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Comparison of Short-Term and Long-Term Graft Uptake Success Rates Following Myringoplasty in Chronic Otitis Media (Mucosal Type)

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ABSTRACT

Introduction: Chronic otitis media (COM) has a high prevalence rate worldwide, and it is still more common in developing countries. COM is an inflammatory process of the mucoperiosteal lining of the middle ear space and mastoid. It is basically divided into squamous or mucosal types. The graft material most commonly used for surgery is temporalis fascia. ***Objective:*** The study's objective is to compare the overall success rate of Myringoplasty after 6 weeks and 4 months following surgery. ***Methods:*** It was a retrospective study from June 2021 to July 2022 in the Otolaryngology-Head & Neck Surgery Department at Bangabandhu Sheikh Mujib Medical University. A total of 100 patients underwent Myringoplasty in our study. Since all Myringoplasties were done under local anaesthesia, patients below 15 years were excluded. The rest of the cases from that period were included in the study. All Myringoplasty were done under local anesthesia using either temporalis fascia or Tragal cartilage. The outcome measured was the graft uptake rate at the end of 6 weeks and the end of 4 months. ***Results:*** The study included 100 patients undergoing Myringoplasty for chronic otitis media-mucosal type, with a mean age of 32.5 years. Females (61%) were more affected, and the right ear was involved in 56% of cases. Most perforations were medium-sized (48%) and commonly located in the anterior quadrant (40%). The temporalis fascia graft with the underlay technique was most frequently used (84%). Intraoperative complications were rare (5%). Overall graft uptake success was 83%, with no significant difference between short-term and long-term follow-up groups. These findings support Myringoplasty as a reliable treatment, with short-term follow-up adequate for most patients. ***Conclusion:*** Adding antrostomy to Myringoplasty does not increase complications but slightly extends the operative time. Outcomes were similar between experienced and less experienced surgeons, highlighting surgical precision. Short-term follow-up is sufficient for most patients, with long-term follow-up reserved for complex cases. Myringoplasty, with or without antrostomy, is safe and effective for tympanic membrane repair.

Keywords: Graft Uptake, Myringoplasty, Chronic Otitis Media.

INTRODUCTION

Chronic otitis media (COM) has a high prevalence rate worldwide. It is still more common in developing countries. It is an inflammatory process of the mucoperiosteal lining of the middle ear space and mastoid. COM is divided into squamous or mucosal types. Berthold first introduced Myringoplasty in 1878, which used a thick skin graft, while Wullstein and Zollner further developed the procedure and used a split skin graft [1-3]. By the 1980s, most otologists were convinced that a graft of mesodermal origin, such as perichondrium, fascia, vein, or fat tissue, was advantageous in Myringoplasty. The graft material most commonly used for the surgery is temporalis fascia. Some surgeons also use a tragal cartilage graft and tragal perichondrium as a graft. The main problems associated with the mucosal type are recurrent otorrhoea and hearing loss. So, Myringoplasty is recommended to eliminate these problems in the future. Although it is one of the common disease conditions otologists encounter in day-to-day practice, the surgical treatment of COM is not fully satisfying to patients and doctors as the procedure cannot be done with full assurance of success. When comparing the overall success rate of short-term versus long-term graft uptake following Myringoplasty for chronic otitis media-mucosal type, studies generally show a similar or slightly higher success rate in the short term compared to the long term, with most studies reporting a graft uptake success rate ranging from 80-90% in the immediate postoperative period, which may slightly decrease over time due to potential factors like recurrent infections or poor middle ear hygiene; however, the overall long-term success rate remains high in most cases. Most of the time, surgeons and patients are concerned about the success of Myringoplasty. Several factors may affect the outcome of Myringoplasty, such as the site and size of the perforation, technique (underlay versus overlay), experience of the surgeon, condition of the other ear, type of graft used, age of the patient and condition of the operated ear (dry versus wet). The success rate of Myringoplasty could be affected by multiple factors. Studies have been done to compare the success rate of Myringoplasty done differently in terms of types of graft, types of surgical technique, types of approaches, etc. Similarly, Myringoplasty with cortical mastoidectomy has also been identified as an effective method of treatment of chronic ear infections resistant to antibiotic therapy. Still, the effect of mastoidectomy on patients without evidence of active infectious disease remains highly debated and unproven [4]. There are multiple opinions regarding this matter. The first is that mastoidectomy is useful for both infected and dry ears [5]. The second is that mastoidectomy is useful for infected ears but not for dry ears [6]. The third is that mastoidectomy is neither useful for infected ears nor for dry ears [7, 8]. In addition, it has been suggested to protect against long-term middle ear damage by preventing the progression of ossicular pathology and the migration of squamous epithelium around the margins of the perforation with possible consequent cholesteatoma formation. Many times, surgeons are happy after looking at the tympanic membrane, which heals completely after a few weeks of surgery.

