Headache Emergencies

Robin McFarlane

Thoughts...

Your patient describes the worst headache of her life.

1. Primary vs Secondary?
2. Are there any red flags?
3. Do I need to get any imaging?

Primary Headache vs. Secondary Headache

Primary: 90%

- Migraine
- Tension Type Headache (TTH)
- Trigeminal Autonomic Cephalgia (TAC)
    - Cluster
    - Paroxysmal Hemicrania
    - SUNCT

Secondary: 10%

- Vascular
    - Dissection
    - subarachnoid hemorrhage (SAH)
    - cerebral venous sinus thrombosis (CVST)
    - reversible cerebral vasoconstriction syndrome (RCVS)
    - Cavernoma
    - Posterior Reversible Encephalopathy Syndrome (PRES)
    - pituitary apoplexy
- Non-Vascular

Secondary Headache Causes

Vascular: (previous slide)

Infectious: intracranial or extracranial; ex abscess, meningitis

Neoplastic

Drugs: SSRI, cyclophosphamide, nicotine patch, caffeine, medication overuse and rebound

Idiopathic/Iatrogenic: intracranial hypotension,
chiropractic manipulation

Congenital: disorders of metabolism

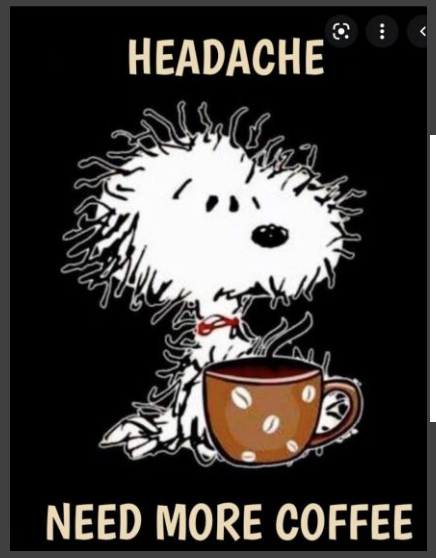
Autoimmune/Rheumatologic: giant cell arteritis (GCA)

Traumatic: skull fracture, temporomandibular joint (TMJ), trigeminal or other cranial neuralgia, cervicogenic headache, colloid cyst

Endocrine: Intracranial hypertension, acute angle-closure glaucoma, pheochromocytoma

Red Flags for Secondary Headaches:

S2NOOP4



- **S**ystemic Symptoms:
  - B signs
- **S**econdary risk factors:
  - HTN
  - Immunocompromised
  - Malignancy
  - Hypercoagulability
- Neurologic focality
  - Papilledema
  - Stroke s/s

- **O**nset (sudden)
- **O**lder Age
- **P**revious w/change in quality
- **P**recipitation
- **P**ositional/Postural
- **P**regnancy

Diagnostic Workup

Headache exam

- Vitals
- HEENT; palpate temples for GCA, TMJ, palpate supraorbital, supratrochlear, and occipital notches, palpate neck and shoulders for spasm and cervical tenderness, palpate sinuses, ROM of head and check nuchal rigidity, evaluate teeth and gums, check eye movement and visual fields
- fundoscopic exam to look for papilledema
- Kernig/Brusinski signs
- Strength, sensation, coordination

Orders

- LP with opening and closing pressure
- MRI with and without out contrast
- CTA or MRA of head and neck with venous phase
- Labs: PT/INR, CBC, CMP, ESR/CRP, TSH w/reflex, UDS

Indication for Imaging

NEJM Journal Watch

SPECIALTIES & TOPICS VOICES CME SPECIAL FEATURES ARCHIVES/PDFs

GUIDELINE WATCH | NEUROLOGY, HOSPITAL MEDICINE

CLINICAL GUIDELINES

January 8, 2020

New Guidelines on Headache Imaging

Stephanie J. Nahas, MD, reviewing Whitehead MT et al. J Am Coll Radiol 2019 Nov

Key Points

- For thunderclap headache, computed tomographic (CT) imaging of the head (CTH) without contrast remains the most appropriate, although CT arteriogram may be appropriate in certain circumstances.
- For new headache with optic disc edema, magnetic resonance (MR) imaging of the brain (MRIB) with or without contrast or CTH without contrast are usually appropriate, while CTH with contrast and CT or MR venography may be appropriate.
- New or progressive headache with “red flags” (e.g., subacute head trauma, exertional headache, neurologic deficit, cancer, immunocompromise, pregnancy, age ≥50) warrants plain CTH or MRIB with or without contrast.
- New primary headache of suspected trigeminal autonomic origin (e.g., cluster headache) should be investigated with MRIB, contrast recommended.
- For chronic headache with new features or progression, MRIB with or without contrast is appropriate (CTH with or without contrast may be appropriate).
- Imaging is not appropriate for newly diagnosed migraine or tension-type headache with a normal neurologic exam or for chronic stable headache with no neurologic deficit.

Case 1

33 yo elementary teacher with PMHx left sided dental extraction, antiphospholipid antibody syndrome, HTN 2/2 renal fibromuscular dysplasia, on birth control presents with sudden onset, left-sided 9/10 headache 2 hours after going to the chiropractor.

She then had difficulty opening her right hand followed by numbness of the RUE.

The weakness and numbness resolved within 10 minutes, but ever since then she's heard a swishing in the left ear and her neck is stiff.

She has normal VS: 105/61 HR76 RR16 and Afebrile.

CTH in the ER is negative despite ongoing head pain.

Red Flags for Secondary Headaches:

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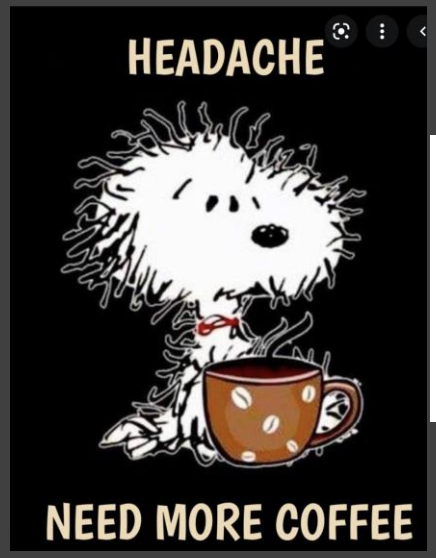

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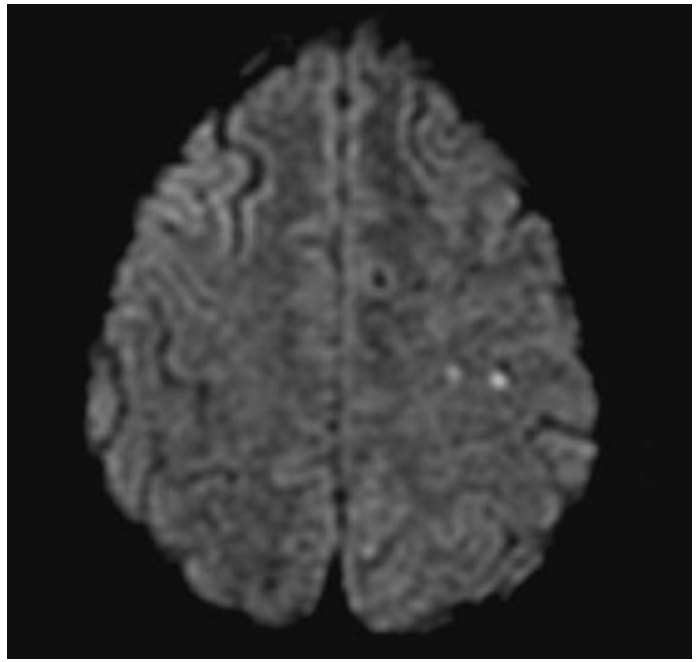
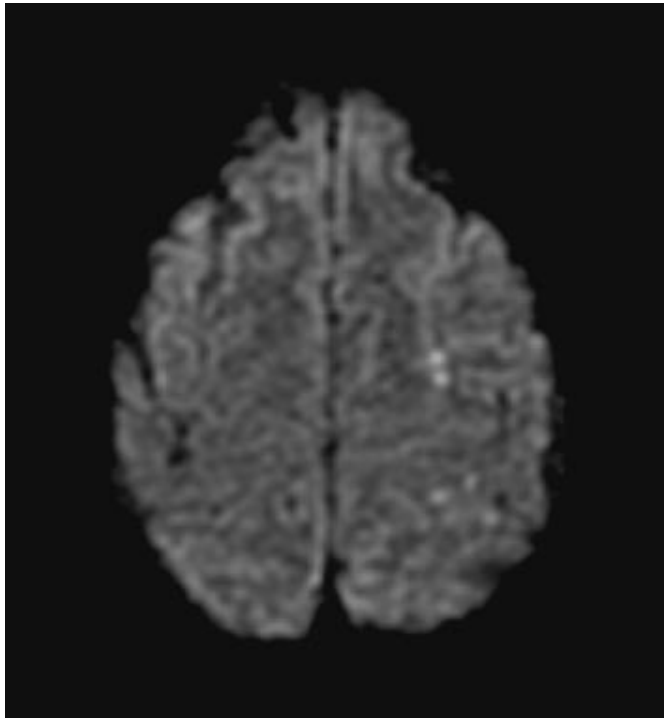
A. Multifocal bacterial abscess

B. Acute ischemic stroke

C. Migraine hyperintensities

D. Demyelinating disease





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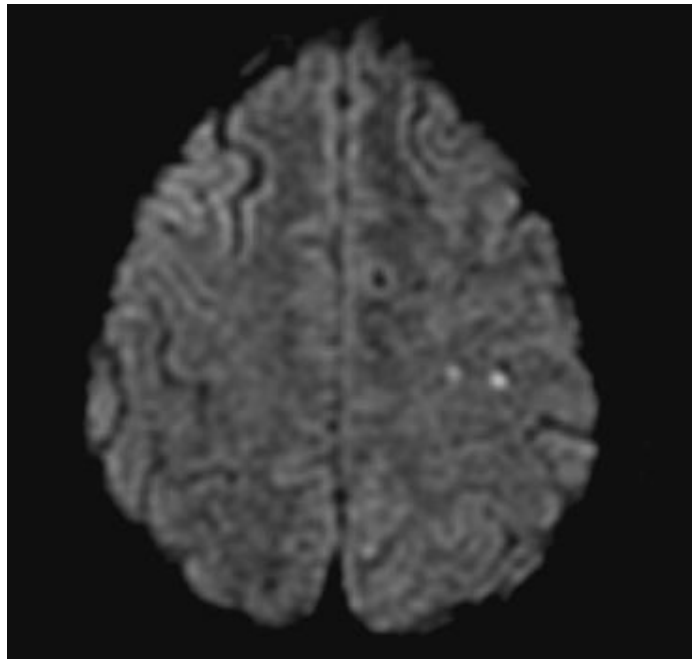
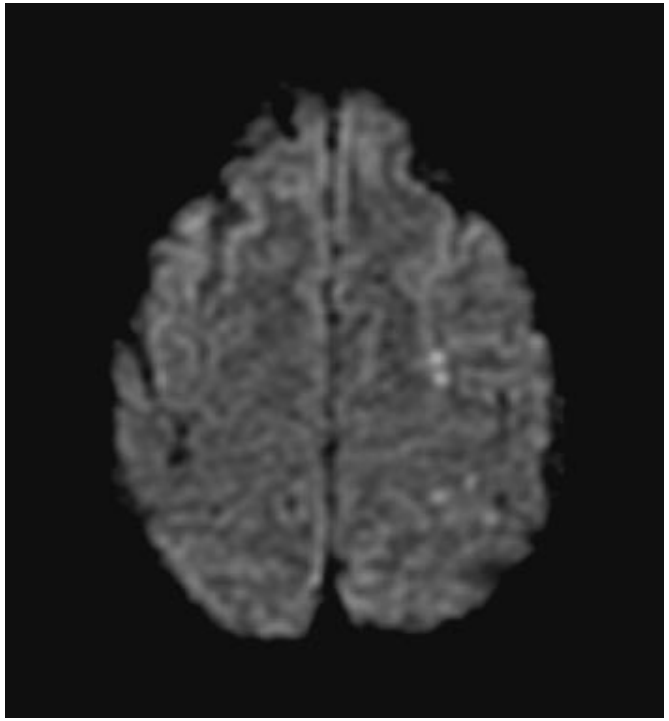




Where did the stroke come from?

