The Difficulty With Dizziness

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Objectives

1. **Discuss why finding the diagnosis of stroke in patients with dizziness is so difficult.**
2. **Learn the pitfalls of categorizing dizzy patients.**
3. **Introduce the *TiTrATE Approach* of diagnosing dizziness.**
4. **Learn to perform a focused neurologic exam to identify a posterior circulation stroke.**
5. **Debunk 7 common myths about dizziness.**

Dizziness Statistics

- **COMMON 3% of all ED visits**
- **EXPENSIVE Annual US costs = $4 billion**
- **ELDERLY affected most (5% ED visits)**
  - **Peaks in 70s & 80s**

Dizziness Statistics

Compared to controls dizzy patients have:

- **More cardiac monitoring (19% vs. 9%)**
- **More EMS arrival (24% vs. 17%)**
- **Longer ED stay (4 vs. 3 hrs)**
- **More CT/MRI (18% vs. 7%)**
- **Higher admission rate (24% vs. 13%)**

Why is dizziness so difficult?

Reason # 1

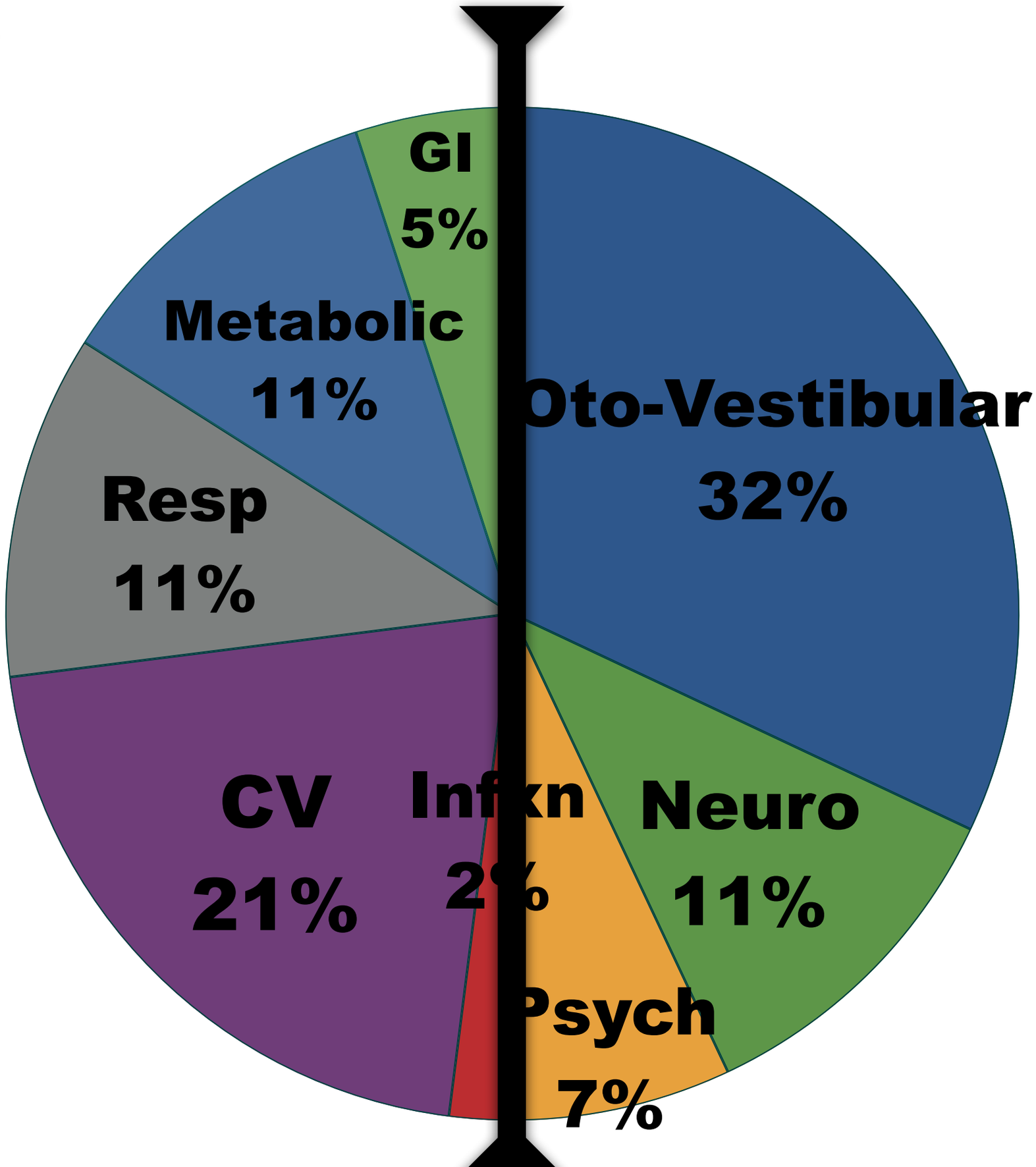
Differential Diagnosis is HUGE

Vestibular/otologic	Benign paroxysmal positional vertigo Traumatic: following head injury Infection: labyrinthitis, vestibular neuronitis, Ramsay Hunt syndrome
Systemic conditions with vestibular/otologic effects	Ménière's syndrome Neoplastic Vascular Otosclerosis Paget's disease Toxic or drug-induced: aminoglycosides
Neurologic	Vertebrobasilar insufficiency or vertebral artery dissection Lateral Wallenberg's syndrome Anterior inferior cerebellar artery syndrome Neoplastic: cerebellopontine angle tumors Cerebellar disorders: hemorrhage, degeneration Basal ganglion diseases Multiple sclerosis Infections: neurosyphilis, tuberculosis Epilepsy Migraine headaches Cerebrovascular disease
General	Hematologic: anemia, polycythemia, hyperviscosity syndrome Toxic: alcohol Chronic renal failure Metabolic: thyroid disease, hypoglycemia

