Be FAST or Be Last

24th Annual Bistate Stroke Symposium: Posterior stroke assessments

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November 4, 2022

Dizziness in the stroke world

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Introduction

- Both: Neurologists at Centerpoint Hospital in Independence, MO
  - Midwest Neurology Physicians
- Dr Chandler
- Dr Reddig
- Stroke program

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  - University of Rochester Residency (neurology) and Fellowship (vascular)
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FAST vs Be FAST

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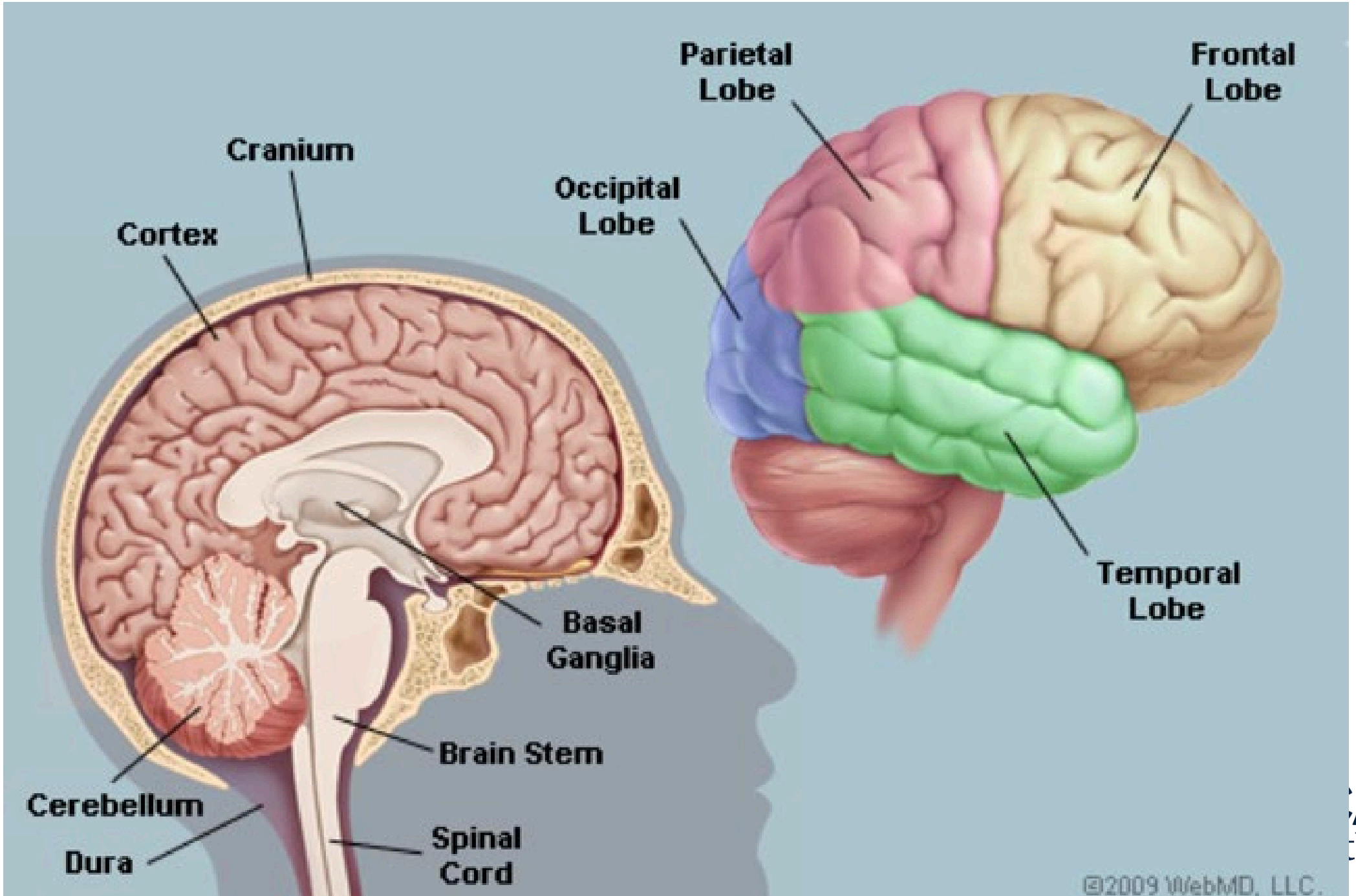
Parietal Lobe
Frontal Lobe
Cranium
Occipital Lobe
Cortex
Temporal Lobe
Basal Ganglia
Brain Stem
Cerebellum
Spinal Cord
Dura
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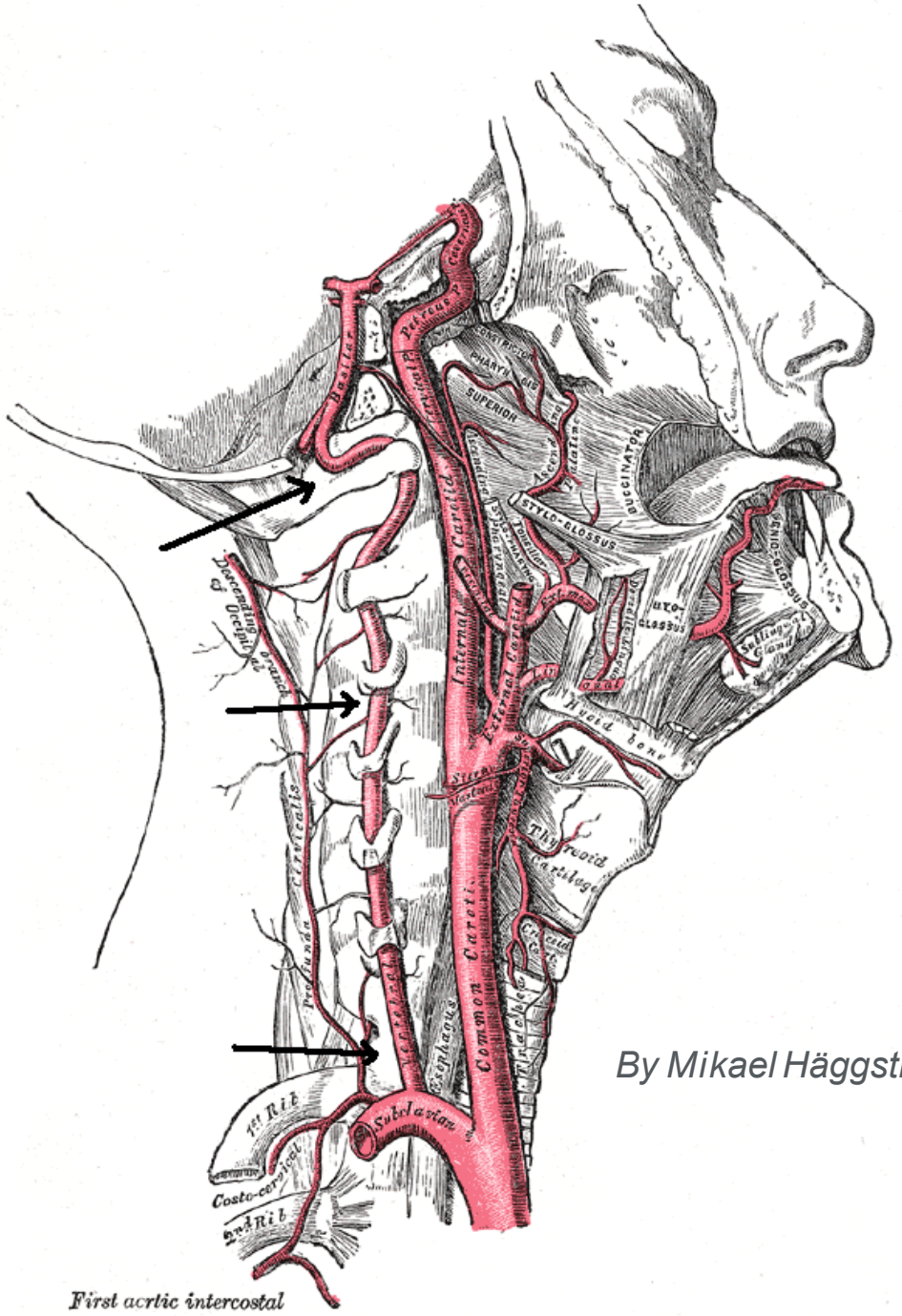
“Posterior” stroke

