

# Evaluation of the Dizzy Patient

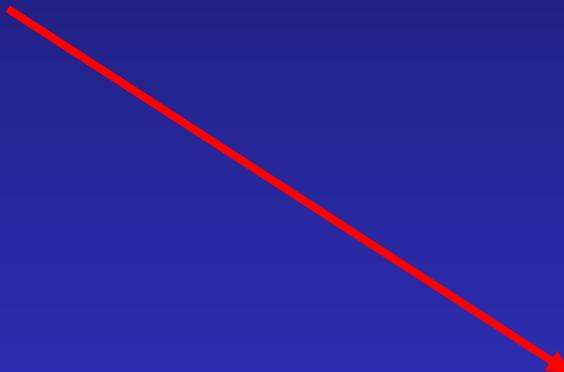
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*The speaker has no disclosures*

# Who Sees Dizzy Patients?

- ED physicians
- Internists
- Neurologists
- ENT

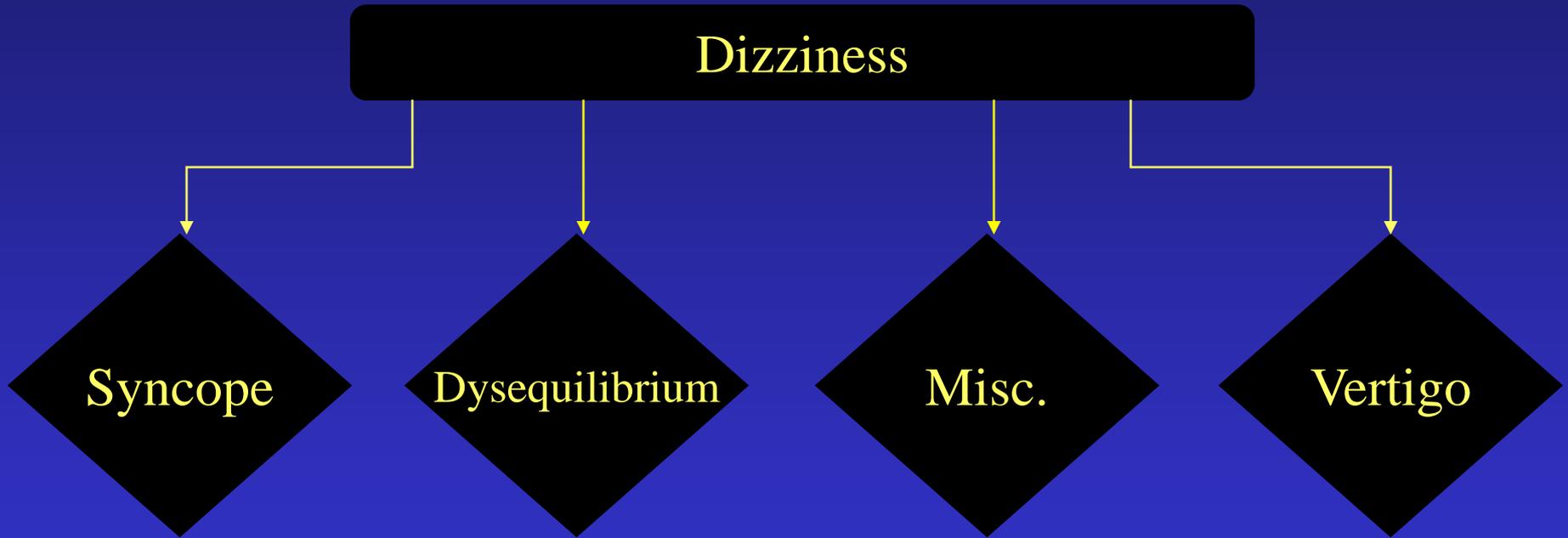


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# Two Key Questions

- 1. What do you mean by Dizzy?
- 2. Localization?

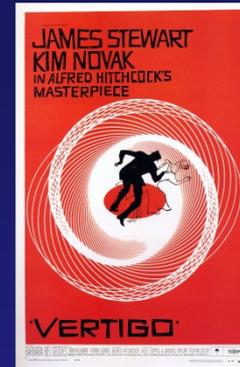
# Q1: What do you mean by “Dizzy”?



