MAYO CLINIC
HEALTH SYSTEM

EVALUATION OF NEW HEADACHE

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Boca Raton Regional Hospital Internal Medicine Update 2022
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DISCLOSURES

- Speaker for Allergan (previous)
- Speaker for Biohaven (previous)

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LEARNING OBJECTIVES

- Briefly highlight the epidemiology of migraine, define migraine, and “typical” migraine behavior
- Present 5 cases of secondary headache syndromes (with real-life RED FLAGS)
- Demonstrate the SNOOP4 mnemonic for identifying RED FLAGS, and how to incorporate this into every day practice
- Discuss minimum physical examination necessary for all patients with new headaches
- Demonstrate the “reflexive” imaging and labs needed for particular new headache characteristics

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MIGRAINE – A COMMON BRAIN CONDITION

- Prevalence: 12% adults (18% women, 6% men)
- Begins in childhood and persists through most of adult hood
- # 2 most disabling condition in the world (years lived with disability)
- 5th cause of ED visits (3rd amongst women aged 15-64)

Burch R, Rizzoli P, Loder E. The prevalence and impact of migraine and severe headache in the United States: Updated age, sex, and socioeconomic-specific estimates from government health surveys. Headache. 2021 Jan;61(1):60-68.

Lipton, R. B., Bigal, ; M E, Diamond, ; M, Freitag, ; F, Reed, M. L., & Stewart, W. F. (2007). *Migraine prevalence, disease burden, and the need for preventive therapy*.

Steiner, T.J., Stovner, L.J., Jensen, R. et al. Migraine remains second among the world’s causes of disability, and first among young women: findings from GBD2019. J Headache Pain 21, 137 (2020).

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MIGRAINE WITHOUT AURA (ICHD-III)

- At least 5 attacks fulfilling criteria B-D
- Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)
- Headache has at least two of the following characteristics:
  - unilateral location
  - pulsating quality
  - moderate or severe pain intensity
  - aggravation by or causing avoidance of routine physical activity (walking or climbing stairs)
- During headache at least one of the following:
  - nausea and/or vomiting
  - photophobia and phonophobia
- Not attributed to another disorder

Olesen J. The International Classification of Headache Disorders, 3rd edition. Cephalagia. 2013;33(9):629-808. doi:10.1177/0333102413485658

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MIGRAINE WITH AURA (ICHD-III)

- A. At least two attacks fulfilling criteria B and C
- B. One or more of the following fully reversible aura symptoms:
  - visual
  - sensory
  - speech and/or language
  - motor
  - brainstem
  - retinal
- C. At least three of the following six characteristics:
  - at least one aura symptom spreads gradually over ≥5 minutes
  - two or more aura symptoms occur in succession
  - each individual aura symptom lasts 5-60 minutes
  - at least one aura symptom is unilateral
  - at least one aura symptom is positive
  - the aura is accompanied, or followed within 60 minutes, by headache
- D. Not better accounted for by another ICHD-3 diagnosis.

Olesen J. The International Classification of Headache Disorders, 3rd edition. Cephalagia. 2013;33(9):629-808. doi:10.1177/0333102413485658

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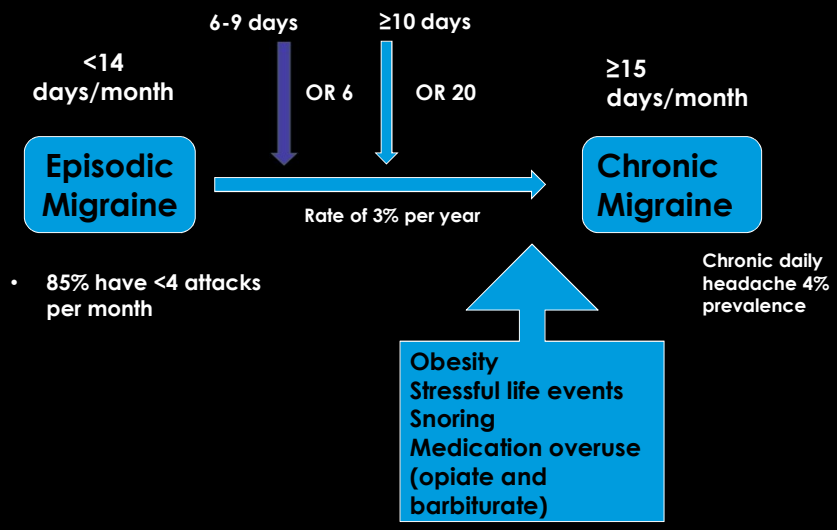
TRANSFORMED MIGRAINE



Lipton RB. Tracing transformation: chronic migraine classification, progression, and epidemiology. Neurology. 2009 Feb 3;72(5 Suppl):S3-7.

