

SOCIAL PERSPECTIVES AT PATIENTS AFTER TYMPANOPLASTY TYPE I- RETROSPECTIVE STUDY AND CASE REPORT

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Abstract: *The goals of a successful tympanoplasty type I are to reconstruct a vibrant, integer tympanic membrane. This type of surgery will change completely the life of patients with tympanic perforation. Prerequisite for tympanoplasty type I is that it exists intact ossicular chain. Several different types of grafts are used, such as temporalis fascia, cartilage and perichondrium. The aim of this study is to present social perspectives from 21 clinical cases with tympanic perforation and to determine prognostic factors that can influential the outcome of tympanoplasty type I. All the patients were treated in ENT Department "Sfanta Maria" Hospital, Bucharest. We present the clinical and paraclinical diagnostic algorithm for tympanic perforation used for the patients admitted in our Clinic from August 2013-November 2017. These patients underwent underlay myringoplasty type I, performed by junior surgeon. All patients' undertake clinical otologic examination and a pure tone audiogram preoperative and postoperative. At 1 month the postoperative otomicroscopy was performed and the hearing outcome assessed 2 months later. The presence of perforation was defined as surgical failure. The patients (7 men and 14 women), were aged between 28-64 years old (mean age 47 years). 5 patients were diagnosed with anterior perforation, 4 patients had central perforations and 12 posterior perforation. Surgical success was obtained in 16 cases and 5 subjects presented with re-perforation. Several prognostic factors have been identified as influential in tympanoplasty type I success such as the perforation size, the Eustachian tube function and middle ear pathological conditions.*

Keywords: tympanoplasty; tympanic perforation; social perspectives; prognostic factors.

1. Introduction

Chronic otitis media is still a delicate and enigmatic subject. This confusion could come primarily because of the lack of a universal nomenclature system and secondly the multitude of surgical procedures associated with this condition. However, a clear definition of mean otitis is any structural change in the mucosa that tapers the middle ear (sometimes affected by mastoid cells) associated with a definitive defect of tympanic membranes (tympanic perforation) (Acuin, 2006:772-787). Tympanic perforations have social implications that may affect the quality of life in these patients. Among these,

the most important would be hearing loss, absenteeism from work / school to solving the acute episode, the impossibility to practice water sports.

Tympanoplasty is the surgical procedure that involves the reconstruction of the tympanic membrane and addresses the pathology of the middle ear (cholesteatoma, retraction bags, ossicular disease). In this procedure, the tympanum is elevated from the sulcus for a much better approach on the medial box. Tympanoplasty has the role of restoring the tympanic perforations and hence of improving the auditory deficit, thus providing a dry ear and also reducing the risk to subsequent infections. The surgical correction of old tympanic perforations (over 3 months) can be achieved using the 2 techniques: underlay or overlay technique (Merchant, McKenna, Rosowski, 1998: 221-228; House Sheehy 1961;73:407).

Unfortunately, functional results are not entirely conclusive and specialized literature does not ensure that the use of a particular type of graft is superior to another. Often the choice remains at the discretion and expertise of the surgeon. In the literature, the success rates of tympanoplasty using fascia of temporal muscles, veins, and tragalpericordium reach about 80-90% (Sheehy 1967; 86: 391).

There are many prognostic factors that can influence auditory status after tympanoplasty. Surgical success can be influenced by several factors: the preoperative auditory threshold (will be detected after the tonal audiogram), the auditory tube function, the presence or absence of otorrhea, histological changes from the middle ear, the extension of tympanic membrane perforation and the ossicular chain erosion, the technique surgical, smoking and, last but not least, the surgeon's experience. One of the most important elements to be followed after surgery is the acceptance of the body for the graft placed (Sheehy, Anderson 1980; 89: 331-334).

A problem of interest for otologists was the influence that the perforation could have on the outcome of tympanoplasty. Pinar et al. found that the surgical success rate was higher for centrally located perforations compared to those anteriorly or posteriorly located (Pinar, Sadullahoglu, Calli, Oncel, 2008; 139:386-90). Also, another study, led by Onal et al., reported significant differences between small diameter and wide perforations (Onal, Uguz, Kazikdas, Gursoy, Gokce, 2005; 30: 115-120).

