Endoscopic Myringotomy and Ventilation Tube Placement: A Valuable Otolaryngologic Procedure under Topical Anesthesia

Dear Editor:

Time has proven that endoscopy is generally a safe and effective tool in the diagnosis and treatment of various conditions. It offers superior visualization with markedly decreased morbidity and mortality. In Otolaryngology, otoendoscopy has been gaining acceptance in providing improved otoscopic visualization and video recording of the tympanic membrane. We describe a technique of myringotomy and ventilation tube insertion under endoscopic visualization using a rigid Hopkins rod scope previously described by other authors based on their accepted clinical guidelines for myringotomy.1,2 The use of rigid endoscopes provides visualization of the entire tympanic membrane with excellent resolution, better fidelity of color with a well-angled or side-to-side vision. The procedure is generally safe, convenient and can be performed in an out-patient setting. Correspondingly, the video recordings could improve disease documentation for baseline and post-myringotomy evaluation. They can also be a tool to enable better understanding for patients.3

METHODS:

A total of seven patients with symptomatic and non-resolving otitis media with effusion (OME) previously managed conservatively for 3-6 months from October 2009 to March 2010 were included in the study. The patients also had disabling otalgia with four of the subjects having more than 30 dB hearing loss. Subjects who had poor pain threshold, were deemed non-cooperative and those in the pediatric age group were excluded from the study. Informed consent with strict compliance to institutional ethical standards was signed by all patients. The procedures were all performed by the junior author at the E.N.T Diagnostic Unit of a private tertiary university hospital. Materials used for the procedure were the same as with conventional myringotomy (eg. aural speculum, Kley or sickle knife, Hartmann ear forceps and ventilation tube/s). The anesthetic used was an Eutectic Mixture of Local Anesthesia (EMLA®) cream 5% (Astra-Zeneca, Sodertalje, Sweden) in a 1 cc tuberculin syringe, and 20-25% aqueous form of phenol solution. A 0 degree 4 mm x 107.5 mm rigid endoscope (KARL STORZ GmbH & Co. KG Mittelstr., Tuttlingen, Germany) was used. (Figure 2)

First an otoendoscopy was performed and the clinical indications and risks for myringotomy were thoroughly discussed with each patient. EMLA® cream was applied to the ear canal and to the external surface of the tympanic membrane using a 1 cc tuberculin syringe. After 60 minutes, the external ear canal was cleared for complete visualization of the tympanic membrane. (Figure 2) The patient was then positioned seated on the examining chair with head tilted to the opposite side. Using a 0 degree 4 mm x 107.5 mm rigid endoscope, the posterior third of the external auditory canal and the tympanic membrane was visualized. The scope was held with the left hand only up to the anterior portion of the cartilaginous canal to avoid involuntary activation of the Xth cranial nerve and to allow further advancement of other instruments to the posterior canal. A shorter rigid otoendoscope (4 mm x 45 mm) or a smaller diameter pediatric rigid endoscope (2.7 mm x 107.5 mm) may be used if available. A Kley knife or myringotomy knife was dipped lightly in phenol solution and carefully advanced to the tympanic membrane for the preferred myringotomy stab incision. (Figure 3)
Care was taken to avoid contact of the phenol and knife tip with the canal wall to avoid stimulating unnecessary movement, canal abrasion or dermal irritation from the phenol solution during the entire procedure. (Figure 3) The myringotomy incisions were made at the posterior-inferior tympanic membrane quadrant for ease of access and drainage. (Figure 4) Evacuation of middle ear fluid was performed using a 2 and 3 mm Frazer middle ear suction tip. The myringotomy incision was made large enough to admit the ventilation tube in four subjects with copious effusions. In these four, the tube was introduced and adjusted using a 1 mm x 8 cm (working length) Hartmann ear forceps. A 1.14 mm I.D. Armstrong beveled fluoroplastic grommet ventilation tube (Xomed, Jacksonville, FL) was used in three subjects while a Sheehy collar button tube without wire (Micromedics Inc, St. Paul, Minnesota, USA) was used in one. The choice of tube depended mainly on the authors' preference, taking tube designs available for specific ear conditions into consideration. (Figure 4) All subjects were instructed to avoid vigorous activities for the first 48 hours post-myringotomy with strict water precautions. Ofloxacin otic drops were then prescribed.

