



Practice Guideline Update: Acute Treatment of Migraine in Children and Adolescents

This is a summary of the American Academy of Neurology (AAN) and American Headache Society (AHS) practice guideline update, “Acute Treatment of Migraine in Children and Adolescents,” which was published in *Neurology*® online on August 14, 2019, and appears in the September 10, 2019, print issue.

Please refer to the full guideline at [AAN.com/guidelines](https://www.aan.com/guidelines) for more information, including descriptions of the processes for classifying evidence, deriving conclusions, and making recommendations.

Establish a Specific Headache Diagnosis

Recommendation 1

Rationale

The appropriate care of a patient with headaches requires establishing a correct diagnosis. This affects our diagnostic approach, treatment, and prognosis. Patients with signs and symptoms of secondary headache, such as sudden change in headache, papilledema, focal deficits, and the additional presence of seizures, require further evaluation beyond a thorough history and physical examination. When migraine is diagnosed, tailored treatments may be considered that can result in improved outcomes.¹ Diagnostic criteria for pediatric migraine include at least 5 headaches over the past year that last 2–72 hours when untreated, with 2 of 4 additional features (pulsatile quality, unilateral, worsening with activity or limiting activity, moderate to severe in intensity), and association with at least nausea, vomiting, photophobia, or phonophobia. These associated symptoms can be inferred by family report of the child’s activities. The time a child sleeps can be considered part of the headache duration. Auras typically occur in about one-third of older children and adolescents and precede the headache by 5–60 minutes.²

Level	Recommendation
Level B	When evaluating children and adolescents with headache, clinicians should diagnose a specific headache type (primary, secondary, or other headache syndrome).
Level B	When evaluating children and adolescents with headache, clinicians should ask about premonitory and aura symptoms, headache semiology (onset, location, quality, severity, frequency, duration, aggravating and alleviating factors), associated symptoms (nausea, vomiting, phonophobia, and photophobia), and pain-related disability in order to improve diagnostic accuracy for migraine and appropriately counsel the patient.

Acute Migraine Treatment

Recommendation 2

Rationale

Migraine treatment should aim to achieve fast, complete pain relief, with minimum side effects. Associated symptoms like nausea, vomiting, photophobia, and phonophobia should also be addressed. In adults, early treatment of migraine (within 1 hour of headache onset) improves pain-

free rates.³ Improved efficacy with early treatment is likely to be seen in children and adolescents as well. Many children and adolescents use and benefit from nonprescription oral analgesics like acetaminophen, ibuprofen, and naproxen.⁴ Triptans are less commonly prescribed in children than in adults, and only almotriptan (for patients aged 12 years and older), rizatriptan (for patients aged 6–17 years), sumatriptan/naproxen (for patients aged 12 years and older), and zolmitriptan NS (for patients aged 12 years and older) are approved by the Food and Drug Administration (FDA) for use in children. Ergots and oral naproxen alone have not been studied in children.

Level	Recommendation
Level B	Clinicians should counsel that acute migraine treatments are more likely to be effective when used earlier in the migraine attack, when pain is still mild.
Level B	Clinicians should prescribe ibuprofen oral solution (OS) (10 mg/kg) as an initial treatment option to reduce pain in children and adolescents with migraine.
Level B	For adolescents with migraine, clinicians should prescribe sumatriptan/naproxen oral tablet (OT) (10/60 mg, 30/180 mg, 85/500 mg), zolmitriptan nasal spray (NS) (5 mg), sumatriptan NS (20 mg), rizatriptan oral disintegrating tablet (ODT) (5 mg or 10 mg), or almotriptan OT (6.25 mg or 12.5 mg) to reduce headache pain.

Recommendation 3

Rationale

Patients respond differently to the same medication. In adults, failure to respond to 1 triptan does not preclude response to an alternate triptan.⁵ In adults who respond to a triptan but have recurrence of their headache within 24 hours, taking a second dose is effective.⁶ Children might have the same experience, but product monograph daily maximum doses must be followed. Migraine features (severity, associated symptoms, disability, and most bothersome symptoms) differ among individuals and among different attacks in the same individual.⁷ Intranasal sumatriptan and zolmitriptan are absorbed more quickly than the oral form^{8,9} and have a faster onset of action.^{10,11} For migraines that rapidly peak in severity or are associated with nausea and vomiting, nonoral forms of treatment may be more effective. Thus, children with migraine may benefit from more than 1 acute treatment choice and different delivery routes, depending on their individual headache characteristics.

Level	Recommendation
Level B	Clinicians should counsel patients and families that a series of medications may need to be used to find treatments that most benefit the patient.
Level B	Clinicians should instruct patients and families to use the medication that best treats the characteristics of each migraine to provide the best balance of efficacy, side effects, and patient preference.
Level B	Clinicians should offer an alternate triptan, if 1 triptan fails to provide pain relief, to find the most effective agent to reduce migraine symptoms.
Level C	Clinicians may prescribe a nonoral route when headache peaks in severity quickly, is accompanied by nausea and/or vomiting, or oral formulations fail to provide pain relief.
Level B	Clinicians should counsel patients and families that if their headache is successfully treated by their acute migraine medication but headache recurs within 24 hours of their initial treatment, taking a second dose of an acute migraine medication can treat the recurrent headache.

