Chronic Daily Headache: Challenges in Treatment

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INTRODUCTION

An overwhelming majority of men and woman living in the Western world will experience headaches at some point in their life. Astoundingly, the lifetime prevalence of headache for men and women in this part of the world is over 94%.[1] Three to five percent of the global population has daily or near-daily headaches.[2] Chronic daily headache (CDH) is not a single diagnosis, but rather a descriptive term for the presence of headaches occurring at least 15 days per month for at least 3 months.

Duration of headache attacks is a key factor in the diagnosis of specific CDH entities. Specifically, it is helpful to differentiate long duration (>4 hours) from short-duration (<4 hours) CDH (**Table 1**). Across the spectrum of CDH disorders, chronic migraine (CM), chronic tension-type headache (CTTH), and medication overuse headache (MOH) account for the vast majority of cases of CDH.[3] Approximately half of people with headache on 15 or more days per month for more than 3 months have medication overuse headache (MOH).[4]

Table 1. Spectrum of Chronic Daily Headache Disorders[4]

Long Duration Subtypes (>4 hours)	Clinical Features
Chronic Migraine (CM)	Migraine-like attacks (defined as disabling moderate to severe attacks of throbbing pain, typically unilateral, lasting 4-72 hours with associated nausea, vomiting, photophobia, or phonophobia) are superimposed on a daily or near-daily headache pattern, greater than 15 headache-days per month for more than 3 months.
Chronic Tension-Type Headache (CTTH)	Frequent episodes characterized by bilateral or tightening-quality pain of mild to moderate intensity lasting hours to days; pain is not associated with physical activity but may be associated with mild nausea, photophobia, or phonophobia. These headaches occur over 15 days per month for more than 3 months (or >180 days per year).
Medication Overuse Headache (MOH; aka "Rebound Headache")	Headache occurring 10 or more days per month for more than 3 months as a consequence of regular overuse of an acute or symptomatic headache medication. Common precipitants include triptans, acetaminophen, NSAIDs, narcotics, and combination-analgesics (ie. Hydrocodone-acetaminophen or Vicodin).
Hemicrania Continua	Persistent unilateral headache with associated ipsilateral conjunctival injection, lacrimaton, rhinorrhea, or ptosis lasting for over 3 months. It is marked by moderate to severe flairs. It is exquisitely sensitive to indomethacin.
New Daily Persistent Headache (NDPH)	Persistent headache, daily from its onset, which is clearly remembered. Pain may be migraine-like or tension-like and must be present for at least 3 months without remission. In the setting of abortive drug use, NDPH may only be diagnosed if the headaches clearly preceeds the medication overuse. The diagnoses are not mutually exclusive.
Short Duration Subtypes (<4 hours)	**Clinical Features**
Chronic Cluster Headaches	Attacks marked by severe stabbing unilateral peri-orbital pain lasting 15-180minutes, occurring up to 8 times daily. Episodic cluster headache becomes chronic when the cluster period occurs for over a year without at least 1 months remission.
Chronic Paroxsysmal Hemicrania	Attacks of severe unilateral peri-orbital pain lasting 2-30 minutes occurring several times a day. Attacks are similar to cluster headaches, but are shorter and more frequent. Attacks are associated with conjunctival injection, lacrimaton, rhinorrhea,or ptosis. They respond absolutely to indomethacin. Paroxysmal hemicrania becomes chronic when attacks occur for a year with remissions lasting less than a month.
Short-lasting, Unilateral, Neuralgiform headache attacks with Conjunctival injection and Tearing (SUNCT)	Headaches resembling cluster and paroxysmal hemicrania, diagnosed when a patient has 20 or more attacks of moderate to severe unilateral peri-orbital or temporal/trigeminal distribution stabbing pain lasting 1-600 seconds, often associated with conjunctival injection, lacrimation, rhinorrhea, and/or ptsosis. SUNCT becomes chronic when the attacks occur near-daily without at least 1 months remission over the course of a year.
Hypnic Headache (aka "alarm clock headache")	Headache attacks that develop only during sleep, cause awakening, and last for up to 4 hours per episode, at least 10 mornings per month for at least 3 months.

