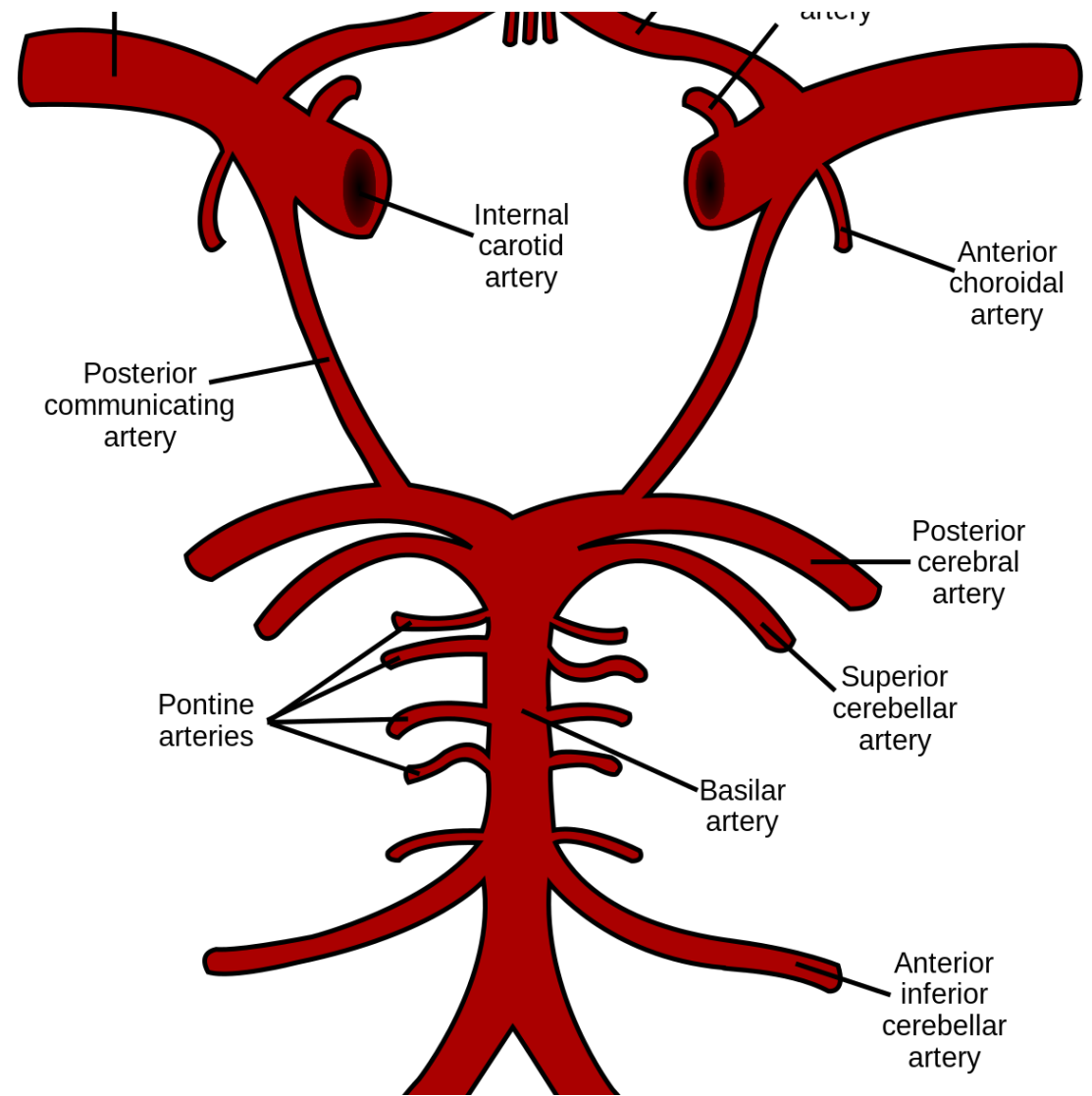


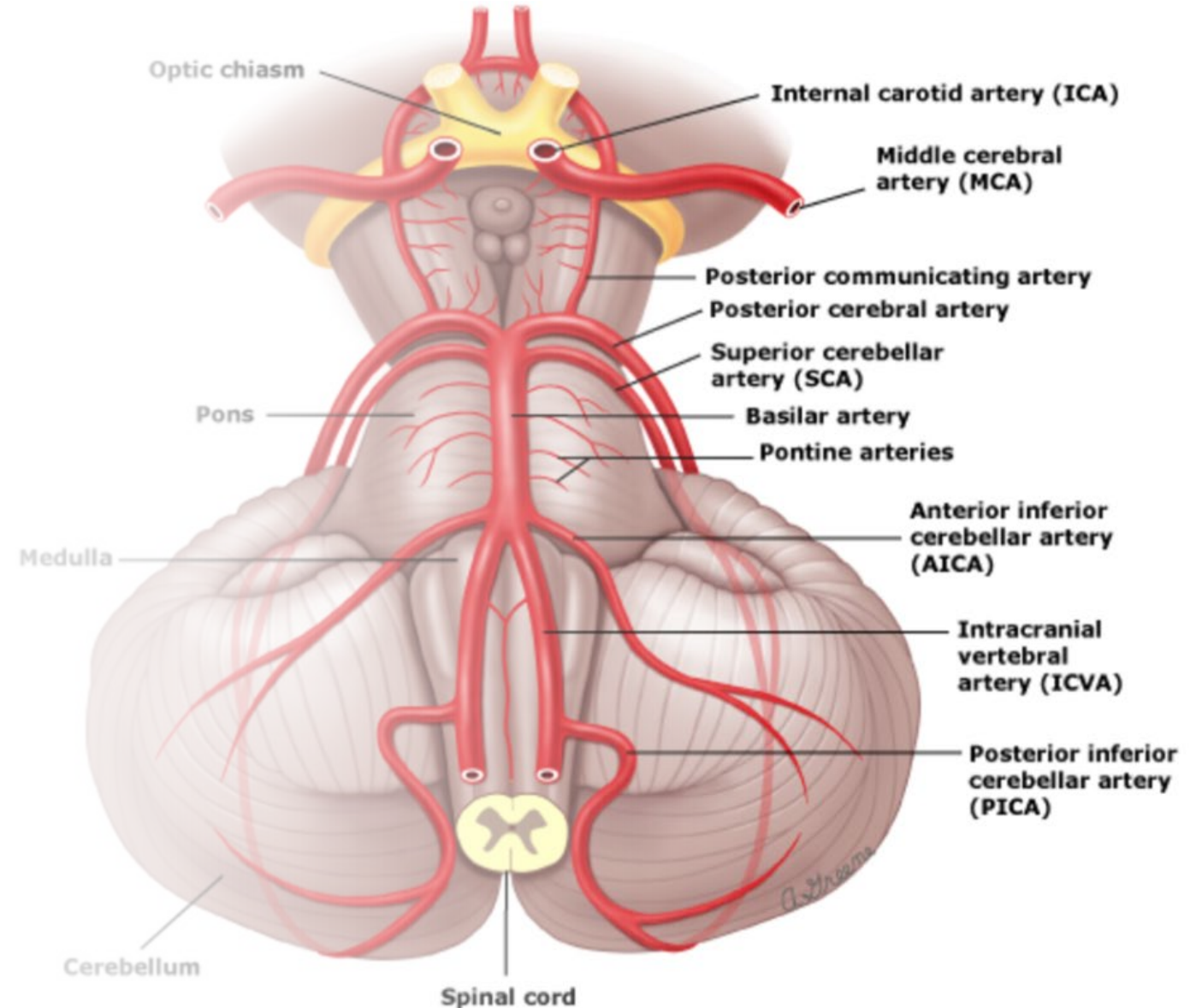
Posterior Circulation Stroke


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Posterior Circulation Stroke

- A clinical syndrome associated with ischemia related to stenosis, in situ thrombosis or embolic occlusion of the posterior circulation arteries (vertebral arteries, basilar arteries, posterior cerebral arteries)
- 20 - 25% of all ischemic strokes
- Many times posterior strokes are initially misdiagnosed or remain undiagnosed resulting in a delay to reperfusion therapy
- Misdiagnosis of posterior circulation strokes presenting with **dizziness** is common, occurring in up to 35% of cases
- Basilar artery occlusion is associated with high mortality and severe disability (eg. Locked in syndrome)





Clinical Presentation of Posterior Circulation Strokes

- Dizziness
- Dysphagia
- Dysarthria
- Diplopia (double vision)
- Dysmetria (ataxia)
- Alteration in consciousness
- Vision loss
- Weakness
- Numbness

Background

- Dizziness accounts for about 3-5% of visits across care settings
- In the US, this translates to 10 million ambulatory visits per year, with about ¼ of these visits to emergency rooms
- Differentiating peripheral etiology vs central etiology of stroke is difficult

Clues to Central Pathology of "Dizziness"

- HINTS examination
 - Head Impulse – a catch up saccade is GOOD!
 - Nystagmus – if unilateral and horizontal - ok; but if rotary, sustained, bidirectional it's concerning