# Syncope/Presyncope

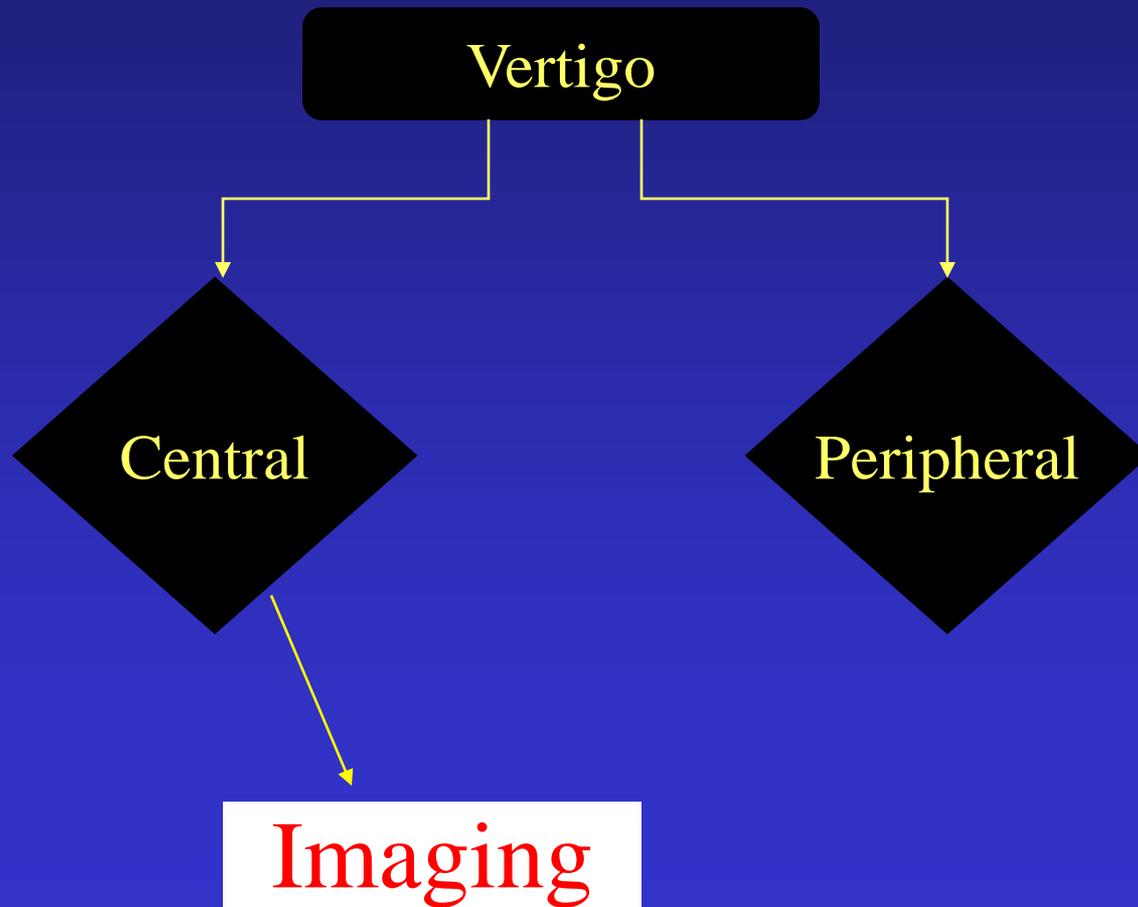
- Nearly one-fifth of patients report as “dizziness”
- Presyncopal symptoms key: Color change, lightheadedness, tunnel vision
- Witnesses may have difficult time distinguishing from seizure

# Vertigo: Definition



- Room spinning not usually present and will lead to many vertiginous patients misidentified
- An illusion of movement, falling, or rocking
- Dissociation between the patient and the environment

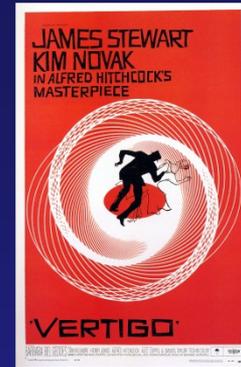
# Q2: Classify Vertigo



Which of the following most reliably distinguishes central from peripheral vertigo?