MATERIAL AND METHODS

A retrospective study was conducted from June 2021 to July 2022 in the Otolaryngology-Head & Neck Surgery Department of Bangabandhu Sheikh Mujib Medical University. A total of 100 patients underwent myringoplasty for chronic otitis media-mucosal type. Since all procedures were performed under local anesthesia, patients below 15 years of age were excluded. All eligible cases during this period were included in the study. The surgeries were performed by consultant ENT surgeons using different approaches, including perinatal, postural, and endaural, depending on the site of perforation and surgeon preference.

During the procedure, an incision was made along the perforation's edge, and a ring of epithelium was removed. The mucosal layer was stripped from the inner side of the perforation, and the fibrous annulus was circumferentially dissected, ensuring preservation of the ossicles, chorda tympani nerve, and any residual tympanic membrane. The tympanometry flap was then positioned to expose the perforation. The middle ear and ossicles were inspected for continuity, and any granulation tissue, tympanosclerosis, or adhesions were removed. The middle ear was packed with gel foam, ensuring adequate support while avoiding excessive packing near the ossicles to prevent adhesions. The graft, either temporalis fascia or cartilage, was placed medial to the malleus handle and securely under the anterior margin of the residual tympanic membrane.

In cartilage myringoplasty cases, the cartilage was shaped using either the palisade or bucket handle technique and placed over the gel foam. The tympanometry flap was repositioned over the graft, and gel foam pieces were placed along the graft and tympanic membrane. The external auditory canal was packed with a ribbon soaked in BIPP, and a mastoid pressure dressing was applied at the end of the procedure.

Postoperatively, all patients were prescribed oral antibiotics for one week until the external auditory canal pack was removed. Subsequently, they were instructed to use antibiotic-steroid ear drops for three weeks. Graft uptake was evaluated at two follow-up points: six weeks (short-term) and four months (long-term).

A subset of patients underwent a modified underlay myringoplasty under local anesthesia with a 4% xylocaine-soaked cotton ball placed over the tympanic membrane to block the tympanic plexus. These procedures were performed exclusively via the permeate approach without elevation of the tympanometry flap. The external auditory canal was cleaned, the perforation margins freshened, and the middle ear was packed with enough gel foam to support the graft. The harvested temporalis fascia was placed directly over the defect, ensuring contact with the remaining tympanic membrane to facilitate epithelialization and graft uptake. The primary outcome measure was the overall success rate of graft uptake, with comparisons made between short-term (≤3 months) and long-term (>3 months) follow-up groups to assess any differences in success rates over time.

