



Letter to the Editor

Canal Wall Up versus Canal Wall down Mastoidectomy: Considerations for the New-Age Otologists

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Dear Editor,

Mastering the techniques of mastoidectomy and understanding their principles constitute one of the primary tasks in the curriculum of otolaryngology residency. The learning curve is steep, but for the otologists, it is fundamental for their understanding of the temporal bone and look beyond. Even a lifetime seems too short to unravel the intricacies of the related surgical principles. No wonder why the age-old debate on the better technique of mastoidectomy in an unsafe ear—canal wall-up (CWU) or -down (CWD)—continues to perplex generations of otologists^[1]. This is a hereditary knowledge trait, refined and updated with every successor, and each time opens up fresh discussions whether the debate would, if ever, have any unanimous solution.

The challenges before the new-age otologists are many. To decide and adopt a technique unbiased and situation-based is often beyond one's capacity in the beginning of his or her surgical career, and it is fine-tuned by complex, unpredictable interactions of multiple factors. It starts with the mother institution and the "school of thought" it brews. Their influences might not always be co-existing, but mostly they are. Further, an interesting observation as it might be, the space allotted for "chronic otitis media (COM), its complications and management" within the broad section of "otology, neurotology, and skull-base surgery" is getting limited as the mentor textbooks, arguably the most authentic sources of documented information and evidence, proudly enter into their latest editions. Within a decade, it has reduced by 10.7% in Scott-Brown's Otorhinolaryngology, Head and Neck Surgery (the 6th, excluding the volume on adult audiology, and 7th editions). The same has increased by 8.94% in Cummings Otolaryngology—Head and Neck Surgery over two decades (the 3rd and 6th editions), but it is against an overall increase by 14.3% of the broad section. Evidently, contemporary otology is fast changing its face, incorporating broadened scope and applications on neurotology, skull-base surgery, related recent advances, and rehabilitation and quality of life (QOL) measures. Should this trend imply that COM as a disease is becoming "smaller"? Is there a decrease in patient load, reduced clinical significance, or both? Or, is it a matter of shifting priority and relevance, with good reasons, of course?

Today, COM and its complications represent a globally diversified disease spectrum with heterogeneous epidemiology, governed by the socio-economic status of a country/region^[2,3]. The gulf is wide and extreme with distinct geographic domination, and the indications for CWD/U procedures are dictating enough such that, at one point, the context of the present debate blurs into insignificance. Although data on the prevalence of cholesteatoma are unknown, the squamous COM in the West is presumably of limited extent, confined within the attic, mesotympanum, or the aditus. This demands a more conservative, or relatively less extensive surgical approach. Facial paresis, lateral semicircular canal dehiscence/fistula, and extratemporal complications have become so rare that they could form anecdotal clinical records, or enthusiastic submissions as entities "revisited." The scenario however is different in the poor and developing nations^[3]. Extensive cholesteatoma advancing into the mastoid and beyond constitutes a considerable proportion of out-door visits, and complications therefrom are not difficult to encounter. The surgical intervention therefore needs to be extensive (and occasionally aggressive); and modified radical mastoidectomy (MRM) might be the most common procedure practiced. Well within the antibiotic era, the West has shifted its focus toward non-infective otologic disorders -the textbooks merely reflect this drift- which is certainly not so on the other side of the world. However, does this adequately explain the hypothesis that the dilemma "Should I proceed?" "Should I convert?" at mastoid surgery or during its planning is an elusive and over-emphasized one?

*We have reached out to the authors for their response to these comments but have not received a reply yet.

