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Navigating Case History, Candidacy and Clinical Considerations for Vestibular Evaluations

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Kaitlin Ryan, AuD, CCC-A

Kaitlin Ryan graduated with her Doctorate of Audiology from Northeastern University in 2019 and had a quick launch into vestibular audiology through the Department of Veterans Affairs in Palo Alto, CA serving veterans across hundreds of miles. This developed into sitting on fall prevention committees, working as an Audiology liaison for a geriatric interdisciplinary clinic and on teams of providers working to rehabilitate active-duty special forces service people after they sustained brain trauma. Currently, Kaitlin is working in a large hospital on a team of 4 vestibular audiologists in conjunction with ENT physicians to serve a significant portion of Massachusetts, helping to better characterize and understand their dizziness. Prior to this, she had the opportunity to study how hearing and balance changes during spaceflight as an intern at NASA, solidifying her passion for bettering the lives of others through audiology.

Disclosures

- **Presenter Disclosure:** Financial: Kaitlin Ryan received an honorarium for this course. Non-financial: Kaitlin Ryan has no relevant non-financial relationships to disclose.
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Learning Outcomes

After this course, participants will be able to:

1. Identify three categories of “dizziness”.
2. Identify three functional assessment tools that may be used to determine how dizziness may be affecting a patient’s mental health.
3. List three conditions that may change a patient’s candidacy for vestibular testing.

Agenda





Defining dizziness

“Don’t say dizzy”

- Extremely important for an accurate understanding
- “Dizziness” umbrella term that is too broad
- Imbalance vs. Dizziness vs. vertigo
- Always ask about the fear of falling or anxiety related to episodes of dizziness

Non-vertiginous complaints

Imbalance

Ataxia, unsteadiness

Shuffling feet

Decreased mobility

Disequilibrium

Without the illusion of motion or vertigo

Often leads to falls

Most often multifactorial in the elderly

Dizziness

Lightheadedness

Common complaint in those with
psychiatric disorders

Fogginess

Presyncope

Vague sensation- chronic subjective
dizziness

Non-vertiginous complaints

Imbalance

- Ataxia, unsteadiness
- Shuffling feet
- Decreased mobility
- Disequilibrium
 - Without the illusion of motion or vertigo
- Often leads to falls
- Most often multifactorial in the elderly

Dizziness

- Lightheadedness
 - Common complaint in those with psychiatric disorders
- Fogginess
- Presyncope
- Vague sensation - chronic subjective dizziness

True Vertigo

- The illusion that the environment is moving (rotating/spinning)
 - Central or peripheral origin
- Attacks of true vertigo are often characterized by the duration of the episode
 - Seconds
 - Minutes
 - Hours
 - Days to weeks
- Associated Events and Symptoms
 - Hearing loss
 - Aural fullness
 - Drop attacks
 - Tinnitus
 - Amplification of sound

What aren't you asking, or what isn't being offered?

- Functional behaviors- avoidance or day to day triggers?
- What is happening between the episodes?
- What triggers have you identified?
- Other symptoms that aren't always offered immediately
 - Mental health involvement
 - If this has ever happened before
 - True nature of symptoms



The art of case history

- Understand patient health to work toward a diagnosis
- Avoid potential harm
- Direct treatment and identify any need for further workup

“describe your symptoms without using the word “dizzy”

Clinical Goals

- Understand patient health to work toward a diagnosis
- Avoid potential harm
- Direct treatment and identify any need for further workup

Patient- Centered Goals

- Balancing empathy with efficiency
- Accurately documenting experience
- Healthcare literacy
- Patient privacy and safety

Extra Considerations

- Healthcare literacy
- Family/caretaker involvement
- Patient privacy

Navigating history

- Establish trust through validation
- Offering broad terms to help with descriptions
- Knowing words/ symptoms to build questions from
- Conversational tends to be more efficient
 - Know when to redirect
- Observe the patient, use audiogram and other knowledge to piece together the history provided.

