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- Email customerservice@AudiologyOnline.com
Learning Outcomes

After this course, participants will be able to:

- identify examples of patient outcomes which can be improved with non-audiologic management including environmental modifications and interdisciplinary treatment.
- explain how to modify counseling for challenging patients to improve outcomes from amplification.
- identify areas of audiology specialty practices that can be used in clinical practice to improve patient care.
Cognitive impairment negatively influencing hearing aid use

David Jedlicka Au.D.

Patient Background

- 90 year old male Korean War Veteran
- Previous BTE hearing aid user since 2004
- Has used assistive technology successfully since 2004
  - Amplified phones
  - FM systems
  - Wireless TV devices (via headphones and hearing aids)
  - Remote microphones
  - Bluetooth cell phone connectivity
Family Information

- Veteran has 2 daughters and 1 son
- Lives with son and is independent
- One daughter lives out of state
- The other daughter is a work from home nurse and is involved with all of the Veteran’s care
  - Daughter is the clinical decision maker for the Veteran
  - Ensures medication compliance
  - Accompanies the Veteran to all of his appointments

Medical History

- Macular degeneration
- Mild peripheral neuropathy (associated with B12 deficiency)
- Chronic otitis media and otitis externa with discharge
- History of falls (refuses to use assistive devices)
- Hypertension
2004 Audiometric Findings

- First was fit with a power behind the ear hearing aid
- Veteran returned this aid for credit after 2 months to switch to a different manufacturer that offered an FM system plus FM boot
- Veteran had issues with active drainage causing his tubing to become occluded
  - Veteran was provided with a 2nd set of earmolds and shown how to change these at home using twist off earhooks as well as how to clean the occluded molds
- Veteran was satisfied with this style and used these aids for 5 years
2009 Audiometric Findings

No significant changes from 2004 testing. Word understanding scores decreased slightly.

2009 Hearing Aid Fitting

- Veteran fit with behind the hearing aids
- Same hearing aid manufacturer was selected
- FM system was provided
- Veteran was provided with a Bluetooth accessory to connect his hearing aids to his cell phone.
- Veteran was highly satisfied with the devices and used these as his primary aids until 2014
2014 Audiometric Findings

Decrease in air conduction thresholds bilaterally. Right ear word understanding scores decreased significantly.

2014 Hearing Aid Fitting

- Daughter requested switching to a different manufacturer based on literature she read from a manufacturer's website.
- Veteran was fit with BTE style hearing aids, a remote microphone, and a Bluetooth adapter for his phone.
- Veteran disliked the sound quality and was unable to use the accessories due to differences in the start/stop streaming function.
2014 Hearing Aid Fitting (2)

- The aids were returned for credit and the same manufacturer that was used in 2004 and 2009 was selected.
- The neck worn Bluetooth adapter was used along with a remote microphone and wireless tv streamer.
- Veteran reported satisfaction with these devices and was able to use them independently.
- Numerous earmold modifications and new earmold orders were required due to chronic otitis externa causing poor fitting molds and soreness.

2018 – A Decline

- Veteran’s wife passes away and the Veteran moves in with his son.
- Veteran loses 3 sets of hearing aids in the span of 18 months (2 sets replaced under L&D warranty and 1 new set was issued).
- Veteran starts experiencing difficulty changing HA batteries.
- Veteran experiences several falls in the new home, however the Veteran refuses to use any assistive mobility devices.
- Veteran experiences several mini-strokes.
- Veteran reports macular degeneration and peripheral neuropathy have worsened.
2018 - Continued

- Veteran’s primary care physician leaves the VA and the Veteran is assigned a new VA PCP
- New PCP administers the SLUMS examination
  - Veteran scores 10/30 indicating the presence of cognitive impairment (dementia)
- PCP recommends referral to the VA Geriatric Evaluation and Management Clinic (GEM)
  - Veteran’s daughter declines the referral and states that the new PCP is unaware of her father’s medical history and cannot make appropriate based referrals until they have completed several more visits together.