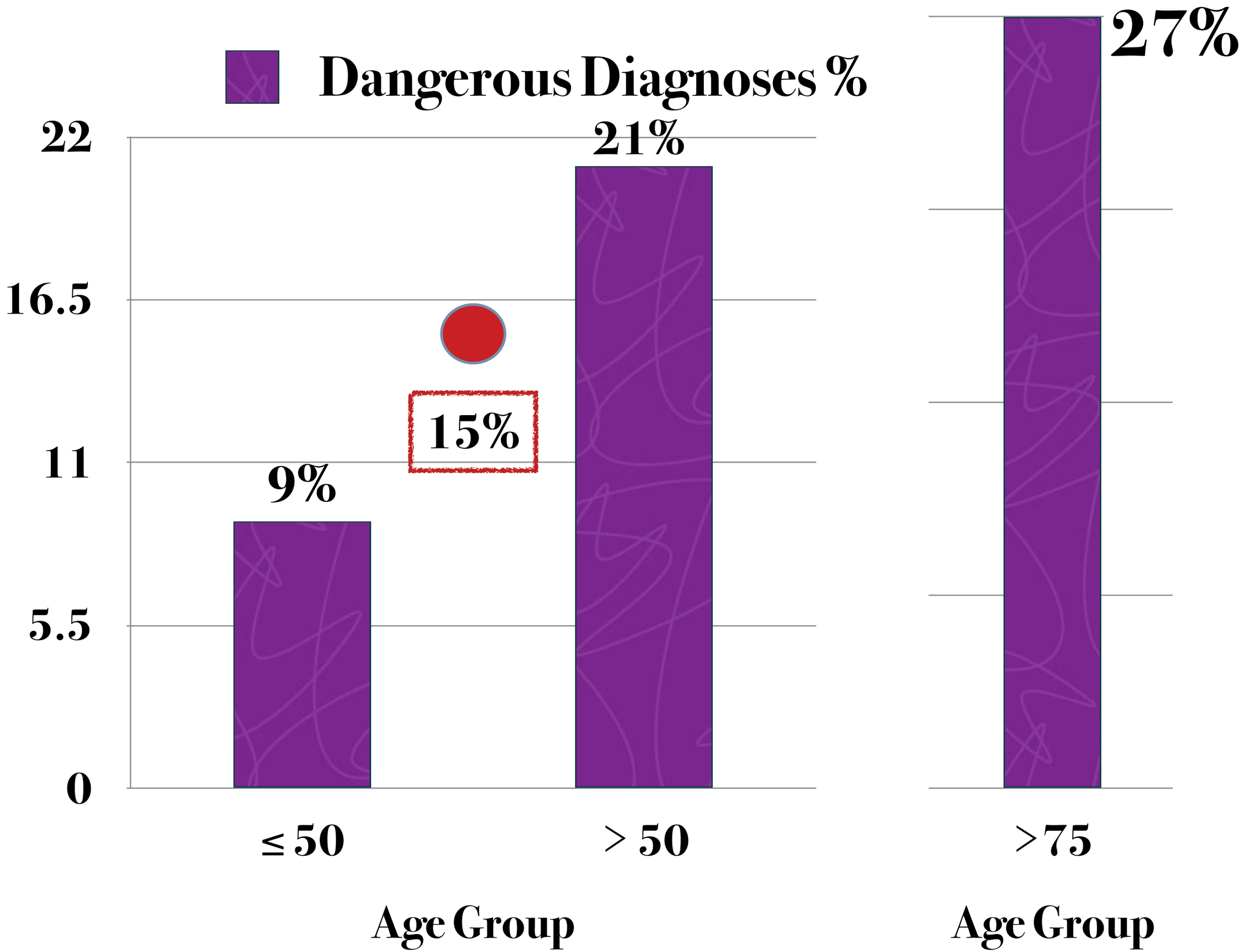
Spectrum of Dizziness Visits to US EDs

Mayo Clin Proc 2008

- **9472 dizzy cases**
- **13 years**
- **~50% causes are medical**



Spectrum of Dizziness Visits to US EDs Mayo Clin Proc 2008



Spectrum of Dizziness Visits to US EDs Mayo Clin Proc 2008

Top 10 Dangerous Causes

1. Electrolyte D/O
2. Arrhythmia
3. TIA (1.7)

4. Anemia
5. Hypoglycemia
6. Angina
7. MI
8. CVA/ICH (0.5)

9. CO
10. SAH/Aneurysm/ Dissection (0.1)

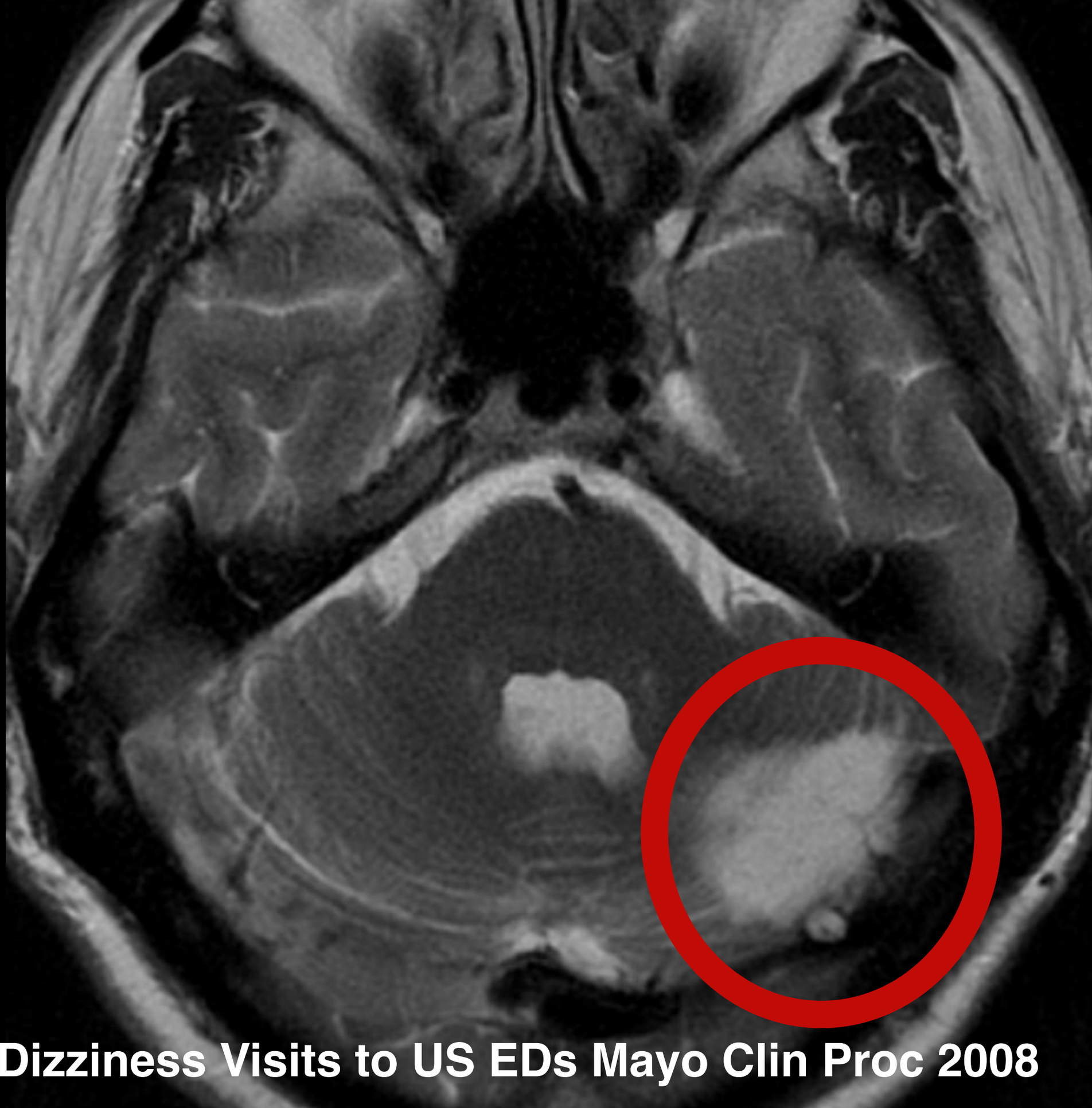
<2% of dizzy patients had a neurologic emergency

Reason # 2

The proportion of stroke in dizzy patients is tiny.

