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Pediatric migraine

Common, yet treatable

Abstract: Migraine headache is a common problem among children and adolescents that is now recognized as a significant and often debilitating condition in this population. Improved recognition and management of pediatric migraine in primary care is necessary, as there is a knowledge gap in understanding the unique features of this condition and a general reluctance to treat children.

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Approximately 8% of children and adolescents suffer from migraine, and the condition is significantly more common in older children over the age of 14.[1] Migraine affects younger male and female children equally; however, the condition disproportionately affects females during adolescence and young adulthood with twice as many females experiencing migraines as compared with males following puberty.[2]

Migraines, especially those transformed to chronic, daily headaches, have been clearly shown to interfere with children's curricular and extracurricular activities as well as socialization and family activities. Migraine remains an independent predictor of moderate-to-severe headache-related disability, even after controlling for depression and other mood disorders.[3]

Improved recognition and management of pediatric migraine in the primary care setting are necessary to lessen the burden these headaches cause and attenuate the associated disability that results. Currently, there is a knowledge gap in understanding the unique features and characteristics of pediatric migraine along with a reluctance and general lack of comfort with treating younger patients. Despite the reluctance of many primary care providers to treat headaches in pediatric patients, this population often responds quite favorably to treatment, with significant gains in quality of life.

Pathophysiology

The exact etiology of migraine remains unclear; however, genetics, environmental factors, stress, and psychological factors play a role in the development of the condition. More research is needed regarding the genomic profile of migraineurs; however, there is familial aggregation with first-degree relatives of migraineurs being 1.88 times more likely to suffer from migraine.[4] Genetic studies have produced large lists of genes implicated in migraine, however the disorder remains phenotypically and genetically heterogeneous with no single variant consistently identified as the basis for developing the condition.[4]

It is now understood that repeated migraine attacks can result in neuroplastic changes in the brain's structure and

Keywords: adolescents, children, chronic daily headache, headache, migraine, migraine prophylaxis, pain, pediatric

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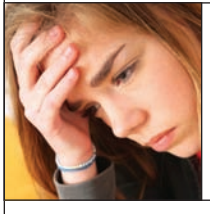
function over time that can promote transformation from episodic to chronic daily headaches.[5] Chronic migraines result in changes in brain metabolism, atrophy of gray matter, generalized hyperexcitability of the central nervous system, and central sensitization.[6] These changes are notably pronounced in individuals who are overusing medications for acute headache, particularly with the use of combination analgesics.[6] Sensitization progresses from peripheral sensitization isolated to the trigeminal nerve (resulting in throbbing pain), to the spinal trigeminal nucleus (causing scalp allodynia), and eventually to the thalamus (resulting in generalized cutaneous allodynia of the trunk and arms).[6] Allodynia is an indicator of migraine progression and correlates with the duration of migraine condition as well as the frequency of attacks.[6] The presence of allodynia may have implications on treatment, with serotonin 5-HT_1 receptor agonists (triptans) thought to be less effective for migraine abortive treatment once allodynia is established.[6]

Clinical presentation

Children and adolescents with migraine typically present with recurring, acute headache pain lasting 1 to 48 hours occurring with physical activity intolerance and associated with nausea, vomiting, photophobia, and/or phonophobia. The headaches are often clearly episodic in the beginning with symptom-free periods between attacks; however, they may become more chronic with frequent to daily occurrence following a lack of appropriate treatment and with overuse of analgesics. The pain is typically frontal or temporal in location and is often bilateral in younger children as compared with the typical unilateral pain seen with adult migraine. The pain is often pulsatile or throbbing when children are able to appropriately describe pain quality; however, many children will have difficulty describing their discomfort. Pain quality is difficult to assess in children and is the least specific feature in pediatric migraine when compared with location, severity, and activity impact.[7]



There are several conditions that coexist commonly with migraine headache including depression and anxiety.