2019 Audiometric Findings

Slight air conduction threshold improvement bilaterally. Left word understanding ability stable, no word understanding ability in the right ear. Bilateral word recognition score was 72%
Hearing Aid Options

- At initial hearing aid evaluation, BTE and BiCROS options were discussed
- Daughter did not want the Veteran to change amplification type, so BTE style was selected
- Rechargeable BTE hearing aids were ordered as they were from the same manufacturer as the Veteran used previously and due to dexterity issues
- The same accessories that the Veteran used previously were ordered for the new hearing aids

Hearing Aid Problems

- New rechargeable BTE requires manual activation
- Veteran unable to see or feel the button to turn the device on
- Veteran has been wearing the aids with them powered off
- Veteran’s son hasn’t been asked to help with care of the device at the request of his daughter
New HA Solution

- Rechargeable BTE hearing aids were returned for credit
- New power RIC hearing aids with custom molds were ordered
- New aids will automatically turn on when removed from the charging ports
- Remote control was provided for volume changes and to activate streaming of the new TV device
- Remote mic was provided but given to the daughter
- Veteran now using a tablet designed for seniors to contact his two daughters as he reports no longer using any phone
- Veteran scheduled to enroll in VA GEM clinic

Hidden Hearing Loss?

- And why simply providing low gain hearing aids is not actually helping your patient.
Case 1 – Our First APD Patient

- 37 year old male
- Police officer
- Difficulty hearing at home and at work
- HHIA score of 40
- Diagnosed with PTSD, Anxiety, and TBI (mental health provider reported patient was non-compliant with medications and cognitive behavioral therapy)
- Discharge audiogram showed a flat 60 dB loss (no speech scores reported)

Audiometric Findings

- SRT Testing completed first
  - Revealed SRT of 15 dB bilaterally
- Audiometric responses were found at 60 dB for air conduction.
  - Patient re-instructed multiple times but would not respond at 30 dB or better
- Word Rec tested at 20 dB, 40 dB, and 60 dB all yielded scores of 92% or better bilaterally
- Quick-SIN administered and found a score of +5.5 SNR
Veteran refused to accept the diagnosis of audiometric thresholds and word understanding ability within normal limits.

Audiology supervisor completed audiometric evaluation and obtained flat 25 dB response bilaterally.

ABR completed and thresholds of 25 dB found bilaterally.

Patient was counseled about inconsistent results and lack of need for amplification.
APD Testing

- Patient was referred for APD testing following the extensive audiometric testing
- The SCAN 3A was administered
- Veteran failed all 3 portions of the screener
  - Veteran reported “1” for all gap detection presentations and had single digit scores for Auditory Figure Ground – 0 and Competing Words – Free Recall
- Veteran failed all of the diagnostic and supplementary tests
  - Examining audiologist reported the patient did appeared to provide inconsistent responses throughout the entire examination

Treatment

- Veteran was offered: low gain hearing aids, an FM system, a Bluetooth device, at home aural rehabilitation (LACE), and in clinic aural rehabilitation
- The Veteran accepted the amplification and accessories
- Veteran declined aural rehabilitation
- At the fitting the Veteran reported improved hearing
- Follow up visit datalogging found 0 hours of use, but a significantly improved HHIA score (2/40)
8 Years Post Treatment

- Patient has not returned to audiology since 2010
- A Remote Ordering Entry System (ROES) record search shows that no hearing aid supplies (batteries/domes/tubes) were ordered by the patient
- Patient was treated for anger management, anxiety, and PTSD after being suspended from his job for “use of excessive force on person of non-interest”
- Mental health services reports improved mood and reduced levels of anxiety with cognitive behavioral therapy and medications related to anxiety (was required by employer)
- Veteran reported “no hearing complaints” to PCP

