Simple Underlay Myringoplasty: A Prospective Study

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ABSTRACT

Background: Chronic otitis media (COM) is highly prevalent disease encountered by an otologist world wide and also in Nepal. Myringoplasty is the treatment of choice in many cases. There are various techniques of performing myringoplasty with various types of grafts. We propose Simple Underlay Myringoplasty (SUM) using fat graft. **Objective**: The objective of this study was to evaluate the role of fat graft in closure of small dry central perforations by simple underlay myringoplasty (SUM) with aim to introduce SUM technique in this part of Nepal (Mid Western and Far Western Region). **Methods:** Young patients above 15 years of age with diagnosis of chronic otitis media, mucosal type with perforations smaller than 50% of tympanic membrane were included for fat graft myringoplasty. There were total 25 cases included for the study. All the cases were done under local anesthesia. A large single piece of fat, approximately double the size of perforation was harvested from the posterior side of ear lobule. The margin of perforation was freshened. The fat was placed like a dumbbell, equal portion lies medial and lateral to the perforation. Graft uptake results were evaluated after 4 weeks. **Results**: Graft uptake was successful in 23 patients (92%). **Conclusion:** The technique avoids extensive middle ear manipulation and it is safe, simpler procedure for the closure of a dry small central perforation. Its success rate is as good as myringoplasty using temporalis fascia in small central perforations.

Key words: *Chronic otitis media, fat graft, myringoplasty*

INTRODUCTION

Myringoplasty is one of the most common operations performed by an otolaryngologist. Temporalis fascia is the most common material used for the closure of tympanic membrane perforation. Berthold[1] in 1878 used a full-thickness free skin graft for tympanic membrane closure. Ringenberg used a fat tympanoplasy for the first time for the closure of a small tympanic perforation[2]. The fat graft tissue tympanoplasty has certain advantages as this procedure can be done on an outpatient basis. The patient goes home on the same day with very limited postoperative care. Fat can be harvested in a very short time and it avoids invasive extensive surgical manipulation of the middle ear.[3]

It is a simple and cost effective technique in managing small tympanic membrane perforation and the success rate of a fat-plug myringoplasty is comparable with the results of temporalis fascia tympanoplasty.[4] The aim of this study was to evaluate fat graft uptake rate in small central tympanic membrane perforations. To the best of our knowledge, the present study is first of its kind in Mid Western and Far Western Region of Nepal.

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MATERIALS AND METHODS

It was a prospective, longitudinal study conducted at Nepalgunj Medical College Teaching Hospital, Kohalpur, Nepal from January 2013 to February 2014. Total 25 cases were included in this study with age greater than 15 years, all gender, patient with chronic otits media mucosal with less than 50% central perforation of tympanic membrane and hearing loss less than 30dB. Perforation more than 50%, active mucosal disease and hearing loss more than 30dB were excluded from this study.

Surgical Technique

All the cases were done under local anaesthesia with 4% xylocaine soaked cotton ball placed over tympanic membrane to block tympanic plexus. All the cases were done via permeatal approach and done by first author. Tympanomeatal flap was not elevated in this technique in contrast to conventional myringoplasty. Around 2 ml of 2% xylocaine was injected on the posterior surface of the lobule and a small incision was made on the posterior aspect of the ear lobule. A single piece of fat, approximately twice the size of the perforation, was harvested (Figure 1) taking care not to make a buttonhole on the anterior surface of the lobule. The skin incision was sutured with silk 4-0. Using the operative microscope, the margin of the perforation was trimmed and de-epithelialized using a sickle knife (Figure 2). Small pieces of gelfoam were placed in the middle ear through the perforation. The piece of fat was positioned in such a way that equal proportion lied medially and laterally to the tympanic membrane and fit the

perforation snugly like a dumb-bell (Figure 3). The fat plug was overlaid with antibiotic soaked gelfoam. These gelfoam pieces prevent the displacement of the fat plug by supporting it from the both sides. The closure of the perforation (Graft uptake) was considered successful for a fat-plug myringoplasty after 4 weeks follow up.

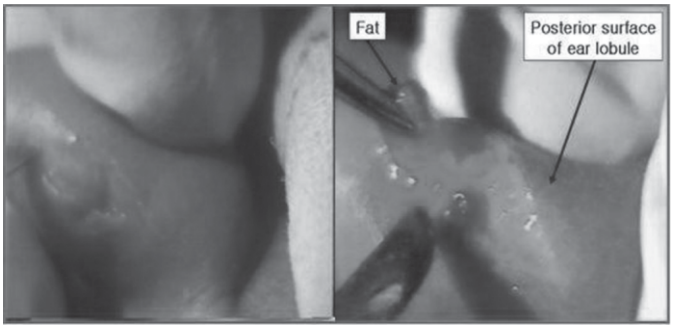

Figure 1: Incision on the posterior surface of the lobule and fat harvesting

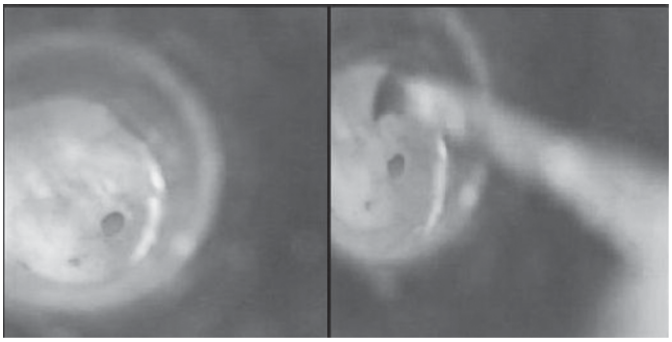

Figure 2: Small central perforation and using sickle knife to freshen the edges of perforation

