Finding the Right Fit in Migraine Classification

In headache categorization, specialists have long tried to strike a balance between specificity and simplicity of use. Here’s how the ICHD criteria have evolved to better reflect real-world use.

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Patients who experience headache on 15 or more days per month commonly present to primary care doctors, neurologists and headache specialists. These very frequent headaches, often termed chronic daily headaches (CDH), affect four to five percent of the general population. Properly attributing an etiology to each presentation is clinically challenging for such a common presentation. Contemporary classification first divides CDH into primary and secondary forms. Secondary CDH is attributable to an underlying cause, such as a brain tumor, a subdural hematoma or a chronic infection. In primary CDH, there is no underlying cause. The primary CDH forms are further divided into those of short duration (i.e., lasting less than hours), such as hypnic headache, chronic cluster and chronic paroxysmal hemicrania. Primary CDH of long duration includes four disorders: chronic migraine (CM), chronic tension type headache (CTTH), hemicrania continua (HC) and new persistent daily headache (NDPH).

These disorders are frequently confused, but important to distinguish because they differ in clinical profile, prognosis and optimal treatment. Herein, we review the evolution of the diagnostic criteria for primary CDH of long duration and provide a clinical context for the diagnosis of this disabling group of disorders.

CDH in the International Classification of Headache Disorders-1

Modern approaches to headache classification began with the publication of ICHD-1 in 1988. While the ICHD-1 created standardized operational diagnostic criteria for most types of headaches, it excluded many disorders that are now part of the “primary CDH of long duration” rubric. Of the now-recognized forms of this entity, it included only chronic tension-type headache. Consider the following case vignette:

Case history: Joan was a 44-year-old woman with a 20-year history of headaches. Initially, she experienced just one attack per month of unilateral, throbbing, severe head pain associated with nausea and photophobia. Beginning a decade ago, her headaches increased in frequency to one per week. Thereafter, attacks gradually worsened and for the last five years, she has had headache 22 days per month on average. On 12 days per month, her attacks fully meet diagnostic criteria for migraine without aura (Table 1). On the remaining 10 days per month, her attacks meet criteria for episodic tension type headache (Table 2). She took Fiorinal 12 days per month. The general medical examination, neurologic examination, MRI and routine blood tests were all normal.

Approaching this patient using the ICHD-1 criteria, the patient would receive the following diagnoses: migraine without aura, episodic tension type headache and possible medication overuse headache. Many headache specialists found this approach complex and biologically irrelevant, believing that such patients have a single disorder representing a form of migraine which evolves over time.

Silberstein and Lipton (S-L) Criteria for Transformed Migraine

Prior to publication of ICHD-1, a form of progressive migraine had been recognized by Ninan Matthew, Joel Saper and Neil Raskin, among others. Matthew coined the term “transformed migraine” to describe this phenomenon. Though clearly conceptualized, operational criteria for transformed migraine were not available.

In 1994, Silberstein and Lipton provided criteria for transformed migraine and other long duration primary headaches. Each form of CDH was sub-classified as headache with or without medication overuse. The authors divided primary CDH of long-duration into TM, chronic tension-type headache (evolving from episodic-tension type headache), new daily persistent headache (NDPH) and hemicrania continua (HC). For TM, the original criteria required a history of IHS-defined migraine without aura, headaches on more days than not lasting four or more hours per day (if untreated), and a history of increasing headache frequency with decreasing severity of migrainous feature over the last three months. These criteria did not require any particular pain characteristics, as the headaches may be pleiomorphic in quality, intensity and location. As mentioned, TM was subdivided in with and without medication overuse.