Questions to ask

- Main questions:
 - Time since onset
 - Is the sensation constant/ episodic?
 - How long does it last? How often does it occur? Are there patterns that you've noticed?
 - Are there otologic changes during episodes? Warning signs?
 - What else happens with the dizziness?
 - Has this ever happened to you before?
- Medical history
 - Specifically: migraines, seizure activity, cardiac health, head trauma, falls, family history, medications

Audiometric features

- Significant asymmetry
 - What does the worse ear look like?
- Suprathreshold bone conduction thresholds
- Acoustic Reflexes
- DPOAE



Assessment tools

Assessing the situation

- Where do assessment tools fit into case history and clinical considerations?
- What kind of assessment tools are out there, and which may be most helpful?
- Can questionnaires cut out some of the case history?

Categories of assessment

- Assessments designed to measure symptoms
 - Vertigo Symptom Scale (VSS)- developed in 1992
 - European Evaluation of Vertigo (EEV)- developed in 2001
- Assessments designed to measure impact of symptoms of quality of life
 - Dizziness Handicap Inventory (DHI)- developed in 1990
 - Vestibular Disorders Activities of Daily Living (VADL)- developed in 2000
 - Vertigo Handicap Questionnaire (VHQ)- developed in 1992
- Mixed assessments
 - Vestibular Rehabilitation Benefit Questionnaire (VRBQ)
 - Vertigo, Dizziness, Imbalance Questionnaire (VDI)
 - Dizziness Factor Inventory (DFI)
- Assessments that focus on mental health
 - Hospital Anxiety and Depressions Scale (HADS)- developed in
 - The Patient's Health Questionnaire (PHQ-9)

European Evaluation of Vertigo (EVV)

- “physician administered questionnaire”
- Assesses symptoms only over a 7 day period
- 5 subscales
 - “Illusion of Movement”, “Duration of the Illusion”, “Motion Intolerance”, “Neurovegetative Signs”, and “Instability”.
- Relatively valid in pilot study, however “duration of illusion” subscale was variable
- Alleges that this measure can be used to monitor changes over time
 - Assess rapid clinical changes
 - Following progress for course of treatment

Dizziness Handicap Inventory (DHI)

- 25 item questionnaire with subscales of “functional” “physical” and “emotional”
 - Address symptom impact of quality of life perceived by patient
- Does not state “dizziness” but instead “your problem”
- Studies done suggest high validity in some areas
 - Increase in frequency of symptoms = increase in functional and emotional scores, but not physical
 - Weak to moderate correlation with posturography
- No correlation between age, gender and vestibular testing results

The Patient's Health Questionnaire (PHQ-9)

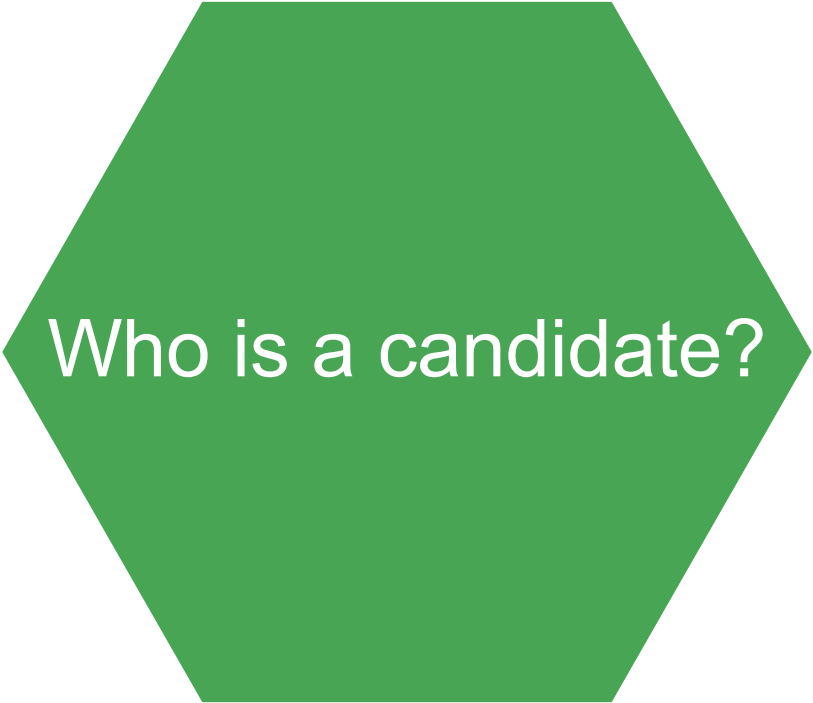
- 9 item questionnaire screening for the severity of depression in patients
- Validated in studies involving 8 PCP clinics and 7 OB-GYN practices
- 88% sensitivity and specificity for major depression
- Many disadvantages to using general scales
 - Small scale changes go unrepresented
 - Results easily confounded by other problems

