Disclosures

No financial relationships to disclose

Objectives

• Describe the differences between migraines in pediatric patients and in adults

• Determine which pediatric patients with migraine need imaging

• Describe the expected benefit and possible side effects of migraine prophylaxis medications
Outline

1. Clinical presentation of pediatric migraine
   - Symptoms
   - Typical clinical course
   - Imaging?

2. Review migraine prophylaxis in children and adolescents

3. What's new?
   - Medications
     NEW! CHAMP study
     NEW! Update on butterbur
   - Cognitive Behavioral Therapy
     NEW! CBT helps

Clinical Presentation

**Toddlers to grade school age**
- Short (<30 minutes), frontal headaches
- Facial pallor, dark circles under the eyes
- Nausea, vomiting
- Can infer phonophobia and photophobia from behavior

Clinical Presentation

**Teenagers**
- More like adult migraines
- Frontal, retroorbital or ‘half the head’
- Nausea/vomiting
- Phonophobia, photophobia
- Disabling
- May have an aura
  - Hemisensory loss
  - Scintillating scotoma
  - Homonymous hemianopsia
Typical Clinical Course

- Intermittent migraines
  - Triggers: stress, poor sleep, barometric pressure change, being extra hot, certain foods or smells

- Chronic daily headache
  Migrainous headache >15 days a month for 3 months

Who needs imaging?

Who does NOT need imaging?

AAN Practice Parameter 2002

Reassuring

- Migrainous headache, especially with aura
- >6 months
- Family history of migraine
- Normal neurological exam

Consider Imaging

Risk Factors from the AAN PP:

- Headache < 1 month duration
- Absence of a family history of migraine
- Abnormal neurological exam
- Gait abnormalities
- Seizures

My addendum: No risk factors for CSVT or pseudotumor cerebri

My addenda: Young age (<5-6 years old), hemiplegic migraine
Migraine Prophylaxis FAQs

When to start?
→ when migraines are interfering with school or home life

When to stop?
→ 3-6 months, maybe end of the school year

What medication is best?
→ the one with the least undesirable side effects

Besides medications, what else should patients be doing to prevent migraines?
→ Good sleep, deal with stress/anxiety, healthy eating, daily exercise, mindfulness

Migraine prophylaxis – my top 3

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dose start low and go slow!</th>
<th>Common side effects</th>
<th>Caution Not a full list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyproheptadine*</td>
<td>2-10 mg at night</td>
<td>Sleepiness, increased appetite</td>
<td>Asthma, overweight</td>
</tr>
<tr>
<td>Amitriptyline*</td>
<td>5-30+ mg at night (1mg/kg/day)</td>
<td>Sleepiness, dizziness, increased appetite</td>
<td>Overweight, long QT, depression, taking SSRIs</td>
</tr>
<tr>
<td>Topiramate+</td>
<td>25-50 mg BID (2mg/kg/day)</td>
<td>Dysesthesias, decreased appetite</td>
<td>Thin, eating disorder, depression</td>
</tr>
</tbody>
</table>

*off-label use
+Topiramate is FDA approved for migraine in patients 12-17 years old

What to expect from medications for migraine prophylaxis

Previous studies show...
Medications decrease migraines by ~ 50%
→ not a cure

Medication responder rate is 80-90%
→ most people get better...

Placebo responder rate is 50% or more
→ with or without medications
What’s new in pediatric migraine?

• **CHAMPS study**
  - Update on *butterbur*
  - *CBT helps!*

**NEW! CHAMPS Study**

*NEJM 2017*

- Childhood and Adolescent Migraine Prevention Study
- Ages 8-17 years, 4 or more migraines per month (mean of 11), 361 patients randomized
- **Topiramate 2mg/kg/day vs amitriptyline 1mg/kg/day vs placebo**
  - Dose escalation over 8 weeks
- Endpoint: 50% reduction in # of days of headache per month

**CHAMP results**

- Trial ended after the interim analysis @ 24 weeks showed futility
- Responder rates statistically indistinguishable

<table>
<thead>
<tr>
<th>Primary analysis (intention to treat)</th>
<th>Observed at interim analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amitriptyline</td>
<td>52%</td>
</tr>
<tr>
<td>Topiramate</td>
<td>55%</td>
</tr>
<tr>
<td>Placebo</td>
<td>61%</td>
</tr>
</tbody>
</table>
Side Effects in CHAMPS study

<table>
<thead>
<tr>
<th>Side Effect</th>
<th>Amitriptyline n=244</th>
<th>Topiramate n=245</th>
<th>Placebo n=72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue*</td>
<td>30%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Dry mouth*</td>
<td>25%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Parasthesia*</td>
<td>31%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Weight loss*</td>
<td>8%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Altered mood</td>
<td>n=3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syncope</td>
<td>n=1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>n=1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*statistically significant compared to placebo

CHAMPS take-aways

Most of the time, migraines improve
- with or without medications

Pick the prophylactic medication based on possible side effects

What’s new in pediatric migraine?

• CHAMPS study

• Update on butterbur

• CBT helps!
Nutriceuticals

No studies show efficacy... 
...trend towards improvement

• Magnesium 9mg/kg/day, or 400mg daily

• Riboflavin (vitamin B2) 25-400mg daily

NEW! In 2015, the AAN retired their 2012 recommendation for butterbur due to potential hepatotoxicity

What if prophylaxis isn’t working?

• Correct diagnosis?
  – Cerebral sinovenous thrombosis
  – Pseudotumor cerebri
  – Sleep apnea, tension headache, post-concussion headache etc

• Right expectations
  – Decrease migraines by 50% at best

• Address driving factors
  – Stress management
  – Anxiety/depression
  – Medication overuse

What’s new in pediatric migraine?

Cognitive Behavioral Therapy

• CHAMPS study

• Update on butterbur

• CBT helps!
NEW! CBT + Amitriptyline works
JAMA 2013 and Headache 2016

- CBT + amitriptyline 1mg/kg/day vs headache education + amitriptyline 1mg/kg/day
  – Dose escalation over 8 weeks

- Ages 10-17 years, chronic migraine (>14 days per month, mean 21 days), 135 patients randomized

- Secondary analysis with new endpoint of 4 or less headache days per month

<table>
<thead>
<tr>
<th></th>
<th>CBT + amitriptyline n=64</th>
<th>Headache education + amitriptyline n=71</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial study 2013</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50% reduction in headache days per month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 weeks follow up*</td>
<td>66%</td>
<td>36%</td>
</tr>
<tr>
<td>1 year follow up</td>
<td>86%</td>
<td>69%</td>
</tr>
<tr>
<td><strong>Secondary analysis 2016</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or less headache days per month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 weeks follow up*</td>
<td>47%</td>
<td>20%</td>
</tr>
<tr>
<td>1 year follow up*</td>
<td>72%</td>
<td>52%</td>
</tr>
</tbody>
</table>

* statistically significant

CBT + amitriptyline study take-aways

- Headaches improve in most patients

- CBT was more helpful than headache education in patients with chronic daily headache
Summary Points

• In pediatric patients migraines are shorter and often frontal
• Most patients don’t need imaging
• Migraines improve with time!
• Pick a prophylactic medication based on possible side effects
• Avoid butterbur
• Consider CBT in chronic daily headache

Thanks very much!

Bibliography

AAN Practice Parameter 2002
Bibliography

CHAMP Study

Bibliography

Nutriceuticals

Bibliography

In 2015 AAN retires their 2012 Guideline that had recommended butterbur for migraine prophylaxis

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CBT + Amitriptyline

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