Treatment of Tympanic Membrane Retraction Pockets by Excision and Cartilage Tympanoplasty: A Prospective Study

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Abstract To assess the role of cartilage tympanoplasty in management of retraction pockets of the pars flaccida. This was a prospective study at a tertiary care centre. Twenty patients having grade III or grade IV retraction pockets were included in the study. Retraction pockets were treated by excision and cartilage tympanoplasty. Findings noted on follow-up were recorded and analysed. Graft was taken up in 18 (90%) cases with residual perforation in 2 (10%) cases. Recurrence of retraction pockets was observed in 6 (30%) cases. Hearing was improved up to 15 dB in 16 (80%) cases. It is concluded that grade III and IV retraction pockets can be well managed by excision and cartilage tympanoplasty.

Keywords Pars flaccida · Retraction pockets · Cartilage tympanoplasty

Introduction

Tympanic membrane retraction, i.e. the medial displacement of the drum from its normal position, is a commonly encountered pathology. Retractions can involve the pars flaccida (PF), pars tensa (PT) or both. Retraction pockets are more frequently observed in pars flaccida than in pars tensa. The point prevalence of tympanic membrane retractions in healthy children aged 5–16 years has been reported to be 14–26% in pars flaccida and 0.3–3.7% in pars tensa [1, 2]. The exact patho-physiological

mechanisms underlying the tympanic membrane retraction are still not clear. However, it is well known that a number of middle ear pathologies, notably, otitis media with effusion (OME) can predispose to retractions. Surgery has a very well defined role in grade III and IV retractions because spontaneous resolution is unlikely in patients with severe retractions. As different techniques for surgical management of grade III and IV retraction pockets with variable results have been reported in the literature, this prospective study was undertaken to assess the role of cartilage tympanoplasty in management of retraction pockets.

Materials and Methods

The present study was conducted in the Department of Otorhinolaryngology, Pt. B.D. Sharma PGIMS, Rohtak. Twenty patients in the age group of 10–40 years having decreased hearing and evidence of grade III and IV retraction pockets in the pars flaccida were selected for the study. Preoperative evaluation of the patients included detailed history, examination, pure tone audiometry and high-resolution CT scan of temporal bone. All the patients included in the study were operated either under general anaesthesia. Postaural incision was used in each case. The retraction pockets were excised after exposing them completely. If any ossicular chain defect was found, it was corrected with small cartilage graft. The bony defect if present and tympanic membrane perforation left after the excision of retraction pockets was covered with cartilage graft of adequate size. The perichondrium was spread over the posterior wall of the external auditory canal and under the tympanic membrane remnant anteriorly. All the patients were regularly followed up for a minimum period

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of 3 months in the outpatient department. Pure tone audiogram was carried out after 3 months of surgery. The clinical parameters noted on follow-up were recorded in the proforma.

Observations and Results

There were 12 (60%) males and 8 (40%) females in our study. The age ranged from 10 to 40 years. The maximum numbers of patients (60%) were between 14 and 30 years. All patients selected for the study had some degree of the hearing loss. Aural discharge was present in 6 (30%) patients. In 16 (80%) there was unilateral disease whereas bilateral ear involvement was present in 4 (20%) patients. Grade III retraction pockets were present in 15 (75%) cases while grade IV retraction pockets were seen in 5 (25%) cases. Seventy percent of the patients were having conductive hearing loss in the range of 25–40 dB and 6 (30%) patients were having loss in the range of 41–55 dB. Cartilage with perichondrium was most commonly used, it was used in 18(90%) patients. In large perforations and large defects of tympanic membrane created after excision of retraction pockets, temporalis fascia was also used for reconstruction of tympanic membrane along with cartilage perichondrium grafts. Follow-up examination and overall follow-up results are summarised in Tables 1 and 2.

Discussion

Every otologist is faced with the dilemma of whether to wait and watch the tympanic membrane retraction or to intervene surgically. Many of the mild retractions can resolve spontaneously and the chances of progression and/or cholesteatoma formation are less. However, it is difficult to predict which pocket will deteriorate with time and culminate in cholesteatoma. All asymptomatic retraction pockets can be treated with no more than periodic surveillance. Surgery has a very well defined role in grade III and IV retractions where the lamina propria of tympanic membrane has undergone irreversible degeneration. There

is a diversity of opinion as to which surgery is the best option. The options include insertion of a ventilation tube alone, excision of the retraction pockets combined with ventilation tube insertion, reinforcement tympanoplasty (with cartilage) and insertion of ventilation tube with cortical mastoidectomy [3, 4].

