PedsCases Podcast Scripts

This podcast can be accessed at www.pedscases.com, Apple Podcasts, Spotify, or your favourite podcasting app.

PEDIATRIC MIGRAINE

Developed by Caitlin Goedhart, Dr. Jessica Foulds and Dr. Janette Mailo for PedsCases.com.
March 2023.

Introduction:

Hello and welcome to this PedsCases podcast on Pediatric Migraine. My name is Caitlin Goedhart, and I am a fourth year medical student at the University of Alberta. This podcast was developed in collaboration with Dr. Jessica Foulds, a pediatric hospitalist, and Dr. Janette Mailo, a pediatric neurologist, who both work at the Stollery Children's Hospital in Edmonton, Alberta. In this podcast we will explore the presentation, diagnosis, and management of pediatric migraine.

By the end of this podcast, we aim for you to be able to:

1) Describe the common presentation of pediatric migraine, including the location, quality, and duration of the headache, as well as four accompanying symptoms.
2) Evaluate a pediatric patient presenting with recurrent headaches and recognize the seven red flags for pediatric headache.
3) Describe the five criteria required for making a diagnosis of pediatric migraine.
4) Differentiate between migraine with aura and migraine without aura, by evaluating for any of the six possible aural symptoms and determining if they meet at least three of the six aural characteristics that can occur.
5) Contrast the acute and preventive management for pediatric migraine by identifying at least three non-pharmacological and three pharmacological options for each.

Now to get things started, let's consider a case:

You are working in the emergency department, and are about to see Maya Grain, an eleven-year-old girl presenting with a two-hour history of a bilateral pulsatile headache, nausea, and vomiting. All of which were preceded by changes in vision that developed gradually but resolved within an hour. Maya has had multiple headaches in the past that have been associated with nausea and vomiting but has only had visual changes preceding a headache on one occasion before. She has been otherwise healthy with no current medications, and she has not had any recent head trauma that her parents are aware of.

What is the best diagnosis for Maya, and what is your management for it? By the end of this podcast, and with clinical insight from Dr. Foulds and Dr. Mailo, you will be able to answer both of these questions.

Insight from Dr. Foulds on what a learner should not miss when taking a history, and doing a physical exam

Clinical Presentation and Evaluation of Pediatric Migraine:

Pediatric migraine commonly presents as recurrent headaches that are accompanied by symptoms such as nausea, vomiting, photophobia or phonophobia.[1] Typically, the headache has a pulsatile quality that has a frontal or bitemporal location and lasts for one to 48 hours.[1] The prevalence of pediatric migraine increases with age, with the mean age of onset being seven and eleven years of age for males and females, respectively.[1] Unlike adults, many children present with bilateral symptoms and often have migraines lasting a shorter duration of time.[2]

Headache itself is a common pediatric complaint with a broad differential, thus a detailed history and physical examination are of utmost importance in differentiating pediatric migraine from other primary headache disorders or headache secondary to other causes.[1] Primary headache disorders include migraine, tension headache, chronic headache, trigeminal autoimmune cephalgia and primary stabbing headache.[3] In comparison, a secondary headache has an underlying pathology, agent, or disease, which is leading to the headache.[3] There is a multitude of causes of secondary headache, some including idiopathic intracranial hypertension, infection such as meningitis, structural disorders like a tumor or space-occupying lesion, vascular disorders, trauma, medications or other substances, as well as many systemic diseases.[3]

To determine if a child with recurrent headaches is experiencing pediatric migraine, the timing, frequency, duration, location, type, and quality of headaches should be assessed.[1] Extent of functional impairment, aggravating and alleviating factors, as well as symptoms that precede or accompany the headaches should also be considered.[1] During the assessment of recurrent headaches, it is essential to keep in mind the red flag symptoms that would suggest diagnoses other than pediatric migraine.[2] These include a new or different headache type, headaches triggered by straining, coughing or positional change, thunder-clap headache, headaches that disrupt sleep or are present upon waking, focal neurologic symptoms, or an abnormal neurological exam.[2,3] Systemic symptoms, such as fever, chills, weight loss, skin changes or joint pain, may indicate a secondary headache and should also be ruled out.[3] Increased suspicion for secondary causes of headache should be exercised for children five years of age or less who present with headache or suspected headache.[3] In this case additional investigations such as neuroimaging should be considered as it is more difficult to obtain an accurate history for younger children and signs of intracranial pathology may be subtle.[3]