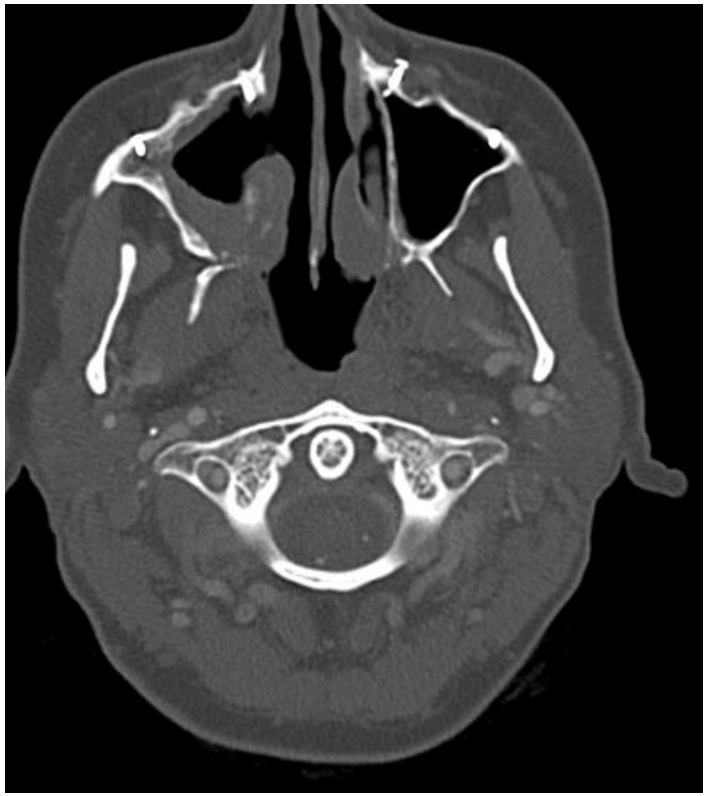
She then had a CTA of the head and neck that looks like this… Any ideas?

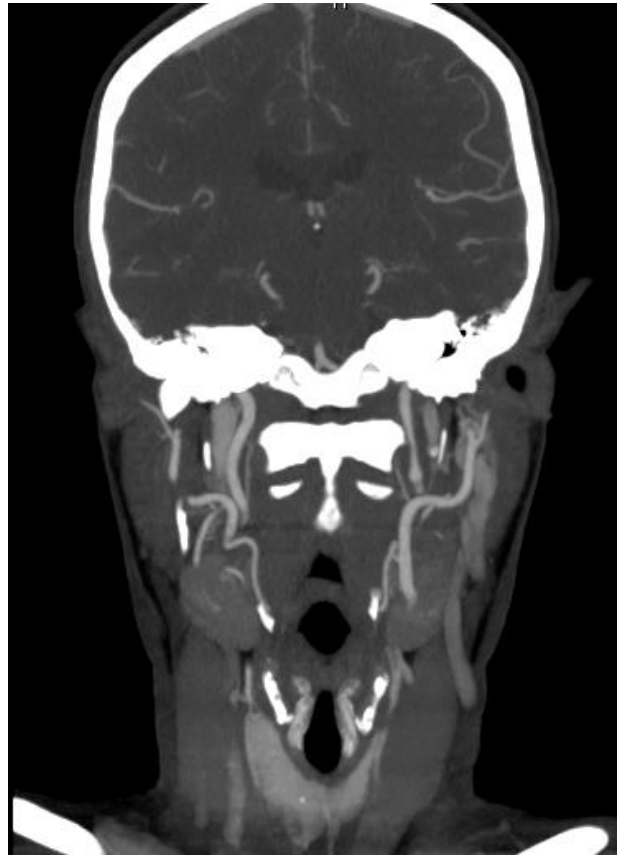
A. Atherosclerosis

B. Cervical Artery Dissection

C. Cardioembolic

D. Venous sinus thrombosis





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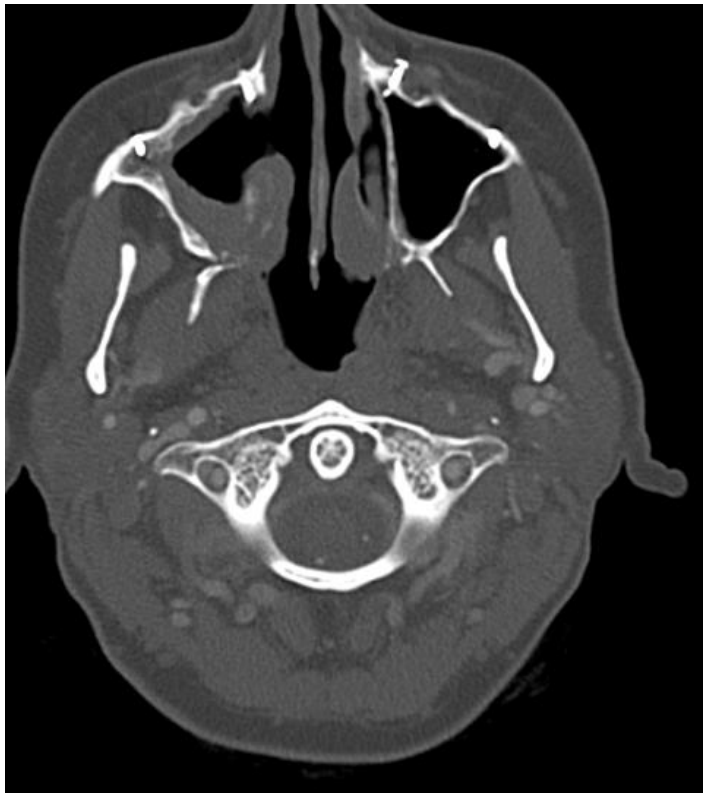
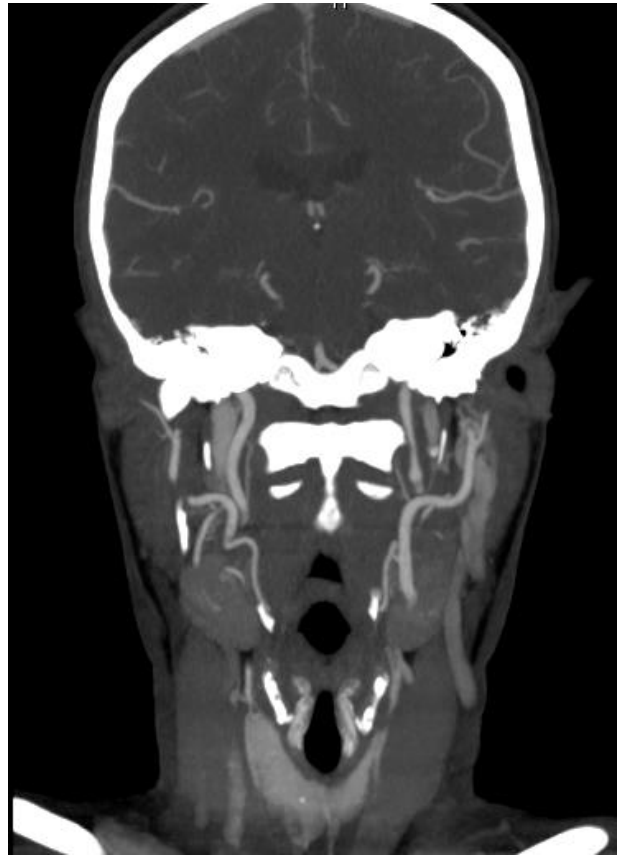
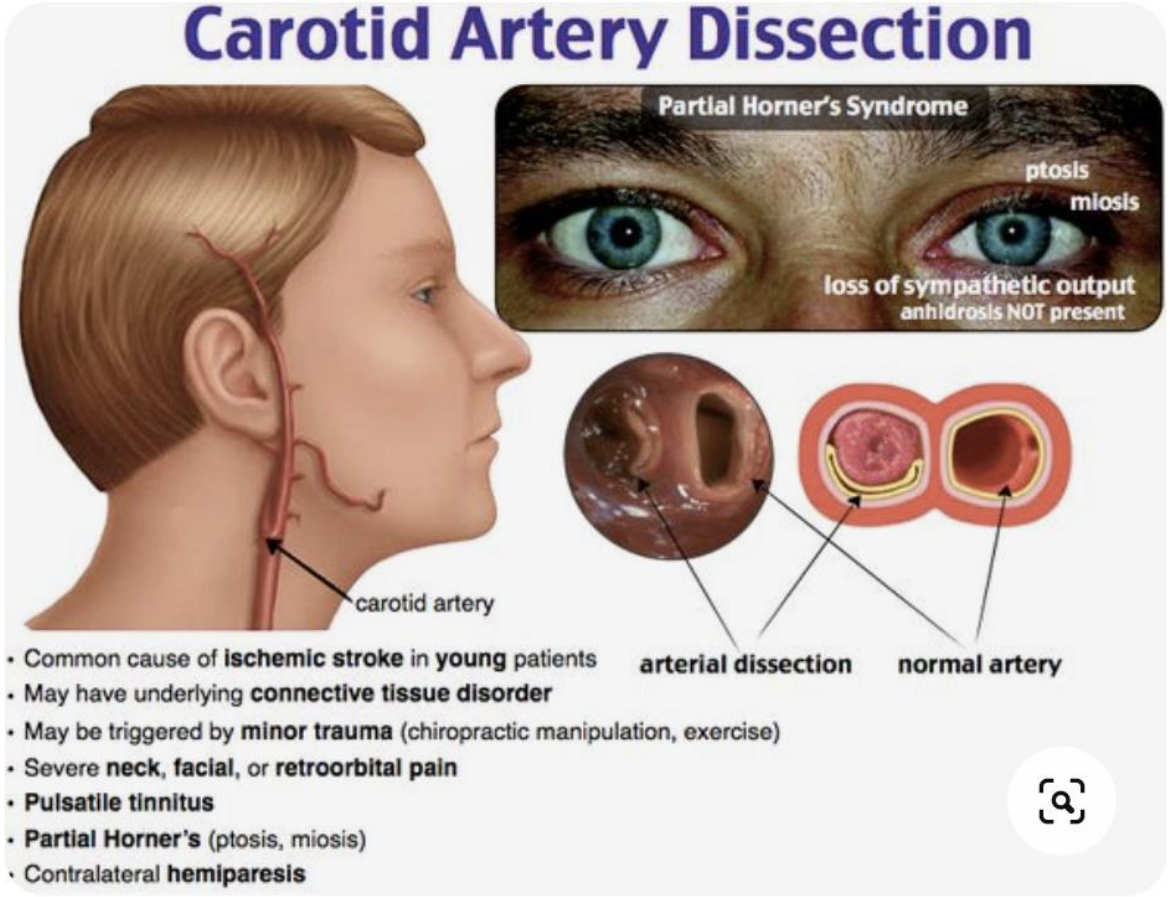




Cervical Artery Dissection

- One of the leading causes of stroke in young people.
- Cervical arteries: vertebral or carotid
- Possible etiologies:
  - trauma, whiplash, chiropractic manipulation, strong cough or vomiting, fibromuscular dysplasia, collagen vascular disease
  - Often with ipsilateral neck/headache pain



How would you treat her?

A. Aspirin 81mg daily

B. Low-intensity heparin drip

C. Apixaban

D. Enoxaparin bridge to warfarin

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Case 2

63 yo gentleman with a history of HTN, erectile dysfunction and medication non-compliance was at the grocery store when he had a headache that was sudden onset. It was all over his head, 12/10 pain and so bad he vomited.

He called his wife to take him home and she gave him a few baby aspirin and a couple of ibuprofen but that didn't help. He laid down for a nap and when his wife came to check on him he was confused and urinated himself so she called 911.

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Case 2 - WHAT NEXT?