Parents frequently note that children will stop their activities and require sleep in a quiet, dark room for resolution of symptoms. Some children may fall behind in school or have problems with truancy or participation in extracurricular activities due to the disability associated with their symptoms. They may not complain directly of sensitivity to light and noise; however, this is often inferred through parents observing the child's patterns of avoidance of any aggravating factors and their need to seek a quiet, dark environment during acute attacks.

Patients frequently complain of difficulty concentrating or thinking clearly and may struggle with academic work during episodes partially due to pain intensity but also as a result of cortical dysfunction during migraine attacks that has been documented with magnetoencephalography.[8] Studies conducted using magnetoencephalography in adolescents suffering from acute migraine attacks showed significant delays in both auditory processing and motor response when compared with same age and gender controls.[8] This alteration in cortical processing may affect critical periods of learning, development, and ultimately, academic progression, further increasing the importance of early recognition and management of pediatric migraine.

Comorbid conditions

There are several conditions that coexist commonly with migraine headache (particularly mood disorders), including depression and anxiety. Migraine patients have greater than twofold increased risk of suffering from depression, and this relationship appears to be bidirectional with depressed individuals being at higher risk for developing migraines.[9] Migraine sufferers are also at a higher risk for developing an anxiety disorder with a fivefold higher risk for obsessive-compulsive disorder.[9] The risk of comorbid psychiatric disorder is increased further in those suffering from chronic daily headache, with the relationship between the two strengthened based on the frequency of headache occurrence.[9]

Individuals experiencing adverse childhood events (emotional/physical or sexual abuse, witnessing domestic violence, growing up with household members suffering from mental illness, substance abuse, incarceration, and/or parental separation or divorce) have a twofold increase in suffering from recurrent headaches.[8] Children and teens who experience maltreatment are more likely to have frequent headaches, disabling pain, and headache pain complicated with anxiety and depression, making these individuals more challenging to treat.[8] It is absolutely vital to screen for prior and ongoing abuse, mood disorders, and stressors that may be impacting headaches. In some circumstances, headaches can be a symptom of a greater problem.

Other comorbid conditions occurring with migraine include: sleep disturbance, epilepsy, patent foramen ovale (PFO), ischemic stroke, fibromyalgia, and chronic fatigue syndrome. Migraine with aura is an independent risk factor for ischemic stroke, with risk increasing further in women, smokers, and those taking oral contraceptives.[9] Children with epilepsy have a 4.5-fold increased risk of developing migraine. Epilepsy and migraine also appear to have a bidirectional relationship; however, epilepsy precedes the development of migraine in 71% of cases.[9]

The prevalence of PFO in migraineurs has been estimated to be as high as 72% compared with only a 25% occurrence of PFO in the general population.[9] There may be a causal relationship between PFO and migraine based on the hypothesis that right to left shunting with blood bypassing the normal filtration through the lungs leads to a potential for mircoemboli as well as higher concentrations of migraine-precipitating chemicals (serotonin, nitric oxide, kinins) that can trigger a migraine.[10] This theory developed as a result of independent reports of migraine cessation or improvement following PFO closure in adults for other indications, such as cryptogenic stroke or decompression illness.[11] It has been suggested that PFO closure may be an effective treatment for some individuals failing medical therapy with studies showing a 55% resolution rate of migraine headache following the procedure; however, additional studies are needed for safety and efficacy data.[10]

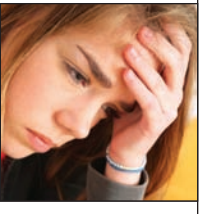
Periodic syndromes

There are several periodic pediatric syndromes that appear to be precursors to migraine, most notably cyclical vomiting syndrome (CVS) and abdominal migraine (AM). CVS is a syndrome of repeated episodes of intense, acute nausea and unremitting vomiting lasting for an hour to 10 days. Vomiting occurs at least four times per hour for a minimum of 1 hour, with attacks occurring at least 1 week apart.[12] Individuals experience symptom-free periods lasting weeks to months between episodes with return to their baseline health status. CVS is a diagnosis of exclusion, and other disorders must be ruled out in order to reach a diagnosis.

