCTION

Chronic suppurative otitis media (CSOM) constitutes a major public health problem in children and adults in the developing world. It is an infection characterized by recurrent middle-ear discharge through a persistent tympanic membrane perforation. This disease is the most common childhood infectious disease worldwide, starting early in life ⁽¹⁾. A consequence of CSOM is hearing loss and a propensity to recurrent infection and discharge ⁽²⁾.

Chronic suppurative otitis media may be:

- Tubotympanic type (safe type)
- Atticoantral type (unsafe type) ⁽³⁾.

Surgical repair (myringoplasty) of CSOM tubotympanic type is indicated to restore hearing ability as well as to prevent recurrent otorrhea ⁽⁴⁾.

Various graft materials were used in myringoplasty e.g. temporalis fascia, tragal perichondrium, subcutaneous tissue, free skin graft, vein graft, dura, etc. The ideal grafting material used for tympanic membrane closure should meet certain criteria namely, low rejection rate, sufficient quantity, good tensile strength, low metabolic rate, and easy availability. Membranous grafts like temporalis fascia and tragal perichondrium meet these criteria and result in closure of tympanic membrane perforation in 95% of ears with normal ventilation ⁽⁵⁾.

AIM OF THE WORK

The aim of this study is to compare the surgical and audiological results of temporalis fascia versus tragal perichondrium graft in myringoplasty.

PATIENTS AND METHODS

A prospective study was carried out on 60 patients (27 males and 33 females with a range from 19-45 years) with a complaint of recurrent ear discharge, hearing loss and diagnosed as CSOM tubotympanic type, with dry central perforation for at least 3 weeks without any other external ear, middle ear or inner ear diseases.

Exclusion criteria are

1. Evidence of cholesteatoma.
2. Previous ear surgery.
3. Recent traumatic perforation.
4. Severe tympanosclerosis.
5. Chronic otitis externa.
6. Systemic diseases as diabetes mellitus and tuberculosis.

Ethical approval:

An approval of the study was obtained from Al- Azhar University academic and ethical committee. Every patient signed an informed written consent for acceptance of the operation.

Each patient was subjected to:

1. Detailed history taking.
2. Full clinical examination with special, general and local otolaryngological examination.
3. Audiological investigation: pure tone audiometer.
4. Full investigation for surgical fitness including:

CBC, PT, PTT, INR, BT, CT, RBS, LFT, KFT and ECG.

Patients were randomly distributed between two groups:

Group A: myringoplasty was done using temporalis fascia.

Group B: myringoplasty was done using tragal perichondrium.

- Pure tone audiometer was determined at frequencies of 250, 500, 1000, 2000, 3000, 4000 and 8000 Hz for air conduction and 250, 500, 1000, 2000, 3000 and 4000 Hz for bone conduction.

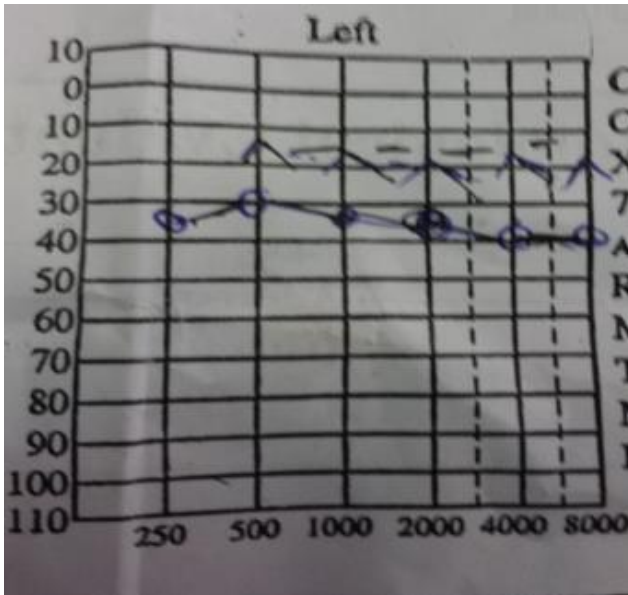


Figure (1): Preoperative pure tone audiometry (temporalis fascia group)

