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SHORT COMMUNICATION

Management of Migraine: An Overview

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ABSTRACT

Migraine headache is an episodic headache disorder. Most people who suffer from migraines get headaches that can be quite severe. The pain usually begins in the morning, on one side of the head. The word migraine is derived from a Greek word that means “half-head”. Less frequently, the entire head is swallowed up by pain. It is a common condition with a prevalence of 17.6% in females and 5.7% in males. About three out of four people who have migraines are women. Migraines are most common in women between the ages of 20 and 45. At this time of life women often have more job, family, and social duties. Migraines can significantly hinder one’s work performance. Medications from several different drug classes may be useful prophylactic agents.

KEY WORDS: Migraine, Headache, Women, Pain

INTRODUCTION:

A migraine headache is usually an intense, throbbing pain on one, or sometimes, both sides of the head. Most people with migraine headache feel the pain in the temples or behind one eye or ear, although any part of the head can be involved. Besides pain, migraine also can cause nausea and vomiting and sensitivity to light and sound. Some people also may see spots or flashing lights or have a temporary loss of vision (1).

Headache is the primary symptom of migraine, but migraine is invariably more than just headache. Headache, one of the most common patient complaints in neurologists' offices and the most common pain complaint seen in family practice, accounts for 10 million office visits a year. Most headaches are of the primary type (e.g., migraine and tension-type headache) (2). Migraine can occur any time of the day, though it often starts in the morning. The pain can last a few hours or up to one or two days. Some people get migraines once or twice a week. Most of the time, migraines are not a threat to overall health. But migraine attacks can interfere with your day-to-day life (1, 3).

Migraine is often undiagnosed. About half of migraine patients stop seeking care for their headaches, partly because they are dissatisfied with therapy. Indeed, public surveys indicate that headache sufferers are among the most dissatisfied patients. In addition to being dissatisfied with their care, many migraineurs report significant disability and an impaired quality of life (2, 3).

More than half of migraines in women occur right before, during, or after a woman has her period. This often is called “menstrual migraine.” But, just a small fraction of women who have migraine around their period only have migraine at this time. Most have migraine headaches at other times of the month as well. How the menstrual cycle and migraine are linked is still unclear. We know that just before the cycle begins, levels of the female hormones, estrogen and progesterone, go down sharply. This drop in hormones may trigger a migraine, because estrogen controls chemicals in the brain that affect a woman’s pain sensation (1, 2, 3).

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MECHANISMS OF MIGRAINE (4-7):

The aura symptoms are, most likely caused by a mechanism similar to spreading excitation and depression. It is has been believed that migraine attack is a specific reaction pattern to an episode of focal cerebral hypoxia. This hypothesis holds that any type of focal brain hypoxia (and thus not only a vasospasm) may provoke a migraine attack. Indeed, as hypoxia is a result of an imbalance between energy supply and energy use, the former can be decreased and/or the latter be increased. Spreading cortical depression, leading to the aura, is believed to be a consequence of brain hypoxia occurring in classical migraine. There are no genuine differences between classical and common migraine, according to the cerebral hypoxia theory. The latter theory may improve our understanding of the mode of action of anti-migraine drugs. Certain calcium entry blockers have a direct protective effect on brain hypoxia, but some other pharmacotherapeutic approaches may also prevent cerebral hypoxia via an effect on brain metabolism, vasomotion or platelet behavior. It has been postulated that the classic migraine is both spreading cortical depression and localized ischemia linked in a vicious cycle by potassium induced vasoconstriction. The cycle can be initiated by any event that raises the local cortical ECF (extracellular fluid) potassium concentration to approximately 20 mM. Such an event could be a localized burst of activity of a group of cells, localized metabolic impairment, or a transient reduction in blood flow to a region of the cortex. Once this level of potassium concentration is reached, it may result in localized depolarization of neurons, releasing more potassium into the ECF. As the concentration continues to rise, vasoconstriction becomes more intense, perpetuating the cycle that results in localized depression of cortical neuronal activity and ischemia. The condition is propagated to adjacent regions of the cortex by diffusion and glial-mediated spread of potassium.

Neuronal hyperexcitability between attacks may be due to:

- Magnesium deficiency.
- Mitochondrial disorder.
- Abnormality of presynaptic calcium channels.

Like many others neurological diseases, mitochondrial involvement, by means of abnormalities in cerebral oxidative metabolism, may play a role in migraine.

The importance of magnesium in the pathogenesis of migraine headaches is clearly established by a large number of clinical and experimental studies. However, the precise role of various effects of low magnesium levels in the development of migraines remains to be discovered.

