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You Spin Me Right Round

A Neurologist’s Approach to Dizziness & Vertigo
Peter Hannon, MD

https://www.youtube.com/watch?v=PGNiXGX2nLU

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Disclosures
- None
- Can’t help tapping my feet to 80s glam rock…
- I tweak slides!

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Objectives
- Review potential etiologies for ‘dizziness’
- Discuss strategies for an approach to dizziness
- Discuss management strategies for described etiologies of dizziness
- Discuss “can’t miss” presentations of dizziness
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Doc, I’m dizzy...

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A neurologist’s perspective...

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4 cases

- Jon Snow
- Dizziness off and on for 3-6 months
- Worse when getting up quickly
- Associated with:
  - dimming/tunnel vision
  - sometimes ears ‘ringing’
  - feeling sweaty, ‘clammy’
- Has felt like he was going to faint in the past, never has
You Spin Me Right Round: A Neurologist’s Approach to Dizziness & Vertigo
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4 cases

- Tormund Giantsbane
- Difficulty with balance
- Worse at night or during sudden movements
- Denies 'world spinning'
- Has fallen in the past
- No specific direction he can remember
- Has been told in the past that he has 'trouble with sugars'

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4 cases

- Cersei Lannister
- Woke up yesterday with acute 'dizziness'
- Can walk, but feels like she leans to left
- Associated with:
  - World 'spinning'
  - Severe nausea
  - Feels she has decreased hearing on left
- Is 'really healthy' overall, though did have a 'bad flu' about a week ago

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4 cases

- Gregor Clegane, aka 'The Giant'
- Has felt 'dizzy' for years
- Has had extensive workup from druids, healers and shamans
- Lab work and imaging have all been (-)
- Has seen a balance specialist in the past on multiple occasions
- Denies 'spinning' or feeling light-headed when standing
- Has a history of anxiety depression
- Is worried this may be due to 'a chronic infection'
- Is frustrated, angry and smelly that no diagnosis has been elicited
- "It makes me murder-y!"
Where to go from here?

Approach to ‘dizziness’

- Multiple potential etiologies
- Even in this day and age of advanced imaging, often not as helpful as H&P
  - Cause simply may not show up on imaging
  - Even if it has been alleged or demonstrated prospectively for certain
    conditions, it may not be helpful
  - Patient’s don’t always know the difference between dizziness, syncope and
    vertigo, and shouldn’t be expected to
    - But can give valuable insight and sometimes incredibly novel and accurate
      descriptions of their symptoms!
- Clearly we need a systematic approach to elicit the cause of dizziness

Let the patient tell you

- The symptom approach
  - Martin Samuels, MD
  - “I might faint. I feel light-headed”
  - “I feel like I’m going to fall”
  - “I’m tilting, the room is spinning”
  - “I just feel dizzy”
Let the patient tell you

Consider the time-course

I might faint, I feel lightheaded....

- Jon Snow
- Dizziness off and on for 3-6 months
- Worse when getting up quickly
- Associated with:
  - dimming/tunnel vision
  - sometimes ears 'ringing'
  - feeling sweaty, 'clammy'
- Denies spinning sensation
- Has felt like he was going to faint in the past, never has
Pre-syncope, syncope

- Cardiovascular problem

- Causes include
  - Orthostatic hypotension
  - Plasma volume, autonomic, volume status
  - Medications
  - Cardiac arrhythmias
  - Carotid hypersensitive
  - Structural etiologies
  - Vasovagal (situational, micturation, post-prandial, etc.)

Pre-syncope

- Neuro exam normal
- Or abnormalities explained by other conditions
- May have orthostatics on testing
- Listen for carotid bruits, murmurs, arrhythmias
- Check cap refill, peripheral pulses
- Carotid massage (specially settings only)
Pre-syncope: Workup/management

- Based on suspected etiology
- Minimize offending meds as tolerated
- Neuro clinic:
  - Discuss strategies for HoTN
  - 1-2” blocks, TED hose, increased salt intake, staying hydrated
  - 24hr event monitor
  - CT/MR
  - TCD
  - VCO even brought up by other providers if actual syncope or 'spells'
  - Referrals as indicated
    - Cardiology
    - Autonomics
    - F&F Clinic

I feel as if I might fall...

