REVIEW

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Headache

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ABSTRACT

Headache, an almost universal human experience, is one of the most common complaints encountered in medicine and neurology. Described and categorized since antiquity, with the first classification by Aretaeus of Cappadocia, other classifications followed. The evaluation of this condition may be straightforward or challenging, and, though often benign, headache may prove to be an ominous symptom. This review discusses the current diagnosis and classification of headache disorders and principles of management, with a focus on migraine, tension-type headache, trigeminal autonomic cephalgias, and various types of daily headache.

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KEYWORDS: Cluster headache; Headache; Headache classification; Migraine; Tension-type headache

Ancient references to headache, migraine, and neuralgia can be found in the Ebers Papyrus (1200 B.C.), and evidence of trepanation of 9000 year old Neolithic skulls suggests the first headache treatment. Visual symptoms associated with headache were described by Hippocrates in 400 B.C., and Aretaeus provided one of the earliest classifications of headache around 200 AD.[1,2]

Interest in headache extends back almost as far as recorded history, and it is one of the most common complaints of patients who present for medical treatment. The direct and indirect socioeconomic costs of headache to society are estimated at $14 billion per year.[3] All primary care providers will encounter the clinical problem of headache on a regular basis; early and accurate diagnosis and appropriate treatment will help to reduce pain and suffering and the economic burden.

EPIDEMIOLOGY

Lifelong prevalence of headache is 96%, with a female predominance. The global active prevalence of tension-type headache is approximately 40% and migraine 10%. Migraine occurs most commonly between the ages of 25 and 55 years and is 3 times more common in females.[4,5] Despite the fact that it causes significant disability, migraine remains underdiagnosed and undertreated.

Trigeminal autonomic cephalgias are rare compared with migraine and tension-type headache. The most common trigeminal autonomic cephalgia is cluster headache, with a population prevalence of 0.1% and a male/female ratio of 3.5-7:1.[6,7]

Chronic daily headache, daily or near-daily headache for months to years, is widely reported in the literature, yet is not an official diagnosis in the International Classification of Headache Disorders. Chronic daily headaches of long duration include chronic migraine, chronic tension-type headache, hemicrania continua, and new daily persistent headache. Worldwide prevalence of chronic daily headache has been consistent at 3%-5%,[4] most of which likely represents chronic migraine.

CLASSIFICATION

The International Classification of Headache Disorders (ICHD)[8] was first published in 1988 and has now gone through 2 revisions, most recently in 2013. The classification, freely available online at https://www.ichd-3.org/, contains explicit criteria based on phenomenology for the diagnosis of many types of headache. By convention, headache classification is based on the characteristics of the individual headache, in the prior year, not the individual with the

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headache, though features specific to individuals may be used in helping to differentiate between two close diagnostic matches (Table 1).

The ICHD is periodically reviewed and continues to evolve. The appendix system allows for the introduction of proposed new headache types or of new criteria for old headache types, and criteria from the main sections that seem outmoded are moved to the appendix and, if deemed not helpful, are later retired.

PRIMARY VERSUS SECONDARY HEADACHE

A primary headache has no known underlying cause. Secondary headache is the result of another condition causing traction on or inflammation of pain-sensitive structures. Headache due to psychiatric disease is also considered secondary. The most common primary headaches include migraine, tension-type headache, and cluster headache. Headaches related to infection, vascular disease, and trauma are examples of more common secondary headaches. Only 1% of patients with brain tumor will have headache as the sole complaint.[9] Fortunately the vast majority of patients who present to their primary care provider for an evaluation will have a primary headache disorder.

CLINICAL SIGNIFICANCE

- Migraine is the third most prevalent disorder and the seventh highest cause of disability worldwide.
- The International Classification of Headache Disorders provides a framework for the diagnosis and treatment of headache.
- More than 90% of patients who present to their primary care provider for evaluation of headaches have a primary headache disorder.
- Approximately 1 billion dollars each year are spent on unnecessary brain imaging of primary headache disorders.

