



## INFORMATION FOR HEALTH CARE PROFESSIONALS



### Pediatric and Adolescent Migraine

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Headache is common among children and adolescents. Up to 82% of adolescents report having a headache before the age of 15. Approximately 6% of adolescents experience migraine yearly. Migraines experienced in the pediatric population are just as disabling as those experienced by adults, though they may be shorter in duration. Making the diagnosis of migraine in this population is more challenging because the expression of the associated symptoms can vary significantly over the span of childhood. As a result, the diagnostic criteria from the International Classification of Headache Disorders (ICHD-3 beta) often lack the flexibility necessary to make an accurate diagnosis of migraine in the pediatric population.

The key features for diagnosis of childhood migraine are:

- The duration tends to be shorter than in adults, sometimes as short as just one hour, although the overall duration is 2-72 hours.
- There is often bifrontal or bitemporal, rather than unilateral pain.
- Pediatric patients have difficulty describing throbbing pain or levels of severity. Using a face scale or numerical scale, or even asking them to draw a picture, can be extremely helpful in determining the level of disability and the severity of their migraine pain.
- Children often have difficulty expressing the associated symptoms: they often have to be inferred from their behavior. For example, photophobia, phonophobia or the presence of nausea aggravated by physical activity often needs to be determined by the parent or caretaker from behavioral cues.
- Consider other associated symptoms, including difficulty thinking, fatigue, and lightheadedness.

### **Episodic Syndromes that may be associated with Migraine (previously referred to as Childhood Periodic Syndromes) and Other Migraine Variants**

There are special presentations of migraine that occur in childhood, referred to as episodic syndromes that may be associated with migraine previously referred to as childhood periodic syndromes. They include cyclical vomiting, abdominal migraine, and benign positional vertigo of childhood. The headache may be mild or absent with these syndromes. They present with cyclical vomiting or abdominal pain, or episodes of vertigo at a very young age. The vertigo may start in toddlers with the initial episodes of cyclical vomiting and abdominal pain in young children. These manifestations may persist in various forms into the adult years. Often they resolve and the more typical symptoms of migraine in adults become evident.

The concern is making an accurate diagnosis, based on thorough understanding of the differential diagnosis associated with these childhood periodic syndromes. The differential diagnoses

includes neoplasm, metabolic disorders, and gastrointestinal disorders; referral to a child neurologist, neurologist, or headache specialist who is familiar with childhood headache may be necessary.

*Aura symptoms* often start in childhood and adolescence, specifically migraine with brainstem aura (previously used terms: basilar-type migraine, basilar migraine) and familial hemiplegic migraine. Migraine with brainstem aura may present with vertigo, tinnitus, diplopia, ataxia, altered consciousness, bilateral paresthesias, dysarthria, impaired hearing, and altered visual symptoms in both temporal and nasal fields, but no motor weakness is present. The aura symptoms should resolve within 60 minutes. A secondary cause of headache must be excluded.

Fully reversible motor weakness is a key component of familial hemiplegic migraine. There may be visual, sensory or dysphasic aura symptoms as well. Often, there is a first or second-degree relative that has a similar history. It is imperative to consider secondary cause and do a thorough evaluation of these patients.

*Status migrainosus* lasting greater than 72 hours is rare in children, but does occur, and warrants appropriate evaluation and intervention.

### **'Red Flags' in the Diagnosis of Childhood Migraine**

Consider a secondary cause of headaches in the following situations:

- Escalating frequency and/or severity of headaches over several weeks (under four months) in a child under the age of 12, and even more importantly under the age of 7
- A change of frequency and severity of headache patterns in young children
- Fever is not a component associated with migraine at any age, especially in children.
- Headaches accompanied by seizures
- Altered sensorium may occur in certain forms of migraine, but it is not the norm, and needs attention to determine an appropriate assessment and intervention.

Most parents and guardians are most concerned about a brain tumor or other sinister neurologic disorder. It is important to reassure the child as well as the parent or guardian of the proper diagnosis, and discuss the normal progression of migraine from childhood through adolescence to adulthood.

### **Treatment**

Headache control is possible when young patients and their families work closely with their physician and allied healthcare professionals. The management of migraine in the pediatric population includes a comprehensive approach, using both pharmacologic as well as non-pharmacologic therapies. The discussion of therapy includes reviewing dietary triggers, avoidance of caffeine overuse, maintaining a normal BMI (body mass index), as well as the importance of avoiding head trauma and using protective headgear whenever appropriate. The comprehensive approach also includes behavior modification programs and exercise protocols. Addressing proper sleep patterns is a key component.

