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Acute migraine management in the emergency department

Acil serviste akut migren yönetimi

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Abstract

Headache is one of the most common neurological complaints admitted to emergency deprtment (ED). In different studies, the proportion of patients admitted to the emergency room due to nontraumatic headache is around 0.5-4.5%. Most of the patients with headache (22-55%) are benign primary headaches. Among primary headaches, migraine is the most common reason for admission to the emergency department. As can be seen in all ages, it usually occurs at a young age. The male to female ratio is 3: 1 and its prevalence is estimated to be 5% in men and 15-17% in women. According to WHO's list of common diseases, loss of functionality and disability, migraine attacks are in the fifth place in women and among the first twenty diseases in men. Therefore, it is very important to manage migraine attacks in the emergency room. When we look at the previous reviews on this subject, we can deduce that they are not always appropriate for emergency physicians, since most of the articles are quite long and detailed.

Our aim in this review is to give enough information in the light of current information about migraine headache that emergency physicians will need.

Key words: Migraine, attack treatment, migraine treatments.

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Öz

Baş ağrısı, acil servise en sık başvurulan nörolojik şikâyetlerden biridir. Farklı çalışmalara göre acil servise non-travmatik baş ağrısı şikâyeti ile başvuran hastaların oranı %0,5-4,5 arasındadır. Baş ağrısı ile başvuran hastaların çoğu (%22-55) benign primer baş ağrısıdır. Primer benign baş ağrılarının arasında en sık acil servise başvuru nedeni migren baş ağrısıdır. Migren, en fazla genç yaşlarda olmak üzere tüm yaş gruplarında görülebilmektedir. Erkek/ kadın oranı 1/3 olup prevalansının erkeklerde %5, kadınlarda ise %15-17 olduğu tahmin edilmektedir. Dünya Sağlık Örgütüne göre, sık görülen ve işlevsellik kaybı açısından migren atakları kadınlarda beşinci, erkeklerde ise ilk yirmi hastalık arasında yer almaktadır. Bu nedenle acil serviste migren ataklarının yönetilmesi ve doğru bir şekilde tedavi edilmesi oldukça önemlidir. Bu konu ile ilgili daha önce yapılan derlemeler incelendiğinde, çoğunun oldukça uzun ve detaylı olması nedeniyle acil hekimleri için uygulanabilir olmayabileceği düşünülmüştür.

Bu derlemede acil serviste çalışan hekimlere son bilimsel kılavuzlara dayalı akut migren yönetimi ile ilgili yeterli bilgi verilmesi amaçlanmıştır.

Anahtar kelimeler: Migren, atak tedavisi, migren tedavisi.

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Introduction

Headache is one of the most common complaints in society. The rate of people who experience a headache at least once in their lifetime is over 90% in the general population, with 93% in men and 99% in women [1]. Life-threatening reasons lie behind only a small portion of headaches, which constitute 3-5% of all emergency department admissions. Primary headache causes such as tension-type headache and migraine constitute the majority of them [2, 3]. Although most of the patients presenting with this symptom are due to non-pathological conditions, some of them are due to life-threatening intracranial related causes. Intracranial pathologies are the first to be ruled out in patients who apply to the emergency department with headache complaints.

Pathophysiology

Headache originates from intracranial or extracranial structures such as nasal sinuses. Almost the entire brain tissue is insensitive to pain. Stimulation of the cerebral cortex causes paresthesias such as tingling of the stimulated area. In other words, in patients with headache complaints, the headache is not caused by cerebral cortex damage. However, recession of the sinuses around the brain, damage to the

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tentorium, or stretching of the dura mater at the base of the brain can cause severe headaches. In addition, traumatizing, crushing or stretching the blood vessels in the meninges also causes headache [1, 4].