PATHOPHYSIOLOGY OF CHRONIC DAILY HEADACHE

The underlying mechanism of headache chronification, regardless of etiology, is not clear. The predominant theory in chronic migraine is that medication overuse induces a state of "latent sensitization" resulting in dysregulation of the central trigeminovascular pathways and neural adaptations, which subsequently decrease thresholds to triggers.[5] The exact etiology of other chronic daily headaches, such as chronic tension-type headache, is also poorly understood. It has been proposed that peripheral pain pathways most likely play a role in episodic tension-type headache, whereas central pain pathways play a more important role in chronic tension-type headache.[4] Increased pericranial tenderness induced by manual palpation is the most significant abnormal finding in patients with tension-type headache. The tenderness is typically present interictally and usually escalates during actual headache episodes.[4]

DIAGNOSIS

A thorough history and neurological exam are sufficient to make the diagnosis of chronic daily headache. Examiners must keep in mind that the headache disorders often overlap. Understanding the various headache types and teasing out the dominant form(s) will help to guide appropriate treatment. Frequently, patients will present with more than one headache type, potentially necessitating diverse treatments. MOH is a common co-morbid condition that occurs in over 80% of patients with chronic migraine.[2]

Adjunctive studies, such as neuroimaging or electroencephalography, should only be considered when there are changes in the headache history or new focality on neurological examination. In the recent "Choosing Wisely" campaign, the American Headache Society (AHS) established that neuroimaging is not needed in patients with stable headache patterns.[8] Patients presenting with headache and a normal neurological exam have a 0.4-0.9% chance of having a significant abnormality on neuroimaging, which is similar to that of the general population without headaches.[1] In a large meta-analysis, an abnormal finding on neurological exam was the most robust predictor of intracranial pathology on neuroimaging.[7] Patients with new focal findings on neurological exam are about 30% more likely to demonstrate pathological findings on neuroimaging.[1] Red flags that should prompt immediate neuroimaging are summarized in **Table 2**. Since many of these potential etiologies for secondary headache may not be visible on head CT, the preferred imaging technique is MRI for non-emergency situations; the diagnostic yield of head CT was 2% compared to 5% for MRI.[8] Because MRI was better at detecting abnormalities, the cost per abnormal finding of CT scans was $2409 compared to $957 for MRI.[8]

EEG serves no role in the diagnosis of chronic daily headache. The American Academy of Neurology (AAN) recommends against the use of EEG for headaches in their recent "Choosing Wisely" campaign.[14] The sensitivity of an EEG in detecting structural brain lesions is considerably lower than that of neuroimaging with CT or MRI. A normal EEG in a patient with evidence of structural abnormality may provide a false sense of security and delay more definitive neuroimaging. Conversely, an abnormal EEG (ie. mild focal slowing or questionable epileptiform activity) in a patient with a primary headache disorder may prompt additional unnecessary work-up and treatment.[14] EEG therefore increases cost without adding benefit.

Table 2. Red flags in patients with Chronic Daily Headache

New focal signs on neurological exam
New onset HA pattern in a patient > 50 years of age
Change in established headache pattern
Drowsiness, confusion, cognitive impairment
Weight loss
Known HIV+
Fever, stiff neck