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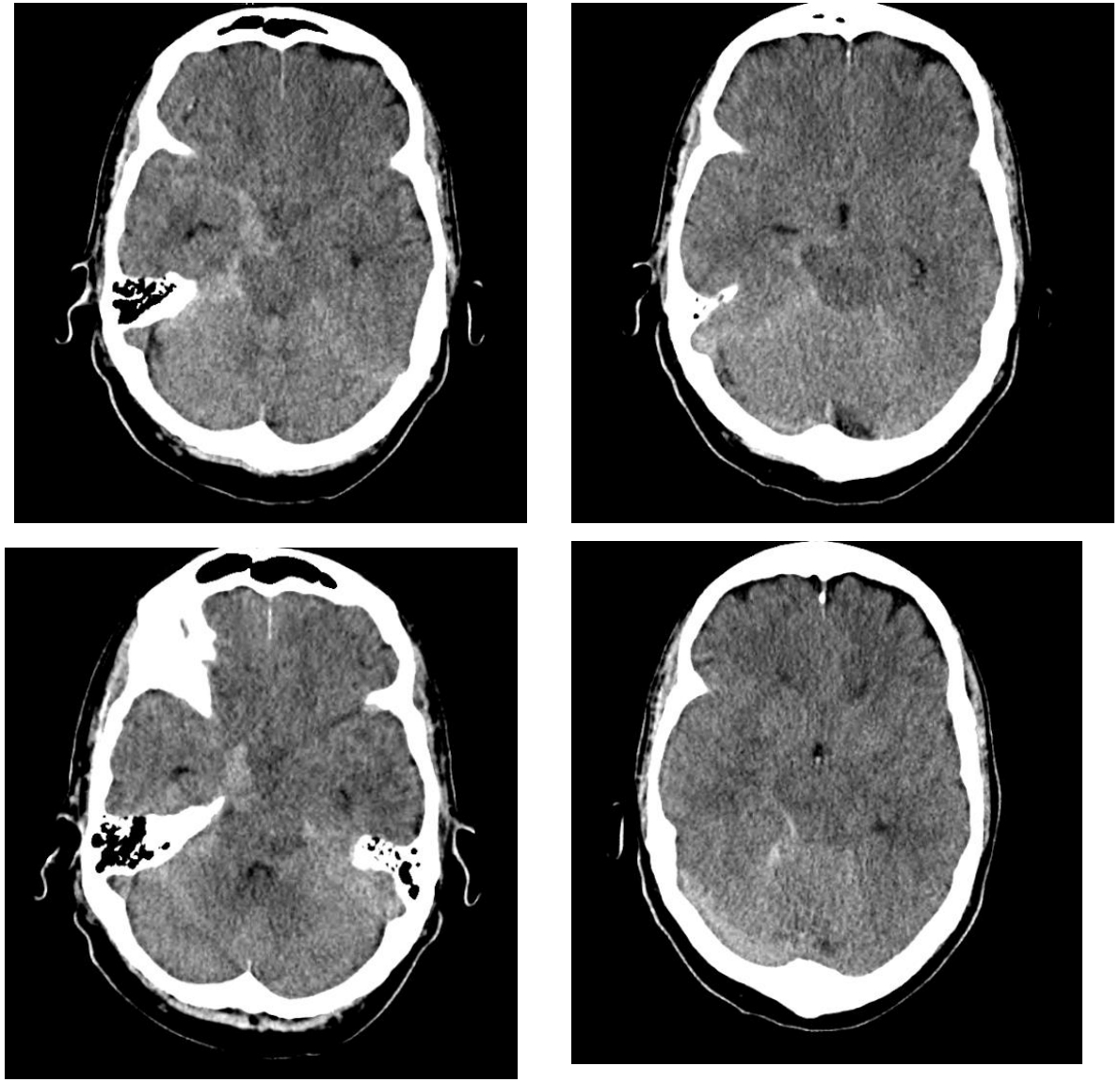
He called his wife to take him home and she gave him some toradol, a few baby aspirin and a couple of ibuprofen but that didn't help. He laid down for a nap and when his wife came to check on him she couldn't wake him up so she called 911.

BP on arrival is 210/105. He has nuchal rigidity on exam.

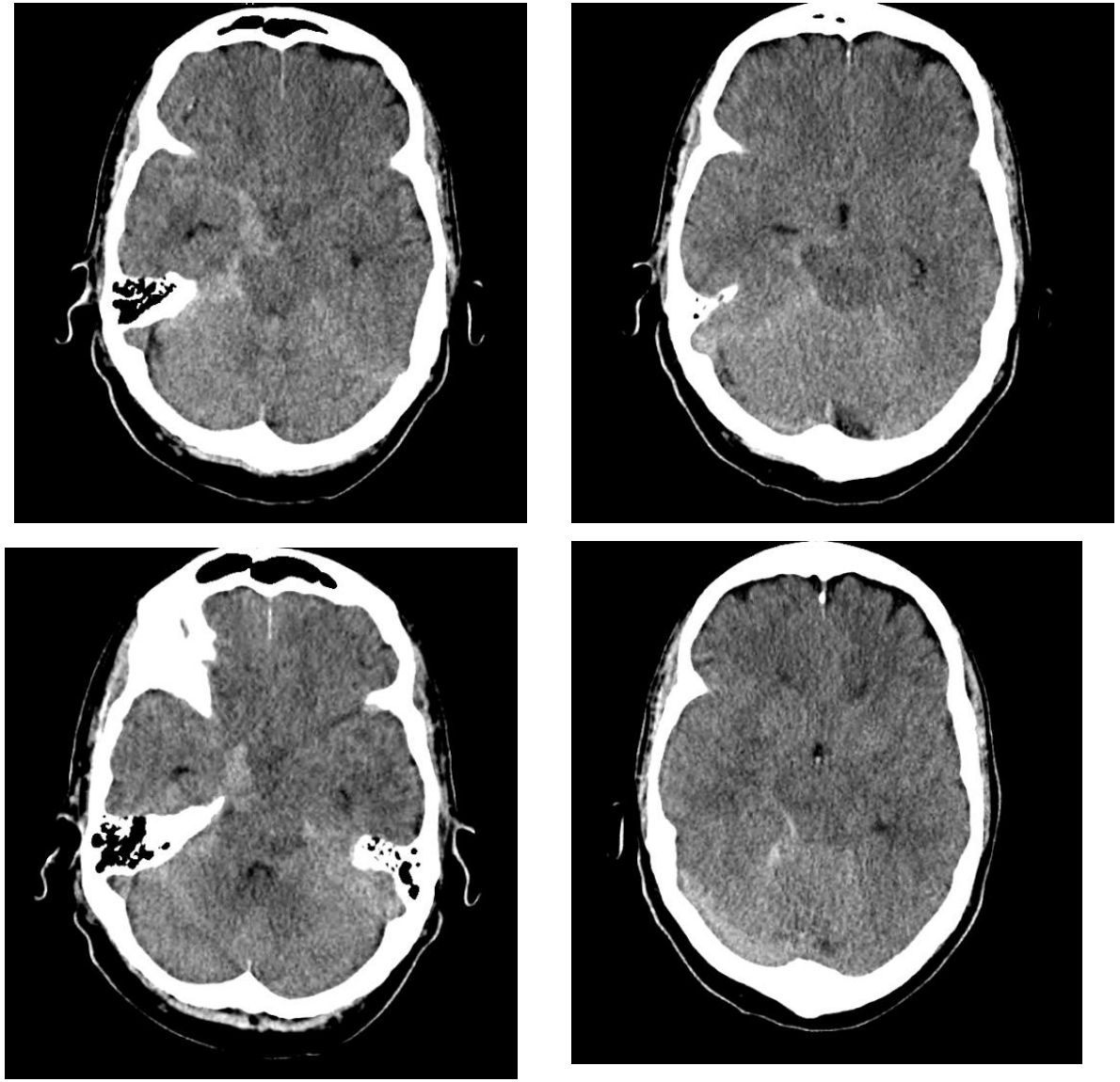
What's the most likely diagnosis?

A. Normal scan
B. SAH
C. CVST
D. Intraparenchymal Hemorrhage

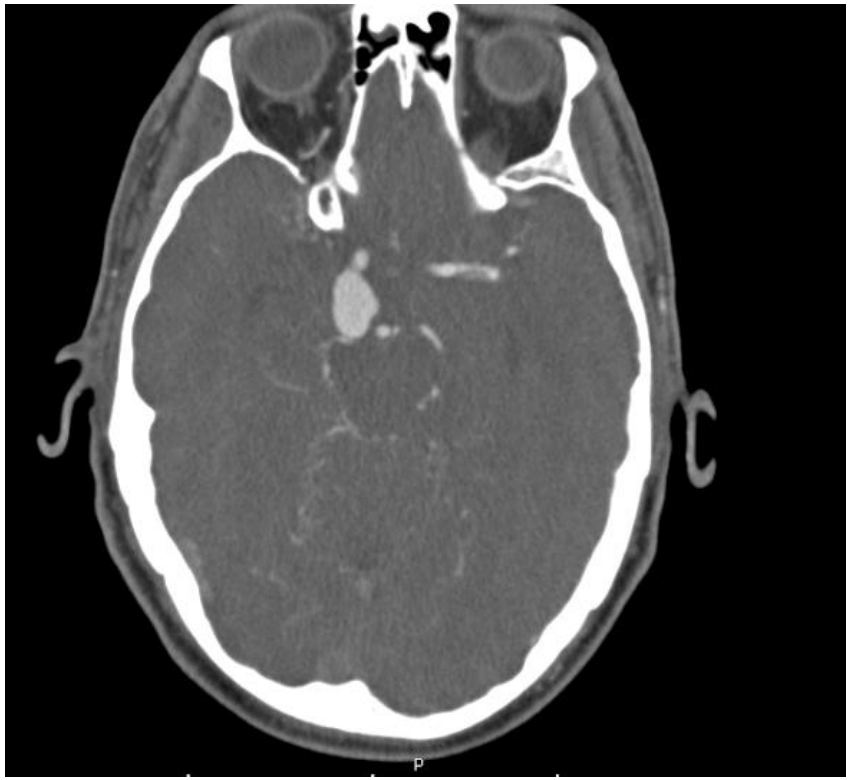


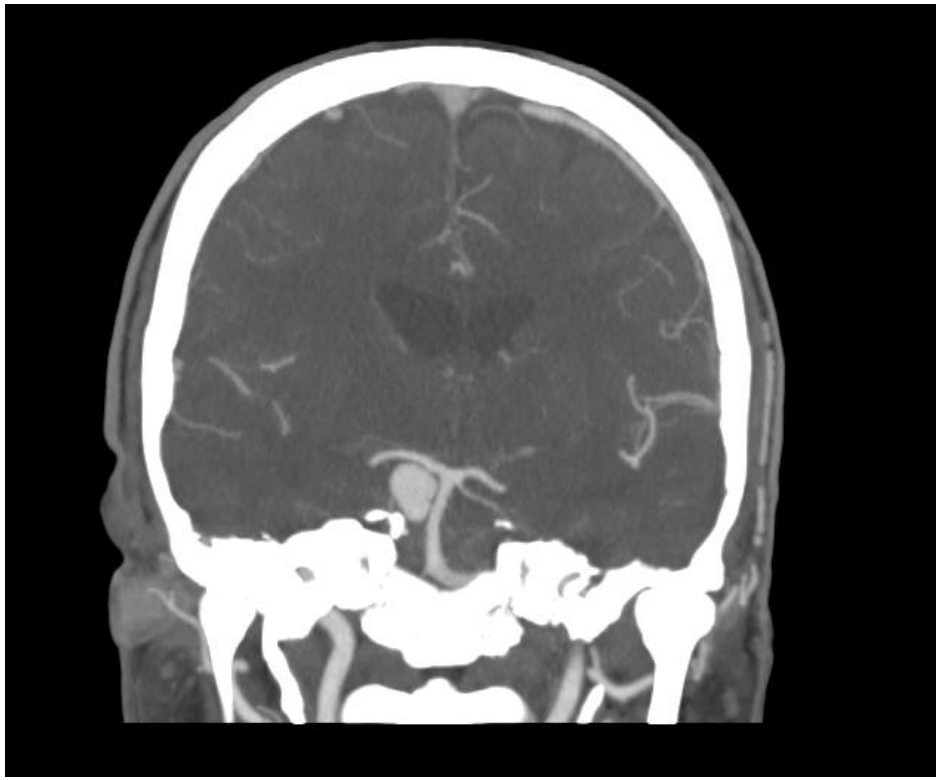
What do you order next?

