“The child with headache”

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Disclosures

- None

J.P , 7 year old

- 6 month history of oppressive headache
- More so in the back of his head, seen in the past by family doctor suggested Tylenol PRN (worked initially , but not anymore)
- Getting worse over time, wakes him up in the middle of the night
- Gets worse when he coughs or sneezes
- No family history of headache

J.P case continues

- Mom is worried because he has been declining in school performance
- He has some changes on personality and his mood seems down lately
- O/E- Normal except for some right limb ataxia

Head CT

Objectives

- Describe the approach to a child with headache
- Clinical pearls to differentiate between primary and secondary headaches
- Updates in management of pediatric migraine

Introduction

Headache- the most common neurological symptom

Affects 88%

One of the most common concerns at pediatric visits

Majority primary headaches

Phenotypes may differ from adults

Approach to pediatric headache/ Where do we start?

- **Headache history**
  - Obtain history directly from the child
  - In young children –headache drawing (migraine vs. non migraine)
    - 90% accurate (artistic diagnosis)
    - Ask the caregiver what the child likes to do when she/he gets a headache ?

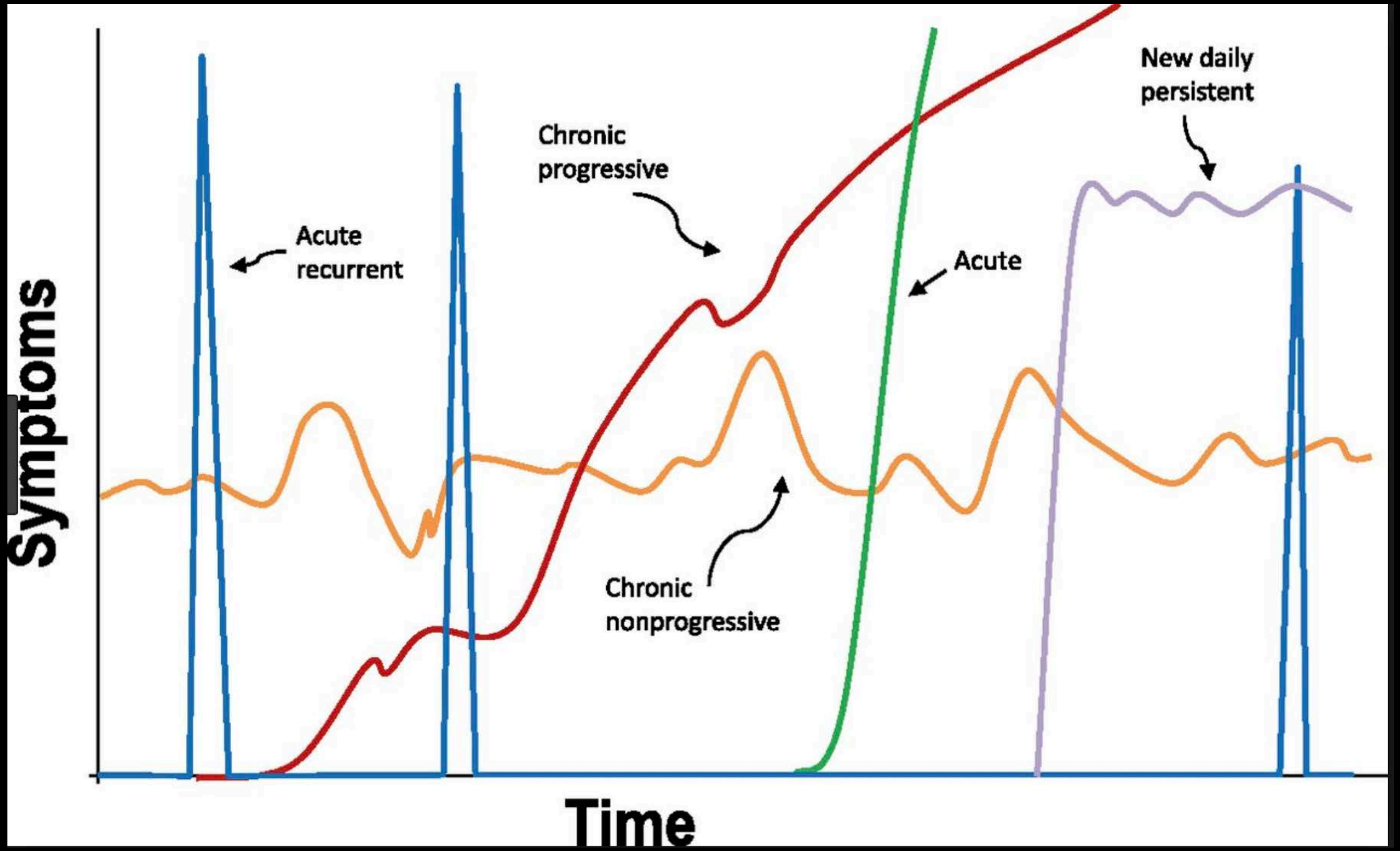

tight rope

Headache pattern

- Initial onset
- Duration
- Temporal pattern
  - Age of first headache, age when headache became troublesome
  - Acute without any history of prior headache (secondary headache)
    - Occupying lesion, vascular process
  - Recurrent episodic pattern- primary headaches
    - Distinct periods of headache freedom
    - Chronic – 15 days > per month for at least 3 months
    - Abrupt onset unremitting daily headache – secondary or newly daily persistent headache (NDPH)

NDPH in children

- Remember the date and circumnstances when headache started
- Preceded by infection
- Most likely starts at the onset of school
- Exclude secondary cause is necessary
- Often misdiagnosed with migraine or tension type headache


Symptoms
Time
Acute recurrent
Chronic progressive
Acute
New daily persistent
Chronic nonprogressive