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1 CASE: PATTERN CHANGE

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ED CONSULT: 38F WITH TYPE 1 DM, HTN, TYPICAL MIGRAINE

- Migraine since menarche, age 12
- Right sided, throbbing headache, constant, with photophobia, nausea, dizziness, vision changes, not relieved by home medication
- Historically, urgent care once every 2 years, no previous ED visits
- 5th ED visit in 2 weeks, for migraine
  - Migraine cocktails (ketorolac, metoclopramide, Benadryl IV)
  - No head imaging

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ED CONSULT: 38F WITH TYPE 1 DM, HTN, MIGRAINE

Baseline:

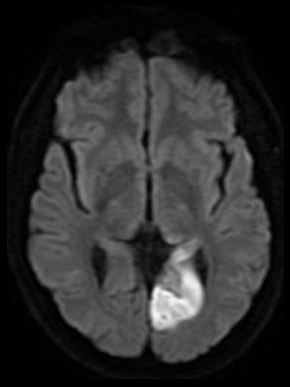
2 migraines / month

Easy to treat with acetaminophen/aspirin/ caffeine

Exam:

BP 160/90

Right homonymous hemianopia



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DIAGNOSIS:
LEFT PCA, ISCHEMIC STROKE SECONDARY TO MOYA-MOYA PHYSIOLOGY, MOST LIKELY DUE TO POORLY CONTROLLED DIABETES

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OTHER CONSIDERATIONS FOR THIS HISTORY:

- Cervical dissection
- RCVS (reversible cerebral vasoconstriction syndrome)

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2 CASE: PATTERN CHANGE AND COMPANY

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ROUTINE CLINIC: 70M WITH GLAUCOMA, HTN, CAD ON PLAVIX, MI, STROKE, AFIB ON WARFARIN AND NEW DAILY HEADACHE X 7 MONTHS

- Current HA:
  - At onset, woke up w/ positive and negative photopsia (monocular, left eye) x 2 hours. 1-2 weeks later, developed throbbing left eye pain, episodic then constant 4 weeks later. Assoc. w/ photophobia, phonophobia, sinus pressure, difficulty concentrating
  - ED → sinus HA. ENT → not sinus. Eye MD → not glaucoma. PCP → migraine with aura. HA now all over and with allodynia. Neurologist → trigeminal neuralgia. MRI brain normal.
  - Context: 20 lb weight loss in 3 month, dry heaving, GI upset, unable to exercise, loss of interest; new anemia, platelets 644
  - ESR 1, CRP <.029
  - Imaging: CT and MRI w/o both show only remote right parietal / occipital infarcts

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ROUTINE CLINIC: 70M WITH GLAUCOMA, HTN, CAD ON PLAVIX, MI, STROKE, AFIB ON WARFARIN AND NEW DAILY HEADACHE X 7 MONTHS

- Previous HA History:
  - Frontal headaches, from age 15 to 20, resolved when he started to exercise
  - Continued in sporadic fashion but only after alcohol or excessive sun
  - No previous history of aura

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ROUTINE CLINIC: 70M WITH GLAUCOMA, HTN, CAD ON PLAVIX, MI, STROKE, AFIB ON WARFARIN AND NEW DAILY HEADACHE X 7 MONTHS

- Workup:
  - Repeat ESR <1; CRP <3.0; ANA neg; H/H 11.4/34.6; Plt 527
  - MRI brain w/wo – no new findings
  - Temporal artery biopsy – negative
  - EDG – esophagitis
  - Colonoscopy – negative
  - Bone marrow biopsy

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DIAGNOSIS:
PRIMARY MYELOFIBROSIS

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OTHER CONSIDERATIONS FOR THIS HISTORY

- Giant cell arteritis
- Malignancy, malignancy, malignancy!