A. Normal scan
B. SAH (perimesencephalic)
C. CVST
D. Intraparenchymal Hemorrhage

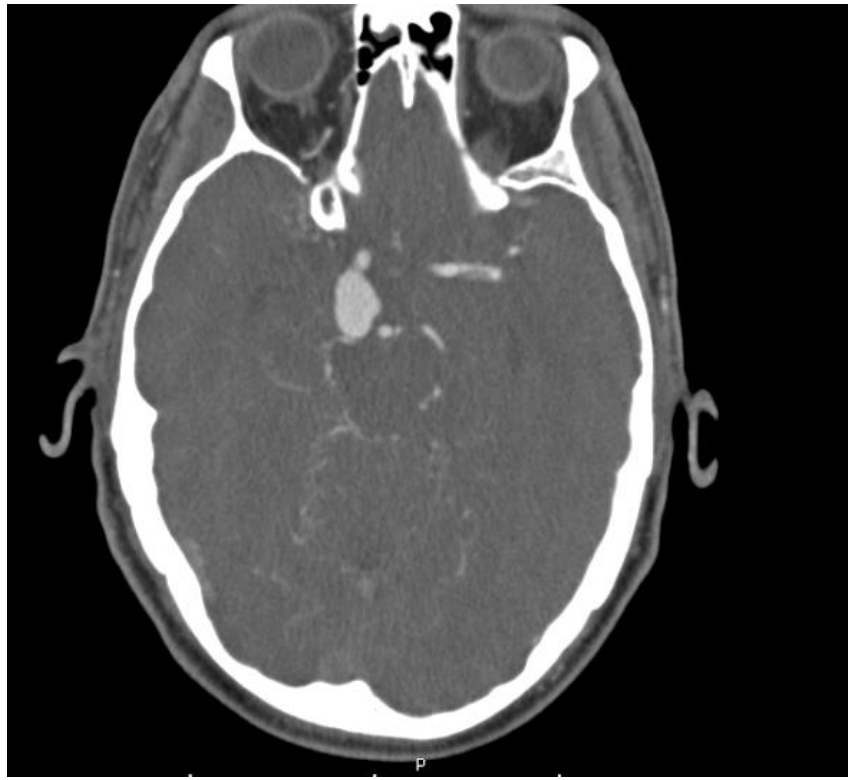


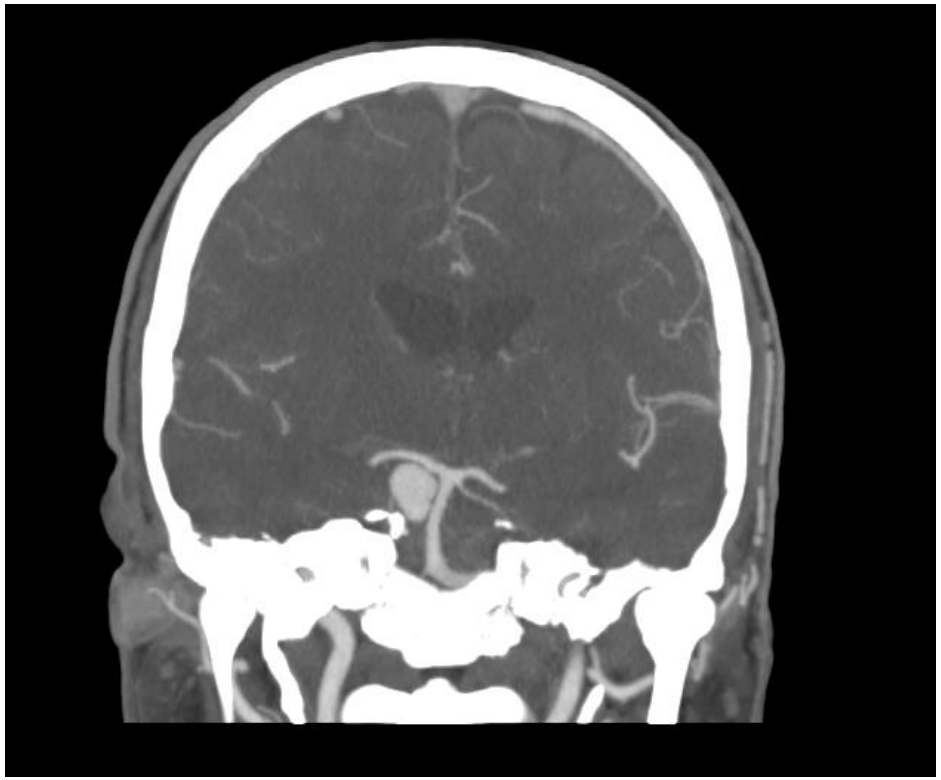
What is it?



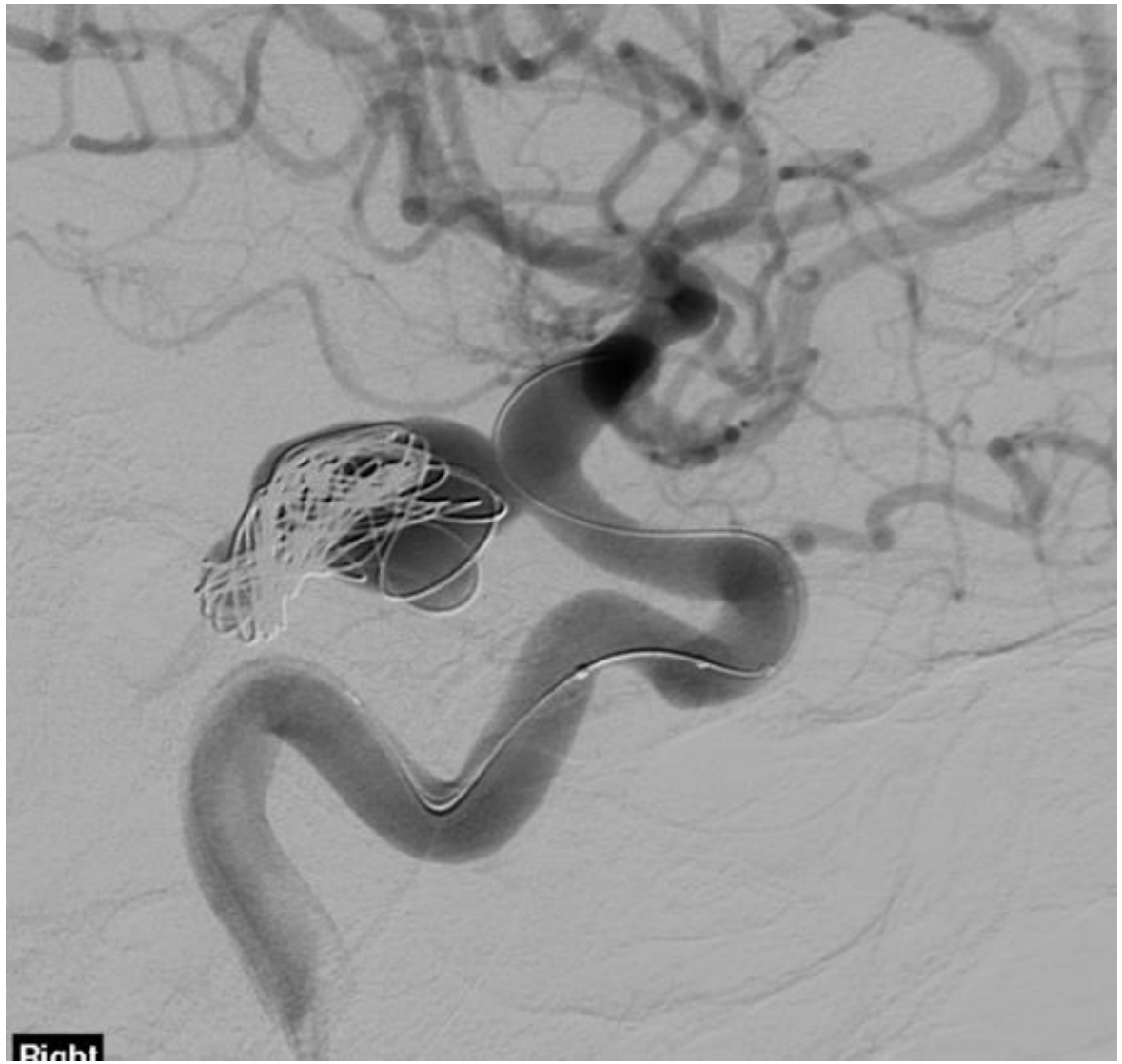


How do you treat it?





- coiling
- avoid physical exertion
- SBP goal < 140/80
- nimodipine 60mg q4H x 21 days
- narcotics for pain
- nerve blocks
- avoid NSAIDS, avoid tryptans
- Fioricet can be used for just a few days but watch for overuse and rebound
- Transcranial doppler and serial mental status exams
- Keppra 500 mg BID



Case 3

23F with PMH migraine is 3 days postpartum with an uneventful pregnancy and delivery. She woke up with a headache after going home from the hospital 3 days ago.

Since then it’s intractable, an 8/10 retro-orbital pressure with associated nausea. It seems to be worse in the morning but never really goes away.

BP 155/89. CTH is completed.

Case 3 – RED FLAGS? S2NOOP4

23F with PMH migraine is 3 days postpartum with an uneventful pregnancy and delivery. This morning she woke up with blurry vision and a headache that's an 8/10 retro-orbital pressure with associated nausea. It seems to be worse with lying down, worse with cough.

BP 155/89. No protein in urine.

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BP 155/89. No protein in urine.

What’s the differential for dangerous HA in pregnant women?

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A. Eclampsia and associated HTN

