Migraine Treatment: How I Do It for Kids and How It Can Apply to Adults: Case-based Approach

Juliana VanderPluym, MD – Mayo Clinic
Marcy Yonker, MD, FAHS – Director of Pediatric Headache Program, Barrow Neurological Institute at Phoenix Children’s Hospital
Disclosures

- Juliana VanderPluym: No Disclosures
- Marcy Yonker: PI-NINDS, Allergan, Consultant-Amgen, Avanir
- Off label and investigational use of medications for treatment of headache will be discussed
  - FDA-approved medications will be indicated as such
Learning Objectives

• Describe the different ways that migraine can present at different ages, including the episodic syndromes that may be associated with migraine
• State the diagnostic criteria for the episodic syndromes that may be associated with migraine, with particular focus on cyclical vomiting syndrome and abdominal migraine
• Recognize that adults may present with episodic syndromes that may be associated with migraine
• Select treatment options for episodic syndromes that may be associated with migraine in adults and children
Goal

• Establish the association between pediatric and adult migraine by recognizing the spectrum of migraine presentation throughout life and the potential for development or persistence of classically pediatric episodic syndromes in adulthood
<table>
<thead>
<tr>
<th>Case</th>
<th>Time</th>
<th>Patient Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8:00am – 8:30am</td>
<td>24 year old Female with migraine</td>
</tr>
<tr>
<td>2</td>
<td>8:30am – 9:30 am</td>
<td>11 year old Female with headache and abdominal pain</td>
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<tr>
<td>3</td>
<td>9:30am-10:30am</td>
<td>52 year old Male with chronic nausea and vomiting</td>
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<tr>
<td>4</td>
<td>10:30-11:30am</td>
<td>52 year old Female with headache</td>
</tr>
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## Migraine Spectrum Through Life

<table>
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<tr>
<th>Infant Colic</th>
<th>Benign Paroxysmal Torticollis</th>
<th>Benign paroxysmal vertigo</th>
<th>Cyclical Vomiting Syndrome</th>
<th>Abdominal Migraine</th>
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- Infant Colic
- Benign Paroxysmal Torticollis
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- Cyclical Vomiting Syndrome
- Abdominal Migraine
- Pediatric Migraine (Boys)
- Pediatric Migraine (Girls)
International Classification of Headache Disorders, 3rd edition beta

Episodic syndromes that may be associated with migraine
• A1.6.4 Infantile colic
• 1.6.3 Benign paroxysmal torticollis
• 1.6.2 Benign paroxysmal vertigo
• 1.6.1 Recurrent gastrointestinal disturbance
  – 1.6.1.1 Cyclical vomiting syndrome
  – 1.6.1.2 Abdominal migraine
Case 1- 24 year old Female with Migraine

- 24 year old female with known migraine
- Had her first child 2 months ago
- Migraines have returned to frequency prior to pregnancy
- Exhausted, overwhelmed, no time to sleep or eat
  - “She just won’t stop crying. The pediatrician says she has colic. She cries all the time and when I get my migraines her screaming drives me crazy. Maybe I’m just not meant to be a mom. I can’t figure what I’m doing wrong- I stopped breast-feeding, I put her on a hypo-allergenic formula, I carry her, I sing to her, I give her toys...”
Infantile colic

• A. Recurrent episodes of irritability, fussing or crying from birth to 4 months of age, fulfilling criterion B

• B. Both of the following:
  – 1. episodes last for 3 hours per day
  – 2. episodes occur on 3 days per week for 3 weeks

• C. Not attributed to another disorder
• Colic has been suggested as an early life expression of migraine
  – Children with migraine are more likely to have experienced infantile colic compared with controls (OR ranging from 1.6 to 6.6 between different studies)
• Mothers with Migraine have been found to be 2.5 times more likely to have infants with colic than mothers without

• For fathers with Migraine, the likelihood of an infant with colic was increased two-fold


What could this mean for a parent with a colicky infant?

• Excessive and inconsolable crying can lead to caregiver frustration and can be a trigger for shaken baby syndrome
  – 1% of parents of 1-month-old babies admit to have shaken their child at least once to try to stop crying
  – By the age of 6 months, 5.6% of parents have shaken, slapped or smothered the baby in attempt to stop crying

How can you help a parent with a colicky infant?

• Educating parents about the association between infant colic and migraine may help them understand why their baby is crying so much
  – Alleviate guilt or concern
  – Reassure that prognosis is good

How can you help a parent with a colicky infant?