Table 1 The International Classification of Headache Disorders, 3rd Edition (Beta Version)[8]

Part 1: The Primary Headaches
1. Migraine
2. Tension-type headache
3. Trigeminal autonomic cephalgia
4. Other primary headache disorders

Part 2: The Secondary Headaches—Headache (or Facial Pain) Attributed to:
5. Trauma or injury to the head and/or neck
6. Cranial or cervical vascular disease
7. Nonvascular intracranial disorder
8. A substance or its withdrawal
9. Infection
10. Disorder of homeostasis
11. Disorder of the cranium, neck, eyes, ears, nose, sinuses, teeth, mouth, or other facial or cervical structure
12. Psychiatric disorder

Part 3: Painful Cranial Neuropathies, Other Facial Pains, and Other Headaches
13. Painful cranial neuropathies and other facial pain
14. Other headache disorders

Appendix

EVALUATION

Patient History and Examination

A detailed history of the patient's headache is of paramount importance in making the correct diagnosis. Information gathered in the history is compared with the diagnostic criteria to create the best diagnostic match. The history records details about the headache, such as frequency, duration, character, severity, location, quality, and triggering, aggravating, and alleviating features. Age of onset is extremely important, and a family history of headache should be explored. Lifestyle features including diet, caffeine use, sleep habits, work, and personal stress are important to obtain. Finally, details of any comorbid conditions, such as an associated sleep disorder, depression, anxiety, and an underlying medical disorder are also useful (Table 2).

The examination in headache is based on the general neurologic examination. Additional features include examination of the superficial scalp vessels, neck vessels, dentition and bite, the temporomandibular joints, and cervical and shoulder musculature. Pericranial muscle tenderness is thought to be an important physical finding in the diagnosis of tension-type headache.[8]

The Diagnostic Evaluation—Indications for Imaging

There is no diagnostic test for migraine, and evidence suggests that, in the specific setting of migraine with a normal neurologic examination, imaging is overwhelmingly likely to be unremarkable.[10,11] There remain appropriate indications for imaging in the evaluation of headache, and imaging should be considered when various "red flags" are present.[10] (Table 3).

In practice, many patients with lifelong headache disorders will end up undergoing imaging at least once, and

Table 2 Essential Elements of the Headache History

- Family history of migraine
- Childhood migraine proxy symptoms: carsickness, gastrointestinal complaints
- Age of onset
- Frequency, severity, and tempo over time
- Triggering, aggravating, or alleviating features
- Autonomic features
- Aura features
- Current and prior treatments
- Lifestyle features
- Comorbid conditions

Table 3 Headache "Red Flags" That Could Indicate Need for Evaluation[10]

- New headache in older patients
- Abnormal neurologic examination including papilledema and change in mental status
- New change in headache pattern or progressive headache
- New headache in the setting of HIV risk factors, cancer, or immunocompromised status
- Signs of a systemic illness (eg, fever, stiff neck, rash)
- Triggered by cough, exertion, Valsalva maneuver
- Headache in pregnancy/postpartum period
- First or worst headache

HIV = human immunodeficiency virus.

Table 4 ICHD-3 (Beta) Migraine Without Aura[8]

A. At least 5 headache attacks fulfilling the criteria B-D
B. Attacks last 4-72 h
C. With at least 2 of the following 4 characteristics:
   1. Unilateral location
   2. Pulsating quality
   3. Moderate or severe pain intensity
   4. Aggravation by or causing avoidance of routine physical activity
D. At least 1 of the following during headache:
   1. Nausea and/or vomiting
   2. Photophobia and phonophobia
E. Not better accounted for by another ICHD-3 diagnosis

ICHD-3 = International Classification of Headache Disorders, 3rd edition.

approximately 1 billion dollars are spent every year on unnecessary brain imaging studies.[12]

Approach to Treatment

The approach to treatment of many of the secondary headaches is focused on treatment of the suspected cause (eg, treating the sinus infection). The treatment of some secondary headaches, such as posttraumatic headache, may default to the treatment of migraine because the majority of posttraumatic headaches have the phenotype of migraine.[13,14]

The treatment of migraine and other primary headaches is not uniform but is proportioned to the severity of the symptoms and disability. Mild and infrequent symptoms may be initially treated with lifestyle modification, stress management techniques, and over-the-counter abortive medications.

Prescription medications may be added as warranted to help thwart disability and maintain function. A distinction is made between prescription abortive and preventive medication in the management of headaches. Abortive medications are prescribed to treat an individual attack, and preventative medications are used to reduce the frequency and severity of the individual attacks, with the goal of reducing disability.