Cyclic vomiting syndrome typically affects young children ages 2 to 7 with usual resolution in adolescence.[13] Cyclical vomiting episodes typically have a consistent onset during a specific time of day, often during the night or early morning hours. Episodes can be triggered by several of the following factors: infection, psychological stress, food products, physical exertion, lack of sleep, or menstruation.[13] There is a strong link between CVS and migraine with strong family history of migraine in children experiencing CVS. Distinguishing the two can be difficult given the episodic nature of both conditions and common overlapping symptoms.

AM is a relatively common condition, occurring in approximately 4% of all children ages 3 to 10 with peak onset occurring at age 5 to 7 years.[13] AM is a type of migraine variant that typically occurs in children and presents as isolated episodes of severe, periumbilical, abdominal pain with associated nausea, vomiting, pallor, anorexia, and photophobia.[13] Children may or may not have concurrent headache among other symptoms, and many will go onto develop typical migraine headaches in adolescence or adulthood, with AM presumed to be a precursor to later migraine development.[14] These children frequently experience significant disability related to their symptoms with interference of family, academic, and social activities, along with a high utilization of healthcare resources, especially when diagnosis is delayed or missed.[14]

Many children may transform to chronic, daily headaches following lack of treatment and/or with analgesic overuse.



AM can be distinguished from other functional abdominal pain conditions based on the isolated attacks with intervening asymptomatic periods of complete symptom resolution between episodes. Family history of a first-degree relative with migraine headache is common and occurs in approximately 90% of children with AM.[13] AM is a diagnosis of exclusion, and evidence of inflammatory, anatomic, metabolic, and malignant conditions must be ruled out prior to establishing the diagnosis. Several criteria have been proposed as exclusionary for a diagnosis of AM, including mild symptoms, burning pain, nonmidline abdominal pain, symptoms consistent with food allergy, and persistence of symptoms between attacks, which make the diagnosis of AM unlikely.[14]

Diagnostic criteria

The International Classification of Headache Disorders, 3rd Edition (ICHD-III), is the current standard for headache diagnosis (see *Migraine without aura diagnostic criteria*). The current criteria for diagnosing migraine are focused on adult presentation; however, footnotes have been added to describe common pediatric features, including shorter duration (2 to 72 hours), bilateral location that is typically

frontotemporal, and the allowance for parental interpretation of associated symptoms.[15] Occipital headache is rare in children and requires diagnostic evaluation.[15]

The formal criteria have been found to capture only 61.9% of children with clinical migraine, while sensitivity increases to 73.9% with use of the pediatric footnotes.[16] Further proposed modifications to the criteria include removing the minimal duration criteria altogether, as it is felt that this would allow identification of 80.8% of children who were clinically thought to have a diagnosis of migraine.[16] It has also been proposed to modify associated symptoms for pediatric patients to include difficulty thinking, lightheadedness, fatigue, nausea, vomiting, photophobia, and phonophobia, as this has been shown to increase sensitivity further to 84.4% of all clinically identifiable cases.[15] The addition of parental observation for associated symptoms is important, as children have considerable difficulty in describing their headaches in terms of associated symptoms as well as pain intensity, location, and character. It has been suggested that overly strict application of the diagnostic criteria in primary care settings may result in missed diagnosis and missed treatment opportunities. Clinical evidence and expert opinion support considering a stable pattern of episodic, severe, disabling headaches with return to normal function within 24 to 48 hours to be migraine unless proven otherwise.[17]

Migraine without aura diagnostic criteria

A. At least (5) prior attacks (fulfilling criteria B-D)

B. Headache lasting 4 to 72 hours (untreated or unsuccessfully treated), in children and adolescents under age 18 years, headache may last 2 to 72 hours

C. Headache has at least (2) of the following characteristics:
- Unilateral location
  Bilateral headache is common in children, most common in the frontotemporal region
- Pulsating quality
- Moderate or severe pain intensity
- Aggravation by or causing avoidance of routine physical activity (for example, walking or climbing stairs)

D. During headache at least (1) of the following:
- Nausea and/or vomiting
- Photophobia and phonophobia in young children, this can be inferred from their behavior by parents

E. Not attributed to another disorder.

Source: Headache Classification Subcommittee of the International Headache Society: The International Classification of Headache Disorders. 3rd ed (beta version). *Cephalgia*. 2013;33:629-808. Used with permission.

