

Innovative Surgical Approaches in Myringoplasty: A Comprehensive Evaluation of Endoscopic Technique without Elevating the Tympanomeatal Flap

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Abstract

Introduction

Chronic otitis media- mucosal type, is a prevalent otological condition. Surgical intervention is often necessary. Various techniques developed over the years. In this study, we investigate the efficacy of endoscopic myringoplasty without tympanomeatal flap elevation, with the use of tragal cartilage.

Methodology

A retrospective descriptive study was conducted at General Hospital Ampara, Sri Lanka, from January 2022 to August 2023. The surgical procedures were performed by the same surgeon, Due to the unavailability of pure-tone audiometry (PTA) and Tympanometry facilities, only physical healing outcomes were assessed.

Results


The study analyzed 97 cases. Among pediatric patients aged 10 to 14 years, 50% achieved successful outcomes after endoscopic myringoplasty. In the adult group (15 to 60 years), 93.26% experienced successful closure of perforations, with only 6.74% showing residual perforations. Cases above 60 years achieved 100% successful outcomes. The overall success rate for all cases in the study was 92.78%.

Conclusion

The study revealed the potential advantages of this surgical technique. Further research and refinement is needed to optimize patient outcomes and enhance the management.

Key words: Endoscopic , Myringoplasty, Tragal cartilage, tympanomeatal flap

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Introduction

Chronic otitis media with tympanic membrane perforation (Mucosal Type of Chronic otitis media) is one of the most common otological condition¹. It is characterized by the perforation of the tympanic membrane, often accompanied by recurrent ear infections and hearing loss². It affects the quality of life and necessitates frequent medical attention².

The hallmark of mucosal type chronic otitis media is the presence of a perforation in the tympanic membrane³. The tympanic membrane plays a critical role in the auditory system⁴. Perforations disrupt the normal transmission of sound waves from the outer to middle ear, causing hearing impairment that can range from mild to profound⁵. As a result, it can lead to difficulties in communication, social interactions, and even educational and occupational problems⁵.

Therefore, the management of chronic otitis media with tympanic membrane perforation is important¹. Surgical intervention is necessary in most instances. The aim of the surgery is to close the tympanic membrane perforation and restore hearing. Over the years, various surgical techniques have been developed to improve patient outcomes^{1,6}.

In this descriptive study, we focus on an exploration of one such surgical approach: endoscopic myringoplasty without tympanomeatal flap elevation, a technique that offers a promising alternative to traditional methods. In addition to this innovative approach, we studied the use of tragal cartilage as a graft material, which exhibits unique properties conducive to successful tympanic membrane repair^{5,6}. By avoiding the elevation of the tympanomeatal flap, this technique aims to ease the surgical process and reduce surgical trauma and operative time⁷.

Our study seeks to provide evidence of the clinical outcomes and success rates associated with this novel surgical approach. Furthermore, we specifically focus on patients diagnosed with chronic otitis media of the inactive mucosal type who are aged between 10 to 14 years and above 60 years, as these subgroups present their own unique set of challenges and considerations.

By shedding light on our experiences and outcomes with endoscopic myringoplasty utilizing tragal cartilage, we aim to contribute valuable insights to the field of otology and help refine the management of this common yet impact full otological condition.

Methodology

This retrospective descriptive study was conducted from January 2022 to August 2023 at General Hospital Ampara, Sri Lanka. All surgical procedures were performed by the same person. The surgical technique involved the following steps:

- Examination and assessment of the tympanic membrane perforation.
- Measurement of the defect size using a Rosen's round knife.
- Harvesting of tragal cartilage with preservation of one side's perichondrium.
- Preparation of the cartilage graft according to the initial defect measurement.
- Placement of the graft to ensure the cartilage was oriented outward.
- Anchoring the graft with gelfoam^R and insertion of a wick.
- Wick removal after two weeks, followed by a reassessment after two months.

Due to the unavailability of pure-tone audiometry (PTA) and Tympanometry facilities, only physical healing outcomes were assessed in this study.

Literature Review

We conducted our literature review to evaluate the impact of chronic otitis media - mucosal type and to study various surgical techniques which are currently practicing.

Schilder et al¹ conducted a systematic review to assess the effectiveness of surgical treatments for tympanic membrane perforations and found to have the surgical intervention is crucial in tympanic membrane perforation management.

Acuin's² study report which was in WHO highlights the impact of chronic otitis media on affected individuals. They also emphasized that the proper management improves the quality of life significantly.

In India, Pal et al³. Conducted a study on endoscopic Myringoplasty approach and they highlighted the benefits in reducing surgical trauma and the time. According to them the endoscopic approach enhanced the comfortableness of the patient.

