

Diagnosis and Treatment of Common Headache Syndromes: A Guide for the Clinician

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Abstract

Headache is one of the most common problems encountered in clinical practice. Over 90 per cent of headaches fall into one of four diagnostic categories: (1) Tension-type headache; (2) Migraine headache; (3) Cluster headache; and (4) Medication overuse headache. The mainstay of diagnosis of these common headaches is the taking of a careful targeted headache history. The physical examination in patients suffering from these common headaches is almost always normal and abnormalities identified on physical examination in this patient population should raise concern. Appropriate use of diagnostic imaging including magnetic resonance imaging of the brain and cervical spine is indicated in those patients with a recent onset of headaches and in those patients in whom a previously stable headache pattern has changed. Laboratory testing will also help the clinician rule out co-existent or occult disease that may be contributing to the patient's headache symptomatology. In most cases, treatment plans should be aimed at preventing headache rather than aborting the headache after symptoms have already occurred. Care must be taken to identify overuse or misuse of medications prescribed to treat headache, as many of these medications have the propensity to cause medication overuse headaches.

Keywords: Headache; Tension-type headache; Migraine headache

Practice Points

- The targeted headache history will allow the clinician to correctly diagnose the type of headache the patient is suffering from in the vast majority of cases.
- Correct diagnosis is essential if the clinician is going to construct a rational and effective plan of treatment.
- Tension-type headache is the most common type of headache encountered in clinical practice.
- Migraine headache is associated with significant morbidity.
- Aura is a painless neurological dysfunction that precedes the onset of headache pain in patients suffering from migraine with aura.
- Cluster headache occurs predominately in males.
- Cluster headache follows a unique chronobiological pattern.
- Patients suffering from cluster headache frequently exhibit trigeminal autonomic symptoms during acute attacks.
- Medication overuse headache is frequently triggered by the overuse of simple analgesics, nonsteroidal anti-inflammatory agents, opioids, caffeine, ergotamines, and triptans.

Introduction

Given that there are estimated to be 45 million headache sufferers in the United States alone, one must ask themselves why it is that most clinicians approach the patient suffering from headache with a mixture of anxiety and dread? [1]. As I posited in a recent issue of Medical Clinics of North America which focused on the Management of Acute and Chronic Headache Pain, the reasons for this emotional reaction are twofold: The first is that almost every patient who presents with the complaint of headache has a completely normal physical examination and their laboratory and neuroimaging evaluations are within normal limits. The clinician caring for the patient with poorly controlled

headaches is often perplexed that how a patient who has no objective evidence of disease can use up so much of the clinician's already limited time and energy and at the same time create so much anxiety, stress, and frustration in all those around him? To make matters worse, many patients are just as perplexed as the treating clinician often the patient is wondering "how can I be "normal" when these damn headaches are destroying my life" [2]. To make matters worse, this patient frustration can eventually turn to anger, which is often directed at loved ones as well as those, caring for the patient.

The second reason that the headache sufferer is approached with some degree of trepidation by many clinicians is that there is always a nagging fear that in spite of the normal physical examination, laboratory testing, and neuroimaging, that something has been missed.....and that something is a something that will kill the patient.....a brain tumor, aneurysm, stroke, or the like [3,4]. The clinician worries about this and so does the headache sufferer. Stories abound, like age old folk legends, about distant relatives who died of a headache. The names, dates, and details are about as vague as the details of the enchanted forest. So what is to be done? The first step is to understand the common reasons that the treatment of the headache sufferer goes awry; and second step is to have solid action plans to avoid these clinical misadventures. As I previously suggested, headache treatment plans fail for one or more of the following seven reasons:

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1. The diagnosis is incorrect, AKA the every bad headache is a migraine fallacy.
2. The diagnosis is incomplete (the patient has more than one type of headache.....see #1)
3. Medication overuse abounds yet is underdiagnosed (especially opioids in our current environment of opioid as panacea for all that ails the world)
4. Headache triggers are ignored (especially caffeine, wine and HRT)
5. Medication misadventures (including too much too early, too little too late, wrong drug due to wrong diagnosis, abortive rather than preventative, drugs prone to cause rebound headache, and of course non-compliance)
6. Failure to identify co-morbid conditions (the magnetic resonance imaging (MRI) was normal, but I didn't take a blood pressure)
7. Psychosocial issues (what would a headache article be without blaming the patient for something?) [2]

