Primary non-continuous new daily persistent headache: Seven cases and proposed diagnostic criteria

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Abstract
Primary non-continuous new daily persistent headache (NDPH) is a rare disorder defined by the third edition of the International Headache Society (ICHD-3) as a continuous and unremitting headache. Non-continuous cases have been reported which do not fit any ICHD-3 criteria. Seven patients are presented who meet all ICHD-3 criteria except for being non-continuous from onset without treatment with a duration of 4 or more hours per day with only one headache per day. The average age of onset was 35.3 years, 57.1% female, and 71.4% had migraine-like features. No cases were unilateral and all cases were persistent without remission. These seven cases constitute a primary NDPH variant. Criteria are proposed for diagnosis similar to ICHD-3 for NDPH with the following change: “pain becoming daily within 24 hours of onset with a duration of 4 to 24 hours without acute or preventive medication or other treatment.”

Keywords
criteria, new daily persistent headache, non-continuous, primary

Introduction
Primary new daily persistent headache (NDPH) is a rare headache disorder. According to the classification of the third edition of the International Headache Society (ICHD-3), NDPH is a “persistent headache, daily from its onset, which is clearly remembered. The pain lacks characteristic features, and may be migraine-like or tension-type like, or have elements of both. The diagnostic criteria are the following:

A. Persistent headache fulfilling criteria B and C Distinct and clearly remembered onset, with pain becoming continuous and unremitting within 24 hours of onset
B. Present for >3 months
C. Not better accounted for by another ICHD-3 diagnosis.”

The 2004 ICHD-2 criteria also defined NDPH as continuous and unremitting.

However, non-continuous cases have been reported since 2002 which do not fit any ICHD-3 criteria. In a retrospective chart review from the United States, Li and Rozen reported 56 cases, 21% with non-continuous pain with a duration of daily headache ranging from 1.5 hours to 24 hours. For inclusion, the untreated average headache had to be more than 4 hours per day.

In a retrospective report of 30 cases from Japan, Takase et al. reported that most patients did not have any headache free time but did not provide any further information on those who had headache free time. In a retrospective study of 63 cases from India, Prakash et al. reported that 7 (2 with
migrainous and 5 with tension-type features) had pain-free periods in a day on a few occasions in a month with no further details on these cases.4

Seven cases are reported which meet all of the NDPH criteria except for being non-continuous from onset with an average duration of 4 or more hours per day without acute or preventive medication or other treatment.

**Methods**

The author performed a retrospective chart review of all patients seen in an outpatient clinic by the author who is a general neurologist with a subspecialty interest in headache from September 1, 2011 through February 28, 2020 (8.5 years) with a provisional diagnosis of NDPH after obtaining an independent review board exemption. A standardized headache intake questionnaire was not used. Until 10/1/15, code 339.42 was applied (International Classification of Diseases, Clinical Modification, ninth revision) and after 10/1/15, code G44.52 (from the tenth revision). These codes were used as an initial or provisional diagnosis even if all of the ICHD-2 or ICHD-3 criteria were not met. Based upon his clinical experience, the author included patients with migraine-like features from 2011–2013 before publication of ICHD-3 beta5 which included those with migraine-like features unlike ICHD-26 which included only those with tension-type like features.

**Results**

Seven cases met all ICHD-3 criteria except for being non-continuous from onset without acute or preventive medication or other treatment (such as nerve blocks, chiropractic, physical therapy, or acupuncture) with an average duration of 4 hours or more per day with only one headache per day. All cases reported a distinct and clearly remembered onset with pain becoming daily within 24 hours. Table 1 presents the demographics, duration since onset, past history of episodic or tension-type headache, and a history of antecedent precipitating factors in the weeks before onset (viral illness, significant psychological stressor, or extracranial surgery). The average age at onset was 35.3 years and gender was 57.1% female. Two cases had a past history of episodic migraine and none of episodic tension-type. No cases had any other current or past relevant medical history.

Table 2 presents the features of the headaches. Neurological examinations were all normal. All had full range of motion of the neck. Blood pressure was within the range of

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Table 1. Demographics, duration since onset, past headache history, and precipitating factors.

| Case | Age at onset | Gender | Ethnicity | BMI (kg/m²) | Duration at first consultation (years) | Duration at last visit (years) | Past history of episodic migraine | Past history of tension-type headache | Precipitating factor |
|------|--------------|--------|-----------|------------|--------------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------|
| 1    | 14           | m      | White     | 19.6       | 5                                    | 2.17                          | –                             | –                             | –                   |
| 2    | 21           | f      | White     | 21.8       | 0.3                                   | 2.17                          | –                             | –                             | –                   |
| 3    | 24           | f      | Hispanic  | 28.1       | 0.33                                  | –                             | –                             | –                             | Laparoscopy 1 week prior |
| 4    | 24           | f      | Hispanic  | 24.7       | 0.33                                  | –                             | –                             | –                             | Broke up with boyfriend 2 weeks prior |
| 5    | 52           | m      | White     | 31.2       | 0.6                                   | –                             | –                             | –                             | –                   |
| 6    | 53           | m      | White     | 30.2       | 1                                     | –                             | –                             | –                             | –                   |
| 7    | 59           | f      | Black     | 33.1       | 0.17                                  | 0.58                          | –                             | –                             | –                   |

BMI: body mass index.

