Seizure 22 (2013) 622–626

Contents lists available at SciVerse ScienceDirect

Seizure

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

Relations between epileptic seizures and headaches

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ARTICLE INFO

Article history:
Received 16 February 2013
Received in revised form 6 April 2013
Accepted 17 April 2013

Keywords:
Migraine
Tension-type headache
Seizure

ABSTRACT

Purpose: To describe headaches in patients with epilepsy and try to identify relations between epileptic seizures and headaches.
Methods: Cross-sectional study, with 304 patients from the epilepsy out-patient section of University Hospital of Federal University of Alagoas (Brazil) between February 2007 and February 2008. The presence of headaches and their relationships with the epileptic seizures were analyzed.
Results: Frequent seizures were associated with a greater tendency of occurrence of headaches (odds ratio = 1.6 times, $p = 0.077$). Headaches occurred in 66.1% of the cases. The highest occurrence was of migraine (32.9% of the patients), followed by tension-type headaches (9.2%). Two syndromes with a *continuum* epilepsy–migraine in the same seizure are worth mentioning: migralepsy in 6.6% and *epilepgraine* in 10.2% of the patients with epilepsy.
Conclusions: A high prevalence of headaches in patients with epilepsy was observed, with emphasis on hybrid crises of epilepsy and migraine.

1. Introduction

The relations between epileptic seizures and headaches are in the interface between seizures and pain in general. Among 858 patients with epilepsy, Blume and Young[1] identified 24 (2.8%) with ictal pain, divided into three groups (a) unilateral pain in the face, trunk or limbs; (b) headache and (c) abdominal pain. More specifically, the association between epilepsy and migraine has been the focus of research since the 19th century. Jackson[2] described a 16-year-old patient with episodes beginning with simple visual hallucinations suggestive of migraine, but which progressed with motor manifestations. He believed that some cases of migraine and certainly those in which there were ocular phenomena associated with lateralized sensory phenomena were, in fact, epilepsy. Should this be so, ensuing headache and vomit would be post ictal phenomena. More than a century later, Panayiotopoulos[3] has a similar view and suggests the name epilepsy-migraine for these spells. Parisi et al.[4,5] in their embracing view consider that "migraine itself can be epilepsy" and migralepsy may merely be a seizure starting with an ictal headache, followed by a sensory-motor partial or generalized seizure. They have also described, for the first time, in an unequivocal way,[6] an "ictal epileptic headache" in which the headache is the unique manifestation of the epileptic seizure and established their diagnostic and therapeutic criteria.[7] These authors[5] proposed the term "ictal headache" to characterize epileptic seizures in which headache is one of the constituents of the epileptic seizure, besides other sensory-motor, psychiatric or non autonomic ictal manifestations. In this context, Striano et al.[8] claim for an urgent necessity of a review of the international classifications of epilepsy and headaches.

Here, we study headaches that occur in patients with epilepsy, focusing on the temporal relations between the pain and the seizures.

2. Methods

Three-hundred and four patients from the outpatient epilepsy clinic of University Hospital of Federal University of Alagoas (Brazil) were evaluated in a cross-sectional study between February 2007 and February 2008. The diagnosis of epilepsy was accepted when patients had two or more spontaneous epileptic seizures or if they had a single seizure and an irritative EEG. The exclusions criteria were the existence of doubts about the diagnosis of epilepsy or the occurrence of mental handicaps, making patients claims untrustworthy. Thirty patients evaluated at the clinic were discarded because a definite diagnosis of epilepsy

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http://dx.doi.org/10.1016/j.seizure.2013.04.016

could not be reached. Also excluded were twenty-six patients in which there were sufficient cognitive alterations to compromise the clarity in description of headaches.

Epileptic syndromes were characterized in accordance with the report of the International League Against Epilepsy Core Group.[9] To allow an adequate statistical analysis, patients were grouped under the following epileptic categories: indeterminate epilepsy, mesial temporal lobe epilepsy (mTLE), juvenile myoclonic epilepsy (JME), and "other types of epilepsy". Ictal semiology was classified as focal, generalized, focal with secondary generalization and indeterminate.

The presence or absence of headache and the temporal relations with seizures was established and described as "Interictal" (ended more than 24 h before seizure's beginning), "Prodromic" (ended less than 24 h before seizure's beginning), "Ictal" (at the same time of seizure, including aura) or "Post-ictal" (began just after seizure's ending). Classification of headaches followed criteria established by the Headache Classification Subcommittee of the International Headache Society,[10] except in the aspects of temporal relations above described that we considered more comprehensive.

Seizures were considered infrequent when occurred less than once a month; otherwise, the patient was considered as having frequent seizures.

