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Original Research Paper

ENT

"UNDERLAY TYPE 1 TYMPANOPLASTY USING VASCULARISED PEDICLE TEMPORALIS FASCIA GRAFT"

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ABSTRACT

Introduction: Chronic Otitis Media is commonly causes chronic inflammation of mucoperiosteal lining of middle ear cleft.. There are several techniques developed in repair of tympanic membrane perforation i.e. use of vascularised pedicle temporalis fascia graft, so present study aims to compare functional outcome of underlay type-1 tympanoplasty using vascularised pedicle temporalis fascia graft. in patients of COM . **Materials & Methods:** All patients of tubotympanic CSOM included in study with sample size of 74 (collected by simple random sampling) and study duration of 24 months **Results:** Majority of study subjects 33 (44.6%) were from age group of 21-30. Majority of cases 37 (50%) had a moderate perforation followed by small perforation in 22 (29.7%) and large perforation in 13 (17.6%). Ear discharge was seen in 72 (97.3%) while hearing loss in 71 (96%) when they presented to ENT OPD. 36 (48.6%) subjects demonstrated an Air-bone gap of 21-30dB followed by 23 (31%) had a gap 31-40dB while 15 (20.3%) had a gap <20dB. 71 (96%) of the cases had an intact TM suggestive of successful graft uptake and only 3 (4%) reported a perforated TM indicative of graft failure. **Conclusion:** Vascularised pedicle graft provides substantial and comparable graft success rates irrespective of the size of perforation. There is significant improvement in hearing and good patient satisfaction. It is associated with a very low failure rate after long follow up

KEYWORDS : CSOM, vascularized pedicle graft, middle ear surgery

1. INTRODUCTION-

Among the several debilitating ear pathologies, Chronic Otitis media (COM) or Chronic suppurative otitis media (CSOM) is one such commonly observed condition that causes chronic inflammation of the mucoperiosteal lining in the middle ear cleft [1]. Type 1 tympanoplasty is conducted when the ossicular chain is intact and mainly involves the repair of tympanic membrane perforations. It ultimately results in restoration of hearing postoperatively [2]. There are several techniques and modifications that are developed for the repair of tympanic membrane perforations.These are generally divided into the underlay or overlay grafting techniques, which involve, respectively, the insertion of a graft either medially or laterally to the fibrous tympanic membrane annulus [3,4]. Each technique has its own application, advantages and complications.

Underlay Tympanoplasty is recognized as a novel modified underlay technique with a skin flap that is placed, for reconstructing anterior, subtotal or total tympanic membrane perforations [5-7]. This technique combines the ease of the underlay technique, with the higher success rate of the overlay approach for this kind of perforations [8]. In the recent studies, vascular pedicle temporalis fascia grafts have been used for tympanic membrane repairs, however studies on their functional outcomes are very few [9,10]. In this context, the present study aims to compare the functional outcomes of underlay type 1 tympanoplasty using a vascularised pedicle temporalis fascia graft in patients with COM.

2. AIMS & OBJECTIVES-

AIMS-

1. Assessment of graft take-up success rate in type 1 tympanoplasty using vascularised pedicle temporalis fascia graft.
2. Assessment of hearing improvement in type 1 tympanoplasty using vascularised pedicle temporalis fascia graft.

OBJECTIVES-

1. To study take-up rate of vascularised pedicle temporalis fascia graft in patients during follow-up.
2. To study the air-bone gap closure in chronic suppurative otitis media patients who is undergoing type-1 tympanoplasty using vascularised pedicle temporalis fascia graft.
3. To study long term (over months) results in patients undergoing type 1 tympanoplasty using vascularised pedicle temporalis fascia graft.

3. METHODS

This was a cross sectional study done in Department of ENT, Vilasrao Deshmukh Govt. Medical College, Latur. Study was done from Nov. 2019 to Oct 2021. All patients of CSOM in whom the middle ear surgery was planned were included in the study. Total number of sample size was 74 patients.

Inclusion Criteria-

Inclusion criteria were patients of tubotympanic CSOM who required middle ear surgery, patients who gave written consent for inclusion in the study.

Exclusion Criteria-

Exclusion criteria were patients who did not give consent, revision middle ear surgeries, cases with ossicular chain erosion, atticoantral CSOM, cases with complications.

Statistical Analysis-

Following statistical parameters used to express study results-

- Means and standard deviations for continuous variables.
- Ratios, proportions, odds ratio & 95% confidence interval for categorical variable.
- Perasons Chi square test/ Fischer exact test.
- Wilcoron signed rank test/ paired sample t-test.