 - Test of vertical skew – Never good
- Any other associated symptoms?
 - Facial droop
 - Difficulty speaking or swallowing
 - Incoordination
 - Hearing loss
 - Visual disturbance

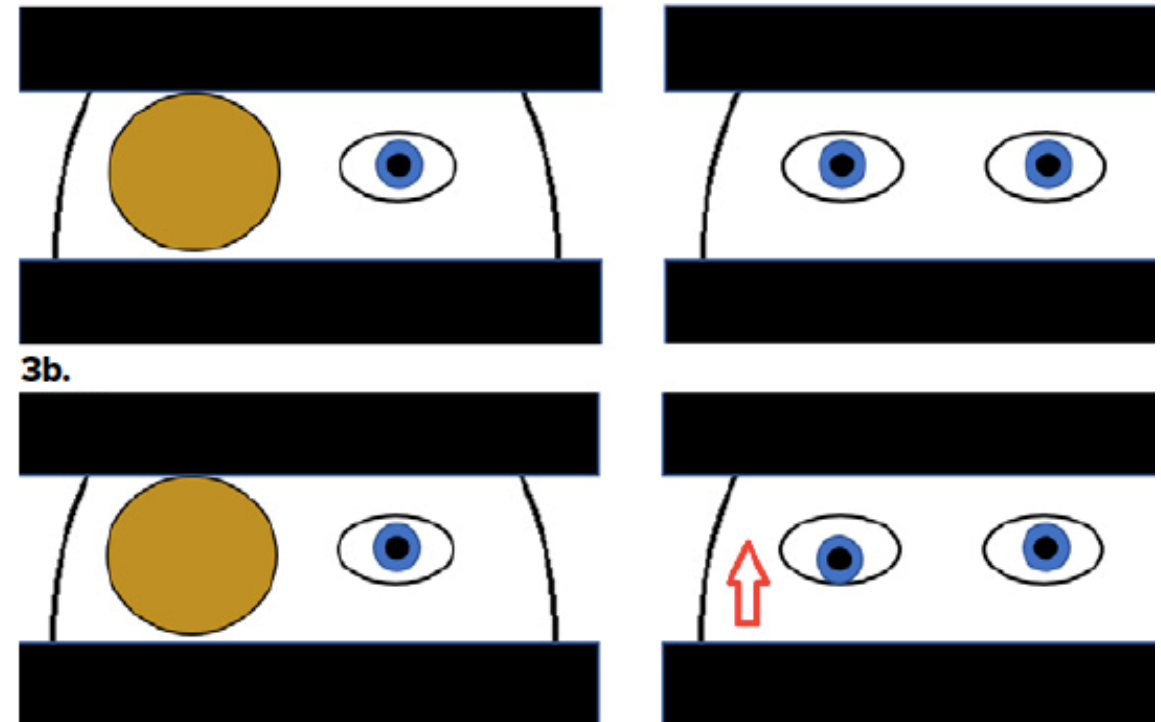


FIGURE 3. A test of skew with no vertical skew (3a) compared to one with a vertical skew that begins to correct when the eye is uncovered (3b).

	Peripheral	Central
Head Impulse	Saccade	No saccade
Nystagmus	Unidirectional	Bidirectional
Test of Skew	No skew	Vertical skew

CASE 1

June 12, 2020

Clinical Presentation

- 44 y.o. woman who presents with **dizziness** and weakness
- She reports that she was bending down to pick up her shoe when she became acutely dizzy, fell to her right side, hit her head but did not lose consciousness.
- On EMS arrival she was diaphoretic, nauseated and had an episode of vomiting.
- She felt that her right side was weak at that time, although this resolved prior to arrival.
- On arrival she is **persistently dizzy**... nothing seems to make the dizziness better or worse. It is associated with a right-sided headache. She reports the headache has been intermittent over the past 2-3 days, mild to moderate, throbbing, mainly retro-orbital on the right.
- No diplopia, neck stiffness, ear symptoms including tinnitus or difficulty hearing. No difficulty swallowing, dysphonia, dysarthria. She has been feeling well previously without fever, cough, rhinorrhea or sinus congestion.



