Pediatric migraine
*Outpatient and ED Management*

**Lawrence Richer MD, MSc, FRCPC**
Associate Professor
Division of Neurology
Department of Pediatrics
University of Alberta

**Disclosures**
- Have attended an ad-board for Topamax (Janssen-Ortho) for use in migraine prophylaxis
- Have participated in recruitment randomized-controlled trial of rizatriptan (Merck)
- No direct financial interests in any product or company related to the treatment of migraine
- Some medications reviewed are not approved to treat migraine in children or adolescents

**Objectives**
- Review of clinical pearls in the evaluation and treatment of children with migraine and other headache disorders.
- Review evidence and emerging options for acute migraine therapy and prophylaxis in children and adolescents.
Headache and migraine are common

- Canadian children/adolescents frequently experience headache
  - 25% report headache at least once per week
- Migraine prevalence
  - 5% in children < 12 years
  - 10%-15% > 12 years
  - Females > males post-puberty

Diagnosis associated with better outcomes

Diagnosis of Migraine

- With or without aura
  - Gradual onset; < 60 mins
- Frontal (unilateral/bilateral)
- Recurring moderate to severe headache
  - Enough to stop usual activity, +/- pulsatile
- Nausea and/or vomiting
- Preference for quiet and dim light
  - Can be assessed by preference or avoidance

ICHD - 3 beta highlights

- Duration 2-72 hours (previously 1 hour)
  - Duration of attack includes sleep
- Very frequent migraine attacks --> chronic migraine
- Migraine with brainstem aura (formerly basilar-type migraine)
- Reclassification of childhood periodic syndromes
Red Flags

- Short history (first or worst)
- Accelerated course (days – weeks)
- Symptoms of raised intracranial pressure
- Personality changes, weakness, seizures or fever
- Neurocutaneous syndrome or systemic illness
- Young age of child (<3 years)

Minimum Examination

- BP and temperature
- Head circumference
- Fundoscopy
- Examination of gait
- Palpation of head and neck
- Skin

Secondary causes

1. Fever (e.g. URTI)
2. Trauma (mTBI)
3. Meningismus
4. Other extracranial infections
5. Papilledema and other neurological sign/symptom
How likely are you to miss something?

• With the following criteria:
  – Clinical features of migraine present
  – Normal neurological examination
  – Well in between attacks

... the diagnostic yield on imaging is < 1%


MANAGEMENT

Reported triggers

**Common**
- stress (48 %)
- few hours of sleep (25 %)
- school work (19 %)
- too few beverages (14 %)
- weather changes (14 %)
- psychol. problems (14 %)
- too much alcohol (7 %)
- electronic media (6 %)

**Less Common**
- less sleep (4 %)
- 2° in bed (4 %)
- menstrual pain (4 %)
- muscle pain (4 %)
- unhealthy diet (3 %)
- eyes (2 %)
- physical activity (2 %)
- other movements (2 %)
- sensibility to light (1 %)

Evidence for migraine drug therapy

<table>
<thead>
<tr>
<th>Pain-free</th>
<th>(95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSAIDs/acet</td>
<td>1.77 (1.30, 2.48)</td>
<td>8.39</td>
</tr>
<tr>
<td>Triptans</td>
<td>1.26 (1.20, 1.31)</td>
<td>91.45</td>
</tr>
<tr>
<td>DHE</td>
<td>0.60 (0.39, 0.92)</td>
<td>0.15</td>
</tr>
<tr>
<td>Overall</td>
<td>1.38 (1.34, 1.54)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis.


