Migraine management: How do the adult and paediatric migraines differ?

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Received 8 May 2011; accepted 8 July 2011
Available online 20 July 2011

Abstract Migraine is one of the common causes of severe and recurring headache. It may be difficult to manage in primary care settings, where it is under diagnosed and medically treated. Migraine can occur in children as well as in adults and it is three times more common in women than in men. Migraine in children is different from adults in various ways. Migraine management depends on the various factors like duration and severity of pain, associated symptoms, degree of disability, and initial response to treatment. The therapy of children and adolescents with migraines includes treatment modalities for acute attacks, prophylactic medications when the attacks are frequent, and biobehavioural modes of treatment to aid long-term management of the disorder. The long lasting outcome of childhood headaches and progression into adult headaches remains largely unknown. However, it has been suggested that adult migraine may represent a progressive disorder. In children, the progressive nature is uncertain and further investigations into longitudinal outcome and phenotypic changes in childhood headaches have yet to be recognized. Even though paediatric and adult migraines seem to be slightly different from one another, but not enough to categorize either as sole.

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1. Introduction

Migraine is an intermittent, often unbearable headache related health problem that causes significant impairment to the patient’s quality of life. Migraine in children can present contrarily from that is seen in adults. Certain variants of migraine are distinctive to children and but hardly ever, occur in adults. Neurological symptoms (Aura) may be more conspicuous than the headache and apart from these, there may be other nonheadache symptoms also (Stewart et al., 1991). Various recognized childhood syndromes that are assumed to be related to migraine include benign paroxysmal vertigo of childhood, cyclic vomiting syndrome, abdominal migraine and acute confusional migraine (Welch, 2003). Benign paroxysmal vertigo of childhood is usually seen in toddlers, acute confusional migraine exhibits in early school years, and hemiplegic migraine presents in early childhood. While basilar migraine is present more in adolescents, females and ophthalmoplegic migraine is seen later. Variant migraine incidents may be sovereign of actual headache. Other symptoms may prevail and be significantly more bothersome (Brandes, 2008).

Migraine ache is not identical in all sufferers, but it can generally be illustrous from other types of headache. Typically the symptoms in adults and children are unlike. Usual symptoms in adults include extreme pain on one or both sides of the head, throbbing in nature, pain in the eye, jaw, face or neck, photophobia and phonophobia, nausea and vomiting and symptoms worsen with even minor exertion. Usually migraines episodes typically last 4–72 h. Sometimes tension headaches, cluster headaches and the headache of subarachnoid haemorrhage are mistaken for migraine. The first, migraine sufferers can be ruled out subarachnoid haemorrhage by a computerized tomography (CT) scan and spinal tap. Usually migraines in a single patient resemble each other and the patient identifies that this is his or her typical headache. In contrast to the adult migraines, children have a tendency to occur all over the head instead of just one side, and tend to be shorter period than migraines in adults. Occasionally children have the symptoms that escort a migraine which are light sensitive, nausea, and vomiting without any headache. This type is called an abdominal migraine, and is usually hard to diagnose (Pakalnis, 2001).

1.1. Epidemiology

The World Health Organization positions migraines as the 19th leading reason of disability worldwide. Globally migraines affect around 10% of people. Headache, and more particularly migraine, is a frequent health problem in children as well as adolescents. Various estimates show that headaches occur in up to 3/4th of adolescents and 1/4th of younger child. The greatest impact on a child and parent is from migraine, which occurs in up to 10.6% of children between the ages of 5 and 15 years, and 28% in children aged between 15 and 19 years. So this prevalence ranks headache and migraine in the top five health problems of childhood. The prevalence of migraine differs considerably by age and gender (Burton et al., 2009). Below the age of 12 years, migraine is more common in boys than in girls, but prevalence increases more rapidly in girls after puberty. Above the age 12, females are two to three times more likely to have migraine than males to suffer from migraine. Difference between genders in migraine prevalence has been linked to menstruation, but these differences persist beyond menopause. Prevalence is highest in both men and women between the ages of 25 and 45 years. The usual age of onset is 12 to 17 years of age for females and 5 to 11 years for males with incidence of migraine with aura cresting earlier in this range for both. In the American Migraine Study II, 92% of women and 89% of men with migraine reported some headache-related disability, and 53% were severely disabled or needed bed rest during an attack (Buse et al., 2009). Number of neurologic and psychiatric disorders, including epilepsy, stroke, major depression and anxiety disorder, show increased co-morbidity with migraine. Whether this relationship is causal or representative of a common pathophysiologic mechanism is unknown. The economic burden of migraine is significant; yet, the direct medical costs associated with migraine treatment are more surpassed by the indirect costs that result from work-related disability (Freitag, 2007).