What does the research say?

- Research overwhelming validates use of questionnaires as ***outcome measures***
- Little evidence across the literature suggest correlations between testing results or functional quantitative measures of postural stability

How can assessment tools be used in the context of case history?

- Help start a conversation
- Allow for patients to reflect on symptoms
 - Prepare for the appointment
- Help the providers understand where a patient is starting from
- Helps patients identify areas in which may be highlighting symptoms that they may not realize
 - i.e.: Anxiety symptoms versus vertigo



Who is a candidate?

Patient is a candidate – schools of thought

Slam dunks

- Apparent vestibular incident
- Family history of vestibular disease
- Very clear symptomatology
- Audiogram and case history align nicely

Big Mystery

- Some vague pattern
- Complex vestibular history, but present
- History of vertigo that has changed
- Not as apparent as hypothesized

Rule in by ruling out/humor me

- No apparent vertigo, but history and audiometry are vaguely supportive
- Use to encourage patient that it is not vestibular in nature

Who is a candidate?

Not a candidate – schools of thought

Complex medical history

- Loss of consciousness
- Heart, mobility and visual deficits in combination
- Inability to describe vestibular symptoms
- Epilepsy/ seizures
- Associated neurologic symptoms

Attention

- Dementia
- Drug addition
- Excessive fatigue
- Developmental delays
- Ability to follow instructions

Easily explained by something else

- Cardiology
- Stress
- Panic
- Polypharmacy

Patient
Considerations

The Elderly Dizzy Patient

- 24% of the population over 72 years old have difficulties with dizziness
 - Cross sectional study suggests 50% in those over 85 years old have dizziness
 - BPPV is the most common peripheral vestibular disorder among aging populations
- Postural stability
 - Multifactorial issues that can cause or are comorbid with dizziness
 - Functional deterioration
- Vertigo/imbalance/dizziness can lead to the fear of falling, increasing risk for actual falls
- Common complaint of difficulty concentrating

Affects of Aging on Postural Stability

Visual

- Reduced acuity, depth perception, contrast sensitivity
- Reduced ability to adapt and detect motion in visual field
- Visual acuity is a predictor of falls in older adults

Somatosensory

- Decreased deep tendon reflex response and vibration detection in ankles

Neuromuscular

- 40% reduction in muscle fibers from 20 to 89 years old
- Strength of lower extremities is imperative to postural control

Vestibular

- Otolith organs, semicircular canals and VOR working together
- Postural control relies on vestibulospinal reflex
- Age related deterioration of the hair and neural cells is likely

Fear of Falling (FOF)

- Studies suggest 30% of adults 65+ experience FOF
 - Especially those who have experienced vestibular impairment
- Related to PPPD, but there is no set diagnostic criteria
- Can include:
 - Reduced gait speed/stride,
 - Reduction in activities
 - Depression and anxiety
 - Generalized stiffening of the body reduces postural stability that is conscious

Case History Considerations

- Asking questions about their functional abilities before/after onset as well as lifestyle
- Previous falls and injuries
 - What happened that cause the fall?
 - Did the fall cause the dizziness to begin?
- Multimorbidity
 - Poor circulatory health, neurologic decline, arthritis etc
- Polypharmacy
- Family observations
- Is a functional assessment more important than vestibular?