RESULTS

The study included 100 patients undergoing myringoplasty for chronic otitis media-mucosal type. The mean age of the study population was 32.5±9.4 years, with the majority being female (61%) and the remaining 39% male. The right ear was more frequently affected (56%), and 22% of patients had associated comorbidities, while 78% were free of comorbid conditions (Table 1). Preoperative findings showed that 48% of patients had a medium-sized tympanic membrane perforation (25-50%), while 26% had small perforations, and another 26% had large perforations. In terms of perforation site, the anterior quadrant was most commonly involved (40%), followed by posterior (30%) and central perforations (30%). The middle ear mucosa was normal in 68% of patients, 20% had edematous mucosa, and 12% showed granulations (Table 2). Surgical data revealed that the postural approach was the most frequently used (65%), followed by the endaural (25%) and transcranial (10%) approaches. The temporalis fascia was the most commonly used graft material (84%), while perichondrium was used in 12% and other materials in 4%. The underlay technique was employed in 90% of cases, with the remaining 10% undergoing the overlay technique. The ossicular chain was intact in 93% of patients, while 5% had discontinuity and 2% had a fixed ossicular chain. Intraoperative complications were uncommon, occurring in only 5% of cases. The mean duration of surgery was 65.3±12.4 minutes (Table 3). At follow-up, graft uptake was successful in 83% of patients, while 17% experienced graft failure (Figure 1). When comparing graft uptake between follow-up durations, patients who were followed up in the short-term (≤3 months) had a 49.4% share of successful graft uptake cases, while those followed up in the long-term (>3 months) accounted for 50.6% of successful graft outcomes. Among the 17 patients with unsuccessful graft uptake, 52.94% were in the short-term follow-up group, and 47.06% were in the long-term group. This distribution suggests no significant difference in graft uptake success between short-term and long-term follow-up periods (Table 4).

Table 1: Demographical characteristic of the study population (N=100)

Variable	Frequency (n)	Percentage (%)
	Mean ± SD	
Age (years)	32.5 ± 9.4	
Sex		
Male	39	39.00
Female	61	61.00
Side of ear affected		
Right	56	56.00
Left	44	44.00
Comorbidities		
Present	22	22.00
Absent	78	78.00

Table 2: Pre-operative Findings of the Study Patients (N=100)

Variable	Frequency (n)	Percentage (%)
Size of perforation		
Small (<25%)	26	26.00
Medium (25-50%)	48	48.00
Large (>50%)	26	26.00
Site of perforation		
Anterior	40	40.00
Posterior	30	30.00
Central	30	30.00
Condition of middle ear mucosa		
Normal	68	68.00
Edematous	20	20.00
Granulations	12	12.00

Table 3: Distribution of Surgical Variables and Intraoperative Findings among Study Patients (n=100)

Variable	Frequency (n)	Percentage (%)
	Mean ± SD	
Surgical Approach		
Postaural	65	65.00
Endaural	25	25.00
Transcanal	10	10.00
Type of Graft Used		
Temporalis Fascia	84	84.00
Perichondrium	12	12.00
Other	4	4.00
Graft Placement Technique		
Underlay	90	90.00
Overlay	10	10.00
Ossicular Chain Condition		
Intact	93	93.00
Discontinuity	5	5.00
Fixed	2	2.00
Intraoperative Complications		
Yes	5	5.00
No	95	95.00
Duration of Surgery (minutes)	65.3 ± 12.4	