- If the parents experience migraine, remind them of what they prefer to do when they have a migraine
  - Photophobia $\rightarrow$ Dim lights
  - Phonophobia $\rightarrow$ Turn down loud music, avoid loud toys, have siblings/pets go to another room
  - Osmophobia $\rightarrow$ Avoid strong smells
  - Worse with activity $\rightarrow$ Rock gently, avoid vigorous bouncing

Case 2-11 yo female

- 11 year old who presents with a history of episodic vomiting, fatigue and photophobia occurring every few months, unassociated with headache for 3-4 years.
- She has been followed by a GI specialist and has had a full workup. She has suffered esophageal tears due to her intractable vomiting.
- She was prescribed oral sumatriptan and oral prochlorperazine which she vomited. She was typically hospitalized and given IV ondansetron and a benzodiazepine when these episodes have occurred.
Case 2-11 yo female

- She presents today with a complaint of episodes of stomach pain followed by an 8/10 headache that lasts for a few days. She feels like the top of her head is “bruised” but denies a throbbing nature.
- She becomes extremely fatigued and feels “queasy” but denies photo/phonophobia.
- The headaches remit spontaneously, then she is ravenously hungry.
- She has continued to have episodes of recurrent vomiting, however, they have been occurring less frequently since her new episodes have begun.
Case 2-11 yo female

• Her neurologic exam is normal.
• Mother has episodic migraine.
Recurrent gastrointestinal disturbance

ICHD 3 beta:

• A. At least five attacks with distinct episodes of abdominal pain and/or discomfort and/or nausea and/or vomiting
• B. Normal gastrointestinal examination and evaluation
• C. Not attributed to another disorder.
Cyclic vomiting syndrome

**ICHD 3beta:**
- A. At least five attacks of **intense nausea and vomiting**, fulfilling criteria B and C
- B. Stereotypical in the individual patient and recurring with predictable periodicity
- C. All of the following:
  - 1. Nausea and vomiting occur at least four times per hour
  - 2. Attacks last 1 hour and up to 10 days
  - 3. Attacks occur 1 week apart
- D. Complete freedom from symptoms between attacks
- E. Not attributed to another disorder

**Rome III:**
- Diagnostic criteria **Must include all of the following:**
  - Stereotypical episodes of vomiting regarding onset (acute) and duration (less than one week)
  - Three or more discrete episodes in the prior year
  - Absence of nausea and vomiting between episodes
  - Supportive criterion: History or family history of migraine headaches
Abdominal migraine

ICHD 3beta:
• A. At least five attacks of abdominal pain, fulfilling criteria B–D
• B. Pain has at least two of the following three characteristics:
  – 1. midline location, periumbilical or poorly localized
  – 2. dull or ‘just sore’ quality
  – 3. moderate or severe intensity
• C. During attacks, at least two of the following:
  – 1. anorexia
  – 2. nausea
  – 3. vomiting
  – 4. pallor
• D. Attacks last 2-72 hours when untreated or unsuccessfully treated
• E. Complete freedom from symptoms between attacks
• F. Not attributed to another disorder

Rome III:
• Diagnostic criteria* Must include all of the following:
• Paroxysmal episodes of intense, acute periumbilical pain that lasts for hour or more
• Intervening periods of usual health lasting weeks to months
• The pain interferes with normal activities
• The pain is associated with 2 of the following:
  – a. Anorexia
  – b. Nausea
  – c. Vomiting
  – d. Headache
  – e. Photophobia
  – f. Pallor
• No evidence of an inflammatory, anatomic, metabolic, or neoplastic process considered that explains the subject’s symptoms
• * Criteria fulfilled two or more times in the preceding 12 months
Cyclic Vomiting Syndrome

**Pediatric**
- 2% of children
- Mean age of onset: 5.2 yrs
- Prevalence of:
  - Headache/Migraine 40.5%
  - FHx migraine 27.8%
  - Anxiety/Depression 26.7%
- Delay to Dx 2.6-3.1 yrs
- Prognosis
  - 13 yr F/U study- 61% resolved

**Adult**
- Prevalence unknown
- Mean age of onset 25.4 yrs
- Prevalence of:
  - Headaches/Migraine 56%
  - FHx migraine 56%
  - Anxiety/Depression 39.7%
- Delay to Dx 7.9 yrs
- Prognosis
  - 4 yr F/U study- 87% Sx improvement

Abdominal Migraine

**Pediatric**
- Prevalence 4.1%
- Mean age of onset: 7 yrs
- Prevalence of:
  - Migraine 24%
  - FHx migraine 2x
- Triggers: Stress, Tiredness, Travel, Lack of sleep, Certain foods, Missing a meal

**Adult**
- Rarely reported
- Mean age of onset 30.6 +/- 17 yrs
- Triggers: Night-time, Stress, Food, Alcohol

Prevalence of Migraine Headache in Children with Periodic Syndromes

* Adapted from studies done by Abu-Arafeh et al.
Case 2- 11 year old female

• Episodes of abdominal pain are occurring frequently enough to cause school absence.
Treatment Options

• Evidenced based preventative treatment
  - topiramate, flunarizine
  - non-evidence based: amitriptyline, cyproheptadine, beta blockers etc

• Evidence based acute treatment
  – Rizatriptan down to 6yrs of age
  – 12 and over-sumatriptan nasal, zolmitriptan nasal, almotriptan
Case 2

- Treated with amitriptyline and rizatriptan for abdominal migraine.
- Treated with rectal prochlorperazine for CVS.
- Ultimately evolved into typical episodic migraine without aura and was transitioned to adult care at 18 on topiramate and rizatriptan.
Case 3 - 52 year old Male with nausea and vomiting