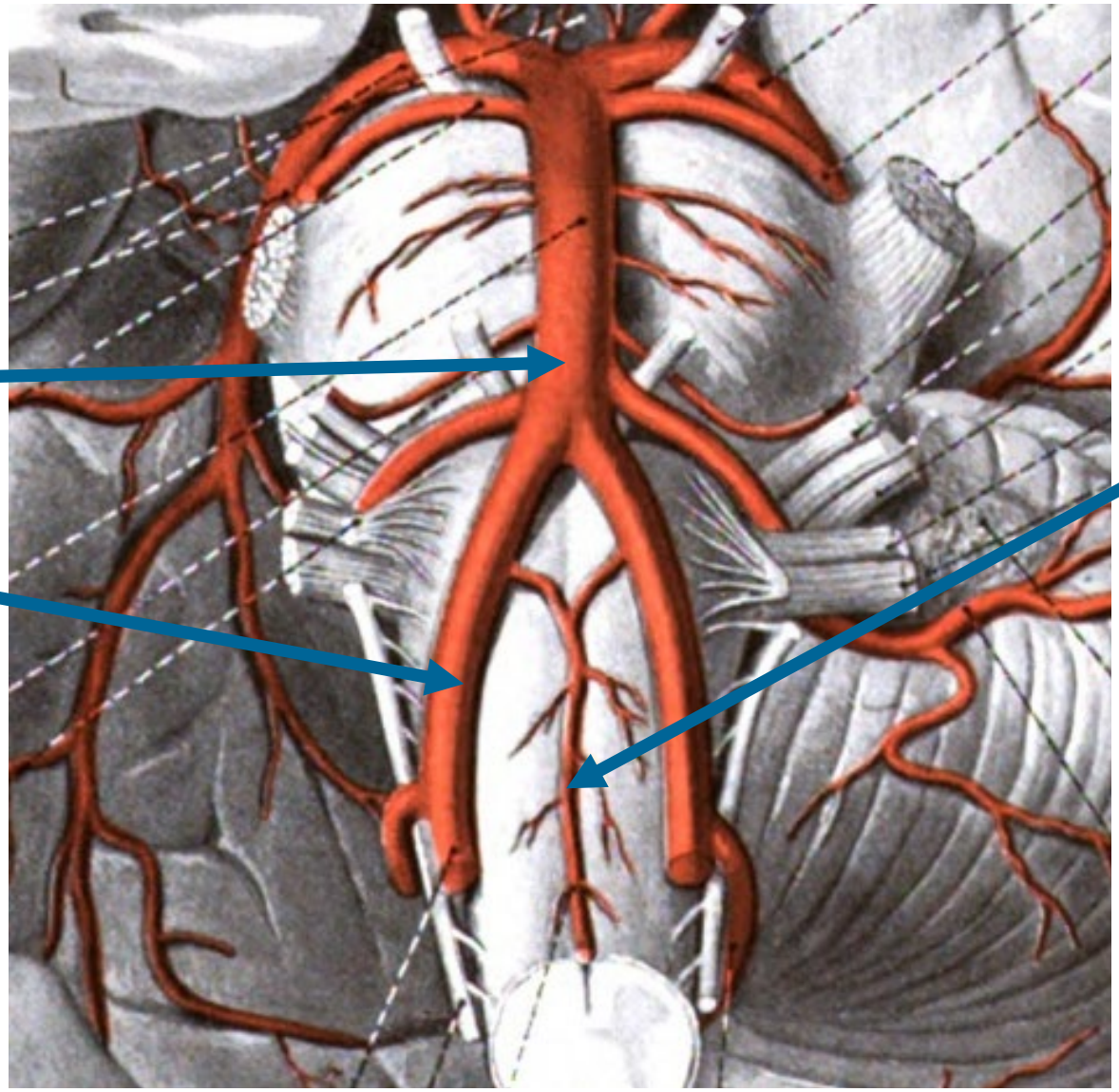
- **Vertebral** blood supply
  - Comes off subclavian artery
  - Less blood flow than carotids
  - Goes through cervical vertebral bodies
  - Give off branches to brainstem, cerebellum
  - Join to form **BASILAR** artery
  - Blood to occipital lobes (vision)