Differential diagnosis and diagnostic testing

Differential diagnosis for pediatric headache includes numerous causes for the pain; however, it is most important to attempt to distinguish primary headaches from secondary headaches that may require immediate intervention. Causes for secondary headaches include idiopathic intracranial hypertension, tumors, meningitis, hydrocephalus, drug intoxication, and sinus disease. The possibility, such as a life-threatening cause for headache, though rare, often may prompt initial presentation for treatment. Parents may have significant concern in terms of intracranial pathology, such as a brain tumor, as the cause of their child's symptoms and often require reassurance and discussion regarding the specific indications for neuroimaging in children presenting with headache. Several risk factors are associated with space-occupying lesions in children with headaches, including: awakening from sleep, new onset headaches without family history, confusion, abnormal neurological findings, lack of aura, and vomiting.[18]

The vast majority of pediatric patients presenting for care suffer from primary headaches, including migraine, tension type headache, and mixed headache with both migraine and tension headache co-occurring. Many children may transform to chronic, daily headaches following lack of treatment and/or with analgesic overuse. Subacute concussion-related headaches are commonly seen in children and adolescents, which makes completing a thorough history of both recent and remote head trauma essential.

The overall pattern of headache occurrence must be established differentiating headaches based on timing and progression into several types: sudden first headache, episodic headache, daily headache, or progressive headache, with sudden first headaches and progressive headache being the most concerning patterns for possible secondary cause.[19] A new onset, severe headache, may be benign; however, a noncontrast computed tomography (CT) may be indicated to look for a possible aneurysm rupture producing subarachnoid hemorrhage. A gradually worsening or progressive headache in child along with a headache that causes awakening during the night with vomiting will likely require imaging with a magnetic resonance imaging (MRI) to rule out secondary causes.

Chronic, daily headaches, particularly in overweight, adolescent females, may warrant a lumbar puncture (LP) with opening pressure to assess for possible pseudotumor-cerebri (PTC). Headaches in children with PTC result from increased intracranial pressure and typically require prompt treatment with a carbonic anhydrase inhibitor. [20] Children with PTC should be regularly evaluated by an ophthalmologist for papilledema, as visual deficits are found in

approximately 42% of pediatric PTC patients and remain permanent in 33%.[20]

Timing should also be discussed with regards to particular times of day, month, or year, when headaches generally tend to improve or worsen. These subtleties can offer clues to possible bullying at school, academic stress in a particular subject, menstrual migraine, or even summer heat exposure as triggers. Consistent tension type headache occurring in late afternoon during weekdays may elicit the need for visual acuity testing and possible visual refraction triggering tension type headaches with straining. Detailed questioning regarding the location, quality, progression, and duration of headache pain along with aggravating and alleviating factors helps establish a diagnosis and need for neuroimaging studies.

Routine lab studies are not generally recommended in the evaluation of pediatric headache. The tests are often unrevealing and not recommended per the American Academy of Neurology, except for headaches associated with fever or other clinical signs of infection.[21] Routine electroencephalogram (EEG) studies and LP are likewise not recommended in the general evaluation of pediatric headache. Eight different studies have been completed looking at the usefulness of EEG in pediatric headache evaluation and found that these are not routinely helpful.

