

A Prospective Study Comparing Healing Times after Modified Radical Mastoidectomy with or Without Mastoid Cavity Obliteration

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Abstract:**Background:** Chronic otitis media is a common middle ear condition necessitating surgical intervention, with modified radical mastoidectomy (MRM) being a well-established approach. A debate exists regarding the incorporation of mastoid cavity obliteration during MRM surgery, which aims to expedite healing and reduce complications.**Methods:** A prospective comparative study was conducted involving 100 patients diagnosed with chronic otitis media. Patients were randomized into two groups: Category A (MRM with mastoid cavity obliteration) and Category B (MRM without obliteration). Gender and age distributions were analyzed. Healing times were assessed using an independent T test.**Results:** Gender and age distributions did not significantly differ between groups. Notably, Category A exhibited a faster healing time (10.83 weeks) compared to Category B (12.62 weeks), with a statistically significant difference ($p = 0.007$).**Conclusion:** Mastoid cavity obliteration in MRM surgery appears to accelerate healing, which may enhance postoperative recovery. This finding aligns with previous studies, emphasizing the potential benefits of this technique in surgical outcomes.**Recommendations:** Based on these results, we recommend considering mastoid cavity obliteration as a valuable adjunct in MRM surgery for chronic otitis media.**Keywords:** Modified Radical Mastoidectomy, Chronic Otitis Media, Mastoid Cavity Obliteration, Healing Time.

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Introduction

Chronic otitis media is a common and challenging middle ear condition that affects individuals of all ages. It is characterized by inflammation and recurrent infections of the middle ear cavity, which can lead to a range of complications, including hearing loss, persistent discomfort, and erosion of the mastoid bone [1]. Due to its potential for serious consequences, surgical intervention is often necessary to manage chronic otitis media effectively.

One well-established surgical approach for treating chronic otitis media is modified radical mastoidectomy. This procedure is designed to address the underlying issues by removing diseased tissue, improving the aeration of the middle ear, and facilitating drainage of both the middle ear and mastoid spaces [2]. The ultimate goal of modified

radical mastoidectomy is to resolve the chronic infection and prevent its recurrence, thereby restoring the patient's ear health.

In recent years, the otolaryngology community has shown increasing interest in the technique of mastoid cavity obliteration when performing modified radical mastoidectomy. Mastoid cavity obliteration involves the use of various materials, such as autologous bone, cartilage grafts, or synthetic substances, to fill the surgical cavity created during mastoidectomy [3]. The primary aim of this additional step is to promote faster healing and reduce the risk of complications that may arise in the post-operative period.

However, a significant debate persists within the field regarding the best surgical approach for

chronic otitis media. While some surgeons advocate for the incorporation of mastoid cavity obliteration, others argue for the traditional approach of modified radical mastoidectomy without obliteration, citing concerns about potential complications and the long-term outcomes of each technique [4].

The aim of this study is to compare the healing times and potential complications associated with modified radical mastoidectomy with and without mastoid cavity obliteration in the management of chronic otitis media.

Methodology

Study Design: This study followed a prospective research design.

Study Setting: The research was conducted at the Jawaharlal Nehru medical college and hospital, Bhagalpur, India, from '2021-2022'.

Participants: A total of 100 participants were included in the study. They were patients aged ≥ 8 years, of all genders, diagnosed with chronic otitis media (COM) squamous active disease, specifically cholesteatoma.

Inclusion Criteria

- Age ≥ 8 years.
- Diagnosis of COM squamous active disease (cholesteatoma).

Exclusion Criteria

- Age < 8 years.
- Complications of chronic otitis media.
- Requirement for revision modified radical mastoidectomy.
- Histologically proven middle ear diseases other than COM squamous (e.g., tuberculosis).

Bias: Efforts were made to minimize bias by randomizing patients into two groups (Category A and Category B) and ensuring that the surgical procedures were performed by experienced faculty members.

Variables: Key variables included Surgical approach (Category A and Category), and Healing time (dry ear)

Data Collection: Data collection included patient demographics, preoperative evaluations, surgical procedure details, and postoperative assessments.

Surgical outcomes, specifically the healing time of the mastoid cavity, were recorded.

Surgical Procedure

Both groups underwent a post-aural approach, either "in to out" or "out to in."