SEASONAL

ENVIROMENTAL

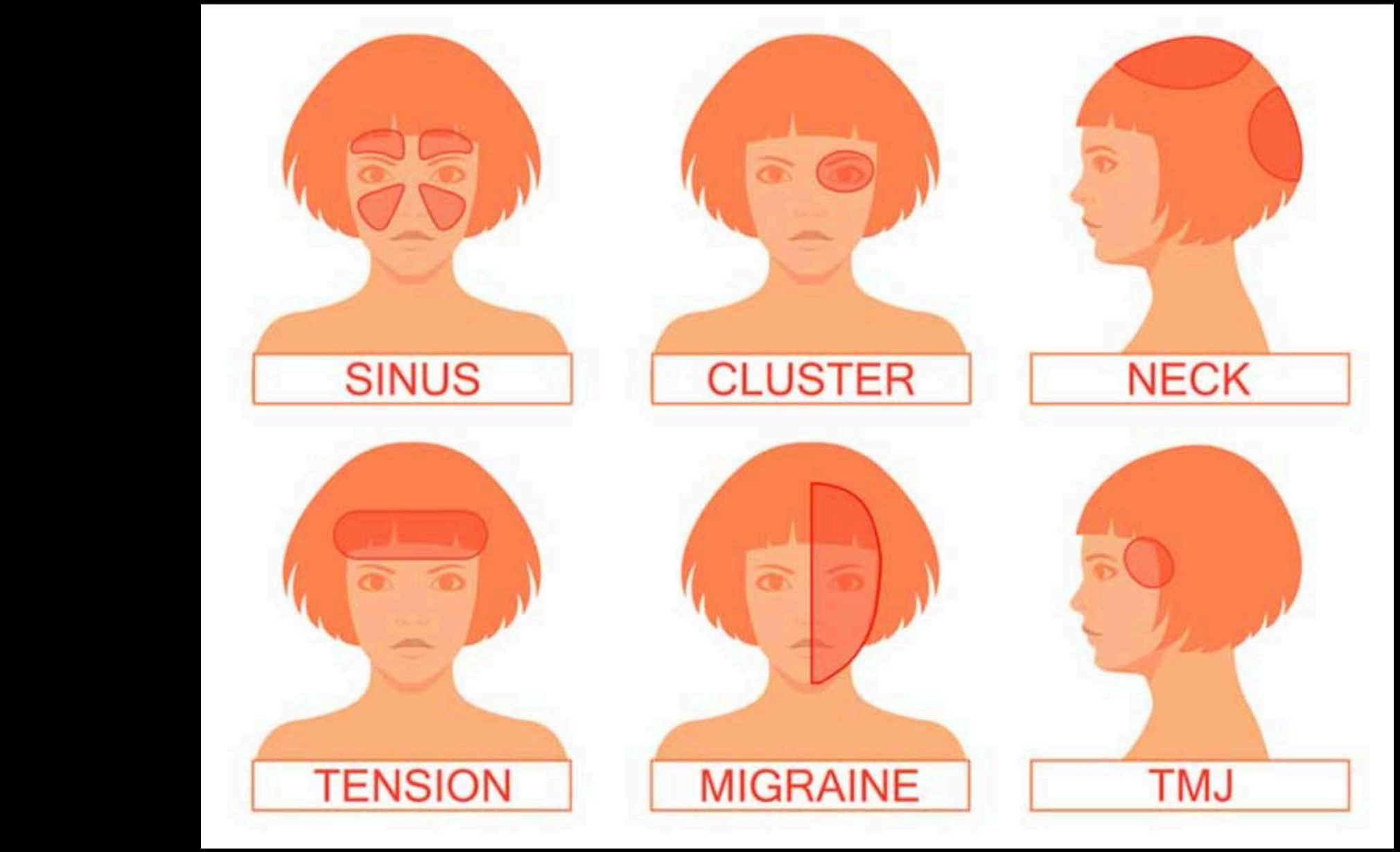
HEADACHE

HORMONAL

PSYCHOSOCIAL

Headache location and duration

- Bilateral frontal/temporal- migraine (minimum 2 hrs)
- Diffuse location – tension type headache (30 min to 7 days)
- Strictly unilateral in a young person may indicate secondary pathology
- Ask the child to point to the location of the pain
- Occipital location -? Secondary pathology