• 10 year history of episodes of vomiting

  Ictal:
  – Episodes last 7-10 days (max 15 days)
  – Vomits ~50/day during the episodes
  – Episodes occur every 7-30 days

  Inter-Ictal:
  – Always has some background nausea

• 5 year history of headache in association with vomiting episodes; no headaches outside those episodes
  – Frontal, throbbing, 5-7/10, photophobia, phonophobia, osmophobia

• Meds- Amitriptyline, Butorphanol, L-carnitine, Mirtazipine, Omeprazole, CoQ10, Phenergan, Carbidopa, Ativan

• Social- Regular marijuana use until recently; 5-6 cups of coffee/day

• Family Hx- Migraine in sister and mother

• GI investigations- unremarkable
Case 3- 52 year old Male with nausea and vomiting

• Clinical Features:
  – 10 year history of episodes of vomiting
  – Ictal:
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    • Always has some background nausea
  – 5 year history of headache in association with vomiting episodes; no headaches outside those episodes
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  – Social- Regular marijuana use until recently; 5-6 cups of coffee/day
  – Family Hx- Migraine in sister and mother
  – Investigations- GI evaluation unremarkable

Cyclic Vomiting Syndrome ICHD 3beta:
• A. At least five attacks of **intense nausea and vomiting**, fulfilling criteria B and C
• B. Stereotypical in the individual patient and recurring with predictable periodicity
• C. All of the following:
  – 1. nausea and vomiting occur at least four times per hour
  – 2. attacks last 1 hour and up to 10 days
  – 3. attacks occur 1 week apart
• D. Complete freedom from symptoms between attacks
• E. Not attributed to another disorder
Case 4- 52 year old Female with headache

• 6 episodes of headache over the last 5 years
• Wakes with severe headache (frontal, throbbing) associated with nausea, vomiting, photophobia, phonophobia
• Duration 3-10 hours
• No prior headache history, but...
  – Throughout childhood recurrent stomachaches with vomiting not associated with viral illness or other GI disturbance
    – Sometimes so severe a doctor would have to come to her home to provide her with medications for the vomiting
Adult Cyclic Vomiting Syndrome

• Phases may be similar to those in children (Well phase, Prodrome, Intense vomiting, Recovery phase)

• Adults more than children may progress to a pattern of subacute symptoms of nearly continuous nausea and frequent vomiting lasting weeks to months

Cyclic Vomiting Syndrome

Differential Diagnosis

- GI - gastric dysmotility
- GU - ureteropelvic junction obstruction
- Neuro
  - Autonomic seizures
  - Cannabinoid hyperemesis syndrome (Ask about predilection for hot-water bathing)
- Metabolic Disorders
  - Mitochondrial disorders
  - Fatty acid oxidation disorders
  - Urea cycle disorders

Treatment

- Acute:
  - Hydration - oral or IV
  - Anti-emetics (5-HT3 antagonists > Neurolptics)
  - Benzodiazepines - reduce anxiety
  - Diphenhydramine - induce sleep
  - Triptans - Nasal spray or SC
  - Aprepitant
- Preventive:
  - Amitriptyline
  - Cyproheptadine
  - Propranolol
  - L-carnitine, Coenzyme Q10, Riboflavin
  - Aprepitant

Gelfand AA. Episodic syndromes that may be associated with migraine: A.K.A. "the childhood periodic syndromes". Headache. 2015;55(10):1358-1364.
Cyclic Vomiting Syndrome

• Fleisher et al 2005 looked retrospectively at a series of 41 adults diagnosed between ages 2-64 and found that the onset of symptoms started between ages 2-49 years.
Adult Abdominal Migraine

• Much less accepted as possible adult disorder but numerous case reports exist

Abdominal Migraine

Differential Diagnosis

• GI
  – Bowel obstruction
  – Crohn’s disease
  – Pancreatitis

• Metabolic
  – Acute intermittent porphyria

Treatment

• Acute:
  – Hydration - oral or IV
  – Simple analgesics
  – Anti-emetics
  – Triptans - Nasal spray
  – IV Valproic acid
  – IV DHE

• Preventive:
  – Pizotifen
  – Flunarazine
  – Propranolol
  – Cyproheptadine
  – Topiramate
  – Taper off over-used opioids


Abdominal Migraine

• Abdominal migraine will resolve in 2/3 of patients into late adolescence
• 50% to 70% will suffer from migraine headaches attacks.

Summary

• Migraine can present in different ways at different ages
• ICHD3 beta outlines diagnostic criteria for the episodic syndromes associated with migraine, which differ slightly from other diagnostic criteria for the some of the same conditions (ex. Rome III criteria)
• Adults may present with episodic syndromes that may be associated with migraine; as well, adults presenting with migraine may have histories suggestive of episodic syndromes associated with migraine in childhood
• There are a variety of treatment options available for episodic syndromes associated with migraine in adults and children; however, none are FDA approved