In 1996, Silberstein and Lipton published results of their field test study in 150 consecutive individuals seen in an outpatient clinic with CDH. The authors found that 25 percent of patients with TM could not be classified with their criteria. These individuals had difficulty remembering the characteristics of their headaches prior to the onset of CDH, whether and how their headaches had escalated, and how long it took for the process of escalation to occur. The authors, therefore, decided to modify the S-L proposed criteria for TM and make it less restrictive. The revision required the following:

- daily or almost daily (> 15 days/month) head pain for more than one month
- average headache duration of more than four hours/day (if untreated)
- at least one of the following:
  - a history of episodic migraine meeting IHS criteria
  - history of increasing headache frequency with decreasing severity of migrainous features over the last three months
  - concomitant headaches that sometimes fill IHS criteria for migraine other than duration

Applying these criteria to the patient presented above, Joan meets criteria for transformed migraine with medication overuse. This new revision served the purpose of using both historical and
current features of the headache, which are important in making a diagnosis. Using the revised 1996 S-L criteria for TM, the authors were able to classify all patients with single diagnoses. In contrast, by applying the ICHD-1 criteria, 14 different combinations of diagnoses were needed to classify 99.8 percent of individuals. More than half had concomitant diagnoses of migraine without aura, CTTH, and medication overuse headache. The authors concluded that although both systems allowed for the classification of most patients with CDH, the S-L criteria requires less diagnosis and is less cumbersome.

### ICHD-2 Criteria for Chronic Migraine

In 2004, the ICHD-2 criteria were released. The second edition now included diagnostic criteria for all four types of primary CDH of long duration: chronic migraine (CM, to classify what S-L called TM), CTTH, NDPH and HC.

The diagnostic criteria for CM required headache fulfilling criteria for migraine without aura on $\geq 15$ days/month for $>3$ months and no medication overuse. In 2004, Bigal et al. repeated the study of 2002, now field testing the new classification criteria for CM. Using the S-L criteria as reference, only nine (5.6 percent) of the 158 patients classified as TM without medication overuse met the ICHD-2 criteria for CM. Most subjects were still classified using combination of migraine and chronic tension-type headache, especially because most did not fulfill criteria for migraine even though they had headaches on almost every day. Of the 399 patients classified as TM with medication overuse by the S-L criteria, only 41 (10.2 percent) were classified with one diagnosis (probable chronic migraine with probable medication overuse) under the ICHD-2. The vast majority of patients in this group were again classified in groups with several diagnoses similar to when the 1988 IHS criteria was used. The authors concluded criteria for CM were still cumbersome.

A similar study was conducted in the pediatric population. In this group, the ICHD-2 criteria for CM performed better. Of the 69 children who were diagnosed using the S-L criteria with TM without medication overuse, 49 (71 percent) were classified with CM using the 2004 IHS criteria and the rest required a combination of diagnoses. Of the 48 subjects diagnosed as having TM without medication overuse using the S-L criteria, 39.6 percent met diagnostic criteria for probable CM with probable medication overuse. The remainder had a combination of more than one diagnoses. In contrast to adults with TM, most adolescents (70.9 percent) were classified using a single ICHD-2 diagnosis.

Following these studies that suggested the impracticability of the ICHD-2 criteria for CM in clinical practice, several revisions to the ICHD-2 were proposed:

**Proposal 1:**
Bigal et al. proposed modifying the diagnostic criteria for CM to include probable migraine (PM) days.

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**Table 1. ICHD–2 Diagnostic Criteria for Migraine Without Aura**

| A. At least five attacks fulfilling criteria B–D |
| B. Headache attacks lasting 4–72 hours (untreated or unsuccessfully treated) |
| C. Headache has at least two of the following characteristics: |
| 1. unilateral location |
| 2. pulsating quality |
| 3. moderate or severe pain intensity |
| 4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs) |
| 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 2. ICHD–2 Diagnostic Criteria for Episodic Tension-type Headache**

| A. At least 10 episodes occurring on $\geq 1$ but $<15$ days per month for at least 3 months ($\geq 12$ and $<180$ days per year) and fulfilling criteria B–D |
| B. Headache lasting from 30 minutes to 7 days |
| C. Headache has at least two of the following characteristics: |
| 1. bilateral location |
| 2. pressing/tightening (non-pulsating) quality |
| 3. mild or moderate intensity |
| 4. not aggravated by routine physical activity such as walking or climbing stairs |
| D. Both of the following: |
| 1. no nausea or vomiting (anorexia may occur) |
| 2. no more than one of photophobia or phonophobia |
| E. Not attributed to another disorder |
Proposal 2: A second proposal recommended that CM should be diagnosed if a patient had ≥15 days of headache per month, where at least 50 percent of the headache days were migraine or PM.