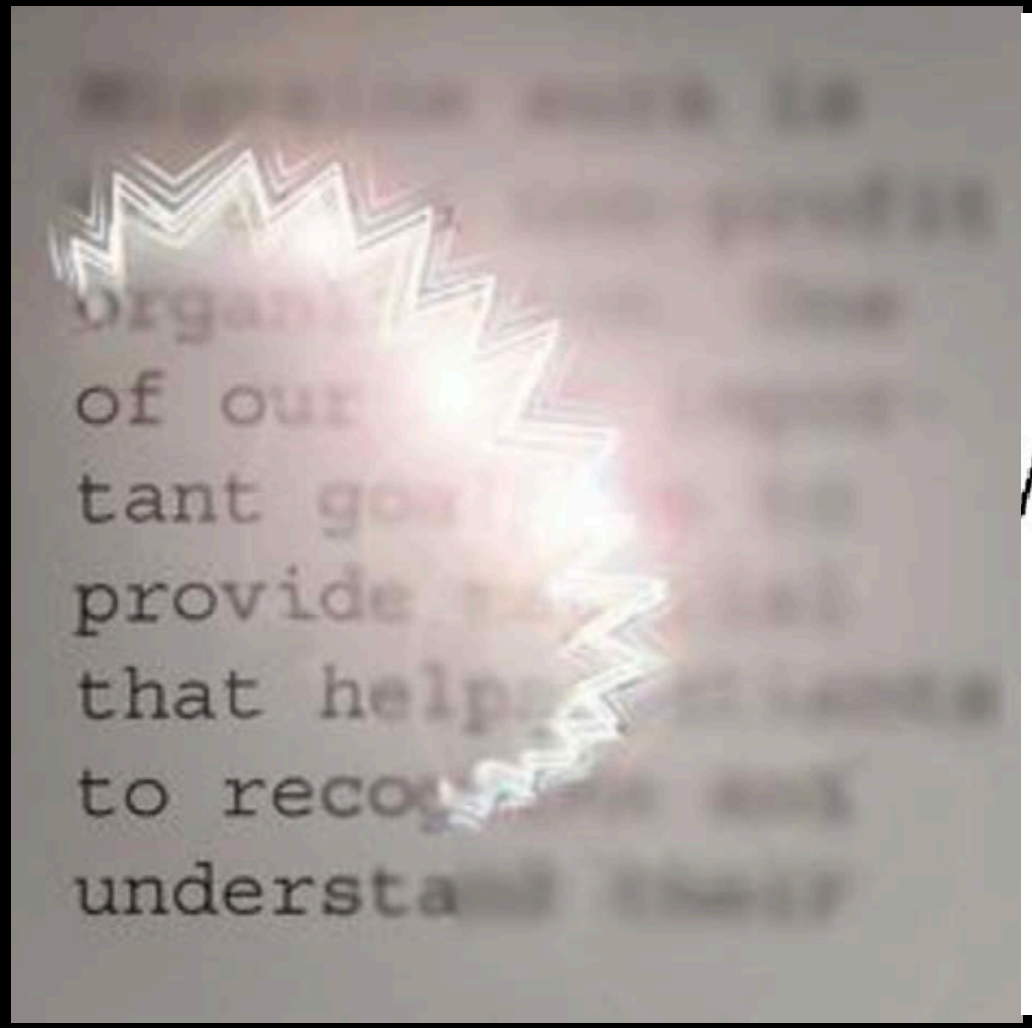

SINUS
CLUSTER
NECK
TENSION
MIGRAINE
TMJ

Associated symptoms

- Primary headaches (migraine , TTH)
  - Nausea and/or vomiting
  - Photophobia and/or phonophobia
  - Osmophobia (33.4% in pediatric migraine and 18.1% in pediatric TTH)
  - Neck stiffness (97%) of children 5 to 17 years with TTH
  - Meningismus 12% pediatric migraine
  - Lightheadedness , vertigo , non pulsatile tinnitus , allodynia and movement sensitivity
  - Cranial autonomic symptoms –nasal stuffiness , lacrimation and facial flushing)

