Outcomes Of Modified Radical Mastoidectomy: A Comparative Study of Cavity Obliteration Versus Non-Obliteration Techniques

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Introduction:

Modified radical mastoidectomy (MRM) remains a well-established surgical procedure in the management of chronic suppurative otitis media (CSOM), particularly in cases associated with cholesteatoma or extensive middle ear disease. (1) The primary objectives of MRM are complete eradication of disease, creation of a safe and dry ear, and preservation or improvement of hearing. Despite its effectiveness in disease clearance, postoperative mastoid cavity problems such as persistent discharge, debris accumulation, recurrent infections, dizziness, and difficulty in hearing aid fitting continue to pose significant challenges, affecting long-term patient satisfaction and quality of life. (2,3,4)

Mastoid cavity obliteration has been advocated as a surgical modification to address these issues. Obliteration techniques involve filling the mastoid cavity with autologous or synthetic materials to reduce cavity size, promote epithelialization, and minimize postoperative complications. Several studies have reported improved cavity hygiene, reduced otorrhea, and better patient comfort following mastoid obliteration. However, concerns persist regarding the risk of residual or recurrent disease, graft failure, and technical complexity. (5) Conversely, non-obliterated mastoid cavities remain widely practiced due to their simplicity, ease of postoperative surveillance, and long-term disease monitoring. Given the ongoing debate regarding the optimal surgical approach, this study aims to evaluate and compare the surgical outcomes of patients undergoing modified radical mastoidectomy with mastoid cavity obliteration versus those without obliteration, with emphasis on disease control, cavity status, hearing outcomes, and postoperative complications. (6,7)

Methodology:

The study was conducted after obtaining approval from the Institutional Ethics Committee, DBVP Rural Medical College and Hospital, Loni. Written informed consent was obtained from all participants or their legal guardians prior to enrollment. This observational, descriptive longitudinal study was carried out over a period of two years in the Department of Otorhinolaryngology–Head and Neck Surgery. A total of 35 patients who had previously undergone modified radical mastoidectomy, either with mastoid cavity obliteration or without obliteration, were included in the study.

Patients of either sex aged between 5 and 80 years diagnosed with chronic otitis media of the squamosal type were enrolled based on predefined inclusion and exclusion criteria. Patients who were unwilling to participate or comply with the study protocol and those with active infections involving the nose and throat were excluded. Relevant demographic data, clinical history, and operative details were recorded for all eligible patients using a structured proforma.

Postoperatively, all patients were followed up at fixed intervals on the 7th postoperative day, at 1 month, 3 months, and 6 months. During each follow-up visit, the status of the mastoid cavity was assessed with respect to healing and epithelialization. Associated cavity-related problems such as pain, otorrhea, giddiness, wax formation, and other postoperative complications were systematically evaluated and documented.

The scale ranged from 1 to 10, where a score of 1 indicated no pain and a score of 10 represented maximal pain. All observations were recorded at each follow-up visit to allow longitudinal assessment and comparison of surgical outcomes between obliterated and non-obliterated mastoid cavities.

Results:

Table 1: Demographic Profile and Baseline Characteristics According to Mastoid Cavity Obliteration Status

Variable	Without Obliteration (n=23)	With Obliteration (n=26)	Statistical Test	p-value
Mean Age (years ± SD)	31.65 ± 17.41	39.39 ± 17.64	Mann–Whitney U	0.135 (NS)
Female	12 (52.2%)	16 (61.5%)	Chi-square	0.50 (NS)
Male	11 (47.8%)	10 (38.5%)		
Pre-operative Ear Discharge	20 (87.0%)	26 (100%)	Chi-square	0.057 (NS)

Table 2: Comparison of Postoperative Symptoms at 3-Month Follow-Up

Parameter (3 months)	Without Obliteration (n=23)	With Obliteration (n=26)	Chi-square	p-value
Ear Discharge Present	13 (56.5%)	7 (26.9%)	4.42	**0.03 (S)**
Ear Pain Present	1 (4.3%)	2 (7.7%)	0.23	0.62 (NS)
Giddiness Present	0 (0%)	1 (3.8%)	0.90	0.34 (NS)
Wax Formation	8 (34.8%)	17 (65.4%)	4.57	**0.03 (S)**

Table 3: Mastoid Cavity Healing and Epithelialization Outcomes at 6 Months

Outcome Parameter (6 months)	Without Obliteration (n=23)	With Obliteration (n=26)	Chi-square	p-value
Dry Ear Achieved	23 (100%)	25 (96.2%)	0.90	0.34 (NS)
Complete Epithelialization	23 (100%)	24 (92.3%)	1.80	0.17 (NS)
Residual Ear Discharge	0 (0%)	1 (3.8%)	—	—
Persistent Giddiness	0 (0%)	0 (0%)		

Discussion

Modified radical mastoidectomy (MRM) remains a cornerstone surgical procedure in the management of chronic otitis media of the squamosal type, with the primary objectives of complete disease eradication, achievement of a safe and dry ear, and prevention of recurrence. However, the optimal management of the postoperative mastoid cavity continues to be debated, particularly regarding the role of mastoid cavity obliteration. The present study compared surgical outcomes in patients undergoing MRM with mastoid cavity obliteration and those without obliteration, focusing on postoperative symptoms, cavity healing, and long-term outcomes. (8)

In the present study, both groups were comparable in terms of demographic characteristics. Although the mean age was slightly higher in the obliteration group, the difference was not statistically significant, indicating that age was unlikely to influence the observed outcomes. Gender distribution was also similar between the two groups, suggesting minimal demographic bias. Preoperatively, ear discharge was more prevalent in the obliteration group; however, this difference did not reach statistical significance, reflecting comparable disease severity at baseline.