Proposal 3: A third proposal suggested that CM should be diagnosed in individuals with 15 days of headache per month and at least eight days of migraine or PM.

These proposals were compared in a clinic-based study. Using Proposal 1, nearly half of the subjects with TM would receive the diagnosis of CM. Using Proposal 2, 87.9 percent of subjects with TM would be classified as CM. Finally, 94.9 percent of subjects with TM would be classified as CM using Proposal 3. Based on the findings, the authors proposed new criteria for CM based on Proposal 3, requiring headache frequency of ≥15 days/month for three months, average duration ≥4 hours untreated, and headache fulfilling criteria for migraine without aura, migraine with aura, or PM on ≥8 days/month.

In 2006, the Headache Classification Committee revised the criteria for CM (ICHD-2R) to better reflect the population of patients seen in tertiary headache clinics based partly on the studies mentioned above. None of the three proposals were adopted, although the structure is similar to Proposal 3. The ICHD-2R for CM required:

- headache (tension-type and/or migraine) on ≥15 days per month for at least three months,
- on ≥8 days per month for at least three months headaches has one of the following:
  - fulfilled criteria for pain and associated symptoms of migraine without aura, without medication overuse and not attributed to another causative disorder.

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**Figure 1. Algorithm for Primary Headache Diagnosis**

- Low to moderate frequency headache
- Frequency ≥15 days per month
- High frequency headache
- Duration ≥ 4 hours
- Shorter Duration Headache
- No
- Yes
- Duration ≥ 4 hours
- No
- Yes
- Triggers by cough, exercise, Valsalva
- No
- Yes
- Shorter Duration, triggered
- Shorter Duration, not triggered
- Low to moderate frequency, long duration
- Migraine ETTH
- Cough Exertional Sexual
- CM CTTH NDPH HC
- Migraine ETTH CCH CPH Hyp SUNCT
— Been treated with triptans or compounds with ergotamine (migraine specific medication).

The new criteria were placed in the Appendix of the ICHD-2R in order to encourage more clinical studies and field testing prior to placing in the main body of the classification. The Committee decided again not to use the term TM, where a longitudinal aspect is required to fulfill the criteria which require patients to pinpoint when the transformation occurred and that the transformation was not due to medication overuse.

In our case study cited above, Joan, who previously was diagnosed using the ICHD-1 criteria with three different diagnoses (migraine without aura, episodic tension-type headache, and possible medication overuse headache), cannot be diagnosed using the ICHD-2R chronic migraine, because she has medication overuse headache. Most clinicians would also feel that she has chronic migraine.

The ICHD-2R criteria was field tested and the results published in 2007. Of the 158 patients with TM without medication overuse, 146 (92.4 percent) met criteria for CM under the revised criteria compared to only nine (5.6 percent) using the ICHD-2 criteria. According to the ICHD-2R criteria for CM, individuals with medication overuse should be classified under medication overuse headache. However, of the 399 individuals with TM with medication overuse, 349 (86.9 percent) had 28 days of migraine per month and were classified with medication overuse headache and probable chronic migraine in the ICHD-2. The authors concluded that there had been a substantial improvement in the criteria for CM. Further debate is needed whether CM should be divided into with or without medication overuse.

**Concluding Remarks**

Debate regarding the classification of CM did not subside or diminish after the release of the ICHD-2R criteria. Seymour Solomon raised an issue with the term ‘chronic migraine’ since a high proportion of headaches are phenotypic tension-type headaches. In addition, the author questioned the need to have as a requirement a response to migraine-specific treatment (triptan or ergotamine) if response is not a requirement for the diagnosis of migraine. A counter argument is that persons with migraine may experience headaches with a migraine mechanism that responds to triptans in the absence of the full clinical features of migraine. This may occur if headaches are treated early, before nausea, photophobia, or phonophobia develops.

So, how does one proceed from here? Seasoned clinicians realize that transformed migraine and chronic migraine refer to the same disease process with slightly different diagnostic criteria. Both terms refer to individuals with a history of migraine that evolved and progressed into daily or near daily headaches, possibly in the setting of acute medication overuse.

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