Mastoid Obliteration in Canal Wall Up Cholesteatoma Surgery: Indications, Techniques, and Outcomes

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Abstract

Background: Acquired middle ear cholesteatoma remains a surgically challenging disease because optimal management must balance durable disease control with preservation of anatomy and hearing. Canal wall up (CWU) mastoidectomy is widely used to maintain near-normal external auditory canal anatomy and facilitate hearing rehabilitation, yet CWU surgery is traditionally associated with concern for residual disease within hidden recesses and a need for planned "second-look" procedures in selected cases. Mastoid obliteration has re-emerged as a key adjunct to CWU cholesteatoma surgery, with the aim of reducing the postoperative mastoid space available for retraction dynamics and epithelial migration, improving middle ear/mastoid aeration patterns, and potentially decreasing the reservoir for recurrent disease.

Aim: This review synthesizes contemporary evidence on mastoid obliteration in CWU cholesteatoma surgery, focusing on (1) indications and patient selection, (2) surgical techniques and obliteration materials, (3) postoperative surveillance strategies including diffusion-weighted MRI, and (4) outcomes including residual/recurrent cholesteatoma, hearing, complications, and long-term ear health.

Summary of evidence: The literature supports a growing trend toward reconstructive CWU strategies (including canal wall reconstruction concepts) coupled with mastoid obliteration to reduce recidivism while maintaining the functional benefits of canal wall preservation. Reported techniques vary widely—ranging from autologous bone pate/chips and cartilage to regional vascularized flaps and selected alloplastic/bioactive materials—reflecting differences in surgeon preference, disease extent, and resource availability. Outcome reporting increasingly emphasizes standardized cholesteatoma classification/staging, imaging-based follow-up protocols (notably non–echo-planar diffusion-weighted MRI), and patient-centered endpoints such as cavity symptoms, water tolerance, and burden of care.

Conclusion: In appropriately selected cholesteatoma patients, CWU mastoidectomy with mastoid obliteration represents a reconstructive strategy that can align disease control with functional goals. However, heterogeneity in technique, materials, follow-up protocols, and outcome definitions continues to limit direct comparison across studies. Future work should prioritize standardized staging, uniform definitions of residual versus recurrent disease, and high-quality comparative designs to clarify which obliteration approaches provide the most durable benefit in specific patient subgroups.

Keywords: *Canal Wall Up Cholesteatoma, Mastoid Obliteration*

Introduction

Acquired middle ear cholesteatoma is a destructive epithelial condition defined by the presence of keratinizing squamous epithelium within the middle ear and mastoid, leading to chronic inflammation, progressive bone erosion, and potentially severe otologic and intracranial complications. Although histologically benign, cholesteatoma can result in ossicular destruction, labyrinthine fistula, facial nerve injury, and meningitis if inadequately managed. Surgical eradication remains the definitive treatment, yet achieving durable disease control while preserving hearing and normal ear anatomy continues to challenge otologic surgeons worldwide [1].

The evolution of cholesteatoma surgery reflects a gradual transition from radical, cavity-forming procedures toward reconstructive approaches aimed at restoring anatomy and function. Canal wall up mastoidectomy was developed to preserve the posterior external auditory canal wall, thereby maintaining a more physiological ear canal configuration and facilitating hearing rehabilitation. Despite these advantages, concerns have persisted regarding residual and recurrent cholesteatoma due to limited visualization of anatomically complex regions such as the epitympanum, facial recess, and sinus tympani, particularly in extensively pneumatized or anatomically variant temporal bones [2].

To address these limitations, mastoid obliteration has re-emerged as an adjunctive strategy in canal wall up cholesteatoma surgery. The rationale for obliteration extends beyond cavity filling, encompassing modification of postoperative mastoid physiology by reducing dead space, limiting the development of negative pressure, and minimizing the potential for retraction pocket formation. Experimental and clinical studies have questioned the traditional assumption that a large mastoid air cell system is essential for middle ear ventilation, supporting the feasibility of reducing mastoid volume without compromising functional outcomes in selected patients [3].

