Headache

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Headache is described as a throbbing, pulsating or dull ache, often worsened by movement and varying in intensity. Headache can be a disorder unto itself, such as migraine, or a symptom of another disorder ranging from a head injury to a brain tumour.

Introductory article

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A common, costly health problem

Headache has troubled humankind from the dawn of civilization. Evidence of trepanation, an early form of neurosurgery, has been found on neolithic skulls dating from 7000 BC. Headache triggers, relieving factors and signs and symptoms of the migraine complex including headache, aura, prodrome, nausea or vomiting, and familial tendency, have been described in the medical and popular literature for over 1000 years.

Headache can be a disorder unto itself, such as migraine, or a symptom of another disorder, with numerous possible causes, ranging from a head injury to a hangover to a brain tumour. Migraine is a primary episodic headache disorder characterized by various combinations of neurological, gastrointestinal and autonomic changes. The headache is often unilateral, pulsating, moderate to severe in intensity and aggravated by routine physical activity. It is typically accompanied by nausea, photophobia and/or phonophobia.

Migraine is a public health problem that has an impact on both the individual and society. As many as 23 million Americans have severe migraine headaches. Some 25% of women experience four or more severe attacks a month; 35% experience one to three severe attacks a month; 40% experience one, or less than one, severe attack a month. Similar frequency patterns are observed for men. **See also**: Migraine

Most migraineurs have some disability with severe attacks; about one-third are severely disabled or need bedrest. Many migraineurs live in fear, knowing that at any time an attack could disrupt their ability to work, care for their families or meet social obligations.

Migraine has an enormous impact on society. A recent large American survey found that 5.5 days of restricted activity per 100 person-years were due to headache. Some 8% of men and 14% of women miss all or part of a day of work or school each month. In the USA, annual lost productivity due to migraine may cost as much as 17 billion dollars a year.

Migraine has a marked impact on healthcare utilization. The National Ambulatory Medical Care Survey, conducted from 1976 to 1977, found that 4% of all visits to physicians' offices (over 10 million visits a year) were for headache. Migraine also results in major utilization of emergency rooms and urgent-care centres. Vast amounts of prescription and over-the-counter medications are taken for headache disorders, resulting in hundreds of millions of dollars in expenses and possible drug side effects including daily headache, ulcers and bleeding.

Migraine is a lifelong disorder. Children with severe migraine often become migraine-free for more than 2 years as young adults, but only 40% continue to be migraine-free after 30 years. Migraine attack frequency often decreases as patients get older.

Tension-type headache (TTH), in contrast to migraine, is usually bilateral. The pain is dull or achy and is usually mild to moderate in severity. It is not associated with nausea, photophobia, or phonophobia. TTH is slightly more common in women than in men (1.04–1.4 : 1), with a peak prevalence between the ages of 20 and 50 years. TTH often interferes with activities of daily living. Almost one-half of TTH sufferers have some limitation of function and have to discontinue normal activity. Most sufferers have less than one attack a month; about one-third have two or more attacks a month. Overall the average frequency is 35 days per year.

A telephone interview prevalence study, conducted from 1993 to 1994 in Baltimore County, Maryland, found the 1- year period prevalence was 38.3% for episodic TTH and 2.2% for chronic TTH. Women had higher episodic TTH prevalence rates than men when corrected for age, race and education subgroups. Episodic TTH prevalence peaked between 30 and 37 years of age for both men and women, and also increased with educational status. Over 71.8% of individuals with episodic TTH experienced 30 or fewer headaches per year. Episodic TTH caused moderate disability, with 8.3% of patients reporting lost workdays and 43.6% having decreased effectiveness at home, work and school.

Chronic TTH, unlike the episodic form, declined with educational status. Women had higher chronic TTH prevalence than men. Patients with chronic TTH demonstrated higher disability than those with episodic TTH. Episodic TTH is more common than chronic TTH, causing moderate individual disability but high societal impact, secondary to its high prevalence rates. Chronic TTH, on the other hand, has tremendous individual impact but little effect on society, because of its low prevalence.