Table 2. Headache features.

| Patient | Quality of pain | Intensity of pain initial consult | Nausea/ vomiting | Light sensitivity | Noise sensitivity | Duration per day least (hours) | Duration per day most (hours) | Duration per day average (hours) |
|---------|-----------------|----------------------------------|-----------------|------------------|-----------------|-------------------------------|-------------------------------|-------------------------------|
| 1       | Pressure and aching | Moderate                  | –               | +                | +               | 4                            | 6                             | 5                             |
| 2       | Throbbing       | Severe                       | Nausea only     | +                | +               | 4                            | 8                             | 5                             |
| 3       | Throbbing and pressure | Moderate                  | Nausea only     | +                | +               | 2                            | 24                            | 6                             |
| 4       | Throbbing       | Severe                       | –               | +                | +               | 4                            | 12                            | 6                             |
| 5       | Pressure        | Moderate                     | –               | –                | –               | 2                            | 24                            | 4.5                           |
| 6       | Pressure        | Moderate                     | –               | –                | –               | 6                            | 24                            | 7                             |
| 7       | Throbbing       | Severe                       | –               | +                | +               | 8                            | 8                             | 8                             |
normal in all except for case 6 which was 138/94 on no antihypertensive medication. None reported that the headaches were better supine and none were unilateral. Five or 71.4% had migraine-like features. All cases had bilateral headaches. The severity was moderate for four and severe for three of the seven. The duration per day ranged from 2 hours to 24 hours with an average ranging from 4.5 to 8 hours. Patients reported they were headache free at other times. Case 1 was the only to report headaches only present upon awakening and not starting later in the day all the time. Clinical features including duration was based upon patient recall. All cases had persistent headaches without remission.

For acute treatment, only case 1 tried a triptan which was not effective although baclofen (tried only in his case) decreased the intensity. Non-steroidal anti-inflammatory medications decreased the intensity of the pain for cases 4 and 5 with no benefit for cases 1 and 2. Only one of the cases was on any preventive medication. Topiramate decreased the intensity for case 2.

MRI scans of the brain without contrast (cases 1, 5, 7), without and with contrast(cases 2, 3, 4, and 6) complete blood counts, comprehensive metabolic panels, thyroid stimulating hormone, thyroxine, and erythrocyte sedimentation rate (in those over age 50, cases 5, 6, 7) were all normal. Cases 2 and 3 had normal magnetic resonance angiograms of the head and neck. None of the patients had sleep studies.

Discussion

These seven cases meet the ICDH-3 criteria for primary NDPH except for being non-continuous. The demographics, clinical features, and precipitating factors are similar to primary NDPH except that all of these cases had bilateral headaches and about 10% of primary NDPH cases are unilateral. Although primary NDPH is typically intractable to treatment, there is insufficient treatment information in these cases to draw any conclusions. The seven cases did not fit any ICHD-3 diagnosis.

During the same 8.5 year period, the author saw 330 patients with primary NDPH. It is possible that other patients did not report that their headaches were non-continuous without medication and were not keeping comprehensive headache diaries.

The cases do not fit criteria for chronic migraine or tension-type headache because they had daily headaches from onset not evolving from episodic. The headaches are bilateral so cluster type and hemicrania continua (HC) are not considerations but might be if similar headaches were unilateral. One case series found that subjects otherwise meeting cluster criteria could have a duration exceeding 3 hours with a median attack duration of 5 hours. If these cases were unilateral, they would not meet ICHD-3 criteria for unremitting HC which accounts for 80% or more of HC and requires continuous pain or the remitting type which has pain-free periods lasting at least 24 hours.

High and low cerebrospinal fluid pressure syndromes are unlikely causes. None of the cases had papilledema. Pseudotumor without papilledema is very uncommon. In a series of 20 patients, the mean range of symptom onset was 8.5–45 years, 90% female, with a mean body mass index (BMI) of 34.9 In this report, the three cases with a BMI of more than 30 were males more than age 50 years. In addition, none of the cases had a unilateral or bilateral VI nerve palsy which is required to diagnose definite pseudotumor cerebri. So pseudotumor without papilledema is possible but unlikely. Spontaneous intracranial hypotension (SIH) is possible as in any case of NDPH but none of the cases had a postural component, three had normal MRI scans without contrast, and four had normal MRI scans of the brain without and with contrast which makes SIH unlikely.

New onset daily headache from onset due to obstructive sleep apnea is not the cause. To meet ICHD-3 criteria for sleep apnea headache, only one case had onset only after awakening from sleep but contrary to the criteria, he had associated light and noise sensitivity and the duration of headache was more than 4 hours. Cervicogenic headache is also very unlikely based upon ICHD-3 criteria as the headaches were not side-locked and cervical range of motion was full.

As with all NDPH diagnoses, the history was dependent upon the patients for accuracy. The duration of headaches may have been inaccurate depending upon the patients’ recall. All patients were insistent that the headaches were daily from onset but not constant.

Conclusions

Uncommonly, NDPH may be non-continuous. It is unknown how common this might be in a NDPH population since NDPH studies have been retrospective and have not utilized electronic headache diaries.

Based upon the ICHD-3 criteria, the following are suggested for primary NDPH non-continuous headache as a primary NDPH variant:

- “Persistent headache, daily from its onset, which is clearly remembered. The pain lacks characteristic features, and may be migraine-like or tension-type like, or have elements of both.”

The diagnostic criteria are the following:

A. Persistent headache fulfilling criteria B and C

Distinct and clearly remembered onset, with pain becoming daily within 24 hours of onset with a duration of 4 to 24 hours without acute or preventive medication or other treatment

B. Present for >3 months

C. Not better accounted for by another ICHD-3 diagnosis.”

Comment: daily pain duration can be shorter than 4 hours on some days as long as the average duration is above 4 hours.
Further studies of this variant including response to treatment will be of interest.

**Clinical implications**
NDPH can be non-continuous.
Seven cases are presented.
Criteria for this non-continuous variant are proposed.

**Consent**
An Independent Review Board exemption was obtained from Integ Review IRB.

**Declaration of conflicting interests**
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