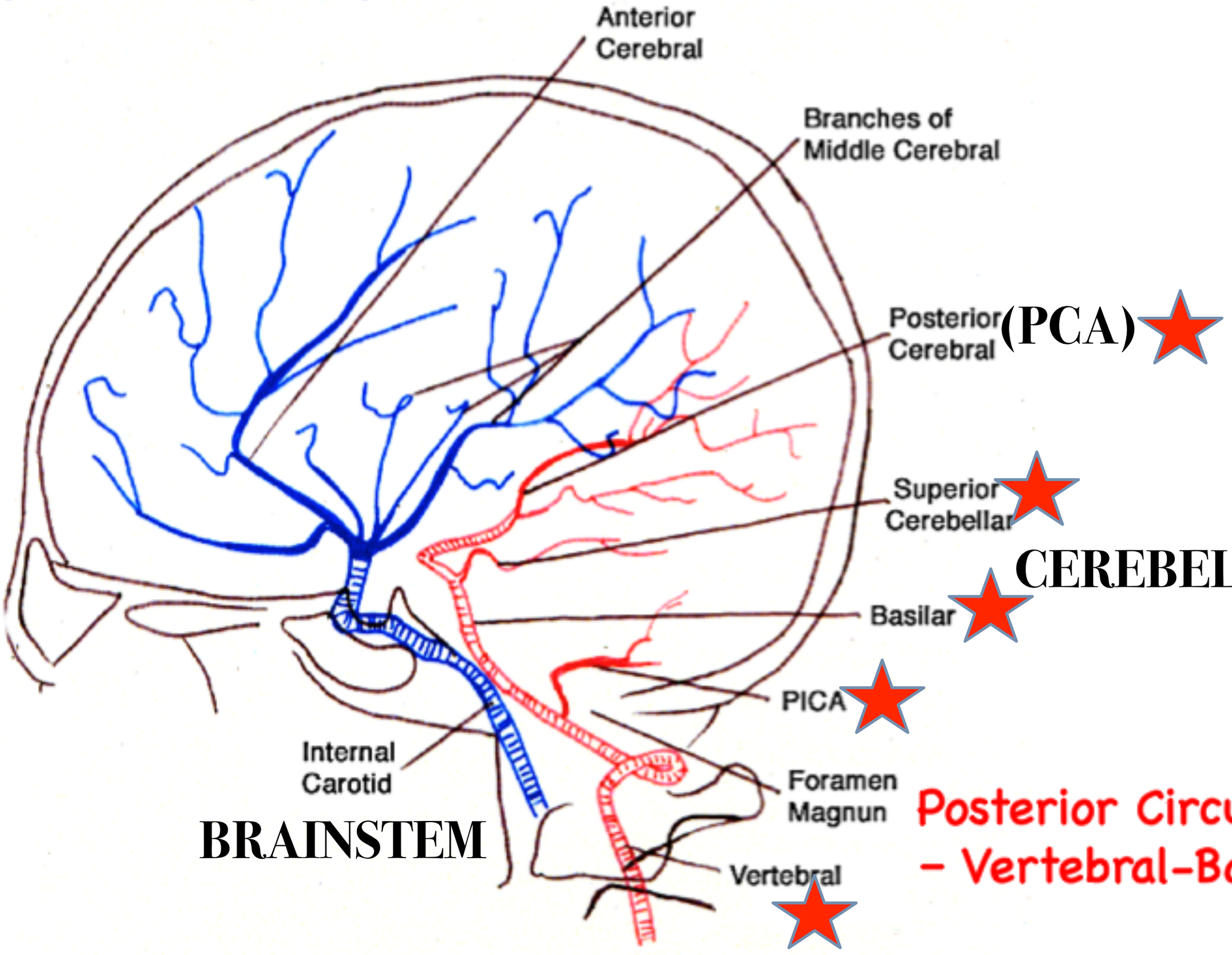
CVA/ICH (0.5)

SAH/ Aneurysm/ Dissection (0.1)



Spectrum of Dizziness Visits to US EDs Mayo Clin Proc 2008

Anterior Circulation
– from Internal Carotid



Posterior Circulation
– Vertebral-Basilar

The concern is real

- **Posterior circulation strokes missed > 2X as often as anterior.**
- **28-59% cerebellar strokes misdiagnosed in ED.**
- **Misdiagnosis can result in significant harm**

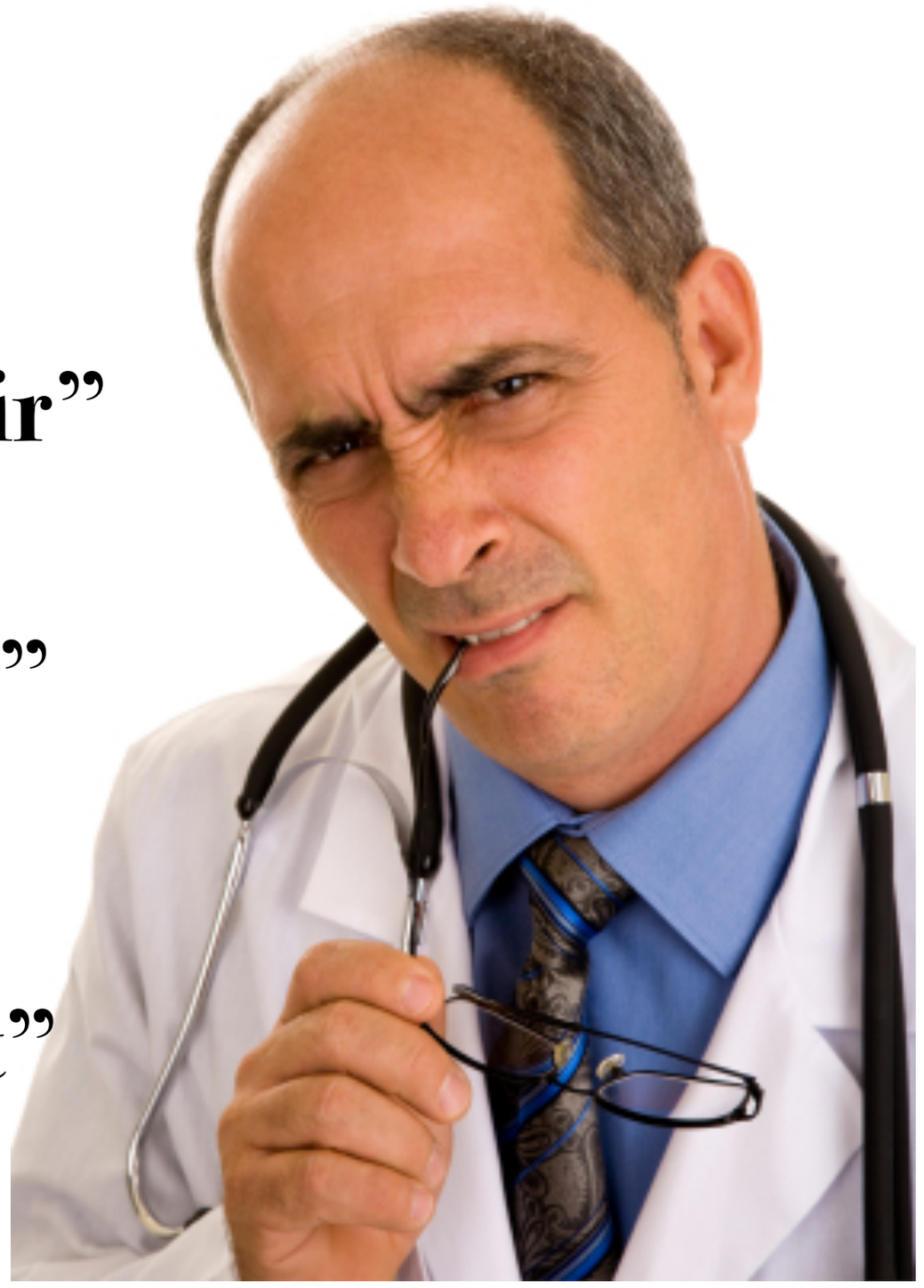
Reason # 3

History is **widely** variable!