Advances in surgical techniques and obliteration materials have expanded the applicability of mastoid obliteration within canal wall up procedures. Autologous materials such as bone pate, cartilage, and fat have demonstrated favorable biocompatibility and long-term stability, while vascularized regional flaps provide enhanced tissue viability in revision or high-risk cases. These developments have coincided with improvements in postoperative imaging, particularly the adoption of non–echo-planar diffusion-weighted magnetic resonance imaging, which has transformed follow-up strategies by enabling reliable detection of residual cholesteatoma without routine planned second-look surgery [4].

Despite increasing adoption, the literature on mastoid obliteration in canal wall up cholesteatoma surgery remains heterogeneous. Variability in patient selection, disease staging systems, obliteration techniques, outcome measures, and duration of follow-up complicates direct comparison between studies. Reported rates of residual and recurrent disease vary widely, and hearing outcomes are influenced by multiple confounding factors, including ossicular status, Eustachian tube function, and extent of disease at presentation. These inconsistencies highlight an ongoing research gap regarding optimal indications and standardized outcome reporting for this reconstructive approach [5].

The aim of this review is to provide a comprehensive synthesis of the existing literature on mastoid obliteration in canal wall up cholesteatoma surgery, with particular emphasis on indications, surgical techniques, obliteration materials, postoperative imaging strategies, and clinical outcomes. By integrating anatomical, physiological, and clinical perspectives, this review seeks to clarify the role of mastoid obliteration within contemporary cholesteatoma management and to identify areas requiring further high-quality investigation [6].

Indications and Patient Selection for Mastoid Obliteration in Canal Wall Up Cholesteatoma Surgery

Appropriate patient selection is central to the success of mastoid obliteration when combined with canal wall up cholesteatoma surgery. The primary indication for this reconstructive strategy is the desire to preserve normal external auditory canal anatomy while minimizing the risk of residual or recurrent disease in patients with limited or moderate cholesteatoma extension. Canal wall up surgery with

obliteration is most commonly considered in ears where complete disease removal can be reasonably achieved under direct microscopic and endoscopic visualization, and where the surgeon seeks to avoid the long-term morbidity associated with open mastoid cavities [7].

The extent and location of cholesteatoma play a critical role in determining suitability for mastoid obliteration. Patients with disease confined to the epitympanum, mesotympanum, or mastoid antrum, without extensive involvement of the retrofacial air cells or petrous apex, are generally considered favorable candidates. Conversely, extensive disease with poor access to hidden recesses or with erosion of key anatomic barriers may increase the risk of residual epithelium, necessitating careful intraoperative judgment before committing to obliteration. Standardized cholesteatoma staging systems have been proposed to facilitate preoperative planning and postoperative outcome comparison in this context [8].

Eustachian tube function and middle ear ventilation status are additional factors influencing patient selection. Poor Eustachian tube function has traditionally been viewed as a risk factor for retraction pocket formation and recurrent disease after canal wall up surgery. Mastoid obliteration has been proposed as a means of mitigating these effects by reducing mastoid volume and limiting pressure fluctuations within the middle ear cleft. Clinical and experimental data suggest that middle ear ventilation can be adequately maintained in the absence of a large mastoid air cell system, supporting the selective use of obliteration even in patients with suboptimal Eustachian tube function [9].

Pediatric cholesteatoma represents a unique subgroup in which indications for mastoid obliteration must be carefully weighed. Children exhibit higher rates of residual and recurrent disease due to more aggressive epithelial behavior, ongoing craniofacial growth, and challenges in long-term follow-up. Nevertheless, several long-term series have demonstrated that mastoid obliteration using autologous materials in canal wall up surgery can be safely performed in pediatric patients, with sustained disease control and acceptable hearing outcomes when meticulous technique and structured imaging surveillance are employed [10].