Category A (MRM with mastoid cavity obliteration) involved modifications in surgical steps, including:

- Temporalis fascia graft harvesting
- Fashioning an inferiorly based musculofascio-periosteal flap
- Sculpturing of mastoid cortical bone
- Obliteration of the mastoid cavity with bone pieces and dust
- Category B (MRM without mastoid cavity obliteration) followed a classical MRM approach.
- Common steps included raising a tympanomeatal flap, canal wall down mastoidectomy, and reconstruction of the attic and posterior canal wall.

Statistical Analysis: Statistical analysis was performed using software known as SPSS 23.0. A significant threshold of $p < 0.05$ was established.

Ethical Considerations: Before surgery, all patients were informed about the procedure and gave their consent. We received ethical approval from the Ethical Committee.

Result

In this study, which included 100 patients, the gender breakdown showed 54% (54 patients) were male and 46% (46 patients) were female across both groups with obliterated and non-obliterated conditions. However, this gender ratio did not show a significant statistical difference between the groups ($p = 0.761$).

Regarding age, the most represented age bracket was 10-19 years, with 42% (42 patients) in the non-obliterated category and 67% (67 patients) in the obliterated group. The 20-29 years age group followed, comprising 29% (29 patients) in the non-obliterated category and 14% (14 patients) in the obliterated group. The 40-49 years age group had the fewest patients, with 7% (7 patients) in each group. No significant statistical difference in age distribution was noted between the groups ($p = 0.325$).

Table 1: Comparison of Healing Time (Weeks) between Two Groups

Type of Surgery	Mean \pm SD	P Value
MRM With Obliteration	10.83 \pm 1.483	0.007
MRM Without Obliteration	12.62 \pm 1.725	

The comparison of healing times between the two groups undergoing MRM showed that Category A,

experienced a quicker healing process, averaging 10.83 weeks with a standard deviation of 1.483

weeks. In contrast, Category B, had a longer healing duration, averaging 12.62 weeks with a standard deviation of 1.725 weeks. This variation in healing times between the two groups was statistically significant, as indicated by a p-value of 0.007.

Discussion

In the present study involving 100 patients, the analysis of gender and age distribution in relation to surgical outcomes yielded noteworthy results. The study found an equitable gender distribution across the obliterated and non-obliterated groups, with 54% males and 46% females, and this distribution did not present any statistically significant difference ($p = 0.761$). Age-wise, the predominant group was the 10-19 years category, with a notably higher representation in the obliterated group (67%) compared to the non-obliterated group (42%). However, this age distribution also did not show a statistically significant difference between the groups ($p = 0.325$). Most crucially, the study revealed a significant difference in the healing times between the two groups. Category A demonstrated a quicker average healing period of 10.83 weeks, in contrast to Category B, which had an average healing time of 12.62 weeks. This difference in healing times was statistically significant, with a p-value of 0.007, indicating that obliteration in MRM surgeries could potentially lead to faster healing.

The study of healing times in various surgical procedures has been a topic of significant interest in medical research. One such study [5], found that the average healing time in MRM with mastoid cavity obliteration was shorter (10.67 weeks) compared to MRM without obliteration (12.47 weeks), with a statistically significant difference in healing times (p value = 0.005). In the realm of foot and ankle surgery, the [6] study demonstrated that patients treated with a silver hydrogel dressing experienced less itching and pain, as well as smaller scar areas compared to those with standard dressings, suggesting an improvement in scarring after surgery.

Another interesting study, [7] showed that robotic surgery in elderly patients might offer shorter recovery times compared to laparoscopic surgery, indicating the potential benefits of robotic surgical approaches. Additionally, [8] shown that, in comparison to the buccal-based triangle flap, the lingual-based flap design was more successful in reducing postoperative problems and managing pain, edoema, and trismus.

Conclusion

This study of 100 patients undergoing surgery for chronic otitis media compared MRM with and without mastoid cavity obliteration. Gender and

age distributions between the two groups were similar, indicating a balanced patient population. However, the critical finding was a significant difference in healing times. Category A showed a notably faster healing period (10.83 weeks) compared to Category B, with an average healing time of 12.62 weeks. These results suggest that mastoid cavity obliteration may promote quicker healing and postoperative recovery.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation: Based on our findings, we recommend considering mastoid cavity obliteration as an adjunct to modified radical mastoidectomy in the surgical management of chronic otitis media to potentially expedite healing and improve postoperative outcomes.

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List of abbreviations:

MRM: modified radical mastoidectomy.

COM: chronic otitis media

SD: Standard deviation

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