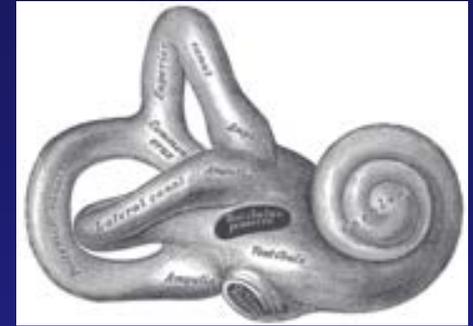
- A. Severe vomiting
- B. Inability to walk
- C. Inability to sit upright without falling to one side
- D. Presence of nystagmus
- E. Slurred speech

# Central vs. Peripheral: History



- Presence of many symptoms not helpful in distinguishing
  - Nausea and Vomiting
  - Inability to Walk
  - Inability to Sit
- All of these tend to be worse in peripheral vertigo, but can't use severity to distinguish

# Central vs. Peripheral: History



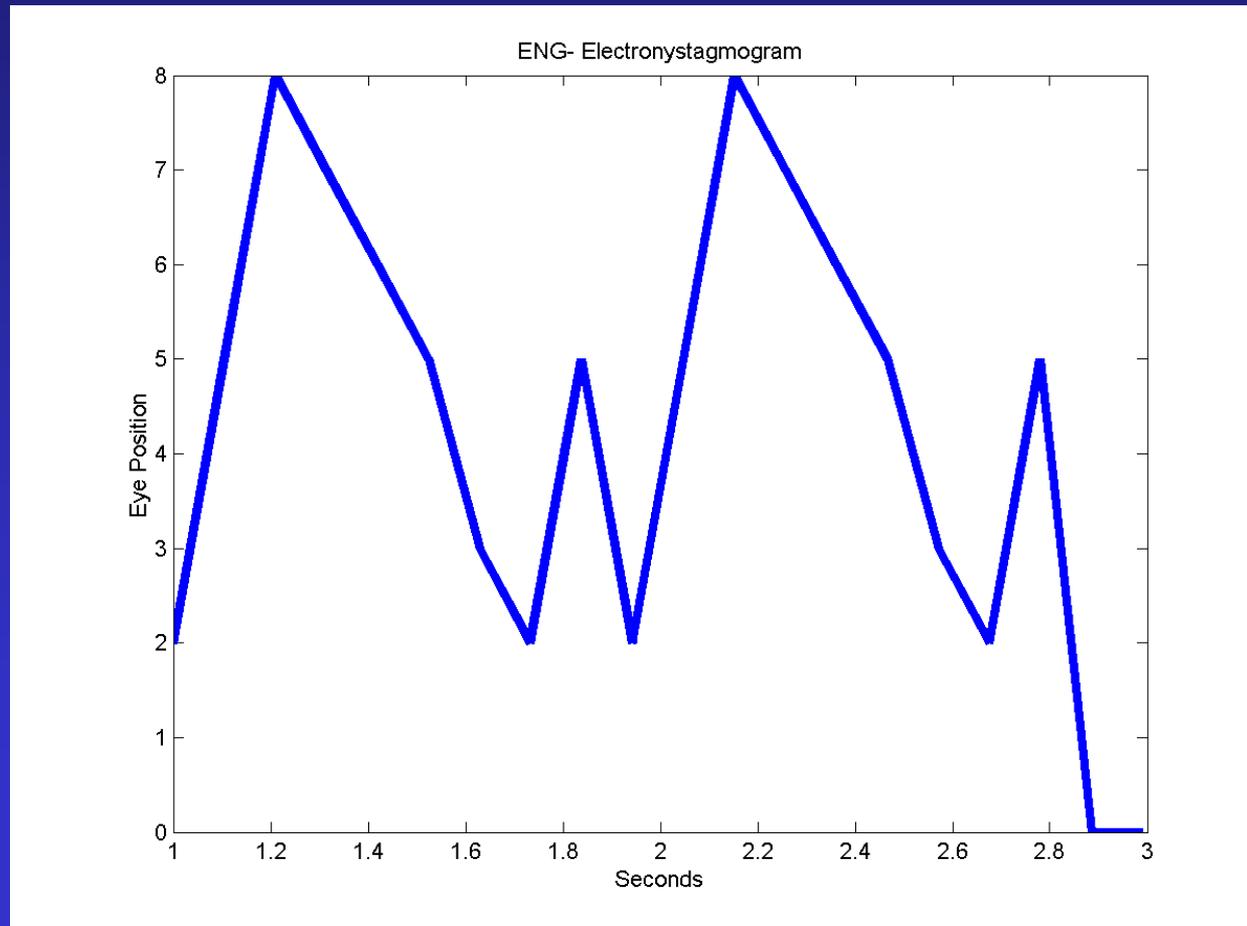
- Peripheral
  - Associated ear findings
    - Hearing loss
    - Tinnitus
    - Pressure or Fullness in the Ear
    - Otalgia
  - Head turning brings on symptoms