Obtaining neuroimaging in children with recurrent headaches and a normal neurologic exam is likewise not indicated; however, it should be done in children with a history of seizures, focal neurologic findings on exam, and/or red flags elicited during the history.[19] Red flags include the following: patients younger than 3 years old, early morning pattern or awakening with headache, worsening of headache with straining, explosive onset, associated mental status change, and steadily worsening pattern of headache. A study regarding neuroimaging in children included a total of 600 children with recurrent headaches who were imaged with MRI/CT or both with abnormalities found in only 16% of children.[19] Furthermore, 82% of these findings were clinically not significant, and all children with clinically significant brain lesions deemed surgically treatable had an abnormal neurologic exam with papilledema, abnormal eye movements, or gait dysfunction prior to imaging.[19]

Management

Management of migraines should be multimodal in nature. Nonpharmacologic interventions and lifestyle modification are equally as important as the use of medications. In fact, all children may not require pharmacologic interventions if triggers are evaluated and avoided or if stressors and mood disorders are addressed.

The early recognition of an impending migraine attack during the prodrome phase or aura is helpful to ensure timely treatment of migraine headaches.[22] Prodrome symptoms can vary widely and include the following: food cravings, constipation or diarrhea, increased frequency of urination, muscle stiffness (particularly in the neck), fatigue, and changes in mood with depression or irritability.[23] Auras involve neurologic dysfunction occurring just prior to the onset of headache and can include visual symptoms, such as flashing lights, wavy lines, spots, partial loss of sight, blurry vision, olfactory or auditory hallucinations, hearing loss, confusion, vertigo, and difficulty finding words or speaking.[23] Symptoms may also include partial paralysis, tingling, or numbness of the face or extremities along with reduced sensation or hypersensitivity to touch.[23] Migraine attacks are preceded with an aura in approximately 15% of cases, with transient neurologic dysfunction, typically characterized by visual or sensory symptoms.[24] Auras tend to build gradually over 5 to 20 minutes and typically last less than 60 minutes.[23]

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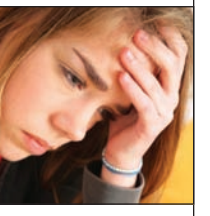
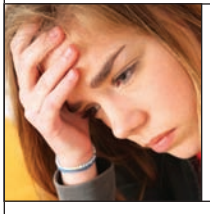


Pharmacologic management

Acute or episodic medications. Most migraines require both pharmacologic and nonpharmacologic treatment tools. The key to acute migraine treatment is to ensure the patient's dosing is sufficient for age and weight and that the medication is taken early in the course of the headache.[25] The child must have ready access to the medication wherever and whenever the onset of headache occurs in order to treat it early.

Nonsteroidal anti-inflammatory drugs and acetaminophen alleviate about 50% of moderate-to-severe headaches within the first 2 hours of onset with few adverse reactions and relief lasting for at least 2 hours.[21] Triptans have shown to be effective for relieving migraines in adolescent patients.[26] Most triptan medications are FDA approved for adults only; however, almotriptan has approval for children age 12 years and older, and rizatriptan is now approved for children as young as 6 years old.[27, 28] Rizatriptan is available as an oral disintegrating tablet that provides a good route for both children unable to swallow

pills and those who have difficulty taking oral medications due to nausea and vomiting. There are nasal and subcutaneous injection routes available for sumatriptan; however, these are often poorly accepted by pediatric patients and these formulations are not currently FDA approved for use in children. Triptan medications should be limited per the manufacturers' dosing recommendations in order to avoid medication overuse or rebound headaches with more frequent dosing. Triptans are relatively costly, and most insurance companies cap coverage for a monthly supply, assisting to prevent overuse on some level.



Prophylactic agents should be selected based on comorbid conditions, adverse reaction profiles, cost, and medication adherence.

Preventive medications. Despite efforts at trigger prevention, caffeine elimination, dietary modifications, regular exercise, attention to sleep hygiene, and stress reduction, some children will continue with frequent, severe, and debilitating migraine headaches that necessitate pharmacologic prophylaxis. Every effort should be made to attempt to manage headaches without immediately resorting to a daily medication; however, the benefits of a period of prophylaxis outweigh the pill burden, adverse reactions, and cost of the acute medications for some children.