Case 2

- Presented to the clinic in 2010 with reports of hearing impairment, with biggest issue being hearing as a call center dispatcher.
- History of anxiety, depression, fatigue, and chronic back pain
- Score of 40/40 on the HHIA
- All audiometric thresholds were at 20 dB or better
- Patient failed the Auditory Figure Ground – 0 and Competing Words – Free Recall sections of the SCAN 3A and scored in the disordered category of MLD 500
- Scores within normal limits for all other SCAN 3A tests
Audiologic Treatment

- Veteran was fit with open fit BTE hearing aids, an FM System, and Bluetooth adapter
- Veteran was provided with LACE training software (downloadable version to be used on a PC at home)
- Veteran was counseled on good listening strategies
- Veteran declined opportunity for in clinic aural rehabilitation

Non-Audiologic Treatment

- Veteran reported he did not wear the hearing aids due to no improvement hearing in noise/work
- HHIA score showed significant improvement (0/40)
- Veteran never installed LACE software on his PC
- Primary care provider provided Citalopram for depression and lethargy
  - Veteran reported improved energy and reduction of depression
Work Accommodations

- Due to the main complaint being hearing at work, a letter was provided to the Veteran to submit for reasonable work place accommodations
- Veteran was moved into a corner seating area of the office away from doorways / high traffic areas
- A noise canceling headset with a volume control was provided to the Veteran
- Veteran reported no difficulty hearing at work following the changes

Final Thoughts

- Treat the patient, not the symptom
- Collaborate with other healthcare providers
- Ensure that the treatments you are providing actually are beneficial rather than relying on patient reports alone
- Patient’s report benefit from hearing aids, but datalogging does not support those claims (Roup et al., 2018)
Vestibular Impairment & Fitting a Patient with MS

Dr. Cara Michaux

CASE #1

- 68 year old male
- Cardiovascular problems
  - Heart disease
  - 4 stents placed (2010)
  - High blood pressure
- Chronic kidney disease with anemia
- Diabetic
  - neuropathy
  - retinopathy
- Hearing loss L>R, ~ 1yr
- HHIE 18
- Constant bilateral tinnitus
- Pressure in left ear ~ 1 yr
- Noise exposure, military and occupational
- Denies dizziness, otalgia, otologic surgery
Amplification Trial

- Fit with Starkey Z Series RIC hearing aids
  - Earmold on left, dome on right

- 1 month follow-up visit
  - Doing “ok” with aids
  - Part time use, though reported full-time
  - Switched earmold to dome for comfort and occlusion
  - Mentioned recent vertigo attack

- Recommendations
  - 2nd follow-up
  - Vestibular evaluation
  - ENT consult

⇒ DECLINED ALL
Over the next few months…

- Another vertigo episode, PCP referred to ENT
  - Prescribed Dyazide
    - Combination diuretic
    - Relieves inner-ear fluid build-up
    - Contraindicated in patients with diabetes or kidney disease

- Routine bloodwork showed elevated K levels
  - Hyperkalemia
    - Can result in abnormal heart rhythms or paralysis
  - Decided to discontinue Dyazide use

Over the next few years…

- Does not return to Audiology or ENT

- PCP annual visits in 2016, 2017 and 2018
  - Reports no vertigo attacks
He’s baaack…

- Returns to Audiology in October 2018
  - Significant decrease in left ear hearing
  - Bilateral tinnitus, constant
  - Fullness in left ear, worse in recent months
  - Off-balance (not vertigo), worse in recent months
  - Feels dizziness is worse when wearing left hearing aid
  - Wears right aid on a part-time basis

<table>
<thead>
<tr>
<th>SRT</th>
<th>R: 20dB</th>
<th>L: 55dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRS</td>
<td>R: 96%</td>
<td>L: 64%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SRT</th>
<th>R: 20dB</th>
<th>L: 65dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRS</td>
<td>R: 88%</td>
<td>L: 20%</td>
</tr>
</tbody>
</table>
Recommendations