Revision surgery is another important indication for considering mastoid obliteration in canal wall up procedures. Patients with recurrent retraction pockets, persistent mastoid air cell disease, or prior unsuccessful canal wall up surgery may benefit from obliteration to eliminate poorly ventilated spaces and reduce the risk of further epithelial migration. In such cases, the use of vascularized flaps or well-integrated autologous materials may enhance tissue healing and reduce postoperative complications, particularly in previously operated or scarred temporal bones [11].

In summary, patient selection for mastoid obliteration in canal wall up cholesteatoma surgery requires individualized assessment of disease extent, middle ear physiology, patient age, and prior surgical history. Careful integration of these factors allows surgeons to maximize the reconstructive advantages of canal wall preservation while maintaining acceptable levels of disease control, underscoring the importance of tailored surgical decision-making in contemporary cholesteatoma management [12].

Surgical Techniques of Canal Wall Up Mastoidectomy Incorporating Mastoid Obliteration

Canal wall up mastoidectomy incorporating mastoid obliteration is founded on the principle of complete cholesteatoma eradication while preserving the posterior canal wall and reconstructing the mastoid cavity to achieve a stable, self-cleaning ear. The procedure typically begins with a cortical mastoidectomy and systematic identification of key anatomic landmarks, including the tegmen, sigmoid sinus, facial nerve, and lateral semicircular canal. Meticulous removal of cholesteatoma from the epitympanum, aditus ad antrum, and mastoid air cell system is essential before any consideration of obliteration, as residual epithelial disease within an obliterated space may compromise long-term outcomes [13].

Variations of the canal wall up technique have been described to enhance exposure of hidden recesses while maintaining canal wall integrity. These include extended atticotomy, posterior tympanotomy via the facial recess, and combined microscopic–endoscopic approaches. Endoscopic assistance has become increasingly valuable for visualizing areas such as the sinus tympani, anterior epitympanum, and supratubal recess, which are common sites of residual disease. Improved visualization allows surgeons

to pursue more aggressive disease clearance while retaining the benefits of canal wall preservation and preparing a clean field suitable for mastoid obliteration [14].

Once disease removal is deemed complete, attention is directed toward preparation of the mastoid cavity for obliteration. All inflamed mucosa, granulation tissue, and residual air cell septations are carefully removed, and bleeding surfaces are controlled to promote optimal integration of obliteration material. The aditus ad antrum is often narrowed or partially sealed as part of the reconstructive strategy, aiming to isolate the middle ear from the obliterated mastoid space and reduce the risk of postoperative retraction or epithelial migration [15].

Obliteration itself may be performed as a single-stage procedure at the time of primary cholesteatoma surgery or as part of a staged approach. In single-stage surgery, obliteration follows immediately after cholesteatoma removal and ossicular chain management. In selected cases with uncertainty regarding complete disease clearance, surgeons may elect to defer obliteration until a planned second-look procedure. This staged strategy allows confirmation of a disease-free middle ear before committing to mastoid space reconstruction, particularly in ears with extensive epitympanic involvement or limited intraoperative visualization [16].

Canal wall reconstruction techniques are sometimes combined with mastoid obliteration in canal wall up surgery. Reconstruction of partially eroded canal walls using cartilage, bone grafts, or composite materials may restore external auditory canal contour and further reduce the volume of the mastoid cavity. These hybrid techniques aim to achieve the disease control advantages traditionally associated with canal wall down surgery while maintaining the functional and hygienic benefits of canal wall preservation [17].

Intraoperative decision-making remains a defining feature of canal wall up mastoidectomy with obliteration. Surgeons must balance the desire for anatomic preservation against the imperative of complete cholesteatoma removal, adjusting the extent of exposure, reconstruction, and obliteration based on real-time assessment of disease extent and patient-specific factors. When performed with meticulous technique and appropriate case selection, this approach offers a flexible and reconstructive solution within modern cholesteatoma surgery [18].