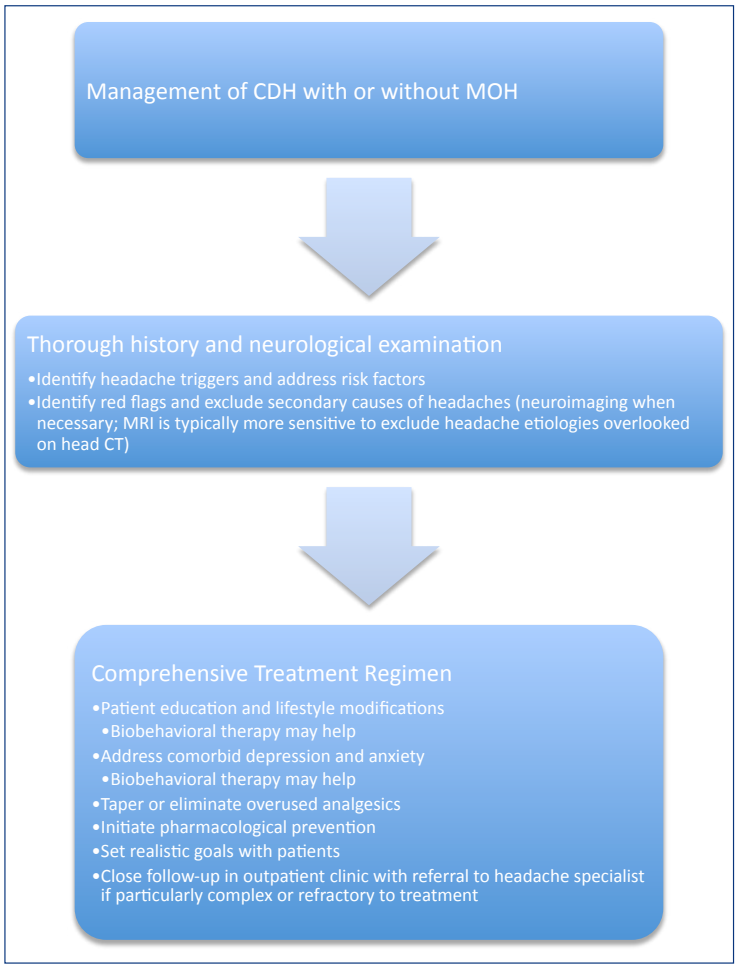
TREATMENT

Individuals presenting with chronic daily headache are among the most difficult and labor-intensive patients encountered in a neurologist's practice.[6] Treatment of CDH disorders is based on accurate diagnosis, exclusion of secondary causes, elimination of medication overuse, and modification of risk factors in a multidisciplinary fashion.[6] We have outlined a general medical approach to CDH (**Figure 1**).

Education is a key element in treating CDH. Taking the time to communicate with patients about reasonable expectations from available treatments for CDH is necessary in order to begin to manage this complicated and frustrating medical problem. Patients need to understand that treatment will take time and that their headaches will likely not disappear immediately, if ever. As physicians, we need to partner with our patients in their treatment, not only managing medications that can help with treatment, but also advising them about behavioral and lifestyle changes that are necessary for successful management.

Lifestyle changes to modify risk factors play an important role in headache prevention. Clinicians must help patients identify headache triggers and address risk factors such as excessive caffeine use, poor sleep habits, maladaptive coping mechanisms to stress, unhealthy diet, and lack of exercise. Moderation of caffeine intake, improved sleep hygiene, stress management, healthy diet, and aerobic exercise all are important in successful management of chronic headaches. A trained psychologist may help promote strategies to modify these risk factors. Patients with comorbid conditions such as depression and anxiety would be ideal candidates for biobehavioral therapy. Referral to a sleep specialist may reveal undiagnosed sleep apnea. Physical therapy may

Figure 1.



prove to be beneficial, especially in conjunction with other multidisciplinary treatment modalitites.[10] Techniques such as relaxation training, biofeedback, stress management, and cognitive-behavioral therapy have proven efficacy in treating patients with CDH.[2,6] Behavioral management is discussed in depth by Rathier and Roth in the current issue of the Journal.[13]

It is essential to taper or eliminate overused analgesics. Both the AAN and AHS recommend against the routine use of opioid or butalbital-containing medications.[8,14] Reducing the 1.4% prevalence of MOH by 50% could save the US healthcare system approximately $15 billion annually in health care costs and lost productivity.[14] Opiates may contribute to MOH with frequency of use as few as 8 days per month, thereby leading to chronification of the very headaches they were originally intended to treat.[9] These medications should be tapered over the course of a few weeks. Simple analgesics and triptans may be abruptly discontinued.[2,6] Patients must be counseled about the role of medication-overuse in perpetuating their daily headache cycle. They also need to be counseled that their headaches may worsen initially as they reduce their medication usage, but they may be reassured that after this withdrawal period they will likely be restored to a more episodic, less chronic headache pattern. As with any lifestyle modification, analgesic overuse will require patience on the part of the practitioner and perseverance on the part of the patient. Cognitive-behavioral therapy (CBT) may help challenge maladaptive thoughts and promote wellness strategies.[13]

Pharmacological approaches to chronic daily headache management are often required in conjunction with nonpharmacologic options. Nearly 40% of patients with migraines need preventative therapy, but only 3-13% currently take these medications.[11] There are a myriad of medications for patients with CDH. The American Academy of Neurology (AAN) and American Headache Society (AHS) have developed guidelines regarding pharmacological prevention of chronic migraine and other chronic daily headache disorders with both conventional medications and herbal remedies (**Table 3**).