The outstanding work of Bile on childhood headache and migraine is one of the earliest well conducted population based study. Bille studied the incidence of headaches in 9000 school-aged children in Sweden in 1962 (Bille, 1962). In this investigation, he reported that by age six years, 39% of children had...
suffered from headache. This estimation drastically increased to 70% by age 15 years. Other studies have reported resembling drifts with an incidence as high as 82%. A study conducted in Taiwan showed that approximately 85% of children aged 13–15 has had headaches (Lu et al., 2000). Other studies showed that up to 51% of children aged seven years and 57–82% of adolescents aged 15 years report recurrent headaches. The prevalence of migraines in the adolescent population has been estimated worldwide to be around 4–10% (Fendrich et al., 2007). Study conducted by Anttila et al concluded the incidence rates of migraine and frequent headache in seven year old Finnish schoolchildren increased from 1974 to 2002 (Anttila et al., 2006). Sillanpaa also reported a 5.7% migraine prevalence rate in Finnish school children and suggested that overall rate may be increased substantially over the past two decades (Sillanpaa et al., 1991).

1.2. Migraine variants in children

In abdominal migraine, the child may exhibit symptoms of episodic abdominal pain, nausea and vomiting. Headache may be minimal or absent. Symptoms are relieved by sleep, antiemetic and antimigraine therapy. Cyclic vomiting syndrome in childhood may be a severe variant of abdominal migraine. Diagnosis is difficult to make during the first episode, but must be considered whenever a child complains of abdominal pain. Trauma triggered migraine, acute minor head trauma can also trigger attacks of migraine in children. Confusional migraine, this variant is less commonly seen in adults. Occasionally a child, whose migraine episode begins in the pre-pubertal years continues into adolescence. The child has a period of confusion and disorientation, with or without agitation followed by vomiting which is relieved by sleep (Ravishankar, 2004). Headache may not be prominent or may be elicited only retrospectively. Diagnosis during the first attacks is difficult and it can be made only after the episode has resolved fully. Differential diagnosis of a single episode includes all types of encephalopathy, ingestion of toxic substances, intoxication or an unobserved seizure with postictal agitation. Next type is Basilar Migraine, which is quite common in adolescent girls. The patient experiences an aura followed by dizziness, vertigo, syncope, inner ear disease and posterior fossa tumours. Hemiplegic migraine presents with hemiplegia or hemiparesis, with or without a speech or language disturbance, which may take minutes to hours to clear. Headache may be less drastic than the hemiplegia. Other migrainous symptoms such as nausea, vomiting and photophobia may be present. Hemiplegia may precede or accompany the headache. This variation is often familial, dominantly inherited and linked to chromosome 19. A defect in the gene for the calcium channel is found in some families. An increased risk of stroke exists in families with this disorder. Diagnosis cannot be made during the first attacks, although it may be suspected in the presence of a positive family history. Most serious causes of hemiplegic migraine, including intracerebral haemorrhage, mass infection, or stroke need exclusion. With repeated, stereotyped episodes and complete normality between episodes, the diagnosis can be made with more confidence, particularly in the presence of a positive family history. Differential diagnosis of repeated episodes includes alternating hemiplegia of childhood, unobserved partial seizures with postictal paralysis and mitochondrial cytopathies particularly the mitochondrial encephalomyopathy, lactic acidosis and stroke syndrome. Benign paroxysmal vertigo of childhood, this syndrome presents with brief episodes of acute vertigo. Based on the observation that a high proportion of children with benign paroxysmal vertigo have a family history of migraine, this entity is considered a migraine variant. This syndrome is not uncommon and most commonly leads to the development of more typical migraines later in childhood. Small children might find it difficult to narrate the symptoms but typically cling to the parent and look frightened. Headache does not follow the attack. Ophthalmoplegic migraine, this migraine variant may begin in childhood. Acute disorders of eye movement, unilateral abnormal papillary response or horner syndrome may precede or accompany the headache. Migraine aura without headache, Migrainous of any age may experience an aura with or without the typical headache. In some, the headache may be minimal while neurological symptoms predominate. Visual symptoms without subsequent headache are fairly frequent. Differential diagnosis includes occipital epilepsy, with or without an identifiable lesion (Cuvellier et al., 2009).