Prophylactic medications are not only useful for decreasing the frequency and intensity of migraine attacks but can also provide benefit by preventing transformation from episodic migraine to chronic migraine.[2] Prophylactic medications are started based on both the frequency and severity of migraine attacks and should be considered with: two or more attacks monthly that interfere with functioning for 4 or more days per month; poor response to acute therapy; contraindication to or adverse reactions with acute treatment; requirement for abortive therapy more than twice weekly; hemiplegic migraine and migraine with prolonged aura.[24] The major classes of useful drugs for migraine prophylaxis in children include antihistamines, antidepressants, beta blockers, and antiepileptic drugs (See *Migraine prophylactic agents*).[21,22,29,20]

Topiramate is the only FDA-approved medication for migraine prevention in adolescents age 12 and older, and none are approved for younger children at this time. Four medications are approved for adult usage: propranolol, timolol, topiramate, and divalproex sodium, and are often used off-label for pediatric patients. There is currently a clinical trial underway through the National Institutes of Health evaluating safety and efficacy of topiramate and amitriptyline for migraine prevention in children and adolescents. The Childhood and Adolescent Migraine Prevention Study has an estimated completion date of April 2016 and may provide additional data for pediatric labeling in children ages 8 to 17. (www.ninds.nih.gov/disorders/clinical_trials/NCT01581281.htm.)

Prophylactic agents should be selected based on comorbid conditions, adverse reaction profiles, cost, and expected medication adherence. For example, cyproheptadine, an antihistamine and antiserotonin agent, may be a good choice for a young child less than 77.2 lb (35 kg) who suffers co-occurring allergic rhinitis symptoms. Topiramate, an antiepileptic agent, may be an appropriate selection for an overweight adolescent due to the side effect profile, which includes decreased appetite and weight loss.

It is best to start prophylactic medications at a low dose and gradually increase until efficacy is achieved, monitoring for adverse reactions that will limit further titration. Benefits of most preventive medications develop slowly over time, and most are not fully effective for several weeks. It is important to discuss the expected time of effectiveness in regards to preventive medications with patients in order to avoid premature discontinuation of therapy due to a lack of perceived benefit, especially considering that there are limited agents available for prophylaxis. An alternative medication may be chosen from another class if a specific prophylactic medication trial does not provide adequate relief after an adequate trial or adverse reactions limit ability to titrate. A single agent should be maximized based on dosing and duration of therapy before moving to combination or dual therapy with agents from two separate classes.

Nonpharmacologic management

Biofeedback is the most extensively researched complementary and alternative therapy. Biofeedback works on the sympathetic nervous system to control bodily functions once considered beyond voluntary control.[31] Using thermal biofeedback for treatment of migraine, in which the patient works to increase finger/hand temperature or decrease forehead temperature using computer-based, portable programs, has shown to be effective in 58% of patients.[32] Acupuncture may also be beneficial in decreasing headaches in children with migraine; however, both therapies can be somewhat limited due to high cost and low availability in some areas of the country.[33]

Migraine prophylactic agents[21,22,29,30]