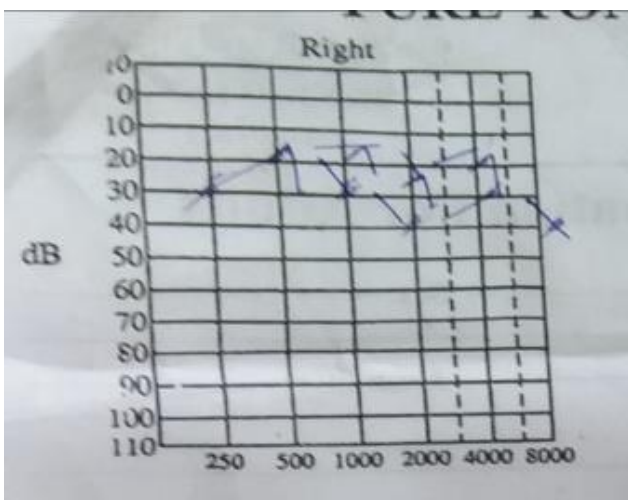


Figure (2): Preoperative pure tone audiometry (tragal perichondrium group)

Audiogram was be repeated after 3 months for comparison.

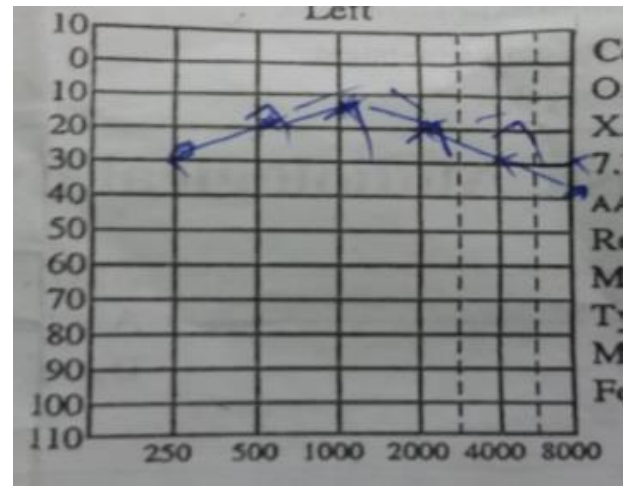


Figure (3): Postoperative pure tone audiometry (temporalis fascia group)

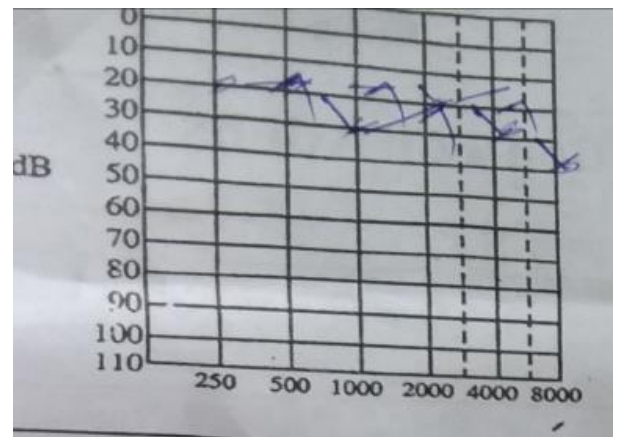


Figure (4): Postoperative pure tone audiometry (tragal perichondrium group)

Surgical Procedure.

All operations were performed under general anesthesia.

Xylocaine 1% with adrenalin 1: 100000 was infiltrated into postaural area and the meatal skin.

The perforation edges were refreshed using fine probe to stimulate growth of tympanic membrane remnants over the graft.

Postaural incision was done, followed by elevation of tympanomeatal flap.

The auricle together with the tympanomeatal skin flap were hold forward by self-retaining retractors.