- Order new earmold for left aid
- Return for reprogramming of both aids
- Vestibular testing to confirm/support Ménière’s diagnosis
- Wants to wait to see what ENT recommends
  - Use meclizine as needed
  - Try low sodium and caffeine diet
  - Try diuretic again
  - Return to ENT after vestibular testing

Vestibular Evaluation

- DHI : 14
- Slight R beating spontaneous nystagmus
  - Suppressed w/ fixation
- WNL: pursuit, OPK, gaze, step test, visual suppression, visual enhancement, subjective visual vertical
- SHA testing: phase lead in low frequencies, gain and symmetry WNL
- Positional testing: right beating nystagmus recorded in supine, head L, and body L
  - Suppressed w/ fixation
- Caloric testing
  - 41% left sided CW
  - 6% rightward DP
- ECog testing
  - Left ear SP/AP= 54%
  - Right SP/AP= 26% (WNL)
ENT visits

<table>
<thead>
<tr>
<th>DATE</th>
<th>SYMPTOMS</th>
<th>TREATMENT/RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/23/19</td>
<td>Several severe vertigo attacks per week, frequent falls</td>
<td>Rec. trying intratympanic steroid, rec’d 1st</td>
</tr>
<tr>
<td>2/8/19</td>
<td>Decreased duration and intensity, frequency same</td>
<td>2nd steroid injection</td>
</tr>
<tr>
<td>3/1/19</td>
<td>Symptoms persisting</td>
<td>3rd steroid injection</td>
</tr>
<tr>
<td>4/5/19</td>
<td>Symptoms persisting</td>
<td>Rec. trying low dose gentamicin injection</td>
</tr>
</tbody>
</table>
Intratympanic Steroids vs Gentamicin

- Steroids
  + low risk/few side effects
  - short acting
  - supporting research is mixed

- Gentamicin (low dose method rather than “chemical labyrinthectomy”)  
  + one dose may be sufficient
  + highly effective for most after a 2nd dose
  - may cause further hearing loss

Protocol for dosing levels and frequency vary, but most low dose regimens recommend waiting 1 month and providing a 2nd dose only if vertigo remains

4/5/19
- Received first injection
- 0.6 cc of 20 mg/mL gentamicin

4/26/19
- Last vertigo episode was 4/8
- Feels “off balance”, sometimes has sensation episode is coming but no vertigo
- Received 2nd injection
- Referred to Audiology for audiogram and caloric testing
Ready for hearing aids

- Starkey Livio AI BICROS system
  - Spent extra time counseling during initial fitting
  - Was able to tolerate target gain

- Follow-up visit
  - Data logging showed 7 hours per day
  - Reported improvement for COSI goals
  - Part-time use of CROS transmitter
  - Has not had a vertigo attack since 4/8
Veteran Specific Issues

- Multiple health issues to take into consideration
- Longer time spans between visits
- Continuity of care (multiple providers)
- Transportation difficulties

CASE # 2

- 52 year old male
- Multiple Sclerosis
  - Diagnosed in 2004
  - Quadriplegic, uses motorized wheelchair with chin-operated controller
- Chronic kidney disease
- Diabetic
- Accompanied by his wife
- Hearing loss, gradual
- HHIE 22
- Constant bilateral bothersome tinnitus
- Noise exposure, military
  - Right handed shooter
- Denies dizziness, pressure, otalgia, otologic surgery, prior hearing aid use
Hearing aid evaluation

- **COSI Goals**
  - Tinnitus reduction
  - Social situations
  - In the car

- Wife (and full-time caregiver) is very supportive
- Wears Bluetooth headset on right ear most of the time for voice control of his Android smartphone
  - Also able to access phone through chin controller
Hearing aid fitting

- Oticon OPN S mini RITE – R
  - Rechargeable for simplicity
  - OPN app has scroll volume feature

- Bilateral fitting but plans to wear right Bluetooth most of the time
  - Discussed unilateral use and other phone streaming options

Follow-up visit

- Reports significant benefit
  - Notices tinnitus alleviation with use
  - Better speech understanding
  - Uses Oticon ON application to change adjust volume
How Psychosocial Determinants Affect CI Outcomes

Leslie Cody, Au.D.