Cartilage tympanoplasty is being increasingly used for the management of retraction pockets. Linde was the first to present the posterior cartilage—perichondrium composite island graft “as developed by the late Dr. Frederick Guilford”. Guilford began using the cartilage perichondrium graft, obtained from the conchal region, in about 1967 and found the procedure worthwhile. Linde followed up all 8 patients treated with posterior island graft. All patients had posterior retraction with dehiscence bone of the posterior scutum. None of the patients developed a post-operative retraction [5]. After this initial report several authors have presented their results.

Glasscock et al. report on 75 cartilage tympanoplasties with the posterior island graft. There was one graft failure and no evidence of recurrent cholesteatoma or tympanic membrane retraction. “This technique has greatly decreased the incidence of the recurrent drum retractions in the postero-superior quadrant of the tympanic membrane and the stiffness of the drum due to cartilage has not been found to affect hearing results. In essence, the cartilage replace the fibrous layer of the drum and acts somewhat like a tympanosclerotic plaque” [6].

Yung operated seventy-two ear with atelectasis and adhesive otitis media. The results of the surgery on posterior retraction pockets were excellent in their study. On the contrary the results of surgery on the completely atelectatic membrane were disappointing [7].

Ozbek et al. studied 54 patients who underwent cartilage tympanoplasty. Twenty-one (37.5%) ears had grade III while 35 (62.5%) ears had grade IV retraction. Successful closure of the tympanic membrane without reperforation or severe retraction was obtained in 51 (91%) ears [8]. All the cases included in our study were of grade III or grade IV retraction pockets. The graft take up was achieved in 90% cases.

Gerber et al. evaluated the frequency specific hearing results in cases of primary cartilage tympanoplasty, and compared that data with results after primary tympanoplasty using temporalis fascia grafting. The authors reported an overall hearing improvement after cartilage tympanoplasty which was comparable to that after fascia grafting [9].

Page et al. evaluated auditory performance following cartilage tympanoplasty for the management of destabilized (epidermosis, otorrhoea) retraction pockets. Good postoperative hearing levels were observed for the majority

Table 1 Follow-up examination

Otoscopic findings	10th day	4th week	2nd month	3rd month
Discharge	–	3	–	–
Graft take up	–	20	18	18
Residual perforation	–	–	2	2
Recurrent retraction pockets	–	–	6	6

Table 2 Overall follow-up results

	Total number of patients
Cases operated	20 (100%)
Cases followed	20 (100%)
Graft take up	18 (90%)
Residual perforation	2 (10%)
Retraction pocket recurrence	6 (30%)
Hearing improvement	Hearing gain in dB
0–10	11 (55%)
11–15	05 (25%)
16–20	04 (20%)
> 21	0

of patients [10]. In our study hearing levels were improved up to 15 dB in 16 (80%) cases.

Possible mechanisms explaining the success of cartilage tympanoplasty in patients with retraction pockets include (a) cartilage provides the tympanic membrane with greater strength in the setting of negative middle ear pressure (b) cartilage graft do not retract in size as may be the case when using temporalis fascia (c) cartilage seems to show high resistance to infections because of the lack of vascularization [11, 12].

Conclusion

Grade III and IV retraction pockets can be well managed by excision and cartilage tympanoplasty. The graft take up and improvement in hearing was achieved in 90% cases. Cartilage perichondrium reinforcement provides the tympanic membrane with greater strength in the setting of negative middle ear pressure. Cartilage reinforcement technique increases the rate of tympanic membrane closure without affecting audiometric results.

Authors' Contribution VKK: Concept, Design, Definition of intellectual content, Literature search, Data acquisition, Manuscript

preparation, Guarantor. SPSY: Definition of intellectual content, Data analysis, Manuscript editing, Manuscript review. MV: Manuscript preparation, Literature search, Data acquisition. BS: Manuscript preparation, Literature search, Data acquisition. AG: Manuscript preparation, Literature search, Data acquisition.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Statement Informed consent was taken at the time of surgery. This surgery is routinely done worldwide including our institute, so no ethical aspect is involved in this study.

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