Associated Symptoms –Aura

- Neurological symptom- visual, sensory, brainstem and speech dysfunction that preceds or occur during the migraine
- Usually spread gradually over the course of minutes (enlarging escotomas and sensory phenomena)
- Duration from 5 to 60 minutes , a more rapid progression points towards vascular etiology
- Speech or motor deficits are more challenging and MR shoud be considered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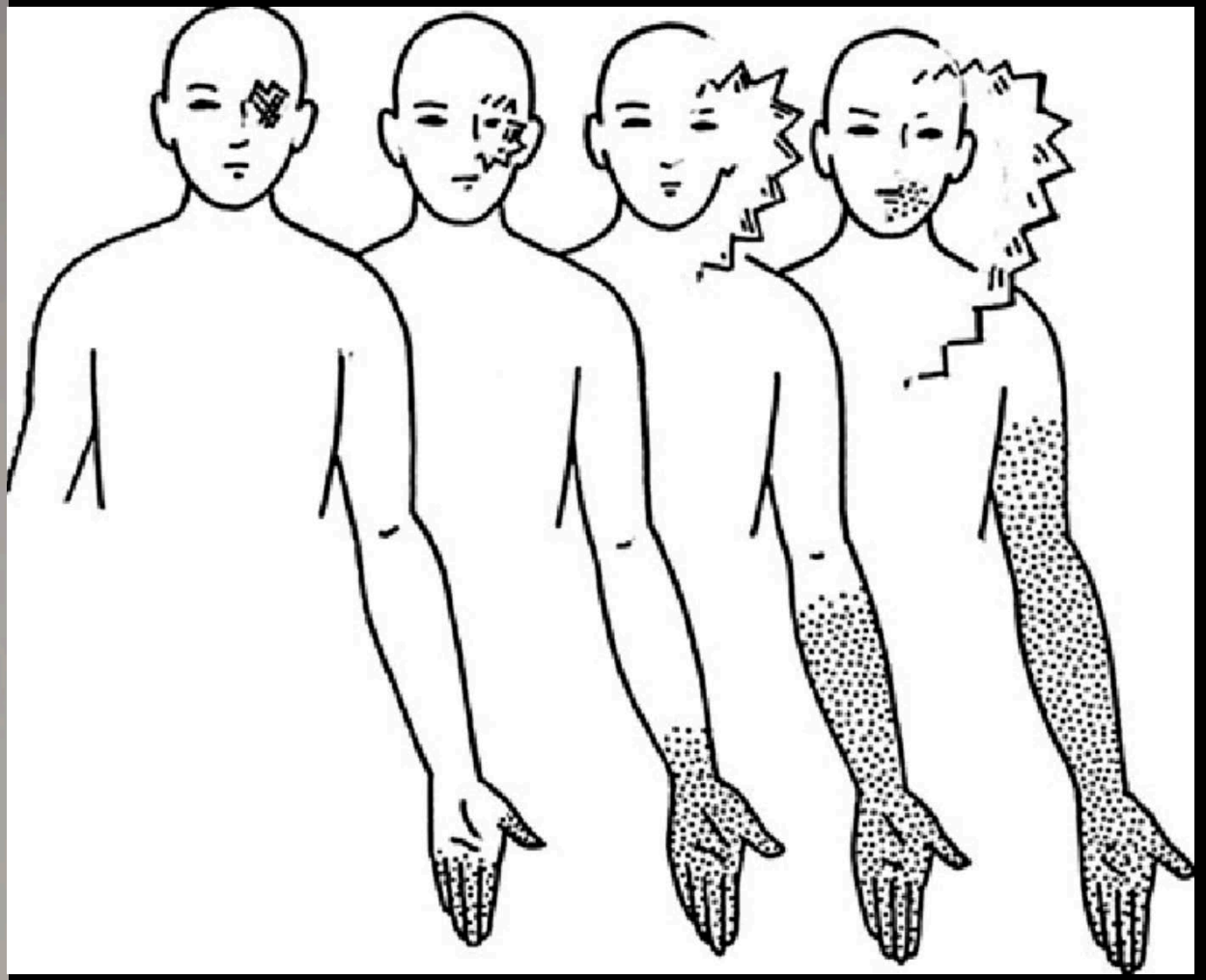