Like migraine, TTH is a disorder of middle life, striking individuals early in life and continuing to affect them through their peak productive years. Most migraineurs, and about 60% of patients with TTH, have a diminished capacity for work or other activities. Despite prominent disability, nearly 50% of migraineurs and more than 80% of patients with TTH had never consulted their general practitioner for their headaches.

In Denmark, 43% of employed migraineurs and 12% of employed TTH sufferers missed one or more days of work, annually, because of headache. Migraine caused at least 1 day of missed work in 5%, while TTH caused a day of missed work in 9%. Annually, per 1000 employed persons, 270 lost work-days were due to migraine and 820 were due to TTH.

Frequent episodic TTH may be a risk factor for chronic TTH. When migraine and TTH coexist, the TTH may be more frequent and more severe. The process whereby headache frequency increases and an episodic disorder becomes chronic is sometimes referred to as transformation. Overuse of ergotamine and/or analgesics is the most common factor leading to transformation. If analgesics are not withdrawn, these patients may be refractory to prophylactic therapy and have a very poor prognosis.

Migraine is a very common cause of temporary disability. Despite this, many migraineurs, even those with disabling headache, have never consulted a physician for headache. Migraine prevalence is highest in women, in persons between the ages of 25 and 55 years, and, at least in the United States, in individuals from low-income households. Migraine prevalence may be increasing in the United States.

A warning of serious illness

In evaluating a patient with headache, secondary causes of headache, such as a mass lesion, subarachnoid haemorrhage or subdural haematoma, need to be identified or excluded. The history and general medical and neurological examinations are used for this purpose (**Table 1**). In the initial evaluation, 'headache alarms', which suggest the possibility of a secondary headache disorder, should be sought. If suspicious features are present, diagnostic testing is often necessary. **Table 2** summarizes some of the alarming features, a partial differential diagnosis and some considerations in the investigation. Once secondary headaches have been excluded, the task is then to diagnose one (or more than one) specific primary headache disorder. **See also**: Traumatic Central Nervous System Injury

Table 1 Headache history

Attack onset
Pain location
Attack duration
Attack frequency and timing
Pain severity
Pain quality
Associated features
Aggravating or precipitating factors
Ameliorating factors
Social history
Family history

The selection of appropriate headache studies is hindered by the lack of controlled trials. Few guidelines exist for headache (particularly migraine) investigation. In a typical healthy migraineur, laboratory tests may not be necessary for diagnosis, but are often recommended before treatment, as, for example, electrocardiography in the older migraineur before the use of triptans or ergots.

Patients with refractory headache who attend tertiary referral centres usually undergo more studies than do those seen by specialists or primary care physicians. If a secondary cause of headache is suspected, laboratory tests are performed. A complete blood count and differential may rule out anaemia or infection. The antinuclear antibody test screens for autoimmune conditions. An erythrocyte sedimentation rate not only acts as a screen for serious diseases such as a malignancy or collagen vascular disease, but can also establish the diagnosis of temporal arteritis, a cause of headache in the elderly. Thyroid function studies are performed to rule out thyrotoxicosis, a condition that may exacerbate headache and is a relative contraindication to ergot administration. Unexpected or overused medication that has a direct impact on headache and its treatment can be identified by toxicology studies and a drug screen. Specific studies (such as estimation of electrolytes and liver or kidney function) may be needed before starting drug treatment. **See also**: Thyroid Disease

An extensive neurological evaluation, including computed tomography (CT) and lumbar puncture (LP), is indicated when a patient presents with his or her first or worst headache, particularly one that is associated with focal neurological signs, stiff neck or changes in cognition. CT can miss subarachnoid blood in as many as 25% of cases, particularly if it is not performed until days after the headache onset. Magnetic resonance imaging may be more sensitive after 24 h, but only with the LP can an unerring diagnosis of subarachnoid haemorrhage be made. **See also**: Brain Imaging as a Diagnostic Tool; Brain Imaging: Localization of Brain Functions

Tension-type Headache

Episodic tension-type headache

Episodic TTH is defined as recurrent episodes of headache meeting the International Classification of Headache Disorders, 2nd Edition (ICHD-2) diagnostic criteria outlined in **Table 3**. TTH is the most common headache type, with a lifetime prevalence (in Denmark) of 69% in men and 88% in women and a 1-year prevalence of 63% in men and 86% in women.