1.3. Migraine variants in adults

Migraine with aura or classical migraine, is a form of headache, which is severe, and usually one sided, frequently associated with nausea and vomiting. This is usually followed by warning symptoms, which usually affect the eyesight and are termed as an Aura (Parsekyan, 2000). Migraine without aura or common migraine has no classic warning signs, the patient may experience one or more symptoms several hours before headache actually starts including feeling of elation or intense energy craving for sweets, thirst, drowsiness, irritability or depression. Retinal or ophthalmic migraine is repeated attacks of monocular scotoma or blindness lasting less than one hour and associated with headache. This condition may be broadly defined as transient or permanent monocular visual disturbances accompanying a migraine attack or occurring in an individual with a strong history of migrainous episodes (Fasmer et al., 2011). One may consider two forms of anterior visual pathway migraine which include transient monocular blindness and permanent unilateral visual loss which is quite uncommon. Basilar migraine is a subtype of migraine with aura. Basilar artery migraine presents itself with two or more of the following symptoms. They are visual symptoms like double vision and dysarthria, ataxia, vertigo, tinnitus, bilateral parenthes, decreased hearing, decreased level of consciousness and bilateral paresis. Familial Hemiplegic Migraine, an autosomal dominant characterized by attacks of transient hemi paresis followed by a migraine headache, is divided into pure familial hemiplegic migraine affecting 80% of families and familial hemiplegic migraine with premature cerebellar signs affecting 20% of families. Familial Hemiplegic Migraine (FHM) is a type of migraine with aura. Complicated migraine is a type of migraine in which migraine attacks are accompanied by permanent neurological deficits, such as paralysis. Menstrual migraine, it is thought to affect 15–20% of women population and according to the American Academy of Neurotology, an estimated 50% of these women experience migraine due to hormonal changes that take place during their menstrual cycle. Menstrual migraines are generally of longer duration and seen more in debilitating persons. It is more likely to recur and is more resistant to treatment than any other migraine. Abdominal Migraine, it is an idiopathic disorder seen mainly in children but quite uncommon in adults (d’Onofrio et al., 2006). It is also
Chronic migraineurs experience headaches more than half of the days of month that fit the criteria of migraine. The patients will normally experience nausea and vomiting, sensitivity to light, sound, or smells, with the pain experienced as throbbing in nature and often on one side of the head. Even minor activity or simply bending forward can aggravate the pain and discomfort. Usually sufferers from chronic headache disorders abide much of the burden that they do not carry it all. This is due to headache disorders which are most niggling in the productive years, estimates of their financial cost to society, mainly from lost working hours and reduced productivity are immense. For example, in UK, some 25 million working or school days are lost every year because of migraine itself. Tension type headache (TTH) is more common but less disabling, while chronic daily headache (CDH) is less common but more disabling, together cause losses which are almost certainly of at least similar magnitude. Chronic daily headache (CDH) is a descriptive term that comprises several different headache diagnoses (Rozen, 2003). Chronic daily headache affects 4% of the adult population in the US and around the globe (Castillo et al., 1999) while chronic TTH affects 1–3% of adults. Chronic Headache ought to be a public health concern. Even though there is good evidence that huge numbers of people upset by headache do not receive actual care. Usually chronic TTH originates during the teenage years and reaches top levels in the 30’s (Guitera et al., 2002). Episodic TTH is the most common headache disorder, reported by over 70% of some populations. Its prevalence varies greatly. African community-based studies have reported only 1.7% of the population affected, but cultural attitudes to reporting a relatively minor complaint may largely explain this finding.
nausea, and vomiting of an attack. Prophylactic therapy becomes necessary when the frequency or duration of attacks or the anxiety of attacks seriously interferes with the patient’s lifestyle. Other indications for prophylaxis include the occurrence of severe or prolonged neurological symptoms or a lack of response to symptomatic treatment. Generally a prophylactic treatment should be considered if attacks occur as often as one to two days per week (Schuurmans and van Weel, 2005).