# Central vs. Peripheral: History



- Central
  - Associated Brainstem symptoms
    - Dysarthria
    - Dysphagia
    - Diplopia
  - Headache
  - Depressed LOC (not related to meds)
  - Age and vascular risk factors

# Central vs. Peripheral: Nystagmus Exam



# Central vs. Peripheral: Nystagmus Exam



- Will fatigue with time →
- Goes away with fixation →
- Changes direction with gaze →
- Latency of 5-10 seconds →
- Direction
  - Torsional/Horizontal →
  - Vertical →



# Central vs. Peripheral: Nystagmus Exam

Torsional/Horizontal

# Central vs. Peripheral: Nystagmus Exam

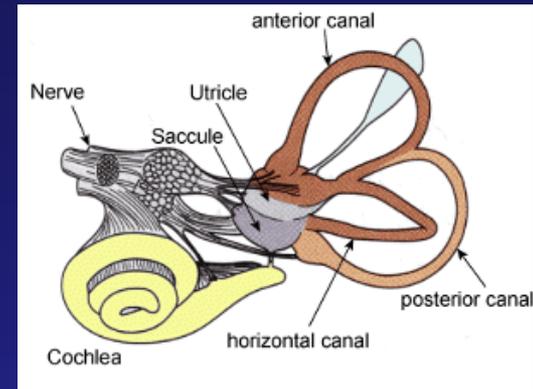
*Alexander's Law: Amplitude increases when eye moves in the direction of the fast phase*

# Central vs. Peripheral: Other Examination Findings



- Always central, always needs imaging
  - 1. Any Cranial Nerve Lesion
  - 2. Any Asymmetric Cerebellar Finding
  - 3. Complete Absence of Peripheral Signs

# Peripheral Vertigo: Anatomy



<b>Episode Duration</b>	<b>Auditory Symptoms Present</b>	<b>Auditory Symptoms Absent</b>
Seconds	Perilymphatic Fistula	Positional vertigo (cupulolithiasis)
Hours	Meniere's syndrome Syphilis	Recurrent vestibulopathy Vestibular migraine
Days	Labyrinthitis Labyrinthine concussion	Vestibular neuronitis
Months	Acoustic neuroma Ototoxicity	Head trauma

# Case 1

- 63M comes to the ED with 12 hours of severe vertigo, nausea and vomiting without hearing loss or tinnitus
- Examination shows right beating nystagmus in all directions of gaze (worse when looking right) and severe imbalance with inability to even sit up
- He recently recovered from a URI

# Vestibular Neuronitis

- Other names
  - Vestibular neuritis
  - With hearing loss: labyrinthitis
- 2<sup>nd</sup> most common cause of peripheral vertigo in most series
- Worsens for 24-72 hours and then slow improvement
- Presumed viral or post-viral etiology
  - History present in only about half of patients

Which of the following treatments works best for this condition?

- A. Acyclovir
- B. Epley Maneuvers
- C. Corticosteroids
- D. Meclizine
- E. Benzodiazepines

# Vestibular Neuronitis: Treatment

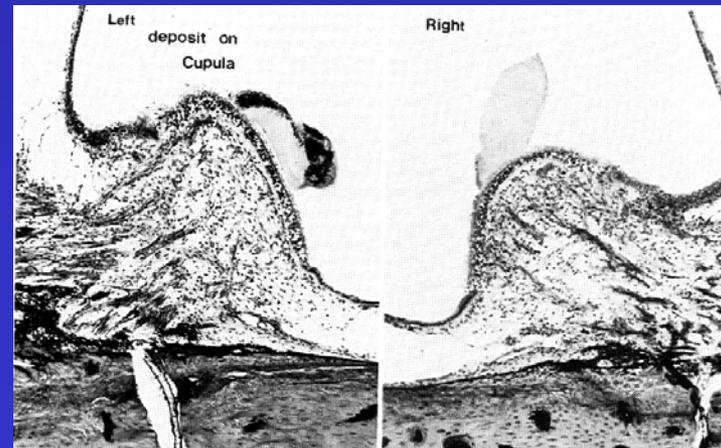
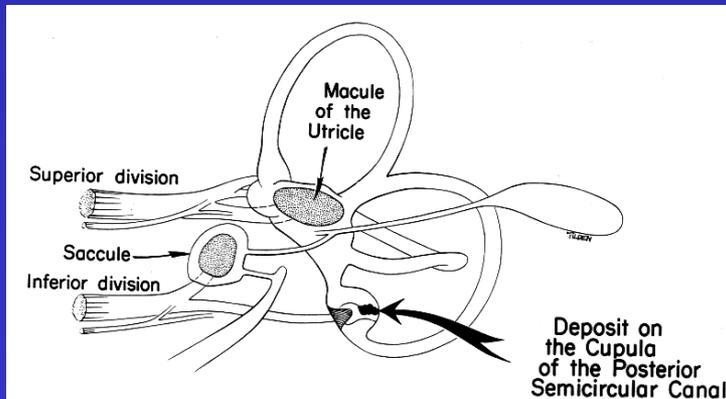
- No role for anti-virals
- Steroids? (Strupp NEJM 2004)
  - Significantly improved outcomes at 1 year
  - High dose used for three weeks
    - 100mg daily oral methylprednisolone for three days and then slow taper
  - Not clear if lower dosages or other regimens effective

