COMPARATIVE STUDY ON BILATERAL SINGLE SITTING ENDOSCOPIC MYRINGOPLASTY CONCHAL CARTILAGE VERSUS TEMPORALIS FASCIA GRAFT

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ABSTRACT

BACKGROUND

Though single sitting myringoplasty using temporalis fascia under general anaesthesia has been documented in many studies, but ours is the first center to have started using tragal cartilage and temporalis fascia harvested from one ear to do bilateral myringoplasty in one sitting using local anaesthesia with excellent results including very good graft uptake rate and audiological improvement without significant complications.

The aim of the study is to compare the outcome of bilateral myringoplasty in dry central perforation in one sitting using cartilage on one side and temporalis fascia on the other ear in an urban tertiary care centre.

MATERIALS AND METHODS

A total of 50 patients above the age of 15 years were included in the study who had dried bilateral perforated ear drum involving pars tensa both sides size of perforation and hearing loss were more or less-matched patients who had persistently discharging ear or had evidence of middle ear infection, granulation tissues, aural polypi, cholesteatoma, ossicular erosion or evidence of sensorineural hearing loss were excluded from the study. In the cases, temporalis fascia graft through postaural incision right side and conchal cartilage was harvested from the right side and endoscopic myringoplasty was performed. Temporalis fascia graft placed by underlay technique and conchal cartilage was used as graft on the left side for all the patients. Patients were followed up after 3 and 6 months to assess closure of tympanic membrane perforation and hearing improvement as depicted by closure of air above gap on pure tone audiometry at 6 months.

Study Design- Interventional, descriptive.

Place and Duration of Study- Department of ENT, UIORL, Madras Medical College and Rajiv Gandhi Government General Hospital, June 2012 to July 2013.

RESULTS

A total of 100 myringoplasties were performed on 50 patients included in the study. Majority of the patients included were having medium to large size perforation. Subtotal perforation was noted in 15 ears and only 5 ears were having small perforation. Successful closure of anatomic defect of tympanic membrane was achieved in 90 ears with an average hearing gain of 16 dB.

CONCLUSION

Bilateral myringoplasty is safe and effective procedure in patients with bilateral dry central perforation of tympanic membrane. It may be performed in one sitting with equally good anatomical and functional results as achieved in unilateral myringoplasties.

KEYWORDS

Chronic Suppurative Otitis Media, Myringoplasty, Sensorineural Deafness, Tympanic Membrane Perforation.

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BACKGROUND

Myringoplasty is an operative procedure used in the reconstruction of a perforated tympanic membrane.[1] The perforation of TM is because of Chronic Suppurative Otitis Media (CSOM) in a majority of outpatient cases, while trauma accounts for only limited number of them.[2] The major advantages of single sitting myringoplasty for bilateral TM perforations include single hospital stay, less expenses or off days from work, decreased waiting period for the surgery and less morbidity due to anaesthesia or postoperative complications.[3] Conventional myringoplasty is usually performed by postauricular route, per meatal or transcanal route, per meatal with tympanomeatal flap raised or mini-endaural route.[4] In underlay technique, we place the graft medial to the tympanic membrane remnant.[5]

Otitis media is the most common disease in early childhood across the world. It has been stated that almost every child suffers from at least one episode of otitis media by the age of 2 years. If not treated adequately, it may lead to persistent perforation of tympanic membrane. The most

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troublesome effect of perforated eardrum is the recurrent discharge from ears. Due to persistent perforated eardrum and emergence of resistant bacteria, the condition is not only recurrent, but over a period of time. It brings about irreversible damage to middle ear mucosa leading to development of certain other pathological conditions, e.g. granulation tissues, aural polypi and even cholesteatoma formation. Besides, there is also a considerable degree of hearing loss ranging from 10-60 dB. Most often, this condition is unilateral. Regardless of degree of hearing loss, if the problem is unilateral, provided that other ear is normal, person's hearing is not much affected. But, 5-15% patients suffer otitis media affecting both ears causing significant hearing loss and disability, resulting in difficulty in linguistic communication and ultimately social isolation. This condition is prevalent in many developing countries, especially in India. Main advantages of single sitting include the following-

- Single hospital stay, resulting into less expenses and less off from school of children.
- Reduces the waiting list for surgery.
- Less morbidity.
- Less postoperative uneventful period.
- No preoperative and postoperative complications of general anaesthesia.

