Endoscopy in Otologic Surgery

Dennis S Poe, MD, PhD
Dept of Otolaryngology, Children’s Hospital
Harvard Medical School, Boston, MA, USA

Minimally Invasive Office ENT Course
Silverstein Institute 27 February 2013
Endoscopic Advantages

- Minimally invasive
- Wide view angles with reduced exposure
- Look around corners
- Reduced surgical artifacts
Differences in fields of view

Microscope - Line of Sight Optics

Endoscope – Wide field & angled optics
CURRENT APPLICATIONS

- Inspection of EAC, TM, Perfs
- Transtympanic exploration
- Eustachian tube
- Perilymphatic fistula
- Adjunct to cholesteatoma surgery
- 2nd stage explorations
- Tympanoplasty
- Stapedotomy
## TRANSTYMPANIC ENDOSCOPY

### Case Material  n= 119

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertigo r/o PLF</td>
<td>59</td>
</tr>
<tr>
<td>IT Gentamicin RW exam for adhesions</td>
<td>37</td>
</tr>
<tr>
<td>Conductive HL</td>
<td>7</td>
</tr>
<tr>
<td>Middle ear mass</td>
<td>9</td>
</tr>
<tr>
<td>TM granulations r/o cholest</td>
<td>2</td>
</tr>
<tr>
<td>Exam RW for poss occlusion (I/T gent)</td>
<td>2</td>
</tr>
<tr>
<td>Vertigo r/o recurrent cholest</td>
<td>1</td>
</tr>
<tr>
<td>Hyperacousis r/o absent stapedius</td>
<td>1</td>
</tr>
<tr>
<td>Exam fibrin glue plf repair</td>
<td>1</td>
</tr>
</tbody>
</table>

Complications = 0
Endoscopic Transtympanic Surgery
Endoscopic Transtympanic Surgery
Endoscopic Transtympanic Surgery
Disadvantages of Endoscopy

- One hand holding endoscope, bleeding control
  - Alternate with microscope to dissect & clean field
  - Irrigation while endoscope in place
  - Suction dissectors
  - Can add time to procedure
- Endoscopes occupy space
- Obstructions to view
  - Adhesions can bleed when lysed
  - Fogging of lens
- Risk of injury
  - Ossicular dislocation (angled views, disorientation)
  - Risk of injury if endoscope holder fixed to table
Functional Approach to Cholesteatoma Excision

- Design surgery to follow the route of cholesteatoma spread (CT is helpful in planning)
  - Maintain matrix intact as much as possible
  - Find adhesions to matrix and lyse
  - Obtain sufficient exposure to lyse the adhesions

- Expand exposure as necessary to follow matrix
  - Atticotomy, antrotomy, mastoidectomy, VII recess (post tympanotomy), CWU
  - Endoscopic assistance to follow the matrix
Endoscopic 70 degree view after cholesteatoma removal
Endoscopic 2nd look (right)
Results

$n = 184$

Follow up 1 – 11 yrs (mean 3.2 yrs, 41% ≥ 3 yrs)

Hanna, Wú, Guo, Poe
Presented at AOS 2011, San Diego

No significant complications
Conclusions

- Use endoscopy for wide fields of view in limited exposure
- Minimally invasive, minimal artifacts
- Adjunct to cholesteatoma surgery
- Use endoscopy to help with decisions, save time, or reduce morbidity.
Attic Cholesteatoma Excision
Attic Reconstruction with Cartilage Grafts
Endoscopic Cholesteatoma Surgery
Endoscopic 70 degree view after cholesteatoma removal
Endoscopic 2nd look (right)
Endoscopic dissection of residual cholesteatoma (right)
Residual Cholesteatoma Rates

**Canal Wall Up Mastoidectomy (planned 2 stage)**

- **Smyth 1995**  
  \( n = 435 \) - residual rate 23 %

- **Sheehy 1990**  
  \( n = 400 \) - residual rate 32 %
  25 % middle ear, 15 % epitymp

**Canal Wall Down Mastoidectomy**

- **Smyth 1995**  
  \( n = 83 \) - Recur/residual 2.5 %

- **Glasscock 1989**  
  \( n = 102 \) - Recur/residual 3.9 %
Endoscopic-Guided CWU Cholesteatoma Surgery

Thomassin 1993

- n = 44  2 stage - Residual rate 47.7 %
- n = 36  2 stage w/ endoscopy
  Residual rate 5.5 %
Reconstruction of the Middle Ear Space
Primary Tympanostomy Tube

Subannular Tube
Minimally Invasive Functional Approach to Cholesteatoma Surgery

Presented at American Otologic Society, 2011

Bassem Hanna, MB BCh, M Sc
Yi-Hsuan Emmy Wu, MD
Lee Guo, DO
Dennis Poe, MD

No financial disclosures

1. Department of Otolaryngology-Head and Neck Surgery, Ottawa University, Ottawa, Canada
2. Department of Otolaryngology and Communication Enhancement, Children’s Hospital, Boston, MA, USA
3. Department of Otolaryngology-Head and Neck Surgery, Tufts Medical Center, Boston, MA, USA
4. Department of Otology and Laryngology, Harvard Medical School, Boston, MA, USA
Functional Minimally Invasive Approach

- Progressive development of exposure following matrix
- Debulk, infold matrix, identify/lyse adhesive bands
- Mobilization & excision of matrix in one sheet
- Endoscopy for recesses & 2nd look
- Prevention of recurrence
  - Cartilage for attic defect & retraction pockets
  - Tympanostomy tube if needed (subannular)
- Follow-up
  - Otomicroscopy alone, or
  - Serial CT annually x 3 years, or
  - 2nd stage surgery at 6 months

**Hypothesis**

Functional approach would reduce rate of residual & recurrent disease
Methods

- Retrospective chart review
  - January 1996 to January 2008
- 184 ears of 169 patients
  - Trans-canal (TC)
  - Post-auricular (PA)
  - Canal Wall Up (CWU)
    - Mastoidectomy
- Outcomes
  - Residual disease
  - Recurrent disease
  - Audiometry
Hearing Outcomes

Air conductive PTA

Air Bone Gap

Pre-Op vs. Post-Op

p < 0.0001

p = 0.0001
Discussion

- Residual, unplanned = 3.3%
  - CWD: 2.5% Smyth 1995, 3.9% Glasscock 1989
- Recurrent disease = 10.3%
- Significant improvement in post-op PTAs and ABGs
- Endoscopic assistance
  - No difference in residual disease rate (Despite worse disease in endoscopy cases) p > 0.05
  - Reduced exposure
    - 37% did not require mastoidectomy
    - 80% of 2nd stage procedures transcanal
Conclusions

- Functional minimally invasive approach:
  - Follow matrix
  - Identify and lyse bands
  - Develop exposure as necessary

- Superior compared to CWU techniques in literature
  - Improved disease control
  - Preservation of anatomy
  - Reduced exposure
  - Reduced numbers of 2nd stage

Transcanal with endoscopy
Postauricular atticotomy
CWU Mastoidectomy