

# Headaches in Children

Farjam Farzam, M.D.  
Pediatric Neurology  
University of Kentucky

# Headaches in Children

- Common complaint in pediatric population.
- All age groups.
- 2-3 years old.
- Teenagers/Adolescents.
- <2 years: uncertain diagnosis.

# Headaches in Children

- Prevalence:
  - 7 years old: 35-50%
  - 15 years old: 60-80%

# Headaches in Children

- Common referral to Pediatric Neurologists.
- Relieve pain/discomfort.
- Relieve parental anxiety/fears.
- Exclude intracranial disease: Brain tumors, Aneurysm.
- Misinterpreted by PCP/families: Allergies, sinusitis, eye sight.

# Headaches in Children

- Challenging diagnosis in young children.
- Limited verbal, language abilities.
- Poor localization, quality.
- Non-specific complaint.
- Pain rating scale: not helpful.
- Associated with other illnesses.

# Headaches in Children

- Serious impact:
  - Physical*
  - Emotional*: stress, anxiety, anger.
  - Social*: parents, employments.
  - Academic*: absenteeism, grades.
  - Financial*: medications, jobs.

# Sources of Headache Pain

- Intracranial:

- Cerebral Arteries
- Dural Arteries
- Large Cerebral Veins
- Venous Sinuses
- Dura Mater brain base

- Extracranial:

- Skull muscles
- Extracranial Arteries
- Sinuses
- Periosteum
- Cervical roots: C1-C3
- Cranial nerves: CN5

# Common Headache Mechanisms

- Inflammation
- Vasodilation.
- Displacement.
- Traction.
- Stretch.
- Prolonged muscle contractions.



# International Classification of Headache Disorders

- **Primary Headache Disorders**
- **Secondary Headaches**

# Primary Headache Disorders

- Migraine Headaches
- Tension-type Headaches
- Cluster Headaches
- Hemicranium continuum

## **Secondary Headache Disorders:**

- Infections: CNS, OM, Sinusitis.**
- Inflammatory disorders: Vasculitis, SLE**
- Head trauma**
- Tumors, Abscess**
- Stroke**
- Seizures**
- Pseudotumor cerebri**
- Toxicity, Withdrawal: Caffeine**
- Hypertension**

# Common Clinical Headache Patterns

- a) *Acute Recurrent*: migraines
- b) *Acute Generalized*: systemic illnesses
- c) *Acute Localized*: OM, sinusitis, trauma
- d) *Chronic Progressive*: masses, hemorrhage
- e) *Chronic Non-progressive*:  
depression, anxiety

# Evaluation of Headaches

- Onset: new or chronic
- Location
- Quality
- Frequency
- Severity
- Duration
- Pattern
- Triggering factors
- Function
- Impact

# Migraine Headaches

- 75% of all headache referrals.
- Hereditary disorder.
- Family history: 90%
- All races and ethnic groups.

# Migraine Headaches

- **Prevalence:**
  - < 7 years: 2.5%
  - 7 years-puberty: 5%
  - Postpubertal: 10%
- ❖ **Gender:** Female to Male
  - Same: < 7 years
  - 3:2 > 7 years
  - Estrogen Factor

# Migraine Headaches

- *Triggering Factors:*

- Stress

- Exercise

- Foods: Chocolate, Caffeine, Cheese, MSG, Nitrites, Aspartame, Nuts, Alcohol.



# Migraine Headaches

- *Triggering Factors:*
  - Sleep deprivation
  - Head Trauma
  - Oral contraceptives
  - Allergies
  - Environmental pollution.

# Migraine Headaches: Clinical Syndromes

## \*International Headache Society (IHS) classification:

A) Migraine without Aura (Common)

B) Migraine with Aura (Classic)

*-Complicated migraines*

C) Childhood Periodic Syndromes

# Classic Migraine Headaches

□ Biphasic Event:

a) Auras:

- Waves of cortical excitation.
- Neuronal depolarization (Ca<sup>+</sup> channels)
- Back to front.
- Decreased blood flow: no true ischemia.
- Transient neurological disturbances.