MATERIALS AND METHODS

This study was conducted at the Department of ENT Head-Neck Surgery, Madras Medical College and Rajiv Gandhi Government General Hospital. Ethical committee clearance has been obtained from Madras Medical College, ethical committee. This paper was presented as free paper in ROCKENT South Zone Conference by the author. A total of 50 patients above 15 years of age who had bilateral perforated eardrum involving pars tensa only for more than12 months' duration, but without any discharge for 6 to 8 weeks were included in the study.

Inclusion Criteria were-

(1) The patient should be willing to undergo concomitant bilateral ear surgery; (2) The tympanic membrane has a small to medium-sized central perforation with no active discharge from the middle ear. (3) Pure tone audiometry shows a hearing threshold of 40 dB or less (to rule out ossicular problems); and (4) There should be no active disease in the nose.

Exclusion Criteria-

1) A very narrow external auditory canal, impairing transcanal visualisation of the perforation;
2) The tympanic membrane showing a marginal perforation, an attic perforation and atticoantral disease or active discharge from the middle ear; aural polypi, cholesteatoma, ossicular erosion or evidence of sensorineural hearing loss; and
3) A hearing threshold of more than 40 dB.

Written informed consent was obtained from all.

Size of perforation was assessed depending upon the number of quadrants involved in pars tensa. A small perforation was involving only one quadrant, a medium perforation involving two quadrants, a large perforation involving three and subtotal perforation was labelled when there was large central perforation involving all quadrants with intact tympanic annulus. All patients were assessed for patency of eustachian tube. Preoperative pure tone audiometry was obtained for all patients to assess type and degree of hearing loss. All patients were operated under general anaesthesia. Large temporalis fascia graft and conchal cartilage was harvested from right ear site with the intention to cover tympanic membrane defect on the right side and conchal cartilage for left side. After freshening the margins of tympanic membrane perforation, grafts were placed by underlay technique and stabilised with gelfoam. Postoperative antibiotics were prescribed for two weeks. After removal of ear pack, topical antibiotics were also prescribed for another three weeks. Patients were also instructed to avoid water entering inside ear canal. Patients were reviewed after 3 months, 6 months and one year. Postoperative closure of tympanic membrane perforation was assessed at each visit. Postoperative pure tone audiometry was obtained at six months to assess the closure of air-bone gap and hearing improvement. Demographic data including patients' age, duration of disease, preoperative air-bone gap, size of tympanic membrane perforation, surgical approaches, graft material used and successful closure of tympanic membrane perforation and postoperative closure of airborne gap for hearing improvement were recorded on institutional approved proforma.

RESULTS

A total of 100 myringoplasties were performed in 50 patients who had dry perforated eardrum. Out of 50 cases included, 30 were males and 20 were females with male-to-female ratio of 3:2. The age range of the patients was 15 to 45 years with mean age of 21 years. All patients had bilateral perforated eardrum ranging from one year to 15 years. Average duration of disease in left ear was 6.36 years and in right ear, it was 5.82 years.

Pure tone audiometry was obtained in all patients to assess the type and degree of hearing loss. Almost, all patients were having conductive type of hearing loss with air-bone gap ranging from 20 dB to 40 dB. Preoperatively, the average air-bone gap in left ear was 29.83 ± 5.258 dB, and in the right ear, it was 30.69 ± 6.083 dB. Temporalis fascia was used graft for closure of tympanic membrane defect on the right side and conchal cartilage on the left side. Successful closure of tympanic membrane was achieved in 84% on right side where the temporalis fascia was used and 96% on the left side where conchal cartilage was used. Pure tone audiometry performed after 6 months of successful myringoplasty revealed hearing improvement of less than 20 dB 92% in left ear and 76% in right ear.

