Variations in Practice

Question 1. When do you use canal wall down as the primary approach for cholesteatoma?

Consensus Answers:
- Significant canal wall erosion
- Irreversible Eustachian tube dysfunction

Other Answers:
- The lateral semicircular canal is eroded
- Extensive disease of the oval or round window niches
- Only hearing ear

Question 2. When do you use a canal wall down approach for chronic otitis media?

Consensus Answers:
- Poorly pneumatized mastoids
- Irreversible Eustachian tube dysfunction

Other Answers:
- Failed medical management and failed intact canal wall mastoidectomy
- Third or more revision case
- Aggressive granulations
- Recurring pseudomonas infection with likely biofilm formation
Variations in Practice

Question 3. In your view, what are the major advantages to using an intact canal wall approach?
- No need for recurrent cleanings
- Optimal hearing result
- No problems with caloric stimulation with water exposure
- Cosmesis

Question 4. In your referral-based practice, what percentage of your mastoidectomy cases end up with a canal wall down cavity?
- 30-50%

Definitions
- Complete, simple, intact canal wall (ICW) or canal wall up mastoidectomy
- Radical mastoidectomy: single cavity of the mastoid, middle ear, epitympanum and external canal. No reconstruction is performed and Eustachian tube is plugged.
- Bondy procedure: open epitympanum and leave middle ear intact, a portion of superior and posterior meatal wall is removed.
- Modified radical mastoidectomy– TM, ossicles or remnants maintained
- Canal wall down mastoidectomy (CWD)– TM, ossicles reconstructed

Indications for Mastoidectomy
- Failed medical management of Chronic Suppurative Otitis Media (CSOM)
  Goals: Eradicate disease
  Establish aeration
- Cholesteatoma
  Goals: Eradicate disease
  Prevent recurrence
  Restore hearing
Intact Canal Wall Advantages

- More closely maintains normal anatomy
- Improved hearing results
- Facilitates hearing aid use
- Smaller incidence of postoperative otorrhea
- Postoperative care reduced
- Safe ear for swimming
- **Disadvantage:** Need second stage procedure

Hearing Results

- Some authors report better hearing outcomes with ICW procedures (Rahgeb et al., 1987 and Karmarker et al., 1995)
- Others dispute this finding (Roden et al., 1996; Hirsch et al., 1992; Toner and Smyth, 1990; Sheehy, 1988)
- The presence of stapes superstructure positively affects hearing status, as does the status of the middle ear mucosa (Umit et al., 2010)

Failure of Cholesteatoma Surgery

- Recidivism (combined recurrent/residual disease)
  ICW procedures—11-34% (Cho et al., 2010)
- Recent retrospective study of 148 ICW procedures (Wilson, Hoggan, and Shelton, 2013)
  —35% had residual cholesteatoma at second stage
    (4 ears more than 2 stages, 1 CWD)
  —8% had recurrent disease (6 CWD)
- Rates of recidivism with CWD surgery (2-18%)
  (de Zinis et al., 2010 and Cho et al., 2010)
Sinus Tympani

Recent meta-analysis (Tomlin et al., 2013)
—Relative risk of 2.87 after ICW vs. CWD
—After 2-stage ICW operation (12-15%) comparable to CWD (4-17%)

Procedure costs:
—Canal Wall Down: $6,562.79
—Intact Canal Wall: $7,441.89
—Staged Intact Canal Wall: $10,169.89 – $12,012.89

The Cost of Failure
Mastoid Cavity Problems

- Require frequent debridement
- Specific antibiotics/antifungals
- Removal of granulations

- Delayed skin grafting in office
- Mycolog, nystatin-triamcinolone, CSF powder, gentian violet

Prevent Cavity Problems

- Adequate meatoplasty
- Lower facial ridge
- Remove dependent mastoid tip
- Bone pate
- Tissue flaps to fill mastoid defect
- Reconstruct canal wall
  - some report higher infection rates requires a second look procedure
  - increased surgical time, complexity
  - long term results are lacking

CWD indications (not absolute)

- Labyrinthine fistula
- Unresectable disease (stapes footplate or facial nerve)
- Inadequate patient follow-up
- Disease in only hearing ear
- ICW failures
- Sclerotic mastoid
- Large posterior canal wall erosion

CWD: Contracted Mastoid
Posterior Wall Defect

In Summary…

- The decision between ICW and CWD approaches should be made by the surgeon and patient on an individual basis.
- Primary goal is to eradicate cholesteatoma.
- Other goals are to prevent recurrence and restore hearing.

Future Directions

- Recent systematic review of 16 studies including 432 patients: (Jindal et al., 2011)
  - Specific diffusion-weighted MRI images have a 91% sensitivity and 96% specificity in detecting postoperative cholesteatoma after intact canal wall mastoidectomy, confirmed at second-look surgery.
  - Even small lesions (2-5mm) were identified.
- Possible future alternative to second-look surgery.
Acknowledgments

- Jeffrey P. Harris, MD, PhD
- Roberto Cueva, MD