Ossicular chain mobility was judged as good before the graft was inserted. Temporalis fascia was harvested, cleaned from muscle fibers and left to dry for few minutes before use.

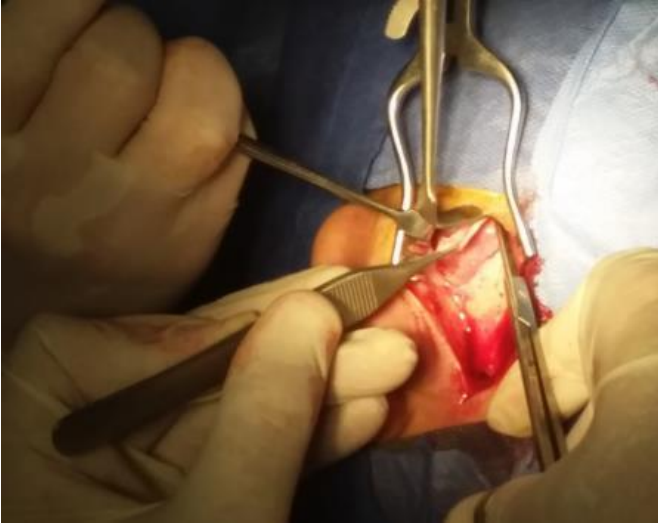


Figure (5): Obtaining of temporalis fascia

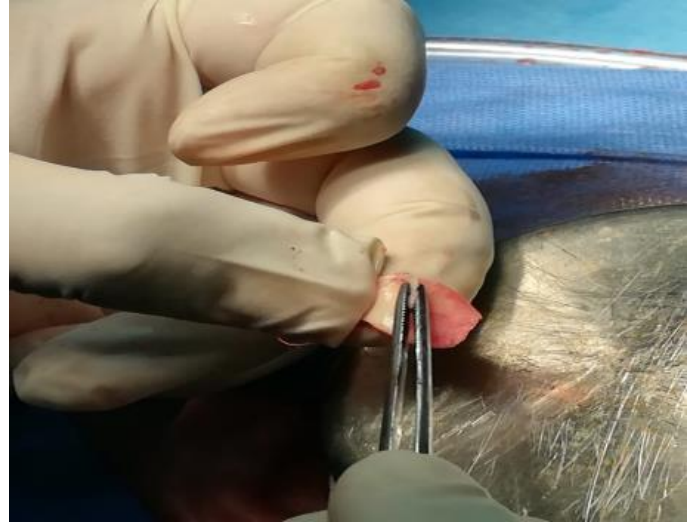


Figure (8): Separation of perichondrium from cartilage

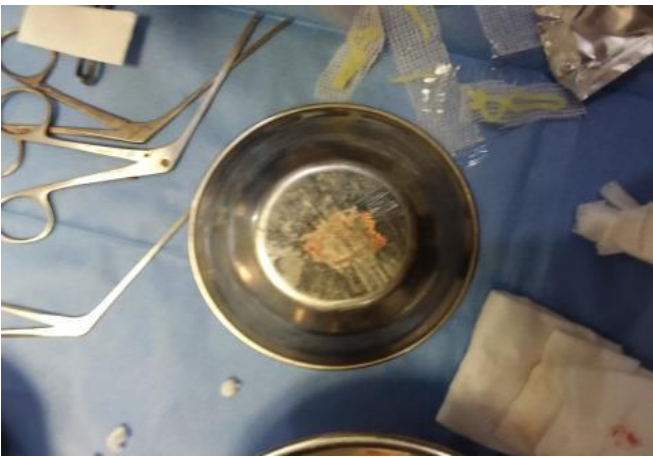


Figure (6): Temporalis fascia

On the other hand, if tragal perichondrium was to be used it was separated from the cartilage so that bare perichondrium was inserted.

Whether perichondrium or fascia was used they were inserted below tympanic membrane remnants and handle of malleus (underlay technique).