Once you embrace that these reasons often result in headache treatment plan failures, you can then arduously search for these clinical missteps whenever the headache patient is not getting better. You can do this by first going with the hackneyed admonition that *when you hear hoof beats, they most often come from horses not zebras*. Hackneyed perhaps, but accurate none the less. Common headaches occur commonly and rare headaches occur rarely. This means that headache diagnosis is first and foremost a numbers game. Tension headache is the most common headache that man suffers from, making up 90% of headaches [5]. Migraine, cluster and medication overuse headache, make up the majority of the remaining headaches encountered in clinical practice. Diagnose one of these four headache types and you will be right over 90% of the time, which is not a bad diagnostic batting average. If you keep your index of suspicion high enough and then simply pay attention to the patient, you will almost always know when the patient is really sick and that it is time to pull out all the stops. Good clinicians know "sick from well" and if your gut tells you that something is really wrong, rethink the situation, get help, and most importantly, do not hang your hat on previously normal laboratory tests and neuroimaging [6]. Repeat everything and above all, carefully re-examine the patient.

If you do all these things, it is amazing how your comfort level with caring for the patient with headaches will rise and your anxiety level will plummet.

Common Primary Headache Syndromes

Tension-type headache

Tension-type headaches comprise over 90% of headaches encountered in clinical practice [5]. Previously known as muscle contraction headache, tension-type headache can present clinically as either an episodic or chronic headache. In spite of its previous name, tension-type headache does not appear to have muscle contraction as its nidus, but rather as a symptom of the headache. The patient suffering from tension-type headache is frequently characterized as experiencing multiple issues of unresolved conflict at home, work, and in his or her social interactions. These conflict issues are identified as abnormalities on the Minnesota Multiphasic Personality Inventory manifesting themselves as borderline depression and somatization.

Many researchers in the field of tension-type headache have postulated that this somatization takes the form of abnormal muscle contraction in many patients diagnosed with tension-type headache [5].

Signs and symptoms

Tension-type headache occurs more commonly in females, evolving over a period of hours to days, with the pain presenting as unilateral or bilateral band-like, non-pulsatile tightness or aching in the frontal, temporal, and occipital regions [7]. Neck symptomatology is often present in conjunction with the headache pain. Significant abnormalities of sleep are common with, insomnia, easy awakening, and non-restful sleep a frequent complaint. Tension-type headaches occur most often between the hours of 4 and 8 AM and 4 and 8 PM [5]. Unlike migraine, there does not appear to be an obvious hereditary pattern, but family clusters have been reported [8].

Tension-type headache is commonly triggered by psychological or physical stress, e.g. menses, conflict with family or co-workers, long airline flights or drives, etc. It has been suggested that pre-existing diseases of the cervical spine such as degenerative arthritis may contribute to the evolution of tension type headache. The psychopathologic milieu responsible for the triggering of tension-type headache may also be responsible for the evolution of idiopathic temporomandibular joint dysfunction [7].

Testing

Testing in patients suffering from tension-type headache is directed at identifying occult pathology or other diseases that may mimic tension-type headache. Although tension-type headache is in most cases easily diagnosed on clinical grounds, current practice is to obtain a magnetic resonance imaging (MRI) scan of the brain in all patients with the recent onset of headache symptomatology and in those patients with a previously stable pattern of headaches that have recently experienced a change in their headache symptomatology [7,8]. MRI scanning of the cervical spine should also be obtained in those patients whose headache symptoms have a significant occipital or nuchal component [7,8]. Laboratory testing including a complete blood count, erythrocyte sedimentation rate, and automated blood chemistry should be obtained when the diagnosis of tension-type headache is in question or if the patient is not getting better [6].

Differential diagnosis

As mentioned previously the diagnosis of tension-type headache is made clinically by taking a careful targeted headache history. Coexistent cervical spine disease and Arnold-Chiari malformations can occasionally mimic tension-type headache as can chronic sinusitis of the frontal sinus (Figure 1) [7]. Rarely, temporal arteritis, and other intracranial pathology including chronic subdural hematoma, tumor, and granulomatous disease may be misdiagnosed as tension-type headache. Migraine headache is also often misdiagnosed as tension-type headache in spite of the significant differences in clinical presentation [9,10]. When this occurs, the patient rarely gets better due to the vastly different treatment algorithms required to successfully treat tension-type and migraine headache. Table 1 compares and contrasts the clinical presentation of these two common headache syndromes.