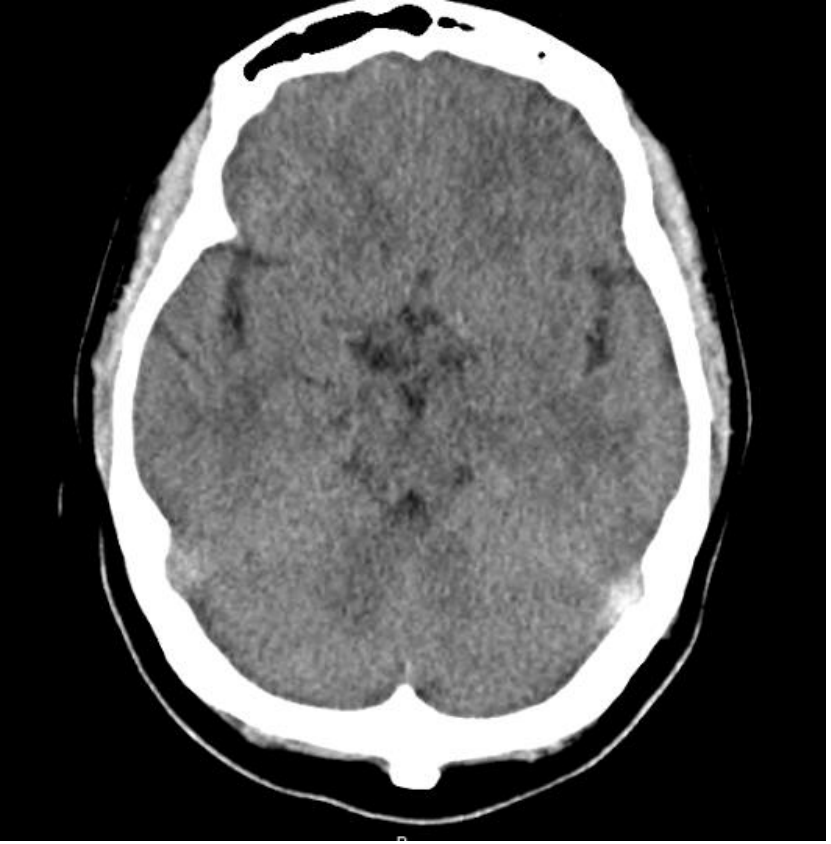
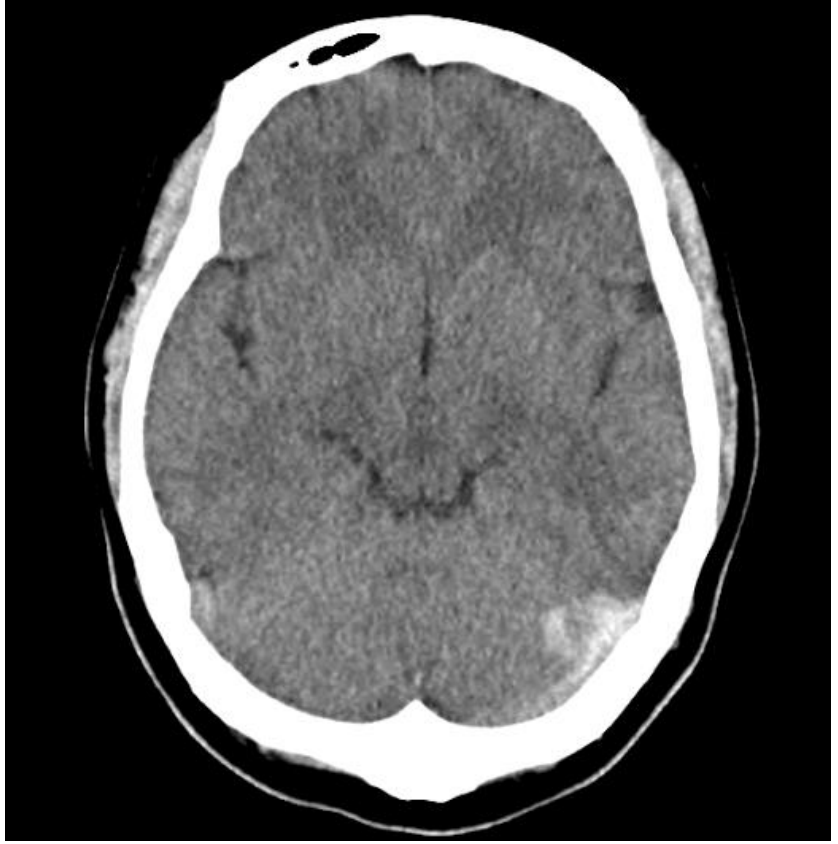
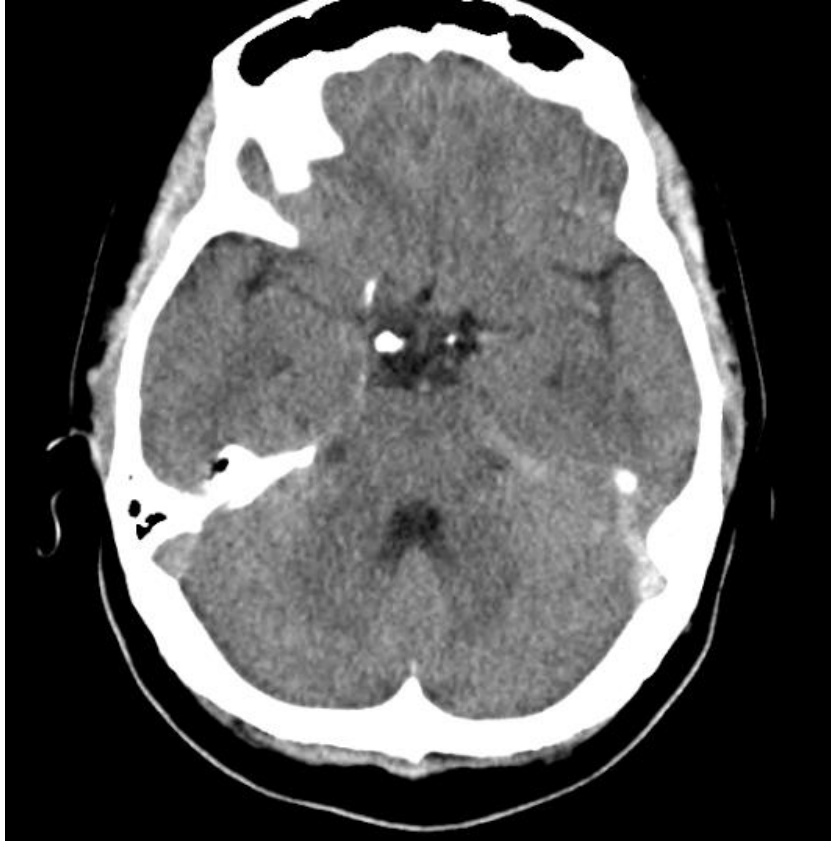
B. Pituitary Apoplexy

C. Venous sinus thrombosis

D. Reversible Cerebral Vasoconstriction Syndrome

E. Posterior Reversible Encephalopathy Syndrome

F. Intracranial hypotension

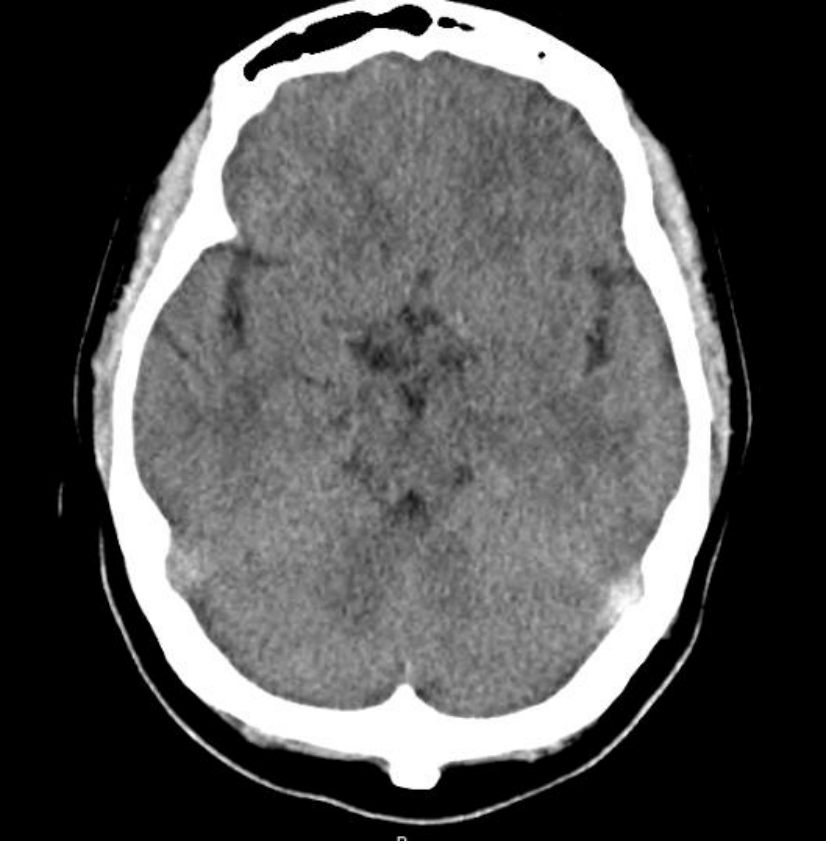
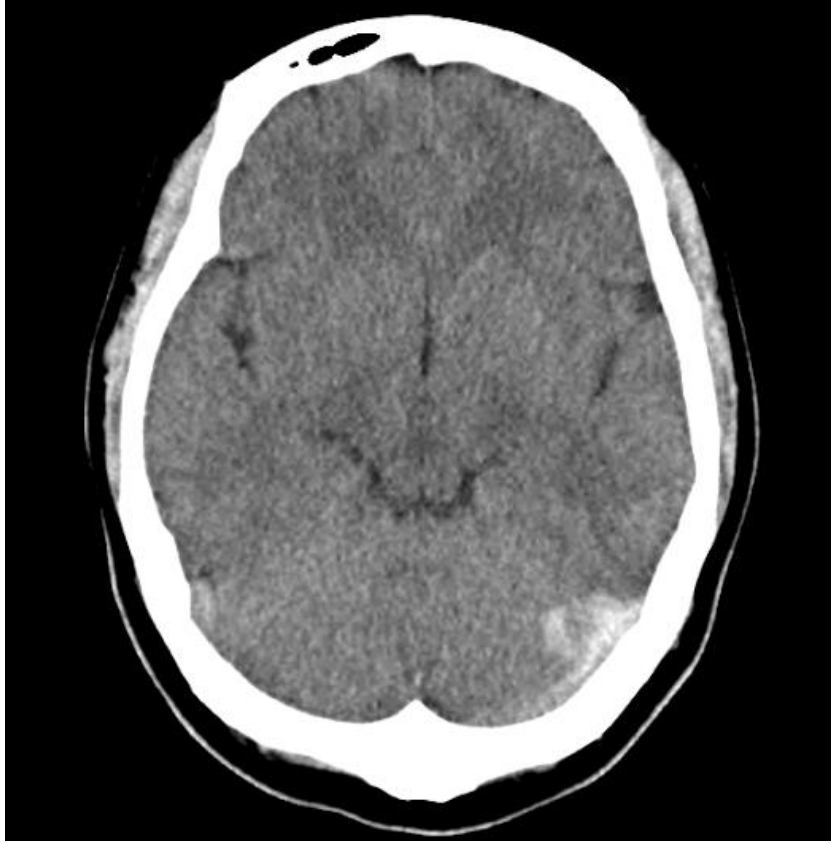
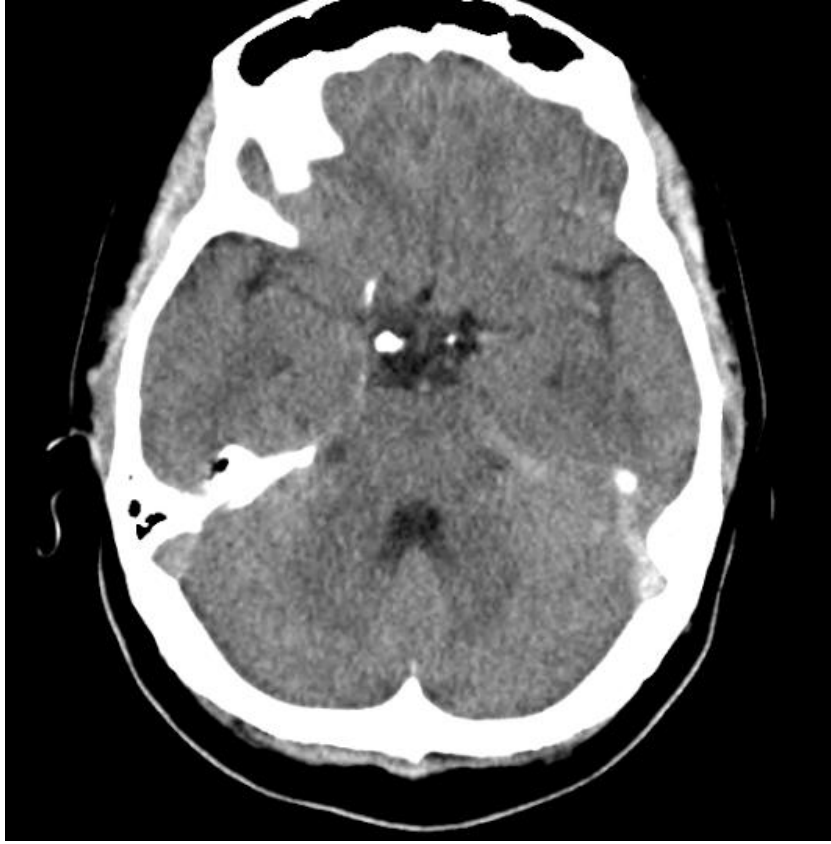
What's the most likely diagnosis?