By Mikael Häggström

Basilar Artery

Vertebral Artery



Anterior Spinal Artery

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Dizziness

- What is dizziness? Not specific!
- Presyncope
  - Light headed, nearly fainting
  - Seconds to minutes
  - Warmth, diaphoresis, nausea, blurred vision, pallor
  - Decreased blood flow (cardiac, vasovagal)
- Disequilibrium
  - Imbalance while walking
  - Neuropathy, vestibular, cerebellar, musculoskeletal, visual
- Non-specific (psychiatric? Hyperventilation?)

Dizziness

- 4% of ED visits
- 3-5% are strokes
- 20% of all strokes are posterior circulation

Vertigo

- Symptoms
  - Illusion of motion
  - Self-motion, motion of the environment
  - Spinning, whirling, tilting, moving
- Vestibular dysfunction
- Can be peripheral or central
- Central is very low cause of dizziness: 3.2% in one study, down to 0.7% if no other neurologic sign or symptom

Clues

- Timing, Triggers and Targeted Exam (TiTraTe)
- Timing
  - Onset
  - Duration: never constant for weeks
- Triggers
  - Actions, movements or situations
- Taken together, 4 possible syndromes

Episodic vestibular syndrome (EVS)
- Triggered (t-EVS)
- Spontaneous (s-EVS)

Acute vestibular syndrome (AVS)
- traumatic/toxic (t-AVS)
- spontaneous (s-AVS).