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3 CASE: ONSET AND ASSOCIATED CHARACTERISTICS

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ED FOLLOW UP: 53M WITH CAD, MI, HX STENT, ANGINA, HTN,HLD

- Hx headache with facial numbness
- 2 days prior to ED felt dizzy at work, HR128 (baseline 50s), headache followed, went home
- 1 day prior to ED woke up with vertical double vision (binocular, constant), headache continued, now with severe photophobia
- ED:
  - Temp 36.4 deg C, HR 59, RR 16, BP 132/83, Sat 97%
  - WBC 5.9; ESR <1
  - CT head without contrast normal
  - Tx w/ migraine cocktail, fluids – relief
  - Diagnosed with probable migraine, discharged

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ED FOLLOW UP: 53M WITH CAD, MI, HX STENT, ANGINA, HTN,HLD

Current headache:

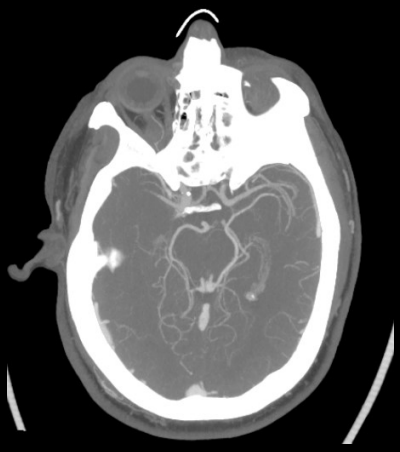
-- Right orbital / hemicranial
-- Pressure, throbbing
-- 2/10 intensity
-- photophobia

Baseline:

-- single HA one year prior, imaging normal

Exam:

-- Eye patch
-- 1mm right ptosis
-- restricted EOM
-- Vertical diplopia
-- Optic nerves normal



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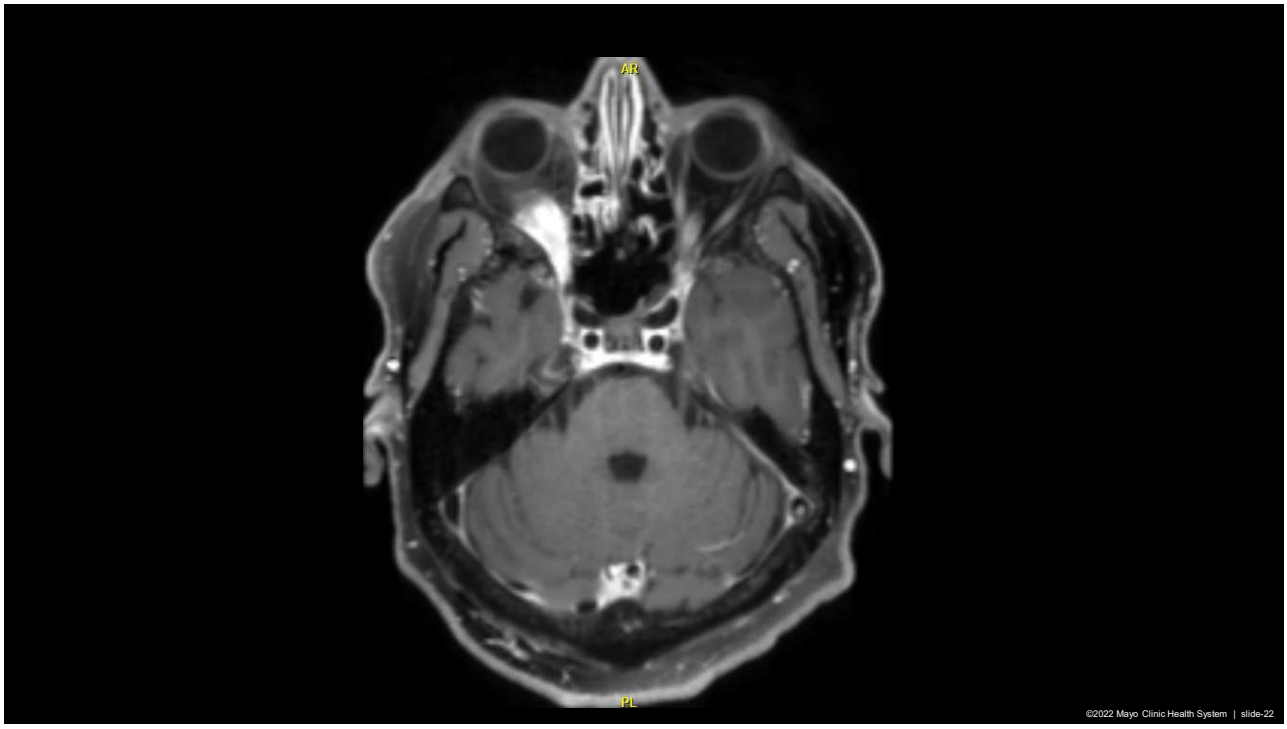

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DIAGNOSIS:
RIGHT ORBITAL APEX SYNDROME

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OTHER CONSIDERATIONS FOR THIS HISTORY:

- Vertebral artery dissection
- Posterior circulation stroke
- Cavernous sinus syndrome
- Pituitary apoplexy

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4 CASE: WORST TIME OF DAY, CHANGE IN PHENOTYPE