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Deeper introspection into the problem indicates that socio-economic diversity is not the only factor to influence decision-making today. Even in the developing nations, with awareness, improved hygiene and living standards, proportion of unsafe ears with extensive cholesteatoma and complications is on the wane. The debate is now achieving universality more than ever, a controversy re-lived with relevance, but in a different perspective that is actually drawing the two worlds together. The novel approach toward patient-centric health care to improve the QOL falls in tandem with the paradigm shift that presently redefines the principles of surgery across disciplines. Urbanization, education, and elevated self-respect among patients are shaping their QOL expectations, bridging the gap between the rich and the poor. This has direct outcomes on their health and disease, and COM is no exception. The QOL factor is actually influencing the current thinking on surgical principles—a conservative, tissue/organ-preserving approach—ensuring maximum benefit from minimum trauma. This relation provenly stands on a firm ground through clinical and basic science researches. This is akin to the present view in managing papillary thyroid carcinoma, where, except in certain situations, many institutes are adopting a pro-hemithyroidectomy attitude;^[4] or in the locally advanced head-neck squamous cell carcinomas, where newer techniques of chemoradiotherapy might obviate the need for surgery^[5,6]. The outcome of conservative surgery on QOL in advanced laryngeal malignancies is well-known^[6]. Likewise, after clearing disease from the attico-antral region, a CWD mastoidectomy can be made “technically CWU,” the so-called canal wall reconstruction (CWR) tympanomastoidectomy,^[7] by reconstructing the scutum and superior/posterior bony canal wall with tragal/conchal cartilage (author’s practice), or replacing the segment of the bridge previously isolated^[8]. Attempts at cavity obliteration might accompany these reconstructive procedures, and the practical possibilities of staged surgeries also need to be explored^[9]. These potentially preclude the major drawbacks of the CWD procedure, such as discharging tympanomastoid cavity, regular follow-up visits for cleaning debris, poorer hearing outcome with reconstruction (a debated proposition!), ill-fitting hearing aid requiring customized mold, and of course, the need for a wide concho-meatoplasty. An “adequate” excision of the conchal bowl with/without the crus of helix/cymba concha with unpredictable cicatrization might raise question to what extent cosmesis should be sacrificed for better visibility, cavity care, and monitoring.

With the inherent intent of restoring the tympanomastoid anatomy and physiology, and given its established role in pediatric cholesteatoma, a primary or technically CWU approach should be more in sync with today’s principles of conservative surgery. One way to materialize this is otoendoscopy which now has a universal acceptance with promising results. It has revolutionized the current practice of otologic surgery and is indispensable in diagnostic and follow-up evaluation. The multi-angled “alternate vision” into the crevices of the middle ear notorious for hidden diseases addresses one of the primary needs for the CWD approach in cholesteatoma surgery,^[10] and thereby can be its potential alternative in most cases. Preserving the bridge and selectively addressing the danger zones under direct vision, or adopting a combined approach with the traditional microscope, help to protect the unaffected and potentially reversible mucosa. The predominant etiopathogenesis of acquired cholesteatoma is a complex interaction among the middle ear pressure change and

dysventilation, mucosal reactions, and secondary infection; thus, it needs to be emphasized that the primary aim of cholesteatoma surgery is not only to eradicate the disease, but also to restore the tympanomastoid mucosa close to its functional state. This might not be achieved by secondary epithelialization following a CWD procedure, because the neo-epithelium is histologically and functionally distinct from the natural mucosal lining of the middle ear and mastoid.

It is not that the CWU surgery should be advocated irrespective of the disease state of COM, but rather far from that. The utility of an atticotomy or MRM would persist till there are presentations of advanced cholesteatoma, with/without complications, and such are aplenty in the “endemic” world. Even otoendoscopy has its limitations in cholesteatoma involving the mastoid with breaches in its barrier^[10]. Nevertheless, it cannot be denied that the new-age otologists would be required to decide on a surgical approach acknowledging the interdependent and evolving front of the unique management triad, that is, the contemporary, changing face of the disease; the expectations of the patients; and the paradigm shift in the philosophy of surgical practice. Our mindset, as also our surgical approach, need to be tailored accordingly. True, the methods to preserve, reconstruct, or reposition the canal in diseased environment are technically demanding and require years of patience and hard work. Expert judgment of the tympanomastoid compartment with multi-angled endoscopic vision, too, demands a learning curve to follow. Also, it is not that some of these techniques were not known previously. However, their importance is re-lived today with fresh insights to optimize the outcome of tympanomastoid surgery through improvisation and judicious adaptation. We have long moved away from radical mastoidectomy for cholesteatoma ear (an associated predominant sensorineural deafness might be its only indication today) to the more refined operative techniques with hearing reconstruction^[1]. It is now the time to proceed further to maximally preserve the anatomy and physiology of the middle ear cleft, simultaneously ensuring disease eradication. As the rhinologists feel convinced that the major outcome of functional endoscopic sinus surgery is to restore the physiology of the mucosa in the sinus system, today’s otologists also need to realize that they have entered into the era of “functional tympanomastoid surgery”, with/without endoscopes, to help preserve or recover the anatomy and physiology of the middle ear-mastoid system close to the pre-disease state. More than dwelling for a solution to the age-old controversy between the CWD and CWU mastoidectomy, actualization of the surgical avenues to execute the fundamental principles of functional tympanomastoid surgery should be the primary impetus that would shape the thinking of the new-age otologists presently, and in the days to come.

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