Magnesium concentration has an effect on:

- Nitric oxide synthesis and release.
- Serotonin receptors.
- A variety of migraine related receptors and neurotransmitters.

The available evidence suggests that up to 50% of patients during an acute migraine attack have lowered levels of ionized magnesium. Infusion of magnesium results in a rapid and sustained relief of an acute migraine in such patients. Two double-blind studies suggest that chronic oral magnesium supplementation may also reduce the frequency of migraine headaches.

Increased tissue levels of taurine, as well as increased extracellular magnesium, could be expected to:

- Counteract vasospasm.
- Increase tolerance to focal hypoxia.
- Dampen neuronal hyperexcitation.
- Taurine may also lessen sympathetic outflow.
- Stabilize platelets.

Thus it is reasonable to speculate that supplemental magnesium taurate will have preventive value in the treatment of migraine.

CAUSE OF MIGRAINE (1, 3, 8) :

The exact cause of migraine is not fully understood. Most researchers think that migraine is due to abnormal changes in levels of substances that are naturally produced in the brain. When the levels of these substances increase, they can cause inflammation. This inflammation then causes blood vessels in the brain to swell and press on nearby nerves, causing pain.

Genes also have been linked to migraine. People who get migraines may have abnormal genes that control the functions of certain brain cells.

Experts do know that people with migraines react to a variety of factors and events, called triggers. These triggers can vary from person to person and don't always lead to migraine. A combination of triggers—not a single thing or event—is more likely to set off an attack. A person's response to triggers also can vary from migraine to migraine. Many women with migraine tend to have attacks triggered by:

- lack of or too much sleep
- skipped meals
- hormone changes during the menstrual cycle
- bright lights, loud noises, or strong odors
- caffeine (too much or withdrawal)
- weather changes
- stress and anxiety, or relaxation after stress
- foods that contain nitrates, such as hot dogs and lunch meats

❖ foods that contain tyramine, such as aged cheeses, soy products, fava beans, hard sausages, smoked fish, and Chianti wine
❖ foods that contain MSG (monosodium glutamate), a flavor enhancer found in fast foods, broths, seasonings, and spices
❖ aspartame (NutraSweet® and Equal®)
❖ alcohol (often red wine)

MIGRAINE TRIGGERS (9, 10):

Triggers are specific factors that may increase your of having a migraine attack. The migraine sufferer has inherited a sensitive nervous system that under certain circumstances can lead to migraine. Triggers do not 'cause' migraine. Instead, they are thought to activate processes that cause migraine in people who are prone to the condition. A certain trigger will not induce a migraine in every person; and, in a single migraine sufferer, a trigger may not cause a migraine every time.

Environmental triggers (10):

Environmental triggers can be the hardest to detect because they're the most subtle. A change in the weather or a whiff of a certain fragrance can bring on a migraine. Leading environmental triggers include:
❖ Sudden weather changes, including a drop in barometric pressure or changes in temperature, humidity, or wind
❖ Loud noises
❖ Perfumes or fumes
❖ Secondhand smoke
❖ Exposure to glare or flickering lights

FOOD TRIGGERS (9, 10):

Fewer than 30 percent of migraine sufferers identify foods as triggers. To be considered a migraine trigger, the food must trigger a typical migraine headache within 24 hours of the time it's consumed, and it must do that more than half the time that the food is eaten.
Many experts believe that eating certain foods causes changes in brain concentrations of chemicals that set off migraine headaches, but not all experts agree about the role of food and dietary limits in the prevention of migraine headache. You will need to discover if there is a relationship between foods and headaches for yourself.
It's important to remember that everybody reacts differently to different foods—hence the saying, **"**One man's meat is another man's poison.**"** Some of these foods may bring on a migraine for you, while others will have no effect. Just as importantly, many times a well-recognized food trigger will not bring on a migraine headache. Many migraine sufferers note that it can take the occurrence of many triggers at one time to bring on a migraine headache.

❖ **ALCOHOL TRIGGERS:** Alcohol is easily the most common food trigger. And of alcoholic beverages, red wine has received the most attention as the leading culprit, but even beer can trigger migraines in some people.

❖ **AGED CHEESE:** Beware of the blue cheeses—Roquefort, Stilton, Gorgonzola—as well as aged cheeses like Parmesan. Even aged sharp cheddars can trigger a migraine.

❖ **FOOD ADDITIVES:** Certain food additives may trigger headache in susceptible people, with a number of additives thought to be responsible, including monosodium glutamate (MSG), aspartame, phenylethylamine, nitrates, and tyramine.