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CLINIC: 24F WITH PREDIABETES, HTN, ACNE, HIDRADENITIS SUPPURATIVA, OBESITY

- Baseline HA:
  - Onset at age 15, occurred only with menses until age 18, then 3-4 HA days per week, treated with sumatriptan. Assoc w/ nausea, phonophobia, aura 30% of the time (dark spot with colorful, shiny lines around it lasting 20 min). Sometimes aura without headache.
- Current HA:
  - Past 3 months
  - Waking up every morning with frontal / retroorbital pain and vision is out of focus for 10 minutes. Improves as the day goes on. Harder to fall asleep due to new whooshing in her ears when she lays flat
  - In the month prior, dermatologist started her on doxycycline for HS
  - Has been on Isotretinoin for acne for 6 months. Started injectable progestin-only contraceptive to be on Isoretinoin.

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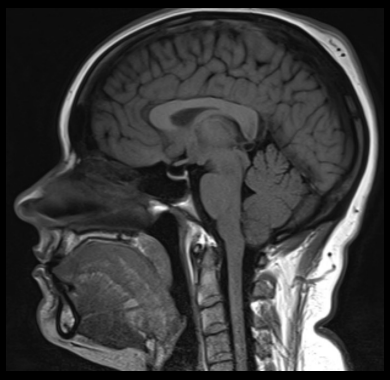

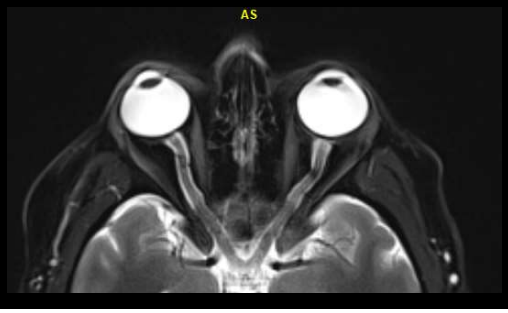

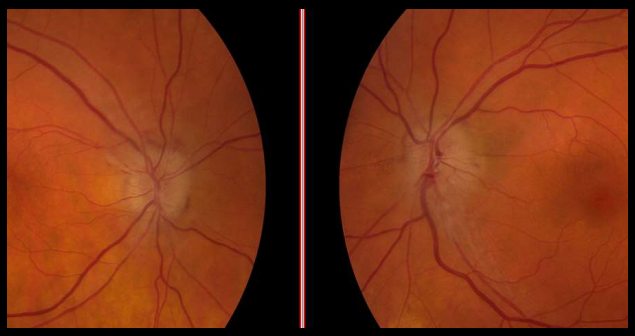

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DIAGNOSIS:
PSEUDOTUMOR CEREBRI SYNDROME

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5 CASE: ONSET, AGE, PRECIPITATION, AND POSITIONAL CHANGE

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ROUTINE CLINIC: 55F WITH HEMOCHROMATOSIS AND NEW DAILY HEADACHES X 13 MONTHS

- Baseline HA:
  - Mild, intermittent, resolved with phlebotomy
- Current HA:
  - September 2020
  - Severe and daily from day 1
  - Frontal, sharp, stabbing
  - Worse with coughing, sneezing. Stopped exercising.
  - AM OK, worse mid day and evening
  - Assoc. with vomiting, dizziness, inability to stay awake, memory "blackouts," slurred speech, imbalance, tremor

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DIAGNOSIS: SPONTANEOUS INTRACRANIAL HYPOTENSION, FROM A CSF-VENOUS FISTULA

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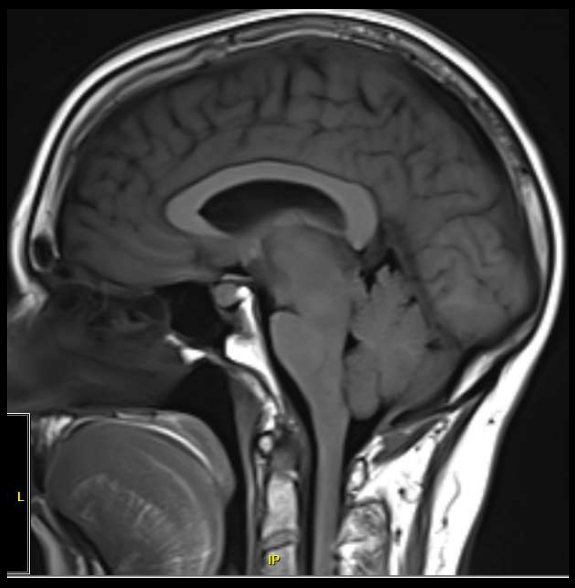