Diagnostic Criteria for Pediatric Migraine:

To diagnose migraine, you can use the diagnostic criteria from the International Classification of Headache Disorders.[4] These criteria divide migraines into several subtypes, three of which include: migraine without aura, migraine with aura as well as childhood periodic syndromes.[4]

Migraine without aura is the most common of the three categories mentioned.[1] To diagnose migraine without aura you must have at least five episodes of a headache lasting two to 72 hours.[1,4] The headache episodes must include at least two of the following characteristics:

1) Unilateral, bilateral, or frontotemporal location;
2) Pulsatile quality;
3) Moderate to severe pain intensity;

Developed by Caitlin Goedhart, Dr. Jessica Foulds and Dr. Janette Mailo for PedsCases.com.
March 2023

4) Exacerbation by or resulting in the avoidance of standard physical activity such as walking.[1,4]

During the headache the child must also experience at least one of nausea, vomiting, photophobia or phonophobia, or a combination of them.[1]

In comparison, migraine with aura involves temporary focal somatosensory phenomena that develop before or with the onset of headache and last for several minutes.[1,2] A diagnosis of migraine with aura requires at least two migraine episodes that are accompanied by the presence of at least one fully reversible aura symptom that can affect:

1) Vision;
2) Sensation;
3) Speech and/or language;
4) Motor function;
5) Brainstem function;
6) Retinal function.[4]

In addition, to qualify as a migraine with aura, a minimum of three of the following characteristics also need to be met:

1) At least one aura symptom spreads over five or more minutes;
2) At least two aura symptoms develop in succession;
3) The duration of each aura symptom is between five and 60 minutes, inclusively;
4) At least one unilateral aura symptom is present;
5) At least one positive aura symptom is present;
6) A headache either coincides with the aura or emerges within 60 minutes of the onset of the aura.[4]

Migraine with aura can be further classified depending on the aural symptoms present. A migraine with “typical aura” encompasses the visual, sensory, speech and/or language symptoms with the absence of motor weakness.[4] Visual symptoms may include seeing flickering lights, spots, or lines.[1] Sensory symptoms can be positive symptoms, such as pins and needles, or negative symptoms, such as numbness.[1] The typical aura can occur with or without headache.[4] Other aural symptoms lead to the diagnosis of migraine with brainstem aura (also known as basilar-type migraine), familial or sporadic hemiplegic migraine, or retinal migraine, each of which have their own additional criteria for a diagnosis to be met.[4] For instance, basilar-type migraines involve episodes of dizziness, vertigo, visual abnormalities, ataxia, or diplopia that precede the onset of a headache.[1] Regardless of the subtype, to fit a diagnosis of migraine with or without aura, the symptoms must not be attributable to another illness.[1]

A third classification of migraine is childhood periodic syndromes, including abdominal migraine, benign paroxysmal vertigo of childhood and cyclical vomiting.[1] These syndromes are often precursors to migraines.[1] These migraine related syndromes will not be further discussed in this podcast, as the topic has previously been reviewed in the PedsCases podcast on Episodic syndromes that may be associated with migraine in children.

Management for Pediatric Migraine:

Adequate management of pediatric migraine is based on the frequency, severity, accompanying symptoms and degree of impairment that are associated with the migraine.[1] Management requires patient education, in addition to acute and often long-term strategies involving pharmacological agents as well as behavioural interventions. Currently, there are no Canadian

guidelines for pediatric migraine management but there are many available management options that are safe and can be combined for maximal benefit.

Acute Management

Acute non-pharmacological management includes ensuring adequate hydration, as well as having children rest in a dark and quiet location where they can hopefully sleep.[2] Acute pharmacologic management can be divided into three main groups of rescue medications that relieve migraine symptoms but do not prevent them.[5] The three categories of rescue medication include: analgesics, the pain relievers; antiemetics, the nausea relievers; and triptans, the antimigraine medication.[5]

Acetaminophen as well as NSAIDs, such as ibuprofen and naproxen, are often considered as first-line analgesia due to being largely tolerated, affordable and available.[6] The American Academy of Neurology and the American Headache Society recommend trialling ibuprofen first for analgesia.[7] If ibuprofen does not work, then naproxen may be tried and have benefit for some individuals due to its longer half life.[2] Anti-emetics such as Dimenhydrinate, Metoclopramide or Ondansetron can be used to mitigate the nausea and vomiting associated with the migraine and can work synergistically with analgesics.[5,7]