History

- 91 year old male Veteran
- Gradual decline in hearing
  - Consistent bilateral hearing aid use since 1990
- 1998 - decrease in hearing AD, accompanied by vertigo
  - Meniere’s
  - No vertigo for 15 years

WRS: R- 8%, L- 4%
CI Eval- 6/11/2018

- AzBio Sentences (quiet):
  - Right - 7%
  - Left - 13%
  - Bilat - 18%
- AzBio Sentences (+10 dB SNR):
  - Right - 7%
  - Left - 5%
  - Bilat - 18%
- CNC:
  - Right - 10%
  - Left - 4%
- Vestibular testing:
  - Compensated right UW

Implantation

- 8/1/2018- implanted with a right Cochlear CI522
  - No complications
  - Cleared for N7 CI activation

### TYPICAL 1 YEAR POST-ACTIVATION TIMELINE

<table>
<thead>
<tr>
<th>Appointment Intervals</th>
<th>Appointment Activities</th>
<th>Appointment Intervals</th>
<th>Appointment Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1, day 1</td>
<td>• Initial Activation</td>
<td>Month 3</td>
<td>• Clean and check devices</td>
</tr>
<tr>
<td></td>
<td>• Create 900 Hz MAP</td>
<td></td>
<td>• Remeasure T/Cs to optimize MAP</td>
</tr>
<tr>
<td></td>
<td>• Discuss operation of device</td>
<td></td>
<td>• Complete post-op testing</td>
</tr>
<tr>
<td>Week 1, day 2</td>
<td>• Remeasure 900 Hz MAP</td>
<td>Month 6</td>
<td>• Clean and check devices</td>
</tr>
<tr>
<td></td>
<td>• Create 720/1200 Hz MAP</td>
<td></td>
<td>• Remeasure T/Cs to optimize MAP</td>
</tr>
<tr>
<td></td>
<td>• Review operation of device</td>
<td></td>
<td>• Complete post-op testing</td>
</tr>
<tr>
<td></td>
<td>• Create a second MAP with different stim rate, depending on preference</td>
<td></td>
<td>• Complete outcomes measures</td>
</tr>
<tr>
<td></td>
<td>• Complete AR screening</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Introduce phone and assistive devices, as needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• May cancel all or some of these appointments based on patient’s needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks 3, 4, 6 &amp; 8</td>
<td>• Remeasure T/Cs to optimize preferred MAP</td>
<td>Year 1</td>
<td>• Clean and check devices</td>
</tr>
<tr>
<td></td>
<td>• Issue AR exercises in clinic and for home</td>
<td></td>
<td>• Remeasure T/Cs to optimize MAP</td>
</tr>
<tr>
<td></td>
<td>• Discuss telephone strategies</td>
<td></td>
<td>• Complete post-op testing</td>
</tr>
<tr>
<td></td>
<td>• Add assistive devices, as needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• May cancel all or some of these appointments based on patient’s needs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FIRST POST-ACTIVATION TIMELINE FOR VET

<table>
<thead>
<tr>
<th>Appointment Intervals</th>
<th>Audiology Appointments</th>
<th>Otology Appointments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1 (8/30, 8/31)</td>
<td>• Reported drainage was present but had subsided</td>
<td>• Crusting over incision</td>
</tr>
<tr>
<td></td>
<td>• Glasses are uncomfortable with processor</td>
<td>• Culture shows pseudomonas</td>
</tr>
<tr>
<td></td>
<td>• Happy with sound quality of 900 Hz and 720 Hz MAPs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wife and daughter present</td>
<td></td>
</tr>
<tr>
<td>Week 2 (9/7)</td>
<td>• Appointment canceled due to infection</td>
<td>• Drainage still present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Admitted to ER for IV Cipro</td>
</tr>
<tr>
<td>Week 3 (9/9, 9/13)</td>
<td>• Appointment canceled due to infection</td>
<td>• 2 washouts occur with plan to remove implant if infection is extensive</td>
</tr>
</tbody>
</table>
### FIRST POST-ACTIVATION TIMELINE FOR VET CONT.