## Case 2

- 75M reports the sudden onset of severe vertigo when rolling over in bed to turn off his alarm clock. He is now reluctant to move as the symptoms quickly return.
- No auditory symptoms
- Examination normal except Dix-Hallpike maneuver
  - 5 second latency, rotatory nystagmus with return of symptoms when placed with right ear down

# Benign Paroxysmal Positional Vertigo (BPPV)

- Most common cause of peripheral vertigo, often recurs
- Calcium carbonate crystals in posterior canal have plunger effect
- Latency due to the movement of the crystals



# BPPV: Treatment

Epley Maneuver

# BPPV: Treatment

## Semont Maneuver

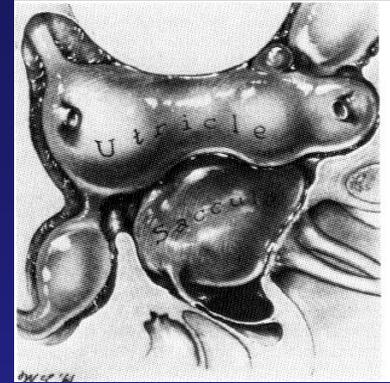
## Case 3

- 55M experienced a pressure sensation behind the left ear followed by vomiting, vertigo, and deafness
- 3 hours later: vertigo improving but the deafness persists
- Exam: Conjugate horizontal nystagmus beating to the right, veers to the right when walking

What is the most likely diagnosis?

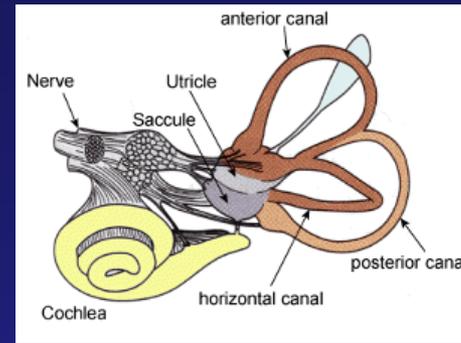
- A. Cerebellar Stroke
- B. Migraine
- C. Meniere's Disease
- D. BPPV
- E. Acoustic Neuroma

# Meniere's syndrome



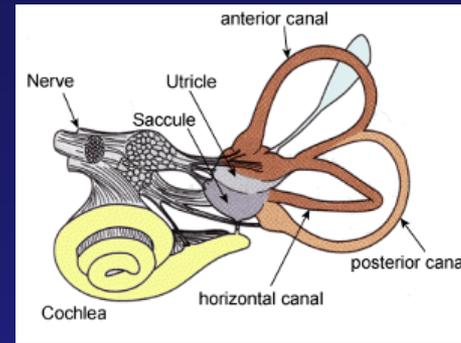
- Etiology unknown, recurrent
- Increase in volume of endolymphatic system
- RARE
- Treatment
  - Low salt diet
  - Diuretics
  - Surgery occasionally

# Peripheral Vertigo: Other Etiologies



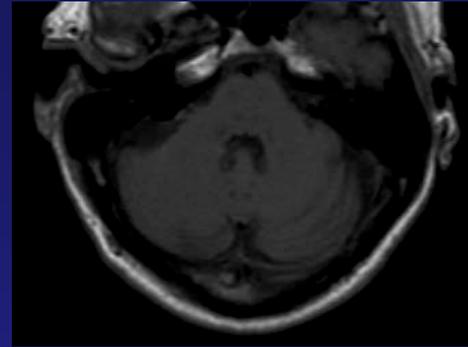
- Post-concussive labyrinthopathy
- Migraine
- Autoimmune inner ear disease
- Ototoxic drugs
- Infections (e.g. Syphilis)
- Mastoiditis
- Acoustic Neuroma

