OTOLOGY PANEL DISCUSSION
2013 AOCOO-HNS ACA
Case Presentation

HPI

- 50 y/o female w/ 1 month hx episodic vertigo minutes to hours in duration
- 1-2 episodes/wk x 1 month
- Most recent episode ~ 24 hours prior to examination
- Tx w/ valium, promethazine PRN.

Episodes of vertigo associated w/ gradually worsening/fluctuating AS HL (worse following each episode vertigo over last month), fluctuating non-pulsatile AS tinnitus, fluctuating AS aural fullness, nausea & vomiting, moderate improvement in symptoms w/ valium & phenergan

Denies: otorrhea, otalgia, headaches, loss of consciousness, syncope/near-syncope
History

☐ PMH: Allergic rhinitis
  ☐ Allergies
    ☐ NKMA
  ☐ Medications
    ☐ Allegra, Valium, Promethazine
  ☐ PSH
    ☐ Foot surgery

☐ Soc Hx
  ☐ Married, Denies EtOH, tobacco, caffeine
Physical Exam

- **HEENT**
  - EOMI, PERRLA, No nystagmus (w/ fixation)
  - EAC patent, TM intact, ME clear AU, pneumatotoscopy – good TM mvt, negative fistula test
  - 512 Hz tuning fork
    - Weber lateralized AD, Rinne AC > BC (positive) AU
Physical Exam

- Neurotologic Evaluation
  - IR Video Oculography (removal visual fixation)
    - No spontaneous nystagmus
    - Horizontal right-beating nystagmus present with right-ward gaze
      - Not present in centric or left-ward gaze
    - Horizontal right-beating post head-shake nystagmus
      - Greater in intensity than nystagmus elicited by right-ward gaze
Testing

- Preferences
  - EcOG, ABR, VNG, VEMP, DVA, VAT, etc.?

- Lab testing

- Imaging
  - MRI of IACs w/o contrast
Testing Results

- Stapes reflex
  - Ipsilateral & contralateral intact

- MRI of IACs w/ gadolinium contrast
  - “Unremarkable”
    - No evidence intravestibular/intracochlear lesion, no evidence IAC mass/lesion, no intracranial mass/lesion
Assessment

- Diagnosis
  - AS Meniere disease
  - Acute unilateral vestibular weakness, AS
  - AS Moderate to profound SNHL
Management

- Treatment options
  - “Lifestyle modification” & medical Tx
    - Diuretics, Betahistine, etc.?
    - Symptom control rates?
  - IT therapy?
  - Surgical?
Management

- IT dexamethasone 24 mg/ml
  - Single trans-tympanic injection

- Dyazide (37.5/25), dietary modification, ativan (1 mg SL PRN)
Management

- Following 1\textsuperscript{st} Dex Perfusion (1 week – follow-up)
  - Continued w/ recurrent vertigo (minutes to hours), fluctuating AS HL, aural fullness, tinnitus
  - 2\textsuperscript{nd} – 4\textsuperscript{th} dexamethasone perfusion (q weekly) →
    - Vertigo relief w/ resolution of left aural fullness and stabilization of left sided hearing loss x 6 wks
**Intratympanic/Trans-tympanic**

- **IT steroids**
  - Use in early v. late disease
  - Steroid type: Dexamethasone v methylprednisolone v. other
  - Administration protocols – weekly v daily v “continuous” v other?
  - Concentration?

- **Aminoglycosides**
  - Gent, Streptomycin, etc.
    - Use in early MD? – “good hearing”
    - “Continuous delivery” v. Single injection protocols?
    - Ablation v. disease modification?
    - Optimal target population (avoid in certain populations?)

- **Other agents**
  - Hyaluronic acid, etc.
6 wk Follow-Up

- Recurrent episodes intense vertigo
- Seconds – minute in duration
- Provoked by positional changes/rolling over in bed
- Not associated w/ changes in hearing, tinnitus
Repeat Examination

- Neurotologic Evaluation
  - IR Video Oculography (removal visual fixation)
    - No evidence spontaneous nystagmus
    - No gaze evoked nystagmus w/ right-ward or left-ward gaze
  - Dix-Hallpike testing
    - Head turned left → Horizontal, left beating (geotrophic) nystagmus
    - Direction changing w/ head turned right →
      - Horizontal, right beating (geotrophic) nystagmus – less intense than w/ head turned left
Management

- Recurrent vertigo following series of 4 dexamethasone perfusions
  - Positional in nature
  - Repeat testing/further testing?
Management

- AS HSC BPPV - cupulolithiasis
  - Positioning maneuvers
    - Log roll
      - Positional vertigo resolved @ 1 week follow up