"Walking on air"

"Disoriented"

"May pass out"



"Swaying"

"Lightheaded"

"I may fall"

"Woozy"


Co-Executive Producer
DAVID FOSTER
4:00

“Symptom Quality” approach

Neurology

Volume 22 • Number 4

An approach to the dizzy patient

David A. Drachman, M.D., and Cecil W. Hart, M.D.

"What do you mean by dizzy?

1. VERTIGO	2. SYNCOPE	3. DISEQUILIBRIUM	4. ALL OTHERS
Vestibular	Cardiac	Neuro	Psych/Other
Meclizine Epley F/U ENT	EKG Labs IVF Admit?	Neuro exam CT CVA W/U	Labs EKG IVF

Pitfalls of categorizing patients

1.Patients usually fall into >1 CATEGORY

or sometimes NO category??!!

Amer J Med 12/2017

Dizziness Symptom Type Prevalence and Overlap: A US Nationally Representative Survey

3000 dizzy patients

6 CATEGORIES

Off balance Unsteady 61%	Lightheaded 49%	Passing out Fainting 40%	Spinning Vertigo 37%	Floaty Tilting 25%	Blurred vision moving head 24%

61% Multiple Types

Average # Dizzy Symptoms = 2.4

Pitfalls of categorizing patients

1. Patients usually fall into >1 CATEGORY
2. Leads to ANCHOR BIAS…wrong tests, exam, treatment, & disposition

VERTIGO	SYNCOPE	DISEQUILIBRIUM	LIGHTHEADED ALL OTHERS

Cardiac

EKG
Labs
IVF
Admit?

Pitfalls of categorizing patients

1. **Patients usually fall into >1 CATEGORY**

2. **Leads to ANCHOR BIAS…wrong tests, exam, treatment, & disposition**

3. **Does not account for TIMING, TRIGGERS & CONTEXT.**

- **Timing**
- **Triggers**
- **Context**

Historical Red Flags

- Abrupt HA/Neck pain
- Trauma
- Hearing Loss
- Vascular risk factors
- Other neuro symptoms:
  - Diplopia
  - Vision Loss
  - Facial droop


EMERGENCY

New Diagnostic Paradigm

TiTrATE

Timing

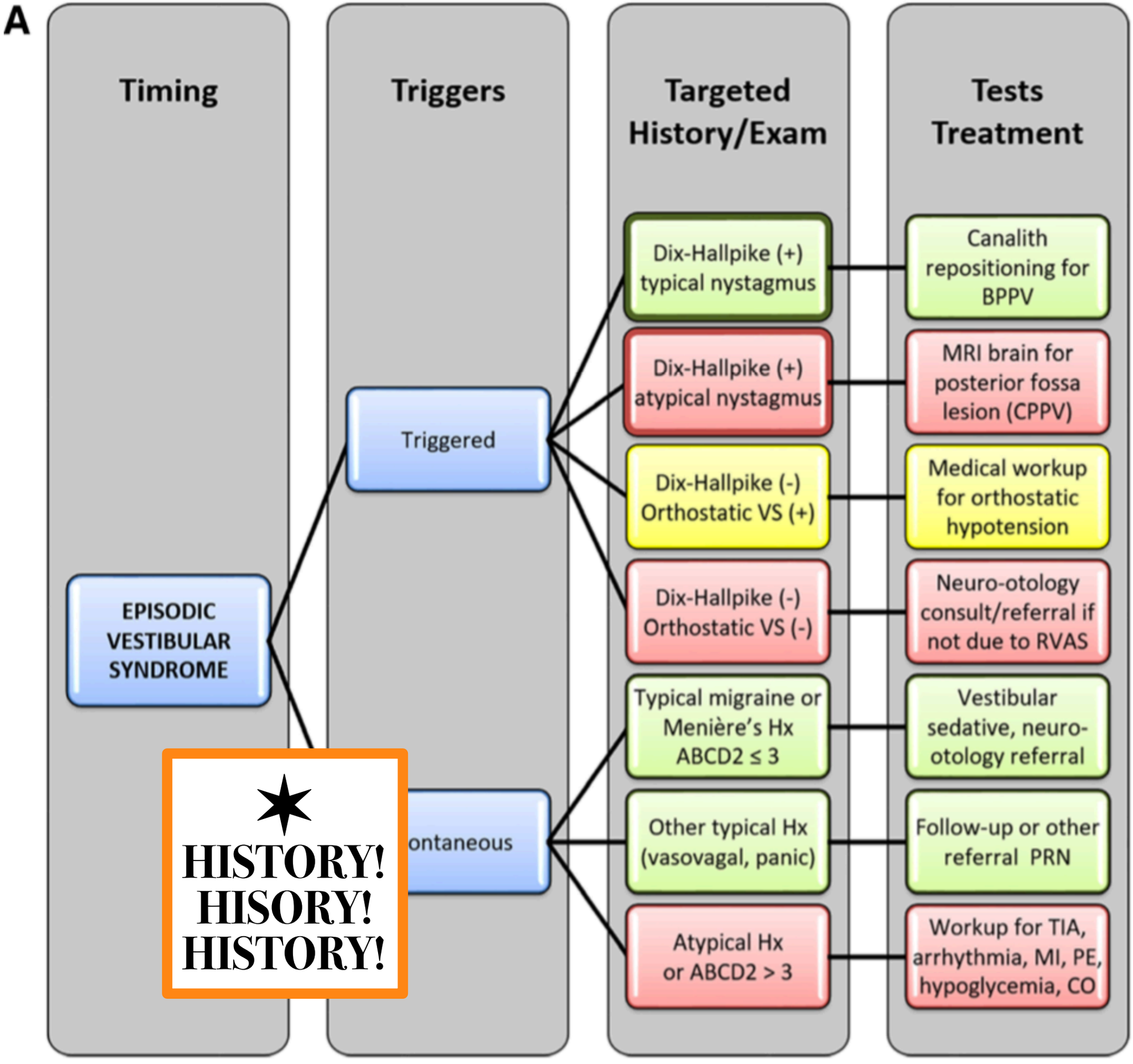
Triggers

And

Targeted **E**xam

“Diagnosing Stroke in Acute Dizziness and Vertigo. Pitfalls and Pearls.” Stroke, March 2018.

4 Syndromes	😐Benign	☹️Dangerous 😯
t-EVS < 1 min.	Orthostatics BPPV	CVA/ICH near 4th ventricle Mass
s-EVS min-hrs	Migraine Meniere Vasovagal, Panic	MOST TIAs Cardioresp. Endocrine
t-AVS	Trauma Toxins	Secondary pathology
s-AVS	Vest neuritis Labyrinthitis	MOST CVAs