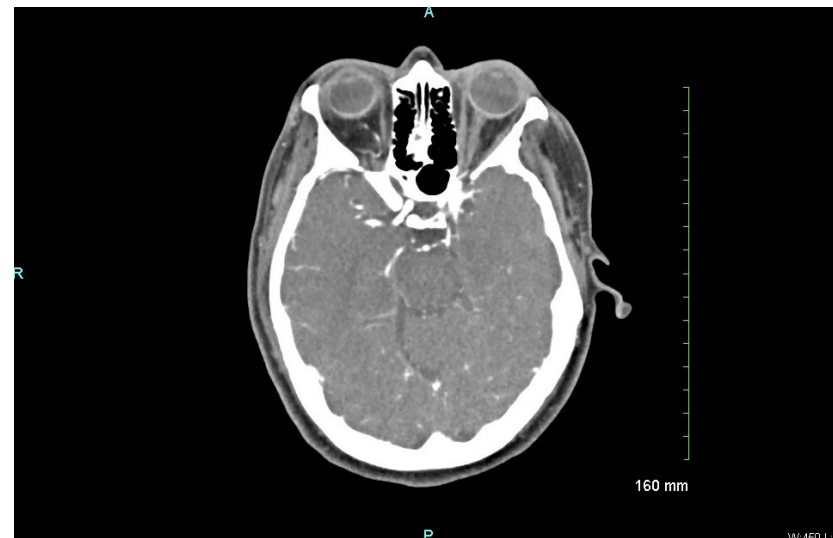
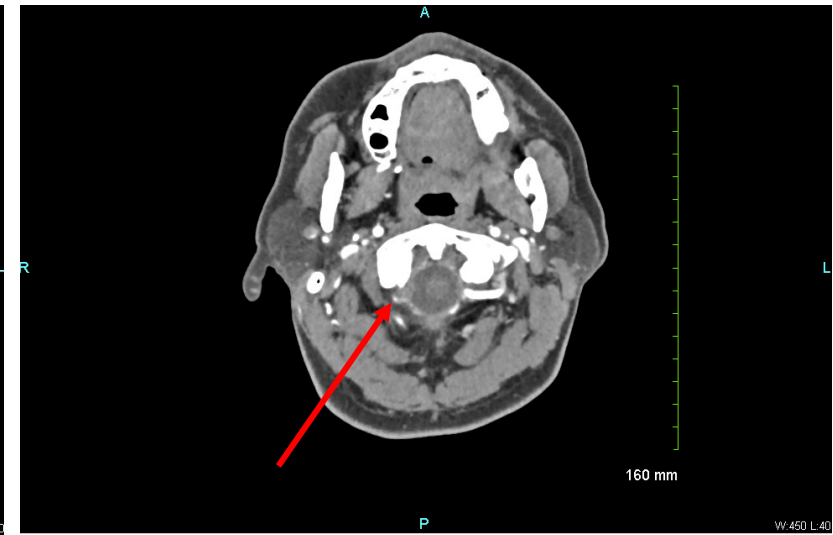
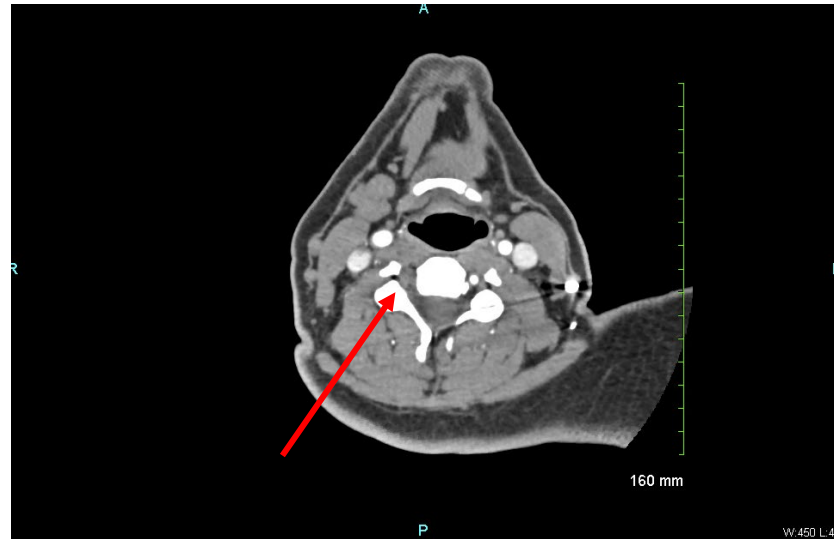
Initial ER Evaluation

- Glucose 220
- Blood Pressure 150/90
- NIHSS = 0, but disabling symptom of not being able to walk
- Neurological Examination: Unable to ambulate without assistance

