

Original article

# Reconsideration of the diagnosis and treatment of childhood migraine: A practical review of clinical experiences

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## Abstract

**Objective:** To provide insight into the wide spectrum of migraine during childhood to establish practical and comprehensive treatment strategies.

**Background:** Although recent studies have confirmed the effect of anti-migraine agents in childhood headaches fulfilling the criteria of migraine without aura, there have been no studies regarding the efficacy of these drugs in childhood migraine without aura not filling the diagnostic criteria.

**Methods:** In total, 154 patients with a clinical diagnosis of migraine, with onset of repetitive headaches at the age of  $\leq 15$  years, were retrospectively included from clinics in seven tertiary medical centers.

**Results:** Patients' diagnoses included migraine with aura ( $n = 49$ ), migraine without aura ( $n = 65$ ), clinical migraine without aura not fulfilling International Classification of Headache Disorders-3 beta criteria (suspected migraine without aura;  $n = 38$ ), and hemiplegic migraine ( $n = 2$ ). Abortive medicine was effective in 74 of 97 patients, and preventive medicine was effective in 61 of 84 patients. Drugs with high efficacy were acetaminophen and ibuprofen for abortive therapy and cyproheptadine, amitriptyline, and propranolol for preventive therapy. Psychosocial problems were less common, and abnormalities on electroencephalography were more common in the suspected migraine without aura group. Otherwise, clinical features and drug responsibility were comparable among the migraine with aura, migraine without aura, and suspected migraine without aura groups. Retrospectively, experts clinically diagnosed childhood migraine without aura when the headache met at least one of the three criteria B, C, and D in International Classification of Headache Disorders-3 beta in addition to A and E. Abortive and preventive medication including paroxetine ( $n = 2$ ) benefited 10 and 15 of the 33 patients with daily headache, respectively. Psychotherapy/counseling ( $n = 4$ ), treatment for orthostatic dysregulation ( $n = 4$ ), and elimination of stressors ( $n = 3$ ) markedly alleviated headache in this group.

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**Conclusion:** Our results indicated that those with suspected migraine without aura not filling International Classification of Headache Disorders diagnostic criteria should be included in the treatment for migraine. Treatment should also be targeted to comorbid developmental disorders, orthostatic dysregulation, and psychosocial problems in patients with refractory daily headaches.

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**Keywords:** Migraine; Childhood; Orthostatic dysregulation; Autism spectrum disorders; Pervasive developmental disorder

## 1. Introduction

Migraines in childhood show distinct clinical features compared with those in adulthood, with short duration, bilateral headache distribution, and lack of phonophobia. These features mean that diagnostic criteria for childhood migraine without aura (MO) are limited in sensitivity, particularly as the International Headache Society (IHS) criteria (1988) defined duration as 2–48 h with sensitivity in children of 39–66% [1,2]. Revised IHS criteria (IHS-R) [1] and the International Criteria of Headache Disorders (ICHD)-II [3] approved the duration of 1–72 h, which improved the sensitivity to 80–90%. Early case-control studies have failed to achieve statistical significance in terms of the effect of abortive agents for childhood migraine, which was attributed to a high placebo responder rate in children [4,5]. Recent reports have confirmed the efficacy of abortive agents using a crossover study design, enrollment of children with headache duration of longer than 4 h, and a primary endpoint of complete rather than partial recovery [6–8]. Given this background, the ICHD-3 beta (Table 1) criteria for childhood MO adopted 2 h as the shorter limit of duration [9].

Apart from criteria designed for the collection of homogeneous population data for clinical research [1], headache duration of 0.5 h or more has been classically referred to as childhood migraine [10]. In addition, even loose criteria including duration, laterality, severity, and photophobia/phonophobia did not reach sensitivities of above 80% [1]. We have experienced children whose symptoms did not initially fulfill ICHD criteria but evolved to classical migraine in adolescence. This suggests that more than 20% of children with MO may be missed for appropriate medication if physicians seek a strict diagnosis before treatment. Although recent studies have confirmed the effect of anti-migraine agents in childhood headaches fulfilling adult MO criteria [6–8], there have been no studies regarding the efficacy of these drugs in childhood MO “not filling the diagnostic criteria.” Statistical significance in the effects of medication for children with headaches of durations  $\geq 4$  h do not reflect the effects in children with shorter duration headaches.

This prompted us to review our experience of childhood migraine, particularly whether medication was equally effective for children with definite and possible

Table 1

Diagnostic criteria for migraine without aura in the International Classification of Headache Disorders, 3rd edition (beta version) (ICHD-3 $\beta$ ) [Ref. [9]].

### 1.1 migraine without aura

- A. At least five attacks fulfilling criteria B–D
- B. Headache attacks lasting 4–72 h (untreated or unsuccessfully treated)
- C. Headache has at least two of the following four characteristics:
  1. Unilateral location
  2. Pulsating quality
  3. Moderate or severe pain intensity
  4. Aggravation by or causing avoidance of routine physical activity (eg, walking or climbing stairs)
- D. During headache at least one of the following:
  1. Nausea and/or vomiting
  2. Photophobia and phonophobia
- E. Not better accounted for by another ICHD-3 diagnosis

### 1.5.1 Probable migraine without aura

- A. Attacks fulfilling all but one of criteria A–D for 1.1 Migraine without aura
- B. Not fulfilling ICHD-3 criteria for any other headache disorder
- C. Not better accounted for by another ICHD-3 diagnosis.

Note: In children and adolescents (aged under 18 years), attacks may last 2–72 h (the evidence for untreated durations of less than two hours in children has not been substantiated).

MO. In addition, few studies have examined the relative usefulness of abortive and preventive medicines (e.g., propranolol and valproate [11]) in a single study. Given that the anti-migraine effects of many triptans and antiepileptics have been confirmed in children, we wanted to clarify a rough scheme of the relative usefulness of each drug that had been proven to be effective for childhood migraine in the same population.

Another aim of our study was to collect information on childhood migraine with long-term daily headaches as well as with particular types of comorbidity, including febrile acute encephalopathy, orthostatic dysregulation (OD), and developmental disorders (intellectual disability and/or autism-spectrum disorders). We determined the significance of these conditions in childhood migraine and desire to disseminate this knowledge in clinical settings.

## 2. Methods

We recruited children clinically diagnosed with migraine by specialists in childhood headaches, with

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