Pediatric Population

- Vestibular system developed fully by 24mo
- Development of postural control and balance continues up to 12-15yrs
- Estimation of prevalence
 - 43x higher likelihood of peripheral vestibular problem in children with sensorineural hearing loss
 - 16x higher likelihood of central vestibular problem in children with headaches
- General occurrence is predicted to be similar to adults however ***presentation is different***

Pediatric Considerations

- Question asking is based on observations
 - Cyclical vomiting
 - Motion sickness
 - Headache complaints
 - Clumsiness
 - Meeting milestones
- Ask about child's behaviors, if they avoid or are inexplicably afraid of environments and how they play
- Ask the child specific questions without leading them to an answer

Pediatric Medical History Considerations

- Migraines/ headaches
- Recurrent or viral otitis media
- Head trauma
- CMV
- Enlarged Vestibular Aqueduct
- Connexin 26 mutations
- Ototoxicity
- Meningitis

Patients with Brain Injury

- Damage to the central nervous system, vestibular labyrinth, neck or combination
- Considerations for testing candidacy and providing history
 - Impaired cognition
 - Nature of injury (specifications of brain lesions)
 - Sleep abnormalities
 - Behavioral changes
 - Headaches

Patients with Traumatic Brain Injury

- A central nature of their symptoms may not always be the answer
 - Labyrinthine concussion
 - BPPV
- Modifying test
 - Consider the nature of their injury and determine the most nuclear tests that would be most helpful
 - Would they need more time or multiple test days?
 - Is it a rule out/in versus diagnostic?



Case Studies

One

- 64 year old with referred by his PCP for Vestibular Function Test c/o aural fullness and dizziness.
- Reported that dizziness with cranial pressure and aural fullness near constantly for 2 years.
 - Tried meclizine at onset- did not help
- A single episode of vertigo lasting 10 seconds after a cervical exercise 3mo ago
 - Diagnosed with cervicalgia
- Noted during episodic swells in symptoms, with tunnel vision, heart rate elevated, arms go numb and he experiences full body sweats. Happens 3+ times per day

Two

- Patient with yearly episodes of vertigo, aural fullness and vertigo referred for vestibular function testing
- “I am here about my Meniere’s Disease”
- “I haven’t yet been diagnosed but my PCP told me I have it, so I was referred to ENT”.
- Dizziness described as “room spinning with standing, and someone is pushing my head back down”.
 - Nausea, head fog, sensitivity to barometric pressure, kaleidoscope vision and cranial pressure
- Tinnitus and aural fullness are bilateral. Tinnitus is constant and has been present for 20 years, aural fullness is random.
 - She associates neither symptom with occurrence of dizziness.
- Medical history includes migraines

Three

- 32 year old female referred by her PCP c/o blurred vision, tinnitus and generalized dizziness
- Eye exam was normal
- Neurologic exam normal-
 - recommended a lumbar puncture, she declined
- Holter monitor- normal
- Reported to me: constant sense of self motion, started after having COVID. Feels intense internal vibration and hears her heart beating loudly in her ears
 - Rocking sensation, cranial pressure, pulsatile tinnitus and fullness.
 - Did not hear her eyes move, but felt like she could hear her nerves fire, some autophony
 - No CT completed