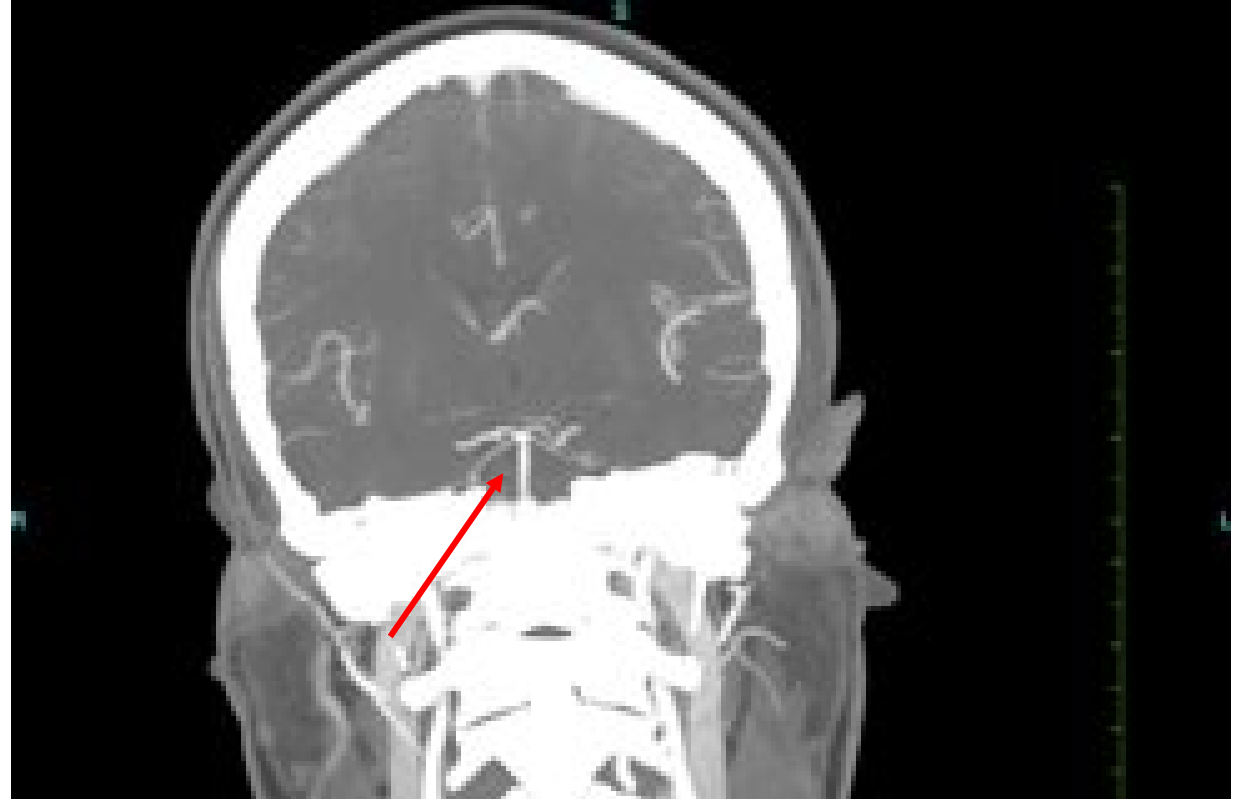
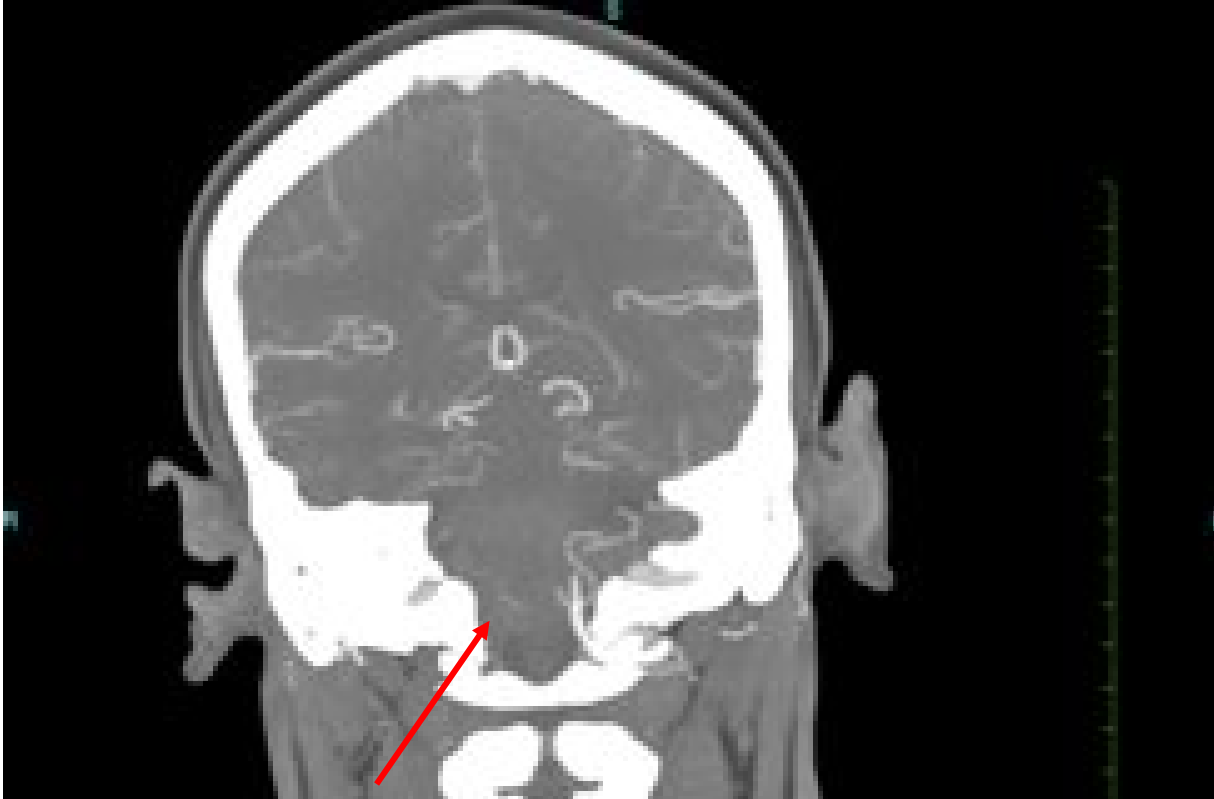
Initial Imaging – Non-contrast Head CT