RESULTS

There were a total of seven patients, three males and four females, with age ranging from 25 to 65 years (mean=50). All of them tolerated the procedure well. Ventilation tubes were inserted in four subjects with copious middle ear effusions. All had minimal intra-operative (PAS 2-5) and post-operative pain (PAS 0-2). The procedures were done on an out-patient basis. Co-morbid conditions were likewise treated. (Table 1) Six of the seven subjects experienced immediate subjective relief of otalgia and hearing loss after myringotomy while one subject had persistent complaint of ear fullness. The main indication for the procedure was otitis media with effusion with significant hearing loss, otalgia and ear fullness non-responsive to three months conservative
management. All patients had significant contributing factors for OME such as frequent infectious rhinitis or chronic persistent allergic rhinitis. Six of the seven subjects had markedly improved hearing. Four subjects with a preoperative pure-tone evaluation of >30-40 dB hearing loss had pure-tone average improvement to 10-15 dB after subsequent hearing examinations. All subjects were evaluated post-operatively with otorhinolaryngology. One case was unresponsive and subsequently diagnosed with adhesions or otitis media and advised to undergo myringoplasty.

**DISCUSSION**

Endoscopic myringotomy under topical anesthesia is a generally safe and practical procedure. Its indications are the same with conventional myringotomy with or without ventilation tube insertion such as Otitis Media with Effusion persisting beyond three months with associated significant hearing loss, impending mastoiditis or intracranial complications, recurrent episodes of acute otitis media (> 3 episodes in 6 months or > 4 episodes in 12 months), chronic tympanic membrane or pars flaccida, barotrauma, autophony (hearing body sounds; e.g. breathing) due to patulous or widely open eustachian tube, craniofacial anomalies predisposing to middle ear dysfunction (e.g. cleft palate), and middle ear dysfunction due to head and neck radiation and skull base surgery.4

Endoscopic visualization of the tympanic membrane enables better patient understanding of their ear conditions. Such has been the basis for the procedure along with the use of 5% EMLA® to decrease the pain and discomfort of patients undergoing out-patient myringotomy procedures.5 Phenol, on the other hand, aids in faster creation of pain and discomfort of patients undergoing out-patient myringotomy insertion.

### Table 1. Description of patients who underwent myringotomy and/or ventilation tube insertion.

<table>
<thead>
<tr>
<th>Subjects’ Age &amp; Sex</th>
<th>Indications</th>
<th>Other related conditions</th>
<th>Myringotomy +/- Ventilation Tube (VT)</th>
<th>Pre-operative PTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/F</td>
<td>Chronic OME, AU; Infectious Rhinitis</td>
<td>+ VT, AU</td>
<td>40 dB Hearing Loss</td>
<td></td>
</tr>
<tr>
<td>25/F</td>
<td>Recurrent OME, AU; Infectious Rhinitis, Allergic Rhinitis</td>
<td>-VT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60/M</td>
<td>Recurrent OME, AU</td>
<td>+VT, AU</td>
<td>30 dB Hearing Loss</td>
<td></td>
</tr>
<tr>
<td>27/M</td>
<td>Chronic OME, AU; Unresponsive to medical management x 2 yrs</td>
<td>Allergic Rhinitis, Subsequently diagnosed w/ Adhesive otitis media, AS</td>
<td>-VT, AS</td>
<td>30 dB Hearing Loss</td>
</tr>
<tr>
<td>29/F</td>
<td>Chronic OME, AS</td>
<td>Allergic rhinitis</td>
<td>-VT, AS</td>
<td></td>
</tr>
<tr>
<td>65/M</td>
<td>OME, AU; Severe hearing loss and otalgia</td>
<td>Infectious Rhinitis</td>
<td>+VT, AD</td>
<td>40 dB hearing loss</td>
</tr>
<tr>
<td>45/M</td>
<td>OME, AU</td>
<td>Infectious Rhinitis</td>
<td>+VT, AD</td>
<td></td>
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### REFERENCES