Treatment

Abortive therapy: Abortive therapy is best suited for patients who suffer infrequent episodic tension-type headache. If the patient suffers a tension-type headache once or twice a month, simple analgesics and the non-steroidal anti-inflammatory agents may represent a

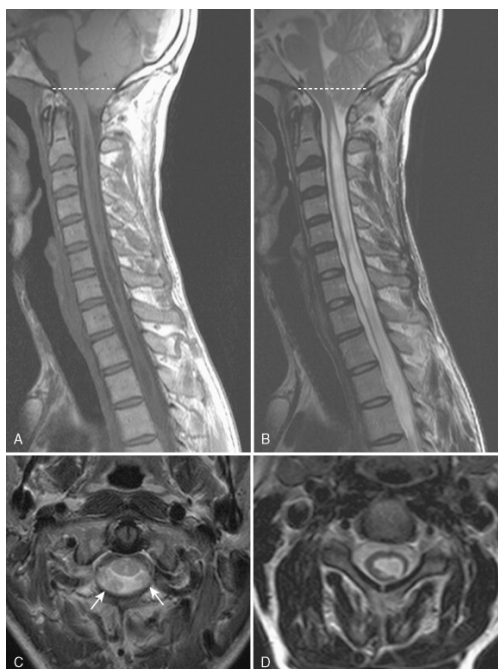


Figure 1: Sagittal T1W (A) and T2W (B) MR images of a patient with Arnold-Chiari malformation type I. The cerebellar tonsils protrude through the foramen magnum (broken line), and an associated syrinx is present. The fourth ventricle is normal, and there is no meningocele or other structural defect. (C), the herniation of the cerebellar tonsils (white arrows) is seen on the axial T2W MR image taken through the level of C1. (D), the syrinx is also well demonstrated on the axial T2W MR image taken through the midcervical spine.

	Tension-Type Headache	Migraine Headache
Onset-to-peak interval	Hours to days	Minutes to 1 hour
Frequency	Often daily or continuous	Rarely >1/wk
Localization	Nuchal or circumferential	Temporal
Aura	Never	Present 20% of time
Character	Aching, pressure, bandlike	Pounding
Laterality	Usually bilateral	Unilateral, but may change sides
Duration	Day to Days	12-24 hours
Nausea and Vomiting	Rarely	Frequently
Photophobia/Sonophobia	Sometimes mild symptomatology	Frequent severe symptomatology

Table 1: Comparison of Tension-Type and Migraine Headache.

reasonable first step in treatment. Extreme caution should be exercised when considering the use of combination analgesic drugs containing caffeine, barbiturates and/or narcotic analgesics as the risk of abuse and dependence and the triggering of medication overuse headache more than outweighs any theoretical benefit. The physician should also strongly consider avoiding abortive treatments in any patient with a prior history of drug misuse or abuse. Many drugs, including the simple analgesics and NSAIDs, can produce serious consequences if they are abused.

Prophylactic therapy: If the patient is experiencing tension-type headache more often than once or twice a month, or if the symptoms of infrequent headaches are so severe that the patient experiences significant disruption of his or her activities of daily living, e.g. missing work and/or social obligations, prophylactic therapy should be considered.

Antidepressants: The antidepressant compounds are the drugs of choice for the prophylaxis of tension-type headache [5,7]. The antidepressants have been shown to not only help decrease the frequency and intensity of headaches but also to correct the pathologic sleep abnormalities and depression frequently seen in tension-type headache sufferers. These drugs are not without side effects. They include sedation, dry mouth, blurred vision, constipation, sexual dysfunction, and urinary retention [11]. Because these drugs must cross the blood brain barrier to exert their therapeutic effects, patients being started on the antidepressant compounds should be informed that although their sleep patterns may begin to improve in a few days, headache relief generally takes 3-4 weeks to begin. Amitriptyline or desipramine is good first choices for the prophylaxis of tension-type headache. A single bedtime dose of 25mg will usually produce a reasonable balance of therapeutic benefit and a tolerable side effect profile, with the dose increased in 25-mg increments as side effects allow. If the patient does not experience excessive daytime sedation or does not tolerate the drug's anticholinergic side effects, trazodone (75 to 300 mg at bedtime) or fluoxetine (20 to 40 mg at lunchtime) should be considered [7,11]. Because many of the antidepressant compounds cause sedation, these drugs should be used with caution and at a reduced starting dose in the elderly and others that are at the risk of falling. These drugs may safely be used in conjunction with the simple analgesics and the non-steroidal anti-inflammatory agents [12].

Complementary therapies: Biofeedback and behavioral management has been shown to be of value in the prevention of tension-type headache in selected patients [13]. Monitored relaxation training is most successful when it is part of a comprehensive treatment plan that includes, medication management, nerve blocks and patient education that includes coping strategies and stress-reduction techniques. Given that yoga has been demonstrated to have a positive effect on anxiety reduction and depression, a trial of yoga may be a reasonable addition to the management of tension-type headache in selected patients [14,15].