<table>
<thead>
<tr>
<th>Appointment Intervals</th>
<th>Audiology Appointment</th>
<th>Otology Appointments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 4 (9/21)</td>
<td>• Appointment canceled due to infection</td>
<td>• Drainage continues</td>
</tr>
<tr>
<td>Otology (9/26)</td>
<td></td>
<td>• Continue with IV antibiotics per infectious diseases</td>
</tr>
<tr>
<td>Week 6 (10/3)</td>
<td>• Kanso ordered</td>
<td>• Drainage improving</td>
</tr>
</tbody>
</table>


### SECOND POST-ACTIVATION TIMELINE FOR VET

<table>
<thead>
<tr>
<th>Appointment Intervals</th>
<th>Actual Audiology Activities</th>
<th>Otology Appointments</th>
</tr>
</thead>
</table>
| Weeks 1 & 2 (10/10, 10/16) | • Glasses adjusted to no longer hit wound  
• Kanso issued  
• Optimized 720 & 900 Hz MAPs  
• Completed AR exercises  
• Daughter present | • Wound looking better but ID increases antibiotics  
• Diagnosed with C-Diff  
• Cleared for Kanso |
| Week 3 10/24 | • Forgot how to change programs so just optimized 900 Hz MAP  
• Completed AR exercises and vet does well  
• Daughter present | • ID recommended removal of device |
Removal and Reimplantation

- 11/2018- Otology
  - Spoke w/otologist about leaving electrode in place
  - Vet wants a revision
  - Vet heals with no complications and leaves for FL
- 5/2019- Returns to Pittsburgh
  - Re-implanted 7/3 with no complications

<table>
<thead>
<tr>
<th>Appointment Intervals</th>
<th>Audiology Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1 (7/31)</td>
<td>• Created 900 Hz MAP</td>
</tr>
<tr>
<td></td>
<td>• Provided extensive counseling on operation of processor and remote</td>
</tr>
<tr>
<td></td>
<td>• Wife and daughter present</td>
</tr>
<tr>
<td>Week 2 (8/7)</td>
<td>• Remeasured MAP</td>
</tr>
<tr>
<td></td>
<td>• Provided re-instruction, per request</td>
</tr>
<tr>
<td></td>
<td>• Completed AR screening</td>
</tr>
<tr>
<td></td>
<td>• Wife and daughter present</td>
</tr>
<tr>
<td>1 month (8/28)</td>
<td>• Remeasured MAP</td>
</tr>
<tr>
<td></td>
<td>• Provided re-instruction again, per request</td>
</tr>
<tr>
<td></td>
<td>• Completed AR exercises</td>
</tr>
<tr>
<td></td>
<td>• Wife and daughter present</td>
</tr>
<tr>
<td>2 months (9/19)</td>
<td>• Cleaned and checked device</td>
</tr>
<tr>
<td></td>
<td>• Reviewed remote again, per request</td>
</tr>
<tr>
<td></td>
<td>• Wife and daughter present</td>
</tr>
</tbody>
</table>
Patient Perception of the CI Experience

- Throughout process, vet expressed extreme satisfaction with the implant and his care
- What made this a successful experience despite all of the obstacles?
  - Shared decision making
  - Family support
  - Emotional intelligence

Shared Decision Making (Elwyn et al., 2012)

Shared Decision Making Model:
1. Choice Talk
   a) Conveys awareness that a choice exists
2. Option Talk
   b) Patients are informed about treatment options in more detail
3. Decision Talk
   c) Patients are supported to explore what matters most to them
Family Support

- Tang et al. (2017) found that patients who live with other people scored 22 points higher on AzBio sentences than those who live alone.
  - Patients practice their listening skills through interaction with those around them.
  - Family may assist with daily operation of processor.
  - Those who live alone reported that they turned off the device to save battery life.