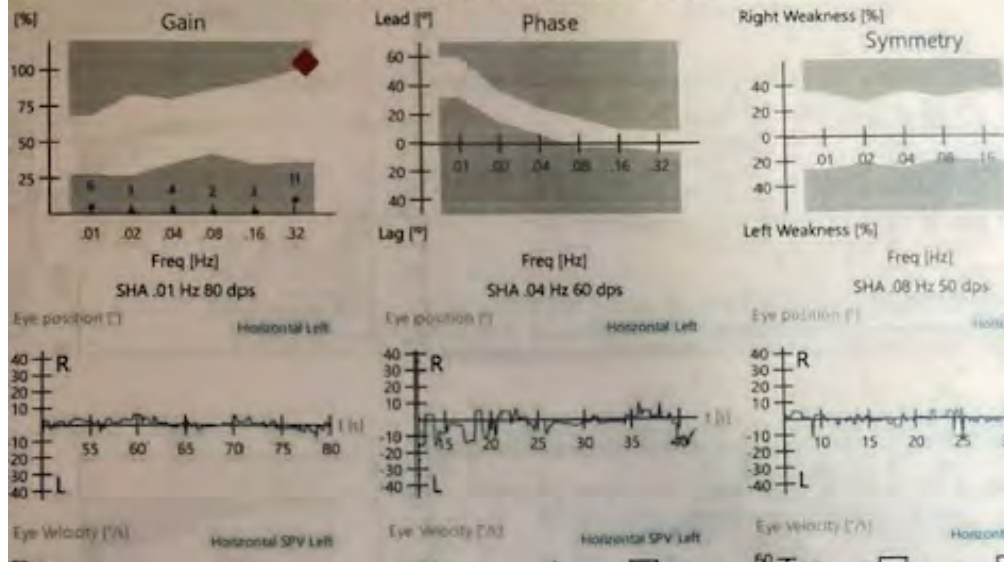
Four – History

- 70y/o patient who reported near drowning when swimming over the last 5-6 years to his hearing aid audiologist.
 - Previously, he was an avid scuba diver, however after this occurred, he did not feel safe.
- When the sensation first started, he noticed seconds long spinning when rapidly turning his head rightward that went away
- Extremely active, but occasionally notes imbalance when he cannot see
- Instance of vertigo 15 years prior lasting an hour
- Sudden hearing loss 5 years ago, denied vertigo at this time