Cervical epidural nerve block: Cervical steroid epidural nerve blocks have been shown in multiple clinical studies to provide long-term palliation of the symptoms associated with of tension-type headaches [16]. Cervical steroid epidural blocks should be added to the treatment program of patients who are not improving with medication management or are not tolerating the side effects of the medications chosen to treat the patient's headache symptomatology. Cervical steroid epidural blocks are also useful in the palliation of headaches that are "out of control" while waiting for pharmacologic and behavioral methods to become effective [17,18]. Cervical steroid epidural nerve blocks can be performed on a daily to weekly basis, depending on clinical symptoms [17].

Monoamine oxidase inhibitors: Rarely, a patient suffering from tension-type headache fails to respond to the above mentioned treatment modalities. The first step in this situation is to carefully reassess the diagnosis by retaking the history and re-examining the patient and obtaining repeat testing when appropriate. If the diagnosis of tension-type headache is confirmed, consideration should be given to two less commonly used treatment options: (1) hospitalization in a specialized In-patient headache treatment unit; and (2) a trial of monoamine oxidase inhibitors [7]. Diamond has demonstrated that this class of drugs can be extremely effective in the small subset of patients suffering from intractable tension-type headache [19]. Phenelzine, at a dosage of 15 mg three times a day, is effective in most patients. Once the headaches are stable for a period of 2 to 3 weeks, the drug can be slowly tapered to a maintenance dose of 5 to 10 mg three

times a day. Monoamine oxidase inhibitors are a unique class of drugs with significant side effects. These drugs have the potential to cause a life-threatening hypertensive crisis if special diets are not followed or if these drugs are taken in conjunction with some commonly used prescription or over-the-counter medications [20]. Therefore, initiation of therapy is best carried out in an in-patient setting and the compliance of patients taking these drugs monitored closely.

Migraine Headache

Migraine headache is thought to affect 12 million individuals in the United States alone [21]. Migraine headache can occur at any age with some children suffering not only from the symptoms of headache, but with unique symptoms such as cyclical vomiting, vertigo, motion sickness [22,23]. These symptoms are termed migraine variant and can result in significant school absenteeism and disruption of the child's activities of daily living. In adults, the onset of migraine headache usually occurs before the age of 30, with pregnancy and menopause often ameliorating both the frequency and intensity of the headaches [8]. Migraine headache occurs much more commonly in females. Migraine headache appears to have a heritable element with migraineurs often displaying a similar personality type consisting of a tendency toward obsession and rigidity in daily routines and compulsive neatness. Migraine headache can be triggered by a variety of endogenous and exogenous events and substances including, hormone fluctuations associated with menses,

• Alterations in sleep patters
• Fatigue
• Stress
• Missed meals
• Strong smells
• Menses
• Changes in barometric pressure
• Oral Contraceptives
• Exogenous estrogen
• Food Triggers
o Tyramine
o Monosodium glutamate
o Nitrates
o Chocolate
o Citrus fruits
o Alcohol

Table 2: Migraine Triggers.

• Chianti
• Aged cheeses
o Stilton
o Gorgonzola
o Camembert
o Swiss
o Aged Cheddar
o Ricotta
• Cured Meats
• Fermented cabbage
• Soy Sauce
• Fish Sauce
• Yeast Extracts
o Marmite
• Broad Beans
o Fava beans
• Spoiled foods

Table 3: Tyramine Containing Foods.

oral contraceptives, stress, missed meals, fatigue and changes in normal sleep patterns (Table 2). Tyramine containing foods, caffeine, chocolate, monosodium glutamate, nitrates, alcohol, and citrus foods can also trigger migraine in susceptible individuals (Table 3) [20]. Interestingly, it appears that the right to left shunting associated with patent foramen ovale may also trigger migraine headache [24]. Approximately 20% of patients suffering from migraine headaches also experience a painless neurologic event which occurs prior to the onset of headache pain which is known as an aura [8,25]. Most frequently, sufferers of migraine with aura experience painless visual disturbances prior to the onset of headache pain, but some patients experience aberrations in olfaction or hearing. These neurologic phenomenon are termed olfactory and auditory auras, respectively. Rarely, the patient with migraine with aura may experience prolonged or severe neurological dysfunction, including hemiplegia, aphasia, and blindness [26].

