



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 12, Issue, 09, pp.13730-13732, September, 2020

DOI: <https://doi.org/10.24941/ijcr.39702.09.2020>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

RESEARCH ARTICLE

TO STUDY THE OUTCOME OF PAPER PATCH MYRINGOPLASTY IN PATIENTS WITH TYMPANIC MEMBRANE PERFORATIONS

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ARTICLE INFO

Article History:

Received 19th June, 2020
Received in revised form
17th July, 2020
Accepted 24th August, 2020
Published online 30th September, 2020

Key Words:

TM Perforation,
Paper Patching, Myringoplasty.

ABSTRACT

Background-The aims of our study were to evaluate the outcome of office-based paper patch grafting in tympanic membrane (TM). **Methods-** This is a retrospective study of 100 patients that underwent paper patch myringoplasty in an outpatient setting. The clinical factors with potential impact on the healing status of the TM were investigated: gender, age, laterality, etiology, duration of perforation, tinnitus, hearing loss, otorrhea, size and location of perforation, status of contralateral ear, ipsilateral findings of computed tomography, and duration of complete healing. **Results-** The total success rate of paper patch grafting was 76.00%. For inflammatory TM perforation completely healed in 59.09% cases, and the mean duration of complete healing was 18.24±16.2 weeks. Traumatic TM perforation completely healed in 78.26% cases, and the mean duration of complete healing was 11.24±12.3 weeks. **Conclusion-** Paper patch grafting can also be considered before formal surgical myringoplasty in the case of small, dry, chronic TM perforations.

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Citation: Baldev Singh and Sanjay Meena. 2020. "To study the outcome of paper patch myringoplasty in patients with tympanic membrane perforations", *International Journal of Current Research*, 12, (09), 13730-13732.

INTRODUCTION

The tympanic membrane is a membranous structure 0.1mm in thickness and 10-11 mm in length which separates the middle ear cavity from the external ear pathway and transmits sound waves to the middle ear (Duckert, 1998). Tympanic membrane perforation is seen as partial and/or total rupture of the ear membrane which can occur for many reasons such as trauma, infection, malignant tumors or iatrogenic interventions (World Health Organization, 2016). Chronic suppurative otitis media (CSOM) is an infection of the middle ear cavity, the eustachian tube and mastoid and is the most frequent cause of permanent tympanic membrane perforation, especially in developed countries (Avnstrop, 2016). Because of perforation, the tympanic membrane is non-intact and there is an intermittent suppurative discharge in the external ear pathway. Conductive hearing loss accompanies the table because of tympanic membrane perforation. Even though a low socio-economic level, crowded living environments, insufficient intake of maternal breast milk, poor nutrition, cigarette smoking, and allergies are held responsible in the etiology, the main etiological factor is frequently recurring and not fully treated middle ear infections (Bluestone, 1998). Traumatic tympanic membrane perforations (TTMP) are a result of blunt or penetrating trauma causing increased pressure in the

external ear pathway, such as traffic accidents, slap injury, blast injury, terror attacks or self-inflicted injuries. Perforations are generally in the anterior quadrant in the pars tensa and tend to spontaneously recover (Gür, 2016).

MATERIALS AND METHODS

Type of study- Retrospective study.

Study Population: Patients in which patch graft myringoplasty was performed to close a TM perforation by an ENT surgeon.

Inclusion criteria- Patients with TM perforations regardless of the cause or onset.

Exclusion criteria

- History of previous middle ear surgery;
- Nasopharyngeal or skull base pathology resulting in Eustachian tube dysfunction;
- History of radiation to head and neck region;
- Attic perforation;
- Patient refusing paper patch grafting and choosing alternative treatment options; and
- Patients who were followed up for less than 1 year after paper patch grafting.

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This retrospective study enrolled all cases in which patch graft myringoplasty was performed to close a TM perforation by an ENT surgeon and informed consent was waived because of the retrospective nature of the study. The candidates for data analysis were patients with TM perforations regardless of the cause or onset. The middle ear/mastoid pathology was verified by operating microscope/otoendoscopy or computed tomography (CT).