A. Intraparenchymal hemorrhage

B. Subarachnoid hemorrhage

C. PRES

D. Intracranial hypotension from lumbar puncture

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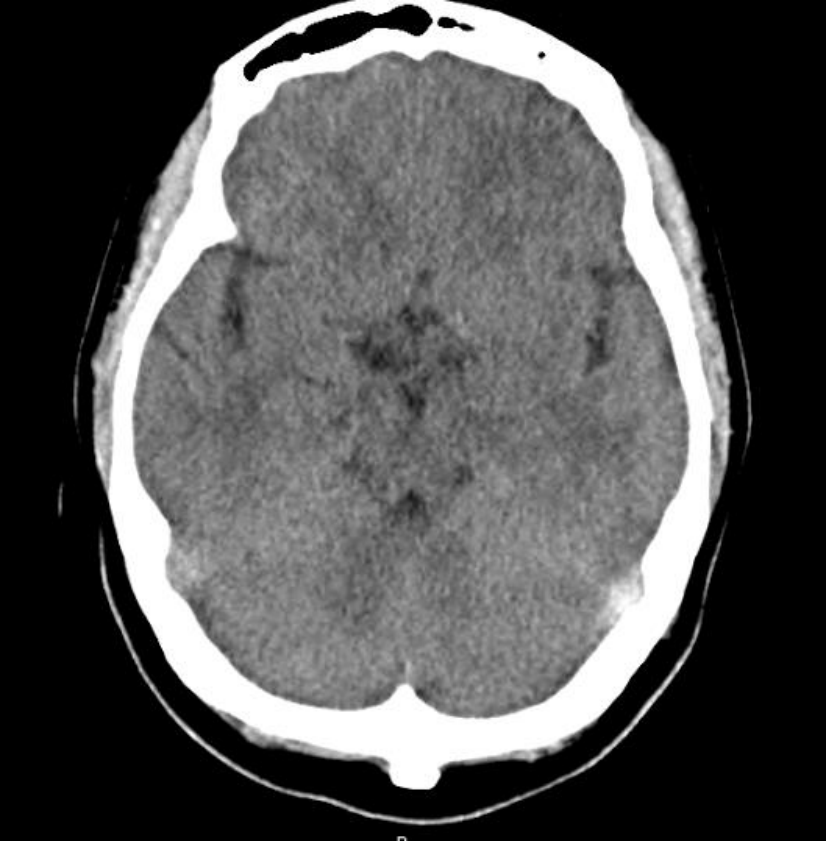
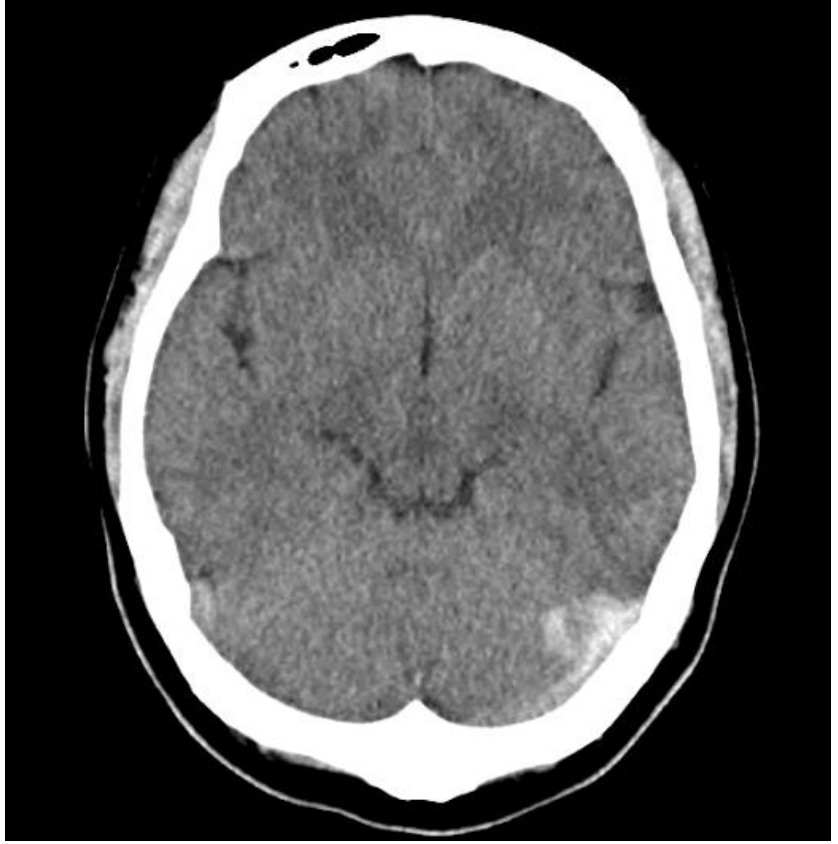
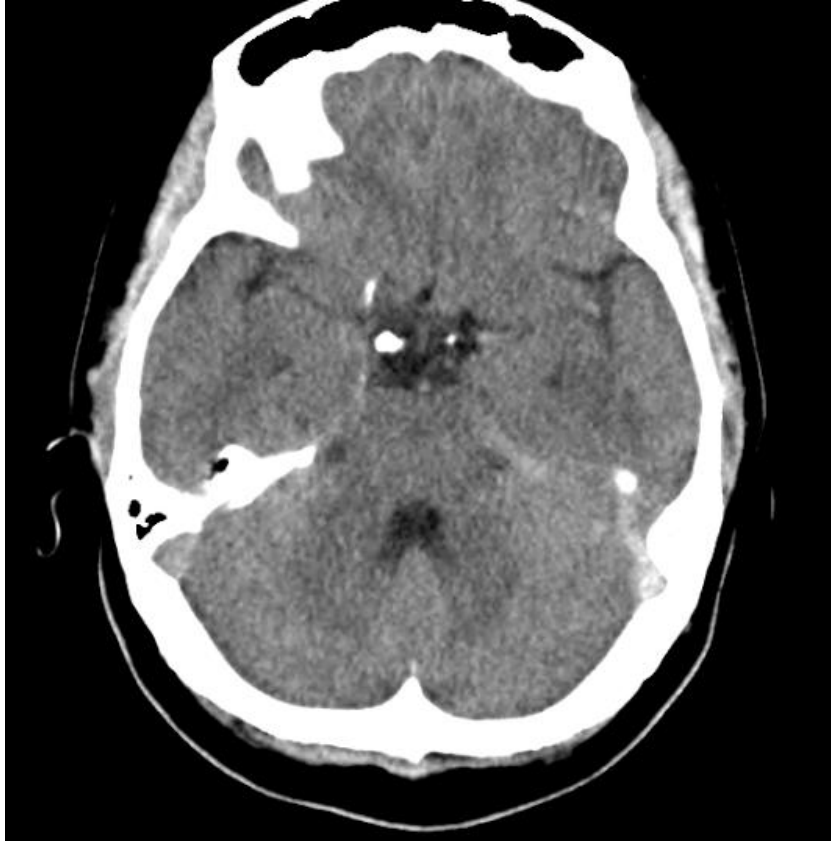
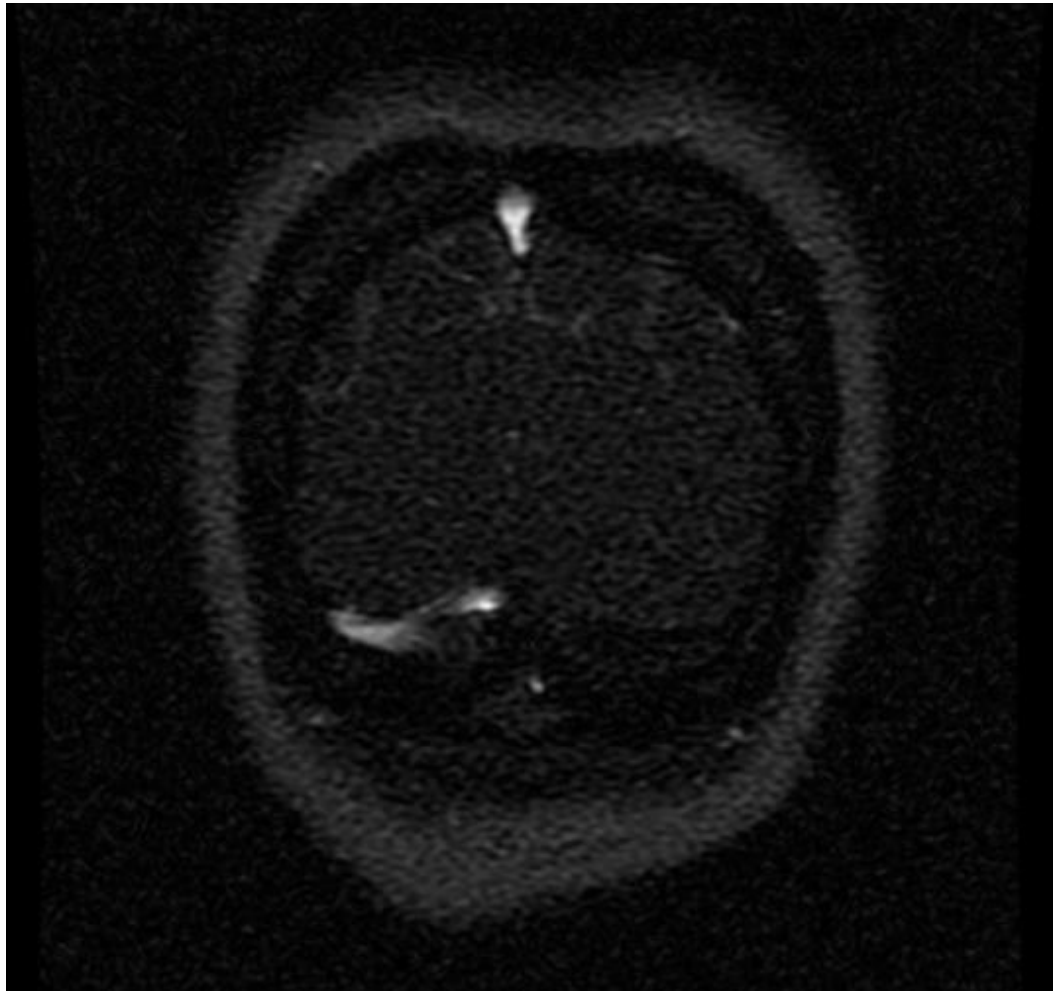
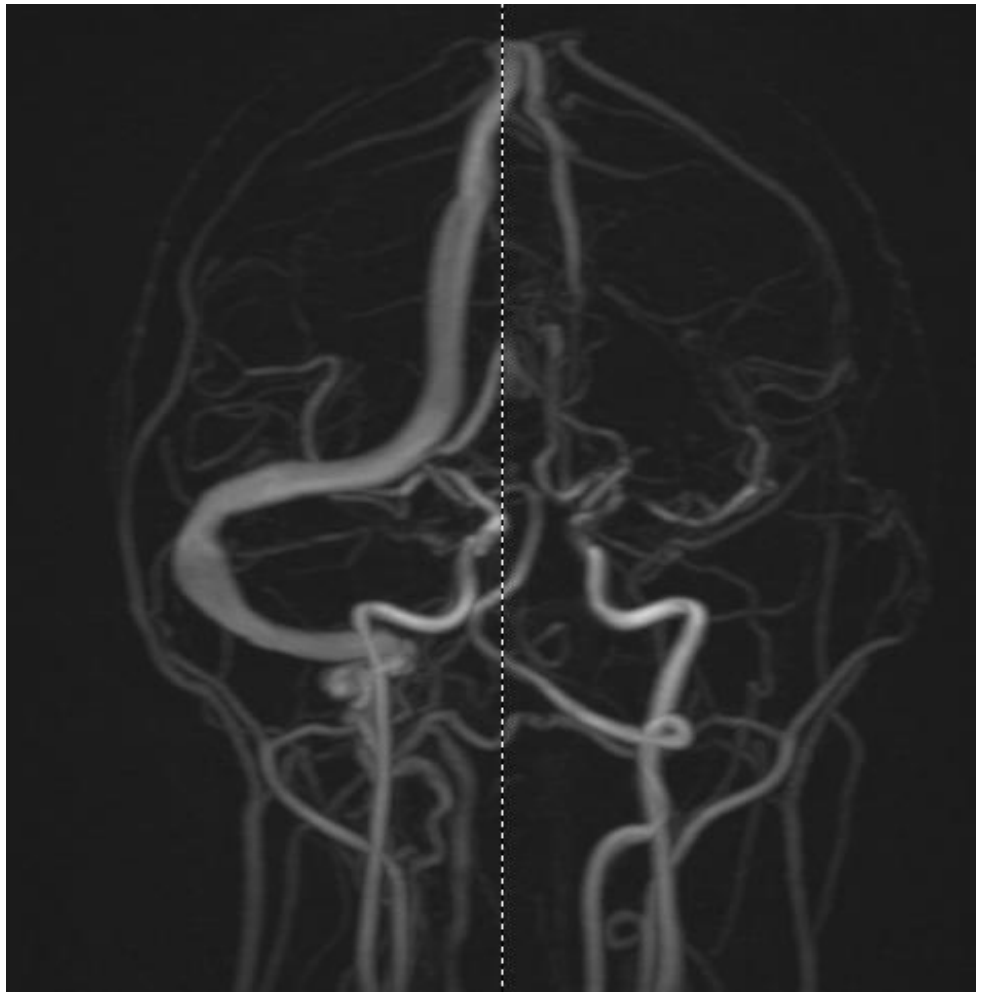
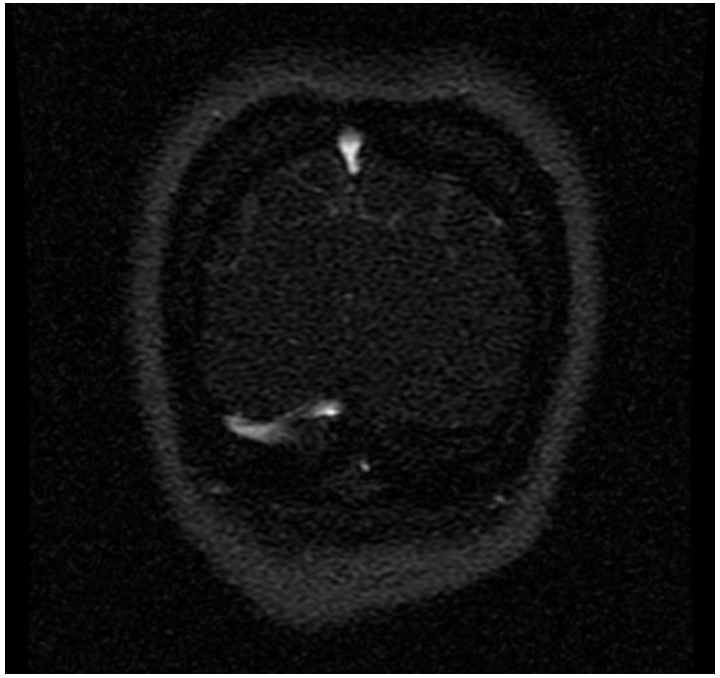
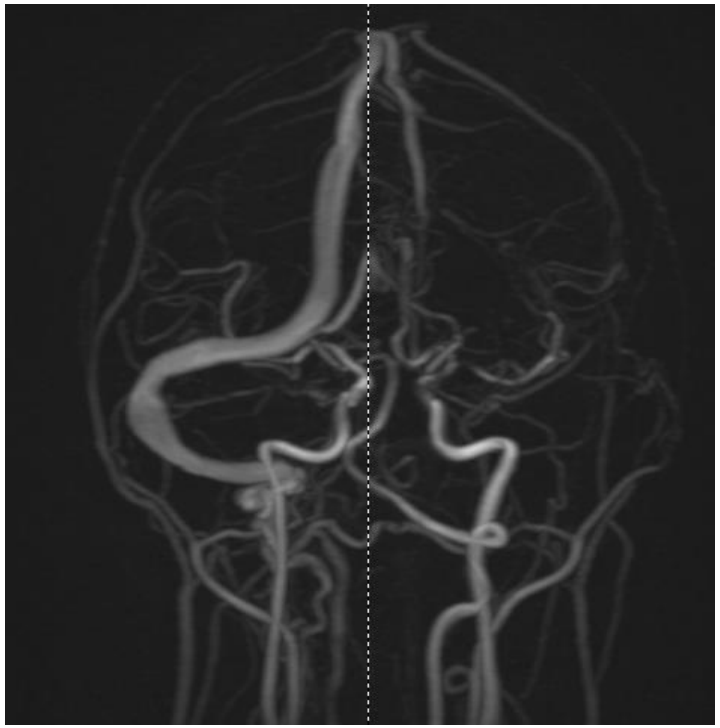