Signs and symptoms

Migraine is an episodic headache that is characterized by severe pain that is pounding in character [8,27]. Migraine is usually unilateral, although the headache can change sides with each episode and can occasionally present with bilateral symptomatology due to the different parasympathetic activation patterns seen in unilateral and bilateral headache. Usually localized to the periorbital or retro-orbital, region, migraine headache is often associated with systemic symptomatology, including nausea, vomiting, photophobia, and sonophobia. Alterations in appetite, mood, libido, and levels of alertness are also common [28]. Migraine headache has a much faster onset-to peak than tension-type headache, with the onset of headache pain occurring from 20 minutes to 1 hour. The patient suffering with migraine headache will appear systemically ill during attacks and will often appear pale, diaphoretic, photophobic, and tremulous. If the patient does not experience aura, the neurological exam should be within normal limits [8].

Testing

Testing in patients suffering from migraine headache is directed at identifying occult pathology or other diseases that may mimic this primary headache syndrome. Although migraine headache is in most cases easily diagnosed on clinical grounds, current practice is to obtain a magnetic resonance imaging (MRI) scan of the brain in all patients with the recent onset of headache symptomatology and in those patients with a previously stable pattern of headaches that have recently experienced a change in their headache symptomatology [7,8]. MRI scanning of the cervical spine should also be obtained in those patients whose headache symptoms have a significant occipital or nuchal component [7,8,27]. Laboratory testing including a complete blood count, erythrocyte sedimentation rate, and automated blood chemistry should be obtained when the diagnosis of migraine headache is in question or if the patient is not getting better [6,8]. Ophthalmologic evaluation, including measurement of intraocular pressures, is indicated in all patients who experience significant ocular symptoms [29].

Differential diagnosis

As mentioned previously the diagnosis of migraine headache is made clinically by taking a careful targeted headache history [3]. Migraine is occasionally misdiagnosed as tension-type or cluster headache which will result in poorly controlled headaches (Table 1) [7,8]. Diseases of the eyes, ears, nose, and sinuses such as glaucoma, temporal arteritis, and sinusitis may also mimic migraine headache and confuse the diagnose [10,29,30]. Intracranial pathology including, chronic subdural hematoma, brain tumor, sarcoidosis, abscess,

hydrocephalus, and pseudotumor cerebri can also present in a manner similar to migraine headache, but these conditions are usually ruled out by obtaining MRI of the brain and appropriate laboratory testing.

Treatment

Developing a rational and effective treatment plan for the patient who suffers from migraine headache requires a careful weighing of the risks and benefits of the various treatment options available. Given the limitations and risks associated with abortive therapy, this treatment approach should be reserved for a carefully selected subset of patients.

Abortive therapy: Abortive therapy is best suited for patients who suffer infrequent migraine headache [8,27]. If the patient suffers a migraine headache once or twice a month and the headache is not too incapacitating, compounds that contain isometheptene mucate (e.g., Midrin); the nonsteroidal anti-inflammatory drug naproxen; simple analgesics, ergot alkaloids and the triptans, including sumatriptan can be considered [31,32]. Extreme caution should be exercised when considering the use of combination analgesic drugs containing caffeine, barbiturates and/or narcotic analgesics as the risk of abuse and dependence and the triggering of medication overuse headache more than outweighs any theoretical benefit [33]. The physician should also strongly consider avoiding abortive treatments in any patient with a prior history of drug misuse or abuse. Many drugs, including the simple analgesics, ergot alkaloids, the triptans, and NSAIDs, can produce serious consequences if they are abused. Intravenous lidocaine, the inhalation of 100% oxygen, and sphenopalatine ganglion block with local anesthetic are all extremely effective in aborting acute migraine headache [34]. It should be remembered that for abortive therapy to be effective, it must be initiated at the first sign of headache [27]. In many patients suffering from migraine, this is difficult if not impossible because of the relatively short onset-to-peak time. Furthermore, many migraine sufferers experience significant nausea and vomiting which may preclude the use of oral pharmacologic agents. It should be remembered that drugs containing ergotamines and the triptans are contraindicated in those patients with a history of hypertension, peripheral vascular insufficiency, and/or coronary artery disease [8,35].

Prophylactic therapy: Prophylactic therapy is often the best treatment approach for the patient suffering from migraine headaches that occur frequently or are so severe that they interfere with activities of daily living [8]. A reasonable starting point for the prophylactic treatment of migraine headache is the use of beta blocking drugs such as propranolol at a starting dose of 80 mg of the long acting formulation [8,27,36]. This drug is usually well tolerated, although it should be avoided in those migraineurs who also suffer from asthma or significant chronic obstructive pulmonary disease. If increasing doses of beta blockers are ineffective in controlling the patient's headache symptomatology, a trial of valproic acid, calcium channel blockers (e.g.,

verapamil), clonidine, tricyclic antidepressants, and naproxen have also been used for the prophylaxis of migraine headache [8,27,36]. Each of these drugs has its own unique side effect profile which must be matched to the individual patient.