Stroke 2018;49:788-795

Episodic Vestibular Syndrome (EVS)

- Transient episodes
- Lasts typically seconds to hours (occasionally days)
- Typically with other vestibular symptoms
  - Nausea, nystagmus (ask about vision changes), falls

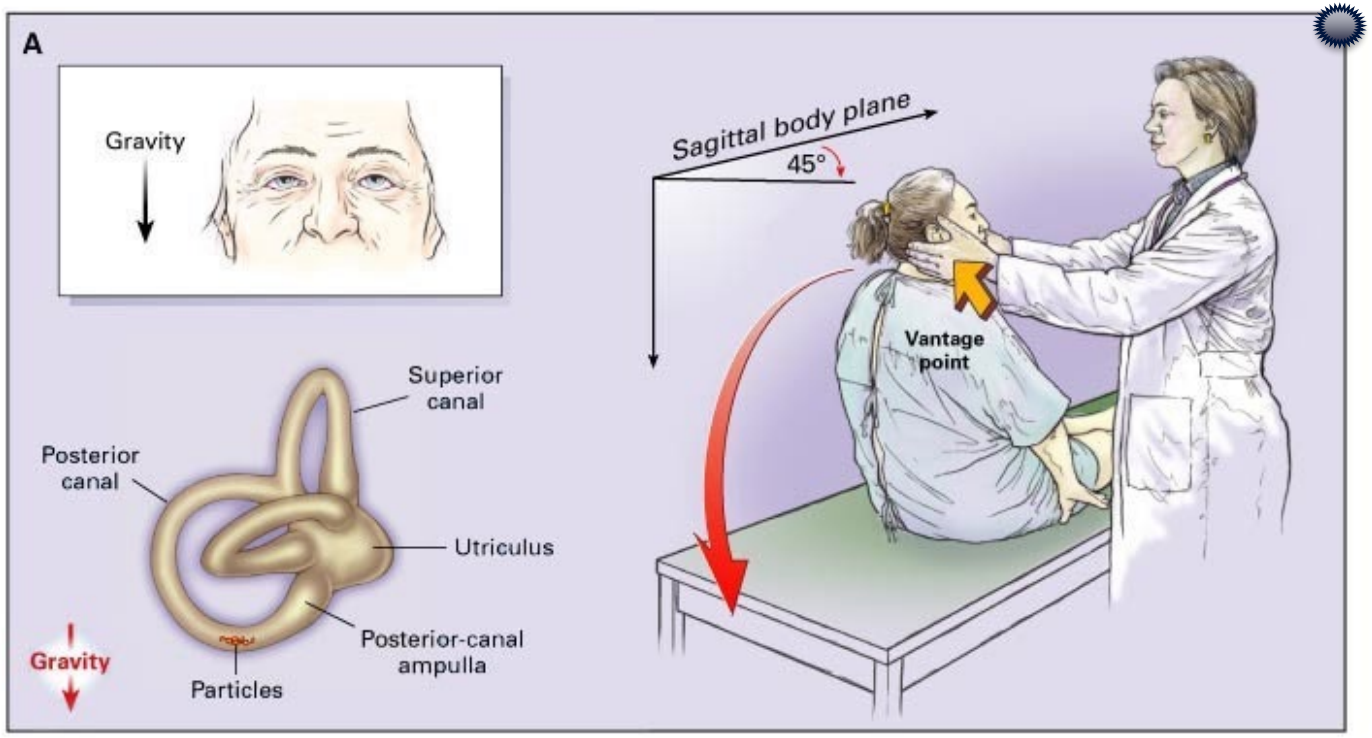
Stroke 2018;49:788-795

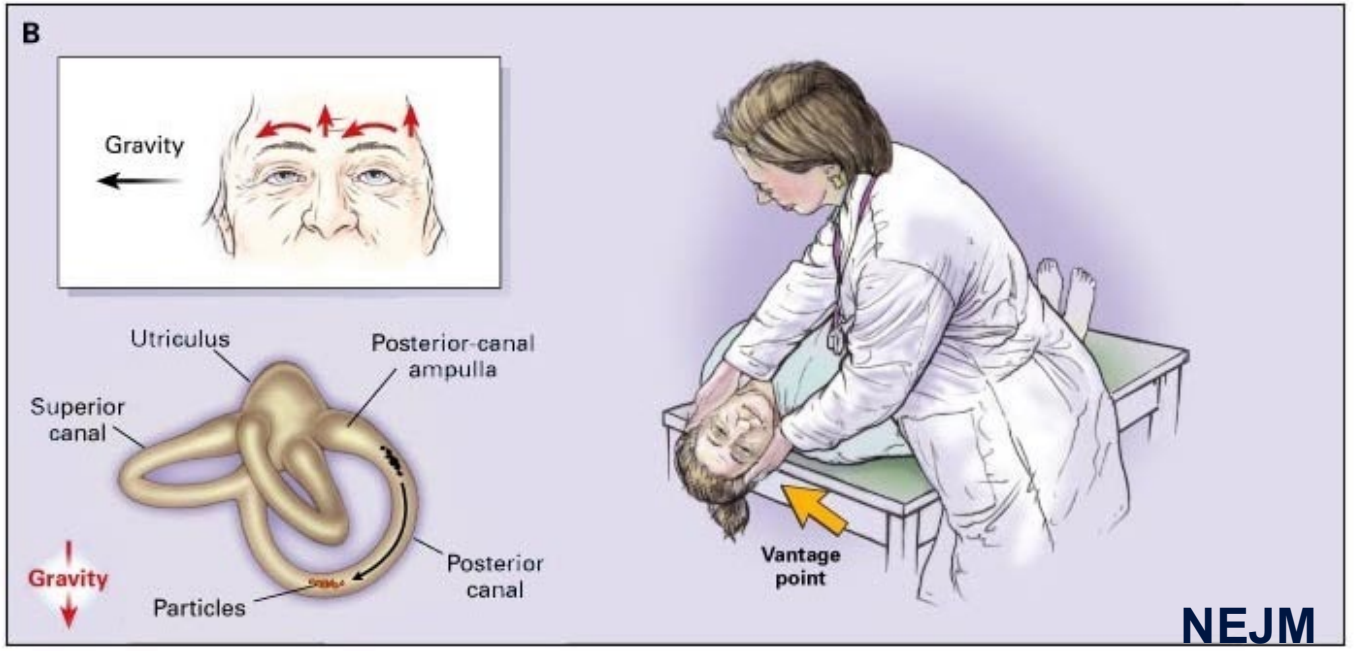
Triggered Episodic Vestibular Syndrome (t-EVS)

- Triggered by something
  - Head movement
  - Change in body position: sitting or standing up
  - Note any head movement makes any type of vertigo worse (good way to look for vertigo!)
- Seconds to minutes
- Benign paroxysmal positional vertigo (BPPV) is most likely cause
- Concern for: rotational vertebral artery syndrome (rare; far lateral rotation occludes 1 or both vertebral arteries) or central paroxysmal positional vertigo (small hemorrhage in cerebellum)

Dix-Hallpike

- Only checks posterior canal
  - By far the most common canal
  - Other procedures for other canals





Spontaneous Episodic Vestibular Syndrome (s-EVS)

- May be brought on by things but not immediately (foods, dehydration, lack of sleep)
- Minutes to hours (not seconds)
- Vestibular migraine, Menieres (vertigo, hearing loss, tinnitus)
- Concern for: TIA, arrhythmias, hypoglycemia

Acute Vestibular Syndrome (AVS)

- Persistent symptoms
- You can check the patient while they have symptoms!