Premonitory Symptoms

- Days before the onset of the migraine headache
- As early as 18 months of age
- Range of symptoms – irritability, anxiety , depression , yawning , difficulty concentrating

Medical history -drugs

- Associated medications
  - OCP
  - Stimulants
  - Tetracycline
  - Lithium
  - Growth Hormone
  - Steroids
  - Medication overuse headache 1/3 to ½ of teens with migraines

Medical History – conditions associated with headache

- Mood and anxiety disorders
- Epilepsy
- Sleep disorders
- ADHD
- Tourette Syndrome
- Atopic disorders
- Vascular conditions (Ischemic Stroke and PFO)

Family and Social history

- Migraine –heritability on 42%
- Meta-analysis of 60,000 individuals with migraine identified 38 individual genomic loci
- Life style and environmental factors also contribute
  - Irregular sleep patterns
  - Poor hydration
  - Skipping meals
  - Lack of excersice
  - Excessive caffeine
  - Stressors at school and at home

Physical Exam

- Primary
  - Normal
- Secondary
  - Growth failure , weight loss , precocious puberty
  - Skin Exam –NF1 stigmata, TS
  - Neuroexam- CV II-Fundoscopy ,pupils , EOM III, IV,VI– papilledema (IIH, occupying lesion)
  - Focal deficits
  - Cerebellar signs

1. Optic nerve edema, O.D.

2. Normal optic nerve with 0.2 cupping, O.S.

Red flags (SNOOPPPY)

- S- Systemic symptoms
- N- abnormal Neurological signs
- O- acute Onset
- O-Occipital
- P-Precipitated by Valsalva
- P- Positional Progressive
- P- Parents –lack of family history
- Y- Years (<6 years old)

Red Flags (Highly associated with neoplasm)