CT Angiogram Head and Neck



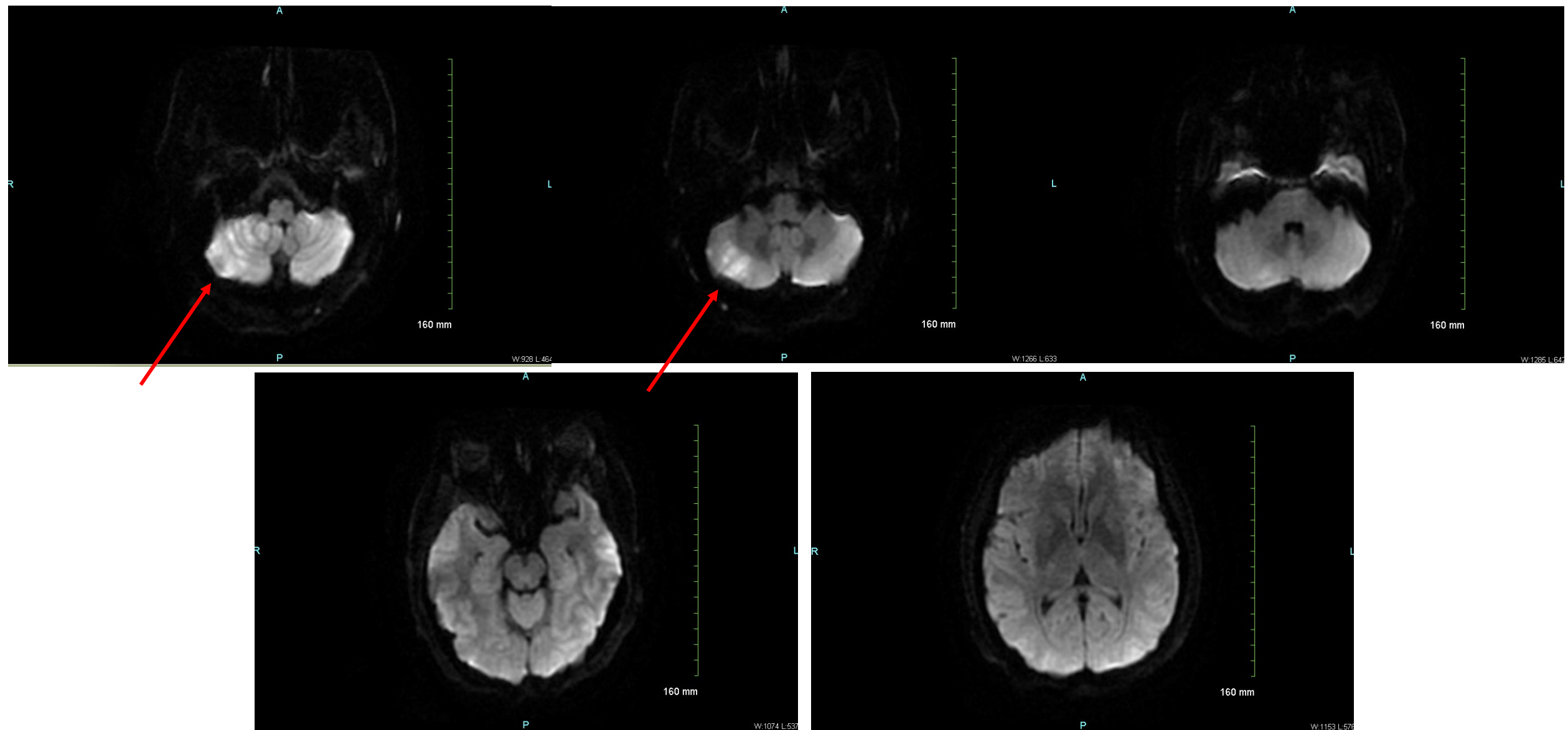
CT Angiogram Head and Neck



Stroke Team Decision Making

- Last known normal: 0800 - 0810
- Alteplase was administered at 1117
- 1355 The patient developed dysarthria, dysphagia while awaiting MRI.
- Repeat CT was ordered to ensure no post-tPA bleed – negative for hemorrhage
- MRI brain obtained
- Stroke team was called again when patient developed right sided weakness, dysconjugate gaze while in the scanner

MRI Brain



MRA head



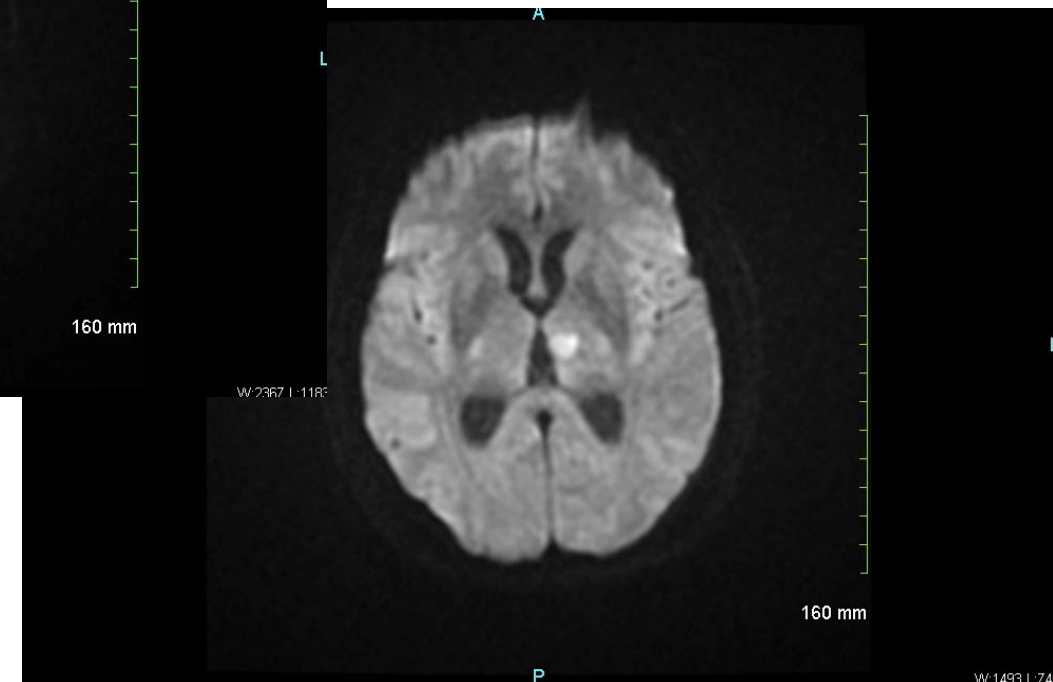
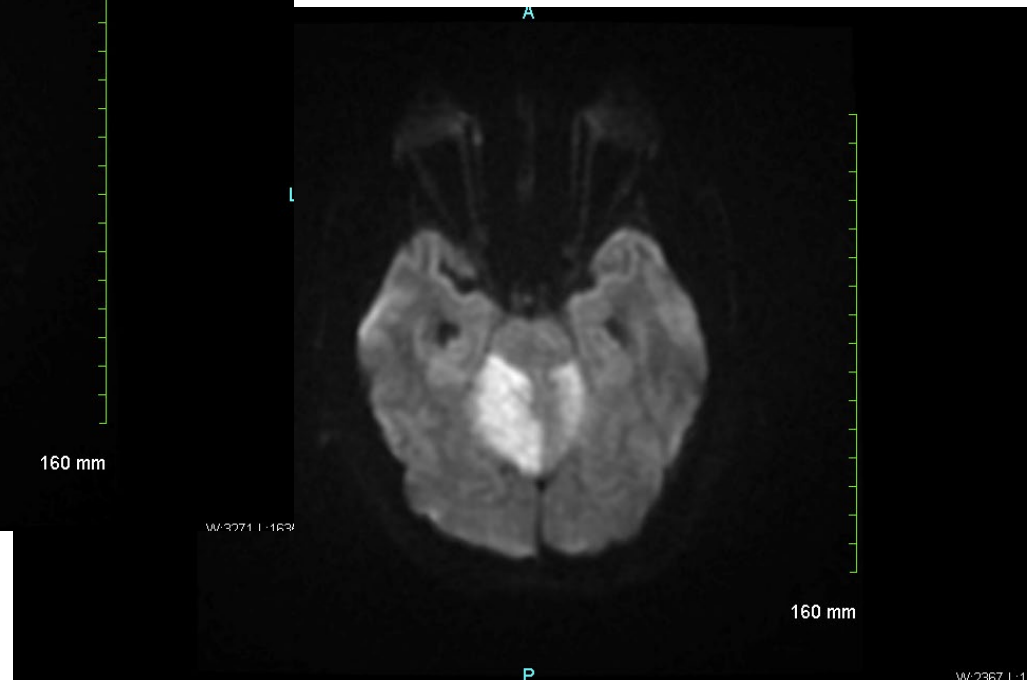
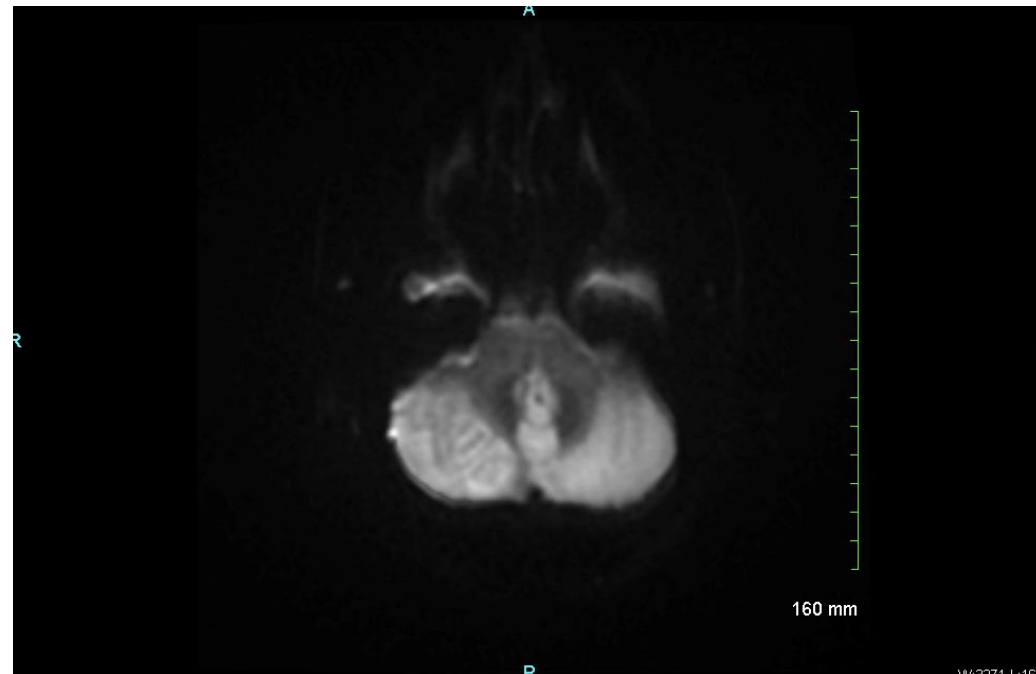
Emergent Transfer to CSC