Recommendation 4

Rationale

Sumatriptan/naproxen OT (10/60 mg, 30/180 mg, and 85/500 mg) is more likely than placebo to result in headache pain-free status at 2 hours. Sumatriptan and naproxen have different pharmacokinetic profiles targeted to aid in migraine relief.¹² In adults, the sumatriptan/naproxen combination OT is more effective than monotherapy with either component.¹³ Because of cost and insurance issues, not all patients have access to all available formulations of medications. Given the distinct mechanisms of action among medications in the triptan class and the nonsteroidal anti-inflammatory drug (NSAID) class, the addition of an NSAID to a triptan may improve rates of pain response and pain-free status.

Level	Recommendation
Level B	In adolescents whose migraine is incompletely responsive to a triptan, clinicians should offer ibuprofen or naproxen in addition to a triptan to improve migraine relief.

Treatment of Associated Symptoms

Recommendation 5

Rationale

Migraine is typically accompanied by other symptoms (nausea, vomiting, photophobia, phonophobia) in addition to head pain. Antiemetics are often prescribed along with specific (triptan) and nonspecific (NSAID) migraine treatments to address nausea and vomiting and to speed the rate of medication absorption. In pediatric migraine trials, the treatment effects on migraine-associated symptoms were less pronounced than the treatment effects on pain. While photophobia and phonophobia were responsive to zolmitriptan NS and sumatriptan/naproxen, none of the treatments studied had demonstrated effectiveness against nausea or vomiting. Antiemetics are available to treat nausea and

vomiting related to other pediatric conditions (acute gastroenteritis, postoperative state, chemotherapy)^{14, 15} and may be of benefit for migraine-associated nausea, although no clinical trials specifically evaluating antiemetics for pediatric migraine-associated nausea have been performed. Nasal spray formulations of zolmitriptan and sumatriptan may be easier to administer in adolescents with migraine with prominent nausea and/or vomiting.

Level	Recommendation
Level B	For children and adolescents with migraine who experience prominent nausea and/or vomiting, clinicians should offer additional antiemetic treatments.

Counseling

Recommendation 6

Rationale

Patient education can improve patient safety and adherence to interventions. It is important to learn about the behavioral aspects of self-care that might improve migraine, including healthy habits with lifestyle modification, potential migraine triggers/aggravating factors, and the risk of overusing medication. Maintaining a headache diary is helpful to track response to any new therapy. Patients and families will benefit from understanding the limitations of current available treatments. Overuse of medication to treat acute attacks has been associated with medication overuse headache in adults¹⁶ but has not been well studied in children. Methods to prevent medication overuse headache are included in adult treatment plans.

Level	Recommendation
Level B	Clinicians should counsel children and adolescents with migraine and their families about migraine-healthy habits, including lifestyle modification, identification/disproof/resolution of migraine triggers/aggravating factors, and avoidance of medication overuse.
Level B	Clinicians should make collaborative agreements with children and adolescents with migraine and their families on treatment goals that are individualized to the patient.
Level C	Clinicians may counsel children and adolescents with migraine and their families to maintain a headache diary to monitor their response to treatments.
Level B	Clinicians should counsel patients and families to use no more than 14 days of ibuprofen or acetaminophen per month, no more than 9 days of triptans per month, and no more than 9 days per month of any combination of triptans, analgesics, or opioids for more than 3 months to avoid medication overuse headache. (There is no evidence to support the use of opioids in children with migraine. Opioids are included in this statement to be consistent with the <i>International Classification of Headache Disorders</i> ² regarding medication overuse.)

Contraindications and Precautions to Triptan Use

Recommendation 7

Rationale

According to the FDA, triptans are contraindicated in patients with a history of cardiovascular disease, including stroke, transient ischemic attacks, myocardial infarction, severe peripheral vascular disease, ischemic bowel disease, and coronary vasospasm, including Prinzmetal angina. Triptans are also contraindicated in patients with cardiac accessory conduction pathway disorders, including Wolff-Parkinson-White syndrome. Although the 2004 American Headache Society consensus statement does not consider these as absolute contraindications,¹⁷ these contraindications are based on the known pharmacology of the triptans¹⁸ and triptan effects on vascular muscle.¹⁹ While these medical contraindications are less prevalent in the pediatric population, they are important to consider.

Level	Recommendation
Level A	Clinicians must not prescribe triptans to those with a history of ischemic vascular disease or accessory conduction pathway disorders to avoid the morbidity and mortality associated with aggravating these conditions.

Recommendation 8

Rationale

In adults who have migraine with typical aura, there is evidence that it is safe to take triptans during the aura, although the triptan may be more effective if taken at the onset of pain.^{20, 21} The use of triptans during the aura phase is of concern because of potential difficulties differentiating early stroke symptoms from migraine aura. While this is unlikely a problem in those with established migraine with visual aura, caution is warranted in those with more complex aura presentations. According to the FDA, triptans are contraindicated in those with a history of hemiplegic aura or migraine with brainstem aura. This contraindication was based on a view of migraine pathophysiology that is no longer considered current.