# Classic Migraine Headaches

- *Auras:*

- Visual:

- Dots, spots, colored/sparkling lines,  
Hemianopia, Transient blindness.

- Others:

- Paresthesia, Aphasia, Confusion, Weakness.

# Classic Migraine Headaches

b) Increased Blood flow:

- Trigeminovascular system activation

- Headache: dull, intensifies.

Forehead, temples, eyes, diffuse.

Unilateral or Bilateral.

- Nausea, Vomit, Photophobia, Phonophobia

- Sleep: helpful.

# Classic Migraine Headaches

- Attacks:
  - Auras alone.
  - Headaches alone.
  - Both.

# Common Migraine Headaches

- More common type.
- Monophasic.
- No auras.
- Headache, nausea, vomit, photophobia, phonophobia.
- Sleep: helpful.

# Migraine Equivalent Syndrome

- Now under Migraine with Aura.
- Term is no longer used.
- Focal, complicated migraine patterns.
  
- Familial Hemiplegic Migraine
- Sporadic Hemiplegic Migraine
- Basilar Migraine.



# IHS Classification of Migraines

- *Ophthalmoplegic Migraines:*

- Omitted
- Under Cranial Neuralgias
- CN III, IV, VI, headaches.

- ❖ *Confusional Migraines:*

- Omitted
- Overlap of hemiplegic and basilar types.

# IHS Classification of Migraines

- *Childhood Periodic Syndromes:*

- \* Precursors of Migraine:

- Cyclic Vomiting

- Abdominal Migraine

- Benign Paroxysmal Vertigo of childhood

- Benign Paroxysmal Torticollis

# Migraine Headaches

- Diagnosis:
  - History
  - Physical Exam: general, neurological
  - Neuroimaging:
    - \* Not routinely recommended.

# Migraine Headaches

- Neuroimaging: CT, MRI of brain

Abnormal exam

Atypical features

Progressive symptoms

Seizures

Uncertain diagnosis

# Management of Migraine

- Education
- Acute Attacks
- Prophylaxis

# Education

- Reassurance
- Lifelong condition
- Hope/Optimism
- Avoid narcotics, addictive drugs, triggers:  
Stress, sleep deprivation, diet, alcohol,  
pollution, allergies, exertion.

# Acute Attacks

- Ibuprofen
- Acetaminophen
- Excedrin
- Indomethacin.
- Hypnotics:
  - Promethazine (Phenergan)
  - Diphenhydramine (Benadryl)
- Antiemetics: Compazine

# Acute Attacks

- Triptans
- Dihydroergotamine (DHE):
  - Migranol
  - Nasal spray.
  - Intravenous: cardiovascular side effects



# Triptans

- Selective Serotonin Agonists
- Not FDA approved in children.
  - Exception:
    - \* Sumatriptan nasal spray: >12 y.o.
- Off label use common.

# Triptans

- Safe and effective.
- Non-sedative.
- 5-6 years old.

# Common Triptans

- 1) Sumatriptan (Imitrex)
- 2) Zolmitriptan (Zomig)
- 3) Rizatriptan (Maxalt)
- 4) Almotriptan (Axert)
- 5) Frovatriptan (Frova)
- 6) Eletriptan (Relpax)

# Common Triptans

- Imitrex: tablets, nasal sprays, subcutaneous injections.
- Maxalt: sublingual tablets
- Zomig: sublingual tablets, nasal sprays

# Migraine Prophylaxis

- Increasing severity
- Increasing frequency:  $> 3$  per month.
- School absenteeism.
- Effective: 4-6 weeks

# Migraine Prophylaxis

- Tricyclic Antidepressants
  - Amitriptyline (Elavil)
- Beta Blockers:
  - Propranolol (Inderal)
  - CNS effects
  - Avoid in Asthma, CHF, Depression

# Migraine Prophylaxis

## \* Antiepileptic Drugs:

- Valproate (Depakote)
- Topiramate (Topamax)
- Gabapentin (Neurontin)

## ● Antihistamines:

- Cyproheptadine (Periactin)

# Analgesic Rebound Headache

- Common in children; Migraine patients
- Dull, generalized, low intensity
- Frequent, cyclic OTC use
- Interfere with activities
- Management: discontinue/minimize analgesic use
- Effects: 4-6 weeks



# Caffeine Headaches

- Common in children, adolescents.
- Soft drinks, Tea, Coffee, chocolate milk
- Headache: dull, diffuse, frontotemporal areas.
- Anxiety, malaise.