Complementary therapies: Biofeedback and behavioral management has been shown to be of value in the prevention of migraine headache in selected patients [37]. Monitored relaxation training is most successful when it is part of a comprehensive treatment plan that includes, medication management, nerve blocks and patient education that includes coping strategies and stress-reduction techniques. Given that yoga has been demonstrated to have a positive effect on pain and symptom relief in patients suffering from migraine without aura, a trial of yoga may be a reasonable addition to the management of migraine headache in selected patients [38,39].

Cluster Headache

Cluster headache occurs much less commonly than tension-type and migraine headache [40]. This primary episodic headache is unique for several reasons: (1) It occurs almost exclusively in males, unlike tension-type and migraine headache which occurs primarily in females; (2) It occurs in clusters followed by headache free remission periods; and (3) It has a chronobiologic pattern unlike any other common headache, with the headache occurring shortly after the onset of sleep with the onset of the clusters of headaches peaking during the spring and fall [40]. Although cluster headache is occasionally confused with migraine, taking a careful targeted headache history will usually make the diagnosis of cluster headache reasonably straightforward [3] (Table 4). Cluster headaches do not appear to have a heritable element, although multiple cases in families have been reported. Cluster headache usually first occur in the third to fourth decade, with attacks of severe unilateral headache pain occurring two to three times a day and lasting for 45 minute to one hour. The onset to peak of the headache pain is seconds to minutes, making abortive therapy extremely difficult [40]. In most patients the duration of each cluster of headaches is 8-12 weeks with headache free remission periods lasting 12-18 months. Rarely, these remission periods may shorten and the clusters of headaches will coalesce into a continual cycle of headaches [40]. This clinical scenario is termed chronic cluster headache and it extremely difficult to treat. Recent clinical trials of deep hypothalamic stimulation for the treatment of chronic cluster headache appear promising [41].

Signs and symptoms

Cluster headache is said to be among the worst pains that man suffers from. The unilateral headache is localized to the retro-orbital and temporal areas and is characterized as having a deep burning or boring quality. During an acute attack of cluster headache, the patient will often exhibit trigeminal autonomic symptoms including profuse lacrimation, rhinorrhea ptosis, abnormal pupil constriction, facial flushing, and conjunctival injection [29,40]. Over time, the ocular changes associated with cluster headache may become permanent and the patient may develop a leonine facies with peau d'orange skin and teleangiectasia over the malar region as well as, deeply furrowed glabellar folds [40,42].

Acute episodic cluster headache may be triggered by alcohol and vasoactive substances such as nitrates and histamine [40,42]. Attacks may also be triggered by high altitude and jet travel of long duration. In contradistinction to tension-type and migraine headaches where the patient often seeks a quiet place to rest, the patient suffering from acute episodic cluster headache may become agitated and unable to sit still

	Cluster Headache	Migraine Headache
Gender	Male 5 : 1	Female 2 : 1
Age of onset	Late 30s to early 40s	Menarche to early 20s, but also in childhood
Family history	No	Yes
Aura	Never	May be present (20% of the time)
Chronobiologic pattern	Yes	No
Onset-to-peak interval	Seconds to minutes	Minutes to 1 hr
Frequency	2 or 3/day	Rarely >1/wk
Duration	45 min	Usually <24 hr

Table 4: Comparison of Cluster Headache and Migraine Headache.

or to lie down. Frequently during the acute attack, the patient will pace back and forth or rock themselves in an effort to obtain pain relief [40]. Given the severity of pain associated with cluster headache, combined with the fact that the patient is frequently awakened from a sound sleep with the onset of the attack leading to sleep deprivation, the clinician should be vigilant for medication misuse and overuse and to carefully observe the patient for signs of depression [43]. Suicidal ideations must be taken seriously and in-patient treatment is recommended.

