OTOLARYNGOLOGY

2017 PANRE Recertification Review

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Disclosure

- I am the chair of the Professional Development Review Panel for the NCAPA and am a paid speaker.

- I have no other financial disclosures or conflicts of interest.
Goals

- Review ENT Anatomy and Physiology
- Discuss Common ENT Disorders
  - Signs and Symptoms
  - Physical Exam
  - Diagnostics
  - Treatment
- Answer 100% of ENT PANRE questions correctly
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<tr>
<th>Acute/chronic otitis media</th>
<th>Acute/chronic sinusitis</th>
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<td>Allergic rhinitis</td>
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<td>Barotrauma</td>
<td>Epistaxis</td>
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<td>Cholesteatoma</td>
<td>Foreign body</td>
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<td>Hematoma of external ear</td>
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<td>Labyrinthitis</td>
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<td>Mastoiditis</td>
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<td>Vertigo</td>
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<td>Benign and malignant neoplasms</td>
<td>Parotitis</td>
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<td>Sialadenitis</td>
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* Not covered in this lecture
Cochlea

helicotrema
cochlear duct
vestibulocochlear nerve
scala vestibuli
vestibular (Reissner's) membrane
glial ligament
stria vascularis
spiral prominence
scala media
spiral limbus
osseous spiral lamina
spiral organ of Corti
basilar membrane
scala tympani
The Mechanism of Hearing
CONDUCTIVE VS. SENSORINEURAL HEARING LOSS
Tuning Fork Test

- Weber
Tuning Fork Test

- Tuning Fork Test - Rinne
## Interpreting Tuning Fork Results

<table>
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<tr>
<th>Test</th>
<th>Purpose</th>
<th>Fork Placement</th>
<th>Normal Hearing</th>
<th>Conductive Loss</th>
<th>Sensorineural Loss</th>
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</thead>
<tbody>
<tr>
<td>Weber</td>
<td>To determine Conductive versus Sensorineural loss in unilateral loss</td>
<td>Midline</td>
<td>Midline sensation; tone heard equally in both ears</td>
<td>Tone louder in poorer ear</td>
<td>Tone louder in better ear</td>
</tr>
<tr>
<td>Rinne</td>
<td>To compare patient’s air and bone Conduction hearing</td>
<td>Alternately between patient’s mastoid and entrance to ear canal</td>
<td><strong>Positive Rinne:</strong> Tone louder at Ear.  (Air Conduct &gt; Bone Conduct)</td>
<td><strong>Negative Rinne:</strong> Tone louder on Mastoid. (Bone Conduct &gt; Air Conduct)</td>
<td><strong>Positive Rinne:</strong> Tone louder at Ear. (Air Conduction &gt; Bone Conduct)</td>
</tr>
</tbody>
</table>
Sensorineural Hearing Loss

- Presbycusis
- Noise induced SNHL
- Idiopathic Sudden SNHL
- Acoustic neuroma
- Ototoxicity
- Acute Labyrinthitis
- Meneire’s Disease
Presbycusis

• Age related hearing loss
• Bilateral, high frequency SNHL
• Onset is subtle, gradual, stable
• Difficulty with social situations
• Better in quiet environments
• Treat with hearing aids
Noise Induced SNHL

- Sudden or prolonged Noise exposure
- Notched Audiogram 3000-6000Hz
- Recovery high frequency
- Unilateral or Bilateral
- Loss is permanent
- Advise Hearing protection
Acoustic Neuroma

- Slow growing, non-cancerous tumor arising from Schwann cells CN 8 (vestibulocochlear nerve)
- Causes Asymmetric SNHL
- Symptoms: hearing loss, tinnitus, imbalance, poor speech discrimination
- Diagnosed with MRI of Internal Auditory Canals with contrast
- Treatment includes: observation, stereotactic radiation, and/or surgery.
Sudden SNHL

- SNHL that has occurred within 72 hours
  - Usually has no warning or prodrome
  - Often patient complains of dizziness/vertigo, ear fullness and tinnitus

- Possible causes
  - Viral Labyrinthitis
  - Autoimmune
  - Vascular compromise

- An otologic emergency
- Refer to ENT without delay

- **When in doubt, treat with steroids!**
  - Prednisone
    - 60mg x 8 days, 40mg x 2 days, 20mg x 2 days
Sample PANRE question #1

Tina Tanner is a 62 year old female with gradual loss of hearing in her right ear for more than a year. Associated symptoms includes right sided tinnitus and imbalance. After performing a proper history and physical exam, you astutely decide to order an audiogram. The audiogram reveals an asymmetric sensorineural hearing loss on the right side. What is the next appropriate intervention?