# Caffeine Headache

- Cycle:
  - Use more to relieve/avoid headaches.
  - Addiction
- Mechanism: direct effect, withdrawal
- Management:
  - Discontinue Caffeine
  - Effects: 4-6 weeks

# Tension Headaches

- Stress, Depression, Anxiety
- Divorce, custody battles
- Abuse: physical, sexual, verbal
- School problems
- Peer relations

# Tension Headaches

- Headaches:
  - Dull, aching
  - Diffuse, bilateral
  - Morning: last all day
  - Almost daily
  - No nausea, vomit, photo/phonophobia

# Tension Headaches

- Examination: normal
- Analgesic rebound headache: may be present
- Management:
  - Address/resolve the cause of stress
  - Discontinue analgesics.

# Sinusitis

- Common diagnosis: parents, PCP
- Fever, cough, congestion, poor airway clearing.
- Tenderness: frontal, maxillary sinuses
- Pain behind nose: Ethmoidal, Sphenoidal sinuses.

# Sinusitis

- Increased pain:
  - Blowing nose
  - Bending head forward
- Diagnosis:
  - Clinically, X-Rays, CT scans.
  - Asymptomatic, coincidental.
- Treatment:
  - Decongestants, antibiotics, surgery.

# Pseudotumor Cerebri

- Idiopathic Intracranial Hypertension (IIH)
- Syndrome:
  - Increased Intracranial pressure (ICP)
  - (+/-) Papilledema
  - Normal brain imaging results
  - Normal CSF content.



# Pseudotumor Cerebri

- Idiopathic: >11 years old.
- Causes: < 6 years old.
- Obese, overweight female: common

# Pseudotumor Cerebri

- *Drugs:*

- Vitamin A
- Tetracycline
- Corticosteroids
- Thyroid replacement
- Nalidixic Acid
- Oral Contraceptives

- *Infections:*

- Otitis Media
- Sinusitis
- Mastoiditis

- *Head Trauma*

# Pseudotumor Cerebri

- *Systemic Disorders:*

- Iron Deficiency Anemia
- Leukemia
- SLE
- Vitamin A deficiency
- Vitamin D deficiency
- Polycythemia Vera

- *Metabolic Disorders:*

- Diabetic Ketoacidosis
- Hyperthyroidism
- Hypoparathyroidism
- Pregnancy
- Galactosemia
- Adrenal insufficiency
- Hyperadrenalism

# Pseudotumor Cerebri

- Headache:
  - Diffuse
  - Wake up in AM
  - Night (severe)
  - Increased: coughing, straining, exertion
- Dizziness, irritable, somnolent

# Pseudotumor Cerebri

- *Visual symptoms:*
  - Blurry, double vision
  - Visual loss: temporary or permanent.
- Tinnitus, ataxia, paresthesia.
- *Examination:*
  - Papilledema
  - CN 6 palsy
  - Visual defects

# Pseudotumor Cerebri

- *Diagnosis:*
  - History, examination
  - Head CT, MRI: normal
  - MRV
  - Lumbar puncture: high opening pressure
  - Visual field test/exam

# Pseudotumor Cerebri

- *Management/treatment:*
  - Lumbar Puncture
  - Acetazolamide (Diamox)
  - Lumboperitoneal Shunts
  - Optic Nerve Fenestrations

# Conclusion

- History and examination: key elements.
- Avoid unnecessary imaging
- Identify triggering factors
- Patient education
- Analgesic rebound headache, Caffeine
- Prophylaxis: essential.