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Chronic daily headache in developmental ages: diagnostic issues

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Abstract Chronic daily headache (CDH) in children and adolescents presents features not sufficiently recognized by the current classification system. The aim of our study was to analyze the applicability of adult CDH classification in child and adolescent clinical populations, outlining similarities and differences. In the developmental age, frequent and severe migraine attacks may overlap daily crises of tension-type headache. The clinical onset features are similar to the subsequent (chronic) trend, while in adults, it is more

typical that migraine changes over time, taking tension features with almost daily crises. Headache with onset in children or adolescents presents age-related characteristics and the classification system should be better tailored to the peculiarities of this clinical phenomenology. Having a strong diagnostic system is the *sine qua non* of further investigations in epidemiology, etiopathogenesis, and therapy of CDH.

Key words Children • Classification • Chronic daily headache

Introduction

Chronic daily headache (CDH) represents a frequent and problematic challenge both in pediatric and adult clinical practice. The prevalence childhood and adolescence CDH ranges from 0.2% to 0.9% [1, 2]. In adults, the prevalence is about 2% [3]. In our experience, the prevalence of CDH in clinical practice ranges from 15% to 20% in our patients.

CDH with developmental age onset represent a matchless opportunity to monitor the trend of the attacks over time, and to identify the factors likely involved in maintaining headache crises. In adults, the role of analgesic overuse in the exacerbation and maintenance of headaches over time has been stressed [4–7]. The examination of CDH with juvenile onset may clarify several aspects of adult CDH, related or not to “rebound headache”, offering a more “pure” basis for clinical investigations compared to adult ages. However, even in pediatric ages the occurrence of “rebound headache” has been described [8].

In adult migraineurs, the use of over-the-counter medication ranges from 60% to 90% [9, 10]. Overuse may predispose to CDH with symptomatic drug dependence and refractoriness to prophylactic medication [11]. Adult patients with CDH frequently refer that the onset of headache was during their infancy or adolescence [4–7]. In spite of the clinical relevance and disabilities related to CDH, the study of CDH in adults, children and adolescents is only at the initial stages. Studies of the etiopathogenesis, diagnosis, prognosis, and therapy of CDH are lacking.

The diagnosis of chronic daily headache is function of a *quantitative* parameter (an almost daily frequency of the crises). We do not have clear *qualitative* parameters (a certain symptomatological characterization of the crises).

International Headache Society (IHS) classification [12] does not provide criteria to classify CDH, which is considered only as “previous term” to name the current chronic tension-type headache.

Studies on clinical and prognostic features of CDH lack common diagnostic criteria, and in developmental ages the diagnosis is even more troublesome, since the clinical characterization shows unclear aspects.

The clinical phenomenology of headache in developmental ages presents age-related characteristics that make the applicability of the IHS criteria troublesome [12]. Modifications have been suggested over time [13–20]. The classification of CDH is even more complicated, inasmuch as international diagnostic criteria are unsatisfactory even for adult patients. Attempts to classify adult CDH patients according to IHS criteria (without ad hoc modifications) have not been feasible in over one-third of cases [20, 21].

Silberstein et al.'s classification [22] represents the first attempt at a better systematization of the argument, by the proposal of diagnostic categories to classify primary and secondary varieties of CDH. The primary varieties (each with or without drug overuse) are:

- *Transformed migraine*, history of episodic migraine (with or without aura), in teens or twenties with episodic migraine and later development of CDH. It is often difficult to distinguish among headache sub-types. These patients frequently have a family history of migraine, menstrual aggravation, identifiable trigger factors, and unilateral headache.
- *Chronic tension-type headache*, history of episodic tension-type headache or de novo headache. Patients meet IHS criteria for chronic tension-type headache. The headaches are more often diffuse and bilateral, frequently involving the posterior aspect of the head and neck, and may have some migrainous features. The major difference with transformed migraine is the absence of a clear history of episodic migraine.
- *New daily persistent headache*, patients may refer fairly rapid-onset headache, some remember the exact day or time when the headache started. Head pain is continuous, and there is no a clear history of episodic migraine or tension-type headache. The patients are generally younger than those with transformed migraine.
- *Hemicrania continua*, continuous but fluctuating, moderately severe, unilateral headache that can alternate sides, phono- and photophobia, nausea, and tearing. Headache is not triggered by neck movements, but tender spots can occur in the neck.
- *Indomethacin-responsive headache disorder* may be occasionally associated with autonomic disturbances, such as ptosis, mydriasis and sweating.

