

*Research Article***Comparison between half thickness and full thickness tragal cartilage in myringoplasty****Adel A. Abd allah, Moustafa S. Hammad, Moustafa T. Abd El Hakim and Mostafa R. Ibrahim**

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Abstract

The use of cartilage for middle ear reconstruction is not new. (Jansen, 1963). Autogenous cartilage contributes minimally to an inflammatory tissue reaction and is incorporated in the middle layer of the TM, with contributions to the external layer coming from the skin epithelium and to the inner layer from the mucous membrane of the middle ear. Cartilage also provides a firm scaffolding with resistance to infection during the healing period. Cartilage has proved to be a promising graft material for closing perforations in the tympanic membrane. Cartilage is the preferred graft material for tympanic membrane reconstruction in our otological practice. We use tragal cartilage for both tympanic membrane and ossicular reconstruction. The rigidity of the cartilage prevents resorption, re-perforation and retraction, even in the context of continuous eustachian tube dysfunction. (Dornhoffer, 2006).

Keywords: tragal cartilage, myringoplasty,**Introduction**

Reconstruction of the tympanic membrane using fascia or perichondrium aims at achieving the normal anatomy and functions of the TM.

Fascia, skin, vein, perichondrium, and dura mater have been used for TM reconstruction. (Nissen et al., 1986; Storrs 1961; Shea, 1960; Preobrazhenski and Rugov, 1965)

To date, temporalis fascia and perichondrium remain the most commonly used materials for closure of TM perforations, and successful reconstruction is anticipated in about 90% cases of primary tympanoplasty. (Sheehy and Glasscock, 1967).

The use of cartilage for middle ear reconstruction is not new. (Jansen, 1963).

Autogenous cartilage contributes minimally to an inflammatory tissue reaction and is incorporated in the middle layer of the TM, with contributions to the external layer coming from the skin epithelium and to the inner layer from the mucous membrane of the middle ear. Cartilage also provides a firm scaffolding with resistance to infection during the healing period. The occurrence of retraction pockets postoperatively is hindered, and the possibility

of recurrent perforation is reduced, Cartilage has numerous advantages over fascia. (Murbe et al., 2002).

Cartilage has proved to be a promising graft material for closing perforations in the tympanic membrane. Cartilage is the preferred graft material for tympanic membrane reconstruction in our otological practice. We use tragal cartilage for both tympanic membrane and ossicular reconstruction. The rigidity of the cartilage prevents resorption, re-perforation and retraction, even in the context of continuous eustachian tube dysfunction. (Dornhoffer, 2006)

However, this rigidity can counteract sound conduction properties (Zahnert et al., 2000)

Aim Of The Work

The aim of this study is to compare the difference in hearing gain and the healing of tympanic membrane perforations with half thickness tragal cartilage, and full thickness tragal cartilage in myringoplasty.

Patients and Methods

This study was conducted in ENT department at Minia University Hospital. This study included 32 patients with chronic suppurative otitis media chosen from those attending the

E.N.T. outpatient clinic at Minya University Hospital in the period from February 2017 to November 2017

Inclusion criteria

TM perforation, a dry ear for at least 3 weeks, only patients with conductive hearing loss regardless age and sex.

Exclusion criteria

- Patients refusing the research procedure.
- Patients with chronic suppurative otitis media have active discharge.
- Patients having a wide ABG suggesting ossicular pathology.

- Patients with atticointral disease.
- Marginal perforation

Ethical consideration

Written consent was taken from patients or their parents.

Results

The graft take was achieved in 30 patients, 15 patients in group A and 15 patients in group B had successful graft take up.

Which had successful closure of TM defect, so the graft take up rate is 93.75 % for both groups, no lateralisation or medialisation seen in the successful cases.

Table (1): Comparison between the two groups regarding some demographic data.

Demographic data

Demographic data	Group A Half thickness graft (n= 15)	Group B Full thickness graft (n= 15)	P - value
Age			
Range	14-36	12-42	
Mean \pm SD	25.2 \pm 6.9	22.6 \pm 8.6	0.217
Median	26	20	
Sex			
Male	4 (26.7%)	5 (33.3%)	
Female	11 (73.3%)	10 (66.7%)	0.690

Mann-Whitney test was used for quantitative data, while chi-square test was used for qualitative data

This table shows characteristics of the study population in both groups as age and sex.

In group A, the mean age of the patients was 25.2 \pm 6.9 years, range from 14 to 36 years with predominance of females representing (73.3%) while males representing (26.7%).

In group B, the mean age of the patients was 22.6 \pm 8.6years, range from 12 to 42 years with predominance of females representing (66.7%) while males representing (33.3%).

Discussion

Cartilage was first introduced in middle ear surgery in 1959, and has recently been used by several otologists for reconstruction of the tympanic membrane, as an underlay graft with perichondrium adjacent to the tympanic membrane remnant.(Dornhoffer JL, 2003).

Mu`rbe D, et al., 2002 have compared different cartilage techniques and stated that from an acoustical point of view, the 0.5-mm cartilage

plate seems preferable compared with the palisade technique.

Mohamad SH, et al., 2012 have concluded that tympanoplasty using cartilage with or without perichondrium has better morphological outcome than tympanoplasty using temporalis fascia. However, there was no statistically significant difference in hearing outcomes between the 2 grafts.

Lee CF, et al., 2007 have developed a cartilage plate-TMcoupled model using high-resolution computed tomography and finite element analysis and from their study they concluded that the optimal thickness of a cartilage graft for myringoplasty appears to be 0.1–0.2 mm for medium and large TM perforations.

For small perforations, a cartilage of less than 1.0mm is a good compromise between mechanical stability and low acoustic transfer loss.

Yung M in 2008 have mentioned from literary review that concerns that the stiffness and mass

of cartilage grafts may adversely affect hearing have not been substantiated in clinical reports thus far.

Conclusion

The graft take up rates are excellent for both half and full thickness tragal cartilage graft in myringoplasty.

Difference in hearing gain is not statistically significant between the two groups, except at 4,000 Hz where hearing gain in half thickness tragal cartilage (Group A) is more than full thickness tragal cartilage (Group B).

For both group A and B, hearing gain is more at 250, 500 Hz than at 1000, 2000, 4000 and 8000 Hz frequencies.

No other complications seen in any of the cases in any group. This technique is good for closure of TM perforations and it provides good hearing gain by thick or thin cartilage pieces.

In Our experimental results show that slicing of the tragal cartilage into a half thickness tragal cartilage (0.5mm) is suitable to improve the sound transmission properties of the reconstructed tympanic membrane in comparison to a full thickness tragal cartilage (1.0 mm).

Our technique of slicing of the tragal cartilage into a half thickness in myringoplasty gives good anatomic and functional results. The highlight of our technique is the harvesting of the graft via the same endaural incision. By slicing the cartilage, desired acoustic benefit is obtained. We recommend using sliced cartilage as a first choice for tympanic membrane reconstruction.

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