The acute therapies used for children and adolescents should be utilized as soon as it is clear that the headache is migraine. The goal is complete resolution of the pain, and preferably all symptoms, within one to two hours. Currently, the American Academy of Neurology practice parameters for physicians has recommended that ibuprofen and sumatriptan nasal spray as effective treatments, acetaminophen is probably effective, and they should be considered for the acute treatment of migraine in adolescents.

- Several triptans have been approved by the FDA for the acute treatment of migraine headaches in adolescents ages 12 to 17 including almotriptan, eletriptan, rizatriptan in tablet formulations, as well as, zolmitriptan nasal spray. Rizatriptan has also been approved by the FDA for use in children ages 6-11. American Academy of Neurology's 2004 practice parameter for migraine in children and adolescents recommended that nasal sumatriptan be considered for treatment in children and adolescents. Nasal sumatriptan has been approved for use in adolescents 12 years and older in Europe. The European migraine guideline in 2009 discusses positive data with sumatriptan and zolmitriptan nasal sprays and oral zolmitriptan and rizatriptan in children, but do not recommend one specific triptan.
- Use the lowest initial available triptan dosage first and increase dosage as clinically indicated. Prescribing considerations for triptans include, but are not limited to, prior evaluation for patients with risk of coronary artery disease, peripheral vascular syndromes, or some other significant underlying cardiovascular disease.
- There are data to support usage and effectiveness of various medications, such as nonsteroidal anti-inflammatory agents (e.g., ibuprofen and naproxen sodium) and aspirin in children over age 15. Begin effective acute treatment as early in the migraine attack as possible.

Analgesics or acute medicines of any type are not used more than twice per week, unless the patient is under medical supervision. Headaches requiring treatment more than once per week may signal the need for improved preventive strategies. Consider supplementation with magnesium, riboflavin, and coenzyme Q-10 (appropriate dosages of these medications have not been determined in children).

Studies of antiepileptic agents, such as topiramate, have shown various levels of efficacy and good tolerability. The FDA has approved topiramate as a prevention of migraine headaches in adolescents ages 12 to 17. Off-label use of the medications used in adults, with appropriate adjustments for milligram per kilogram dosing and addressing potential side effect profiles, have been used effectively in children.

When does one start and stop preventative treatment? The childhood and adolescent migraine prevention [CHAMP] study (ages 8-17), findings showed no difference between three treatments on the number participants with a 50% or greater reduction in headache days or headache related disability. The two treatment medications amitriptyline and topiramate had greater side effects than the third treatment, placebo. Further analysis of this data is underway and the question is: what do we do now? Consider preventive treatment when a child has more than two to three migraines per month that are not fully controlled with acute medicine. In light of this most recent study we may want to consider a nonpharmacologic approach such as riboflavin or co-Q10 as an initial preventive option in this population. The goal is to reduce the headaches frequency to one per month or less over the course of three to six months, and then to discontinue preventive therapy as soon as possible. Fortunately, not all adolescents will experience headaches throughout their life, but up to 70% will experience some continuation of their headaches, whether persistent or episodic.

## References

1. Sun H, Bastings E, Temeck J, et al. Migraine therapeutics in adolescents: A systematic analysis and historic perspectives of triptan trials in adolescents. *JAMA Pediatr.* 2013; 67:243-249.
2. HO TW, Pearlman E, Lewis D, et al. Efficacy and Tolerability of Rizatriptan in Pediatric Migraineurs: Results from a randomized, double-blind, placebo-controlled, trial using a novel adaptive enrichment design. *Cephalgia*, 2012; 32:750-765
3. Winner P., Lewis D., Rothner A.D., "Headache in Children and Adolescents", 2nd edition, Hamilton, Ontario: BC Decker, Inc.; 2008: page 1-322.
4. Winner P, Farkas V, Stillova H, Woodruff B., Liss C, Lillieborg S, Raines S. et al. Efficacy and Tolerability of Zolmitriptan Nasal Spray for the Treatment of Acute Migraine in Adolescents: Results of a randomized, double-blind, multi-center, parallel-group study (TEENZ) *Headache* 2016;
5. Scott W Powers, PhD, Christopher S. Coffey, PhD, Leigh A. Chamberlain, R.D., M. Ed., Dixie J. Ecklund R.N., M.S.N., Elizabeth A. Klinger, M.S., Jon W. Yankey, M.S., Leslie L. Korbee, B.S., Linda L. Porter, PhD., and Andrew Hershey M.D., PhD. et al. Trial of Amitriptyline, Topiramate, and Placebo for Pediatric Migraine *N Engl J Med* 2017; 376: 115-124