- AS MD
  - Observe
Management

- Relation of MD and
  - Migraine
    - w/ relatively high incidence of Migrainous vertigo, does this change your initial management/evaluation strategy – especially in early stage Meniere’s?
  - BPPV
Repeat Examination

- 2 weeks post AS HSC BPPV treatment (8 wks post IT Dex)

  - Patient presents again c/o repeated episodes vertigo (hours in duration) associated w/ fluctuating AS aural fullness, HL, tinnitus, not associated w/ changes in position/rolling over in bed

  - Currently nauseated w/ decreased hearing, increase in left aural fullness/tinnitus and c/o vertigo
Physical Exam

- Neurotologic Evaluation
  - IR Video Oculography (removal visual fixation)
    - Spontaneous horizontal, left-beating nystagmus (increasing in intensity w/ removal visual fixation)
      - Increasing in intensity w/ gaze to left and decreasing in intensity w/ gaze to right
Assessment

- AS MD - worsening
  - Post IT Dexamethasone perfusion x 4

- AS HSC BPPV – cupulolithiasis
  - Resolved
Management

- Further testing?
- Repeat Dexamethasone perfusion?
- ELS, VNS, Gent, Trans-canal or Trans-labyrinthine labyrinthectomy?
Management

- AS gentamicin perfusion
  - 0.2 ml 80 mg/ml trans-tympanic x 1
    - 7 minutes supine
1 week f/u Post Gent Perfusion

- Pt denies vertigo, c/o disequilibrium
  - Hearing improved, aural fullness resolved, tinnitus improved
  - Neurotologic exam (IR video oculography)
    - Spontaneous horizontal, right-beating nystagmus
      - Horizontal right-beating nystagmus increasing in intensity w/ right-ward gaze
        - Less in left-ward gaze
3 Month Follow-up

- No further episodes vertigo
  - Disequilibrium resolved
    - Playing volleyball & running on treadmill
  - Aural fullness resolved
  - Minimal, constant tinnitus present AS (2-3 of 10 down from 8-9 of 10 @ greatest intensity)
  - Hearing subjectively improved
1 year follow-up

- Patient w/ recurrent episodes of imbalance (no vertigo) – several per month, lasting seconds in duration
  - Fluctuating aural fullness and HL left ear
  - Tinnitus present and unchanged

- C/o nasal congestion, itching, post nasal drainage, obstruction, sneezing, watery eyes, etc.
Follow up

- Exam unchanged
  - No nystagmus post head-shake testing

- Hearing unchanged on repeat audiometric testing

- Treatment
  - Role of allergy testing/treatment/immunotherapy?
  - Continued use of diuretics?
  - Other treatment considerations
Case 2

- 65 y/o Caucasian male
  - B/L slowly progressive, non-fluctuating hearing loss > 20 years
  - Patient wears bilateral hearing aids for > 15 years
    - Denies vertigo or otalgia
    - Admits to recurrent right sided otorrhea
    - Previous bilateral ear surgery
PSH/PMH

- **PSH**
  - B/L ear surgery
    - Left - canal wall down Tympanomastoidectomy
    - Right - tympanomastoidectomy (canal wall intact)
  - CABG

- **PMH**
  - CAD, COPD, HTN, hypercholesterolemia

- **Allergies**
  - Levaquin
Physical Examination

- **HEENT**
  - **Right ear**
    - Thickened TM w/ granulation tissue and poor movement w/ pneumatotoscopy
    - Unable to visualize middle ear space
  
  - **Left ear**
    - Canal wall down cavity w/ intact TM and ossicular chain. Middle ear clear of effusion. TM retracted superiorly onto malleus head, incus body and long process down onto stapes and facial nerve
Audiometric Testing

- **Speech Reception Threshold**
  - Right: 90 dB HL; Left: 85 dB HL (live voice)

- **Speech Awareness**
  - Right at 60 dB HL; left at 75 dB HL

- **Word Recognition Testing**
  - Right: 36% at 95 dB HL (0 dB masking)
  - Left 36% at 100 dB HL (0 dB masking) (live voice)
AzBio sentences were completed at 60 dB using recorded voice and patient’s own hearing aids. He obtained a score of 14%.
Case 3

- Cochlear implant candidate?
- Choice of ear(s)?
- Further considerations/work-up?
- Choice of device?
Vaccine Recommendations

TABLE. Recommended pneumococcal vaccination schedule for persons with cochlear implants, Advisory Committee on Immunization Practices, 2003

