Epilepsy & Behavior 25 (2012) 9–10

Contents lists available at SciVerse ScienceDirect

Epilepsy & Behavior

journal homepage: www.elsevier.com/locate/yebeh

Editorial

"Ictal epileptic headache": Beyond the epidemiological evidence

Epilepsy and headache are both episodic disorders and share overlapping symptoms and physiopathological mechanisms [1]. However, the prevalence and incidence of these disorders in the general population, including all stages of life, differ [2]. In fact, headache predominates in males before puberty, while it is more common in females afterwards. In contrast, epilepsy predominates in males at all ages [2]. The age at peak incidence of these two conditions also differs. The peak age for migraine occurs during the working years [3], while it is under the age of one year and over the age of 60 years for epilepsy [4].

Indeed, there are some conflicting literature data about this topic [5–7], which can be explained by the co-occurrence (synergistic and/or divergent) of confounding variables used according to the different sampling methods and study designs. These conflicting results may be partly explained by differences in the target populations, study design, age range, methods, inclusion criteria limited to referral patients with epilepsy or just tertiary headache centers, or not having appropriate control groups, and/or using different or ill-defined diagnostic criteria [5]. Thus, due to the different methodologies and criteria used, these studies are quite difficult to compare.

Although, to date, there is no conclusive evidence of a real causal relationship between the two disorders, we have to take into account that headache and epilepsy comorbidity, beyond any reasonable doubt, clearly differs in children when compared to adults. Children are more likely to have an autonomic symptomatology both in epilepsy and in headache attacks. Moreover, they can have isolated, long-lasting ictal autonomic manifestations, while ictal autonomic manifestations (both in epilepsy and in headache) in adults are usually associated, simultaneously or sequentially, with other motor or sensory ictal signs and symptoms [8,9]. Further, it is important to remember, despite the scarce literature availability [10–12], that, if we take a look at pediatric population, the framework acquires different shapes.

Among 50 children with epilepsy, Yamamane et al. [10] found that 46% had headache, and 10 (43.5%) out of the 23 headache sufferers had migraine. Most patients with headache were older than 10 years (54.5%) and had idiopathic epilepsy (65.2%). Remarkably, in the majority (95%) of the cases reported, the headache started in the same year as, or after, the diagnosis of epilepsy.

Piccinelli and co-workers [11] found EEG interictal abnormalities in 16 (12.8%) out of 137 children and adolescents with headache, in particular, those with migraine with aura (MWA).

Another intriguing field is represented by the comorbidity of headache in patients with idiopathic epilepsy of infancy. In fact, it is well-known that patients with epilepsy with rolandic or occipital paroxysms or even absence of epilepsy show concomitant migraine in up to 60% of the cases [1,4,5]. Investigating a large pediatric population of 1795 patients with headache under 18 years of age consecutively diagnosed at a headache center, Toldo et al. [12] found a strong association between migraine and epilepsy. In this study, the migraineurs showed a risk of epilepsy 3.2 times higher when compared with tension-type headache, without significant difference between migraine with and without aura. Migraineurs affected by focal epilepsies had a three times higher risk of having a cryptogenic epilepsy than an idiopathic epilepsy.

Recently, adolescents with any headache types reported [13] higher and significant rates of epilepsy, as previously confirmed by Baca et al. [14] who found 15% of migraine comorbidity in children with epilepsy. Interestingly, confirming previous data [15] showing that almost 36% of the parents of children with headache are unaware of the headache, Colombo et al. [16] stressed that pediatric headache is still under-diagnosed and is not adequately considered as a health problem in the medical community, as well as in social settings: imagine how underestimated headache is, whereas, in co-morbid condition, the clinical picture is dominated by the diagnosis of epilepsy.

1. Beyond the controversial epidemiological evidence

In the last few years, several single cases of headache as sole manifestation of an epileptic seizure [17,18] have been reported [19], and the term "ictal epileptic headache" has been recently proposed to identify an EEG-recorded epileptic seizure with migraine/headache-like features [20]. In particular, ictal epileptic headache (IEH) is recognized as a headache ("as sole ictal manifestation" and without presenting "specific" clinical picture of migraine, migraine with aura or tension-type headache), lasting from seconds to days, with evidence of ictal epileptiform EEG discharges, which immediately resolves after intravenous antiepileptic medications [20].

The ICHD-II [21] includes ictal headache among a broad group of "headache attributed to epileptic seizure" (7.6), which may be ictal, peri-ictal, post-ictal, inter-ictal or co-morbid, without specifying characteristics of these headaches. Of the ictal headaches, ICHD-II describes only hemicrania epileptica criteria (7.6.1), which does not fulfill our proposed diagnostic IEH criteria [19,20]. On the other hand, migralepsy is an unlikely explanation for the comorbidity of these disorders; in fact, the review of approximately 50 reported cases of "migralepsy" showed that most of the patients had symptoms of visual seizures [22]. Thus, it is probable that these cases are genuine occipital seizures imitating migraine [1,22].

In conclusion, although controversial epidemiological data in adults are often used as proof against the association of these two conditions, there are some studies, conducted particularly in pediatric population, supporting the comorbidity between headache and epilepsy. Thus, further and larger studies, planned in pediatric population, are needed to firmly support this link.

The criteria of IEH have been proposed by our group to identify the case of headache (as sole ictal manifestation) of epileptic origin in order to promptly obtain an EEG recording and confirm the diagnosis

1525-5050/$ – see front matter
doi:10.1016/j.yebeh.2012.07.002

[20]. This clinical picture is extremely rare and has only been documented in about 10–12 cases, and its epileptic nature is documented with ictal EEG [19,20]. For this reason, it is difficult to obtain firm conclusions about the frequency of IEH based on epidemiological studies. Using our criteria, we will be able to clarify if IEH represents an underestimated phenomenon or not.

The clarification of these issues as well as of the underlying mechanisms between these two disorders may allow both fields (epilepsy and headache) to learn lessons from each other, in order to improve clinical diagnosis and therapeutic strategies.

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18 June 2012
Available online xxxx