The latter are post-traumatic headaches, cervical spine disorders, headache associated with vascular disorders, headache associated with nonvascular disorders, and others.

The application of Silberstein et al.'s model [22] in the youngest age does not give us an exhaustive diagnostic framework, but it opens to the hypothesis of specific symp-

tomatological expression of CDH in children and adolescents. By the application of Silberstein et al.'s criteria [22], Gladstein and Holden [23] found that 45% of children and adolescents did not fit into these categories. However, by adding a category called *comorbid* (migraine crises in comorbid association with tension-type headache), all but one of 37 patients could be classified according to Silberstein et al.'s 1994 criteria.

The aim of our study was to analyze the clinical features of CDH with childhood or adolescence onset on the basis of the current status of knowledge. The symptoms of CDH in children and adolescents present age-related features [24] and do not overlap with adult characteristics. Developmental factors, onset age, comorbidities and several other factors influence the clinical phenomenology, the time trend and the outcome of CDH, even if little is known about them. Two points seem to differentiate the child or adolescent clinical expression of CDH compared to the adult form. On one hand, in the developmental age, frequent and severe migraine attacks overlap daily crises of tension-type headache. The onset clinical features are similar to the subsequent (chronic) trend. On the other hand, in adults, the tendency of migraine to change over time is more typical, taking tension features with almost daily crises. About 30% of adult CDH sufferers are "unclassifiable" according to IHS criteria [11, 25]. Either the symptomatological features of the crises are incompatible with IHS criteria for chronic tension-type headache, because specific migraine symptoms occur, or the length of the attacks exceeds 72 hours (over the border term accepted for migraine).

Materials and methods

Out of 571 subjects examined in our headache center in 1996, we selected 81 CDH patients for further study.

On the basis of almost daily headache attacks, IHS criteria (chronic tension-type headache) were integrated with Silberstein et al.'s criteria [22]. In addition, we distinguished between the time trend of CDH (new onset or transformation of other types over time) and the clinical phenomenology: mixed headache (migraine and tension-type features in the same attack), or chronic tension-type headache and comorbid headache (migraine episodes clearly distinguishable by near daily tension-type headache).

Results

We studied 81 patients with CDH, including 54 girls and 27 boys. The patients' mean age was 12.3 years (SD = 2.1 years; range, 7–18 years). The mean age at CDH presentation was 8.3 years (SD = 2.8) in boys and 9.1 years (SD = 2.7) in girls.

Table 1 Diagnosis of CDH in 81 children, according to the temporal presentation

	Patients, n (%)			
	Mixed	Chronic tension-type	Comorbid	Total
CDH at onset	36 (70.6)	11 (52.4)	0	47 (58.2)
Transformation from other types	15 (29.4)	10 (47.6)	9 (26.5)	34 (41.8)
Total	51 (62.9)	21 (25.9)	9 (11.1)	81 (100.0)

Table 2 Diagnosis of CDH per gender in the 81 children

	New onset				Transformed				Total
	Mixed headache	Chronic tension-type	Comorbid headache	Total	Mixed headache	Chronic tension-type	Comorbid headache	Total	
Boys	9 (25.0)	2 (18.2)	0	11 (23.4)	6 (40.0)	4 (40.0)	6 (66.7)	16 (47.1)	27 (33.3)
Girls	27 (75.0)	9 (81.9)	0	36 (76.6)	9 (60.0)	6 (60.0)	3 (33.3)	18 (52.9)	54 (66.7)
Total	36 (44.4)	11 (13.6)	0	47 (58.0)	15 (18.5)	10 (12.3)	9 (11.1)	34 (42.0)	81 (100)