- Tormund Giantsbane

- Difficulty with balance
- Worse at night or during sudden movements
- Denies ‘world spinning’
- Has fallen in the past
  - No specific direction he can remember
  - Did have to go to the druid-urgent care
  - Denies feeling light-headed when standing
  - Has been told in the past that he has ‘trouble with sugars’

Disequilibrium

- A balance problem

- Can be cerebellar
  - Chronic degeneration
  - Tumor
  - Tumor

- Or due to combined sensory deficits
  - Loss of or decreased proprioception, vision, hearing, etc.
Combined sensory deficits

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Combined sensory deficits: Sensory ataxia

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Combined sensory deficits: Exam
- Special emphasis on sensory exam
- TENSOR
- Dedicated proprioception testing
  - Sensory position testing (sensory, eyes open/closed)
  - Proprioception testing
  - Romberg
  - DTRs

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Combined sensory deficits: Management

- Testing
  - Neuro-ophthalmic labs, per AAN guidelines
  - MRI/CT imaging, to rule out mass effect
- May consider advanced lab if indicated by hx
- Consider infectious causes if indicated by hx
- May consider EMG/NCS
- PT with emphasis on gait and balance training
- OT for home safety
- Nightlight!
- Ophthalmology, Audiology follow-up as indicated

http://www.neurology.org/content/72/2/185.full.html
https://www.urmc.rochester.edu/libraries/courses/neuroslides/lab3b/slide120.cfm
http://neuropathology-web.org/chapter8/chapter8Nutritional.html

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Cerebellar Ataxia

http://da.biostr.washington.edu/DA-ATLASES/Neuroanatomy/gifs/Gross/Topography/hempostnew.gif
http://www.neuroradiologycases.com/2012/02/cerebellar-degeneration.html

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Cerebellar Ataxia: Exam findings

http://library.med.utah.edu/neurologicexam/html/coordination_abnormal.html
Cerebellar Ataxia: Exam, cont

- EOMI
- RAM
- "Shoot the gun" test
- "Mirror" test
- Fine motor movements (finger count)
- Station/Gait

http://www.78stepshealth.us/examination-sequence/clinical-testing.html

http://library.med.utah.edu/neurologicexam/html/coordination_abnormal.html

Cerebellar Ataxia: Management

If history and physical suggestive of cerebellar dysfunction

- Brain imaging: MRI/CT
- Remove offending drugs/ETOH
- Consider genetic testing
- PT with emphasis on gait and balance training
- OT for home safety

"I'm tilting, the room is spinning"

- Cersei Lannister
- Woke up 5 days ago with acute 'dizziness'
- Has been falling, consistently to left
- Associated with:
  - Head 'spinning'
  - Severe nausea
  - Feels she has decreased hearing on left
- 'Really healthy' overall, though did have a 'bad flu' about a week ago
Evaluation of vestibular disorders

- Is this peripheral or central vestibular dysfunction?
  - Central or peripheral
    - Central?
      - Nuclei/pathways
    - Peripheral?
      - Cochlear (inner ear)
      - Retrocochlear (nerve)

A few words about nystagmus

- Rotary: [Link](https://www.youtube.com/watch?v=a1noptspSUA)
- Down beat: [Link](https://www.youtube.com/watch?v=ORbUVruf2Iw)

A few words about nystagmus

[Further information](https://www.youtube.com/watch?v=a1noptspSUA)
Central vs peripheral vestibular disorders

Peripheral vertigo
- Can be combined horizontal and torsional nystagmus
- Inhibited by fixation
- Nystagmus does not change direction
- Fades after a few days
- Mild-moderate imbalance, able to walk
- N/V may be severe
- Hearing loss/changes commonly associated
- Other (non-hearing) neuro symptoms rare
- Latency following provocative maneuver—longer (up to 20 seconds)

Peripheral vertigo: causes
- BPPV
- Acoustic neuroma
- Ménière’s disease
- Cholesteatoma
- Acute vestibular neuritis
- Acute labyrinthitis

Of note:
- Cochlear-type SNHL (Ménière’s) —speech discrimination generally relatively preserved
- Retrocochlear-type SNHL (vestibular neuroma) —disproportionate amount of loss of speech discrimination
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Central vertigo

- Purely vertical, horizontal, or torsional nystagmus
- Not inhibited by fixation
- May last weeks to months
- Nystagmus may change direction (direction of fast phase)
- Intensity can be severe; unable to stand still or walk
- N/V—varies (may not be as severe as peripheral vertigo)
- Hearing loss—rare
- Associated neuro Sx (non-hearing)—common
- Latency—up to 5 seconds

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Central vertigo: causes

- Stroke
- Migraine
- MS
- CNS tumors
- Infection/inflammation

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"Every morning!"