Drug class/name/considerations	Adverse reaction profile
Antihistamine	
Cyproheptadine • Not FDA-approved for pediatric migraine prevention • Use for patients with migraine and allergic rhinitis • Use for patients with problems maintaining adequate appetite/weight • More effective in younger children less than 35 kg • Ease of once daily dosing at night • May assist with sleep • Caution in overweight children due to potential for increased appetite and weight gain	• Sedation • Dry mouth • Blurry vision • Constipation • Dizziness • Excitability • Increased appetite • Weight gain • May rarely cause behavioral problems and hyperactivity
Tricyclic antidepressant	
Amitriptyline • Not FDA-approved for pediatric migraine prevention • Use if sleep onset insomnia • Use if co-occurring neuropathic pain condition or functional abdominal pain • Avoid if suicide is a concern, as can be fatal in overdose • Caution in overweight patient due to potential for weight gain • Improvements in pediatric depression are no better than with placebo	• Sedation • Weight gain • Dry mouth • Dizziness • Blurry vision • Urinary retention • Constipation
Beta blockers	
Nadolol, Metoprolol, Propranolol • Not FDA-approved for pediatric migraine prevention • Can provide benefit for physical symptoms associated with anxiety, such as tachycardia, and sweating • Avoid in patients with asthma and diabetes • May worsen depression • Monitor heart rate	• Dizziness • Fatigue • Exercise intolerance • Depression • Bradycardia • Hypotension
Antiepileptics	
Valproic acid • Not FDA-approved for pediatric migraine prevention • Avoid in women of childbearing age	• Liver toxicity • Sedation • Nausea • Weight gain • Cognitive slowing
Gabapentin • Not FDA-approved for pediatric migraine prevention • Use in patients with co-occurring neuropathic pain	• Dizziness • Sedation • Weight gain • Worsening of depression • Cognitive slowing
Topiramate • FDA-approved for migraine prevention in adolescents 12 years of age and older • Use in overweight individuals due to weight loss benefit with decreased appetite	• Sedation • Cognitive slowing • Loss of appetite • Weight loss • Paresthesias • Blurred vision or eye pain with secondary angle closure glaucoma

Guided imagery, relaxation, and self-hypnosis are all coping skills that will be useful throughout the patient's lifetime and can also be used to treat depression and anxiety. Building coping skills in young children and adolescents is important, as stress frequently plays a role in triggering migraines. These techniques can be taught to children during an office visit and implemented/reinforced by parents on a long-term basis without necessitating visits to a psychologist or counselor. Children with a more significant stress or mood overlay may require regular psychological support with a psychologist or licensed counselor.

Daily exercise is an important intervention for increasing overall function and health; however, this may not change the frequency or intensity of headaches.[34] Supplements such as magnesium, calcium, riboflavin, and coenzyme Q10 may be helpful for migraines, but more studies are still needed.[35,36]

Education

Headache education should begin at diagnosis and continue to be tailored on an individual basis to each patient and family. Patients and families should be educated about prodrome and aura along the importance of medicating early in the migraine attack. Adverse reactions of the medications should also be discussed as well as time to efficacy for preventive medications to decrease the risk of premature discontinuation of prophylactic medications. Providing the patient and family with a headache diary will provide accurate tracking of frequency, duration, possible triggers, and response to treatment. Many types of electronic diaries exist and may be more appealing to the adolescent population. Education about nonpharmacologic interventions and the importance of avoiding triggers should be discussed at diagnosis and reviewed with each visit. According to Neut et al., stress was the most common trigger of migraines in 75.5% of children and adolescents followed by lack of sleep in 69.6%.[37]

It is vitally important to communicate realistic expectations to the patient and family. Migraines are a chronic condition that can be controlled but not likely eliminated in most children. Education can help decrease the anxiety and helplessness of having a chronic condition, allowing the patient and family to feel in control and encouraging patients to be accountable for active participation in their own healthcare.[38]

Referral

Many children with migraine headaches can be effectively managed by their primary care provider; however, referral should be considered for those who do not respond to treatment and experience worsening frequency and/or severity of episodes with a decline in function. Consultation with a specialist should also be considered where there is concern for epilepsy, secondary intracranial cause, postconcussive syndrome, and abnormalities on neurologic exam. Multidisciplinary management is considered on an individual basis with psychiatric evaluation, psychological support, physical therapy, and complementary and alternative therapies, such as biofeedback, acupuncture, and massage.

Migraine headache is a common problem in children that can result in debilitating symptoms; however, with appropriate evaluation, diagnosis, and development of a multimodal treatment plan, these children can put headaches behind them and return to being children. NP

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The authors and planners have disclosed that they have no financial relationships related to this article.

DOI-10.1097/01.NPR.0000454980.88918.f0