A study by Albu and his collaborators (Albu, Babighian, Trabalzini, 1998: 136-140) revealed three of the most important indicators of prognosis:

- Average ear status is the most important prediction indicator
- The presence of the hammerhandle
- If the perforation diameter exceeds the size of the tympanic membrane by > 50%, the prognosis is not favorable.

Another study by Salviz et al. (2014) revealed that the use of tragal cartilage is associated with faster hearing improvement compared to

tympanoplasty where temporal muscle fascia was used. Also, in patients with risk factors such as: the affected contra-lateral ear, the small ages associated with hyper-trophic rhinoadenoids, the use of tragical cartilage graft is preferred instead of the temporal muscle fascia (Salviz, Bayram, Bayram, 2015: 20-3).

2. Material and Methods

A prospective study was performed on 21 adult patients, males and females (M/F=7/14), aged between 28-64 years old (mean age=47).

Assessment protocol:

- guided history taking (number of otologic infections/year, time period without otorrhea)
- specific physical exam (otoscopy, rhinoscopy),
- audiometric tests: pure tone audiogram, Eustachian tube dysfunction test (pre- and postoperative),
- temporal bone computed tomographies.

The otoscopic assessment evaluated the:

- perforation size,
- the location according to quadrant,
- possibility of visualizing all the perforation borders,
- the presence or absence of inflammatory mucosa in the middle ear.

The surgical procedures were performed under general anesthesia, using a microscope and the transmeatal approach. The graft consisted in tragus perichondrium (Figure 1). All surgeries were performed by junior surgeon.



Fig. 1. The graft- tragus perichondrium

3. Result

Out of 21 patients, 5 (23.81%) patients had anterior quadrant affected, 4 (19.05%) patients had central perforation and 12 (57.14%) patients had perforations in posterior quadrant. (Table 1).

	Graft accepted	Graft not integrated
Perforation in anterior quadrants	1 (4.76%)	4 (19.05%)
Perforation in posterior quadrants	11 (52.38%)	1 (4.76%)
Central perforation	4 (19.05%)	0
Small perforation	4 (19.05%)	0
Medium perforation	12 (57.15%)	1 (4.76%)
Large perforation	2 (9.52%)	2 (9.52%)
Granulation tissue	1 (25%)	3 (75%)
Typanosclerotic plaques	2 (100%)	0
Patent Eustachian tube	13 (92.85%)	1 (7.14%)
Blocked Eustachian tube	3 (42.85%)	4 (57.14%)

Tab.1. *Graft integration or not towards several parameters (total percentage)*

To note in our study that of the 5 patients who had perforation in anterior quadrant of the tympanic membrane, 4 patients (80%) of them presented rejection of the graft. This can be explained by the fact that anterior perforations are technically more difficult to access and to place a graft adequately; the blood supply is also poorer.

The size of the perforation was graded as small (less than 50% of the total tympanic membrane area) (Figure 2), medium (50-75%) and large (>75%).



Fig. 2. *Small tympanic perforation (left ear)*

The size of the perforation was compared for its effect on the outcome of surgery. Of the 5 patients who presented surgical failure, 2 patients (40%) were found to have large tympanic perforation. Good success rate of the outcome of tympanoplasty was highlighted to patients with small and medium tympanic perforation.

Middle ear pathological conditions such as tympanosclerosis, granulation tissue and mucosal polyps were evaluated as prognostic factors. Tympanosclerosis was present in 2 patients, granulation tissue was present in 4 patients and mucosal polyp was seen in 1 out of total 21 patients. The success of graft uptake following tympanoplasty was 25 %in patients with granulation tissue. Surgical failure in this case was 75 %, this was due to persistent inflammation in these patients.

In our study of 21 patients, Eustachian tube function was evaluated by the Eustachian tube dysfunction test (ETF test). 14 patients (66.67%) were found with patent Eustachian tube and 7 patients (33.33%) with blocked

Eustachian tube. To mention that 4 (57.14%) of this 7 patients with blocked Eustachian tube had surgical failure. Therefore a patent Eustachian tube is a gainful prognostic factor for graft success.

In what hearing loss is concerned, 3 patients (14%) had severe hearing loss, 7 patients (33%) had mild conductive hearing loss and 11 patients (52%) slight conductive hearing loss.

