Endoscopic Tympanomastoid Surgery-Our Experience
Dr. Sukamal Das

Abstract

Introduction: In last few decades medical science has seen resurgence of minimally invasive surgery by development of endoscopes with adequate illumination, magnification and image quality. Although operating microscope made significant advances in ear surgery but it has a drawback of unobservable blind angles in cavities of middle ear. Endoscopic tympanomastoid surgery offers a panoramic view of middle ear cavity and endoscopic surgery preserves much of normal anatomy as possible by minimizing unnecessary dissection of bone & soft tissue. In addition there is more chance of ossicular preservation without jeopardizing disease clearance, hence it should be added to surgical armamentarium for better disease clearance and superior surgical outcome.

Keywords: Otoendoscopy, operating microscope, cholesteatoma, panoramic.

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Although operating microscope made significant advances in ear surgery for a period of 50 years, but right from the start it faced the drawback of unobservable blind angles in the cavities of the middle ear. With the advent of endoscopy in otology, ear surgery has gained a new momentum. The video assisted surgery under endoscopic guidance has broad range of applications, not only for middle ear surgery but also for otoneurosurgery, surgery for Eustachian tube orifice.

Surgical eradication of cholesteatoma involves canal wall down or intact canal wall techniques. The choice of technique depends on extent of disease. Elimination of mastoid bowl and better hearing are major advantages of the canal up (CWU) procedures. The high rate of residual disease in CWU procedures is due to poor visualization of middle ear regions that harbors residual disease such as epitympanum and posterior tympanum. It is documented that preoperative and intraoperative otoendoscopic evaluation gives more accurate findings than conventional procedures.

Although otoendoscopy has been introduced years ago, its use in management of ear pathology is still limited. Considering the shortcomings of ear surgery using the microscope, we propose to investigate whether addition of otoendoscopy in surgical armamentarium offers any additional therapeutic benefit.

Aims:
To demonstrate the effectiveness otoendoscope along with operating microscope in tympanomastoid surgeries.

Materials and Methods:
This prospective study was held at the Department of ENT and Head-Neck surgery, Vivekananda Institute Of Medicine.

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Discussion:

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residual cholesteatoma at 9.4%, which was similar to open follow up of 6.5 years. Yung reported the incidence of and small cavity mastoidectomy in 115 ears with mean surgeries included closed cavity mastoidectomy in 53 ears cholesteatoma performed from 1988 to 1999. These Yung et al f reported 231 primary operations for disease has been found till date.

All patients underwent microscopic and otoendoscopic examination at 3 and 6 months after surgery, to look for any sign of recurrent or residual disease and no residual disease has been found till date.

Discussion:

Yung et al f reported 231 primary operations for cholesteatoma performed from 1988 to 1999. These surgeries included closed cavity mastoidectomy in 53 ears and small cavity mastoidectomy in 115 ears with mean follow up of 6.5 years. Yung reported the incidence of residual cholesteatoma at 9.4%, which was similar to open cavity mastoidectomy incidence of 8.7%. This study showed that residual cholesteatoma, although not eliminated by the advent of endoscopy, can be reduced significantly to levels similar to those of open cavity techniques.

part of the procedure in all cases. We also used the otoendoscope complimentary to the microscope. In our series, higher number of patients underwent CWD mastoidectomy (42.5%) compared to the above mentioned study, possibly due to late presentation of the patients when the disease has resulted in more bone erosion. Shelton and Sheehy in 1990 reported residual cholesteatoma in one third of their cases and attributed it to poor control over areas difficult to reach with the microscope. Dodson EE et al in 1988 observed that residual disease may reach upto 42% in canal wall up technique, & 12% in canal wall down technique. In our study we have found that intraoperative residual cholesteatoma was 13 % in CWU mastoidectomy operation and 11.8% in CWD mastoidectomy operation when using microscope only and no residual cholesteatoma was left when both microscope and otoendoscope were used in tymanomastoid surgery. Thomasin et al in 2007 reported that the sinus tympani was considered the main site of recurrence. According to them ST remains the most difficult diseased site in the middle ear and can be challenging to address. The present study also confirmed ST was the only site of intraoperative cholesteatoma remnant in both CWU and CWD groups (total 5 cases, 3 CWU mastoidectomy and 2 CWD mastoidectomy).