Age Group	Male	Female	Total
<20	4	2	6
21-30	9	7	16
31-40	10	8	18
41-50	7	3	10
Total	**30**	**20**	**50**

Table 1. Age Group Distribution in the Study Population

Type	Graft Uptake	Percentage
Temporalis fascia	42	84
Conchal cartilage	48	96

Table 2. Postoperative Graft Uptake

Preop AB Gap	No. of Patients (50)		Percentage
	Right Ear	Left Ear	
21-30	30	32	62
31-40	20	18	38

Table 3. Preoperative Hearing Levels

Hearing Level	Temporalis Fascia	Conchal Cartilage	Total	Percentage
<20	19	23	42	84
21-30	3	5	8	16
	22	**28**	**50**	**100**

Table 4. Postoperative Hearing Levels

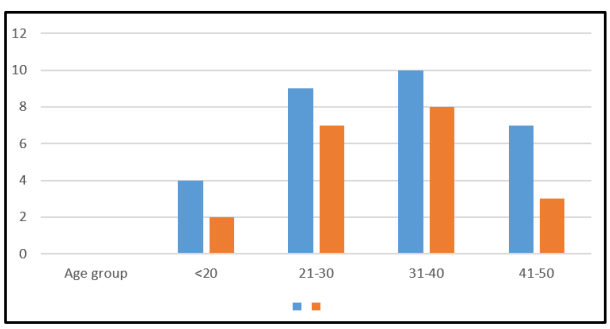

Chart 1. Age Group Distribution in the Study Population

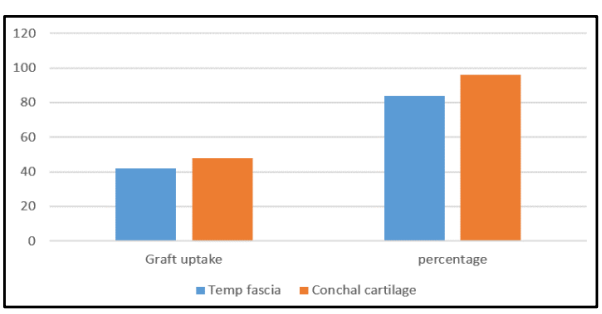

Chart 2. Postop Graft Uptake

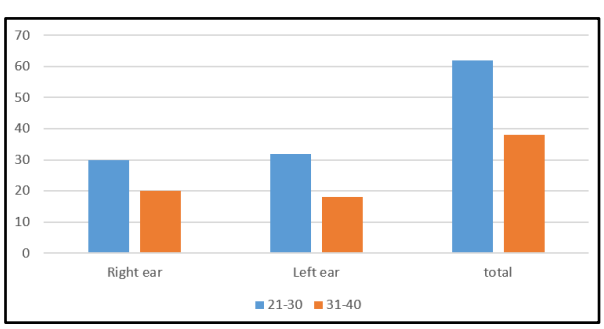

Chart 3. Preoperative Hearing Levels

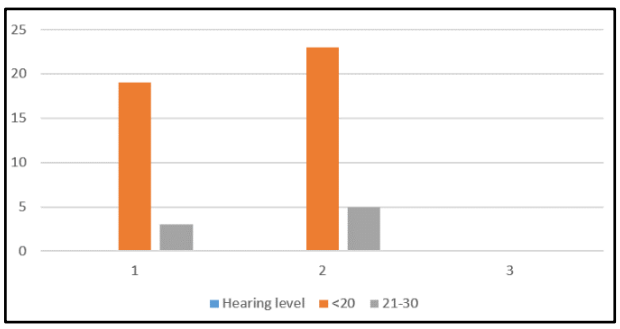

Chart 4. Postoperative Hearing Levels

DISCUSSION

Although, chronic suppurative otitis media is common in general population, majority have unilateral disease. There are many causes of tympanic membrane perforation. But, perforation resulting from unresolved otitis media during early childhood is the main factor accounting up to 80%. The most important nuisance effect of tympanic membrane perforation is the recurrent discharge from the ear. The other important effect is hearing impairment. Patients usually don't bother much about hearing if the other ear is normal. The resulting hearing impairment is troublesome, if it is bilateral. Furthermore, the degree of hearing loss is affected not only by size of perforation, but is also affected by site of perforation. In this study, we included patients above the age of 15 years. Although, there is no restriction in the upper age limit. But, most patients were from younger age group with mean age of 21 years. This is in accordance with other studies published in this context.

Pure tone audiometry was also performed in all patients to document degree of hearing loss and also to exclude sensorineural hearing loss. In this study, preoperative hearing loss was in accordance to the size of perforation and the duration of discharge ranging from 20 dB to 40 dB with average of 30 dB. This study, only patients with bilateral dry perforated eardrum were selected without ossicular damage, discharging ears and cholesteatoma. Most of the patients in this series had medium-sized perforation followed by large perforation as was also observed in most other studies. We used temporalis fascia graft in 50 (50%) ears and conchal cartilage in 50 ears. Bilateral myringoplasty, no external surgical scar on the other side. Successful anatomical closure of tympanic membrane perforation was achieved in 84% on right side and 96% on the left side, overall closure achieved was 90%. The grafts were taken up successfully by majority (84% and 96%), irrespective of the surgical approach used and did not differ in terms of hearing gain, this is commensurate with what is already reported.