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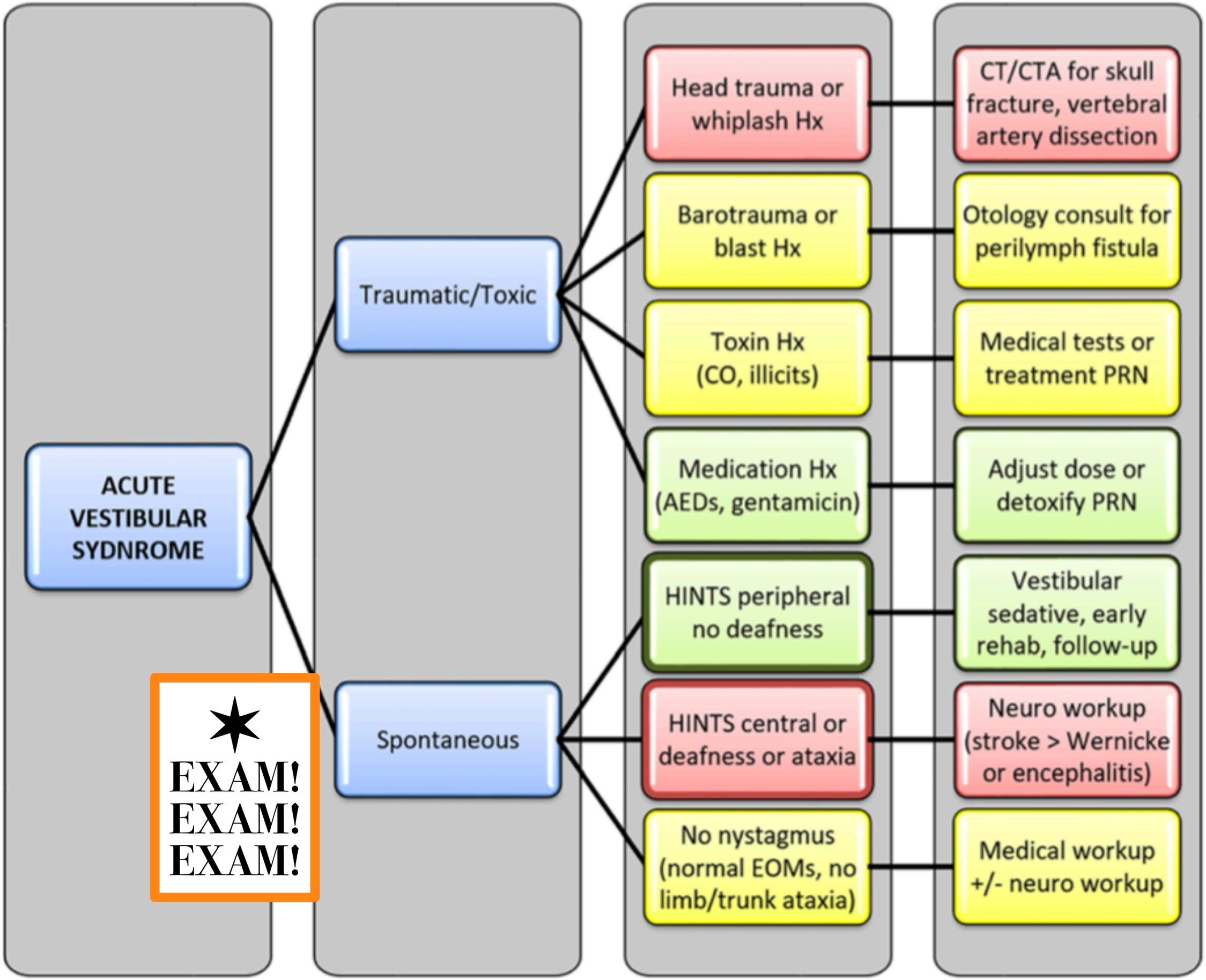


"Diagnosing Stroke in Acute Dizziness and Vertigo. Pitfalls and Pearls." Stroke, March 2018.

Symptoms Present in ED?

NO

YES

Not dizzy at rest
(EVS)

Orthostatics
Dix Hallpike

\+

−

t-EVS

s-EVS

Need
AWESOME
HISTORY

Continuous dizziness
AVS

1. Nystagmus
   - vertical/downbeat
   - direction changing
2. HINTS
3. Dizzy Neuro Exam

\+

CVA workup

Symptoms Present in ED?