PRIMARY HEADACHE

Migraine

Migraine is the third most prevalent disorder according to the 2010 Global Burden of Disease Survey and the seventh-highest cause of disability worldwide[5] (**Table 4**).

The main subtypes are migraine with and without aura. An aura is a fully reversible set of nervous system symptoms, most often visual or sensory symptoms, that typically develops gradually, recedes, and is then followed by headache accompanied by nausea, vomiting, photophobia, and phonophobia. Less common symptoms of aura include speech/language symptoms, motor or brainstem symptoms, or retinal symptoms. If an aura contains multiple features, symptoms usually occur in succession of at least 5 or so minutes each, with a total symptom complex of 5-60 minutes. Thus, visual symptoms, both positive, such as scintillations, and negative, such as scotomata, are typically noted at the outset, followed by development of sensory complaints, then a mixed dysarthric/aphasic language disorder, followed by gradual clearing. The headache usually begins within 60 minutes after the resolution of the neurologic symptoms. Some patients will experience an aura, usually visual, without an accompanying headache, referred to as "typical aura without headache." Hemiplegic migraine is a rare subtype of migraine with aura that is characterized by unilateral weakness and may be familial or sporadic. Aura phenomena are likely linked to a characteristic spreading cortical depression, starting posteriorly and moving slowly across the brain surface, producing this orderly progression of neurologic symptoms.[15]

The overall clinical picture of migraine may be divided into 4 phases: prodrome, aura, headache phase, and postdrome. The prodrome, present in up to 60% of patients, may precede development of the headache by hours to days and can consist of a multitude of symptoms, including depression, hyperactivity, cognitive changes, frequent urination, irritability, euphoria, neck stiffness/pain, and fatigue. Food cravings, such as for chocolate, may be present and result in these foods being blamed for triggering the attack when in fact the craving was simply part of the onset. A subset of patients will then experience an aura but not necessarily with each and every attack. The headache in migraine is typically described as unilateral (approximately 60%) and of moderate to severe intensity, and though an individual's headache attacks tend to be fairly stereotyped, many variations can be present. Finally, the headache may be followed by a postdrome, characterized by impaired concentration and feelings of fatigue or feeling "washed out." Some patients alternatively report feeling refreshed and rejuvenated after an attack.[16]

Migraine pathophysiology, can be viewed upon a background of a presumably genetically induced hypersensitivity of the brain to both internal and external homeostatic changes that can act as headache triggers. These triggers influence the trigeminovascular system, which contains both peripheral and central nervous system components. Stimulation of the trigeminovascular system results in release of neuropeptides and other substances that cause both local inflammation and distant amplification of neural circuitry in the brainstem, trigeminal nucleus caudalis, thalamus, and cortex, leading

Table 5 The Triptans: 5-HT 1B/D Receptor Agonists (Adapted from Mathew[19])

Name (Brand)	Formulation	Half-Life
Sumatriptan (Imitrex)	PO (25, 50, 100 mg), SC (4, 6 mg), nasal spray/powder	2.5 h
Sumatriptan/naproxen sodium (Treximet)	PO (85/500 mg)	2/19 h
Rizatriptan (Maxalt)	PO and ODT (5, 10 mg)	2-3 h
Naratriptan (Amerge)	PO (2.5 mg)	5-8 h
Eletriptan (Relpax)*	PO (20, 40 mg)	4 h
Almotriptan (Axert)	PO (6.25, 12.5 mg)	3-4 h
Frovatriptan (Frova)	PO (2.5 mg)	26 h
Zolmitriptan (Zomig)	PO and ODT (2.5, 5 mg)	3 h

ODT = orally disintegrating tablet; PO = per oral; SC = subcutaneously.
*Unlike others, metabolized by the CYP3A4 system.

to central sensitization and symptom worsening along with reduced activity in central descending inhibitory systems and reduced ability to control or extinguish the headache attack.[17,18] Treatment goals are to prevent or reverse this process.