# Peripheral Vertigo: Treatment



- Specific Therapies
- Symptomatic therapies
  - Meclizine, Valium, etc.
    - Work by sedation
    - Interfere with normal compensation process
  - Antiemetics
- Vestibular rehabilitation
  - Lying in bed detrimental

# Central Vertigo: Anatomy

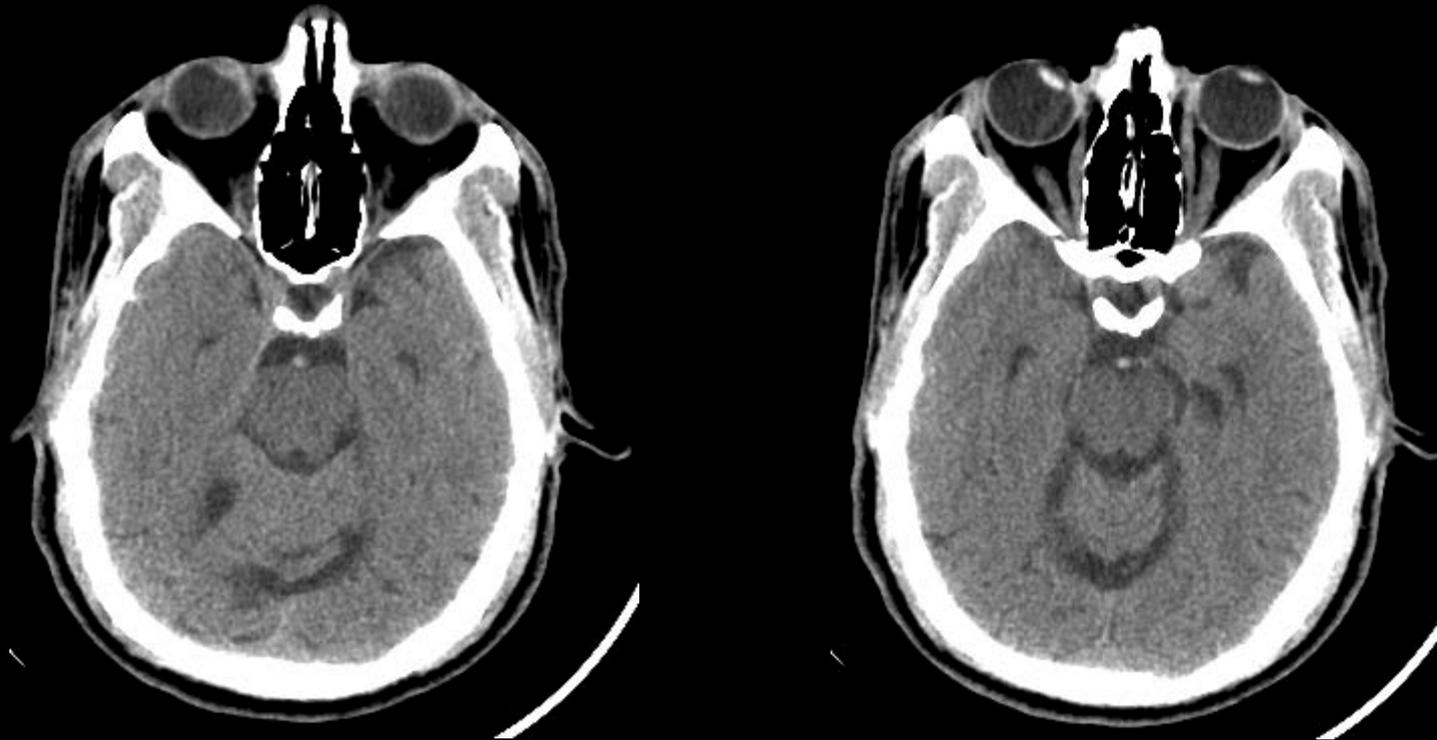


- “Cerebellar Signs”
  - 1. Cerebellum itself
  - 2. Brainstem

# Case 4

- A 30 year-old man with no PMH presents with 6 hours of vertigo. He is on no medications.
- Exam: The right pupil is 4mm and minimally reactive while the left reacts briskly 3 to 2mm. He has vertical bobbing movements of both eyes and there is no corneal response on the left.
- Motor examination is difficult, but all four extremities are moving antigravity