YES

Continuous dizziness
AVS

1. Nystagmus
   - vertical/downbeat
   - direction changing
2. HINTS
3. Dizzy Neuro Exam

\+

CVA workup

1. Nystagmus
   - vertical/downbeat
   - direction changing
2. HINTS
3. Dizzy Neuro Exam

+

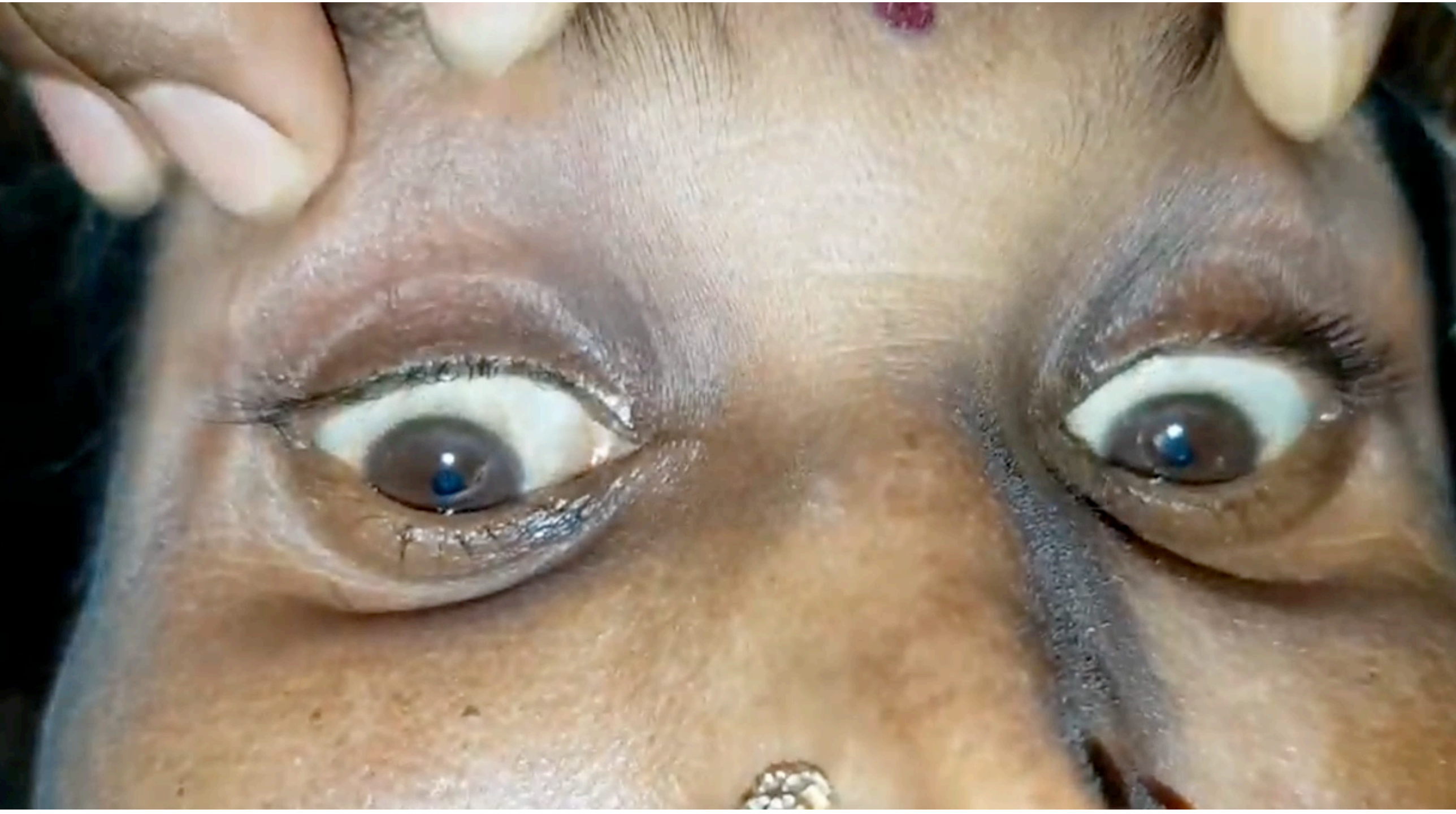
CVA workup

- name for fast beat
- look 15-20°

Practice Identifying Nystagmus

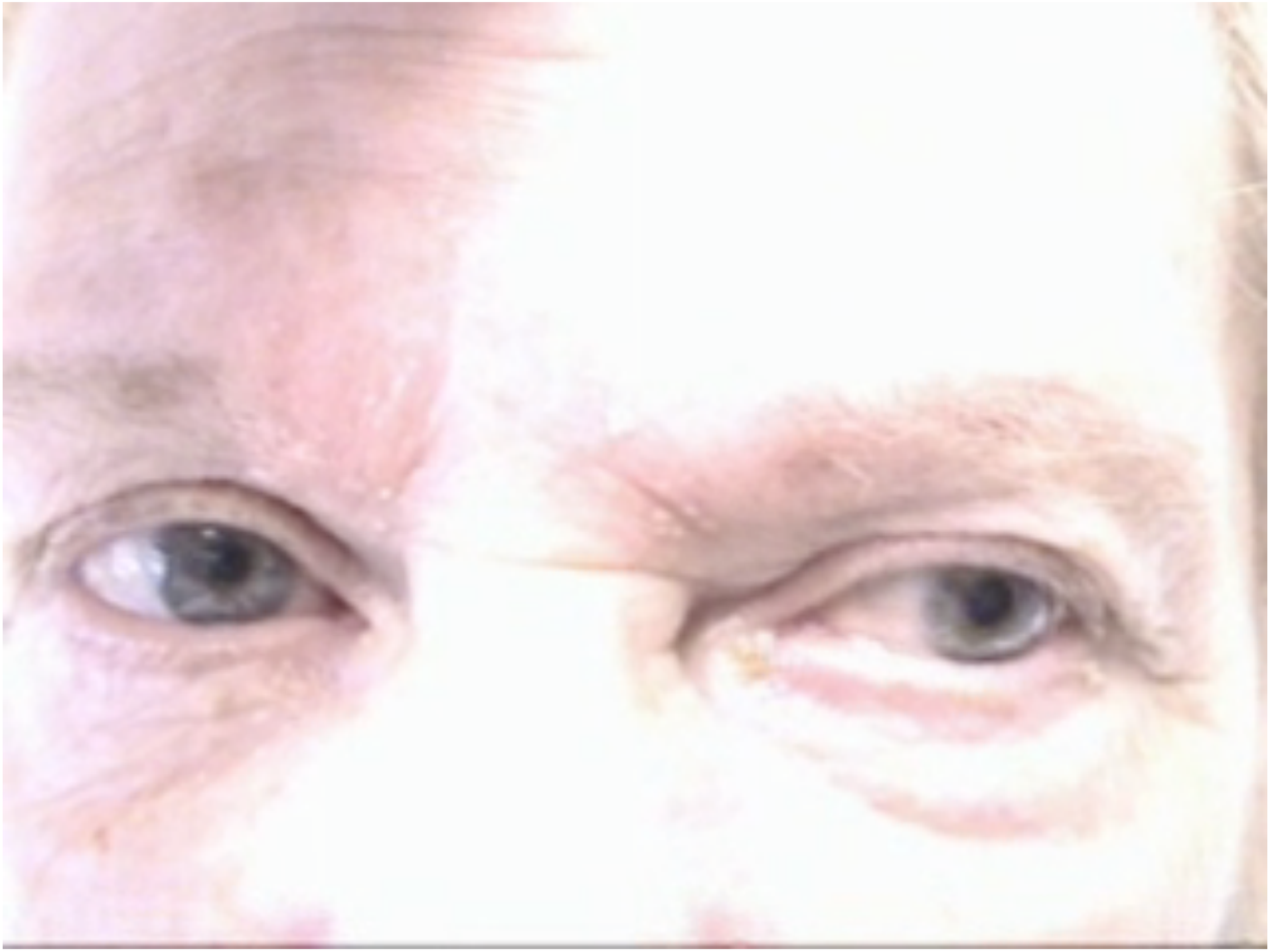
https://youtu.be/LxD-lgqix-s?t=241

Practice Identifying Nystagmus



https://youtu.be/APLe2GKxtHE?t=10

Practice Identifying Nystagmus



Symptoms Present in ED?

YES

Continuous dizziness
AVS

1. Nystagmus
   - vertical/downbeat
   - direction changing
2. HINTS
3. Dizzy Neuro Exam

\+

CVA workup

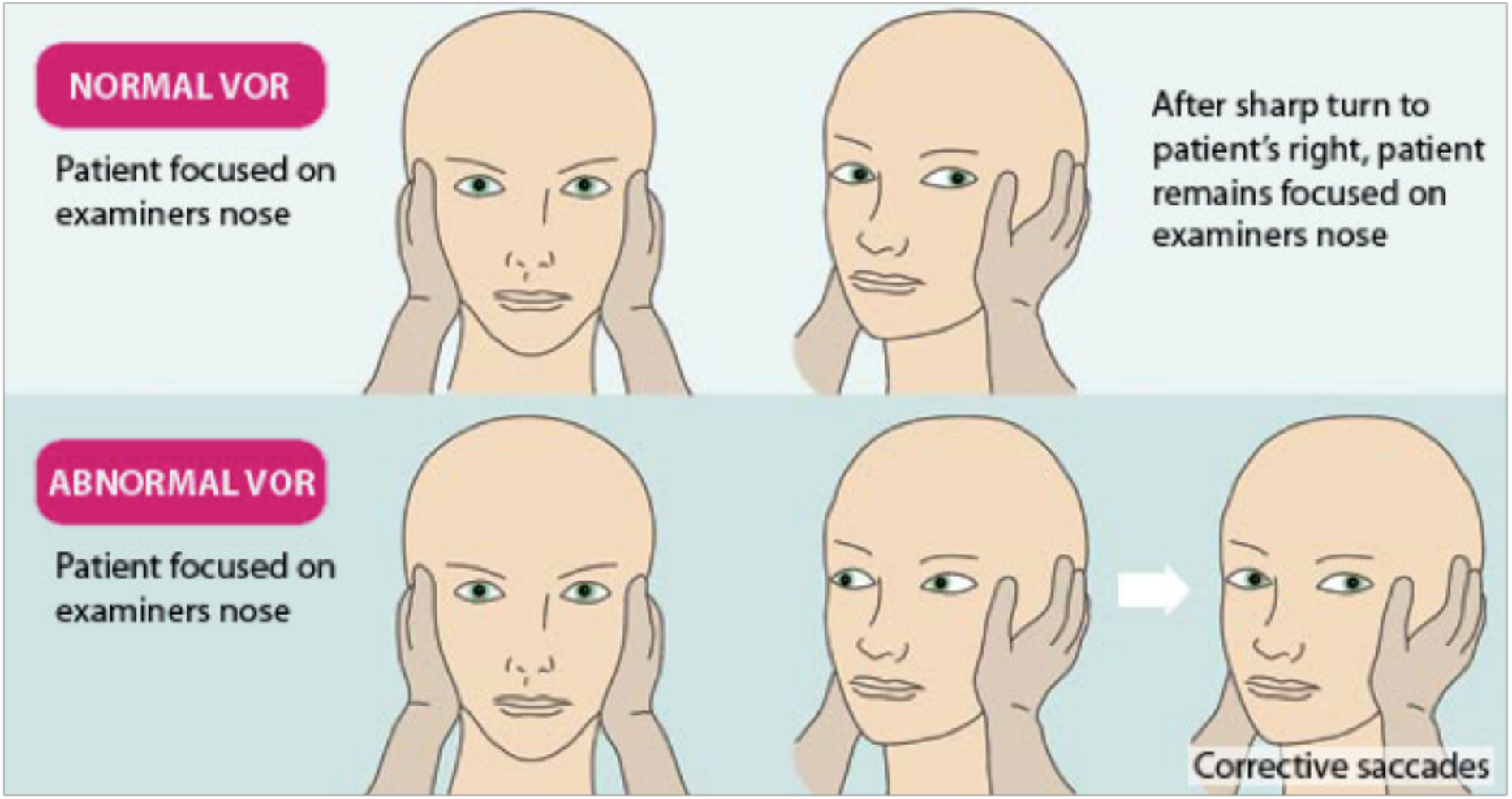
1. Nystagmus
   - vertical/downbeat
   - direction changing
2. HINTS
3. Dizzy Neuro Exam