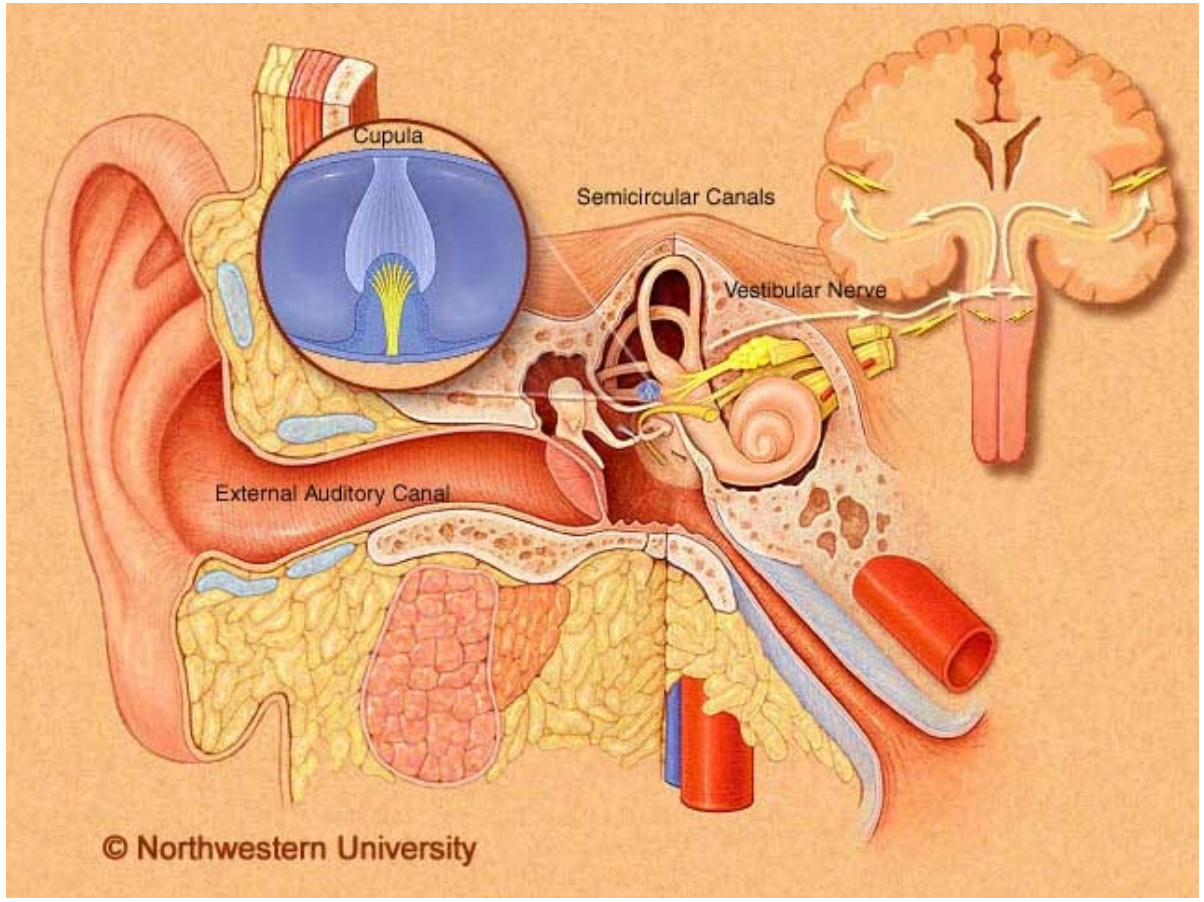
Peripheral	Central
Very intense	Intense vs mild
+/- Auditory symptoms	No hearing changes
No other CNS signs	May have others
Usually no headache	May have headache

Traumatic/toxic Acute Vestibular Syndrome (t-AVS)

- Usually fairly obvious cause
- Trauma, drug intoxication (seizure medications, aminoglycoside antibiotics), carbon monoxide
- Gradually resolve over days to weeks
- Concern for: next slide

Spontaneous Acute Vestibular Syndrome (s-AVS)

- Most common: vestibular neuritis
- Second cause: stroke (10-20% of s-AVS)
  - Brainstem or cerebellar, 95% ischemic
  - Can have preceding TIAs
- Other concerns: thiamine deficiency, listeria encephalitis (typically infects brainstem or cerebellum)



Cerebellar Signs

- Speech: scanning
- Nystagmus
- Ataxia: finger to nose, heel to shin, gait, sitting/standing
- Rapid alternating movements
- Rebound (arms held out, push down; rebounding reflexes)

Evaluation in s-AVS

- HINTS!
- Head impulse: normal in 90% stroke, 5% vestibular
- Nystagmus: direction changing in 38% stroke, 8% vestibular
- Skew deviation on covering one eye: 30% stroke, 2% vestibular

- Combo: If all HINTS points to vestibular (abnormal HI, direction-fixed nystagmus, no skew): 96% no stroke
- Better than MRI in first 48hrs! (~80%)
- ONLY do if patient is symptomatic at the time