<table>
<thead>
<tr>
<th>Age at first PCV7 dose (mos)*</th>
<th>PCV7 primary series</th>
<th>PCV7 additional dose</th>
<th>PPV23 dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–6</td>
<td>3 doses, 2 months apart†</td>
<td>1 dose at 12–15 months of age§</td>
<td>Indicated at ≥24 months of age††</td>
</tr>
<tr>
<td>7–11</td>
<td>2 doses, 2 months apart†</td>
<td>1 dose at 12–15 months of age§</td>
<td>Indicated at ≥24 months of age††</td>
</tr>
<tr>
<td>12–23</td>
<td>2 doses, 2 months apart**</td>
<td>Not indicated</td>
<td>Indicated††</td>
</tr>
<tr>
<td>24–59</td>
<td>2 doses, 2 months apart**</td>
<td>Not indicated</td>
<td>Indicated††</td>
</tr>
<tr>
<td>≥60</td>
<td>Not indicated††</td>
<td>Not indicated††</td>
<td>Indicated</td>
</tr>
</tbody>
</table>

* A schedule with a reduced number of total 7-valent pneumococcal conjugate vaccine (PCV7) doses is indicated if children start late or are incompletely vaccinated. Children with a lapse in vaccination should be vaccinated according to the catch-up schedule (CDC. Pneumococcal conjugate vaccine shortage resolved. MMWR 2003;52:446–7).
† For children vaccinated at age <1 year, minimum interval between doses is 4 weeks.
‡ The additional dose should be administered ≥8 weeks after the primary series has been completed.
§ Children aged ≥5 years should complete the PCV7 series first; 23-valent pneumococcal polysaccharide vaccine (PPV23) should be administered to children aged ≥24 months ≥8 weeks after the last dose of PCV7 (CDC. Preventing pneumococcal disease among infants and young children: recommendations of the Advisory Committee on Immunization Practices. MMWR 2000;49(No. RR-9).
** Minimum interval between doses is 8 weeks.
†† PCV7 is not recommended generally for children aged ≥5 years.

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5231a5.htm#tab
<table>
<thead>
<tr>
<th>Risk group</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunocompetent children</td>
<td>Chronic heart disease*</td>
</tr>
<tr>
<td></td>
<td>Chronic lung disease†</td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>Cerebrospinal fluid leaks</td>
</tr>
<tr>
<td></td>
<td>Cochlear implant</td>
</tr>
<tr>
<td>Children with functional or anatomic asplenia</td>
<td>Sickle cell disease and other hemoglobinopathies</td>
</tr>
<tr>
<td></td>
<td>Congenital or acquired asplenia, or splenic dysfunction</td>
</tr>
<tr>
<td>Children with immunocompromising conditions</td>
<td>HIV infection</td>
</tr>
<tr>
<td></td>
<td>Chronic renal failure and nephrotic syndrome</td>
</tr>
<tr>
<td></td>
<td>Diseases associated with treatment with immunosuppressive drugs or radiation therapy, including malignant neoplasms, leukemias, lymphomas, and Hodgkin disease; or solid organ transplantation</td>
</tr>
<tr>
<td></td>
<td>Congenital immunodeficiency§</td>
</tr>
</tbody>
</table>

* Particularly cyanotic congenital heart disease and cardiac failure.
† Including asthma if treated with prolonged high-dose oral corticosteroids.
TABLE 2. Recommended routine vaccination schedule for 13-valent pneumococcal conjugate vaccine (PCV13) among infants and children who have not received previous doses of 7-valent vaccine (PCV7) or PCV13, by age at first dose --- Advisory Committee on Immunization Practices (ACIP), United States, 2010

<table>
<thead>
<tr>
<th>Age at first dose (mos)</th>
<th>Primary PCV13 series*</th>
<th>PCV13 booster dose†</th>
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<tbody>
<tr>
<td>2---6</td>
<td>3 doses</td>
<td>1 dose at age 12--15 mos</td>
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<td>2 doses</td>
<td>---</td>
</tr>
<tr>
<td>24--59 (Healthy children)</td>
<td>1 dose</td>
<td>---</td>
</tr>
<tr>
<td>24--71 (Children with certain chronic diseases or immunocompromising conditions§)</td>
<td>2 doses</td>
<td>---</td>
</tr>
</tbody>
</table>

* Minimum interval between doses is 8 weeks except for children vaccinated at age <12 months for whom minimum interval between doses is 4 weeks. Minimum age for administration of first dose is 6 weeks.
† Given at least 8 weeks after the previous dose.
§ For complete list of conditions, see Table 1.