TTH varies in frequency as well as in severity, from rare, brief episodes to frequent, often continuous, disabling headaches. The ICHD-2 has criteria for infrequent and

Table 2 Diagnostic alarms in the evaluation of headache disorders

Headache alarm	Differential diagnosis	Possible investigation
Headache begins after age 50 years	Temporal arteritis, mass lesion	Erythrocyte sedimentation rate, neuroimaging
Sudden-onset headache	Subarachnoid haemorrhage, pituitary apoplexy, bleed into a mass or AVM, mass lesion (especially posterior fossa)	Neuroimaging, lumbar puncture
Accelerating pattern of headaches	Mass lesion, subdural haematoma, medication overuse	Neuroimaging, drug screen
New-onset headache in a patient with cancer or human immunodeficiency virus infection	Meningitis (chronic or carcinomatous), brain abscess (including toxoplasmosis), metastasis	Neuroimaging, lumbar puncture
Headache with systemic illness (fever, stiff neck, rash)	Meningitis, encephalitis, Lyme disease, systemic infection, collagen, vascular disease	Neuroimaging, lumbar puncture, blood tests
Focal neurological symptoms or signs of disease (other than typical aura)	Mass lesion, AVM, stroke, collagen vascular disease (including antiphospholipid antibodies)	Neuroimaging, collagen vascular evaluation
Papilloedema	Mass lesion, pseudotumour, meningitis	Neuroimaging, lumbar puncture

AVM, arteriovenous malformation.

frequent episodic and chronic TTH. TTH has no prodrome or aura. The pain is a dull, achy, nonpulsatile feeling of tightness, pressure or constriction (vice-like or hatband-like) and is usually mild to moderate in severity, in contrast to the moderate to severe pain of migraine. The pain intensity increases as the attack frequency increases. Most patients have bilateral pain, but the location varies considerably within and between patients, and may involve the frontal, temporal, occipital or parietal regions, alone or in combination, commonly changing locations during the attack. Some patients have neck or jaw discomfort or have frank problems with the temporomandibular joint. Scalp tenderness may also occur.

Migraine and episodic TTH have traditionally been considered distinct entities. However, some workers believe that migraine and TTH are related entities, which differ more in severity than in kind. What we call TTH may be two distinct disorders. The first may be attacks of mild migraine, while the second may be a pure TTH that is not associated with other features of migraine (nausea, photophobia or sensitivity to movement) or with attacks of severe migraine. What we call migraine may be the upper end of a normal distribution of painful episodic headaches. Whether TTH is a milder form of migraine or a distinct entity is still not certain.

The approach to the treatment of episodic headache, whether TTH or migraine, is similar, and consists of psychophysiological therapy, physical therapy and pharmacotherapy. Simple analgesics and nonsteroidal anti-inflammatory agents (NSAIDs) are effective in TTH, as demonstrated by the headache attack model for acute pain. Ibuprofen and naproxen are significantly more effective than placebo and may be more effective than aspirin or paracetamol (acetaminophen). There is no evidence that muscle relaxants, such as the mephenesin-like compounds, baclofen, diazepam, tizanidine, cyclobenzaprine or dantrolene sodium, are effective in the treatment of TTH. **See also**: Pain and Analgesia

Prophylactic treatment, designed to reduce the frequency and severity of headache attacks, should be considered if the frequency (more than two per week), duration (>3–4 h) and severity might lead to the overuse of abortive medication or significant disability. We prefer to begin treatment with antidepressants, which control pain centrally, but any of the migraine-preventive drugs may be used empirically.

Relaxation and biofeedback are useful in the management of TTH. Relaxation training and/or electromyographic biofeedback training can produce a 50% reduction in headache activity. Cognitive behavioural interventions, such as stress management programmes, may effectively reduce TTH activity when used alone, but they may be more useful in conjunction with biofeedback or relaxation therapies, particularly in patients with a high level of daily stress. Patients with continuous headache are less responsive to relaxation or biofeedback therapies, and those with significant psychiatric comorbidity may do poorly with behavioural treatment that does not address the comorbid problem.