a. Order a contrasted MRI of the internal auditory canals
b. Place the patient on a 12 day course of prednisone
c. Order a non-contrasted CT of the temporal bone
d. Start Meclizine 25mg TID for her imbalance
e. Advise the patient to utilize a right-sided hearing aid
Conductive Hearing Loss

- EAC swelling/stenosis/obstruction
- TM perforation
- Eustachian Tube Dysfunction
- Otitis Media
- Otosclerosis
- Cholesteatoma
EXTERNAL EAR

- Malleus
- Incus
- Stapes
- Semicircular canals
- Facial nerve
- Cochleovestibular nerve
- Carotid artery
- Cochlea
- Tympanic membrane
- Jugular vein
- Eustachian tube
External Auditory Canal Foreign Body

- Attempt to remove if it appears you can get it on the first try.
- If completely obstructing EAC, if TM perf present, or if touching the TM, consult ENT.
- Do not attempt to remove batteries, consult ENT and do not lavage.
Auricular Hematoma

- Physical trauma to the auricle which causes shearing of the tissues and a perichondral hematoma.
- The auricle will be very swollen.
Auricular Hematoma

- Failure to treat early can lead to permanent remodeling of the auricle, cauliflower ear.

- Treat with I&D, then bolster both sides with dental rolls.
Otitis Externa (OE)

- Infection or Inflammation of the external auditory canal

- Differential Diagnosis:
  - Acute Bacterial
  - Acute Fungal
  - Chronic OE

- Associated Symptoms
  - Pain
  - Hearing Loss
  - Otorrhea
  - Fullness
  - Itching

- Physical Exam
  - Tenderness of tragus/auricle
  - Swollen EAC
  - Purulent drainage
Otitis Externa (OE)

- Bacterial
  - Streptococcus
  - Staphylococcus
  - Pseudomonas
  - MRSA

- Fungal (otomycosis)
  - Aspergillus
  - Candida
Acute Bacterial OE

- Remove purulent debris
  - Suction if possible

- If the canal is too narrow, insert a wick

- Topical Antibiotic Drops:
  - Neo/Poly/HC...use only if TM is intact
    - Fluoroquinolone
      - Ciprofloxacin
      - Ofloxacin

- Culture otorrhea (aerobic and fungal) if topical antibiotics fail
Acute Fungal OE

- Fungal ear infections are usually very itchy
- They can look like bacterial infections
- Suspect fungal infections if antibiotic drops fail to resolve the problem
Treatment of Fungal OE

- Remove Debris if possible

- Topical treatment
  - Acetic acid ear drops
  - Antifungal drops (clotrimazole)

- Powders
  - CASH powder:
    - Chloramphenicol
    - Amphotericin B
    - Sulfamethoxazole
    - Hydrocortisone
Malignant Otitis Externa

- OE that causes temporal bone destruction
  - Aka Temporal bone osteomyelitis

- Seen in diabetics and immunocompromised patients

- Usually caused by *Pseudomonas aeruginosa*

- Rads:
  - MRI with contrast
  - Gallium uptake
  - CT Temporal Bone

- Emergency, refer to ENT if suspected

- Treatment
  - IV antibiotics
MIDDLE EAR DISORDERS
Eustachian Tube Dysfunction and tympanic membrane retraction

Causes:
- Nasal Allergy
- URI
- Nasopharynx mass
- Anatomic

Signs:
- TM retraction

Symptoms:
- Hearing Loss
- Ear Fullness
- Popping/Crackling
- Improvement with Valsalva
Eustachian Tube Dysfunction

- Treatment
  - If acute ETD, counsel patience and time
  - Nasal steroid spray
  - If ETD is chronic and hearing loss is present, bilateral myringotomy with tube placement
  - ETD and TM retraction - Risk of cholesteatoma
Otitis Media with Effusion

Caused by:
• Chronic ETD
• Acute OM
• Barotrauma
• Nasopharynx Mass

Signs:
• Bubbles
• Amber coloration
• Air-Fluid Line
• Immobile TM to pneumatic

Symptoms:
• Conductive Hearing Loss
• Ear Fullness
Otitis Media with Effusion

- This is treated very similarly to TM retraction.
- Counseling is very important!
  - Hearing loss may be present for 3-4 months
  - Patience is key!
- Nasal steroids
- Myringotomy with tube placement if not better in 3-4 months.
- Rule out Nasopharyngeal Mass/Tumor
Acute Otitis Media (AOM)