+

- Introduced 2009
- No studies of EPs performance success
- EPs report HINTS use at 30%
  - only 16% confidence in use

CVA workup

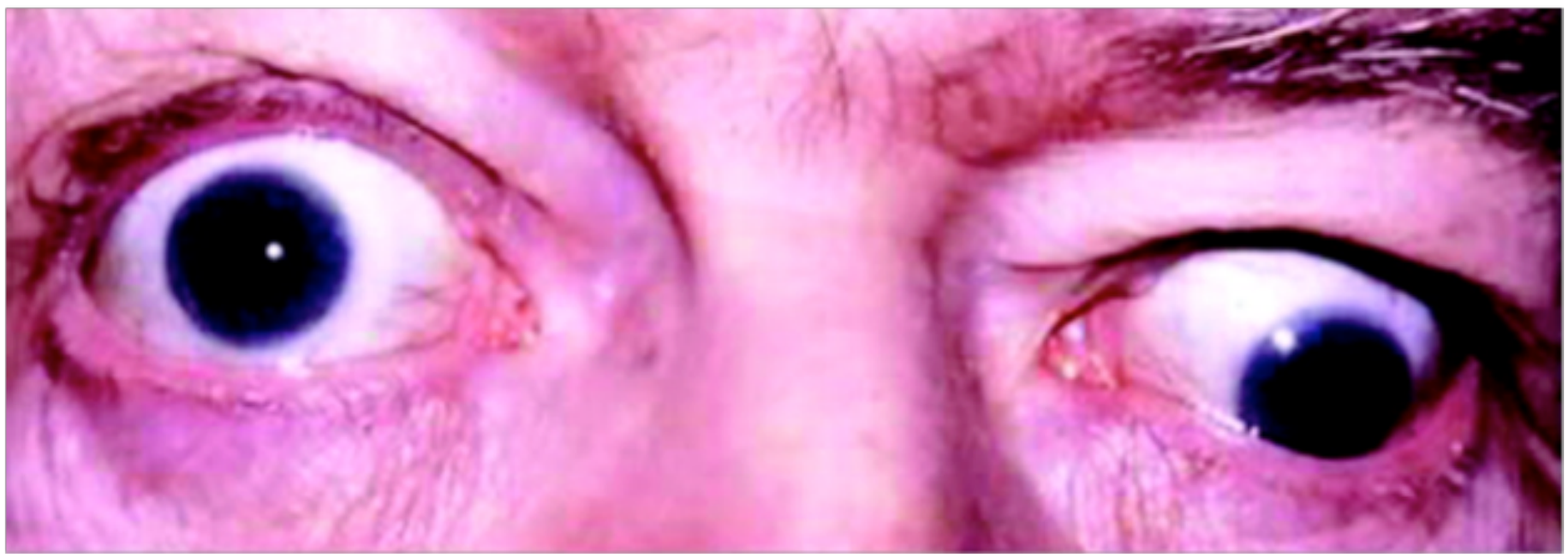
"Emergency Physician Attitudes, Preferences, and Risk Tolerance for Stroke as a Potential Cause of Dizziness Symptoms" *WestJEM* 10/2015 Volume 10, Issue 5



Head

Impulse Test

Nystagmus



Test of

Skew

First 48 hrs

MRI misses 12-20% Posterior CVA
Physical exam outperforms MRI

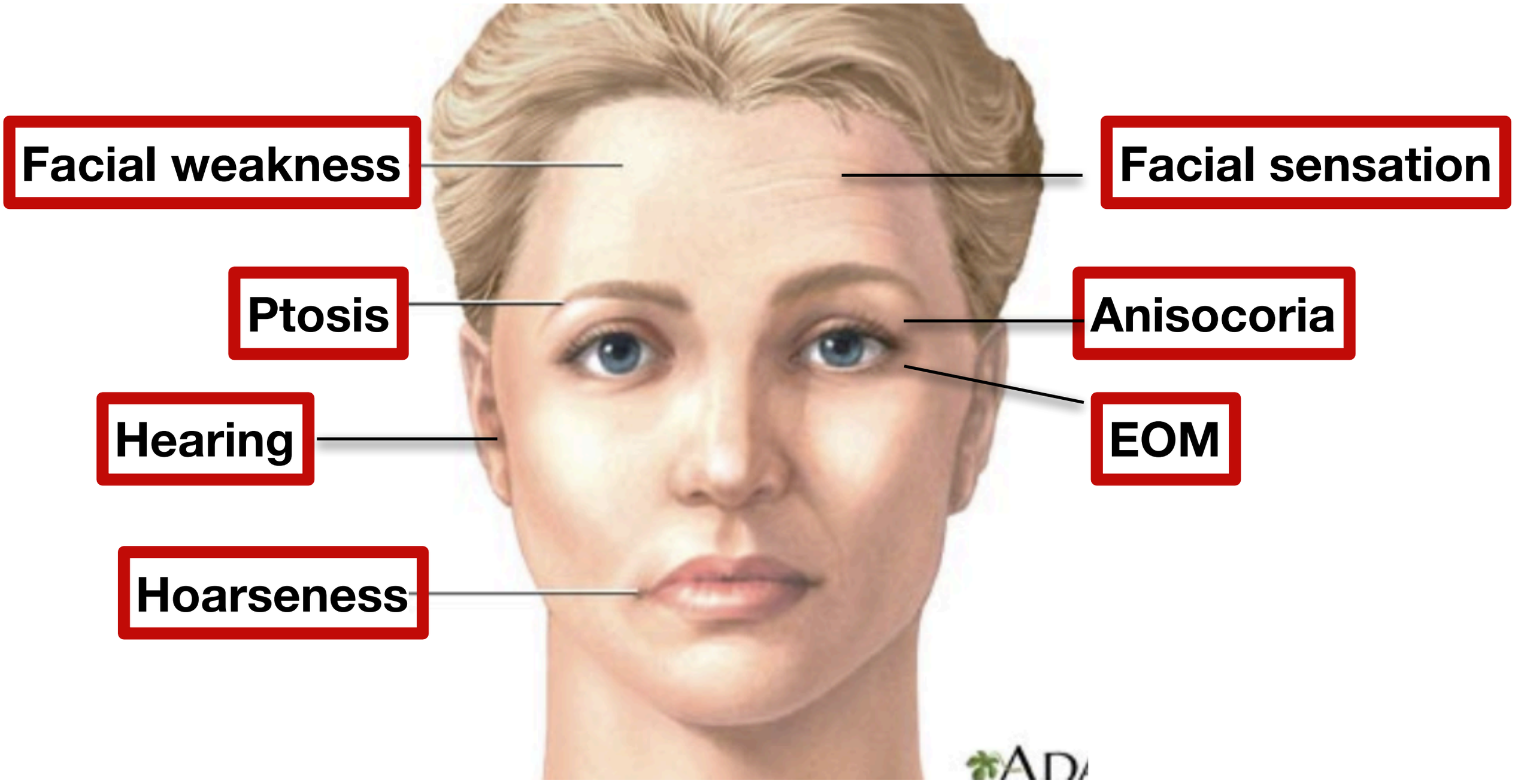
1. Nystagmus
   - vertical/downbeat
   - direction changing
2. HINTS
3. Dizzy Neuro Exam