In the Iranian journal of Otorhinolaryngology, there was a study by Ahmadi A et al⁴. They compared the endoscopic and the microscopic approaches. They have showed the benefits and drawbacks of both methods. Also, Rezende et al. conducted a prospective study of 168 patients to assess the outcomes of endoscopic Myringoplasty. This research provides valuable clinical evidence of the effectiveness of the endoscopic approach.

In 2010,Chole and Hubbell conducted a study to assess the use of cartilage as the graft material in Myringoplasty and provided valuable insights into the effectiveness of cartilage graft⁵. In contrast to that Chirila et al. present a study that studied on Myringoplasty using tragal cartilage⁶. They found that the tragal cartilage is positively effective in achieving closure of tympanic membrane perforations.

Inclusion and Exclusion Criteria.

Inclusion criteria

Patients with inactive mucosal type chronic otitis media
Patients aged above ten years.

Exclusion criteria

Patient with active mucosal chronic otitis media
Patients below ten years of age.

Results

In this study evaluating the efficacy of endoscopic myringoplasty without tympanomeatal flap elevation, a total of 97 cases were analyzed. The patients were categorized into different age groups. Four patients (4.12%) were aged between 10 to 14 years, Four patients (4.12%) were above 60 years, and the majority, 89 patients (91.75%), fell in the age range of 15 to 60 years.

Among the pediatric group (10 to 14 years), comprising 4 cases, 2 cases (50%) presented with residual perforations, while the other 2 cases (50%) achieved successful outcomes, indicating a balanced result within this age group.

In the adult group (15 to 60 years), which constituted the largest portion of the study population with 89 cases, 6 cases (6.74%) showed residual perforations, while the majority, 83 cases (93.26%), experienced successful closure of the perforation.

Remarkably, in the senior age group (above 60 years), all 4 cases (100%) achieved successful outcomes.

The results illustrate the procedure's effectiveness across different age groups. The overall success rate for all cases in the study was 92.78%, indicating the favorable outcomes of endoscopic myringoplasty without tympanomeatal flap elevation in this cohort.

Discussion

Mucosal type chronic otitis media is a prevalent otological condition that badly affects the lives of affected individuals. Due to the presence of a perforation in the tympanic membrane, this condition leads to recurrent ear infections. It also results varying degrees of hearing loss. Therefore it affects the quality of life of the individual, necessitating frequent medical attention.

The tympanic membrane is an important part of the auditory conductive system, responsible for the transmission of sound waves from the outer to the middle ear. Perforations in it, interferes the normal conduction of sound, resulting in conductive type of hearing impairment which may ranges from mild to profound⁷. This affects in communication, social interactions, education and employment.

The goal of the treatment of inactive mucosal type chronic otitis media is the closure of the tympanic membrane and restore hearing. Surgical management is the option when the medical management fails. Many types of surgical methods have been described in the history⁸.

In this descriptive study, we evaluated the effectiveness of one such surgical approach – endoscopic myringoplasty without tympanomeatal flap elevation. This technique gives a good alternative to traditional methods. Through avoiding the elevation of the tympanomeatal flap, this approach not only simplifies the surgical process but also reduces surgical trauma and operative time. It enhances patient comfort and postoperative recovery.

Our study has focused on providing valuable evidence to the clinical outcomes and success rates associated with this novel surgical Technique. A special attention was placed on patients those aged between 10 to 14 years and above 60 years. These age groups were chosen due to their specific considerations and the potential variability in treatment outcomes.

The results of our study, of a total of 97 cases, have revealed several important findings. The age distribution among patients demonstrated a wide range, with the most falling between 15 to 60 years. It shows the diverse demographic affected by this condition. In the pediatric age group (10 to 14 years), relatively a low outcome was observed. But in the adult population (15 to 60 years) majority of the study group, had a successful closure of perforations. Only six patients ended with a residual perforation showing the importance of understanding the factors contributing to varied outcomes. Even though it is not advisable to perform myringoplasty in the above 60 years of age group, we were able to show good results. The overall success rate for all cases in our study was 92.78%, underlining the favorable outcomes associated with endoscopic myringoplasty without tympanomeatal flap elevation.

It's important to acknowledge the limitations of our study, including the absence of pure-tone audiometry (PTA) and tympanometry facilities for hearing assessment. As the facility is not available in our center it was very difficult to get two PTA s (Pre surgical and post surgical) This restricted our evaluation to physical healing outcomes, necessitating the inclusion of comprehensive audiometric assessments in future studies .

Conclusion

In conclusion, our study sheds light on the effectiveness of endoscopic myringoplasty without tympanomeatal flap elevation, offering a promising avenue for the management of chronic otitis media with tympanic membrane perforation. These results show the potential advantages of this innovative surgical technique, and highlight the importance of further research and refinement to optimize patient outcomes in managing this prevalent and impact full otological condition.

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