Emotional Intelligence

- EI: ability to identify and manage one’s own emotional response to both internal and external conflict.
- People with high EI perceive conflict as a challenge to overcome and use positive coping strategies.
A Challenging Hearing Aid Case: The Importance of Patient-Centered Care

Leslie Cody, AuD

Introduction to patient

- 75 year old male Veteran
- Long-term VA patient
- Has worn hearing aids for 35-40 years
2005

- Receives Phonak Perseo BTEs
- Preliminary CI testing:
  - HINT Sentences: 79% (aided binaurally)
  - Score exceeds FDA criteria

2006 and 2009

- 2006 and 2009: results remain stable
- 2009: Phonak Exelia BTEs are ordered and issued
2009 Cont.

- Returns to the clinic 5 times over the next year with complaints that his hearing aids are distorted and he needs to increase the volume
  - Various programming adjustments are made
  - CI eval is recommended

3/2010

- CI Eval
  - HINT Sentences: 64% (aided bilaterally)
  - Exceeds criteria by a small margin
  - Vet prefers to defer implantation
11/2011

- Reports that he cannot hear well on his new phone
  - Unwilling to listen to recommendations
- Vet inquires again about an implant
  - Reluctant based on information provided by a friend
- Agrees to another CI eval

12/2011

- HINT sentences:
  - Right: 14%
  - Left: 6%
  - Bilat: 20%
- CNC words:
  - Right/Left: 0%
- AZ Bio sentences:
  - Right: 11%
  - Left: 8%
  - Bilat: 21%
- Now meets FDA criteria
- Right ear is recommended
  - Vet's preference

WRS: R- 8%, L- 20%
2012

- 2/2012 - Meets with ENT and decides to move forward with surgery
  - Wants to wait until competitive shooting season is over in October
- 10/2012 - Cancels surgery stating he has other health related problems

2/2013

- Phonak Bolero BTEs with ComPilot and TV device are ordered
- Tells me he actually cancelled his CI surgery due to distrust of the VA

WRS: R- 4%, L- 10%
10/2016

- Audiogram remains stable
- Still not interested in CI
- Discussed caption phone and amplified smoke detector but declines both

3/2019

- Reluctant to complete test and try new hearing aids
  - “it’s pointless”
- Turning point in clinician-patient relationship is reached over a discussion about his dog
- Recommended ReSound BTEs, Phone Clip, Remote Mic, and TV device
  - Vet agrees to all except TV device

WRS: R- 0%, L- 12%
3/2019 Cont.

- HHIE-S: 40 points
- COSI:
  1. Hear in a restaurant - stated that he has stopped going out to eat
  2. Hear his wife while driving in the car
- Returns for fitting appointment with a positive attitude and is satisfied with the hearing aids and devices

4/2019

- Returns for follow-up
- HHIE-S: 40 points
- COSI:
  1. Hear in a restaurant  
     - Degree of change: Slightly better  
     - Final aided ability: Most of the time (75%)
  2. Hear wife in the car  
     - Degree of change: Much better  
     - Final aided ability: Most of the time (75%)

“I’m very pleased and very happy with the new aids and the accessories are very helpful”
What made his final appointments successful?

Patient-Centered Clinical Method:
1. Effective Communication
   a. Sharing information
   b. Compassionate and empowering care provision
   c. Sensitivity to patient needs
2. Health Promotion
   a. Effective case management
   b. Efficient use of resources
3. Partnership
   a. Inter-professional collaboration
   b. Relationship building

(Grenness, MacDermid, Bello-Hass, & Law, 2014)

Grenness et al. (2014)

- Study analyzed the nature of verbal communication between audiologists, patients and companions.
- Relationship building:
  - Large portion of utterances by each speaker was categorized as relationship building
    - Most utterances were agreements with little emotional relationship building
  - Results are not in line with patient-centered care
ABR and SSNHL

Dr. Tia Mulrooney
Case history

- 65 y.o. male.
- Known to audiology for longstanding mild to moderate sensorineural hearing loss.
- Wears Oticon OPN Mini RITE hearing aids, issued in 2018.
- Diagnoses include bipolar disorder and autism.