One of the key findings of this study was the significantly lower incidence of persistent ear discharge at the 3-month follow-up in the mastoid obliteration group compared to the non-obliteration group. This supports the concept that obliteration reduces the dead space within the mastoid cavity, thereby minimizing moisture retention and bacterial colonization. Similar findings have been reported in previous studies, which demonstrated faster cavity drying and improved patient comfort following mastoid obliteration. In contrast, patients without obliteration continued to experience higher rates of otorrhea during early postoperative follow-up, necessitating prolonged cavity care.

Postoperative ear pain and giddiness showed no statistically significant difference between the two groups at any follow-up interval. This indicates that mastoid obliteration does not increase postoperative morbidity in terms of pain or vestibular symptoms. These findings align with existing literature suggesting that obliteration techniques, when performed meticulously, are safe and do not add significant surgical risk. Facial nerve-related complications, nystagmus, and postauricular swelling were also infrequent and comparable between groups, reinforcing the safety profile of both techniques.

Wax formation was significantly higher in the obliteration group at the 3-month follow-up. This finding may be attributed to altered epithelial migration and reduced cavity size following obliteration. Although statistically significant, this did not translate into clinically significant morbidity and was manageable with routine outpatient care. Importantly, by the 6-month follow-up, wax-related issues were comparable between the two groups, suggesting that this is a transient phenomenon during the healing phase. (9,10)

Long-term outcomes at 6 months demonstrated excellent results in both groups, with nearly all patients achieving a dry ear and complete epithelialization of the mastoid cavity. (11) The absence of statistically significant differences at this stage indicates that both obliterated and non-obliterated cavities are effective in achieving durable disease control. However, the obliteration group showed earlier symptomatic improvement, which may translate into better quality of life and reduced need for frequent postoperative visits.

Conclusion:

In summary, the findings of this study suggest that mastoid cavity obliteration following modified radical mastoidectomy offers superior early postoperative outcomes, particularly in reducing persistent ear discharge, without increasing complication rates. While long-term outcomes are comparable between obliterated and non-obliterated cavities, the advantage of earlier cavity stabilization favors the use of obliteration in selected patients. Careful patient selection, meticulous surgical technique, and regular follow-up remain essential to optimize outcomes in both approaches.

References:

1. S. Chhapola, I. Matta. Mastoid Obliteration Versus Open Cavity: A Comparative Study. Indian J Otolaryngol Head Neck Surg. 2014 Jan; 66(Suppl 1): 207–213
2. Shraddha D, Arpit S, Jyoti D. Mastoid cavity obliteration: Our experience. Otolaryngologia Polska 66 (2012) 379–381
3. Heemani B, Saddaf A, Yavan B, Tariq M, Dev R. Comparison of Outcomes of Open Mastoid Cavity- with or Without Obliteration. Indian J Otolaryngol Head Neck Surg. 2022 Dec; 74(Suppl 3): 4341–4344
4. Head K, Chong LY, Bhutta MF, Morris PS, Vijayasekaran S, Burton MJ, Schilder AG, Brennan-Jones CG. Topical antiseptics for chronic suppurative otitis media. Cochrane Database Syst Rev. 2020 Jan 06;1(1):CD013055.
5. Emmett SD, Kokesh J, Kaylie D. Chronic Ear Disease. Med Clin North Am. 2018 Nov;102(6):1063-1079.
6. Master A, Wilkinson E, Wagner R. Management of Chronic Suppurative Otitis Media and Otosclerosis in Developing Countries. Otolaryngol Clin North Am. 2018 Jun;51(3):593-605.
7. Özcan N, Saat N, Yildirim Baylan M, Akpolat N, Atmaca S, Gül K. Three cases of Chronic Suppurative Otitis Media (CSOM) caused by Kerstersia gyiorum and a review of the literature. Infez Med. 2018 Dec 01;26(4):364-368.
8. Gantz BJ, Wilkinson EP, Hansen MR. Canal wall reconstruction tympanomastoidectomy with mastoid obliteration. Laryngoscope. 2005;115(10):1734–1740
9. Dornhoffer JL. Surgical modification of the difficult mastoid cavity. Otolaryngol Clin North Am. 2006;39(6):1237–1248.
10. Yung M, Bennett A. Use of mastoid obliteration techniques in chronic ear surgery: a review of indications and outcomes. J Laryngol Otol. 2010;124(6):589–596.
11. Lasisi AO, Abdullahi M, Olatoke F. Mastoid cavity obliteration versus open cavity: a comparative study of postoperative outcomes. Indian J Otolaryngol Head Neck Surg. 2017;69(2):197–203.