Figure (9): Intraoperative myringoplasty by temporalis fascia



Figure (7): Obtaining of tragal perichondrium

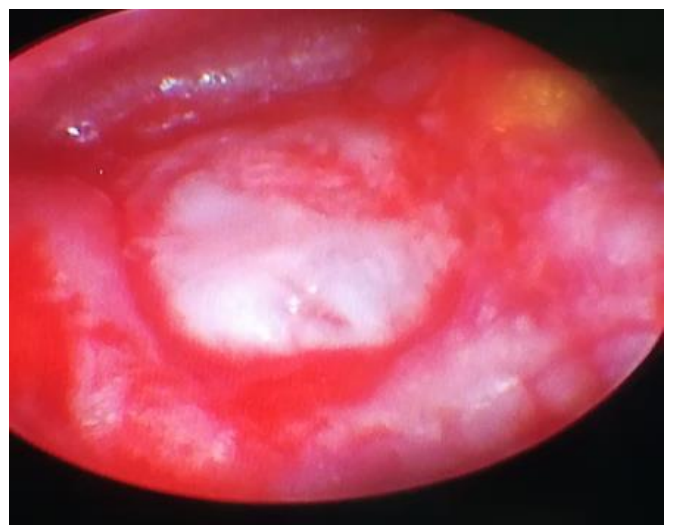


Figure (10): Intraoperative myringoplasty by tragal perichondrium

Skin flap reposition and pledges of gel-foam was put on the graft and the ear was packed. Suitable antibiotic was given to the patient daily for five days postoperatively. Stitches were removed after 7 days while the pack was removed on the 10th day, after which antibiotic ear drops were prescribed for 10 days. Gel-foam usually was left for spontaneous absorption after 3 weeks.

Statistical analysis

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

- Independent-samples t-test of significance was used when comparing between two means.
- Chi-square (x²) test of significance was used in order to compare proportions between two qualitative parameters.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. The p-value was considered significant as the following:
- Probability (P-value)
 - P-value <0.05 was considered significant.
 - P-value <0.001 was considered as highly significant.
 - P-value >0.05 was considered insignificant.

RESULTS

Table (1): Comparison between temporalis fascia group and tragal perichondrium group regarding Sex

			Temporalis fascia graft group	Tragal perichondrium graft group	X ²	P value
Sex	Female	No.	17	16	.067	0.795
		%	56.7%	53.3%		
	Male	No.	13	14		
		%	43.3%	46.7%		

In this table (1) there is no statistically significant difference between two groups regarding sex.

Table (2): Comparison between temporalis fascia group and tragal perichondrium group regarding age

		Temporalis fascia graft group	Tragal perichondrium graft group	t test	P value
Age (years)	Range	23 – 45	19 – 44	1.3	0.195
	Mean±SD	34.40±7.28	31.80±8.06	11	

In table (2) there was no statistically significant difference between the two groups regarding age.

Table (3): Comparison between temporalis fascia graft group and tragal perichondrium graft group regarding improvement of hearing

		Temporalis fascia graft group	Tragal perichondrium graft group	t test	P value
Gain	Range	0.00 – 15	0.0 – 15	1.953	0.046
	Mean±SD	10.50 ± 3.79	8.16 ± 5.33		

In table (3) there were statistically significant difference between the two Groups regarding Improvement of hearing.

Table (4): Comparison between temporalis fascia graft group and tragal perichondrium graft group regarding healing

			Temporalis fascia graft group	Tragal perichondrium graft group	X ²	P value
Healing	Healed	No.	24	22	0.373	0.542
		%	80.0%	73.3%		
	Not healed	No.	6	8		
		%	20.0%	26.7%		

In table (4) there were no statistically significant difference between two groups regarding healing.

Table (5): Comparison between preoperative air bone gap and postoperative air bone gap among temporalis fascia graft group

		preoperative air bone gap	postoperative air bone gap	t test	P value
Temporalis fascia graft group	Mean±SD	28.66 ± 7.89	16.66 ± 8.16	18.33	<0.001

In table (5) there were statistically significant difference between preoperative air bone gap and postoperative air bone gap among temporalis fascia group.