- Decision to fly patient to neuro IR
- Repeat exam after the patient came out of MRI demonstrated left gaze deviation, right sided hemiplegia on the upper extremity, minimal effort against gravity in the right lower extremity, severe aphasia, mutism.
- Stroke Team called again --> recommended intubation
- She was flown to CSC for intervention.

Intervention and Post Intervention

- Upon arrival to CSC, patient went for thrombectomy which opened the basilar, although bilateral posterior inferior cerebellar arteries remained occluded
- Admitted to the neuro-ICU
- Patient was initially awake and following commands post intervention
- She again deteriorated a few hours later
- MRI brain

Repeat MRI brain



Clinical Course



- Emergency neurosurgery – suboccipital decompression
- 2 days later – withdrawal of care

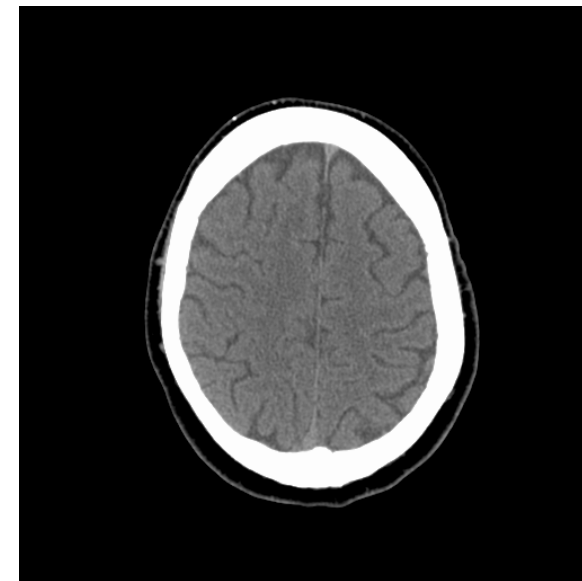
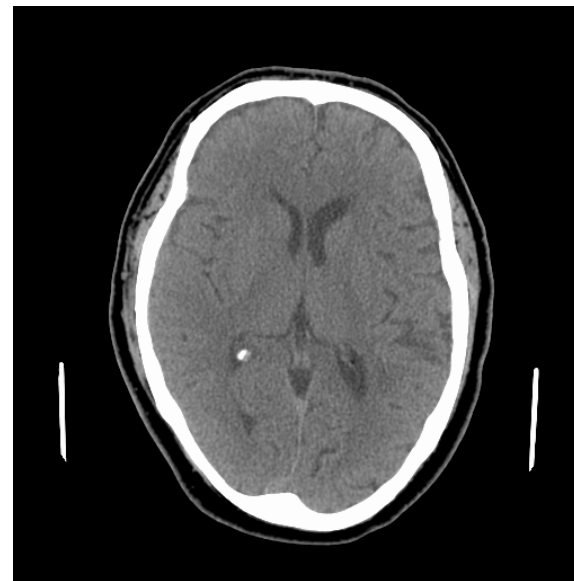
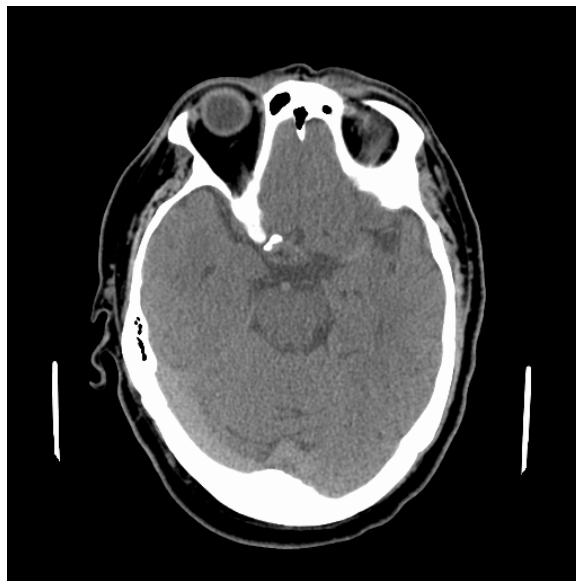
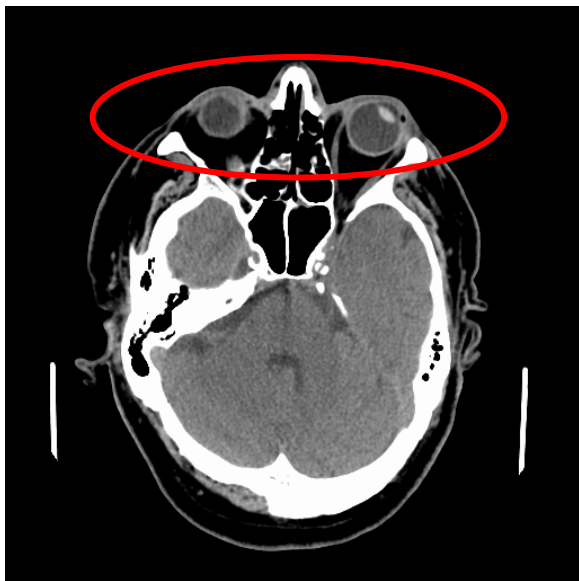
Case 2