4. RESULTS

Observations in total study population (n=74)

In our study thee are patients ranging from 16-52 years. Maximum 44.6% (33) patients belong to 21-60 years. We found that females were affected more than males i.e 40(54%) females and 34 males (46%) males thus F:M is 1.1:1 and it was further observed that higher female : Male ratio is maintained in individual age groups also. Amongst Unilateral disease, left is more commonly involved as 34.9% as compared to right 35.1%

Observations based on ear microscopy findings- Majority 37(50%) of cases had a moderate perforation followed by small perforations in 22(29.7%) and large perforation in 13 (17.6%). Only 2 (2.7%) had a subtotal perforation.

Observations based on PTA

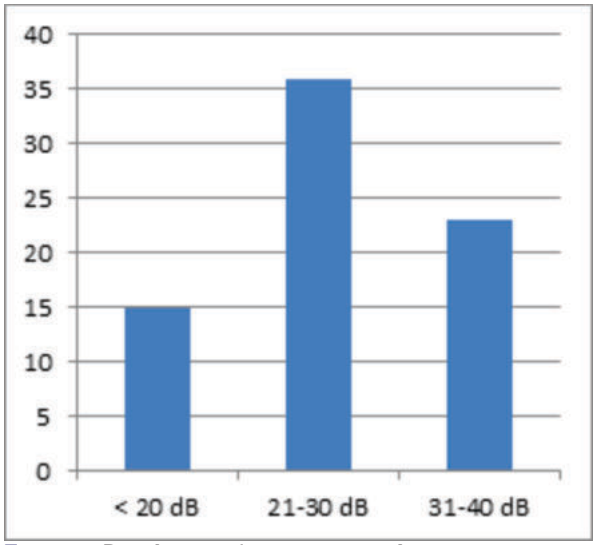

Figure 1: Distribution of patients according to preoperative ABG (N=74)

It was observed that 36(48.6%) of the cases demonstrated an Air bone gap of 21-30dB followed by 23 (31.1%) of them with an air bone gap of 31-40dB and 15 (20.3%) with an air bone gap of <20dB

Figure 2: Distribution of patients according to post-operative graft status at 6 months. (N=74)

It was observed that 71 (96%) of cases had an intact TM suggestive of successful graft uptake and only 3 (4%) cases reported a perforated TM indicative of graft failure

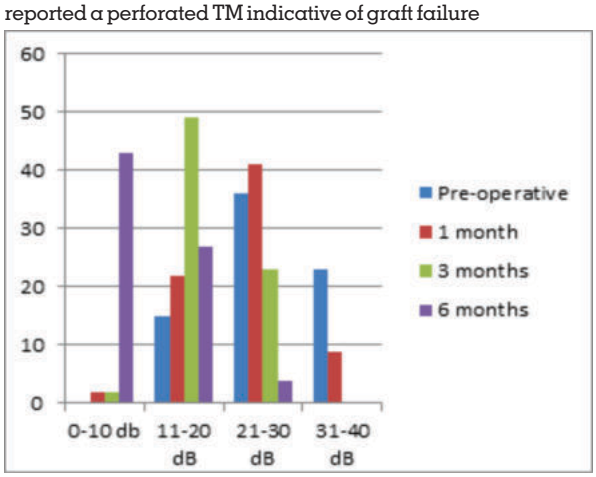

Figure 3: Distribution of patients according to improvement in postoperative ABG closure at 1 month, 3 months and 6 months. (N=74)

There was a statistically significant closure in the ABG in the preoperative category of 31-40dB at 3 & 6 months post-operative follow up (p<0.0000001)

Table I: Distribution of patients according to postoperative hearing improvement.

Hearing Loss	Pre-operative No (%)	Post-Operative No(%)	P value
Yes	71 (96%)	0 (0%)	<0.0000001
No	3 (4%)	74(100%)	
Total	74	74 (100)	

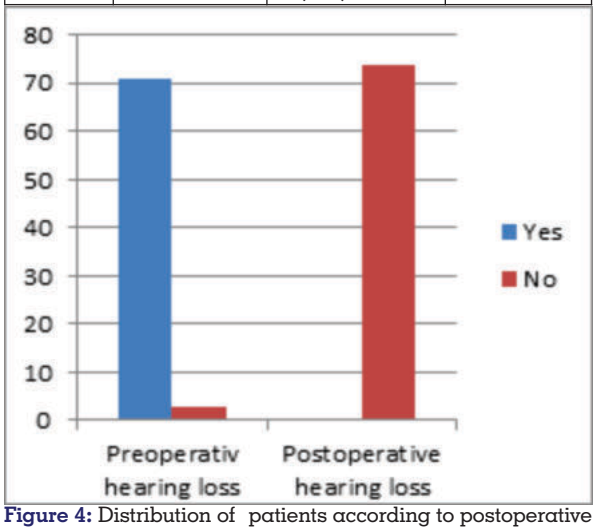

Figure 4: Distribution of patients according to postoperative hearing improvement. (N=74)