The relations in a time sequence of the epileptic crises and migraine were emphasized and greater emphasis was given to migralepsy in a broad sense[11] and to situations in which migraine occurs immediately after the epileptic seizure. We have proposed the neologism *epilepgraine* to describe this last situation. We consider migralepsy as seizures initiated by migrainous aura or migraine without aura, immediately followed by an epileptic seizure in the same ictal event. The group formed by patients with migralepsy and patients with *epilepgraine* we have called patients with "hybrid crises".

Statistical analysis was carried out with the software SPSS version 13.0, calculating descriptive measures such as arithmetic means, building frequency distributions, calculating odds ratio and applying Pearson's chi-square test of independence (association) and, if necessary, Fisher's exact test. A 5% level of significance was adopted.

Our institutional review board (Ethics in Research Committee – University Hospital of Alagoas Federal University) approved this study.

3. Results

Three hundred-four patients were included and fifty-six patients were excluded according to the established criteria. Female were 53.6% (163/304) of the patients. Ages varied from 4 to 88 years with an average of 31 years. The majority of patients (198/304), i.e. 65.1% were in the age group between 19 and 64 years; 28.6% (87/304) were less than 19 years old and 6.3% (19/304) were 65 years old or more.

3.1. Aspects of the epilepsies

Focal seizures occurred in 49.7% of the patients (151/304); 24.7% (75/304) had generalized seizures; 50.3% (153/304) had focal seizures with secondary generalization and 8.2% (25/304) had seizures with indeterminate clinical symptomatology. There were cases in which patients presented more than one type of seizures.

Patients distribution according to the epileptic syndromes is showed in Table 1. Statistical groups were Indeterminate Epilepsy, with 92 patients (30.3%); Mesial Temporal Lobe Epilepsy (mTLE), with 71 patients (23.3%), Juvenile Myoclonic Epilepsy (JME), with 52 patients (17.1%) and – Other Types of Epilepsy, with 89 patients (29.3%).

Table 1
Patients distribution according to ILAE's 1985 classification of epileptic syndromes.

Epileptic syndrome	Number of patients	%
Indeterminate	92	30.3
mTLE	71	23.3
JME	52	17.1
Occipital lobe epilepsy	11	3.6
Parietal lobe epilepsy	20	6.6
Frontal dorsolateral epilepsy	12	4.0
Frontal pole epilepsy	5	1.6
Frontal cortex motor epilepsy	15	5.0
Temporal posterolateral epilepsy	5	1.6
Infantile absence epilepsy	5	1.6
Juvenile absence epilepsy	4	1.3
Epilepsy with GTCS when waking up	2	0.7
Idiopathic generalized epilepsy	6	2.0
Benign childhood epilepsy with centro-temporal spikes	3	1.0
Benign occipital epilepsies of childhood	1	0.3
Total	304	100

JME = juvenile myoclonic epilepsy; mTLE = mesial temporal lobe epilepsy; GTCS = generalized tonic-clonic seizures.

As a group, patients had seizure frequency of ≥ 1 per month in 43.4% (132/304 patients). The epileptic syndrome with highest frequency of seizures was mTLE with 69% (49/71) of the patients having $\geq$1 seizure per month. The epileptic syndrome with lowest frequency of seizures was JME, in which only 26.9% (14/52) of the patients had $\geq$1 seizure per month. These differences in control of seizures were statistically significant ($p = 0.000$).

3.2. Aspect of the headaches

With regard to the occurrence of headaches it was found that 66.1% of the patients (201/304) had headaches. As for their gender, 58.9% (83/141) of males and 72.4% (118/163) of females had headaches ($p = 0.013$).

The relation between age and occurrence of headaches showed that 62.1% (54/87) of the patients under 19 years old, 73.7% (146/198) of those between 19 and 64 years old and only 5.3% (1/19) of the patients 65 years old or older had headaches ($p = 0.000$).

Migraine was the headache with greatest prevalence (Table 2). As to the frequency of headache crises, the greatest prevalence occurred in the range extending from 4 to 15 days per month with headache in 34.3% (69/201) of the patients. The frequency of less than 1 day per month occurred in 14.0% (28/201); 32.3% (65/201) had headaches 1–3 days per month and 17.4% (35/201) had headaches in more than 15 days per month, and in 2% of the patients (4/201) the information about headache crisis frequency was unavailable.

Headaches lasted more than 4 h in 69.1% of the patients (139/201). A brief headache ($\leq$5 min duration) occurred in 4.5% (9/201) of the patients. Headaches lasting more than 1 h and less than 4 h occurred in 5% (10/201); headaches lasting more than 5 min and less than 1 h occurred in 13.4% (27/201); different combinations of

Table 2
Prevalence of specific types of headache.

Type of headache	Frequency	%
Migraine	100	32.9
Migraine-like <4 h	7	2.3
Tension-type headache	28	9.2
Migraine and tension-type headache	3	1.0
Unclassified	63	20.7
Without headache	103	33.9
Total	304	100

Total = 304 patients with epilepsy.