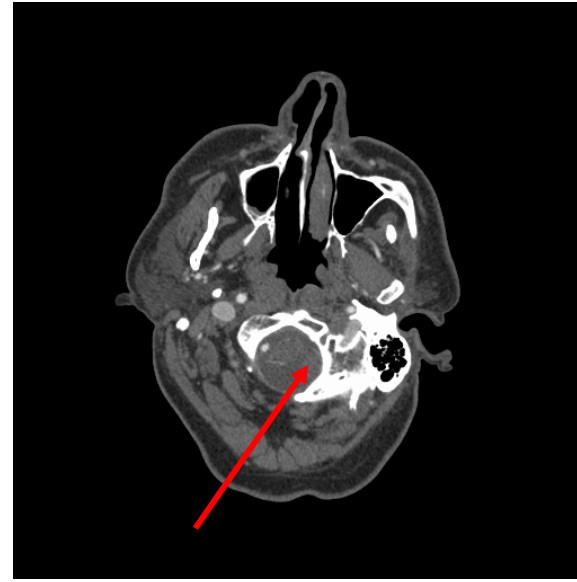
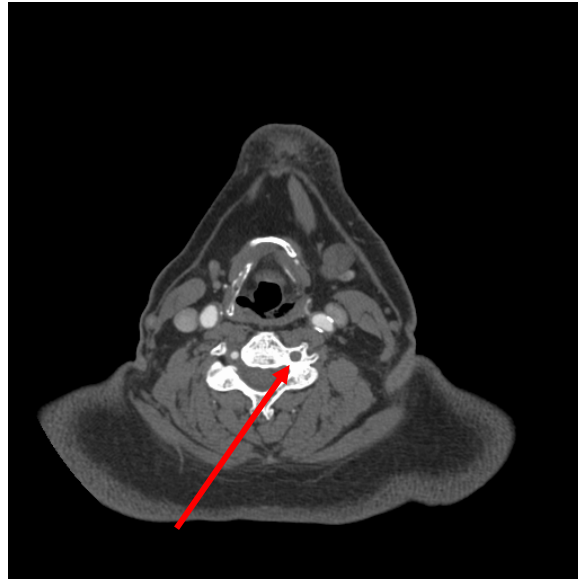
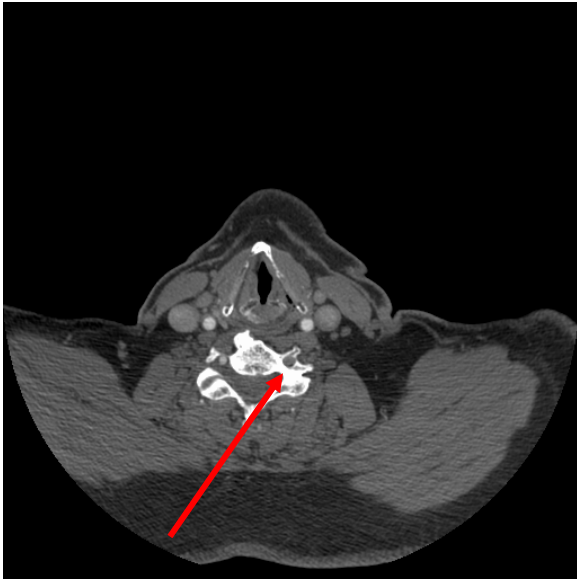
June 18, 2020

Clinical Presentation – ED Triage Note

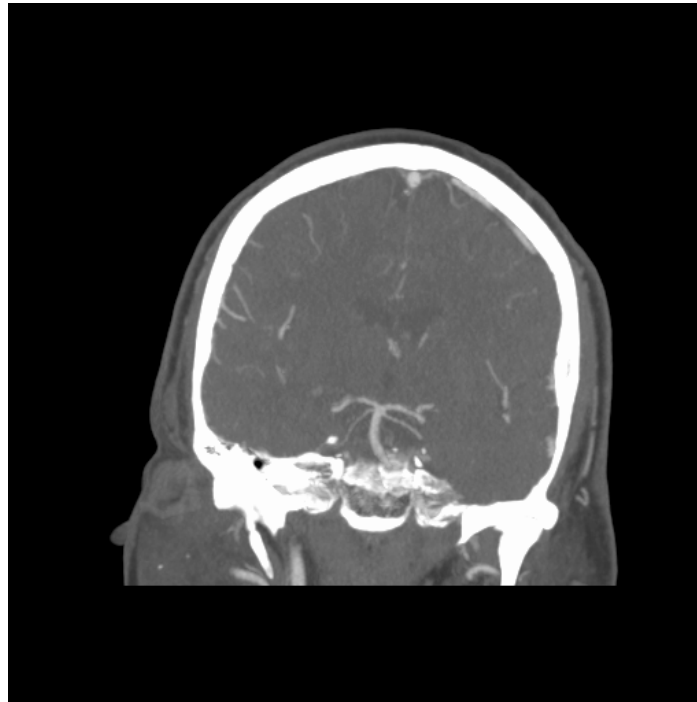
- 59 y.o. man who presents in the ED for stroke-like symptoms.
- Last known well was 0730 that morning. He had woken up around 0600 and felt completely normal. Pt states at 0730 he woke his girlfriend up because he started to not feel right. Girlfriend states over the next 30 mins the symptoms started to get worse.
- ED doc notes that at 8AM he developed **dizziness "room spinning"**
- No weakness or slurred speech
- **"EMS noted facial droop"**
- Code Stroke called and imaging obtained