+

CVA workup

Brainstem & Cerebellum Exam	Posterior CVA locations
1. Hearing	AICA CVA
2. EOM	Diplopia=central cause
3. Ptosis	Horner's, Lateral medullary CVA
4. Anisocoria	Horner's, Lateral medullary CVA
5. Facial weakness	Brainstem CVA
6. Facial sensation	Lateral medullary CVA
7. Hoarseness	Lateral medullary CVA
8. Limb ataxia	Cerebellar CVA
9. Truncal ataxia	Cerebellar/Brainstem CVA
10. Gait ataxia	Cerebellar/Brainstem CVA

Focused Neurologic Exam



Ataxia

1. Limb

Ataxia

2. Truncal

3. Gait

ILLOGICAL!

25% dizzy patients get CT

7-16% Sensitivity AIS

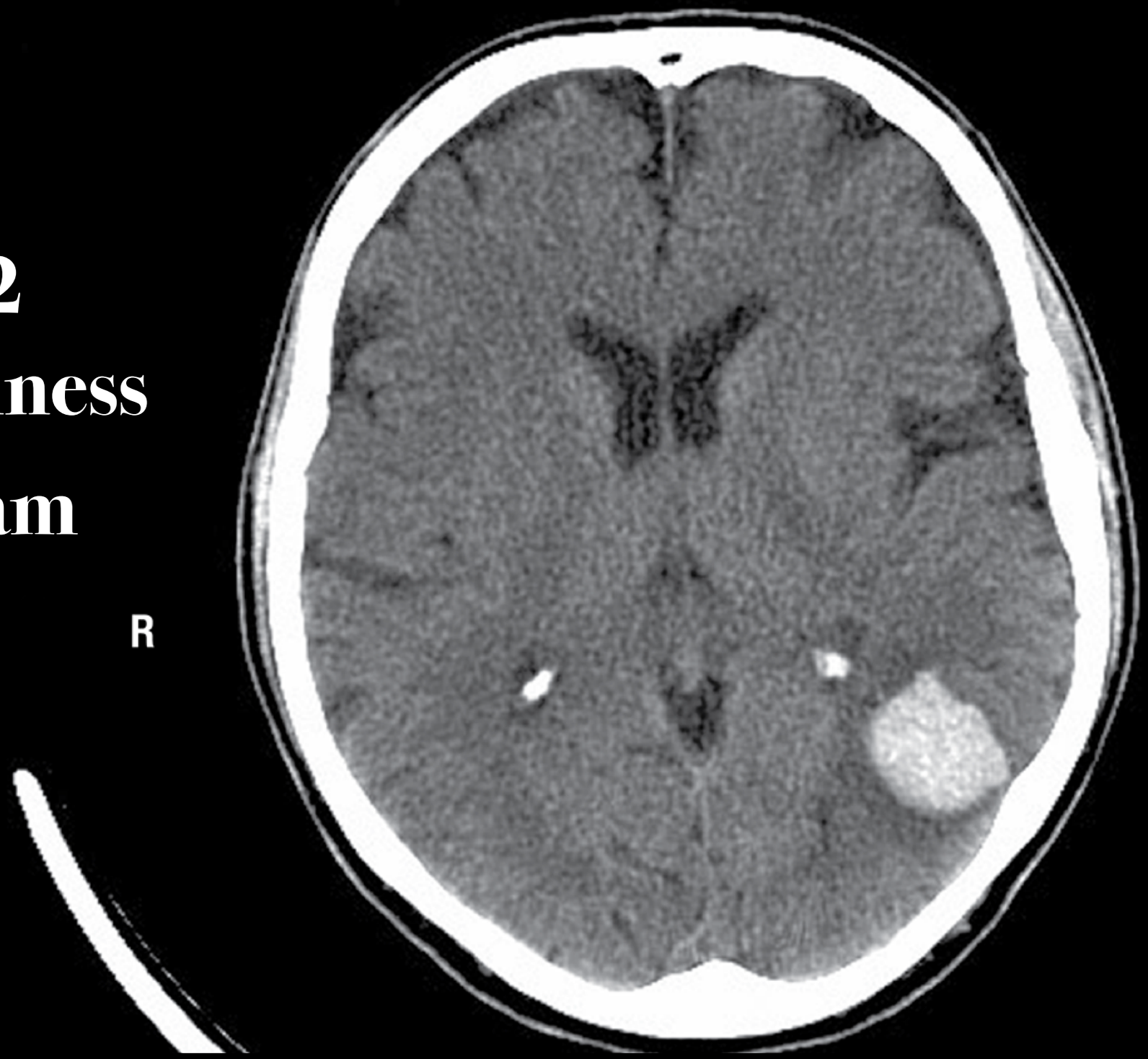
Dizziness + ICH

595 ICH

12% NIH <2

2.2% C/C Dizziness

0 Normal Exam



Does ICH mimic benign dizziness presentations? A population based study. Emerg Med J 2012: 29: 43-46.

Most SENSITIVE for posterior stroke

EXAM 100%

MRI 88%

CT 16%

7 Myths about Stroke in Dizzy Patients

1. If symptoms are worse with head movement it must be peripheral.

2. Hearing loss means peripheral cause.

3. Dizzy stroke patients will have limb ataxia or other focal neuro findings.

4. CT is useful to search for acute posterior fossa CVA.

5. Negative MRI rules out CVA.

6. Vestibular migraine should be diagnosed if headache accompanies dizziness.

7. CT is needed to rule out cerebellar hemorrhage in patients with isolated acute dizziness.

Summary

1. **A small % of dizzy patients have stroke but we do not want to miss this diagnosis.**
2. **Using the TiTrATE approach can help you find the cause of dizziness.**
3. **History and examination are the most sensitive means to detect posterior CVA.**
   - **Nystagmus➜ HINTS➜ Face/Voice/Ataxia**

References

1. Edlow, Jonathan, A. "A New Approach to the Diagnosis of Acute Dizziness in Adult Patients." EM Clin N Am 34 (2016).

2. Newman-Toker, DE, et al. "Spectrum of Dizziness Visits to US Eds: Cross-Sectional Analysis From a Nationally Representative Sample." Mayo Clin Proc. July 2008; 83 (7): 765-775.

3. Superior Cerebellar CVA pic: Case courtesy of Dr Roberto Schubert, Radiopaedia.org, rID: 23819

4. Edlow, Jonathan A. "Diagnosing Patients With Acute-Onset Persistent Dizziness." Annals of Emergency Medicine, May 2018.

5. Saber Tehrani, et al. "Diagnosing Stroke in Acute Dizziness and Vertigo. Pitfalls and Pearls." Stroke, March 2018.

6. https://westjem.com/original-research/emergency-physician-attitudes-preferences-and-risk-tolerance-for-stroke-as-a-potential-cause-of-dizziness-symptoms.html