❖ **COFFEE AND OTHER CAFFEINATED DRINKS:** When it comes to migraine, caffeine is a double-edged sword. It can actually reduce headache pain—especially at the beginning of a migraine. On the other hand, if drink a lot of coffee and suddenly quit, could well develop migraine pain.

❖ **CITRUS:** Oranges, grapefruits, lemons, limes, pineapples, and their juices can trigger migraines.

❖ **PROCESSED MEATS:** Luncheon meats such as bologna, as well as some hot dogs, sausage, and bacon, can trigger migraines. Typically, processed meats contain food additives and preservatives.

MEDICATION TRIGGERS (9, 10):

Some drugs are believed to trigger migraine.
Vasodilators: Certain vasodilators, generally prescribed to lower blood pressure, and drugs designed to ease chest pain, such as nitroglycerin, can bring on headaches. However, the headaches associated with these medicines are probably not migraine headaches, because they tend to come on shortly after starting a new medication and tend to disappear the longer one takes them.

PHYSICAL TRIGGERS (10):

❖ Get hit in the head during playing a sport, for example, or in a car accident—and get a terrible headache
❖ Intense physical pressure on the head—sometimes known as "goggle migraine," because some swimmers develop it after an hour or two in the water.
❖ Air crews flying at high altitude have also reported migraine symptoms a few minutes after descent.

MIGRAINES & WOMEN (1, 3, 10):

Women are 3 times more likely than men to get migraines. What's more, women's migraines often seem timed to events that are hormone related, such as pregnancy, menopause, and menstrual cycles. That's why, although the research is not conclusive about the role of hormones in migraine for some women, it's widely believed that there is a connection.

Here's a list of the events in women's lives during which hormone levels fluctuate and during which migraine symptoms may be triggered or reduced:

❖ **MENSTRUATION:** Women sometimes have monthly migraine attacks at specific points in their menstrual cycle. It may be just before their periods, during their periods, or at midcycle, during ovulation. These are called menstrual migraines.

❖ **PREGNANCY:** Pregnancy can be a particularly blessed event for women who get migraines. That's because some women get relief from migraines during pregnancy, especially during the second and third trimesters. However, for others, pregnancy is the start of their migraines, or they worsen during this time.

❖ **MENOPAUSE:** A woman's natural level of estrogen falls off sharply with menopause. As a result, many women who have menstrual migraines find that their migraines become less frequent and less severe after menopause. While they're going through menopause, however, their migraines may sometimes be worse as their bodies cope with fluctuating hormone levels.

TYPES OF MIGRAINE (11, 12):

1. MIGRAINE WITHOUT AURA

A. At least 5 attacks that fulfill criteria in B, C, D, and E

B. Headache attacks that last 4 to 72 hrs (untreated or unsuccessfully treated)

C. Headache has at least 2 of the following characteristics:

- Unilateral site
- Pulsating quality
- Moderate to severe intensity
- Aggravation by walking stairs or similar routine physical activity

D. During headache, at least 1 of the following symptoms:

- Nausea or vomiting (or both)
- Photophobia and phonophobia
- E. No evidence of related organic disease

2. MIGRAINE WITH AURA:

A. At least 2 attacks that fulfill criteria in B and C

B. At least 3 of the following 4 characteristics:

- One or more completely reversible aura symptoms that indicate focal cerebral cortical or brain-stem dysfunction (or both)
- At least one aura symptom develops gradually over >4 min or two or more symptoms occcur in succession
- No aura symptom lasts >60 min
- Headache follows aura in <1 hr

C. No evidence of related organic disease

There are also some rare types of migraine. They are also classed as migraine with aura:

BASILAR-TYPE MIGRAINE:

This is named after the basilar artery, a blood vessel in the back of your head, although it is unclear whether this blood vessel is actually involved. This type of migraine usually involves a headache at the back of your head rather than on one side. This follows, or is accompanied by, an aura which may involve problems with vision or hearing, speaking difficulties, tingling in your hands and feet (on both sides) and dizziness or problems with co-ordination.

HEMIPLEGIC MIGRAINE:

Hemiplegia means paralysis on one side of the body and weakness or paralysis on one side is a key symptom of this type of migraine. Other symptoms might include numbness or pins and needles, visual problems, confusion and speech problems. These problems usually go within 24 hours, but they may last a few days. A headache usually follows. This type of migraine can be particularly frightening as the symptoms are similar to a stroke but in hemiplegic migraine they usually develop more slowly, whereas a stroke is usually a sudden event. If you have a parent who has hemiplegic migraines then you have about a 50 per cent chance of having this type of migraine yourself. This is called familial hemiplegic migraine (FHM). In some families with FHM, problems have been found with particular genes which affect how the brain cells communicate with each other. If no one else in your family has hemiplegic migraines this is called sporadic hemiplegic migraine (SHM).