Right cerebellar stroke

- Nystagmus with NORMAL head impulse test

Stroke. 2009;40:3504–3510

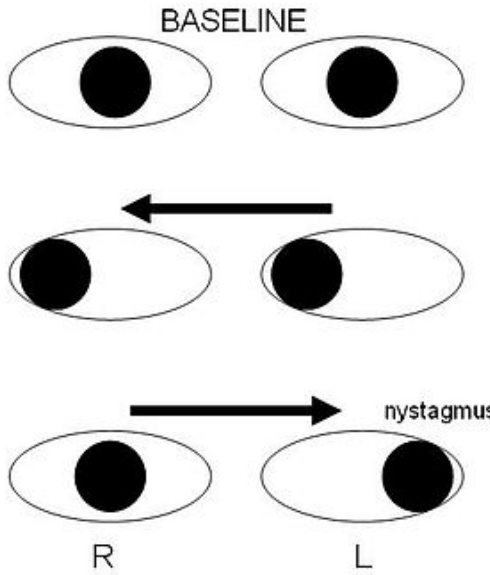
Right vestibular neuritis

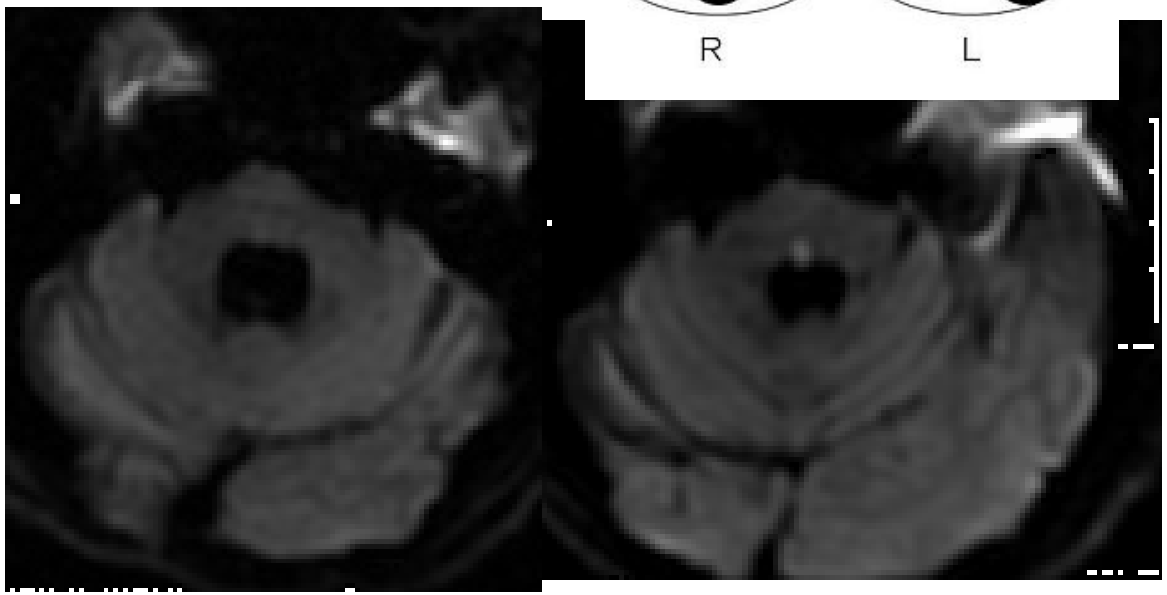
- Nystagmus with ABNORMAL head impulse test

 | Stroke. 2009;40:3504–3510

Strange case

- 65yo M, prior stroke woke 1am with “blurry vision”
- Right eye: can’t look left. Left eye: nystagmus looking left





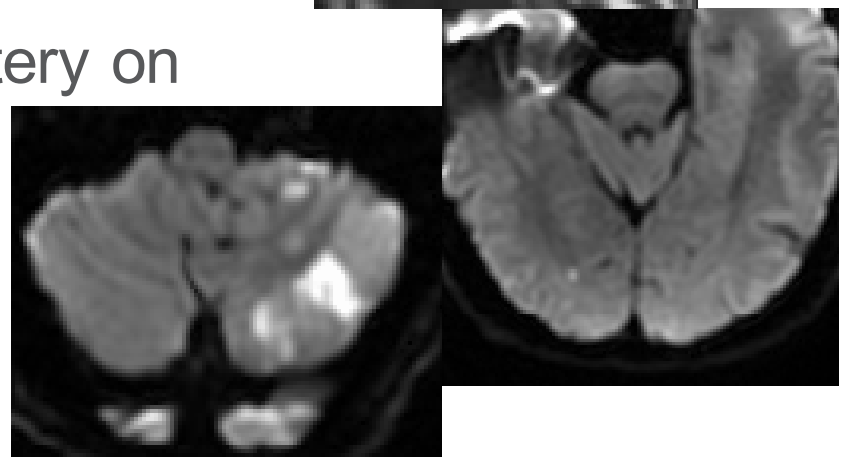
Oct 4, 5am Oct 5, 3pm

INO (Internuclear Ophthalmoplegia)