The pure-tone audiogram performed 2 months after surgery, revealed a normal hearing in 16 patients. In 5 patients the air-bone gap was similar to the pre-operative findings (Grafic 1).



Graf.1. Audiometry after surgery (60 days)

Post-operative closure of air bone gap was 12.23 dB in small perforations, 16.86 dB in medium perforations and 6.8 dB in large perforation. Of the 21 ears operated on, 7 (33.33%) were left ear and 14 (66.67%) right ear. In our study, the side of the affected ear (right or left), did not influence the overall success rates.

Our study revealed that 5 patients (23.80%) had surgical failure and there are also some factors that have led to this outcome:

- 4 patients (80%) had anterior quadrant tympanic perforation, concomitant with anterior localization, 2 patients (40%) had large perforation.
- Furthermore, at 4 patients (80%), the ETF test revealed blocked Eustachian tube.
- Granulation tissue was found at 3 patients (60%) with surgical failure

4. Case report

A 34 year old woman was admitted in our ENT Department for hearing loss at right ear that occurred 4 years previously. The ear endoscopy showed a

central tympanic membrane at right ear, no pathological fluids were identified (Figure 3).



Fig. 3. Central perforation of the tympanic membrane (right ear)

The tonal audiogram on admission revealed slight conductive hearing loss at right ear (Figure 4).

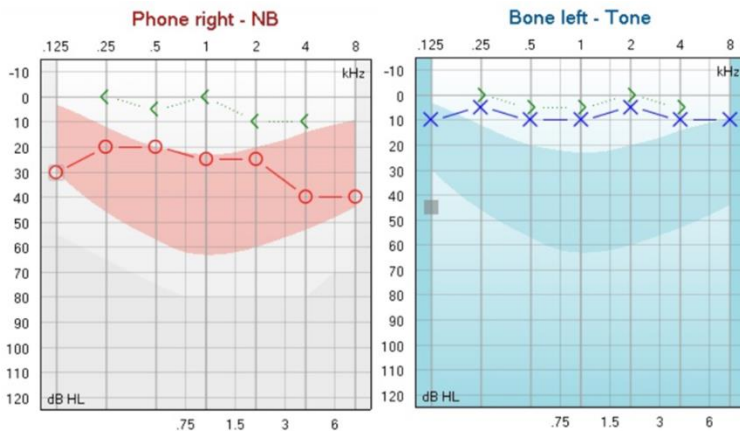


Fig.4. Preoperative audiogram (Slight conductive hearing loss)

The ETF test revealed a patent Eustachio tube. Temporal bone computed tomography pointed out a central tympanic perforation, intact ossicular chain and the absence of inflammatory mucosa in the middle ear. Our decision was to perform tympanoplasty type I at right ear using tragus perichondrium. The operation was performed under general anesthesia. The otoendoscopy after 30 days from surgery, revealed a normal tympanic membrane at right ear. 2 months after surgery, the hearing outcome was assessed with tonal audiogram that revealed normal hearing at both ears. (Figure 5).

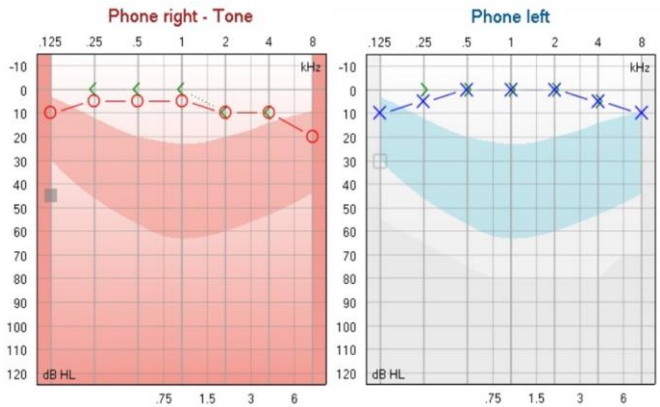


Fig.5. Postoperative audiogram (Normal hearing at both ears)

5. Conclusions:

In our study we concluded that the site of the perforation (anterior quadrant of tympanic membrane), the size of the perforation (larger perforation), the presence of granulation tissue in middle ear and the blocked Eustachian tube effects surgical outcome in tympanoplasty type I. The quality of life of patients increases after surgery.

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