THE MIGRAINE PROCESS (3, 13, 14):

The process of a migraine, which can take days to completely evolve and abate, is divided into 4 or 5 phases. The first is the premonitory phase, commonly referred to as the prodrome. This phase may or may not be followed by aura, the second phase. The third phase is the headache phase.

1. THE PREMONITORY PHASE (PRODROME):

Premonitory symptoms presumably result from neurochemical alterations in the brain (perhaps the hypothalamus) and represent the first signs and symptoms of an impending attack. Physical symptoms included food cravings, emotional and mood swings, cognitive dysfunction, yawning, sensitivity to sound, change in vision, nausea and vomiting, and impaired speech. Premonitory symptoms may be present for up to 48 hours prior to the onset of headache pain20 and, 72% of the time, is a predictor of subsequent headache within 72 hours.

2. THE AURA PHASE:

An aura is a self-limited, totally reversible neurologic event. Generally sensory in nature, visual or sensory changes are by far the most common symptoms to occur and are observed in 15% to 20% of attacks. Auras have been hypothesized as a mechanism for activation of trigeminal afferents in the meninges. The headache associated with migraine typically follows within 60 minutes of resolution of the aura. Migraine aura is thought to be caused by neuronal dysfunction. For example, patients who see scintillating lights will continue to see spots of light even after they close their eyes; in patients with sensory spread, the fingers, the first area of neurologic impairment, will return to normal by the time the numbness marches to the upper arm—the opposite of what would occur in a vascular event, where resolution is characterized by the first deficits being the last to clear. Spreading cortical depression (SCD) is a wave of electrical depolarization and hyperpolarization that moves across the brain at 2 to 3 mm/minute. It is characterized by an excitatory phase followed by depolarization of perivascular trigeminal terminals; the trigeminal nerve is known to participate in the genesis of migraine headache.

Once the perivascular sensory trigeminal neurons are activated, they respond to stimuli by sending pain impulses to sensory neurons in the trigeminal nucleus caudalis (TNC) in the brainstem. The trigeminal nuclei relay incoming pain signals to higher cortical centers, where migraine pain is registered. In rare instances, an aura may not be followed by a headache, a diagnosis called migraine aura without headache. ❖

3. THE HEADACHE PHASE:

The meninges, the capsule structure around the brain, are the most significant pain-producing intracranial tissues, and the trigeminal nerve is the primary sensory input from the face, head, and intracranial vault. The trigeminal nerve is a mixed sensory and motor nerve arising from the trigeminal ganglia, extending to the pain-producing intracranial extracerebral blood vessels in the meninges and the trigeminal nuclei in the brainstem and upper cervical spinal cord. Nerve has 3 peripheral branches that send sensory signals into the brainstem at the level of TNC. These second order neurons relay signals to higher order neurons in the thalamus and then to the cerebral cortex. The 3 branches of the nerve include the ophthalmic branch (V cranial nerve), innervating the meninges (anterior and middle cranial fossae); the maxillary branch, projecting into the middle part of the face and the sinus cavities; and the mandibular branch, projecting into the lower jaw and the muscles of mastication, including the temporalis. Innervation of the cerebral vessels by the trigeminal nerves provides a pain pathway from the meningeal blood vessels into the brain called the trigeminovascular system. Activation of perivascular sensory trigeminal neurons results in transmission of pain impulses to sensory neurons in the TNC, stimulating the release of vasoactive neuropeptides, causing further vasodilation and neurogenic inflammation. This, over time, results in increased nerve activation and intensified headache pain. Continued activation of the trigeminal fibers are transformed into an abnormal sensitized state, is known as central sensitization. Clinically, this can be noted as allodynia, a state in which innocuous stimuli that are normally nonpainful, such as touch, become an input of pain. Central sensitization may play a key role in maintaining pain in migraine. Meanwhile, the maxillary branch can contribute to vasodilation in the nasal passages, releasing nasal active peptides and resulting in inflammation of the nasal mucosa. The resulting facial pressure with possible nasal congestion is a common symptom associated with migraine.

4. THE POSTHEADACHE PHASE (POSTDROME):

Postdrome is the period of time after resolution of a headache. Migraine-associated symptoms can persist during postdrome for up to 2 days.

