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A Comprehensive Overview of Migraine: Etiology, Epidemiology and Treatment Strategies

Talari Preethi, Narender Boggula, Mandepudi Lakshmi Chandini*

Omega College of Pharmacy, Edulabad, Ghatkesar, Hyderabad, Telangana, India
***Corresponding Author:** Mandepudi Lakshmi Chandini

ABSTRACT

An overwhelming majority of the global population, approximately 95%, have suffered from a headache at some point in their lives, with an alarming annual prevalence that suggests nearly half of all adults have experienced a headache within a given year. Migraine and associated symptoms are a significant burden to the financial, mental, and physical wellbeing of those that live with this chronic disease. Migraine it is a common chronic disorder it is typically characterized by attacks of headache and accompanying symptoms including aura. The understanding of migraine pathophysiology has evolved over the years. There are several different theories surrounding migraine development and maintenance. The aetiology is multifactorial with rare monogenic variants depression, epilepsy, stroke, migraine attacks themselves act as stressor. This review provides an overview that both stress and migraine are reciprocally related cyclically influencing each other across time. The individual and global burden of migraine is of such significance that there are accelerated efforts to develop new therapies. New migraine therapeutics are needed to address the current deficiencies that exist in the efficacy and adherence rate of approved anti-migraine medications.

KEYWORDS: *Migraine, etiology, epidemiology, headache*

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INTRODUCTION

The World Health Organization recognizes the debilitating nature of headaches, including them among the top ten global causes of disability. Interestingly, in women, the prevalence and impact of headaches are even more pronounced, ranking among the top five causes of disability. It is pertinent to note that the debilitating impact of headaches is comparable to chronic conditions, such as arthritis and diabetes, and its severity exceeds that of conditions like asthma [1].

Migraine, a long-term headache disorder punctuated by episodic bouts, is characterized by repeated instances of severe headaches that present with unique associated symptoms. These include photophobia, a heightened sensitivity to light, and phonophobia, an increased sensitivity to sound. The classification of episodic migraine-an intermittent but recurring form of this disorder-hinges on the frequency with which a patient experiences these debilitating headaches. Chronic migraine, although less common when compared to its episodic counterpart, remains a pervasive and incapacitating issue. It poses a significant burden on those afflicted with the condition, dramatically impacting their daily lives and well-being. This persistent form of migraine continues to be a widespread challenge, necessitating ongoing research and improved therapeutic strategies to ease the strain it puts on sufferers [1,2].

Migraine is an extremely disabling, common neurological disorder characterized by a complex neurobiology, involving a series of central and peripheral nervous system areas and networks. A growing increase in the understanding of migraine pathophysiology in recent years has facilitated translation of that knowledge into novel treatments, which are currently becoming available to patients in many parts of the world and are substantially changing the clinical approach to the disease. Migraine is a genetically influenced complex neurological disorder characterized by episodes of modern-to-severe headaches, typically unilateral and frequently accompanied by nausea and heightened

sensitivity to light and sound. The word "migraine" is derived from Greek word hemicrania [3,4].

Subtypes of migraine

- A migraine without aura: This subtype involves recurrent headache attacks lasting 4 to 72 hours.
- Migraine with aura: This subtype features recurrent, fully reversible attacks lasting minutes, typically presenting with 1 or more unilateral symptoms such as visual, sensory, speech.
- Chronic migraine: This is defined as a headache that occur on 15 or more days in a month for more than 3 months, with migraine features present on at least 8 or more days in month [4,5].

Figure 1: Types of migraine

Symptoms

- Nausea
- Sentivity to light and sound
- Fatigue
- Cognitive difficulties
- Dizziness and vertigo
- Mood swings
- Loss of appetite

What triggers the migraine?

A trigger is something that causes a symptoms to start.some of the most common migraine triggers include;

- Stress
- Hormonal changes
- Changes in sleep
- Certain medication
- Addicitive substances like caffeine or tobacco

Figure 2: Migraine pain

How migraine affects the body?

Migraine can significantly impact the body. Primarily affect the head,specifically causing throbbing or pulsating pain that is usually felt on one side but can also occur on both sides. Beyond the head,migraines can also involve other areas of the body including the neck,face,eyes.in addition also affects the brain and nervous system.the trigeminal nerve may also be involved in the pain experienced during a migraine attack.

