Disease-a-Month 61 (2015) 218–222

Contents lists available at ScienceDirect

Disease-a-Month

journal homepage: www.elsevier.com/locate/disamonth

# Migraine headaches

Irene A. Semenov, DO

## Epidemiology

Migraine is a common primary headache disorder, which affects 11% of world's population.[1] The prevalence of migraine in the US was estimated to be 17.6% in females and 5.7 % in males based on three large epidemiological studies. Although it is reported to be similar in both genders before puberty, migraine prevalence is nearly three times higher in females between the ages of 25 and 55.[2] Migraine headaches also occur in pediatric population with prevalence of 3% in children 2–7 years of age, and increases to 8–23% in children 11 years of age and older.[3] In the United States the prevalence of migraine was found to be inversely related to the household income and the level of education. It is associated with significant economic burden in the US and worldwide. The annual direct costs of diagnosing and treating migraines are estimated to be over $1 billion per year, while the indirect costs to American employers are close to $13 billion per year due to reduced productivity.[4] There is also a high percentage of missed family and social activities, reduced ability to do household work, and high likelihood of adverse consequences in relationships between migraines and other family members.[4]

## Diagnosis and treatment

The diagnosis of migraine headache is made by applying the ICHD III criteria and excluding secondary headache disorders. The treatment of migraine can be separated into preventative and abortive approaches. Besides pharmacotherapy, it is important to address the treatment of co-morbid conditions. Patients should be educated about the common migraine triggers such as hormonal changes, dietary triggers, irregular sleep patterns, skipped meals, barometric and temperature, and emotional stress.

Acute treatment options include non-steroidal anti-inflammatory drugs, combination analgesics, dopamine antagonists, corticosteroids and opioids, and migraine specific medications. The choice of treatment is based on the individual migraine attack characteristics. Migraine specific medications are more effective, but are also more expensive. Use of migraine specific medications was shown to lead to a significant decrease in the medical office and emergencies room visits, as well as a decrease in loss of productivity compared to non-specific therapies. The optimal time to treat migraine attack acutely is during a prodromal phase or during the early headache phase.[5]

http://dx.doi.org/10.1016/j.disamonth.2015.03.003

Abundant evidence of efficacy exists for orally available NSAIDs and acetaminophen in combination with caffeine. Ketorolac IM or IV should be considered for the acute treatment of migraine for patients requiring parenteral therapy. Gastric toxicity may be the main limiting factor. While the efficacy of butalbital-containing products has not been demonstrated, there is plenty of evidence that careful patient monitoring is needed due to a high risk of developing drug dependency, development of medication overuse headaches, and potential for withdrawal reaction. The use of opioids is generally not recommended, except for selected cases when no other medication is effective or tolerated. There has been a dramatic increase in opioid administration over the past 25 years, with limited evidence of efficacy for either pain reduction or increased function, and increasing evidence of adverse effects, including headache chronification. Only about 10–20% of refractory headache patients who meet the specific criteria for chronic opioid therapy respond with convincing headache reduction and functional improvement over the long term.[6]

## Migraine specific medications

Both ergotamine and dihydroergotamine (DHE 0.45) are alpha adrenergic and serotonergic agonists with vasoconstricting actions on arterial smooth muscle. Ergotamine tartarate is available as a sublingual tablet, in combination with caffeine in oral form and as a suppository, which has a better absorption rate. Dihydroergotamine is a weaker arterial vasoconstrictor, but equally strong venocontrictor, when compared to ergotamine tartarate, and is effective acute treatment of severe migraine headache, particularly in the presence of nausea and vomiting. It may be administered in multiple forms, including intranasal, intramuscular, subcutaneous, and intravenous routes. Most of the existing placebo-controlled clinical trials are on the efficacy and safety of intranasal DHE preparation (Migranal). DHE infusion was shown to be effective in eliminating prolonged or intractable headache in 89% of patients within 48 h and has been the standard treatment of intractable migraine in the hospital setting. Contraindications to both ergots and DHE include renal or hepatic failure, pregnancy, uncontrolled hypertension, sepsis, CAD, and PVD.[7]

Triptans were developed as specific acute anti-migraine agents, with injectable sumatriptan being the first one available in 1992. The acute anti-migraine effects are attributed to the selective agonist activity at 5HT1b/1d/1f serotonergic receptors, which reduce neurogenic inflammation. Although they are known to constrict meningeal, dural, pial, and cerebral vessels, they were not demonstrated to have any effect on cerebral perfusion and mostly have venoconstrictive as opposed to arterial constrictive effects. Seven additional triptans have been developed and subsequently approved by the FDA over the past two decades—zolmitriptan, naratriptan, riatriptan, almotriptan, frovatriptan, and eletriptan. All of the above are available as oral tablets, while sumariptan and zolmitriptan are also available as nasal sprays. Rizatriptan and zolmitriptan are available as orally disintegrating tablets. While they differ in their pharmacokinetic profiles, they are more similar than in their global effect, and have all been shown to be effective acute migraine medications.[7]

## Are triptans safe for everybody?

Despite the high efficacy and favorable adverse effect profile of these medications, there are some concerns about their cardiovascular safety. Although triptans are known to have a higher affinity for serotonergic receptors in the cerebrovascular beds, they may narrow coronary arteries by 10–20%. There is a controversy whether they are safe for patients with a risk factors for CAD. According to the current American Headache Society recommendations, cardiovascular risk-benefit profile of tirptans favors their use in the absence of specific contraindications, such as uncontrolled hypertension, established CAD, angina, or history of strokes or myocardial infarctions.[8,9]