TREATMENT OF MIGRAINE (2, 3, 15):

There are various things do to help reduce the risk of an attack:

❖ **EAT AND DRINK REGULARLY:** Dieting or fasting can bring on an attack. Having your meals at regular times each day may reduce the chance of a migraine. Eating high protein meals can reduce migraine attacks.

❖ **EXERCISE:** Go jogging or join a gym. Keeping your body healthy and fit is a great way to reduce migraines.

❖ **REDUCE STRESS:** Regular exercise, deep breathing exercises, yoga, and transcendental meditation can be good stress relievers for many.

❖ **STOP SMOKING:** Smoking is a migraine risk factor. One-third of smokers complain that smoking initiates or exacerbates their migraines. The odour of cigarette smoke can also trigger attacks.

❖ **FOLLOW A REGULAR SLEEP ROUTINE:** Try going to bed and awakening at the same time each day. Get enough sleep–but don't oversleep.

❖ **AVOID OVERSTIMULATION OF SENSES:** Avoid using fluorescent lights.

❖ **PSYCHOLOGICAL SUPPORT:** Cognitive behavioural therapy (stress coping) teaches sufferers problem-solving and coping skills that can be used to handle their migraine triggers.

❖ **PHYSICAL THERAPY:** For some sufferers, migraines are induced by physical trauma. Hot packs, ultrasound and therapeutic massage can help diminish pain.

❖ **BEHAVIOURAL TECHNIQUES:** Relaxation technique thermal and electrical stimulation of the head and management skill programs have all been effective in reducing attacks.

Table 1: Drug used to treat migraine

Sr. No.	Category	Drug
1	**Alpha-2 agonists**	Clonidine
		Guanfacine
2	**Antiepileptics**	Vigabatrin
		Carbamazepine
		Gabapentin
		Sodium valproate
		Divalproex sodium
		Tiagabine
		Topiramate
3	**Antidepressants :**	
	Tricyclic antidepressants (TCAs):	Nortriptyline
		Amitriptyline
		Protriptyline
		Doxepin
		Imipramine
	Selective serotonin reuptake inhibitors (SSRIs)	Fluoxetine
		Fluvoxamine
		Paroxetine
		Sertraline
	Monoamine oxidase inhibitors (MAOIs)	Phenelzine
	Other antidepressants	Bupropion
		Venlafaxine
		Mirtazepine
		Trazodone
4	**Beta-blockers**	Atenolol
		Nadolol
		Metoprolol
		Propranolol
		Timolol
5	**Calcium Channel Blockers**	Cyclandelate
		Flunarizine
		Diltiazem

		Verapamil
		Nimodipine
6	**NSAIDs**	Fenoprofen
		Aspirin
		Mefenamic acid
		Flurbiprofen
		Indobufen
		Tolfenamic acid
		Ibuprofen
		Ketoprofen
		Naproxen
		Lornoxicam
7	**Serotonin Antagonists**	Cyproheptadine
		Lisuride
		Methylergonovine
		Pizotifen
		Methysergide
8	**Others**	Estradiol
		Flumedroxone
		Feverfew
		Magnesium
		Vitamin B2

Common non-prescription painkillers such as acetylsalicylic acid, acetaminophen and ibuprofen can be effective for milder attacks, if taken early. Prescription medications may also be used for the treatment of migraine and include both non-specific and specific therapies. Non-specific migraine therapies include non-steroidal anti-inflammatory drugs (NSAIDs), and combinations of analgesics. Specifically developed for the treatment of migraines, the triptans are another treatment option for the relief of migraine pain.

As with many medications, potential side effects of these drugs should be considered. Side effects associated with NSAIDs include nausea, epigastric pain and dizziness. Daily use of opioids can lead to dependency, rebound headaches and decreased efficacy. Side effects associated with the use of triptans include nausea, dizziness and asthenia.

Non-pharmacological therapies such as relaxation therapy, electrical stimulation, acupuncture, and even hypnosis may also be considered in the treatment of migraine.

CONCLUSION:

A migraine is a relatively common medical condition that can severely affect the quality of life of the sufferer and his or her family and friends. Migraine is the most common cause of severe, recurring headache. Migraines are different from other headaches because they occur with symptoms such as nausea, vomiting, or sensitivity to light. However, migraine can be effectively treated, and sometimes even prevented. Migrainous triggers may not always be apparent, even with compilation of a meticulous headache diary by the patient, or preventable even when identified. Rescue medications are often opioids-narcotic pain relievers. They knock out pain, but they can also make very drowsy and often increase nausea. And, as with other headache medications, frequent use of narcotic medicines may lead to daily rebound headaches. In addition, they can become addictive. For these reasons, rescue medications are medications of last resort.

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