Headaches in Children

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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
  - 7 years-puberty: 5%
  - Postpubertal: 10%

  - **Gender:** Female to Male
    - Same: < 7 years
    - 3:2 > 7 years
    - Estrogen Factor

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

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 With Auras

- **Biphasic Event:**
  - **Auras:**
    - Cortical spreading depression.
    - Waves of cortical excitation.
    - Neuronal depolarization (Ca+ channels).
    - Back to front.
    - Transient neurological disturbances.

### Migraine with Auras

- **Auras:**
  - **Visual:**
    - Dots, spots, colored/sparkling lines, Hemianopia, Transient blindness.
  - **Others:**
    - Paresthesia, Aphasia, Confusion, Weakness.

### Migraine with Auras

- **b) Increased Blood flow:**
  - Trigeminovascular system activation
  - Substance P
  - Calcitonin gene related peptide
  - Serotonin: reduced levels
  - Vasoconstriction and vasodilation.

### Migraine without Auras

- **Common Migraine (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 palsies; headaches.

- Confusional Migraines:
  - Omitted
  - Overlap of hemiplegic and basilar types.

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.
- Antiemetics:
  - Prochlorperazine (Compazine)
  - Metochlopramide (Reglan)
  - Promethazine (Phenergan): hypnotic

### Acute Attacks

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

### 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

- Sumatriptan: tablets, nasal sprays, subcutaneous injections.
- Rizatriptan: sublingual tablets
- Zolmitriptan: sublingual tablets, nasal sprays
Acute Attacks

- **Intravenous Valproic Acid**:
  - IV load: 20-30 mg/kg
  - Continuous IV infusion: 1-2 mg/kg/hour
  - 24 to 48 hours.
  - Decrease in severity and intensity (65-70%)

Migraine Prophylaxis

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

Migraine Prophylaxis

- **Beta Blockers**:
  - Propranolol (Inderal): 20-80 mg/day.
  - CNS effects
  - Avoid in Asthma, CHF, Depression

- **Antihistamines**:
  - Cyproheptadine (Periactin)
  - 4 to 8 mg/day.

Migraine Prophylaxis

- **Tricyclic antidepressants**:
  - Amitriptyline (Elavil): 10-50 mg/day.
  - Nortriptyline (Pamelor): 10-50 mg/day.

Migraine Prophylaxis

- **Antiepileptic Drugs**:
  - Valproate (Depakote)
  - Topiramate (Topamax)
  - Gabapentin (Neurontin)
  - Levetiracetam (Keppra)
  - Zonisamide (Zonegran)

Migraine Prophylaxis

- **Calcium channel blockers**:
  - Not as effective.
  - Beneficial for Familial Hemiplegic migraines.
<table>
<thead>
<tr>
<th><strong>Analgesic Rebound Headache</strong></th>
<th><strong>Caffeine Headaches</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Common in children; Migraine patients</td>
<td>• Common in children, adolescents.</td>
</tr>
<tr>
<td>• Dull, generalized, low intensity</td>
<td>• Soft drinks, Tea, Coffee, chocolate milk</td>
</tr>
<tr>
<td>• Frequent, cyclic OTC use</td>
<td>• Headache: dull, diffuse, frontotemporal areas.</td>
</tr>
<tr>
<td>• Interfere with activities</td>
<td>• Anxiety, malaise.</td>
</tr>
<tr>
<td>• Management: discontinue/minimize analgesic use</td>
<td></td>
</tr>
<tr>
<td>• Effects: 4-6 weeks</td>
<td></td>
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</tbody>
</table>

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<thead>
<tr>
<th><strong>Caffeine Headache</strong></th>
<th><strong>Tension Headaches</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cycle: Use more to relieve/avoid headaches. Addiction</td>
<td>• Stress, Depression, Anxiety</td>
</tr>
<tr>
<td>• Mechanism: direct effect, withdrawal</td>
<td>• Divorce, custody battles</td>
</tr>
<tr>
<td>• Management: Discontinue Caffeine</td>
<td>• Abuse: physical, sexual, verbal</td>
</tr>
<tr>
<td>Effects: 4-6 weeks</td>
<td>• School problems</td>
</tr>
<tr>
<td></td>
<td>• Peer relations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tension Headaches</strong></th>
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</tr>
</thead>
<tbody>
<tr>
<td>• Headaches: Dull, aching</td>
<td></td>
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<tr>
<td>• Diffuse, bilateral</td>
<td></td>
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<tr>
<td>• Morning: last all day</td>
<td></td>
</tr>
<tr>
<td>• Almost daily</td>
<td></td>
</tr>
<tr>
<td>• No nausea, vomit, photo/phonophobia</td>
<td><strong>Tension Headaches</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>• Examination: normal</td>
<td>• Analgesic rebound headache: may be present</td>
</tr>
<tr>
<td>• Management: Address/resolve the cause of stress Discontinue analgesics.</td>
<td></td>
</tr>
</tbody>
</table>
### 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)
- 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**

- **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 (severe) - Night
  Increased: coughing, straining, exertion
  Dizziness, irritable, somnolent

- **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.