Oral analgesics for migraine

<table>
<thead>
<tr>
<th>Drug</th>
<th>T max (mins)</th>
<th>Potency</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>45</td>
<td>++</td>
<td>10 mg/kg (max 800 mg)</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>45-60</td>
<td>++</td>
<td>15 mg/kg (max 1000 mg)</td>
</tr>
<tr>
<td>Naproxen sodium</td>
<td>60</td>
<td>++</td>
<td>&gt;12 years: 220 mg or 275 mg (generic); not controlled release</td>
</tr>
<tr>
<td>Diclofenac potassium (Cambia)*</td>
<td>15-30</td>
<td>+++</td>
<td>&gt;12 years: 50 mg oral solution (safety and effectiveness not established in pediatrics)</td>
</tr>
</tbody>
</table>

*Not approved for pediatric patients

Triptans for migraine

- **Oral**
  - Approved for use in 12 – 17 year olds
  - Almotriptan 6.25 mg or 12.5 mg
  - Not yet approved
  - Rizatriptan wafer 5 or 10 mg
- **Intranasal**
  - Sumatriptan 5 mg or 20 mg IN
  - Zolmitriptan 5 mg IN
- **Subcutaneous**
  - Sumatriptan 6 mg SC
Combination of medications with different mechanisms

<table>
<thead>
<tr>
<th>Drug</th>
<th>Effect</th>
<th>Duration (HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraine 300</td>
<td></td>
<td>1.7 (1.2, 2.2)</td>
</tr>
<tr>
<td>Naproxen 1000</td>
<td></td>
<td>1.4 (1.1, 1.7)</td>
</tr>
<tr>
<td>Naproxen 1000</td>
<td></td>
<td>2.0 (1.5, 2.5)</td>
</tr>
<tr>
<td>Butalbital 50000</td>
<td></td>
<td>1.3 (0.7, 2.4)</td>
</tr>
<tr>
<td>Verapamil 500</td>
<td></td>
<td>1.2 (0.8, 1.7)</td>
</tr>
<tr>
<td>Sertraline 200</td>
<td></td>
<td>1.3 (1.1, 1.6)</td>
</tr>
</tbody>
</table>

Best practices

• Best drug / Right dose / Right time
  • Early treatment (15 to 30 mins from onset)
    • Include school letter
  • Appropriate dose
  • Use rapidly absorbed preparation
  • Combine with metoclopramide
  • No opioids or butalbital-containing meds

Avoid medication overuse (< 2-3 doses/wk)

Establish clear treatment expectations

• Ideal = no headache at 2 hours
• Acceptable = much less headache at 2 hours
• Unacceptable = multiple doses over 24 hours (really means medication NOT working)

Consider prophylaxis early!
Headache and mTBI

- Almost 50%; may be classified as:
  - Post-traumatic migraine
  - Post-traumatic headache
- Post-traumatic migraine => longer recovery
- Risk factors include:
  - Pre-injury chronic pain
  - LOC with amnesia
  - Female or family history of headache

Post-traumatic migraine

- Rest is good, but to a point
- Avoid medication overuse; no opioids!
- Dizziness is often postural
- Prophylaxis – no evidence
  - Vitamin B2, melatonin
  - Amitriptyline
- Manage expectations

Chronic Headache

- Chronic migraine
- Chronic post-traumatic headache/migraine
- Less common:
  - New daily persistent headache
  - Hemicrania continua
  - Chronic tension-type headache
Homeostasis

- e.g. Environment
- Heat
- Sweat
- Stable temperature

Allostasis (physiological/behavioural)

- Conservation of water
- Seek shade
- Decrease urine output

- e.g. Environment
- Heat
- Stable temperature

- HPA axis
- ANS system
- Cytokines
- Other systems

Allostatic load

- Allostatic load
- Attack frequency
- Brain changes

Exercise and migraine

Sleep
• Quality of sleep and sleep hygiene
  – Consistent routine
  – Avoid stimulating activity, beverages, or foods
• Sleep disordered breathing
  – Need to ask
• Delayed sleep phase
  – Common

Other Modifiable factors
• Academic support
• Psychosocial stressors
• Psychiatric co-morbidity
• Medication overuse
• Diet and eating pattern
• Hydration, fluid intake
• Obesity
Rational Medication Choices

- Cyproheptadine
  - < 12 years; poor appetite
- Propranolol
  - Small doses may help with anxiety
- Amitriptyline
  - May help with sleep, anxiety, mood disorder
- Topiramate
  - May help with weight loss
- Botulinum toxin
  - Those who do not tolerate oral medication

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