Our results are in tandem with the series by Young et al19 in 1994 who studied the use of endoscope in cholesteatoma surgery and documented that endoscope provided better control over pathology in difficult-to visualize areas . Mohamed et al 12 in 2009 documented that the use of endoscopes achieved a significantly higher degree of control over middle ear disease and dramatically reduced the incidence of cholesteatoma recurrence particularly in those hidden recesses such as the sinus tympani. Meselatey et al10 (2003), Tarabichi et al11 (2010), Migirov et al12 (2011) also opined that endoscopy provides better control over pathology and better eradication of disease and allowed complete eradication of cholesteatoma. In our study we have also found that complete clearance of the cholesteatoma ( 100 %) could be achieved when otoendoscope was added in the surgical armamentarium during mastoidectomy operation. Ozturan et al13 in 1996 stated that the ST is the most often mentioned inconspicuous region for which endoscopic ear surgery has a place. They believed that while endoscopes may improve visualization of this area, they do not solve the problem of removing the disease. We disagree with this statement, as in our experience using the 30° endoscope together with the specially adapted instruments, perfect control over the disease could be achieved, enabling complete intraoperative disease clearance in our series.
Different surgical techniques have been proposed to access the ST. The usual approach when using microscope is to perform blind probing with blunt instrumentation.\(^1\) The anterior approach consists of drilling the posterior wall of the EAC, delineating the facial nerve and circumnavigation of the microscope around the patient’s head. Even with this careful dissection, only a minority of ST with limited depth (less than 1mm) could be adequately accessed by this approach as described by Cesario de Abreu CE et al\(^{17}\) in 2007. Toran et al\(^{18}\) in 2004 also described in detail the surgical steps to manage ST cholesteatoma but they concluded that complete removal of pathology could not always be confirmed. On the other hand, posterior approaches, i.e. from the mastoid to the tympanic cavity, necessitate excessive drilling in the retrofacial region as commented by Pickett BP et al\(^{19}\) in 1995. In the present study, ST was approached endoscopically. Our results showed that endoscopes offer effective control of the disease due to better visualization round the corner. Moreover\(^2\) as the disease clearance is done under direct vision without unnecessary drilling the procedure remains safe. The facial recess approach or posterior tympanotomy provides access to oval window and facial recess, but it does not permit visually controlled surgery of the tympanic sinus, as noted by Thomassain et al in 1993\(^{10}\). Facial recess approach was not performed in any of our patients.

Bottrill and Poe in 1995\(^{20}\) concluded that wide-angle endoscopes, particularly 30° and 45°, provide a panoramic view of the oval window, facial recess as well as sinus tympani even with preservation of posterior canal wall and with no need for posterior tympanotomy. According to our experience, the 30° endoscope gave the best overall exposure of the middle ear recesses particularly ST in both CWU and CWD procedure. Our results show that endoscopy provides effective control over the disease thereby reducing the need to drill superfluous bone.

All patients in our series were followed up 3 and 6 months after their surgery. The patients underwent microscopic as well as otosurgical examination at follow up. At the end point of our study, 6 months post-surgery, none of our patients had any sign of recurrent or residual cholesteatoma. It is needless to say that long-term follow-up is very important when discussing the recurrence rate of cholesteatoma. The rate of recurrence increases with follow-up time. In our study, though follow-up to date is relatively short, further observation are planned to assess long-term results.

**Conclusion:**
Otoendoscope enables disease clearance from the hidden areas of the tympanomastoid cavity in canal wall down procedures, thereby decreasing the possibility of residual and recurrent disease.

Endoscope also aids through disease clearance from the posterior tympanum, attic and aditus. This leads to more ossicular chain and canal wall preservation, enhancing the possibility of heavy reconstruction.

Therefore, otendoscope must be added to surgical armamentarium for routine tympanomastoid surgery.

**References:**