What caused the hemorrhage? What imaging do you get next?









Cerebral venous sinus thrombosis (CVST)

- Risk Factors
  - Hypercoagulable states
  - Cancer
  - OCPs, pregnancy and post-partum
  - Dehydration
- Mimics Idiopathic Intracranial Hypertension
- Present with
  - Venous infarcts
  - Intracranial Hemorrhage
  - Seizures

How would you treat her?

A. Keppra 500mg IV BID

B. Heparin drip and transition to OAC

C. IR for local alteplase

D. no anti-coagulant or anti-platelet due to hemorrhage

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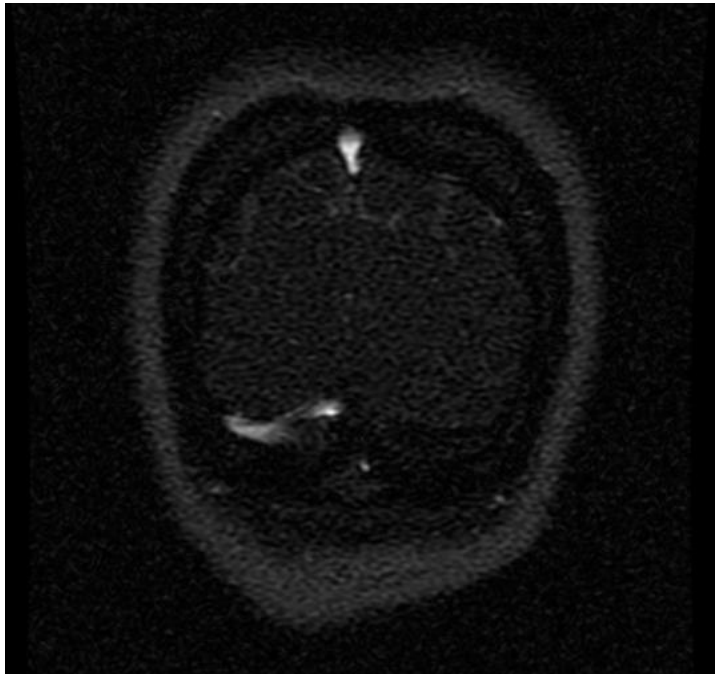
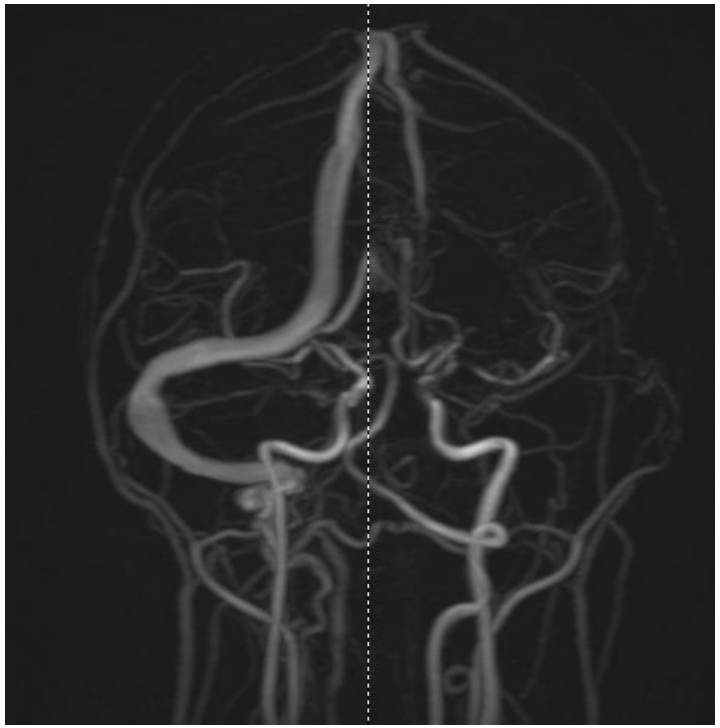
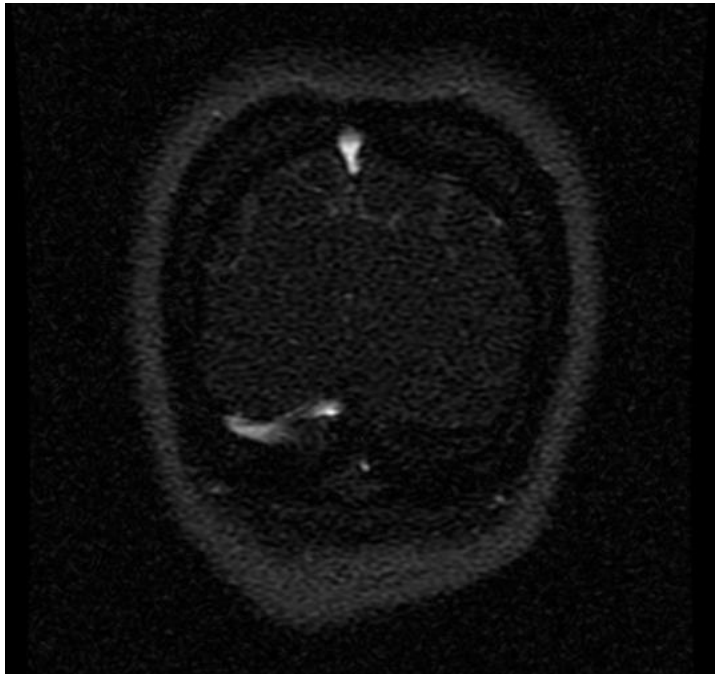


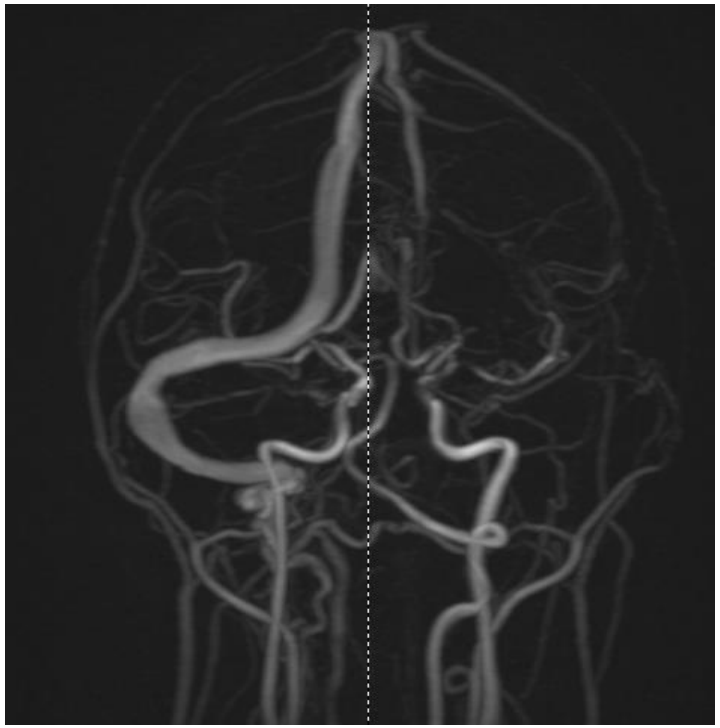


Cerebral venous sinus thrombosis (CVST)

Let's say the thrombosis never goes away.
What complications can you expect?

What would be the long-term treatment?





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Case 4

23F with PMH migraine, well treated depression, pre-eclampsia and allergies is 32 weeks pregnant. Over the past 5 days she has had recurrent headache that comes on suddenly and gradually eases throughout the day. It seems to be well controlled with eucalyptus oil and massage. Her co-workers called 911 when she developed her daily headache but then also left sided weakness and drowsiness.