2.3. Prophylactic treatment

The main drugs given for childhood migraine prophylaxis include betablockers like propranolol and metoprolol, flunarizine and valproic acid, tricyclic antidepressants like amitriptyline hydrochloride and nortriptyline hydrochloride, Cyproheptadine, and antihistamine with antiserotonergic but less useful in teenagers, NSAIDs such as naproxen sodium and ibuprofen. In this flunarizine is the drug of first choice. The most effective prophylactic agents for adults include β-adrenergic blockers propranolol, timolol, nadolol, atenolol, and metoprolol probably have approximately the same benefit in migraine as propranolol (Sonal et al., 2009). The only pharmacological trait that likely have approximately the same benefit in migraine as propranolol, timolol, nadolol, atenolol, and metoprolol probably have approximately the same benefit in migraine as propranolol (Sonal et al., 2009). The only pharmacological trait that separates β-adrenergic blocking agents effective in migraine from those that are not is a lack of sympathomimetic activity. Propranolol is more effective in patients with a single migraine type, whereas amitriptyline is more beneficial for patients with mixed migraine and tension features (Meyer, 2009). Amitriptyline also is useful in patients with co-morbid insomnia. Attacks of migraines during menses can be prevented with a course of an NSAID beginning several days before menstruation and continuing during the first few days of the period. NSAIDs can be especially helpful in patients with co-morbid osteoarthritis. However, chronic NSAID use must be undertaken cautiously because of the potential for adverse effects involving the gastrointestinal tract and renal function (Mannix, 2004). Monoamine oxidase inhibitor (MAOI) phenelzine can also be used. Unfortunately, the dietary restrictions that must be carefully followed if a hypertensive crisis is to be avoided is limiting the widespread use of these inhibitors for prevention of migraine. For patients with particularly severe and intractable attacks, the MAOIs may be considered. Calcium-channel blockers verapamil and flunarizine have benefit for preventing recurrent attacks of migraine. Antiepileptic medications are very effective in preventing migraine attacks. Divalproex sodium is an effective migraine preventive for adults but, it should be avoidable for women who are at risk of becoming pregnant as it is associated with an increased risk for neural tube defects. Topiramate is the most recent addition to the antimigraine armamentarium (Cruz et al., 2009). It is currently being investigated as a migraine preventive agent in children and adolescents (Loder and Biondi, 2005). Dosages for migraine prevention range from 50 to 200 mg/d in single or divided doses. Serotonergic Agent Methysergide is a derivative of lysergic acid diethylamide it should be reserved for the most intractable migraine and should be given for periods of only six months at a time. Between courses, methysergide should be discontinued for four weeks. Cyproheptadine is also a peripheral serotonin antagonist but only has less effect in adults. Others include riboflavin administered orally in a dose of 400 mg/day and Botulinum toxin-A injection (Sonal et al., 2009).

2.4. Symptomatic treatment

The symptomatic treatment of migraine involves pharmacologic and nonpharmacologic methods. Treatment includes starting counselling as soon as clinical manifestations occur. Apart from this use simple and appropriate drug in adequate doses, management of dehydrations, sleep deprivation, nausea and vomiting. Usually pharmacologic modalities include single analgesics, combination analgesics with or without opiate narcotics, nonsteroidal anti-inflammatory drugs (NSAIDs), ergotamine derivatives, and 5-HT1 receptor agonists. Patients should be informed about continuous use of symptomatic treatments which can lead to rebound headaches and eventually to chronic daily headaches (Hershey, 2010). Symptomatic treatment should generally begin as early in the starting of an episode as possible. Patients should take the medications if aura is present and should not wait for the pain to begin. Exception for this is sumatriptan in subcutaneous formulation, which is less effective if administered earlier than the onset of the headache phase. Presently sumatriptan and related selective serotonin receptor agonists are the treatment of choice for chronic migraine episodes. For migraines with typical migraines, mid-line treatment, Triptans are a suitable. But, they may not effective for atypical or severe migraines, transformed migraines, or status migraines. Generally Triptans are highly effective in reducing the symptoms or aborting the attack within 30–90 minutes in 70–80% of patients. Unusually many patients have a recurrent migraine later in the day and only one such recurrence in a day can be managed with a second dose of a triptan. Triptans are now available as various dosage forms like tablets (sumatriptan, zolmitriptan, rizatriptan, almotriptan malate, eletriptan hydrobromide, naratriptan hydrochloride, and frovatriptan succinate), dissolving tablets (zolmitriptan and rizatriptan), injections (sumatriptan) and nasal sprays (sumatriptan and zolmitriptan). In young migraines, triptans can be successfully used with increasing frequency as rescue medications.

Availability of the various classes of medications and formulations allows for flexibility in the management plan. It must be elicited, though that once the attack is fully developed. Due to decreased gastrointestinal motility and poor absorption, usually oral preparations are less effective. More over if vomiting starts, oral preparations are no longer useful. Till the introduction of sumatriptan in 1985, ergot derivatives were the main oral drugs available to manage a migraine once it is established. The main role of ergot drugs are as a preventive or abortive therapy. However, their relative higher expense and cumulative side effects suggest reserving them as an abortive rescue medicine. Ergotamine tartarate tablets, usually along with caffeine, though highly effective, and long lasting (unlike triptans), have fallen out of favour due to the problem of temporarily disabling calf pain caused by overdose called ergotism. Unless the patient is nauseated, oral ergotamine tablet absorption is reliable. For evening-night migraines, pure ergotamine tartrate is highly effective. Dihydroergotamine (DHE), which is available as injection or inhalation, can be as effective as ergotamine tartrate, but is much more expensive. Intravenous dihydroergotamine (DHE) is an effective abortive agent when used early in an attack and is an option for the older child. Children and adolescents often respond to over-the-counter
medication, including nonsteroidal anti-inflammatory drugs (NSAIDs) or combination analgesics. Analgesics like Acetaminophen and Ibuprofen are safe, effective and widely used for treatment of acute attacks of migraine in children. Some times stronger analgesic medication such as butalbital may be necessary. Because of the risk of Reye’s syndrome, Aspirin-containing compounds are of concern in children younger than 15 years. Although a combination of aspirin, caffeine, and acetaminophen is effective in adult acute migraine, it has not been tested in children for mild to moderate migraines. Even other NSAIDs are effective if taken at a high but appropriate dosage during the aura or early headache phase. In most migraine patients occurs gastric stasis which causes delay in absorption of oral medications. Sometimes, carbonated beverages may improve absorption (Lewis, 2010).