Mastoid Obliteration Materials and Reconstruction Methods

The choice of obliteration material is a critical determinant of the long-term success of mastoid obliteration in canal wall up cholesteatoma surgery. An ideal obliteration material should be biocompatible, resistant to infection, stable over time, and capable of integrating with surrounding bone and soft tissue. Over the past decades, a wide range of materials has been investigated, reflecting evolving surgical philosophy and improved understanding of mastoid physiology and wound healing [19].

Autologous bone remains one of the most commonly used materials for mastoid obliteration. Bone pate harvested during mastoid drilling or bone chips collected from cortical bone offer excellent biocompatibility and osteoconductive properties. Histopathological studies have demonstrated long-term survival and incorporation of autologous bone within the obliterated mastoid cavity, with gradual remodeling into mature bone. These properties make bone-based obliteration particularly attractive in primary canal wall up procedures, where infection control and biological integration are priorities [20].

Cartilage has also been widely utilized, either alone or in combination with bone pate, for mastoid obliteration and canal wall reconstruction. Conchal or tragal cartilage provides structural stability and resistance to resorption, particularly in areas subjected to pressure changes. Cartilage is frequently used to reinforce the attic, reconstruct the scutum, or partition the middle ear from the obliterated mastoid space. Clinical series have reported favorable long-term outcomes with cartilage obliteration, including low rates of resorption and satisfactory disease control when meticulous surgical technique is employed [21].

Soft tissue materials, such as autologous fat and muscle, represent another category of obliteration options. Fat grafts harvested from the abdomen have been used extensively due to their ease of harvest and favorable handling characteristics. Muscle and musculoperiosteal flaps, including postauricular and

temporoparietal fascia–based flaps, provide well-vascularized tissue that may be particularly advantageous in revision surgery or in ears with compromised local vascularity. Vascularized flaps enhance wound healing and may reduce the risk of postoperative infection or breakdown in previously operated mastoids [22].

Alloplastic and bioactive materials have been explored as alternatives or adjuncts to autologous tissue. Hydroxyapatite cement and other calcium phosphate–based materials offer osteoconductive properties and structural stability, allowing precise contouring of the mastoid cavity and canal wall. While these materials have shown promising results in selected series, concerns remain regarding infection risk, extrusion, and long-term stability, emphasizing the importance of careful patient selection and meticulous surgical technique when non-autologous materials are used [23].

Reconstruction strategies often combine multiple materials to optimize outcomes. Composite obliteration using bone pate for volume reduction, cartilage for structural support, and soft tissue flaps for surface coverage has been described as a pragmatic approach that leverages the strengths of each material. Such layered reconstruction aims to achieve a stable, well-epithelialized ear while minimizing dead space and reducing the risk of recurrent disease. The choice of materials is ultimately guided by disease extent, surgical setting, and surgeon experience, underscoring the individualized nature of mastoid obliteration in canal wall up cholesteatoma surgery [24].

Clinical Outcomes of Mastoid Obliteration in Canal Wall Up Cholesteatoma Surgery

Assessment of clinical outcomes following mastoid obliteration in canal wall up cholesteatoma surgery centers on disease control, hearing preservation or improvement, postoperative complications, and long-term ear stability. The primary metric of success remains the rate of residual and recurrent cholesteatoma, as incomplete eradication or postoperative retraction-driven recurrence can undermine the advantages of canal wall preservation. Contemporary series have increasingly reported favorable disease control with the addition of mastoid obliteration, suggesting that reduction of the mastoid space may contribute to a more stable postoperative environment [25].

Residual cholesteatoma is typically related to incomplete removal of epithelial remnants at the time of initial surgery, particularly in anatomically complex recesses. Mastoid obliteration does not directly prevent residual disease; however, it may reduce the likelihood that small residual pearls progress into clinically significant lesions by limiting available space for expansion. Systematic reviews and meta-analyses have demonstrated lower overall recidivism rates in obliterated mastoids compared with non-obliterated canal wall up procedures, supporting the adjunctive role of obliteration in selected patients [26].