Second-line pharmacologic options include triptans, which act on serotonin receptors.[3] Almotriptan is the only triptan approved in Canada for children between twelve and seventeen years of age.[6,7] Sumatriptan, Zolmitriptan and Rizatriptan are considered safe, and are FDA approved, but have yet to be officially approved for children in Canada.[6] As NSAIDs, acetaminophen and triptans do not have drug interactions with each other, they can be safely combined.[6]

For all acute pharmacological treatment, it is recommended that a weight and age-appropriate dose of medication be readily available and taken as close to headache onset as possible.[6] It is important to be mindful of how often over-the-counter analgesic medications are being utilized though as overuse can contribute to the development of chronic migraines.[1,8] Medication overuse headaches can occur with use of:

1) Simple analgesia like NSAIDs or acetaminophen for fifteen or more days per month for more than three months; or
2) Analgesia with caffeine, triptans and opioids on at least ten days in a month for over three months.[6,8]

Commonly overused medications include aspirin, ibuprofen, and acetaminophen.[1]

Preventative Management

Long-term goals of migraine management include: reducing the severity, duration, frequency and impairment of headache; mitigating related stresses; decreasing reliance on ineffective acute pharmacological interventions; and, promoting quality of life.[1] Patient education regarding behavioural strategies to prevent migraine are of utmost importance. Children who suffer migraine often benefit from following a schedule that incorporates an appropriate amount of sleep with a consistent bedtime and wake-up time, regular meals, continued hydration, and frequent exercise.[1,2] It is recommended that children keep a headache diary to identify potential triggers, such as certain foods like chocolate or cheese, caffeine intake, as well as other stressors.[1] Stress reduction, achieved through a variety of means such as relaxation techniques

or exercise, is of utmost importance as stress often precipitates migraines in pediatric populations.[1,2]

Although the evidence is limited, preventative pharmacological management may be considered in children who experience severe migraines that cause great disability or frequent migraines occurring at least four days per month.[1,2] Potential preventative pharmacological regimens include anticonvulsants such as topiramate, valproic acid or gabapentin, beta blockers such as propranolol, calcium channel blockers such as verapamil, antidepressants such as amitriptyline or nortriptyline, and antihistamines such as cyproheptadine.[8,9] Other prophylactic management strategies include use of supplements such as riboflavin, magnesium, melatonin, or coenzyme Q10, as well as cognitive behavioural therapy.[2,9]

When considering use of preventive pharmacological therapy, it is important to counsel patients on the paucity of data available regarding the efficacy of such therapies, as well as the possible benefits and harms of treatment.[9] Most research has yet to identify a preventative pharmacological treatment that preforms better than placebo.[9] However, some patients may still find benefit from initiation of preventative therapy.[9] Thus, it is reasonable to complete a short-term trial of a preventative treatment, which is usually for a minimum of two months.[9] As attaining clinically meaningful improvements is the recommended treatment goal, the preventative therapy that is trialled can be tailored to also treating comorbidities that the patient has.[9] For instance, topiramate may be a feasible option for patients with epilepsy.[9] Or if a patient also has difficulty getting to sleep, then they could benefit from a medication, such as amitriptyline, that can have drowsiness as a side effect.

Other Considerations for Management

One more piece of management, not related to management of the headache itself, is being aware of implications that migraine can have. Specifically, migraine with aura is an absolute contraindication to using an estrogen-containing hormonal oral contraceptive pill.[10] Previous studies have indicated that patients with migraine with aura who used an estrogen-containing oral contraceptive pill were at an increased risk of cerebrovascular events, such as stroke.[10,11]

Insight from Dr. Mailo and Dr. Foulds on pediatric migraine management

Summary:

And to finish our podcast let's look back at the case of eleven-year-old Maya. Migraine with aura should be at the top of our differential for Maya as she is having recurrent pulsatile headaches that are bilateral in location. Maya's visual symptoms are also consistent with an aura, which she has experienced with two headache episodes now. In the emergency room you give her a dose of ibuprofen for analgesia and ondansetron for nausea. Within the next two hours her headache improves, and she feels ready to go home. Upon discharge from the emergency room, you should counsel Maya on lifestyle behaviours that may prevent migraine, and you may consider providing a prescription for a Triptan to take at the onset of her next migraine if NSAIDs or acetaminophen are not effective.