- **Injury to medial longitudinal fasciculus**

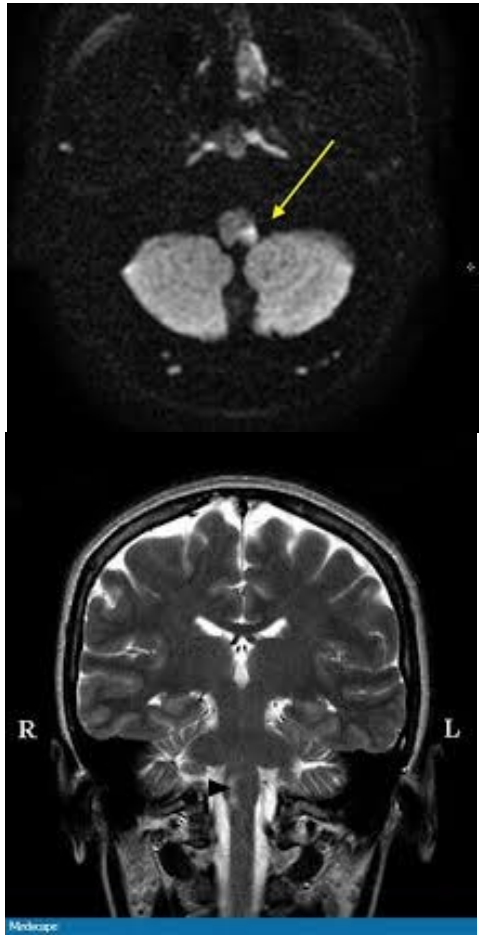
Next Case

- 78yo M, left neck pain into arm with numbness/tingling, went to chiro, then days later has left leg numbness too; said some problems seeing things on left
- Subtle leg ataxia on exam
- Dissection left vertebral artery on CTA



Posterior Circulation Stroke Syndromes

- Lateral Medullary Syndrome
  - *UNITLATERAL* Pain, numbness on ½ of the face
  - Ataxia
  - Nystagmus
  - Diplopia
  - **Vertigo**
  - Nausea
  - Vomiting
  - Horner syndrome (ptosis, miosis, anhidrosis)
  - Dysphagia
  - Loss of taste
  - *CONTRALATERAL* loss of pain and temperature sensation



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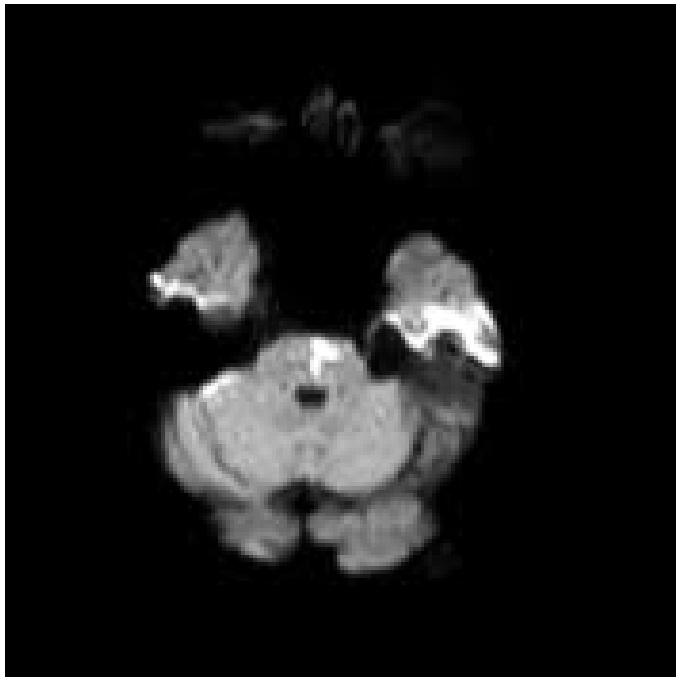
Medial Inferior Pontine Syndrome

- *UNILATERAL* paralysis of conjugate gaze to the side of the lesion
- **Nystagmus**
- Ataxia
- Diplopia on lateral gaze
- *CONTRALATERAL* face, arm, and leg paralysis

  Impaired tactile and proprioceptive sense



Treatment

- BPPV (Benign paroxysmal positional vertigo): Positional therapy
- Orthostatic hypotension: fluids, BP med reduction, binders, salt, meds
- Stroke: acute treatment, therapies, prevention strategies

Summary

- Acute Vestibular Syndrome (AVS)
  - Never asymptomatic, no triggers
  - Vestibular neuritis vs stroke
- Triggered episodic vestibular
  - Periods of being asymptomatic, has triggers
  - BPPV
- Spontaneous episodic vestibular
  - Periods of being asymptomatic, no triggers
  - Migraine vs TIA vs cardiac

Snappy conclusion

Balance

Watch for sudden loss of balance

Eyes

Check for vision loss

Face

Look for an uneven smile

Arm

Check if one arm is weak

Speech

Listen for slurred speech

Time

Call **911** right away

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