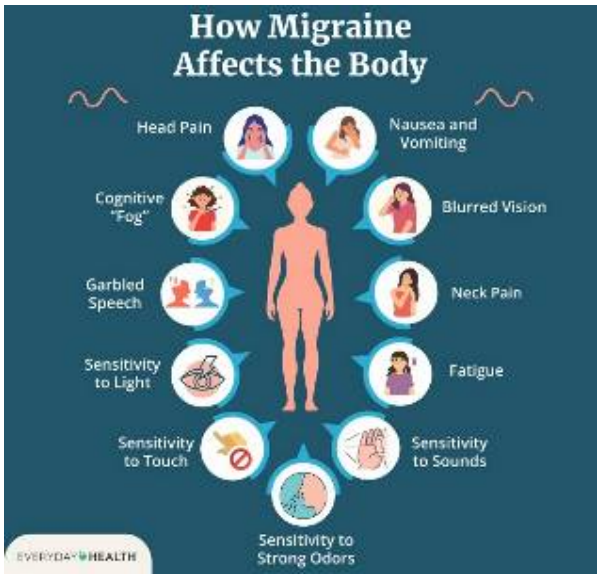

Figure 3: Affects of migraine

Risk factors for migraine

Women are more likely than men to experience a migraine.

- Biological family history: migraines tend to run in biological families.
- Underlying medical condition (depression, anxiety, sleep disorders and epilepsy).
- Regular use of tobacco products [6-9].

Etiology

Understanding the etiology of migraine headaches is crucial for effective and diagnosis and treatment. Migraines are believed to result from a combination of genetic, environmental, and neurological factors. Research indicates that these headaches are linked to abnormal brain activity that affects nerve signals, chemicals and blood vessels within the brain [10,11].

Epidemiology

- An estimated 1.3billon individuals across the globe were estimated to have migraine in 2017.
- In the WHO global burden of disease study, headache disorders have consistently been the 2nd most prevalent disease in the world.
- Women are approximately 3 times more likely than men to have migraine.
- Among people aged less than 50 years old, migraine is the most common cause of disability [11,12].

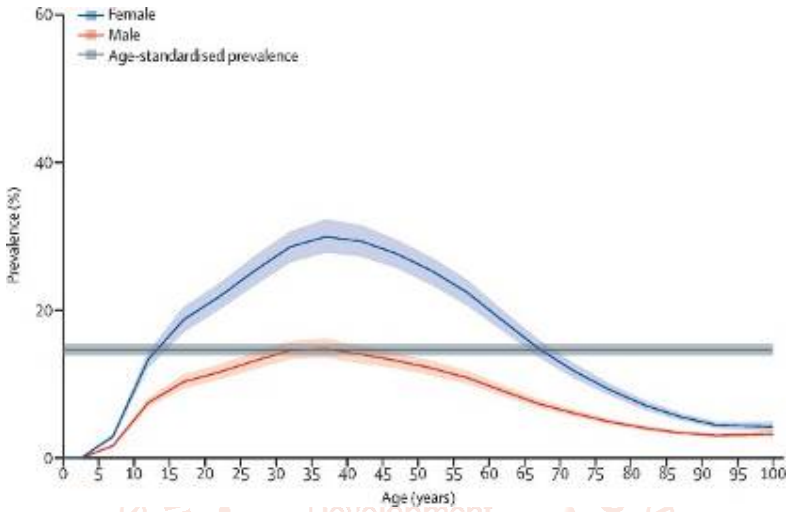

Figure 4: Prevalence

Pathophysiology

Headache has been known for almost 600 years. The modern concept of chronic migraine was known at the beginning of the 17th century. In the early days, the pathophysiology of migraine was principally based on neurological or vascular mechanism. migraine is divided into four phases including {premonitory, aura, headache and postdrome} these phases can occur sequentially or may show significant overlap. The pathophysiology of migraine involves modulating pain originating in disrupted neural network in the head. Neurotransmitters such as serotonin also plays a critical role in pathophysiology and the treatment of migraine [13,14].