Physical therapy techniques include positioning, ergonomic instruction, massage, transcutaneous electrical nerve stimulation, heat or cold application and manipulations. While none of these techniques has been proven to be effective in the long term, some, such as massage, may be useful for acute episodes of TTH.

Migraine

Migraine is a primary episodic headache disorder characterized by various combinations of neurological, gastrointestinal and autonomic changes. In the United States,

Table 3 Tension-type headache (International Headache Society classification)

2.1 Infrequent episodic tension-type headache
Diagnostic criteria:
A. At least 10 previous headache episodes occurring on <1 day per month on average (<12 days per year) and fulfilling criteria B–E listed below.
B. Headache lasting from 30 min to 7 days.
C. At least two of the following pain characteristics:
1. Pressing/tightening (nonpulsating) quality.
2. Mild or moderate intensity (may inhibit, but does not prohibit activities).
3. Bilateral location.
4. No aggravation by walking, climbing stairs or similar routine physical activity.
D. Both of the following:
1. No nausea or vomiting (anorexia may occur).
2. Photophobia and phonophobia are absent, or one but not the other is present.
E. Not attributable to another disorder.

2.2 Frequent episodic tension-type headache
Diagnostic criteria:
A. At least 10 episodes occurring on <1 but <15 days per month for at least 3 months and fulfilling criteria B–E.
B. Headache lasting from 30 min to 7 days.
C. At least two of the following pain characteristics:
1. Pressing/tightening (nonpulsating) quality.
2. Mild or moderate intensity (may inhibit, but does not prohibit activities).
3. Bilateral location.
4. No aggravation by walking, climbing stairs or similar routine physical activity.
D. Both of the following:
1. No nausea or vomiting (anorexia may occur).
2. Photophobia and phonophobia are absent, or one but not the other is present.
E. Not attributable to another disorder.

2.3 Chronic tension-type headache
Diagnostic criteria:
A. Average headache frequency >15 days per month on average for >3 months (180 days per year), fulfilling criteria B–E.
B. Headache lasts hours or may be continuous.
C. At least two of the following pain characteristics:
1. Bilateral location.
2. Pressing/tightening quality.
3. Mild or moderate severity (may inhibit but does not prohibit activities).
4. Not aggravated by walking stairs or similar routine physical activity.
D. Both of the following:
1. Not more than one of the following: nausea, photophobia or phonophobia.
2. Neither moderate or severe nausea nor vomiting.
E. Not attributed to another disorder.

more than 17% of women and 6% of men had at least had one migraine attack in 1997. The migraine attack can be divided into four phases: the prodrome, which occurs hours or days before the headache; the aura, which immediately precedes the headache; the headache itself and the headache resolution phase. Migraine may occur with or without aura. These are discussed more fully in the article on Migraine. **See also**: Migraine

Formal diagnostic criteria

To establish a diagnosis of migraine without aura, the ICHD-2 criteria (**Table 4**) require five attacks, each lasting 4–72 h and having two of the following four pain characteristics: unilateral location, pulsating quality, moderate to severe intensity and aggravation by routine physical activity. In addition, the attacks must have at least one of the following: nausea or vomiting, or photophobia and phonophobia. Using these criteria, no single associated feature is mandatory for diagnosing migraine, although recurrent episodic attacks must be documented. Migraine with aura (IHS 2.1) is the new term for classical migraine (**Table 5** and **Table 6**). To make a diagnosis using the IHS criteria requires at least two attacks with any three of the following four features: one or more fully reversible symptoms of aura; aura developing over more than 4 min; aura lasting less than 60 min and headache following aura with a free interval of less than 60 min.

Table 4 Migraine without aura (1.1)

Previously used terms: common migraine, hemicrania simplex
Diagnostic criteria:
A. At least five attacks fulfilling criteria B–E.
B. Headache lasting 4–72 h (untreated or unsuccessfully treated).
C. Headache has at least two of the following characteristics:
   1. Unilateral location.
   2. Pulsating quality.
   3. Moderate or severe intensity (inhibits or prohibits daily activities).
   4. Aggravation by or causing avoidance of routine physical activity.
D. During headache at least one of the following:
   1. Nausea and/or vomiting.
   2. Photophobia and phonophobia.
E. Not attributed to another disorder.