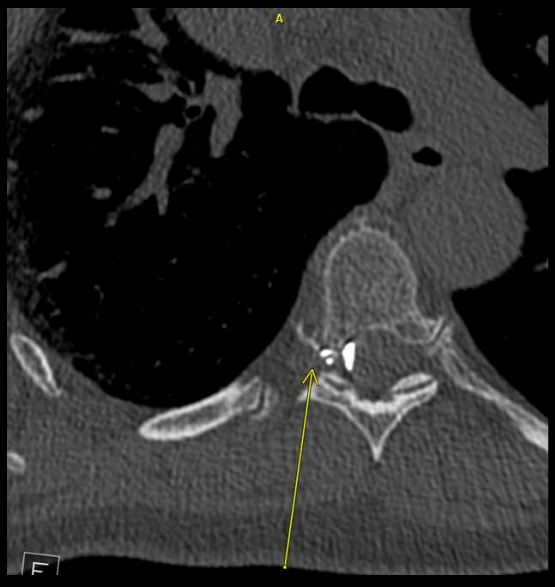

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SNOOPING FOR BAD THINGS

SNOOP4 Mnemonic for Identifying Headache Red Flags	
Red Flag	**Raises Suspicion For:**
Systemic symptoms and signs	Meningitis, vasculitis, cancer, infection
Neurologic symptoms and signs	Neoplasm, stroke
Onset, sudden	Cerebrovascular, CSF leak
Older age at onset (>50 years)	Giant cell arteritis, neoplasm
Pattern change/progression	Neoplasm
Precipitated by Valsalva maneuver	Posterior fossa lesion, CSF leak
Positional aggravation	High or low pressure (CSF leak)
Papilledema	High pressure

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HISTORY – KEY QUESTIONS REGARDING PATTERN

- Prior headache (especially migraine) history
- What was happening with your headaches before they became daily?
- Ask the patient to walk you through the current headache onset moment by moment, especially if aura has occurred –
- Is this the worst headache of your life?
  - Has this ever occurred before
  - What were you doing the moment is started?
  - How long did it take to go from 0 pain to maximum pain ?
- How is this headache different from usual headaches ?

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Things I don't like to hear	
History	**Possible cause**
Feels like regular migraine but: -- much more severe -- constant without medication -- multiple unusual ER trips	Migraineur manifesting pathology as increased migraines
Totally different phenotype from usual migraines -- overnight predominance -- new positional quality -- new Valsalva quality	Migraineur developed new intracranial pressure issue
Thunderclap onset -- especially during intercourse	Subarachnoid hemorrhage or RCVS until proven otherwise
Aura -- all symptoms occurred simultaneously -- vasculopath -- continuous auras -- new auras after age 50	Stroke, with ischemia causing aura Neoplasm causing auras

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EXAM

- Single most important examination: fundoscopic exam
- Vitals signs – they should not have SKY HIGH BLOOD PRESSURE
- Neck exam
  - Palpate occipital nerves
  - Palpate cervical muscles
  - Range of motion – chin to chest
- Full cranial nerve exam
  - Pay attention to autonomic signs – unilateral ptosis, miosis, lacrimation, injection, flushing
    - Office setting: these probably reflect a primary headache syndrome
    - In ED it's probably a carotid or vertebral dissection!
- Screening motor (drift, orbit, finger tapping)
- Screening sensory (temperature in face, proximal arms, proximal legs)
- Coordination and gait

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WORKUP

- Typical headache, no change to pattern – no imaging
- Thunderclap onset – follow SAH protocol
  - CT head, CTA head and neck, LP, MRI
- Dramatic change to pattern – stroke, CSF leak, PTC
  - Brain MRI w/wo
- High pressure symptoms, signs (tumor, venous thrombosis, PTC)
  - CT head, CT venogram
  - MRI brain, MR venogram
- New onset unilateral neck pain, with headache, with autonomic signs or other neuro signs (dissection)
  - CTA head and neck
  - MRI brain to look for stroke

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LABS

- Limited utility unless age >50 or immunocompromised
- ESR, CRP for GCA exclusion
- Immunocompromised – LP for chronic meningitis (fungal, CMV etc)

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SUMMARY

- Migraine is a common brain variant, there will always be patients who manifest secondary headache syndromes as worse/new/different migraines
- Asking about RED FLAGS, for example using the SNOOP4 mnemonic easily identifies the patients most at risk for a secondary headache disorder
- For certain headache disorders, a “normal” non contrast image is not enough – know when to use contrasted imaging, and when to include vascular imaging

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