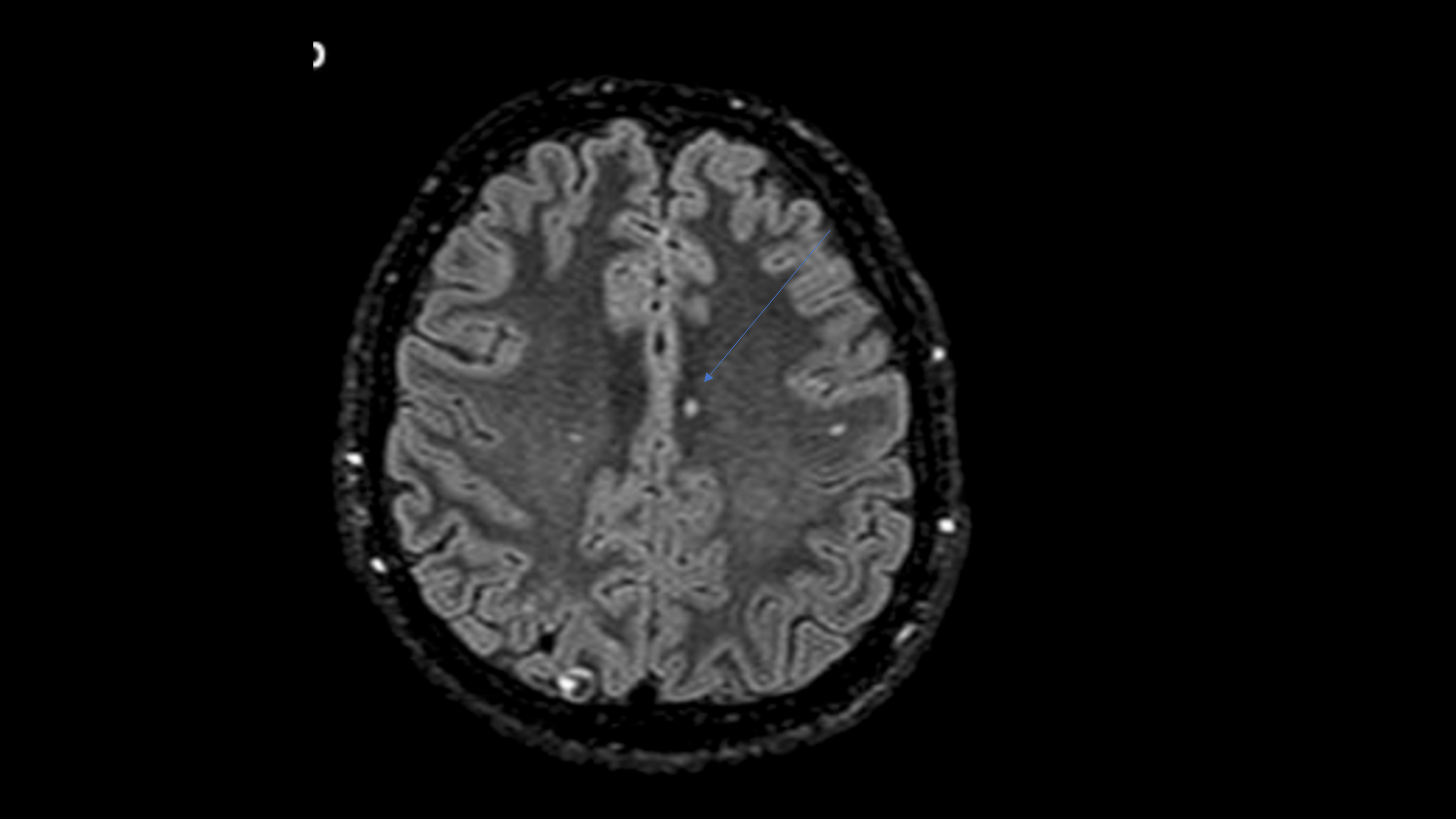
- Focal neurological deficits
- Seizures
- Vomiting (irrespective of time of day)

When to order neuroimaging ?

- Headaches awakening from sleep
- Change in headache frequency
- Lack of family history
- Occipital headache
- New daily persistent headaches
- High risk populations – Sickle cell anemia, history of malignancy, coagulopathy, congenital heart disease