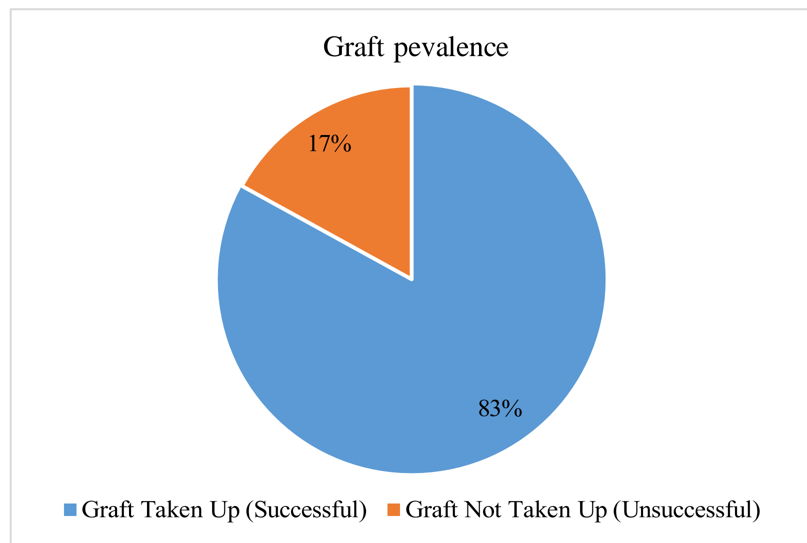

Figure 1: Distribution of Graft Uptake Status among Study Patients (n=100)

Table 4: Outcome Comparison of Graft Uptake Status between Short-term and Long-term Follow-up Groups (N=100)

Follow-up Duration	Graft Taken Up (Successful)		Graft Not Taken Up (Unsuccessful)	
	(N=83)		(N=17)	
	n	%	n	%
Short-term (≤3 months), (N=50)	41	49.40	9	52.94
Long-term (>3 months), (N=50)	42	50.60	8	47.06

DISCUSSION

Myringoplasty is a well-established surgical procedure for repairing tympanic membrane perforations, particularly in patients with chronic otitis media of the mucosal type. In the present study, the overall graft uptake rate was

83%, which aligns with previously published studies reporting success rates ranging from 80% to 90% [9-10]. The high success rate in this study may be attributed to meticulous surgical techniques, proper patient selection, and the predominant use of temporalis fascia, which is widely considered the gold standard graft material for myringoplasty [11]. The comparison between short-term (≤3 months) and long-term (>3 months) follow-up groups revealed no significant difference in graft uptake rates. This finding is consistent with previous research, indicating that most graft failures occur within the first few weeks after surgery due to infection, inadequate graft positioning, or Eustachian tube dysfunction [12]. Longer follow-up durations do not necessarily correlate with reduced success, as the tympanic membrane tends to stabilize within the first 3 months [13]. The short-term group accounted for 49.4% of successful graft cases in the current study. In comparison, the long-term group accounted for 50.6%, further supporting that follow-up duration does not significantly influence ultimate graft uptake. Preoperative factors, such as the size and site of perforation, middle ear mucosal condition, and the presence of granulation tissue, have been widely recognized as predictors of surgical outcome [14]. In this study, most patients had medium-sized perforations and normal middle ear mucosa, which may have positively influenced the overall success rate. Conversely, larger perforations and the presence of granulations have been associated with poorer outcomes [15]. The surgical approach (postural in 65% of cases) and underlay grafting technique (used in 90%) are also factors contributing to the favourable results, as both have been shown to provide better graft stabilization and lower extrusion rates compared to overlay techniques [16]. The low incidence of intraoperative complications (5%) underscores the importance of precise surgical techniques. Our findings indicate that incorporating an antrostomy procedure alongside myringoplasty does not lead to additional complications, though it does extend the average operative time to 65.3 minutes. Procedures were performed by less experienced and more experienced surgeons, with an equal distribution of cases between Group I and Group II for each surgeon. To strengthen these findings, further research with a larger sample size and, ideally, a single surgeon performing all procedures is recommended. Overall, this study supports the use of short-term follow-up as sufficient for evaluating the success of myringoplasty in most patients, with long-term follow-up reserved for those with specific complicating factors.

CONCLUSION

This study highlights that adding an antrostomy to myringoplasty does not increase intraoperative complications, though it modestly extends the operative time. Both experienced and less experienced surgeons achieved similar outcomes, emphasizing the importance of surgical precision over experience alone. Short-term follow-up proved sufficient for most patients, effectively assessing graft success and hearing improvement. Long-term follow-up may only be necessary for select cases with complicating factors. Future research with a larger sample size and procedures performed by a single surgeon is recommended to validate these findings further. Myringoplasty, with or without antrostomy, is safe and effective in tympanic membrane repair.

Conflict of Interest: *None.*
Source of Fund: *Nil.*

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