Opiate analgesics like codeine, morphine or others agents provide variable relief, but their side effects, chances of rebound headaches or overuse headache, and the risk of addiction contraindicates their usual usage. Some of the dopamine antagonists including prochlorperazine maleate and metoclopramide hydrochloride were effective for the nausea and vomiting due migraine headaches. The earlier these drugs are used in the management, the better their effect. Intravenous chlorpromazine has proven very effective in treating status migrainous which is a life-threatening condition. Uncomplicated, non-nauseated cases can be treated with 20 mg of prednisone tablets every eight hours until the migraine stops, followed by mandatory tapering off the doses. Compared to ketorolac, prochlorperazine is more effective in the reduction of symptoms in one hour after intake in controlling severe acute migraine attack in the emergency department (Mack, 2010).

3. Conclusion

Childhood and adult migraine are common public problems among the primary complaints of the both populations. These two exhibit slightly different from each other, but not enough to categorize either as unique. The reason for this is migraine research still has to go a long way, because researchers have done only few studies that are comprised of large sample sizes, or that can comprehensively separate psychosocial and physiological influences as well as therapies. Moreover, it is not yet clear whether genetic factors or socio-psychological parameters exert more influence over the other factors in determining the specific etiopathogenesis of migraine. But migraine in general is presumed to be due to a genetic predisposition with environmental and systemic triggers. For the general practitioners there is little known about clinical features and treatment strategies. Generally headache practitioners consider the age related differences of headache characteristics and management schedules.

Doing a specific diagnosis that attacks are migrainous in origin may be quite helpful in their management. Usually families are relieved to know that the child does not have a more serious condition like brain tumour and that further unwanted medical intervention may not be necessary. If episodes present on multiple occasions, with complete resolution between episodes, particularly in the evidence of a positive family history of migraine, extensive laboratory testing and imaging can be avoided. During the first episode, if the child is observed acutely, more extensive evaluation may be necessary to exclude alternative diagnoses.

Various studies have reported prevalence rates of migraine in paediatric population have increased worldwide. The higher prevalence rates reported in the Scandinavian and other studies may be due to the use of different diagnostic criteria. Despite its prevalence, migraine remains generally under diagnosed or misdiagnosed, just as in adults in whom migraine is often attributed to sinus disease. The misdiagnosis has been demonstrated in adults to result in a significant impact on treatment, disability, and quality of life. Correspondingly in children, frequent headaches can cause a significant impact on disability and quality of life, prompting the need for early identification and treatment. The long-term outcome of childhood headaches and evolution into adult headaches remains largely unknown. It has been suggested that for adults migraine may represent a progressive disorder. In children, however, the progressive nature is uncertain and further investigations into longitudinal outcome and phenotypic changes in childhood headaches have yet to be recognized.

Most of the therapeutic agents are developed from research data extrapolated from adult interventional studies with concerns of safety and efficacy when using these agents in children. Current focus in management of recurrent headaches in adults involves nonpharmacological modalities like dietary modification and stress management. Application of these possibilities especially permits further explaining in respect to its relevance in paediatric migraine management.

Contributors

Mr. Sonal Sekhar and Shalini Sasidharan wrote the manuscript and shall act as the guarantors for the paper; Ms. Shalini Sasidharan and Mr. Siby Joseph collected the data for the manuscript preparation; and Dr. Anand Kumar critically reviewed the manuscript.

Conflict of interest

We declare that there is no conflict of interest on this article.

Funding source

Nil.

Acknowledgements

We deeply express our profound and sincere gratitude to Manipal University, Amrita Vishwa Vidyapeetham and Dr. K.G Revikumar, Principal, Amrita School of Pharmacy for the valuable guidance and encouragement.

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