Approach to the patient with headache

When evaluating the patients presenting with headache, the classification of the pain should be done first. With the International classification of Headache Disorders 3rd edition (ICHD-3) published by The International Headache Society in 2018, more than 200 types of headaches were categorized together with their diagnostic criteria [5]. This classification, as in the previous classifications, divides headaches into two groups as primary headaches and secondary headaches. Such a distinction, beyond identifying the characteristics of headaches, has enormous utility in clinical practice. Because if the patient's complaints are considered as one of the "primary headaches", it is understood that the headache itself is a disease and is not life-threatening, that further investigations are not usually required for diagnosis, and that it is usually a headache that can be controlled with treatment and recommendations. However, if it is considered as one of the "secondary headaches", it is understood that the headache is a symptom, that there is another underlying disease, it can be life-threatening, therefore it should be treated promptly, and it should be diagnosed and treated as soon as possible with further investigations. The main headings of the classification of headaches organized by the International Headache Society (IHS) in 2004 are given in the table below [1, 3, 4] (Table 1).

Primary headaches constitute 90% of headaches. These pains occur unrelated to diseases of the central nervous system or other systems. Secondary headaches occur with diseases involving the nervous system or other systems. While primary headaches have unique pain characteristics, secondary headaches do not, and they can mimic any primary headache [1, 4, 6].

Table 1. The main headings of the classification of headaches organized by (IHS)-2004

Primary Headaches	Secondary Headaches	Cranial Neuralgias, Central and Primary Facial Pain and Other Headaches
Migraine	Due to head and/or neck trauma	Cranial neuralgias and central facial pain related Causes
tension-type	Due to cranial or cervical vascular disorders	Other headache, cranial neuralgia, central or primary facial pain
Cluster type and trigeminal autonomic causes	Due to non-vascular intracranial disorders	
Other causes	substance use or withdrawal	
	Due to Infection (nervous system or systemic)	
	Due to homeostasis disorder	
	Related to cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other facial or cranial structures or facial pain	
	Due to psychiatric disorders	

Migraine

Although "migraine", the prototype of primary headaches, has been known since ancient times, its exact cause is still unknown today. However, although the etiology is not fully known, serious studies have been carried out on the pathogenesis and important results have been obtained [1]. The most prominent symptom of migraine is intermittent unilateral headaches. The duration of attacks in migraine headaches progressing with attacks is 4-72 hours. Although hemicrania is typical for migraine, the pain can also be bilateral. Their pain is usually of a throbbing type, increasing with unilateral physical activity. It is accompanied by nausea, vomiting and photophobia. Its cause

is a primary brain disease in which neural events cause vasodilation of blood vessels, first causing pain and then nerve activation. It is more common in women. There is a family history. Pain begins slowly and can last for 4-72 hours [1, 4, 6]. If the patient states that it is not the same as their previous pains, the underlying cause should be investigated. It has genetic and familial characteristics [1, 3, 7]. It is classified into 7 groups according to their clinical types:

1.1. Migraine without aura

1.2. Migraine with aura

1.3. Migraine precursor or accompanying childhood syndromes

1.4. Retinal migraine

1.5. Migraine complications

1.6. Possible migraine

Migraine without aura constitutes 80% of migraine patients. Unilateral, pulsatile headache may be accompanied by nausea, vomiting, photophobia and phonophobia.

Migraine with aura is preceded by a single or more successive aura symptom lasting 4-60 minutes, which is the expression of a focal neurological disorder. Migraines with aura are more visual. These are bright flashes of light, dark spots, and bright scotomas. The typical aura appears as lines and lights surrounding a scotoma and in one half of both eyes. These patients constitute 10% of patients with migraine. If it is non-visual, hemiparesthesia, hemiparesis and aphasia may be seen.

Migraine is more common in women and during the menstrual period. Oral contraceptives, starvation, and some foodstuffs can initiate a migraine attack (monosodium glutamate, chocolate, white cheese, red wine, and nitrites in some foodstuffs).

According to the current theory in the pathogenesis of migraine, external stimuli create a spreading depression(spreading depression of leao) wave in the brain cells of individuals with genetic predisposition, resulting in oligemia and aura symptoms. Pain occurs as a result of a series of events such as stimulation of noradrenergic and serotonergic nerve fibers, vasodilation in intracranial vessels, activation of afferent fibers of the trigeminal nerve, release of inflammatory neuropeptides, and sterile neurogenic inflammation [1, 8, 9].