Table 5 Migraine with aura (classical migraine) (1.2)

Diagnostic criteria:
A. At least two attacks fulfilling criterion B.
B. Migraine aura fulfills criteria B and C for one of the subforms 1.2.1–1.2.6.
C. Not attributed to another disorder.

Table 6 Typical aura with migraine headache (1.2.1)

Diagnostic criteria:

A. At least two attacks fulfilling criteria B–D.
B. Aura consisting of at least one of the following, but no motor weakness:
   1. Fully reversible visual symptoms including positive features (e.g. flickering lights, spots or lines) and/or negative features (i.e. loss of vision).
   2. Fully reversible sensory symptoms including positive features (i.e. pins and needles) and/or negative features (i.e. numbness).
   3. Fully reversible dysphasic speech disturbance.
C. At least two of the following:
   1. Homonymous visual symptoms and/or unilateral sensory symptoms.
   2. At least one aura symptom develops gradually over > 5 min.
   3. Each symptom lasts > 5 and < 60 min.
D. Headache fulfilling B–D for 1.1 *Migraine without aura* begins during the aura or follows aura within 60 min.

Treatment

Effective migraine treatment begins with making an accurate diagnosis, explaining it to the patient and developing a treatment plan that considers the patient's diagnosis, symptoms and any coincidental or comorbid conditions and deals with the most disturbing symptoms in the most appropriate way.

Relaxation, biofeedback and behavioural interventions, such as maintaining a regular schedule, getting adequate sleep and exercise and giving up tobacco are helpful in some patients. Biofeedback is a useful treatment that serves to engage patients in cognitive behavioural therapy. It is especially useful in children, pregnant women and patients in whom stress is a trigger. Although behavioural interventions are important, drugs are the mainstay of treatment for most patients.

The pharmacological treatment of migraine may be acute (abortive) or preventive (prophylactic), and patients who are experiencing frequent severe headaches often require both approaches. Acute treatment attempts to abort (reverse or stop the progression of) a headache once it has started. Preventive therapy is given, even in the absence of a headache, to reduce the frequency and severity of anticipated attacks. Symptomatic treatment is appropriate for most attacks, even in patients who are on preventive medication and should be used for 2–3 days a week at most. Preventive treatment is used more selectively, to decrease the occurrence of frequent attacks, for example.

For a full description of the specific drugs used for abortive and prophylactic treatment see the article on Migraine.

Cluster Headache

Cluster headache is a rare, distinct, primary headache characterized by devastating pain. The image of the tortured sufferer rocking or pacing in the dark, with tears streaming from one eye and face contorted in exquisite pain, is distinct and unique in medicine. Attacks occur in series lasting for weeks or months (cluster periods), with the attack frequency ranging from one every other day to eight a day. The cluster periods are separated by remissions that usually last for months or years. About 10% of patients have chronic symptoms with no remission periods. The ICHD-2 criteria (**Table 7**) for cluster require at least five attacks of severe, unilateral, orbital, suborbital and/or temporal pain lasting for 15–180 min if untreated, and associated with at least one of the following: conjunctival injection, lacrimation, nasal congestion, rhinorrhoea, forehead and facial sweating, miosis, ptosis or eyelid oedema.

Cluster headache attacks are stereotypical. They are generally shorter than those of migraine, invariably unilateral and very severe. The pain is usually located around the orbit or over the temporal regions. The attack frequency varies from one per day or every second day, to two or more daily. Cluster headache has associated autonomic symptoms, which include lacrimation and nasal congestion, suggestive of cranial parasympathetic activation and miosis and ptosis, suggestive of Horner syndrome. **See also**: Autonomic Nervous System