# CT Brain in the ED: Negative



Patient deteriorated over two hours to coma

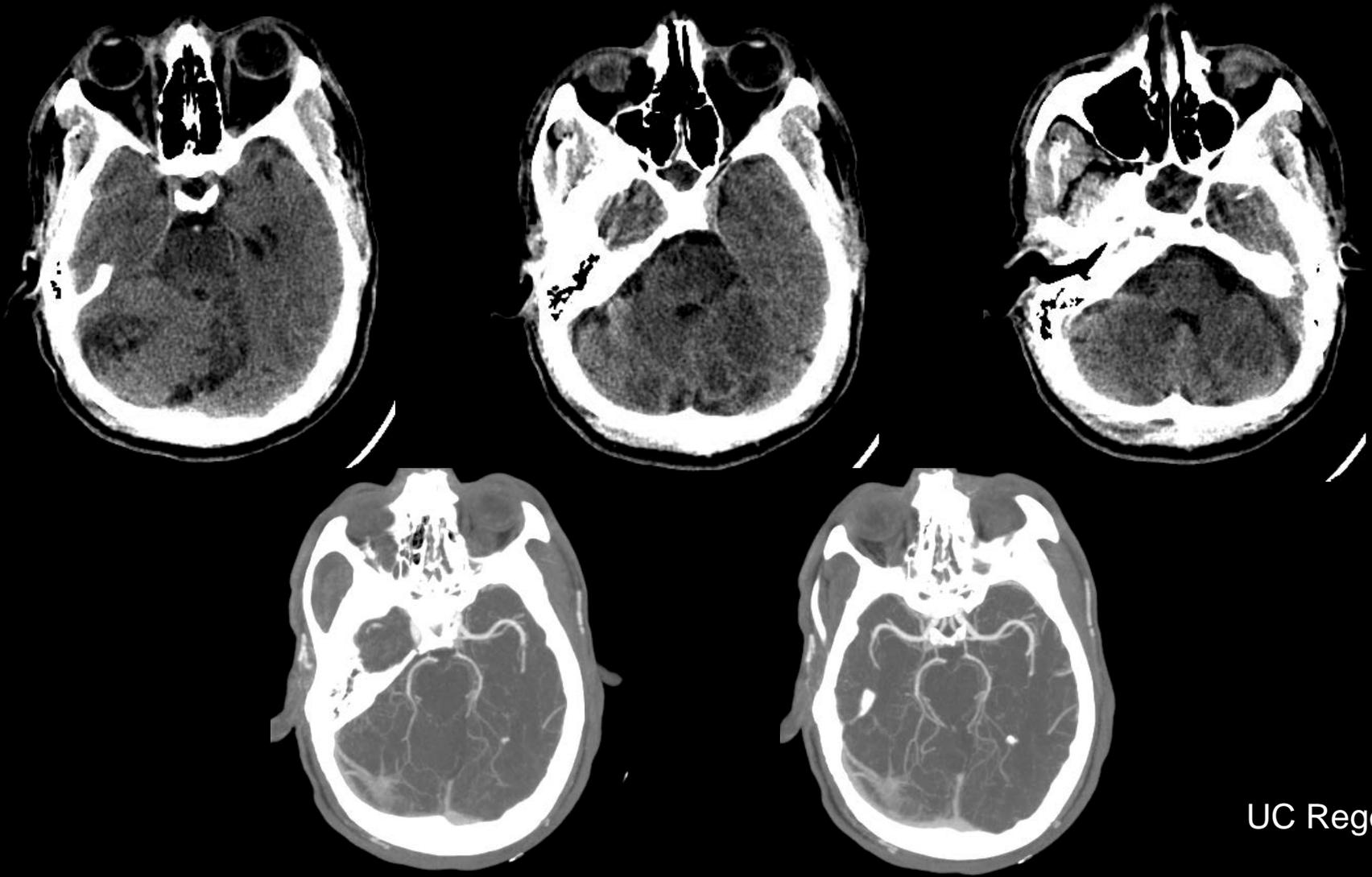
What is the most likely diagnosis?

- A. Cerebellar Stroke
- B. Basilar Artery Thrombosis
- C. GHB Ingestion
- D. Benzo overdose
- E. Migraine