Table (6): Comparison between preoperative air bone gap and postoperative air bone gap among tragal perichondrium graft group

		preoperative air bone gap	postoperative air bone gap	t test	P value
Tragal perichondrium graft group	Mean±SD	28.33±7.715	19.33±8.84	8.088	<0.001

In table (6) there were statistically significant difference between preoperative air bone gap and postoperative air bone gap among tragal perichondrium graft group.

DISCUSSION

This study showed that, there was no statistically significant difference between temporalis fascia graft group and tragal perichondrium graft group regarding preoperative air bone (A-B) gap. This study showed that, mean value of postoperative air bone gap was lower among temporalis fascia graft group than tragal perichondrium graft Group.

Santhanakrishnan and Poornima ⁽⁶⁾, who aimed to compare the outcomes of temporalis fascia and tragal perichondrium as graft materials in tympanoplasty, found that, there was no statistically significant mean A-B gap among patients in group 1 (temporalis fascia) and group 2 (tragal perichondrium) as the p value was 0.80. A study by **Jyoti et al.** ⁽⁷⁾ found that temporalis fascia achieved

a graft uptake of 84%, and satisfactory hearing improvement in 76% of the patient. Myringoplasty was the surgical procedure to repair tympanic membrane perforations and thereby improving hearing, providing a dry ear and reducing susceptibility to infections.

Myringoplasty is accomplished by underlay or overlay technique depending on whether the graft is placed medial or lateral to tympanic membrane remnant ⁽⁸⁾. Success in myringoplasty is usually assessed in terms of healing of the perforation as well as hearing gain ^(3,8).

This study showed that, % of healed among temporalis fascia graft group (80%) and (73.3%) of healed among tragal perichondrium graft group. There were no statistically significant difference between temporalis fascia graft group and tragal

perichondrium graft group regarding healing. **Kumar et al.** ⁽⁹⁾ in their study, found that, graft uptake rate for temporalis fascia was 80% as compared to tragal perichondrium was 75%. Graft take-rate was slightly better for temporalis fascia than for tragal perichondrium. This marginal difference however, is not significant.

Santhanakrishnan and Poornima ⁽⁶⁾ found tragal perichondrium achieved a success rate of 80% graft uptake and 75% hearing gain, with no statistical significance of difference between them. In a comparative study of underlay and overlay technique of myringoplasty done by **Singh et al.**, graft take up rate was found to be the same (93.3%) ⁽¹⁰⁾.

Santhanakrishnan and Poornima ⁽⁶⁾ study observed similar results with underlay technique with both temporalis fascia and tragal perichondrium graft. In the study conducted by **Gibb and Chang** ⁽¹¹⁾ using temporalis fascia as graft material by underlay technique the percentage take rate was 87.5%.

Santhanakrishnan and Poornima ⁽⁶⁾ found in their study graft uptake after three months in temporalis fascia was 95.65% and in tragal perichondrium 89.5%. This study showed that, mean value of gain among temporalis fascia graft group was higher than tragal perichondrium graft group. (10.5 and 8.16 respectively). There were statistically significant difference between Temporalis fascia graft group and tragal perichondrium graft group regarding gain.

Kumar et al. ⁽⁹⁾ in their study, found that mean improvement in hearing temporalis fascia was 09.5 dB and mean improvement in hearing using tragal perichondrium was 09.0 dB. There was no statistically difference in mean improvement in hearing using either temporalis fascia or tragal perichondrium. **Jyoti et al.** ⁽⁷⁾ reported hearing result in total 50 patients, temporalis fascia group improved in 76% while tragal perichondrium group achieved 75% hearing gain.

CONCLUSION

This study showed that, mean value of postoperative air bone gap was lower between temporalis fascia graft group and tragal perichondrium graft group. There was no statistically

significant difference between the two groups regarding healing.

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