[3] Pure tone audiometry performed after 6 months of successful myringoplasty revealed hearing improvement of 96% in left ear and 88% in right ear with an average hearing gain of 17 dB in each ear. Medium-sized perforations were the most common type of perforations in this study (56.7%), which is similar to the results of the study by Omran.[6] However, in the study by Shrestha and Sinha,[7] large perforations were the most common. The ABG closure ratio or a change in the postoperative ABG, improved significantly as the mean hearing gain for all operated ears was 10.15

dB, which is similar to the results of Cruz et al.[8] The total success rate in terms of graft uptake at 6 months postoperatively was 93.3%, similar to the success rate reported by Yu and Yoon,[9] Gersdorff et al[10] and Karela et al[11] and higher than that reported by Omran and Dornhoffer.[12] However, our success rate was lower than that reported by Yung et al.[13] In majority of other studies, different types of tympanoplasties including myringoplasties, ossiculoplasties and mastoidectomies with unilateral or bilateral chronic otitis media with or without active discharging ears were included.[14] In contrast, in this study, only patients with bilateral dry perforated eardrum were selected without ossicular damage, discharging ears and cholesteatoma. Most of the patients in this series had medium-sized perforation, followed by large perforation as was also observed in most other studies.[10,15] This is also comparable to most other studies. Advantages of conchal cartilage from single ear include the following-

- Easy availability at the site of operation.
- Nontoxic.
- Less extrusion.
- Minimum shrinkage and lateralisation.
- Very cost effective.
- Maintains its rigid quality and resists resorption and retraction, even in the cases of severe eustachian tube dysfunction.
- Better cosmesis.
- Stable and resistant to negative middle ear pressure.

CONCLUSION

The bilateral myringoplasty is safe and effective procedure in patients with bilateral dry central perforation of tympanic membrane. The left side where cartilage was used showed a better result compared to the right side with fascia. It has the advantage of being performed in one sitting with single anaesthesia with temporalis fascia graft used on right side and conchal cartilage on left side without visible surgical scar on the other side with equally good anatomical and functional results as achieved in unilateral myringoplasties and cartilage myringoplasty fared better than graft myringoplasty.

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