Abortive medications include nonsteroidal anti-inflammatory agents, combination analgesics, antiemetic medications, and corticosteroids. Opioid medications and butalbital compound are generally discouraged because of the risk of overuse and potential for rebound. More specific antimigraine agents include the selective 5-HT1B/D serotonin agonists, the triptans, and ergotamine-containing preparations, such as intravenous/intranasal dihydroergotamine (**Table 5**).

Treatment early in the course of the attack produces the best results.[20] Features of the headache, including severity, speed of onset, and early associated nausea/vomiting, may influence the choice of agent(s).

Preventative medication is recommended if the patient is suffering from headaches more than 6 days, impaired for 4 days, or completely disabled for 3 days each month despite abortive treatment. When initiating preventive management it is important to begin at a low dose, increase the dose slowly to help minimize adverse side effects, and to continue for an adequate trial length of time, usually 3 months, so as not to miss a slowly developing therapeutic effect[21] (**Table 6**).

Chronic migraine, defined as headache on more than 15 days per month for a period of more than 3 months, shows a persistent prevalence of approximately 3% of the population and forms up to 70%-80% of cases seen in a tertiary headache center. Implicit in the diagnosis is a process of transformation from a prior pattern of episodic migraine that can occur over months to years. Though the resulting headache pattern may lose many of its distinguishing features, migraine features on 8 days per month are required for the diagnosis[5,8] (**Table 7**).

Risk factors associated with transformation to chronic migraine include coexisting noncephalic sites of pain, mood and anxiety disorders, medication overuse, obesity, female sex, and lower educational status.[22] It is, however, not possible to predict who will transform and whether aggressively treating a pattern of increasing-frequency migraine can reliably prevent transformation to chronic migraine. The management of chronic migraine can be challenging, and preventive agents used in combination may be of benefit. There are data to support the combination of topiramate and nortriptyline.[23] Onabotulinum toxin A has demonstrated efficacy in reducing the number of headache days per month and is a US Food and Drug Administration–approved treatment.[24]

Tension-Type Headache

Although typically not as severe as migraine, tension-type headache is far more common, with a lifetime prevalence in the general population of up to 80%. There is often a degree of associated disability, and this, combined with the high frequency, produces significant socioeconomic impact.[5]

Table 6 Selected Migraine Preventive Medications[21]

Grade	Name	Daily Adult Dose Example (mg)	Comments
A	Propranolol	80-240	? Avoid in migraine with aura
A	Metoprolol	50-150	? Avoid in migraine with aura
A	Divalproex sodium	250-1500	FDA pregnancy category D
A	Topiramate	25-150	FDA pregnancy category D
B	Amitriptyline	10-150	Strong clinical impression of efficacy
B	Atenolol	50-150	? Avoid in migraine with aura
B	Venlafaxine	37.5-150	Well tolerated, nonsedating
C	Cyproheptadine	2-8	Used in pediatric population, sedating
U	Gabapentin	300-1800	Favorable AE profile
U	Verapamil	80-480	Migraine with prolonged aura, vestibular migraine

AE = adverse effect; FDA = US Food and Drug Administration.

Table 7 ICHD Chronic Migraine[8]

A. Headache (tension-type-like and/or migraine-like) on 15 d per month for >3 mo and fulfilling criteria B and C
B. Occurring in a patient who has had at least five attacks fulfilling criteria B-D for 1.1 migraine without aura and/or criteria B and C for 1.2 migraine with aura
C. On 8 d per month for >3 mo, fulfilling any of the following:
1. Criteria C and D for 1.1 migraine without aura
2. Criteria B and C for 1.2 migraine with aura
3. Believed by the patient to be migraine at onset and relieved by a triptan or ergot derivative
D. Not better accounted for by another ICHD-3 diagnosis.

ICHD = International Classification of Headache Disorders.

Tension-type headache is a dull, bilateral, mild- to moderate-intensity pressure–pain without striking associated features that may be categorized as infrequent, frequent, or chronic and is easily distinguished from migraine. Infrequent tension-type headache is thought to be the form of headache experienced by nearly everyone at one time or another and typically does not require medical management (**Table 8**).

Although there may be a genetic element in the development of tension-type headache, environmental factors likely play a larger role than in migraine. Tenderness of pericranial muscles, co-existing mood disorders, and mechanical disorders of the spine and neck may be contributing factors.[25]

Abortive and preventive medication management may be considered, depending on the frequency and disability. Simple and compound over-the-counter analgesic agents with caffeine have shown efficacy. Preventive agents include tricyclic antidepressant medications and various muscle relaxants[26,27] (**Table 9**).