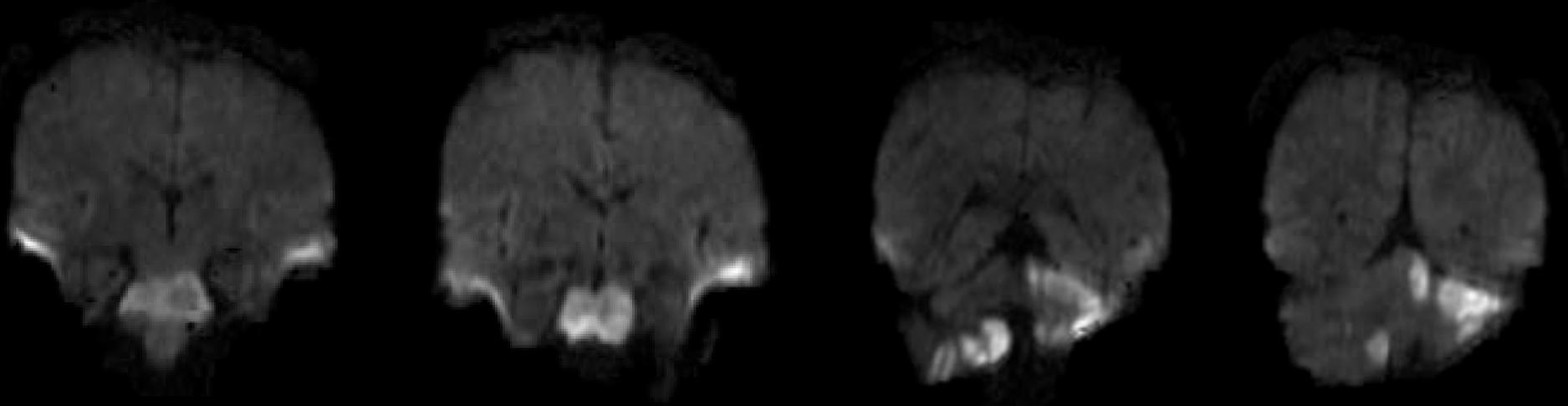
# UCSF “Stroke Protocol” CT

- Obtained at UCSF in all suspected acute stroke and TIA patients
  1. Non-contrast CT of the head
  2. CT Angiography from aortic arch/heart through Circle of Willis
  3. CT Perfusion study
  4. Post-contrast CT of the head
- Very powerful tool in vertigo investigations

# Repeat CT and CT Angiogram



# MRI Brain



Patient expired 3 days later after withdrawal of support by family

# Basilar Artery Thrombosis



- Carries a high mortality
- Common from cardioembolic disease or vertebral artery dissection (in young)
- Embolectomy successful out to 12-16 hours
- CTA can identify this and other posterior circulation occlusions/stenoses (VBI)
- Clues on exam
  - Vertigo or coma with any cranial nerve abnormalities

## Case 5

- A 65 year-old man with a history of DM, HTN presents with 1 day of imbalance and vertigo
- Examination shows right-sided homonymous hemianopia and R>L severe ataxia of the limbs with inability to walk due to imbalance. Power is normal throughout.

## Case 5 (con't)

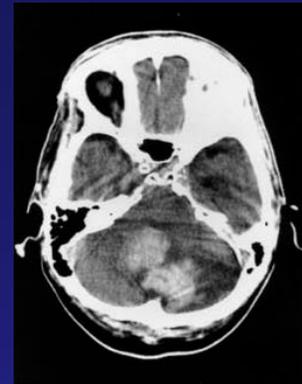
- Patient discharged from the ED
- BIBA 24 hours later after respiratory arrest at home, now in coma

# Cerebellar Ischemic Stroke



- Maximal swelling: 3-5 days
- Decompression indicated if patient decompensates
- Will only see on MRI
- “Malignant Meniere’s”
- Exam findings not to miss
  - Asymmetric cerebellar examination
  - Lack of peripheral signs in a vertiginous patient
    - Midline SCA stroke

# Cerebellar Hemorrhage



- Life-threatening emergency
- When the neurosurgeons will intervene
  - 3cm rule?
  - Patient deteriorating?
- Ventriculostomy (EVD)?
  - Concern for upward herniation

# Central vs. Peripheral: Which Imaging Modality?

- Always central, always needs imaging
  - 1. Any Cranial Nerve Lesion
    - Think Brainstem: CT/CTA or MRI needed
  - 2. Any Asymmetric Cerebellar Finding
    - Think Cerebellum
      - Non contrast CT can exclude hemorrhage
      - MRI needed if CT negative
  - 3. Complete Absence of Peripheral Signs
    - Think midline cerebellum: MRI needed

# Take Home Points

- Two major questions
  - What do you mean by Dizzy?: History Key
  - Central or Peripheral?: Exam key
- Demystify nystagmus exam
- Vestibular Neuronitis and BPPV are common
- Imaging indications for central vertigo
  - Brainstem Abnormal: Basilar Artery Thrombosis
  - Cerebellar Exam Asymmetric: Cerebellar Stroke/ICH