Table 1 shows the prevalence and temporal presentation of CDH. Mixed headache was the most prevalent (62.9%); in 70.6% of the cases it occurred at onset. Comorbid pattern (migraine and tension-type headache) was never displayed at onset, but developed exclusively from other types of headache. We found no difference between onset or transformed chronic tension-type. CDH at onset outnumbered the transformed types (58.2% vs. 41.8%). Of the patients with transformed headache, 9 (26.5%) presented a basis of tension-type headache (in 80% chronic tension-type) plus episodic migraine crises (67% without aura and 33% with aura). Chronic tension-type headache was characterized by de novo onset of daily crises in half of the cases.

Table 2 shows the characteristics of CDH per gender. CDH prevailed in girls (66.7% vs. 33.3% in boys) and in all single diagnostic categories, except transformed comorbid headache.

The prevalence among girls was stronger at onset (44.4%) compared to transformed CDH (22.2%). Boys showed onset CDH in 12.6% and transformed headache in 19.8% of the cases.

Discussion

The applicability of Silberstein et al.'s diagnostic categories [22] has shown shortcomings in developmental ages, needing addition and modifications. We worked on a double

level: the clinical characteristics of headache and the temporal presentation. The diagnostic framework should necessarily distinguish between the time view (de novo onset or transformation of previous pattern) and the clinical view (the clinical phenomenology within the temporal pattern). Only this differentiation allowed the inclusion and diagnosis of all patients.

The presence of age-related symptomatological features needs closer examination, although the difficulty in obtaining a careful description of the symptoms by the child may represent an obstacle for a clear and unequivocal diagnosis. However, the existence of specific diagnostic categories and age-related characteristics of the symptoms needs further studies.

Gladstein and Holden [23] found the pattern classified as "comorbid headache" in 35% of the sample. We found it in about 11% of our sample, only among transformed headache patients. This finding supports the importance of a temporal differentiation in the classification of CDH. The diagnostic category of mixed headache catches most of our patients and needs further examination in order to reach a better discrimination of the clinical characteristics, even according to de novo or transformed presentation of the crises.

However, several other points need to be clarified. The most relevant obstacle to the systematization of several issues related to CDH remains the lack of a sound diagnostic system of classification. Once we will have a common diagnostic system to classify CDH in children and adolescents, more easily we can analyze other important issues

related to CDH with developmental age onset. However, the classification of child or adolescent CDH using the current adult (although provisional) diagnostic categories may cause additional difficulties. CDH with de novo onset prevails in the youngest patients, but the clinical and differential characteristics need to be clarified with respect to adults and to different stages of patient development. Our proposal of classification allowed the diagnosis of all patients, even though it requires further investigations to guarantee the full applicability.

Once we will have defined adequate diagnostic categories to pursue the standardization of the CDH classification, several other questions compel attention. The prevalence and incidence rates need to be clarified. Etiological determinants (do they differ in relation to the clinical phenomenology of the crises? which is the role of genetic or environmental factors?), therapeutical interventions (how to manage pharmacological treatment on the basis of our knowledge of the problems related to rebound headache? what about non-drug therapy for CDH?), the process and

the factors related to the chronicization of the crises (which is the difference compared to adult CDH? which is the role of stress? which are the predisposing factors to the development of CDH?) are aspects to clarify. Finally, the issues of rebound headache and analgesic overuse need special attention especially in the youngest patients. The risk of rebound headache since pediatric age has been outlined [8].

The impact of CDH on a patient's daily life (and on the family) is severe, with consequences on school achievement, peer relationships, and other activities. In spite of the serious impact of CDH on the patient and family, we are still at the initial steps in systematization of the subject. Little is known about CDH from etiopathogenesis to diagnosis and therapy. The study of CDH should be pursued, taking into account the peculiarities of developmental age onset from diagnosis to therapy. During pediatric age, the culture of a correct drug intake assumes preventive significance. Starting in childhood, the prevention of drug overuse should be pursued as part of general management, and both parents and patients should be alerted to the risk of drug overuse.

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