- Tyrion Lannister
- Sudden onset of vertigo getting out of bed
  - Came on suddenly, but then "calmed down"
  - Always seem to occur in the morning!
  - Did recently have head trauma in a "brawl"
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**BPPV**
- MCC of vertigo
- Positional
- Dix-Hallpike
  - Head elevated
  - Tilts back with neck over end of table
  - Expect latency
  - Nystagmus
    - Slow—towards lesion
    - Fast—away from lesion


Jung et al, Approach to dizziness in the emergency department, Clinical and Experimental Emergency Medicine, 2015;2(2):75-78

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“I was just eating my dinner”
- Sandor Clegane, aka ‘The Hound’
- Was eating dinner at the inn and had sudden onset 'dizziness' with NV
- Unable to stand without falling
- Associated with:
  - ‘World was spinning’
  - Facial droop (patient says that is chronic)
  - Denies hearing loss
  - Vision ‘seems off’

http://awoiaf.westeros.org/index.php/Sandor_Clegane

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**Vertigo: stroke**
- 2015, Stroke, Missed Ischemic Stroke Diagnosis in the Emergency Department by Emergency Medicine and Neurology Services
- 465 patients with stroke reviewed
- 22% (55/280) missed at Academic Hospital, 26% (48/185) at CH
- 33% missed within 3 hr window, additional 11% within 3-6 hr window
- Symptoms independently associated with greater odds of missed stroke:
  - NV (OR 4.02), dizziness (OR 1.99), positive stroke Hx (OR 2.4)
- 37% of posterior strokes initially misdiagnosed vs 16% anterior
- For missed strokes, only 8% were triaged as ‘code stroke’
- 35% of missed strokes had neuro involvement!

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Vertigo: stroke

Spot a Stroke

Stroke Warning Signs and Symptoms

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Vertigo: stroke

- FAST → no posterior Sx!
- ROSIER
  - 343 suspected stroke Pts assessed
  - Sensitivity 92%
  - Specificity 83%
  - PPV 90%
  - NPV 88%
- FAST-AV (FAST + Ataxia & Visual Disturbance)
  - 35 stroke patients analyzed
  - 11/35 (31%) were FAST negative
  - 5 of those 11 would have been FAST –AV (+)

Huwez F et al, FAST-AV or FAST-AB tool improves the sensitivity of FAST screening for detection of posterior circulation strokes. Int J Stroke. 2013 Apr;8(3)

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Vertigo: stroke → HINTS

- HINTS → Head-impulse-Nystagmus-Test-of-Skew
Vertigo: stroke

- HINTS
  - Stroke, 2009
  - 101 patients with A/V and 1 or more stroke risk factors
  - 100% sensitive and 96% specific

- What about rapid MRI?
  - Initial MRI diffusion-weighted imaging was falsely negative in 12% (all <48 hours after symptom onset)

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I'm just dizzy!

- Gregor Clegane, aka 'The Giant'
- Has felt 'dizzy' for years
- Has had extensive workup from druids, healers and shamans
- Lab work and imaging has all been (-)
- Has seen a balance specialist in the past on multiple occasions
- Denies 'spinning' or feeling light headed when standing
- Has difficulty characterizing dizzy symptoms
- Does have a history of anxiety depression
- Is worried this may be all due to 'a chronic infection'
- Is frustrated, angry and anxious that no diagnosis has been elicited

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Chronic Subjective Dizziness (CSD)

- Initially described as 'phobic postural vertigo'
- 2nd most common Dx made in tertiary neuro-otology centers
- Sx fluctuate in severity for months to years
- Usually associated with other comorbid medical and psychiatric illnesses
- Almost always triggered by an acute neuro-otologic, medical or psychiatric illness
Chronic Subjective Dizziness (CSD)

- Tx
- SSRIs, SNRIs
- Vestibular rehab
- CBT


Dizziness

- Pre-syncope/syncope
- Disequilibrium
  - Cerebellar
  - Multiple sensory deficits
- Vertigo
  - Central
  - Peripheral
- Chronic subjective dizziness

Dizziness: Take home points

- Categorize potential etiology—let the patient tell you!
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**Dizziness: Take home points**

- Utilize history and exam to elicit etiology
  - CN
  - EOMI
  - Nystagmus?
  - Associated CN abnormalities?
  - Motor
    - Weakness? Loss/gain of tone?
    - DTRs
    - Focal findings?
  - Evidence of neuropathy?
  - Coordination
    - Ataxia, dysmetria
  - Sensation
    - Focal findings?
    - Evidence of neuropathy?
    - Evidence of loss of proprioception?
  - Station
    - Romberg (+)?
  - Gait
    - Wide based? Directional lean?

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**Dizziness: Take home points**

Consider special testing

- Orthostatics
- Dix Hallpike
- Shoot the gun
- Finger mirror testing
- HINTS testing

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**Dizziness: Take home points**

Diagnostics as indicated per suspected etiology

- EKG
- TTE
- Event monitor
- Vascular imaging
- MRI/CT
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Dizziness: Take home points

Refer as needed
- Cardiology
- Neurology
- ENT
- PT/OT
- Psych/SW
- Specialty clinics
  - Autonamics
  - Faint & fall

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Thank you!

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Questions/Discussion?