Level	Recommendation
Level B	Clinicians should counsel adolescent patients with migraine with aura that taking their triptan during a typical aura is safe, but that the triptan may be more effective if taken at the onset of head pain.
Level C	Clinicians may consider referral of children and adolescents with hemiplegic migraine or migraine with brainstem aura who do not respond to other treatments to a headache specialist to find effective treatment.

References

1. Hershey AD. Current approaches to the diagnosis and management of paediatric migraine. *Lancet Neurol* 2010;9:190-204.
2. Headache Classification Committee of the International Headache S. The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia: an international journal of headache* 2013;33:629-808.
3. Lanteri-Minet M, Mick G, Allaf B. Early dosing and efficacy of triptans in acute migraine treatment: the TEMPO study. *Cephalalgia* 2012;32:226-235.
4. Bigal ME, Lipton RB, Winner P, et al. Migraine in adolescents: association with socioeconomic status and family history. *Neurology* 2007;69:16-25.
5. Farkkila M, Olesen J, Dahlof C, et al. Eletriptan for the treatment of migraine in patients with previous poor response or tolerance to oral sumatriptan. *Cephalalgia* 2003;23:463-471.
6. Ferrari MD, James MH, Bates D, et al. Oral sumatriptan: effect of a second dose, and incidence and treatment of headache recurrences. *Cephalalgia* 1994;14:330-338.
7. Buse DC, Loder EW, Gorman JA, et al. Sex differences in the prevalence, symptoms, and associated features of migraine, probable migraine and other severe headache: results of the American Migraine Prevalence and Prevention (AMPP) Study. *Headache* 2013;53:1278-1299.
8. Duquesnoy C, Mamet JP, Sumner D, Fuseau E. Comparative clinical pharmacokinetics of single doses of sumatriptan following subcutaneous, oral, rectal and intranasal administration. *Eur J Pharm Sci* 1998;6:99-104.

9. Uemura N, Onishi T, Mitaniyama A, et al. Bioequivalence and rapid absorption of zolmitriptan nasal spray compared with oral tablets in healthy Japanese subjects. *Clinical Drug Investigation* 2005;25:199-208.
10. Tfelt-Hansen P. Efficacy and adverse events of subcutaneous, oral, and intranasal sumatriptan used for migraine treatment: a systematic review based on number needed to treat. *Cephalalgia* 1998;18:532-538.
11. Charlesworth BR, Dowson AJ, Purdy A, Becker WJ, Boes-Hansen S, Farkkila M. Speed of onset and efficacy of zolmitriptan nasal spray in the acute treatment of migraine: a randomised, double-blind, placebo-controlled, dose ranging study versus zolmitriptan tablet. *CNS Drugs* 2003;17:653-667.
12. Haberler LJ, Walls CM, Lener SE, Taylor DR, McDonald SA. Distinct pharmacokinetic profile and safety of a fixed-dose tablet of sumatriptan and naproxen sodium for the acute treatment of migraine. *Headache* 2010;50:357-373.
13. Brandes JL, Kudrow D, Stark SR, et al. Sumatriptan-naproxen for acute treatment of migraine: a randomized trial. *JAMA* 2007;297:1443-1454.
14. Fedorowicz Z, Jagannath VA, Carter B. Antiemetics for reducing vomiting related to acute gastroenteritis in children and adolescents. *Cochrane Database Syst Rev* 2011:CD005506.
15. Carter B, Fedorowicz Z. Antiemetic treatment for acute gastroenteritis in children: an updated Cochrane systematic review with meta-analysis and mixed treatment comparison in a Bayesian framework. *BMJ Open* 2012;2.
16. Bigal ME, Serrano D, Buse D, Scher A, Stewart WF, Lipton RB. Acute migraine medications and evolution from episodic to chronic migraine: a longitudinal population-based study. *Headache* 2008;48:1157-1168.
17. Dodick D, Lipton RB, Martin V, et al. Consensus Statement: Cardiovascular Safety Profile of Triptans (5-HT_{1B/1D} Agonists) in the Acute Treatment of Migraine. *Headache: The Journal of Head and Face Pain* 2004;44:414-425.
18. Humphrey PP, Feniuk W, Perren MJ, Connor HE, Oxford AW. The pharmacology of the novel 5-HT₁-like receptor agonist, GR43175. *Cephalalgia* 1989;9 Suppl 9:23-33.
19. Carel I, Ghaleh B, Edouard A, et al. Comparative effects of frovatriptan and sumatriptan on coronary and internal carotid vascular haemodynamics in conscious dogs. *Br J Pharmacol* 2001;132:1071-1083.
20. Bates D, Ashford E, Dawson R, et al. Subcutaneous sumatriptan during the migraine aura. Sumatriptan Aura Study Group. *Neurology* 1994;44:1587-1592.
21. Olesen J, Diener HC, Schoenen J, Hettiarachchi J. No effect of eletriptan administration during the aura phase of migraine. *Eur J Neurol* 2004;11:671-677.

This practice guideline was endorsed by the [Child Neurology Society](#) and the [American Academy of Pediatrics](#).

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