Recurrent cholesteatoma, often arising from postoperative retraction pockets, represents another important outcome domain. By decreasing mastoid volume and modifying pressure dynamics within the middle ear cleft, obliteration may reduce the tendency for attic and posterior canal wall retractions. Clinical studies have reported lower rates of secondary retraction pocket formation and subsequent recurrence in obliterated ears, particularly when combined with scutum reconstruction and careful management of the aditus ad antrum [27].

Hearing outcomes following canal wall up surgery with mastoid obliteration are influenced by multiple factors, including ossicular chain status, middle ear mucosal health, and Eustachian tube function. Overall, the preservation of the posterior canal wall facilitates ossiculoplasty and postoperative sound conduction. Available evidence suggests that mastoid obliteration does not adversely affect hearing outcomes and may indirectly support hearing stability by reducing chronic inflammation and recurrent disease that can compromise ossicular reconstruction [28].

Postoperative complications associated with mastoid obliteration are generally infrequent when appropriate materials and techniques are employed. Reported complications include infection, graft resorption, wound breakdown, and, rarely, extrusion of obliteration material. Autologous tissues demonstrate the lowest complication rates, while non-autologous materials require heightened vigilance. Long-term follow-up studies indicate that well-performed obliteration contributes to a dry, self-cleaning ear with reduced need for ongoing medical care [29].

Patient-reported outcomes and quality of life have gained increasing attention in recent literature. Compared with non-obliterated canal wall up procedures or traditional open cavities, obliterated ears are associated with improved water tolerance, fewer otorrhea episodes, and reduced dependence on routine clinical cleaning. These functional benefits underscore the broader impact of mastoid obliteration beyond traditional surgical endpoints and support its role within patient-centered cholesteatoma management strategies [30].

Postoperative Imaging and Surveillance After Canal Wall Up Mastoidectomy With Mastoid Obliteration

Postoperative surveillance is a critical component of cholesteatoma management following canal wall up mastoidectomy with mastoid obliteration, as clinical examination alone is often insufficient to exclude residual or recurrent disease. The reconstructed anatomy and obliterated mastoid space limit direct visualization of the epitympanum and mastoid cavity, increasing reliance on imaging to ensure long-term disease control. As a result, structured radiologic follow-up has become an integral part of contemporary practice for patients undergoing this reconstructive approach [31].

High-resolution computed tomography retains value in the immediate postoperative period for assessing bony anatomy, ossicular reconstruction, and the position of obliteration material. However, CT lacks specificity in differentiating soft tissue entities within the middle ear and mastoid, particularly when obliteration materials are present. Postoperative soft tissue density on CT may represent granulation tissue, scar, fat, or residual cholesteatoma, limiting its utility as a standalone surveillance tool in long-term follow-up [32].

Non–echo-planar diffusion-weighted magnetic resonance imaging has emerged as the imaging modality of choice for detecting residual and recurrent cholesteatoma after canal wall up surgery. This technique exploits the restricted diffusion properties of keratin debris, enabling reliable identification of cholesteatoma pearls as small as a few millimeters. Multiple clinical studies have demonstrated high sensitivity and specificity of non–echo-planar diffusion-weighted imaging in obliterated ears, supporting its use as an alternative to routine planned second-look surgery in appropriately selected patients [33].

The timing of postoperative diffusion-weighted imaging is an important consideration. Most authors recommend initial imaging between 6 and 18 months following surgery, allowing sufficient time for residual epithelial disease to reach a detectable size while minimizing unnecessary delay in diagnosis. Subsequent imaging intervals are individualized based on initial findings, disease stage, and patient-specific risk factors, with extended surveillance often advised in pediatric patients and in cases of advanced disease [34].