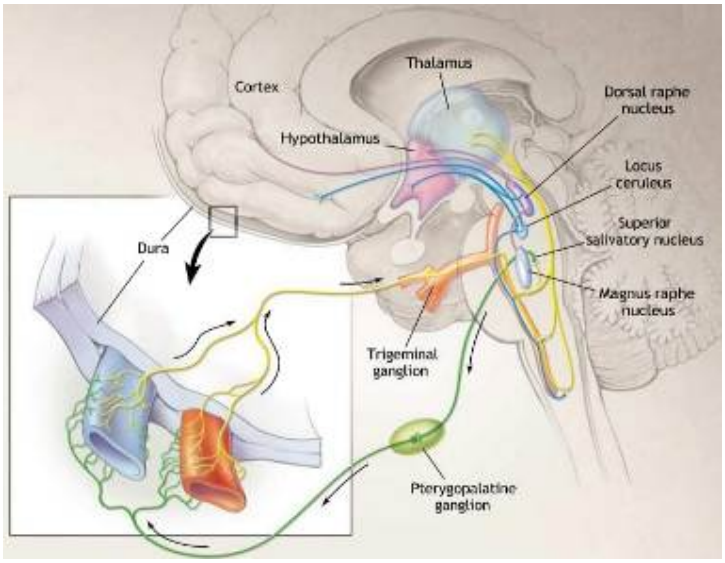

Figure 5: Pathophysiology

Treatment

It should be explained to the patient that migraine is a recurrent and episodic disease that currently has no cure and that in general allows an adequate quality of life when it is known and treated. Inadequate treatment of migraine attack has a huge socio-economic impart and also increase the risk of transformation of migraine into chronic forms. It should be explained to the patient that migraine is a recurrent and episodic disease that currently has no cure and that in general allows an adequate quality of life when it is known and treated. Inadequate treatment of migraine attack has a huge socio-economic impact and also increases the risk of transformation of migraine into its chronic forms. Common medications that prevent migraine includes- Prochlorperazine, Metoclopramide, Triptans, Lasmiditan.

Migraine treatment consists of non-pharmacologic and pharmacologic options.

Non-pharmacologic

Lifestyle modifications: Lifestyle factors of sleep, meal habits, stress and physical exercise routine are known to be related to migraine evolution. An observational study of 350 migraine patients showed that chronic migraine individuals exhibit significantly less regular lifestyle behaviours of sleep, exercise and meal time that episodic migraine patients. Perceived stress scores are higher in chronic migraine patients compared to controls. The relationship between headache and sleep is bidirectional: suboptimal sleep habits can worsen migraine frequency and migraine can decrease the quality of sleep.

The five factors identified as the most common triggers of migraine are: stress, fasting, atmospheric changes, sleep-related factors, and in women hormonal fluctuations. Triggers should be addressed in the anamnesis and recommendation of lifestyle changes should be made for all patients. Performing a headache calendar should be the first step in every patient with migraine, allowing the physician to monitor the interventions in a quantitative way (i.e., changes in the total number of headache days per month). Even though, the global status of the patient should be taken into consideration, as some patient may experience very few headache days and still be incapacitated.

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Pharmacologic

Acute migraine treatment: One of the most important aspects is to teach the patient to identify their migraine attacks because early treatment is essential to get an adequate response to end the attack. A stratified treatment must be carried out from the beginning, choosing the drug according to the severity of the symptoms, route of administration characteristics and comorbidity of the patient. Migraine acute therapy can be divided into specific, non-specific and adjuvant treatments.

Non-specific acute treatment: There is good quality evidence supporting the use of acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), such as acetylsalicylic acid (ASA), ibuprofen, diclofenac, and dexketoprofen. These therapies can control mild migraine attacks and auras on their own. In the specific case of paracetamol (acetaminophen) is less potent and it may be a useful first choice drug for acute migraine in those with restriction to, or who cannot tolerate, NSAIDs or aspirin. It is generally only recommended in gestational migraine, during adolescence-childhood and in attacks without a severe level of disability.

Adjuvant medications are primarily antiemetic/neuroleptics Dopamine D2 receptor antagonists, (domperidone, metoclopramide, Chlorpromazine), that are necessary in patients with nausea or vomiting which also supports the absorption of the rest of the treatment. When using these treatments, you should monitor the potential extrapyramidal side effects and concern over potentially permanent tardive dyskinesia, sedation and orthostatic hypotension.

It is strongly recommended to avoid morphs and combinations of analgesics with barbiturates, codeine, tramadol and/or caffeine, because it is associated with headache chronification and development of medication overuse headache.

Specific acute treatment: They are the drug of the choice for a moderate severe attack and every migraine patient should be prescribed a triptan. Triptans are specific migraine drugs with proven efficacy and safety in several clinical trials, however due to its vasoconstriction effect they are contraindicated in patients with uncontrolled hypertension, coronary, cerebrovascular and peripheral vascular disease. The most frequent side effects are palpitations,neck, check tightness, dysgeusia, laryngeal discomfort and should always be

warned to patient when prescribed. Despite these effects, it should be pointed out that they are extraordinarily safe at the vascular level [15-20].

CONCLUSION

Migraine remains an intriguing neurological disorder with complex mechanisms and pathophysiology that are still being researched extensively. Migraines are believed to be hereditary conditions characterized by increased responsiveness of cortical and subcortical networks; however, the triggers and factors contributing to its onset and progression remain unknown. Migraine's multidimensionality can be seen through the following various phases: premonitory phase, headache pain, postdromal phase, and sometimes aura phase. Each of these involves interactions among hypothalamus nuclei, cortical regions, and trigeminovascular pathways, resulting in characteristic symptoms experienced during an attack. Migraine is a common cause of headache,early diagnosisand prompt treatement of migraine enhances the quality of the life prevent conversion of episodic migraine to chronic migraine. As there is growing interest in pathophysiology new armatarium targeting the different pathways are being discoved.

Conflicts of Interest

The authors declare no conflict of interest.

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