It was observed that there was a statistically significant improvement in hearing after surgery with restoration of hearing in all cases. (p<0.0000001)

5. DISCUSSION

The present study was conducted in the Otorhinolaryngology department of a tertiary care centre among 74 cases of CSOM to study take-up rate of vascularised pedicle temporalis fascia graft. In patients undergoing type 1 tympanoplasty along with the Air-bone gap closure and hearing improvement as assessed using pure tone audiometry over a period of 6 months follow up.

In our study there patients ranging from 16-52 years. Age group of 21-30 years (44.6%) are the most common age groups in whom CSOM is detected followed by 31-40 years (27%). These results were similar to study done by Fernandez et al[11]. He found that majority of patients of CSOM were among age group of 21-30 years. Kumar et al. reported 31-40 years age group is the most commonest age group [12].

In our study we found that F:M 1.1:1, this higher F:M ratio is maintained even in individual age groups also. These results of our study are similar to the study done by Fernandez et al, Kumar et al., Singh et al. & Loy et al [13].

In our study, it is observed that majority 37(50%) of the cases had moderate perforation. This was followed by small perforations that were observed in 22 (29.7%) of the cases and large perforations in 13 (17.6%) of the cases. This is similarly reported by Kumar et al who observed 18 (51.4%) cases with medium sized perforations, 9 (25.7%) with large central perforations and 8 (22.8%) with small central perforations [14].

In our study, after vascularised pedicle graft Tympanoplasty, it was observed that 71 (96%) of the cases had an intact TM suggestive of successful graft uptake and only 3 (4%) of the cases reported a perforated TM indicative of graft failure at the end of 6 months follow up. Similarly, the study by Fernandez et al (2019) also reported successful TM perforation closure in 93.33% when among composite cartilage and temporalis fascia graft as compared to temporalis fascia alone which had a success rate of 81.66%.

These findings also resonate with those reported by Singh et al (2019) which showed a graft take up rate of 85% in the temporalis fascia group as compared to tragal and conchal cartilage grafts that showed an uptake rate of 95%. Similar rates of graft uptake were reported by other studies [15].

In our study, there was a statistically significant closure in the ABG in the preoperative category of 31-40dB at 3 and 6 months postoperative follow up ($p<0.0000001$). It was also observed that there was a statistically significant improvement in the hearing after the surgery with restoration of haering in all the cases ($p<0.0000001$). In the Avile's, the post-operative ABG declined significantly from 30.38+/- 6.01 to 6.94+/- 6.4 [11]. This was in also agreement with that observed by ElBatawi et al. who reported the postoperative mean ABG of 7dB +/- 5SD from the preoperative mean of 18 dB +/- 5 SD. In their study the hearing gain was about 25.53+/-6.26 which was statistically significant [16]. In another study by Singh et al the reported improvement in hearing was 13.34 dB. This difference between preoperative and postoperative hearing levels was statistically significant ($p<0.001$) [13].

The study by Vaidya et al. observed an average hearing improvement of 14.03dB in small sized perforations, 16.08dB hearing improvement in medium sized perforations, 15dB in large sized perforations and 16.25dB hearing improvement in subtotal perforations [17]. Similarly, Deosthale et al reported that average hearing improvement of 19.25dB in subtotal perforations as compared to small sized perforations (6.03dB) [18]. Also, in the study conducted by Zhang et al there was an average improvement in hearing from 5.5dB to 10.5dB [19].

Therefore, our study concludes that vascularised pedicle graft provides substantial and comparable graft success rates irrespective of the size of perforation and sitgnificant improvement in symptoms, hearing and good patient satisfaction.

6. CONCLUSION-

1. Vascularised pedicle graft provides substantial and comparable graft success rates irrespective of the size of perforation
2. There is significant improvement in hearing and good patient satisfaction.
3. It is associated with a very low failure rate after long follow up

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Conflict of Interest- None declared

Ethical Approval- The study was approved by the Institutional Ethical Committee

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