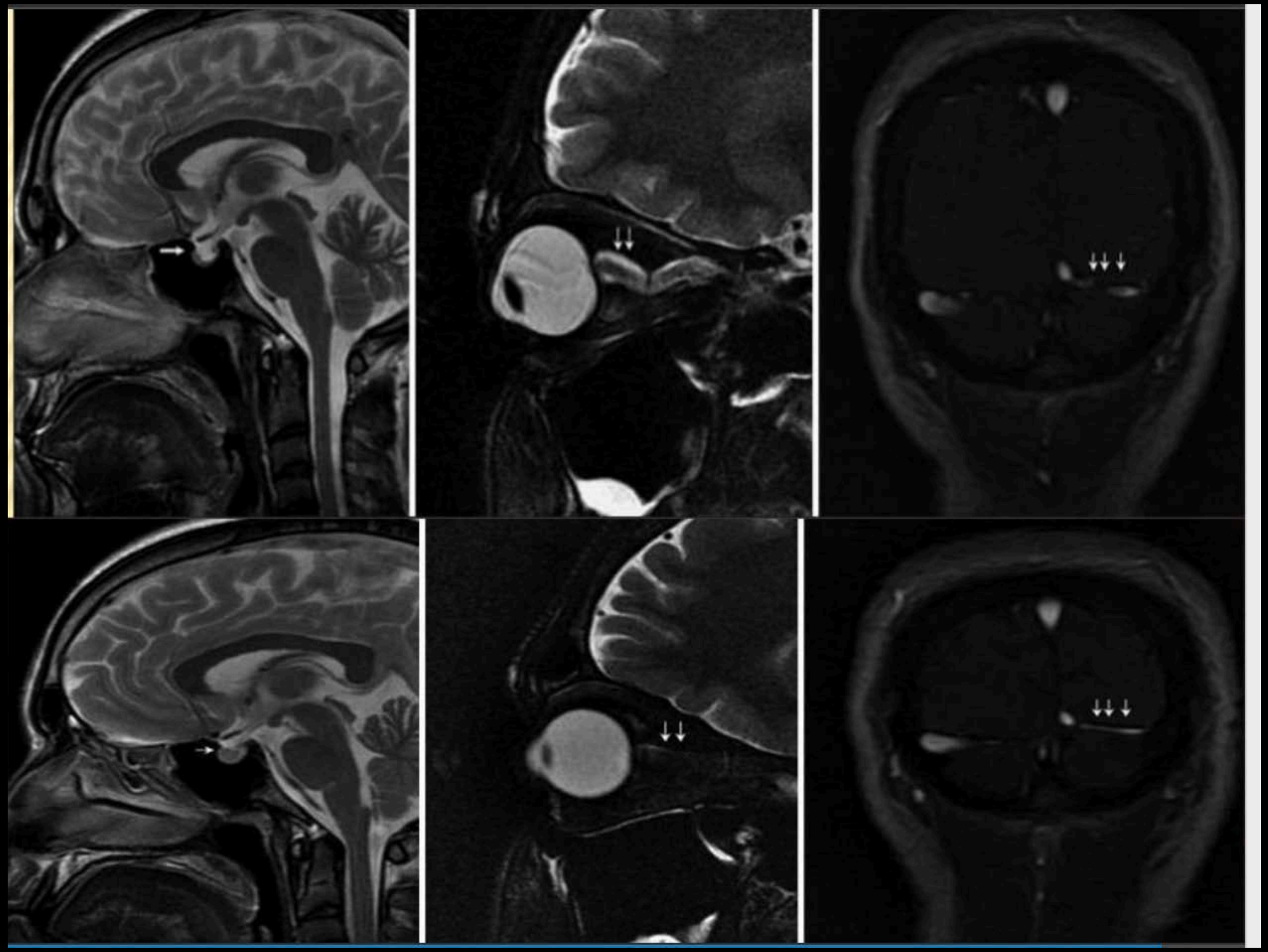
CT head vs MR

- Only in the ER setting (significant concern for intracranial pathology) and MR not available
- MR modality of choice (chronic headache disorders)
- Incidental findings with headache (14 to 28%)-
  - non specific white matter abnormalities , enlarged perivascular spaces, arachnoid cyst and Chiari Type I
  - Extracranial Abnormalities-mucosal thickening, sinusitis



Lumbar puncture ?

- Chronic headache disorder to assess for IIH
  - Positional HA that worsens when lying supine and improves when standing
  - Papilledema without any structural brain lesion
  - Opening preassure (children 28 cm H2O)
    - High volume tap, can be diagnostic if meaningful reduction of headache afterwards
  - MR- empty sella , flattening of the posterior globe , optic nerve sheath distention , tortuous optic nerve, and transverse sinus stenosis
  - Dilated exam of the ON is necessary
- Cell count and diff if meningitis or encephalitis suspected



Case 2, JT

- 6 year old girl
- Headache onset a year back,
- Frequency 2-3 per week, duration 2 to 3 hours , then she is back to normal
- Stops playing , cries and goes to lie down with eyes closed
- When asked where pain is she point to the forehead
- At times she complains of GI discomfort
- Mom has headaches
- Exam –normal

Migraine in children

Migraine in children

- 10% children from 5 to 15 years , up to 28% of adolescents
- Boys slightly higher (prior to puberty), more prevalent in girls afte 11 years

Migraine –definition

- Episodic pain disorder that can vary from an occasional occurrence to daily occurring and can subsequently become very disabling

Migraine-Diagnosis

- Recurrent pain
- Throbbing
- Moderate to severe intensity
- Unilateral or bilateral
- Frontal or temporal location
- Shorter than in adults (2 to 72 hours)

Migraine –associated features

- Nausea and vomiting
- Light and sound sensitivity (inferred based on behavior)
- Pain aggravated by activity
- ++Family history
- 10% of children have auras (visual, sensory, speech, language disturbance, motor or brainstem finings)
- Normal neurological exam

Migraine- challenges associated to peds population

- Misdiagnosed as sinusitis (due to similar features) with autonomic features
- Episodic syndromes
  - Recurrent GI disturbances
  - Cyclic vomiting –predictable when will happen
  - Abdominal migraine-moderate tp severe dull pain in mid abdomen, +/- N/V up to 72 hours with vasomotor symptoms
  - Benign paroxysmal vertigo – nystagmus, ataxia, vomiting ,pallor and fearfulness
  - Benign paroxysmal torticollis