When patients with a diagnosis of migraine apply to the emergency department, attention should be paid to whether the present pain is the same as the previous pain in the history, and whether there is a neurological deficit in the physical examination. Accordingly, further examination should be planned for the patient. Patients with migraine with aura should not be discharged before their aura has passed [10, 11]. Patients with a neurological deficit in their aura should be followed up until the neurological deficit subsides. Although there is no common consensus for the treatment of patients who present to the emergency department with migraine headaches, opiate use is common [8, 12].

Diagnostic criteria for migraine without aura

“A. Having had at least 5 attacks meeting criteria B and D in the past (many new guidelines look for ≥4 attacks)

B. Headache attacks lasting 4-72 hours (no treatment or unsuccessful treatment attempt) C. Accompanied by 2 or more of the following features

1. Unilateral location

2. Throbbing character

3. Moderate or severe pain

4. Pain exacerbated by routine physical activities and avoidance of activities

D. Accompanied by 1 or more of the following symptoms

1. Nausea and/or vomiting

2. Photophobia and phonophobia

E. Absence of another underlying condition or disease

Diagnostic criteria for migraine with aura

A. At least two attacks including criteria B and C

B. 1 or more of the following aura symptoms that fully resolve

1. Visual

2. Auditory

3 Speech and/or language

4. Motor

5. Brain stem

6. Retinal

C. Presence of at least 3 of the following 6 features" [13].

1. At least one aura symptom occurring within 5 minutes or longer

2. Two or more aura symptoms appearing one after the other

3. Each aura symptom terminating in 5-60 minutes.

4. At least one aura symptom been unilateral

5. At least one aura symptom includes a positive finding

6. Aura continues with the onset of headache within 60 minutes

D. It cannot be better explained by another diagnosis of ICHD-3.

Imaging

According to the American Academy of Neurology; In cases where there is no pathological finding in the neurological examination and the headache is typical, imaging is not required. However, when secondary headache is suspected, central imaging should be considered.

Treatment

According to the WHO ranking of loss of functionality and disability due to common diseases, migraine attacks are in the fifth place in women and in the first twenty diseases in men [8]. The main purpose of migraine pharmacotherapy is to reduce the effect and limitation of both attacks and their frequency. It is estimated that approximately 97% of people with migraine use medication for acute treatment, but 13% receive preventive treatment [10, 11].

A. Non-drug treatments

● Informing the patient about the disease

● Lifestyle regulation: regular sleep and nutrition, exercise, relaxation techniques

● Awareness and avoidance of triggers: diet (alcohol, nitrites, aspartame, cheese, sweetener), environmental factors (bright light, weather changes, altitude, odor), drugs, hormonal factors (menstruation, ovulation, oral contraceptives)

B. Pharmacological treatments

The treatment of attacks is mostly aimed at pain. Drugs used for this purpose;

● a)Simple and combined analgesics, Non-steroidal anti-inflammatory drugs

Although various agents are recommended in the guidelines, the most commonly used agents are given in Table 2 (treatment doses may differ from source to source) [1,12-15]. In a study conducted in Pamukkale University emergency department, there was no significant difference between IV paracetamol, dexketoprofen and ibuprofen treatments in the treatment of migraine without aura, and that they were similarly safe drugs, Metoclopramide, which is applied in patients with nausea and vomiting, can be used in combination in the treatment of migraine, Ibuprofen may be preferred more than others due to its slightly faster metabolic effect according to the change in ΔVAS scores, although not significantly. When the effect of ibuprofen was examined, it has been shown that it responds more quickly to treatment than other NSAID-type drugs [16]. Turkcuer et al. [17] compared the efficacy of intravenous paracetamol and dexketoprofen in patients admitted to the emergency department with acute migraine attack. They reported that IV paracetamol and dexketoprofen provided equal effectiveness in pain control in migraine attack in the emergency department. In addition, it has been mentioned that ibuprofen has similar and equal effects in pain control compared to other drugs. In a meta-analysis on the use of ibuprofen in the treatment of migraine-type headache, it was found that ibuprofen is a more dominant treatment method than the placebo effect [18, 19].

● b) Triptans [1, 12, 14, 15, 20]

It should be remembered that such agents should not be used in patients with high risk of coronary artery disease. Even if various agents are recommended in the guidelines, the most commonly used agents are given in Table 3.