Even after eliminating medication-overuse and instituting appropriate prophylactic pharmacological measures, up to 40% of patients may suffer a relapse after initial successful treatment.[2] CDH is a difficult spectrum of disorders to treat. It is essential to educate patients, manage their expectations, and set goals for treatment. Rather than expecting to be completely pain-free, more realistic goals may include decreasing headache intensity, restoring daily functioning, and improving quality of life.[6] Behavioral therapy may augment medical therapy to maximize success.[13]

Table 3. Pharmacological Prevention of Chronic Migraine and other Chronic Daily Headaches (Adapted from AAN/AHS Guidelines[11,12])

Level A: Medications with well-established efficacy	Level B: Probable efficacy	Level C: Possible efficacy
Valproate	Amitriptyline	Lisinopril
Topiramate	Venlafaxine	Candesartan
Propranolol	Atenolol	Clonidine
Timolol	Nadolol	Carbamazepine
Metoprolol	NSAIDs[a]	Co-Q10
Butterbur (petasites)	Magnesium	Estrogen
OnabotulinumtoxinA	Feverfew (MIG-99)	Cyproheptadine
	Riboflavin (Vit B2)	
	Histamine SC	

a. NSAIDs such as ibuprofen, naproxen, and fenoprofen may help prevent migraines but also pose a risk for MOH

CONCLUSIONS

Treating patients with CDH is extremely challenging. Taking the time to perform a detailed history, neurological examination, and review medication utilization is critical in order to determine appropriate management. Treatment starts with educating patients about their condition, tapering overused analgesics, and setting realistic goals during an ongoing dialogue between clinician and patient. A comprehensive approach to preventative therapy, both pharmacologically and non-pharmacologically, will enable

patients to reach their goals. Although CDH is difficult to manage, the partnership formed with patients to cope with this condition can be exceptionally rewarding for the clinician and life-changing for the patient.

References

1. Mellion ML, Jayaraman MV. Use of neuroimaging in the workup of headache. *Med Health RI*. 2007 Aug;90(8):249-50.
2. Dodick DW. Clinical practice. Chronic daily headache. *N Engl J Med*. 2006 Jan 12;354(2): 158-65.
3. Scher AI, Stewart WF, Liberman J, Lipton RB. Prevalence of frequent headache in a population sample. *Headache*. 1998 Jul-Aug;38(7):497-506.
4. Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia*. 2013 Jul;33(9):629-808.
5. Diener HC, Holle D, Dodick D. Treatment of chronic migraine. *Curr Pain Headache Rep*. 2011 Feb;15(1):64-9.
6. Halker RB, Hastriter EV, Dodick DW. Chronic daily headache: an evidence-based and systematic approach to a challenging problem. *Neurology*. 2011 Feb 15;76(7 Suppl 2):S37-43.
7. Detsky ME, McDonald DR, et al. Does This Patient With Headache Have a Migraine or Need Neuroimaging? *JAMA*. 2006 Sep 13;296(10):1274-83.
8. Loder E, Weizenbaum E, Frishberg B, Silberstein S; American Headache Society Choosing Wisely Task Force. Choosing wisely in headache medicine: the American Headache Society's list of five things physicians and patients should question. *Headache*. 2013 Nov-Dec;53(10):1651-9.
9. Taylor FR, Kaniecki RG. Symptomatic treatment of migraine: when to use NSAIDs, triptans, or opiates. *Curr Treat Options Neurol*. 2011 Feb;13(1):15-27.
10. Biondi DM. Physical treatments for headache: a structured review. *Headache*. 2005 Jun;45(6):738-46.
11. Silberstein SD, Holland S, Freitag F, et al. Evidence-based guideline update: Pharmacologic treatment for episodic migraine prevention in adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society. *Neurology*. 2012;78:1337–1345.
12. Holland S, Silberstein SD, Freitag F, et al. Evidence-based guideline update: NSAIDs and other complementary treatments for episodic migraine prevention in adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society. Neurology. 2012;78:1346–1353.
13. Rathier L, Roth J. A Biobehavioral Approach To Headache Management. R I Med J. (in press)
14. Langer-Gould AM, Anderson WE, Armstrong MJ, et al. The American Academy of Neurology's Top Five Choosing Wisely recommendations. *Neurology*. 2013 Sep 10;81(11):1004-11.

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