Pharmacological treatment for cluster headache may be abortive (acute), prophylactic (preventive) or a combination of both methods. Abortive treatment is directed at

managing the individual attack. Preventive treatment is directed at shortening the bouts of episodic cluster and controlling the frequency of attacks in both the episodic and chronic forms of the disorder. Acute treatment includes oxygen inhalation, injectable sumatriptan or dihydroergotamine (DHE) and local anaesthetics. Preventive treatment in cluster headache is aimed at both shortening bouts and controlling attack frequency. Patients with cluster headache require prophylactic therapy since: (1) attacks are frequent, severe, of rapid onset and often too short lived for abortive medication to take effect; (2) abortive treatment may only postpone the attack; (3) treating frequent attacks abortively may result in overmedication and (4) failing to stop the cluster period early may prolong the suffering for months. Medications effective in the prophylactic treatment of cluster include ergotamine, methysergide, corticosteroids, verapamil, lithium carbonate, valproic acid and, occasionally, indomethacin.

The principles of prophylactic pharmacotherapy are as follows: (1) start medications early in the cluster period; (2) continue the drugs until the patient is headache-free for at least two weeks; (3) taper the drugs rather than abruptly withdrawing them and (4) restart the drugs at the beginning of the next cluster period. If an acute attack occurs despite preventive treatment, abortive agents such as oxygen, sumatriptan, DHE or intranasal lignocaine (lidocaine) may be used.

Treatment and dosage must be individualized. Many clinicians start treatment of episodic cluster headache with verapamil 240–560 mg per day; others start with ergotamine tartrate 1–4 mg daily, particularly in patients with nocturnal attacks, to whom a dose is given at bedtime. Methysergide 2 mg three to four times a day is an effective alternative. Lithium or divalproex can be used next, alone or in combination with verapamil. Pizotifen is preferred by some, when it is available, before verapamil, but this would not be our approach. Corticosteroids may be used to break the cycle of headache or to treat severe exacerbations.

Chronic cluster can be treated with verapamil or lithium, alone or in combination. In resistant cases, triple therapy using ergotamine, verapamil and lithium, or methysergide, verapamil and lithium, may be considered. Divalproex can be used alone or in combination with verapamil or methysergide.

Patients with chronic cluster headache may be resistant to prophylactic medication, and may be candidates for surgery. Indications for surgery include: (1) strictly unilateral headaches, (2) total resistance to medical therapy or significant contraindications to effective medical therapy and (3) a stable personality profile with no addictive potential. The procedure of choice is radiofrequency thermocoagulation of the trigeminal ganglion. The overall results have been encouraging, with almost 75% of patients becoming free of cluster headache attacks. Complications include anaesthesia dolorosa, transient corneal infection, transient diplopia and recurrent sty. Recurrence of pain is possible after a number of years and repeat surgery may be necessary. Recently, hypothalamic stimulation has been proposed for the treatment of intractable cluster headache.

Table 7 Cluster headache

3.1 Diagnostic criteria of cluster headache
A. At least five attacks fulfilling criteria B–D.
B. Severe or very severe unilateral orbital, supraorbital and/or temporal pain lasting 15–180 min.untreated.
C. Headache is associated with at least one of the following signs, which have to be present on the pain side:
1. Ipsilateral conjunctival injection and or lacrimation.
2. Ipsilateral nasal congestion and/or rhinorrhea.
3. Ipsilateral eyelid oedema.
4. Ipsilateral forehead and facial sweating.
5. Ipsilateral miosis and/or ptosis.
6. A sense of restlessness or agitation.
D. Frequency of attacks: from one every other day to eight per day.
E. Not attributed to another disorder.
3.1.1 Episodic cluster headache
A. Fulfill criteria for 3.1.
B. At least two cluster periods lasting (untreated patients) from 7–365 days, separated by pain-free remissions of >1 month.
3.1.2 Chronic cluster headache
A. Fulfill criteria for 3.1.
B. Attacks recur over >1 year without remission periods or remission periods lasting <1 month.

Chronic Daily Headache

Patients with chronic daily headache are still difficult to classify using the ICHD-2 criteria. Frequent headache sufferers can be divided into two groups, based on headache duration, once secondary headache has been excluded. When headache duration is less than 4 h, the differential diagnosis includes cluster headache, chronic paroxysmal hemicrania, idiopathic stabbing headache, hypnic headache and other miscellaneous headache disorders. When the headache duration is greater than 4 h, the major primary disorders to consider are chronic migraine (similar to what was called transformed migraine), hemicrania continua, chronic TTH and new daily persistent headache (NDPH) (**Table 8**).