Muscle relaxants are used largely on the basis of anecdotal evidence. Selective serotonin reuptake inhibitors and selective norepinephrine reuptake inhibitors, advised in the past for this pattern of headache, have been shown to be ineffective.[28] Monoamine oxidase inhibitor drugs have shown efficacy but are used only infrequently owing to potential side effects.[26,27] Memantine, a glutamatergic *N*-methyl-D-aspartate receptor antagonist, has been studied in chronic tension-type headache and chronic migraine and may have some benefit.[29,30] In those patients with chronic daily headache having features of both tension-type headache and migraine, treatment may default to the preventive management of migraine, including, at times, the use of onabotulinumtoxin A.

Table 8 ICHD Infrequent Episodic Tension-Type Headache[8]

A. <1 d per month
B. 30 min to 7 d duration
C. At least 2 of:
1. Bilateral location
2. Pressing or tightening (nonpulsating) quality
3. Mild or moderate intensity
4. Not aggravated by routine physical activity
D. Both of
1. No nausea or vomiting
2. No more than 1 of photophobia or phonophobia

ICHD = International Classification of Headache Disorders.

Table 9 Selected Preventive Agents for Tension-Type Headache (Modified from Freitag[26])

Tricyclic Antidepressants	
Amitriptyline	10-100 mg nightly
Nortriptyline	25-75 mg nightly
Imipramine	25-50 mg daily
Muscle Relaxants	
Baclofen	5-20 mg tid–qid
Carisoprodol	350 mg bid (short-term use, subject to abuse)
Cyclobenzaprine	5-10 mg bid
Tizanidine	2 mg qid
Other	
Memantine	20-40 mg daily
SSRI/SNRI	Banzi 2015 Cochrane review showed none of these worked[28]

bid = twice daily; qid = four times daily; SSRI/SNRI = selective serotonin reuptake inhibitor/selective norepinephrine reuptake inhibitor; tid = three times daily.

Nonmedication management techniques, including physical therapy and other manual therapies, various local injections, counseling including cognitive behavior therapy, relaxation techniques, and biofeedback, may have limited benefit but have not been shown to be unequivocally effective in the treatment of headache. Although acupuncture does not have proven efficacy in the treatment of tension-type headache, a 2016 Cochrane analysis for migraine prevention found it to be effective in reducing the frequency of attacks.[31-40]

In many patients tension-type headache is described as fairly treatment-refractory, resulting in use of a blend of abortive and preventive pharmacologic management along with nonpharmacologic modalities.[26]

Trigeminal Autonomic Cephalgias

Trigeminal autonomic cephalgias are a group of headaches classified together as unilateral trigeminal distribution pain attacks, often associated with ipsilateral cranial autonomic features. These headaches lack the associated features seen in migraine and tension-type headache and are clinically distinct (**Table 10**).

Cluster headache, often referred to as "suicide headache" because the intensity of the pain, occurs more commonly in men and is usually episodic, characterized by "clusters" of from 2 weeks to 3 months. The pain is extremely severe, with 1 to 8 episodes per day, often awakening the patient from sleep shortly after falling asleep. Features are stereotyped with attacks of severe unilateral orbital pain lasting 15 minutes to 3 hours, usually associated with ipsilateral autonomic symptoms (increased lacrimation, nasal congestion/discharge, partial Horner's) and producing a characteristic restlessness. Cluster episodes tend to recur annually at about the same time of year, though significant variation is reported. Approximately 20%

Table 10 Trigeminal autonomic cephalgias [modified from Rizzoli[41]]

Name	Location	Duration	Attack Frequency per Day	Associated Features	Treatment
Cluster	Unilateral orbital	15-180 min	1-8	Lacrimation, conjunctival injection	Verapamil, lithium, sumatriptan SC/NS
Paroxysmal hemicrania	V-1, ophthalmic division	2-30 min	2-40	Same	Indomethacin
SUNCT	Unilateral orbital to temporal region	15 s to 4 min	3-200	Conjunctival injection lacrimation	Lamotrigine, IV lidocaine
SUNA	Unilateral orbital to temporal region	15 s to 4 min	3-200	Conjunctival injection or lacrimation and rhinorrhea/nasal congestion	Lamotrigine, IV lidocaine
Hemicrania continua	Unilateral	Persistent		Conjunctival injection, lacrimation, nasal congestion, sweating eyelid edema, ptosis	Indomethacin