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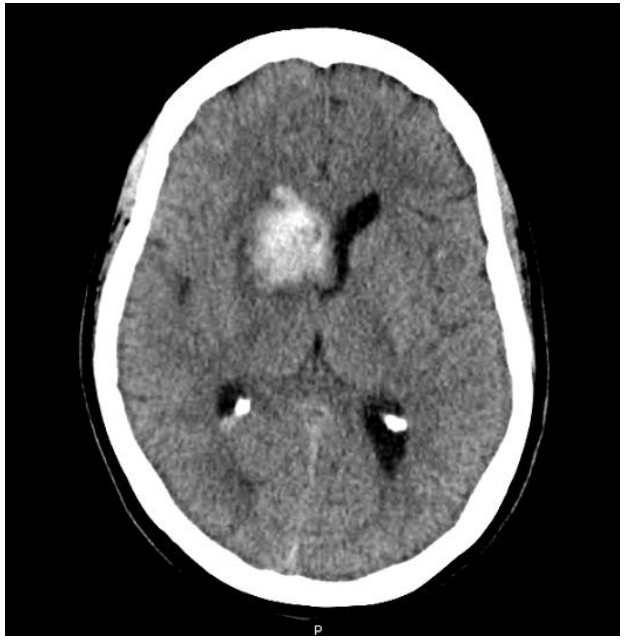
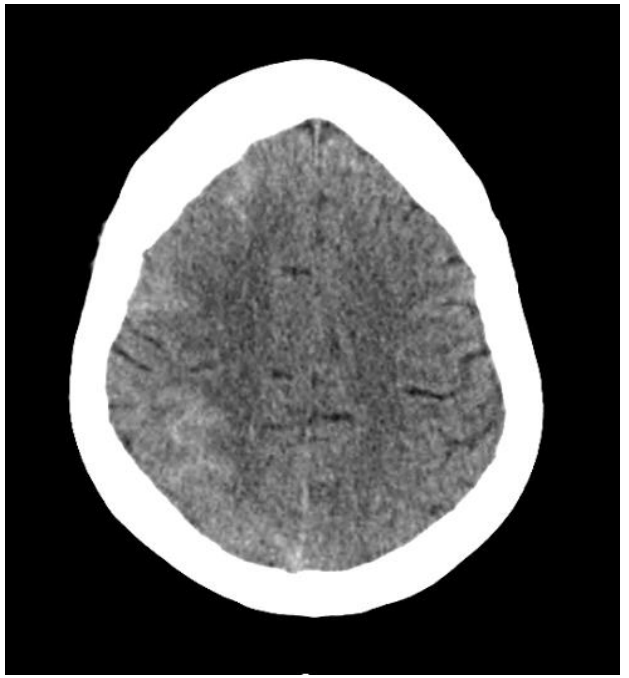
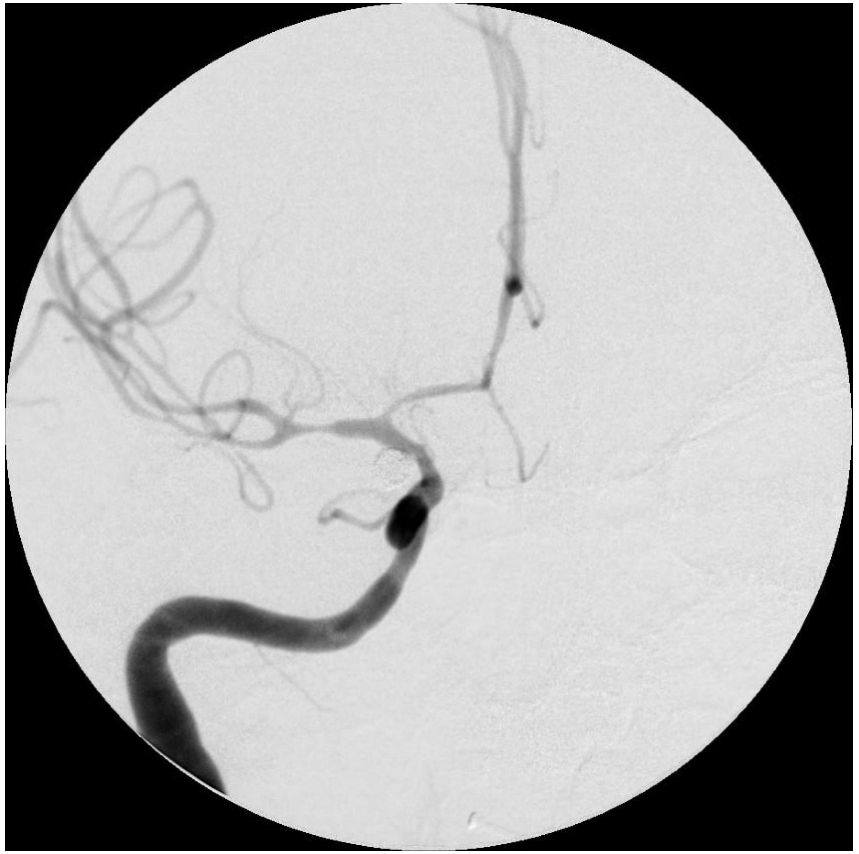
What do you see on CT?

A. Intracranial hemorrhage
B. Calcified caudate head
C. Subarachnoid hemorrhage
D. Traumatic hemorrhage
E. Both A and C





She undergoes a cerebral angiogram. What is the secondary diagnosis?



A. RCVS

B. Aneurysmal SAH

C. Primary CNS vasculitis

D. Atherosclerotic plaque

RCVS

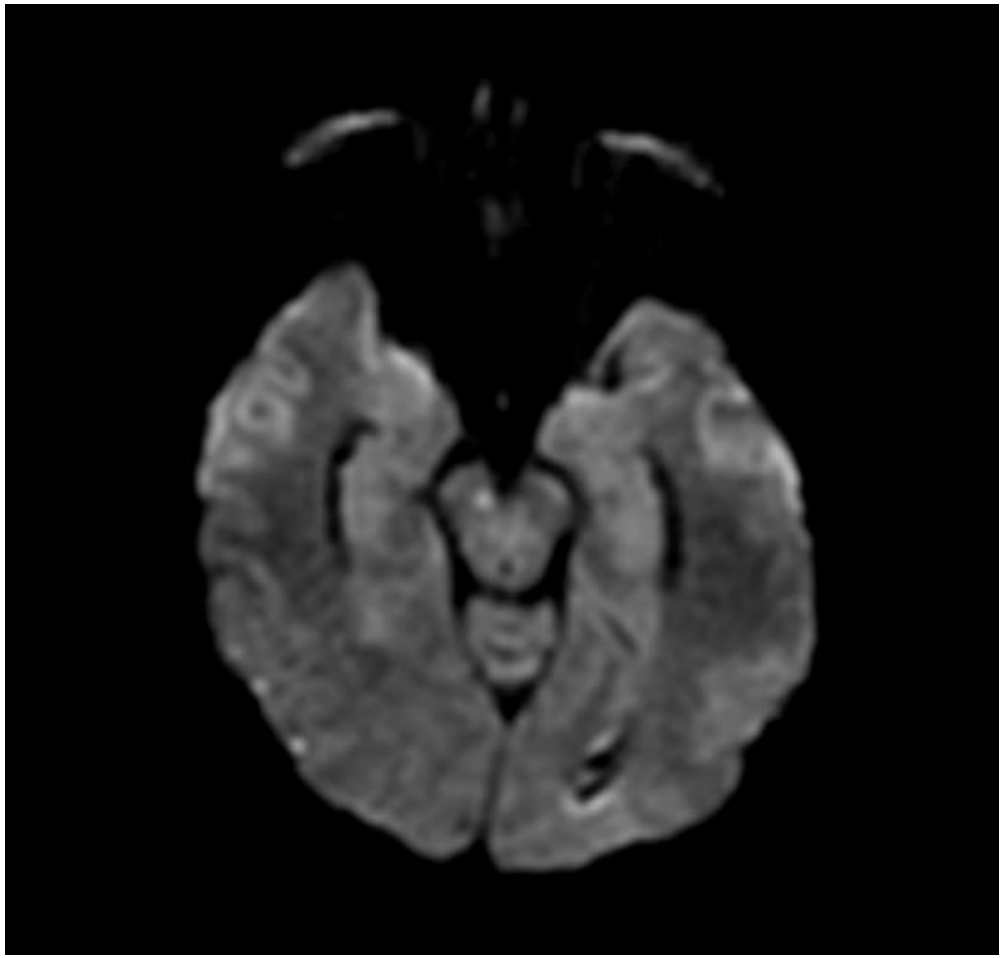
- Vasospasm typically triggered by serotonergic or adrenergic stimulus.
- Recurrent Thunderclap Headaches
- Women 20-40
- Substances: SSRIs/SNRIs, illicit drugs, decongestants, triptans and ergots
- Delayed imaging findings in 30-70%
- Associated with PRES, stroke, ICH, SAH

RCVS2 Score

- Recurrent or single TCLAP HA
  - Present 5
  - Absent 0
- Carotid artery
  - Affected -2
  - Not 0
- Vasoconstrictive trigger
  - Present 3
  - Absent 0
- Sex
  - Female 1
  - Male0
- SAH
  - Present 1
  - Absent 0

- ≥5 (dx RCVS)
  - 99% specific
  - 90% sensitive
- <2 (excluding RCVS)
  - 100% specific
  - 85% sensitive
- 3-4 (dx RCVS)
  - 86% specificity
  - 10% sensitivity

- Treatment:
  - Nimodipine 60mg Q4 initially and then can transition to verapamil (helps with HA but not vasospasm)
- Follow-up imaging
  - 3 months
- Headache
  - Address phenotype, avoid possible triggers



Case 5

24 y/o man w/PMH recurrent headache, gradual onset blurry vision presents today with worsening of HA pain and persistent blurry vision.

You review his records and discover he was here last month with the same complaints. You see his CT was w/out abnormalities. Notes say the ED physician wanted to do an LP but the patients HA got better w/Fioricet so the left AMA as he's terrified of needles.

After leaving the ED last month his headache was ok for the rest of the day but it was back again the next morning. His blurry vision never really got any better though and now he's worried about how his bad vision is going to affect his job as a truck driver.

He describes his HA as worse when he lies flat, 10/10 in intensity and so bad it makes him vomit. The vomiting makes the pain so bad he sobs in pain. The HA is also accompanied by/photo and phonophobia, throbbing/pulsating in quality with a pressure behind the eyes.

Case 5

On exam: He's sitting in a dark room, TV off, barf bag in his hands, sitting up in bed.

HEENT: his blurry vision goes away when he looks left. It gets worse when he looks right and you notice his right eye does not abduct with right gaze and on forward gaze seems to slowly adduct. PERRL. Vertical gaze is intact. TTP of neck and shoulders.

Able to touch his chin to his chest, negative Kernigs, negative Brudzinskis signs.

Thoughts?

Case 5

CT head w/acute hydrocephalus, new since last CT.

LP: concerning for viral meningitis

Case 5

69yo woman with two weeks of a diffuse, nearly constant headache that brought her to the ER because it's impacting her daily activities as it's a 6/10. She has a history of migraines but hasn't had one since menopause started. She's had moderate generalized fatigue, some jaw aching that worsens during meals.

She has a normal neurologic exam.

She had a normal CTH in the ER.

Labs are remarkable for a platelet count of 435, Hb 11, normal CMP and TSH

What is most likely on your DD?

- New Daily Persistent Headache
- Migraine with status migrainosus
- Temporal arteritis
- Tension type headache
- Headache secondary to TMJ

What if I give you more history?

- She has no TTP of the supraorbital or occipital nerves but winces with palpation of her temporal arteries.
- Five days ago she had a 20-second episode of right eye vision loss and described it like a curtain came down over the eye.

What would you check next?

- ESR and CRP
- CTA head and neck
- TA biopsy
- temporal artery ultrasound

ACR diagnostic criteria for GCA

3 or more of:

- Age >50
- New-onset headache
- ESR >50 mm/hour
- Temporal artery tenderness or diminished temporal artery pulse
- Abnormal temporal artery biopsy

How would you treat?

- 1 g solumedrol x 3 days
- prednisone 40mg daily
- prednisone 60 mg daily
- aspirin 81mg daily

GCA

- Started on Solumedrol 1g/day and transitioned to 80mg PO.
- Temporal artery biopsy