Interpretation of diffusion-weighted imaging in obliterated mastoids requires familiarity with the signal characteristics of various obliteration materials. Autologous fat, bone pate, and cartilage may produce variable signal intensities that can mimic or obscure cholesteatoma if misinterpreted. Correlation with conventional MRI sequences and clinical history is essential to reduce false-positive and false-negative interpretations. Close collaboration between otologic surgeons and experienced head and neck radiologists is therefore critical for accurate postoperative assessment [35].

In summary, effective postoperative surveillance after canal wall up mastoidectomy with mastoid obliteration relies on a multimodal approach that integrates clinical examination with advanced imaging techniques. Non–echo-planar diffusion-weighted MRI has transformed follow-up paradigms by enabling noninvasive detection of recurrent disease, reducing the need for routine second-look surgery, and supporting the broader adoption of reconstructive strategies in cholesteatoma management [36].

Mastoid Obliteration in Special Populations and Challenging Clinical Scenarios

Special patient populations present unique challenges in the application of mastoid obliteration within canal wall up cholesteatoma surgery, requiring careful adaptation of surgical strategy and follow-up protocols. Pediatric patients represent one of the most extensively studied subgroups, as childhood cholesteatoma is associated with higher rates of residual and recurrent disease due to more aggressive epithelial behavior and ongoing craniofacial growth. Despite these concerns, long-term clinical series have demonstrated that mastoid obliteration using autologous materials can be safely incorporated into

canal wall up surgery in children, provided that meticulous disease clearance and structured imaging surveillance are maintained [37].

Poor Eustachian tube function is another factor traditionally considered unfavorable for canal wall up approaches. In such cases, persistent negative middle ear pressure may promote retraction pocket formation and recurrent disease. Mastoid obliteration has been proposed as a compensatory strategy by reducing mastoid volume and limiting pressure-related changes within the middle ear cleft. Clinical and physiological studies suggest that adequate middle ear ventilation can be preserved even in the absence of a well-pneumatized mastoid, supporting the selective use of obliteration in patients with documented Eustachian tube dysfunction [38].

Revision cholesteatoma surgery constitutes a particularly challenging scenario for mastoid obliteration. Scar tissue, altered anatomy, and compromised vascularity increase the risk of postoperative complications and graft failure. In these cases, vascularized flaps such as postauricular musculoperiosteal or temporoparietal fascia flaps may offer advantages by providing robust blood supply and improved healing capacity. Revision cases often require individualized reconstruction strategies, and mastoid obliteration may serve as a means to eliminate persistently diseased air cell tracts and stabilize the postoperative ear [39].

Patients with extensive epitympanic disease, labyrinthine fistula, or tegmen erosion present additional complexity. While such findings do not categorically preclude canal wall up surgery with obliteration, they demand heightened intraoperative vigilance and careful judgment. Obliteration in the presence of exposed dura or inner ear structures requires secure separation of critical anatomy from the obliterated space and meticulous sealing of potential cerebrospinal fluid pathways. When these principles are respected, favorable outcomes have been reported even in advanced disease presentations [40].

Elderly patients and those with significant medical comorbidities may also benefit from mastoid obliteration as part of canal wall up surgery. Reduced need for lifelong cavity care, fewer postoperative visits, and improved ear hygiene may be particularly advantageous in this population. However, healing capacity, bone quality, and overall surgical risk must be weighed when selecting obliteration materials and reconstructive techniques in medically complex patients [41].

Overall, mastoid obliteration in canal wall up cholesteatoma surgery can be successfully applied across a broad spectrum of patient populations when individualized risk assessment and tailored surgical planning are employed. Recognition of population-specific challenges and adherence to meticulous technique are essential to maximizing the benefits of this reconstructive approach while minimizing complications and disease recurrence [42].