SUNA = short-lasting unilateral neuralgiform headache with cranial autonomic symptoms (rhinorrhea, tearing); SUNCT = short-lasting unilateral neuralgiform headache with ipsilateral conjunctival injection and tearing.

of patients do not experience a remission of more than 1 month in a calendar year and suffer from chronic cluster headache.[6,7]

Short-lasting unilateral neuralgiform headaches are rare, severe, side-locked, very brief sharp pains currently subcategorized depending on the pattern of associated autonomic features: SUNCT with ipsilateral conjunctival injection and tearing, and SUNA with those features or rhinorrhea and nasal congestion.[6]

Paroxysmal hemicrania is a severe rare headache disorder characterized by brief frequent side-locked orbitofrontal headache attacks with ipsilateral autonomic features. Attacks, usually with a duration of minutes, may appear on a background of chronic mild headache in up to one-third of patients. Both chronic and episodic paroxysmal hemicranias are described, and the chronic form is more common in females.[6]

Hemicrania continua is a persistent, lateralized, side-locked headache associated with ipsilateral autonomic features.[42,43] Both hemicranias continua and the paroxysmal hemicranias share an often dramatic response to therapeutic doses of indomethacin and otherwise typically respond poorly to other treatments.[6,42,43]

Stimulus-Induced Headache

A number of primary headaches are categorized according to their relationship to specific triggers. These include headaches triggered by cold exposure, such as the commonly described ice cream headache, headaches related to external cranial pressure or traction (eg, ponytail headache), or headaches related to various forms of exertion.[44]

Thunderclap Headache

This is probably the most abrupt-onset, reaching maximal intensity within 1 minute, and severe headache. Although in some patients there may be no underlying cause, structural/medical pathology must always be ruled out with alacrity. Currently thunderclap headache may be either primary (benign or idiopathic) or secondary; examples of secondary causes are reversible cerebral vasospasm, subarachnoid hemorrhage, venous sinus thrombosis, hypertensive encephalopathy, and pituitary apoplexy[8,45,46] (**Table 11**).

New Daily Persistent Headache

This is an unusual and distinctive pattern of headache, first described in 1986, and is generally not well known outside of headache medicine. Though usually not particularly responsive to treatment, nonetheless it is important to recognize this pattern to advise patients correctly and avoid unnecessary testing. Once appreciated, the history in future patients is typically dramatic and pathognomonic, that of headache onset one day essentially out of the blue, becoming constant and unremitting. The headache may begin in the context of a viral infection and occurs more commonly in females. Patients can often recall the exact day that the headache began. Extensive evaluations in multiple patients have failed to disclose any clear cause, and the headache is currently classified as a primary headache disorder. Treatment protocols have been published, though the general experience is that the headache pattern is relatively refractory[47,48] (**Table 12**).

PAINFUL CRANIAL NEUROPATHIES

The trigeminal nerve supplies sensation to the face through 3 divisions: V1 ophthalmic, V2 maxillary, and V3 mandibular. Trigeminal neuralgia is described as brief paroxysmal attacks of strictly unilateral severe electric shock-like pain in

Table 11 Selected Conditions Presenting as Thunderclap Headache[45,46]

Idiopathic or primary thunderclap headache
Reversible cerebral vasoconstriction syndrome
Non-aneurysmal subarachnoid hemorrhage
Venous sinus thrombosis
Pituitary apoplexy
Vascular dissection
Spontaneous intracranial hypotension
Hypertensive crisis

Table 12 New Daily Persistent Headache—A Very Mysterious Headache

Persistent headache characterized by:
Having a distinct and clearly recalled onset day, date, year, even time in some
Continuous and unremitting within 24 hours of onset
Largely unresponsive to management
Yet generally not disabling

the distribution of usually the second or third divisions. The duration of the pain is seconds to minutes, and attacks are triggered by innocuous stimuli to the affected side of the face. The syndrome may be further classified as purely paroxysmal, with no pain between attacks, or as associated with concomitant persistent facial pain. The purely paroxysmal version may be more responsive to medication management than the version with persistent facial pain. Classic trigeminal neuralgia is a primary headache syndrome with the exception of the one allowed secondary cause, that of compression from an intracranial neurovascular bundle. By definition, classic trigeminal neuralgia should present with a normal neurologic examination.[8,49,50] Carbamazepine and oxcarbazepine are the most effective medications. Gabapentin, pregabalin, baclofen, and lamotrigine may have some effect.