Now let's revisit some of the high yield content we have reviewed to help reinforce the learning outcomes for our podcast:

1) Pediatric migraine commonly presents as recurrent pulsatile frontal or bitemporal headaches that are accompanied by symptoms such as nausea, vomiting, photophobia or phonophobia.[1]
2) Evaluation of a pediatric patient presenting with recurrent headaches largely involves obtaining a thorough history and physical exam that deduces characteristics of the headache itself and explores symptoms that precede or accompany the headache. It is also important to rule out red flag symptoms, such as:
    a) a new or different headache type;
    b) headaches triggered by straining, coughing or positional change;
    c) thunder-clap headache;
    d) headaches that disrupt sleep or are present upon waking;
    e) focal neurologic symptoms;
    f) an abnormal neurological exam; or,
    g) systemic symptoms.[2,3]
3) A diagnosis of pediatric migraine requires a minimum of five headache episodes that last between two and 72 hours in duration and cannot be accounted for by a different diagnosis.[4] They must involve two of the following characteristics including unilateral location, pulsatile quality, moderate to severe intensity, or aggravation by or avoidance of activity.[4] They must also include at least one of nausea, vomiting, photophobia or phonophobia, or a combination of them.[4]
4) Migraine with aura includes temporary focal somatosensory phenomena that develop before or with the onset of headache, in addition to meeting all the same criteria as migraine without aura.[4] The aura can affect vision, sensation, speech, language, motor function, brainstem function or retinal function, and needs to have at least three of six possible characteristics outlined in the podcast.[4]
5) Acute pediatric migraine management often involves use of age and weight appropriate doses of NSAIDs, acetaminophen and/or triptans as close to the onset of migraine as possible.[3,6] Behavioural interventions such as hydration, limiting visual and auditory stimulation, and sleep (if possible) may be helpful.[2]
6) Long-term pediatric migraine management relies on a combination of behavioural modifications, such as a consistent sleep schedule, regular meals, and frequent exercise.[1,2] A variety of different pharmacological agents, some including anticonvulsants, beta blockers or antidepressants, or supplements may also be considered.[8,9]

References:

1. Lewis DW. Pediatric Migraine. Pediatrics in Review. 2007;28(2):43-53.
2. Greene K, Irwin SL, Gelfand AA. Pediatric Migraine: An Update. Neurologic Clinics. 2019;37(4):815-833.
3. Blume HK. Pediatric Headache: A Review. Pediatrics in Review. 2012;33(12):562-576.
4. ICHD-3. Migraine [Internet]. 2021. Available from: https://ichd-3.org/1-migraine/
5. Myhealth.alberta.ca. Headache Treatments for Children [Internet]. 2021. Available from: https://myhealth.alberta.ca/Alberta/Pages/headache-treatments-for-children.aspx
6. Faber AJ, Lagman-Bartolome AM, Rajapakse T. Drugs for the acute treatment of migraine in children and adolescents. Paediatrics & Child Health. 2017;22(8):454-458.
7. Oskoui M, Pringsheim T, Holler-Managan Y, Potrebic S, Billinghurst L, Gloss D, et al. Practice guideline update summary: Acute treatment of migraine in children and adolescents. Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Headache Society. Neurology. 2019;93(11):487-499.
8. Patterson-Gentile C, Szperka CL. The changing landscape of pediatric migraine therapy a review. JAMA Neurology. 2018;75(7):881-887.
9. Oskoui M, Pringsheim T, Billinghurst L, Potrebic S, Gersz EM, Gloss D, et al. Practice guideline update summary: Pharmacologic treatment for pediatric migraine prevention. Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Headache Society. Neurology. 2019;93(11):500-509.
10. Meglio G Di, Crowther C, Simms J. Contraceptive care for Canadian youth. Paediatrics & Child Health. 2018;23(4):271–7.
11. Sheikh HU, Pavlovic J, Loder E, Burch R. Risk of stroke associated with use of estrogen containing contraceptives in women with migraine: A systematic review. Headache. 2018;58(1):5–21.

Developed by Caitlin Goedhart, Dr. Jessica Foulds and Dr. Janette Mailo for PedsCases.com.
March 2023