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5909a2.htm#tab2
Cochleostomy

- Optimal location
  - Expanded RW
  - RW
  - Inferior/anterior cochleostom

- Hearing preservation techniques
Imaging/Work - UP

- Optimal imaging modality(ies) pre-op
  - Adult
  - Pediatric
Case 3

- 22 y.o. female seen and examined for follow-up evaluation of left sided hearing loss present since childhood
- History of left ear surgery x 4
  - Recent: AS CWD t-mast w/ OCR, and AD t-plasty
- Denies
  - Otalgia, otorrhea, or vertigo
- Recently started on SLIT for AR – w/improvement in symptoms
- Unable to wear left hearing aid d/t CWD cavity
PMH/PSH

- Left ear
  - Surgery x 4 – most recent – AS CWD T-mast w/ OCR w/ cartilage graft
- Right ear
  - AD tympanoplasty
- Lap chole
- Depression, COM
Audiometric Testing

- **Speech Reception Threshold:** (live voice)
  - Right: 10 dB HL
  - Left: 30 dB HL

- **Word Recognition Testing:** (live voice)
  - Right: 100% presented at 40 dB HL, (--- dB masking)
  - Left: 100% presented at 65 dB HL (40 dB masking)

- **Pure tones:**
  - RE: Normal hearing
  - LE: Mild to severe conductive loss
Case 3

LEFT
Frequency in Hertz

RIGHT
Frequency in Hertz

Hearing Loss in Decibels

250 500 1000 2000 4000 8000

0 10 20 30 40 50 60 70 80 90 100 110
Case 4

- 46 y.o. female w/ bilateral hearing loss Right > Left
  - Right sided hearing loss
    - Present since childhood
  - Left sided hearing loss
    - Secondary to COM
      - AS Kartush patch placed - TM perforation (2010)
      - Has worn AS hearing aid for many years
      - C/O recurrent purulent otorrhea present > 2 months despite Rx Ciprodex, aural toilet, PO antibiotics
PMH/PSH

- Congenital AD profound HL
- AS COM
- Depression, migraine, HTN, uterine CA
- AS tympanostomy w/ tube, Kartush myringoplasty patch
- Cholecystectomy, tonsillectomy, hysterectomy
Case 4

- Rx 14 days Ciprodex, PO antibiotics x 2
  - Patient continues w/ left sided otorrhea, HL and otalgia
  - Options/next step?
Case 4

- Persistent AS TM perforation and otorrhea
  - C(s)OM

- Culture & sensitivity
  - MRSA +
  - Options?
Case 4

- Left Tympanomastoidectomy w/o OCR
- Resolution infection, otorrhea, etc.
Post OP

- **Speech Reception Threshold:** (live voice)
  - Right: CNT dB HL
  - Left: 30 dB HL

- **Word Recognition Testing:** (live voice)
  - Right: DNT % presented at -- dB HL, (-- dB masking)
  - Left: 100 % presented at 65 dB HL (-- dB masking)

- **Pure tones:**
  - RE: DNT
  - LE: mild to severe mixed loss
Post – OP

**LEFT**
Frequency in Hertz

**RIGHT**
Frequency in Hertz

profound loss
Case 4

- Considerations for rehabilitation of hearing loss?
Case 5

- 64 y/o male w/ bilateral, slowly progressive HL present > 10 years w/ recent decline in left sided hearing loss over ~3 months (following general surgical procedure)
  - Pt referred by hearing instrument specialist in community of asymmetric HL – has worn hearing aids x 10 + years
  - Denies otalgia, otorrhea, tinnitus, vertigo, previous ear surgery
  - Admits to family hx HL (father, mother), + noise exposure (farming, firearms), use of b/l HA
Case 5

- PMH
  - HTN, Osteoarthritis
- PSH
  - Herniorrhaphy, cholecystectomy
- Meds
  - Norvasc
- Allergies
  - NKMA
Right: 35 dB HL
Left: 55 dB HL

**Word Recognition Testing:** (live voice)
Right: 92% presented at 70 dB HL, (0 dB masking)
Left: 72% presented at 85 dB HL (60 dB masking)

**Pure tones:**
RE: Mild to moderately severe sensorineural hearing loss
LE: Moderate to severe sensorineural hearing loss

**Tympanometric results:** See scanned image.

Right ear-Type A (1.6 ear canal volume; 0.7 compliance; 25 middle ear pressure). Left ear- Type A (1.4 ear canal volume; 0.8 compliance; 55 middle ear pressure).
Work-up

- Further testing
  - OAE, ABR, etc.

- Imaging

- Other
Work up

- MRI IACs w/ w/o contrast
  - “Unremarkable”
Speech Reception Threshold: (live voice)

Right: 35 dB HL
Left: 55 dB HL

Word Recognition Testing: (live voice)
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