Testing

Testing for patients suffering from cluster headache is directed at identifying occult pathology or other diseases that may mimic this primary headache syndrome. Although cluster headache is in most cases easily diagnosed on clinical grounds, current practice is to obtain a magnetic resonance imaging (MRI) scan of the brain in all patients with the recent onset of headache symptomatology and in those patients with a previously stable pattern of headaches that have recently experienced a change in their headache symptomatology [7,8]. Given the association with cluster headache-like symptoms in patients with intracranial vascular abnormalities, magnetic resonance angiography should also be strongly considered [44]. MRI scanning of the cervical spine should also be obtained in those patients whose headache symptoms have a significant occipital or nuchal component [7,8,25]. Laboratory testing including a complete blood count, erythrocyte sedimentation rate, and automated blood chemistry should be obtained when the diagnosis of cluster headache is in question or if the patient is not getting better [6,8]. Ophthalmologic evaluation, including measurement of intraocular pressures, is indicated in all patients who experience significant ocular symptoms [29].

Differential diagnosis

As mentioned previously the diagnosis of migraine headache is made clinically by taking a careful targeted headache history [3]. Cluster headache is occasionally misdiagnosed as migraine headache which will result in delays in proper treatment [7,8] (Table 4). Diseases of the eyes, ears, nose, and sinuses such as glaucoma, temporal arteritis, and sinusitis may also mimic migraine headache and confuse the diagnose [10,29,30]. Intracranial pathology including, arteriovenous malformations, aneurysms, brain tumor, sarcoidosis, abscess, hydrocephalus, and pseudotumor cerebri can also present in a manner similar to cluster headache, but these conditions are usually ruled out by obtaining MRI of the brain and appropriate laboratory testing [45].

Treatment

Cluster headache should be considered a true pain emergency. Given the increased risk of suicide from poorly controlled cluster headache, in-patient treatment should be considered if the patient's headaches are not rapidly controlled. Because of the rapid onset to peak of seconds to minutes, abortive therapy is problematic and initial treatments should be aimed at preventing the cluster headache from occurring. The use of prednisone at a starting dose of 80 mg given

• Simple analgesics
• Nonsteroidal anti-inflammatory drugs
• Opioid analgesics
• Sinus medications
• Ergotamines
• Triptans
• Barbiturates

Table 5: Drugs Implicated in Medication overuse headache.

in divided doses is a reasonable first step in the treatment of acute episodic cluster headache. The dose may be tapered by 10 mg/day as the headaches are brought under control. The inhalation of 100% oxygen via a close-fitting mask is also beneficial in decreasing the severity and duration of the acute attacks of cluster headache and can be used concurrently with medication management as well as daily sphenopalatine ganglion blocks with local anesthetic [32,34,40]. If the cluster headaches are not controlled with these modalities, the use of lithium carbonate is a reasonable next step. Lithium carbonate is a relatively safe drug in spite of its small therapeutic window so long as the dosage is carefully titrated and the patient carefully observed for signs of drug toxicity [40,42]. A bedtime starting dose of 300 mg may be increased after 48 hours to 300 mg twice a day. If the patient exhibits no medication induced side effects, the 300mg dosage may be increased to three times a day. In otherwise healthy patients, lithium carbonate may be continued at 300 mg three times a day for 10 days. At that point the drug should be decreased in 300 mg increments every three to four days. Other drugs that may also be useful in the treatment of acute cluster headache include methysergide and the triptans [46,47]. Destruction of the gasserian ganglion by retrogasserian injection of glycerol, balloon compression, or by radiofrequency lesioning may be a reasonable next step [48]. As mentioned above, recent clinical experience suggests that deep hypothalamic stimulation may play a role in the treatment of intractable cluster headache [41].

Medication Overuse Headache

The continued overuse of drugs to abort acute headache is not only associated with the risks inherent in exceeding the recommended therapeutic dose of the drug or drugs being overused, but such overuse has the propensity to cause a new type of headaches superimposed on the patient's original headache. These superimposed headaches are called medication overuse or analgesic rebound headaches [49]. If many patients, these new headaches are more incapacitating than the original headache type being treated. Making matters worse, the original headache type becomes increasingly refractory to treatment with the overused drug or drugs. Drugs implicated in the evolution of medication overuse headache include the simple analgesics, the nonsteroidal anti-inflammatory agents, caffeine, barbiturates, opioids, ergotamines, and the triptans (Table 5) [50]. Medication overuse headache appears to be increasing in frequency in part due to the increased direct to patient advertising for over the counter pain relievers and in part due to the increased awareness of this common headache syndrome by healthcare professionals [45]. The only effective treatment for medication overuse headache is the withdrawal of the drug or drugs that are being overused [49-51].