Data analysis: Data was recorded on a Performa. The data analysis was computer based; SPSS-22 will be used for analysis. For categorical variables chi-square test was used. For continuous variables independent samples's *t*-test will be used. *p*-value <0.05 was considered as significant.

Results

Table 1. Demographic variable

Mean age	42.15±20.14 Yrs
Sex (Male : Female)	42:58
Area (Rural : Urban)	48:52
Etiology (Trauma: Infection: Iatrogenic: Unknown)	46 : 44 : 6 : 4
Side (Right:Left)	45:55

Mean age of patients 42.15±20.14 Yrs. 58 patients were female and 52 patients were from urban area. 46 cases were traumatic injury and 44 cases were infective.

Table 2. Clinical profile

Tinnitus present	56(56.00%)
Hearing loss present	61(61.00%)
Time interval between TM perforation and patch grafting	64(64.00%)
	3 weeks- 3 months 25(25.00%)
	>3 months 11(11.00%)
Size of TM perforation	<1/3 78(78.00%)
	1/3-2/3 18(18.00%)
	>2/3 4(4.00%)
Location of TM perforation	Anterior 67(67.00%)
	Inferior 9(9.00%)
	Posterior 19(19.00%)
	Multiple 5(5.00%)
Duration for complete healing (weeks, mean ±SD)	15.1±12.9
Success rate	76(76.00%)

For inflammatory TM perforation completely healed in 59.09% cases, and the mean duration of complete healing was 18.24±16.2 weeks. Traumatic TM perforation completely healed in 78.26% cases, and the mean duration of complete healing was 11.24±12.3 weeks.

DISCUSSION

The long-term success rate of paper patch grafting for TM perforation was 76.00% in this study. Our success rate is similar to or slightly higher than those in previous reports (Golz, 2003; Lee, 2008). However, our general success rate is lower than that reported by Lou et al. (2012) In their study, almost 98% of 504 cases with traumatic TM perforations were acute onset (within 1 month after a trauma), and a spontaneous healing rate of 89% cases was reported. In this study, the long-term success rate reached 86.0% only for 50 cases with traumatic TM perforations within 3 weeks after onset. Our success rate of paper patch grafting for traumatic TM perforations were acute onset is still lower than that of Lou et al. ⁸ and this difference in success rate suggests that there may

be other prognostic factors apart from etiology. The strength of this study is that we evaluated the predictive clinical factors for successful paper patch myringoplasty for TM perforation. Previous studies reported the size of TM perforations as the predictor for successful paper patching. Golz et al. (2003) reported that the closure rate of paper patch myringoplasty depended on the perforation size in the cases of chronic perforations of more than 1 year. Lee et al. (2008) also reported that TM perforations of less than 4 mm show the highest closure rate, significantly in cases of chronic otitis media. However, these two studies analyzed only the size of TM perforation as the outcome predictor and did not evaluate any other clinical factors.

The study by Park et al. (2015) reported that perforation size was the only outcome predictor of paper patch myringoplasty, although they analyzed predictive factors, including age, sex, affected ear, hearing level, duration of perforation, cause, location and size of perforation, relationship between the perforation border and the malleus, status of TM surface, and number of patch applications. Contrastingly, our study revealed that patient's age, etiology of TM perforation, and history of otorrhea were the important predictive factors for successful paper patch myringoplasty for TM perforation. There were three major differences between the materials and methods of the two studies. The candidates of Park et al. ⁹ had chronic perforations lasting for more than 3 months; however, our study included all TM perforations regardless of duration.

Conclusion

The predictors of successful outcome were patient's age and etiology of perforation. Clinicians can attempt paper patch myringoplasty first in younger patients, traumatic TM perforation cases, and in patients with no history of otorrhea. Paper patch grafting can also be considered before formal surgical myringoplasty in the case of small, dry, chronic TM perforations.

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