Trigeminal neuralgia is distinguished from other presentations of trigeminal distribution pain that have atypical features, and findings indicative of axonal damage, such as sensory loss in the distribution of pain. These are termed "painful trigeminal neuropathies," are always considered secondary, and have been attributed to both acute and chronic (post-herpetic neuralgia) herpes zoster infection, mass lesion, trauma, and presence of a local multiple sclerosis plaque. Evaluation is generally indicated, and in most instances, magnetic resonance imaging is the most appropriate diagnostic study.[8,51]

SECONDARY HEADACHE

Numerous secondary headaches are cataloged by the ICHD. Categories include headache attributed to trauma, infection, vascular disease, or homeostatic disorders, toxic or withdrawal headaches, and headache due to nonvascular intracranial conditions. Inclusion in the list of secondary headaches is based solely on rigorous scientific literature support of the headache as having a secondary cause, and headaches are viewed as secondary if they begin or worsen in relation to the development of the pathologic condition and, further, if they clear or improve with amelioration of the condition.[8]

Giant Cell Arteritis

While a detailed discussion of secondary headache disorders is beyond the scope of this article, it is prudent to mention giant cell arteritis, often referred to as temporal arteritis, because its recognition and treatment constitute a medical emergency. Giant cell arteritis is a granulomatous inflammatory vasculopathy affecting medium- and large-sized arteries, usually including the superficial temporal artery. The disorder affects older individuals, more often women, with an average age of 70 years, and the most prominent clinical feature, occurring in 90% of patients, is new-onset but fairly nonspecific headache. Other symptoms include scalp tenderness and jaw claudication, and the condition may be associated with polymyalgia rheumatica in 50% of patients. Visual loss can occur in up to 20% of patients. Sedimentation rate and C-reactive protein are usually elevated, with a reported mean sedimentation rate of 70 mm/hour. It is recommended that high-dose steroid treatment be initiated immediately, followed by an early temporal artery biopsy. Newer noninvasive diagnostic modalities, such as temporal artery ultrasound, that could simplify diagnosis, are under review[9,52,53] (**Table 13**).

Table 13 The American College of Rheumatology classification criteria for Giant cell arteritis[54]

- Age at disease onset >50 years: development of symptoms or findings beginning at the age of >50 years.
- New headache: new onset of or new type of localized pain in the head.
- Temporal artery abnormality: temporal artery tenderness to palpation or decreased pulsation, unrelated to arteriosclerosis of cervical arteries.
- Elevated ESR: ESR 55 mm/hour by the Westergren method.
- Abnormal artery biopsy: biopsy specimen with artery showing vasculitis characterized by a predominance of mononuclear cell infiltration or granulomatous inflammation, usually with multinucleated giant cells

Medication Overuse Headache

Medication overuse headache involves the tendency among some to overuse abortive or analgesic medications in the management of migraine, leading ultimately not to the expected improvement but to the development of a more refractory headache pattern. With discontinuance, and after a latency, clinical improvement is described in approximately half of the patients. The mechanism is unclear, and the evidence for both the existence of and management of this often stigmatizing diagnosis is not rigorous, thus the value of sudden and complete removal of purportedly overused symptomatic medications is unclear and may produce unanticipated negative outcomes. An argument can be made that this diagnosis should viewed with more skepticism.[55-57]

CONCLUSION

Headache, a condition that has been described almost since the beginning of recorded history, is now an area of increasingly intense interest and focus. Fundamental improvements in our understanding of this common and, at times, debilitating condition are emerging. A flexible system of categorization of the various headaches allows for proper management in the present and sets the stage for advancement of future discoveries.

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