Differences with adult migraines

- Shorter in duration
- GI complains more prominent (abdominal pain, nausea and vomiting)
- Bilateral location
- Frontotemporal
- Photo and phonophobia- inferred by child’s behavior
- Can affect QoL of children and family

Chronic Migraine

- 15 headaches/ month within 8 days characterized as migraines

Migraine- Disability

- Top causes of disability
- 28% of children report moderate to severe disability
  - Miss school, family events , extracurricular and social activities
- Difficulty concentrating
- Stress and isolation
- Psychiatric comorbidities – strong risk factor for headache related disability
- Poor QoL

Powers et al, 2004

Goals of care when managing the migraneous child

- How much does the headache impact QoL?
- Is child missing school?
- Family dynamics and modifiable triggers ?
- Early intervention to prevent chronicity and disability ?

Treatment for Migraines- Multi-D approach

- Pharmachological
  - Acute abortive therapies
    - Anti-inflammatory meds
    - Triptans –approved for children by FDA –Sumatriptan, rizatriptan , zolmitriptan and almotriptan
    - Side effects- fatigue , paresthesias, dizziness and taste disturbances
  - Preventive medications
- Non Pharmachological
  - life style modifications
  - Behavioral therapies
    - CBT, mindfulness
- CBT+Amitriptyline

Migraine- When to prescribe preventive medication?

- Migraine is disabling or occurring at regular basis
  - Headaches occurring 1 per week or more

- Goal- significant reduction on headache frequency, and imrproving on headache related disability

Current available medications for children with migraine

- Flunarizine
- Propranolol
- Amitriptyline
- Divalproex
- Topiramate

Migraine management -What is new?

- CHAMP (childhood and adolescent migraine prevention study)
  - Three arm , RCT , double blind placeno
  - Amitriptyline vs Topiramate

Hershey,et al. 2013

Migraine Prophylaxis

- Amitriptyline
  - Migraine prevention adults and children
  - Open label trial 192 children (mean age 12 years) frequent HA (>3/month)
  - Dose 1 mg/kg/day
  - 80% reduction in frequency and severity but not in duration
  - Most common side effect - sedation
- Topiramate
  - FDA approved >12 y and older for migraine prevention
  - Class II evidence in adults 100 to 200mg /day
  - RCT > 70 reduction of migraine in children

Hershey,et al. 2013

CHAMP study- primary outcome 50% reduction HA frequency

Table 1 Specific aims of the CHAMP study [3, 17••]

Aim 1	To test if amitriptyline is superior to placebo in reducing headache frequency and headache-related disability
Aim 2	To test if topiramate is superior to placebo in reducing headache frequency and headache-related disability
Aim 3	To evaluate the tolerability and side effects for each therapy
Aim 4	To compare the efficacy of amitriptyline and topiramate in reducing headache frequency and headache-related disability

Hershey,et al. 2013

Migraine –CHAMP trial

- Largest study of migraine prevention in paediatric population
- Children from 8 to 17 years
- Meet criteria for migraine (ICHD-II)
- Prospective headache diary during a 28-day baseline
- Total of 488 patients enrolled

Hershey,et al. 2013

Migraine- CHAMP trial results

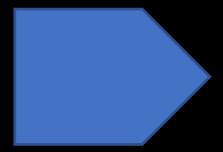
- 3 arms
  - Amitriptyline – target dose 1 mg/kg
  - Topiramate – 2 mg/kg
  - Placebo

- Results
  - No significant differences in primary outcome , around 50 to 60% on each group had a 50% reduction on headache, disability and headache days did not differed among groups
  - Higher rates of adverse effects –groups of Amitriptyline and topiramate
  - High placebo effect- due to “expectations of clinical benefits from daily medications”

Hershey,et al. 2013

Status migrainosus

- Migraine lasting more than 72 hours
  - ER management
  - IV saline infusion
  - IV Ketorolac (0.5 mg/kg-max dose 30 mg)
  - IV prochloperazine (0.15mg/kg-max dose 10 mg)



50% reduction within 50 min

- Other options
  - Dihidroergotamine (DHE)- 0.5 to 1 mg (high dose), or 0.1 to 0.2 mg/kg (low dose) q/8 hours – pretreatment with metoclopramide or prochlorperazine

Take home messages

- A throrough hostory and examination can differentiate between primary and secondary headaches
- Primary headaches in pediatrics are different to those in adults
- Pediatric migraines can affect the QoL and cause significant disability, a multi-D approach is potentially more beneficial to manage the headache condition

Western