Symptoms

- Ear Pain, Hearing Loss, Tinnitus
- Sharp pain with otorrhea -> perf

- Signs: Bulging ear drum, middle ear mucus/pus, Loss of landmarks, obscured malleus
Acute Otitis Media

- Treatment should cover the most common pathogens:
  - *Streptococcus pneumoniae*
  - *Moraxella catarrhalis*
  - *Haemophilus influenzae*

- Amoxicillin, Amox/clav, Fluoroquinolone, cephalosporins, SMX/TMP, doxycycline, and others.
Complications of AOM

- Mastoiditis
- Meningitis/Intracranial abscess
- TM perforation
- Hearing loss
- Facial nerve paralysis
Acute Mastoiditis

- Complication of OM and is defined as spread of infection to the mastoid air cells.

- Physical exam findings include fever, otalgia, post auricular erythema, swelling, and tenderness with protrusion of the auricle.

- Treatment includes IV abx, ENT consult, admission for observation and often mastoidectomy.
Cholesteatoma

- Non-cancerous skin cyst
- Can arise from retraction pocket or after the middle ear is seeded with skin cells following perforation
- Causes a conductive hearing loss
- Destroys bone through pressure and chronic infection
- Requires surgical excision
Cholesteatoma
Tympanic Membrane Perforation
TM Perforation

- Symptoms
  - Hearing loss
  - Tinnitus
  - Otorrhea
  - Ear pain if acute
  - Bleeding

- Treatment
  - Watchful waiting
  - Treat infections with topical drops (quinolones only)
  - Tympanoplasty
    - Paper patch
    - Temporal muscle fascia graft
Acute TM perforation
Chronic TM perforation
Traumatic TM Perforation

- Usually posterior
  - Bloody
  - Symptomatic hearing Loss
- Get audiogram

- Put on non-ototoxic ear drops (ofloxacin, ciprofloxacin)

- Keep ear dry and give TM time to heal and recheck hearing in 1-2 months
Barotrauma

- Rapid pressure changes cause negative pressure in the middle ear resulting in effusion and ruptured blood vessels.
- Treat with nasal steroids and time, generally will resolve
- Audiogram will help determine if any significant hearing loss occurred.
Bullous Myringitis

- Likely caused by *Mycoplasma*, *H. Flu*, or *Strep pneumo*

- Very painful, especially when coughing, sneezing

- Treat with antibiotics (macrolide like clarithromycin) and topical antibiotics if vesicles rupture

- Pain management with opiate is acceptable for the short term.
Otosclerosis

- Caused by fusion of the stapes footplate to the oval window
- Usually has family history
- Causes a conductive hearing loss
- Can be treated surgically with a stapedectomy
- Otherwise, can be treated with hearing aids
Sample PANRE question #2

Tyler Swift is a 22 year old male who experienced right ear pain after a flight to California. He had a cold a few days before. Now the patient says he cannot hear in his right ear. On exam, you note a blue/dull tympanic membrane on the right. What is the patient’s most likely diagnosis.

a. Right sensorineural hearing loss
b. Left sensorineural hearing loss
c. Right conductive hearing loss
d. Left conductive hearing loss
e. Tympanic membrane perforation
Sample PANRE question #3

Alice Cooperton is a 35 year old with Type 1 diabetes mellitus. He has had multiple sets of pressure equalization tubes in the past. He presents for an evaluation of chronic ear drainage. He has been on multiple oral and topical antibiotics without improvement. His physical exam reveals an inflamed retraction pocket in the pars flaccida with granulation and keratinous debris. The most likely diagnosis is:

a. Malignant otitis externa  
b. Chronic otitis media with a TM perforation  
c. Chronic fungal otitis externa  
d. Pars flaccida cholesteatoma  
e. Bullous Myringitis
MISCELLANEOUS

- Tinnitus
- Vertigo
Tinnitus

- Any abnormal sound in the ear

**Treatment** -
- Get a hearing test- Tinnitus may be a sign of hearing loss
- No studies have shown definitively that surgical or pharmacological interventions help resolve benign tinnitus due to SNHL
- If tinnitus caused due to HL which is correctable, then often resolving the HL will reverse the tinnitus (wax, fluid, TM perforation)

**Patient Education**
- Anxiety relief
- Background Noise
- Stop medications which can cause Tinnitus
- Avoid caffeine/nicotine
- Tinnitus Therapy and/or Biofeedback