Table 8 Headache classification for chronic daily headache

Daily or near-daily headache lasting for more than 4 h per day for more than 15 days per month
1.8 Chronic migraine.
2.2 Chronic tension-type headache.
4.7 New daily persistent headache.
4.8 Hemicrania continua.
8.2 Medication overuse headache.

Patients with transformed migraine often have a past history of episodic migraine, typically beginning in their teens or twenties. In subspecialty clinics, most patients with transformed migraine are women, 90% of whom have a history of migraine without aura. The headaches grow more frequent over months to years and the associated symptoms of photophobia, phonophobia and nausea become less severe and less frequent than during typical migraine. Patients often develop a pattern of daily or nearly daily headaches that phenomenologically resemble chronic TTH, that is, the pain is often mild to moderate and not associated with photophobia, phonophobia or gastrointestinal features. Other features of migraine, including unilaterality, gastrointestinal symptoms and aggravation by menstruation and other trigger factors, may persist. Attacks of full-blown migraine superimposed on a background of less severe headaches occur in many patients.

About 80% of patients with transformed migraine overuse symptomatic medication. These are classified as medication overuse headaches (MOH) by the IHS. Patients without MOH can be classified as chronic migraineurs. Headaches often increase in frequency during a period of increasing medication use. Stopping the overused medication frequently results in distinct headache improvement, although improvement often takes days to weeks to occur. Many patients have significant long-term improvement after detoxification.

Other Forms of Chronic Daily Headache

Chronic TTH (**Table 3**) may also develop in patients with a history of episodic TTH. These headaches are more often diffuse or bilateral, and frequently involve the posterior aspect of the head and neck. In chronic TTH, in contrast to transformed migraine, most features of migraine are absent, as is previous or coexistent episodic migraine.

Chronic TTH requires head pain on at least 15 days a month for at least six months; patients often have daily headaches. Although the pain criteria are identical to those of episodic TTH, the IHS classification allows only mild nausea but not vomiting.

NDPH is the abrupt development of a headache that does not remit. It develops over less than three days, and some patients remember the exact day or time the headache started. NDPH is likely to be a heterogeneous disorder. Some cases may reflect a postviral syndrome. Patients with NDPH are generally younger than those with transformed migraine.

Hemicrania continua is a rare, indomethacin-responsive headache disorder characterized by a continuous, moderately severe, unilateral headache that varies in intensity, waxing and waning without disappearing completely. It may rarely alternate sides. It is frequently associated with jabs and jolts (idiopathic stabbing headache). Hemicrania continua is not triggered by neck movements, but tender spots in the neck may be present. Exacerbations of pain are often associated with autonomic disturbances, such as ptosis, miosis, tearing and sweating. Some patients may have photophobia, phonophobia and nausea.

Effective management of chronic daily headache requires: first, excluding secondary headache disorders; second, diagnosing the specific, long-duration, primary disorder of chronic daily headache and third, identifying comorbid medical and psychiatric conditions and exacerbating factors, especially medication overuse. All symptomatic medications must be limited. For outpatients, we gradually taper the overused medications, at a rate of 10% a week, often replacing them with NSAIDs. If outpatient detoxification proves difficult or is dangerous, hospitalization may be required. Disturbances in mood and function are common, and require management with behavioural methods of pain management and supportive psychotherapy. Treatment of the comorbid psychiatric illness is often necessary before chronic daily headache comes under control.

Patients with daily headaches should be treated primarily with preventive medications, with the explicit understanding that medications may not become fully effective until the overused medication has been eliminated. Antidepressants are attractive agents for use in chronic daily headache, as many patients have comorbid depression and anxiety. Serotonin-selective reuptake inhibitors, the new selective noradrenaline (norepinephrine) and serotonin reuptake inhibitors (e.g. venlafaxine) and monoamine oxidase inhibitors may have a therapeutic role, but this has not yet been proven. The anticonvulsant divalproex sodium is an important drug for use in patients with chronic daily headache, even those in whom other agents have failed. **See also**: Serotonin

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