Table 2. The most commonly used agents in acute migraine attack [1, 12-15]

Agents	Doses
Acetyl Salicylic Acid (ASA)	650-1000 mg oral
Acetaminophen	650-1000 mg oral
Diclofenac	50-1000 mg oral/IV
Flurbiprofen	100-300 mg
Ibuprofen	400-800 mg oral
Ketoprofen	50-100 mg oral
Ketorolac	30-60 mg IM
Metamizole	1000 mg oral/IV
Naproxen	550-1100 mg oral
Phenazon	1000 mg oral
Tolfenamic Acid	200-400 mg oral

Table 3. Triptans can be used for migraine relief

Agents	Doses mg/day (oral)
Frovatriptan	2.5
Naratriptan	2.5
Rizatriptan	5-10
Sumatriptan (oral spray, subcutaneous)	50-100
Zolmitriptan	2.5-5

● c) Ergotamine derivatives

Non-selective 5-HT is used in the treatment of moderate and severe attacks due to its alpha adrenergic and dopaminergic activities. Although they have many side effects, their effectiveness is mild-moderate [13].

● d) Antiemetics

Nausea and vomiting can be as irritating as pain during an attack. Stomach stasis and delayed emptying of gastric contents; reduces the effectiveness of oral medications. Antidopaminergic agents such as metoclopramide, prochlorperazine, chlorpromazine, and very rarely 5-HT3 serotonin receptor antagonists such as ondansetron and granisetron are also used pro kinetically for the absorption of antiemetic and oral drugs [21].

● e) Opioids

It is used because the use of triptans and ergotamines is contraindicated in patients with a history of coronary artery disease. Its use in routine attack treatment is controversial, since treatment efficacy is low and the possibility of addiction is high [13].

●f) Prophylaxis [1, 7, 14, 15, 20]

Prophylactic treatment can be considered to prevent attacks or to reduce the frequency, severity and duration of attacks, to minimize acute attack treatments, to improve the quality of life with the disappearance of the disability, and to ensure that the patient is exposed to the least side effects. Especially ≥2 attacks per month, ≥4 painful days per month, rare but prolonged and/or disabling attacks, attacks that prevent daily activities despite attack treatment, contraindications to attack drugs, serious side effects or increasingly frequent attacks in excessive use of attack drugs and those at risk of developing headaches following drug overuse, the patient's request for prophylaxis and some special conditions (basilar migraine, complicated migraine) are the indications for prophylactic treatment. With this aim;

- beta-blockers (Propranolol, Metoprolol)
- Antidepressants (Amitriptyline, SSRI)
- Antiepileptic drugs (Valproic Acid, Topiramate, Gabapentin)

• Agents such as Calcium channel blockers (Flunarizine, Verapamil) can be used [1, 14, 15, 20].

Treatment of special conditions related to migraine [1, 13, 15]

Acetaminophen and NSAIDs in the second trimester can be preferred in the treatment of attacks during pregnancy. If NSAIDs are used in the third trimester, they are contraindicated as they may cause prolongation of labor and delivery, adverse effects on the kidney, premature closure of the ductus arteriosus (DA) and pulmonary hypertension. For similar reasons, triptans and ergotamines are contraindicated in pregnancy. They can be used in breastfeeding patients by interrupting breastfeeding for 24 hours.

It constitutes 1% of the applications to the emergency department in pediatric patients. 40% of these patients are diagnosed with primary headache and 75% of them are migraine [22]. Ibuprofen 10mg/kg, acetaminophen 15mg/kg can be used for children over 6 years old. Sumatriptan spray 5-20mg can be applied additionally over the age of 12. Domperidone can be used in children with nausea and vomiting. It has been shown that the use of low-dose propofol in children reduces the risk of relapse.

In the case of menstrual migraine, NSAIDs, triptans, and ergotamine derivatives can be preferred. In prophylaxis, transdermal estradiol short-term hormonal prophylaxis treatment can be applied.

A migraine attack that lasts longer than three days is called status migraine. In these patients, liquid electrolyte replacement, iv pharmacotherapy for pain control and migraine prophylaxis should be started when necessary.

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