Non-contrast head CT





CT Angiogram Head and Neck

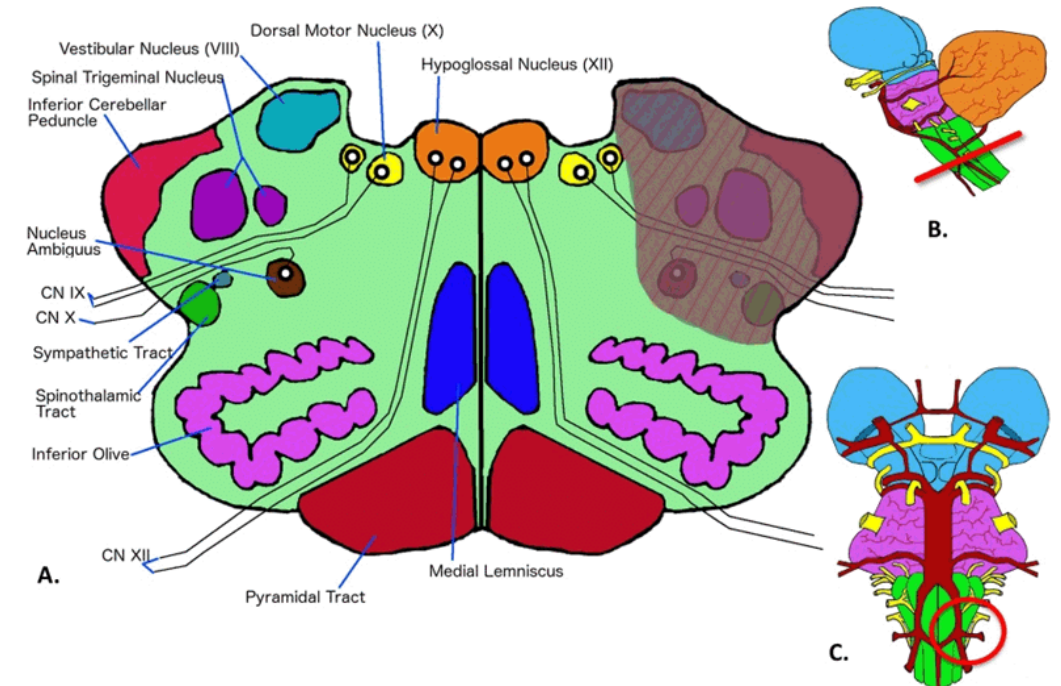
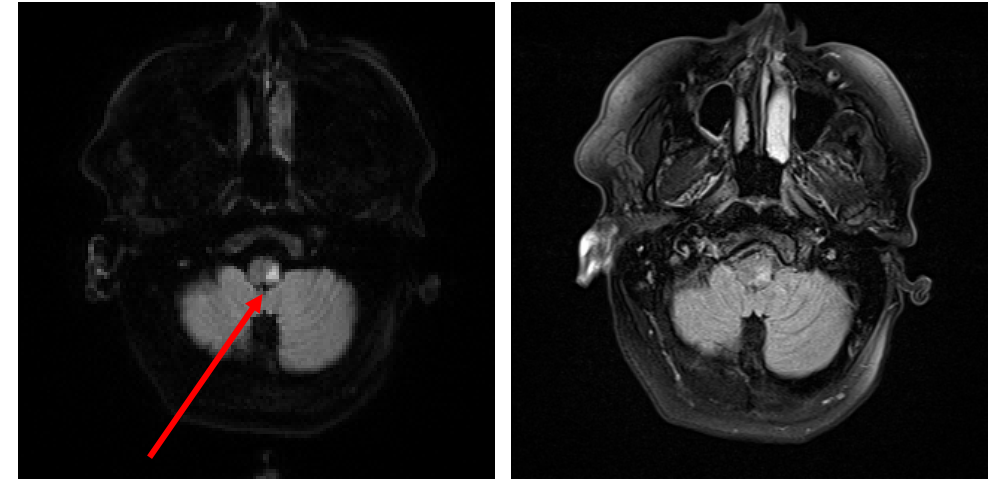


Clinical Decision Making in the ER

- NIHSS = 3
- Disabling symptoms
- No contraindication to IV alteplase, which was given at PSC (DTN 38 minutes)
- Patient transferred to CSC ICU for close monitoring
- On arrival there, patient reported decreased sensation on the left side of his face, double vision, dizziness, and ataxia
- Neurological examination
 - Dysconjugate gaze, left gaze preference, left pupil pinpoint
 - Face sensation decreased on the left
 - Asymmetric palate elevation

Lateral Medullary Infarct "Wallenberg Syndrome"

- **Posterior Inferior Cerebellar Artery**
- Ipsilateral face numbness
- Contralateral body numbness
- Ipsilateral Horner's Syndrome
- Ipsilateral Ataxia
- Hiccups





Clinical Course

- All deficits resolved after alteplase with exception of persistent dysphonia and dysphagia 2/2 vocal cord paralysis
- ENT saw patient and stated that "vagus nerve can take up to 6 months to recover"
- Patient discharged to rehab with a PEG

Management of Posterior Circulation Strokes

- Neurological examination, focusing on NIHSS and disability
- If patient has disabling symptoms and has no contraindications to IV thrombolytics, then treat accordingly
- If there is a large vessel occlusion (basilar artery or PCA) then consult your neuro interventionalist to discuss endovascular options.
 - Risks are higher in the posterior circulation.
- Be especially mindful of post-stroke swelling in the posterior fossa.
 - May need to consider careful watch in a neuro-ICU
- Stroke w/u as usual – posterior circulation strokes can be due to embolus, large vessel athero or small vessel athero



Basilar Artery International Cooperation Study (BASICS) Trial

- Multicenter, international, randomized trial with blinded outcome designed to assess the efficacy and safety of endovascular therapy plus best medical management, versus best medical management alone, <6 hours of the estimated time of basilar artery occlusion
- The manuscript has not yet been published. Results were shared at a joint ESO/WSO conference in May 2020
- Failed to show benefit of intervention over medical therapy for basilar artery occlusions
 - Trend towards benefit in older patients and those with higher NIHSS (≥ 10)
 - Trend toward better outcome if alteplase was administered

Summary

- More difficult to diagnose than anterior circulation stroke
 - FAST → BE-FAST
 - Think about “D’s”
- Dizziness is an extremely common chief complaint seen in emergency rooms and benign vs problematic etiologies can be difficult to differentiate
- Initial exam where there is dizziness PLUS anything else is a stroke until proven otherwise
- NIHSS is terrible at predicting outcomes/disability for strokes in the back of the brain
- Imaging with CT in the ER can sometimes reveal posterior circulation pathology
- Outcomes vary greatly, and patients where strokes are suspected should be monitored closely.