February 2018 audiogram
April 2018 walk-in visit

- Cannot hear the indicator beeps from the left aid and his head "feels like it has been in a bubble for weeks."
- Otoscopy clear bilaterally.
- Cleaned and checked hearing aids: Right working WNL, left aid was not functioning after repair actions.

Patient continued to report left aural fullness.
- Tympanometry was completed. Type A tympanograms bilaterally.
- He states he is unsure if he notices a change in hearing status.
- DP-OAEs completed and were absent in the left ear and present through 1600Hz in the right ear.
April 2018 audiogram

Threshold search ABR

<table>
<thead>
<tr>
<th>WAVE V LATENCIES</th>
<th>RIGHT</th>
<th>LEFT</th>
</tr>
</thead>
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<tr>
<td>100dB nHL</td>
<td>DNT</td>
<td>? at 6.30ms</td>
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<tr>
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<td>6.0ms</td>
<td>No repeatable wave V</td>
</tr>
<tr>
<td>70dB nHL</td>
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<tr>
<td>60dB nHL</td>
<td>7.10ms</td>
<td></td>
</tr>
<tr>
<td>50dB nHL</td>
<td>No repeatable wave V</td>
<td></td>
</tr>
</tbody>
</table>
Plan

- Referred to ENT for immediate appointment.
  - High dose steroids x2 weeks (prednisone 60 mg daily)
  - IT dexamethasone injections x2
  - MRI negative for retrocochlear lesion
- Unfortunately, multiple audiograms since April 2018 show no improvement in left ear hearing sensitivity.
- Patient is now wearing a BiCROS system and doing fairly well with it.

ECoG and Meniere’s Disease
ECog Review

- Electrocochleography can give information about endolymphatic pressure.
- We are comparing the SP to the AP (SP/AP).

Case history

- 56 y.o. male.
- Known to audiology; wears RIC hearing aids.
- Fluctuating SNHL in the right ear; fluctuates between mild-moderate SNHL to a flat moderate SNHL.
- “Buzzing” tinnitus in the right ear only.
- Vertigo.
- Reports receiving Meniere’s diagnosis at a private clinic in Florida 7 years prior.
Visit summary

- Came to audiology for updated audiologic evaluation, hearing aid check, and vestibular testing.
- States he has notices worsening vertigo symptoms for approximately 6 months. ENT ordered updated vestibular testing with ECog.
- Need to confirm or disprove reported Meniere’s diagnosis prior to ENT treatment.

Ecog results

- Right ear: 68% SP/AP
- Left ear: 20% SP/AP
- Using tip trodes (high noise)
Plan

- Patient followed up with ENT. ENT reinforced low sodium diet (Patient previously non-compliant) and gave vestibular suppressant medication to use PRN.
- Discussed surgical options.
- Recommended patient return to audiology annually to monitor hearing and balance. Return sooner if significant change is suspected.

Limitations of ECog

- No consensus on normative data (30% SP/AP vs. 50% SP/AP).
- Difficult to interpret, especially if using tiptrodes.
- ECog results can be abnormal in other conditions, such as SSCD.
- SP/AP ratios may not be elevated in between Meniere’s episodes, resulting in a false negative.
- Poor recordings or no recordings with severe SNHL.
Kim et al, 2005

- No significant difference between those with Meniere’s disease and those with “possible Meniere’s disease.”

- “30% of those with definite Meniere’s disease would not be classified as having Meniere’s disease based on ECoG results.”

References - Jedlicka

References - Michaux


References - Cody

References - Mulrooney