Signs and symptoms

Medication overuse headache is diagnosed by taking a careful targeted headache history [3,50]. Careful questioning regarding the type and amount of over the counter drugs being taken is crucial to making the diagnosis, as often the patient may not understand that these drugs are important since they can be purchased without a prescription [51]. As the patient continues to overuse their abortive headache medications, the classic signs and symptoms of their original headache diagnosis will blur making treatment problematic. The diagnosis of medication overuse headache should be entertained any time a patient presents with increasing frequency and intensity of a previously stable and well controlled headache pattern or if there is a change in the character of headache, e.g transformed migraine, chronic tension-type headache, etc.

Testing

Testing for patients suffering from medication overuse headache is directed at identifying occult pathology or other diseases that may mimic this primary headache syndrome [50,52]. Although medication overuse headache is diagnosed on clinical grounds if an accurate medication use history can be obtained, current practice is to obtain a magnetic resonance imaging (MRI) scan of the brain in all patients with the recent onset of headache symptomatology and in those patients with a previously stable pattern of headaches that have recently experienced a change in their headache symptomatology [7,8,53]. Given the fact that changes in headache patterns and character are often associated with intracranial pathology, e.g. tumors, aneurysms, infection, etc., magnetic resonance angiography should also be strongly considered [50,53]. MRI scanning of the cervical spine should also be obtained in those patients whose headache symptoms have a significant occipital or nuchal component [7,8,25]. Laboratory testing including a complete blood count, erythrocyte sedimentation rate, drug screening for prescription and illicit drugs and automated blood chemistry should be obtained when the diagnosis is in question or if the patient is not getting better [6,8]. It should be remembered that the simple analgesics and nonsteroidal anti-inflammatory agents can cause significant renal and hepatic dysfunction. Ophthalmologic evaluation, including measurement of intraocular pressures, is indicated in all patients who experience significant ocular symptoms [29].

Differential diagnosis

Medication overuse headache can be difficult to diagnose if the patient is not forthcoming about his or her pattern of medication use [46]. Because medication overuse headache is superimposed on top of the patient's original headache symptomatology, the new headache may assume some of the characteristics of the original headache, e.g. aura in patients suffering from migraine with aura, circumferential band-like tightness in tension-type headache, etc [50,54]. This can further confuse the patient's clinical presentation, making diagnosis difficult. However, even in the instance of documented medication overuse, the clinician should not automatically attribute changes in a previously stable headache pattern to medication overuse and needs to carefully reevaluate any patient whose headache pattern changes for occult pathology [49,50,52].

Treatment

The mainstay of treatment of medication overuse headache is the tapering of all overused or abused drugs with an eye toward complete discontinuation of the offending drugs for at least 3-4 months [49,50]. Some of the drugs associated with medication overuse headaches such as barbiturates and opioids, cannot safely be abruptly discontinued but must be tapered slowly over time [49]. There may be significant behavioral barriers to allowing the patient to do this in the outpatient setting and ultimately require hospitalization in a specialized headache unit may be the best course of action. Whether outpatient or inpatient treatment of medication overuse headache is being considered, the patient must be educated that:

- In all likelihood, the patient's headaches and associated symptoms will get worse before they get better.
- Any use, no matter how small, of the offending medications will result in a return of medication overuse headaches and recovery will be delayed.
- The patient cannot self-medicate with over-the-counter or illicit drugs in an effort to obtain relief.

- The significant overuse of opioids or headache medications containing barbiturates or ergotamine can result in physical dependence, and abrupt discontinuation of such drugs can be extremely hazardous
- If the offending medications are discontinued, the patient can expect the headaches to improve.
- The addition of prophylactic medications such as the tricyclic antidepressants, beta blockers, topiramate to treat the patient's underlying headache, e.g. migraine, tension-type headache, etc. should be considered during the withdrawal of the medications thought to be responsible for medication overuse headache appropriate to help avoid recurrent headache symptomatology.

Conclusion and Future Perspectives

The care of the patient suffering from headache need not create stress or anxiety for the clinician if he or she follows some simple steps. First and foremost, the taking of a careful targeted headache history will simplify the diagnosis and treatment of the vast majority of headache patients. Second, an understanding that the physical exam is normal in basically all of patients suffering from the primary headache syndromes discussed above will allow the clinician to quickly identify factors that cause concern when examining the patient. Third, the prophylaxis of headaches is in most instances preferable to the use of abortive therapy, with consideration given to the addition of alternative therapies such as monitored relaxation training and yoga in selected patients. Fourth, that medication overuse can cause the patient's headaches to worsen and that prevention of medication overuse headache requires patient education and close monitoring of medication intake. If these steps are followed, the care and treatment of the headache patient will become a straightforward and gratifying endeavor for the patient and clinician alike.

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