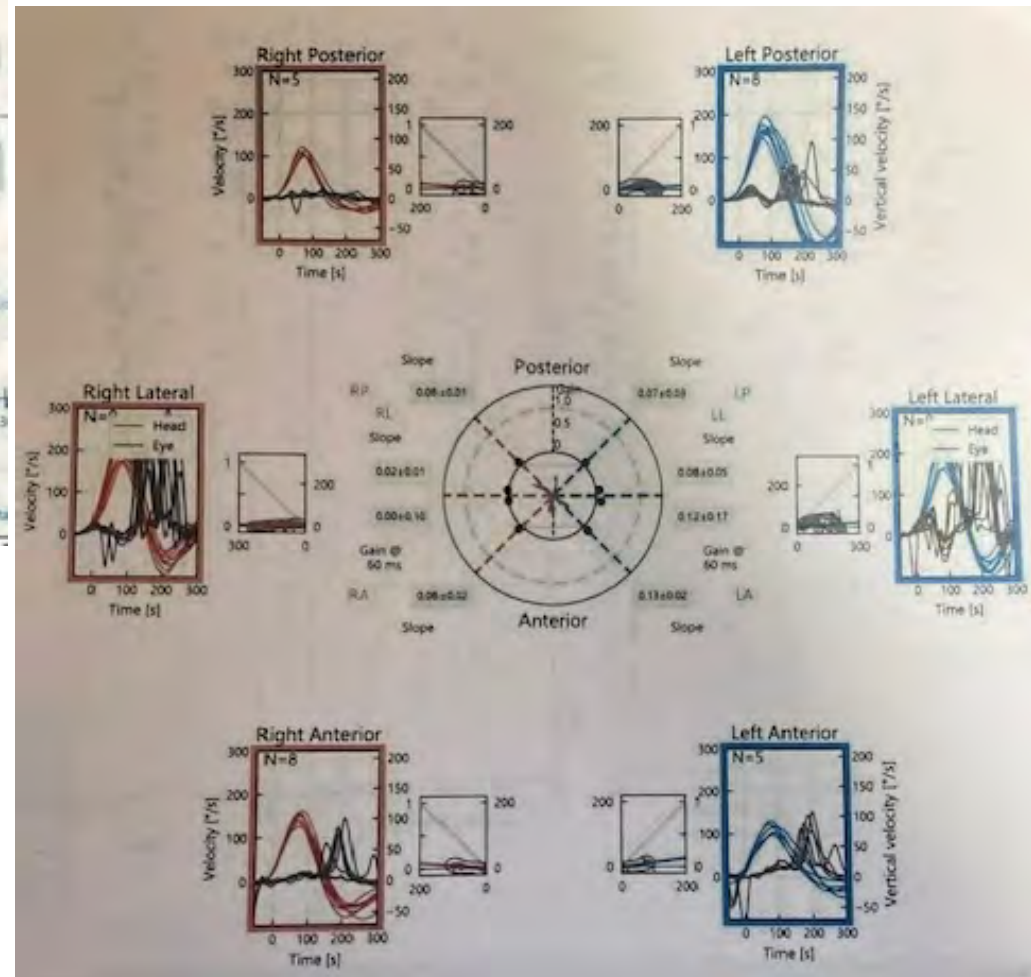
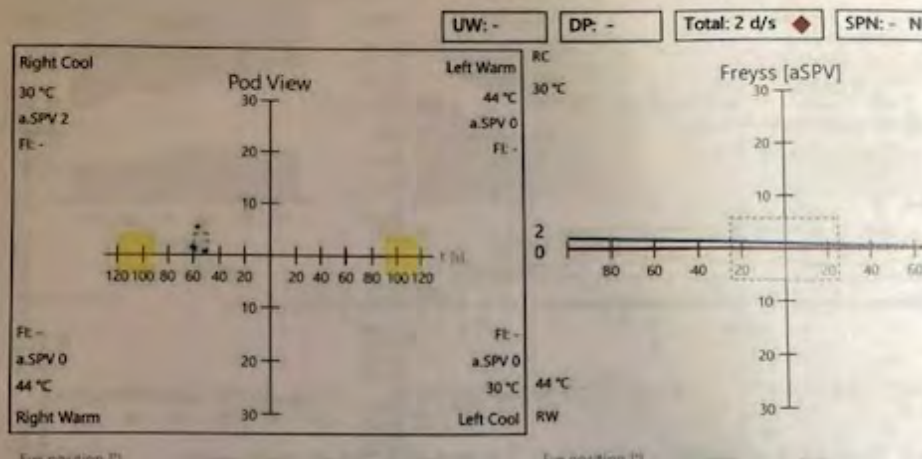
Four – Results

- Audiometric data:
 - Right: moderately severe to severe SNHL, WRS 32%
 - Left: Normal hearing sensitivity 250-500Hz, mild to moderate SNHL 1000-8000Hz, WRS 96%
- cVEMP: present, relatively low amplitude right, absent left
- oVEMP: absent in both ears
- Oculomotor: normal smooth pursuit and random saccades, no gaze evoked or spontaneous nystagmus
 - OPK: very low gain tracking left, low gain tracking right
- Positional assessment: normal

Sinusoidal Harmonic Acceleration



Caloric



Wrap up

- Case history is something that can be streamlined over time
- Requires a big picture and clinical reasoning skills
- Questionnaires unfortunately do not replace case history but may help aid in obtaining it
- Special considerations for different individuals can not only help drive a more succinct diagnosis with the proper provider, but it can make testing more effective
- Trust your gut and prepare to be humbled!

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Questions?

Thank you!