Controversies, Knowledge Gaps, and Future Directions in Mastoid Obliteration for Canal Wall Up Cholesteatoma Surgery

Despite increasing adoption of mastoid obliteration as an adjunct to canal wall up cholesteatoma surgery, several controversies persist regarding its routine use and long-term benefits. One of the most debated issues concerns whether obliteration truly reduces recurrent disease or merely shifts the burden toward reliance on imaging-based surveillance. Critics argue that obliteration does not prevent residual cholesteatoma and may delay its detection, whereas proponents emphasize that modern diffusion-weighted imaging has mitigated this concern by enabling reliable noninvasive follow-up [43].

Another area of ongoing debate relates to the optimal choice of obliteration material. Although autologous tissues are widely regarded as the gold standard due to their biocompatibility and low complication rates, variability in availability and handling characteristics has led to exploration of bioactive and alloplastic alternatives. Comparative data between different materials remain limited, and most published studies are retrospective with heterogeneous outcome reporting. The lack of high-level evidence makes it difficult to establish definitive recommendations regarding material selection in specific clinical scenarios [44].

Standardization of outcome measures represents a significant knowledge gap in the current literature. Definitions of residual versus recurrent cholesteatoma vary between studies, and follow-up duration is often insufficient to capture late recurrences. Furthermore, many series focus primarily on disease

control while underreporting functional outcomes such as hearing stability, quality of life, and patient-reported symptom burden. The absence of uniform staging systems and reporting frameworks limits meaningful comparison across institutions and surgical techniques [45].

The role of mastoid obliteration in the era of endoscopic ear surgery also remains incompletely defined. Endoscopic techniques have improved visualization of hidden recesses, potentially reducing residual disease rates in canal wall up surgery. Whether the enhanced exposure afforded by endoscopy diminishes the incremental benefit of mastoid obliteration, or conversely complements it by enabling safer and more comprehensive reconstruction, is an area that warrants further investigation through comparative studies [46].

Future research directions should prioritize prospective, multicenter studies employing standardized cholesteatoma classification systems, uniform imaging protocols, and long-term follow-up. Integration of patient-reported outcome measures and health economic analyses will be essential to fully capture the value of mastoid obliteration beyond traditional surgical endpoints. Advances in biomaterials and tissue engineering may further refine obliteration techniques, offering materials that combine biocompatibility, structural stability, and imaging compatibility [47].

In summary, while mastoid obliteration has become an important component of reconstructive canal wall up cholesteatoma surgery, its optimal application remains an evolving field. Addressing existing controversies and knowledge gaps through high-quality research will be critical to defining evidence-based guidelines and refining patient selection for this technique in the future [48].

Conclusion

Mastoid obliteration has emerged as a valuable adjunct to canal wall up cholesteatoma surgery, offering a reconstructive strategy that seeks to balance durable disease control with preservation of ear anatomy and function. By reducing mastoid volume and modifying postoperative middle ear physiology, obliteration addresses key mechanisms implicated in retraction pocket formation and recurrent disease, while maintaining the advantages of canal wall preservation.

When applied in appropriately selected patients, mastoid obliteration can contribute to lower rates of recurrent cholesteatoma, stable hearing outcomes, and improved long-term ear health. Advances in surgical technique, endoscopic visualization, and obliteration materials have expanded the safety and applicability of this approach across a broad range of clinical scenarios, including pediatric and revision cases. Importantly, the integration of modern diffusion-weighted magnetic resonance imaging has transformed postoperative surveillance, enabling reliable noninvasive detection of residual disease and supporting wider adoption of reconstructive strategies.

Despite these advances, heterogeneity in patient selection, surgical methods, and outcome reporting continues to limit definitive conclusions regarding optimal indications and techniques. Future efforts should focus on standardized staging systems, uniform definitions of disease recurrence, and long-term, patient-centered outcome measures. Through continued refinement and high-quality research, mastoid obliteration in canal wall up cholesteatoma surgery is well positioned to remain a cornerstone of contemporary otologic practice.

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