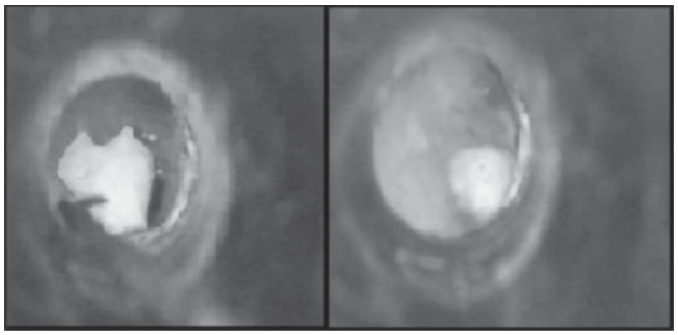

Figure 3: Figure 3: Fat plugging the perforation

RESULTS

There were total 25 cases included in this study. Among them, 15 patients were male and 10 patients were female. Twenty-three patients had complete closure of the tympanic membrane perforation while two patients had residual perforation after one month follow up. Overall success rate in our study was 92%. Average time for the procedure was only 20 minute

Author (Reference)	No. of cases	Success rate
Liew, et al., 2002(5)	15	100%
Ayache, et al., 2003(6)	45	91.9%
Hagemann & Hausler, 2003(7)	44	91%
Ozgursoy & Yorulmaz, 2005(3)	18	82.4%
Present Study 2015	25	92%

Table I: Results of myringoplasties with fat graft

DISCUSSION

The overall success rate in our study was 92% which is comparable with the study of Liew et al[5] who used adipose tissue in the persistent perforation following tympanostomy tube removal (Table I). He had a 100% success rate in his series of 15 children. He harvested fat by placing a small horizontal incision along the inferior aspect of the lobe. Ayache et al[6] harvested fat from the abdomen, making a separate skin incision close to the center of the umbilicus, in 91% of the cases and from the pretragal area in 9% of the cases. They also affixed the fat with biologic glue. Hagemann and Hausler[7] found a 91% success rate in their large study. Though in our study of 25 cases with 92% success, we propose a bigger study to establish its success rate. We restricted our case selection to those perforations with a size of less than 50%. The larger perforation was avoided for this type of procedure due to the possibility of failure.

Dedden et al[8] found that the size of the perforation is a crucial factor and 30% of the drum surface is a good prognostic factor for the fat graft. Perforations larger than one quadrant of the tympanic membrane are unfavorable for the insertion of the fat plug.[2] All our cases had the perforation in the antero inferior and postero inferior quadrant of the tympanic membrane and the success rate was not related with any particular quadrant of the tympanic membrane as shown in the result. It is important to note the property of the fat tissue for the fat tympanoplasy procedure. Although it can be harvested from the abdomen, buttock and ear lobule, the ear lobule fat harvesting is much simpler than the other sites. It can be harvested from the same sterile area of surgical field prepared for the fat tympanoplasy. Its scar is almost invisible as incision is given on the posterior

aspect of lobule. The fat of ear lobule is denser and has better epithelial and mucosal tympanic growth. It presents a big revascularization activity[2] as seen by otoscopy a few days after the procedure. There is significant bulging on the tympanic membrane[3] till the end of the third month postoperatively and after three months bulging of the fat graft progressively disappeared and converted into a smooth sclerotic area on the tympanic membrane at the fifth month. This findings were also seen in all our successful patients in the postoperative period of 1-3 months. There are two histological theories of fat grafts.[9] The host cell replacement theory' of Neuhof[10] and 'The cell survival theory' of Peer.[11]

The host cell replacement theory states that all the original cells die and are totally replaced by new wandering adipocytes or by fibroblasts. The cell survival theory states that not all the original adipose cells die. Those fat cells which receive adequate blood supply survive whereas remaining degenerate, thus explaining loss of volume. The transplanted fat cells are not replaced by scar tissue, instead a connective tissue capsule outside the fat graft begins three weeks after transplantation, which becomes progressively thinner over the course of a year. Fat tissue provides the basic requirement for the grafting of the tympanic membrane with its own favorable characteristics.[3]

CONCLUSION

The temporalis fascia is the most common material used for tympanoplasty. However, myringoplasty, using fat graft is a quick procedure and avoids middle ear manipulation. The harvesting of fat tissue is easy. Patient can be discharged on the same day with minimal postoperative care. Thus we propose that Fat-plug myringoplasty is easy, require less surgical time, cost effective with the success rate as good as with myringoplasty using temporal fascia for the small dry central perforation.

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