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LETTER TO THE EDITOR

Migraine attack triggering a generalised seizure: is this a case of migralepsy or ictal epileptic headache?

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Dear Editor,

We describe the electro-clinical, neuroimaging and treatment features of a 23-year-old woman patient who suffered of migraine and epilepsy.

The historical based hypothesis that migraine and epilepsy are related dates back to the 19th century. Although, it is rare that a migraine attack triggered an epileptic seizure (phenomenon called migralepsy), headache develops very frequently prior or after an epileptic seizure [1, 2]. Migraine and epilepsy are strongly associated, independent of seizure type, aetiology, age at onset or family history of epilepsy [1, 2]. Although the association between migraine and epilepsy is independent from the epilepsy syndrome and the risk of migraine is evident within every type of epilepsy, it is reasonable to think that this relationship can be even more common among female patients. In fact, migraine is often encountered in female patients compared to males [2]. Juvenile myoclonic epilepsy (JME) is one of the most common idiopathic generalized epilepsy in women, and it is characterized by frequent bilateral myoclonic jerks of the arms associated at times with generalized tonic–clonic or absence seizures with a good response to antiepileptic drugs [3–5]. Habitually, menstrual period and sleep deprivation can trigger seizures. Seizures are very well controlled by appropriate therapy in up to 90% of subjects [3, 4]. Generalized 3–6 Hz polyspike-wave (PSW) discharges are the cornerstone in the diagnosis and treatment of JME [3–5]. According to the International Classification of Headache Disorders II (ICHD-II), the diagnosis of "migralepsy" should fulfil two diagnostic criteria: migraine fulfilling criteria for migraine with aura (MA) and a seizure fulfilling diagnostic criteria for one type of epileptic attack occurs during or within one hour after a migraine aura [6].

A 23-year-old woman referred to the epilepsy outpatients clinic of the University of Catanzaro, because of a reappearance of generalised tonic–clonic seizures (GTCS). The patient signed informed consent. She had unremarkable past medical history other than history of migraine attacks. At admission, her neurological examination was normal. She had either family history of epilepsy and migraine. At 13 years of age she began having very rare episodes of headaches preceded by visual aura lasting no longer than one hour usually around 20 min. These attacks had clinical features of migraine with aura according to ICHD-II [6]. At 15 years of age, she began having 2–3 min episodes of unprovoked myoclonic jerks mainly on awakening with or without GTCS and/or typical absence seizures. She had no evidence of intellectual or neurological deficit. The diagnosis of JME was made using the Classification of the International League Against Epilepsy (ILAE) [7]. She underwent to various EEG recordings performed during wakefulness in a soundproof room, with a Xltek machine, employing scalp electrodes placed

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according to the International 10–20 system. Additional electrodes were used for polygraphic parameters, in particular for muscular (deltoid) polygraphy. The interictal EEG showed generalized, synchronous PSW discharges with a photoparoxysmal response. For this history she was started in the past with valproate at dosage of 1000 mg a day with partial resolution of her seizure frequency. Her compliance was good however she complained about a mild tremor at upper limbs. At the age of 20 years she spontaneously withdraw the antiepileptic medication because of apparent seizure freedom and partial side effects.

During the admission, routine laboratory analyses were normal as well as the cerebrospinal fluid examination (CSF). The patient underwent routine brain magnetic resonance imaging (MRI), including Fluid-Attenuated Inversion Recovery (FLAIR) and post-gadolinium sequences. Brain MRI showed no abnormalities. An intensive video-EEG recording for 48 h was recorded in attempt to capture typical seizures. The interictal EEG showed only a photoparoxysmal response (PPR) with generalized spike and polyspikes-waves at 4 Hz between 12 and 21 photic stimulation. We have been able and lucky to record one typical episode characterised by her usual migraine attack lasting several minutes followed by tonic–clonic seizure lasting almost 60 s. Simultaneously to the migraine attack, her ictal EEG showed a activity characterised by bilateral 2–3 Hz delta waves localised over the fronto-temporal regions bilaterally lasting almost 6 s followed by a generalised fast rhythmic activity at 16–18 Hz lasting 5 s that grew in amplitude followed by generalised spike and polyspikes at 3–4 Hz lasting almost 10 s (Fig. 1). At the end the EEG showed a slow background activity. Thus, she was started with topiramate increasing the dose up to 200 mg per day. She was followed-up for 6 m and she is currently seizure and migraine free.

Given the past patient's history and the result of the intensive video-EEG, this case may illustrate the close relationship between migraine and epilepsy or the peculiar condition called "migraine-triggered epilepsy (migralepsy)".

Since the first case report in the late 1970s by Manzoni et al. [8] the possibility that epileptic seizures and classic migraine attacks may occur in the same patient have been discussed. Although epilepsy and migraine are often easily discriminated, less commonly, these two disorders can be inextricably enmeshed as in "migralepsy" in which epileptic seizures arise during a pre-established migraine attack [9]. Both disorders are characterised by recurrent neurological attacks with a partial clinical and therapeutic overlap. Considering the high comorbidity of migraine and epilepsy, epilepsy triggered by a migraine attack is

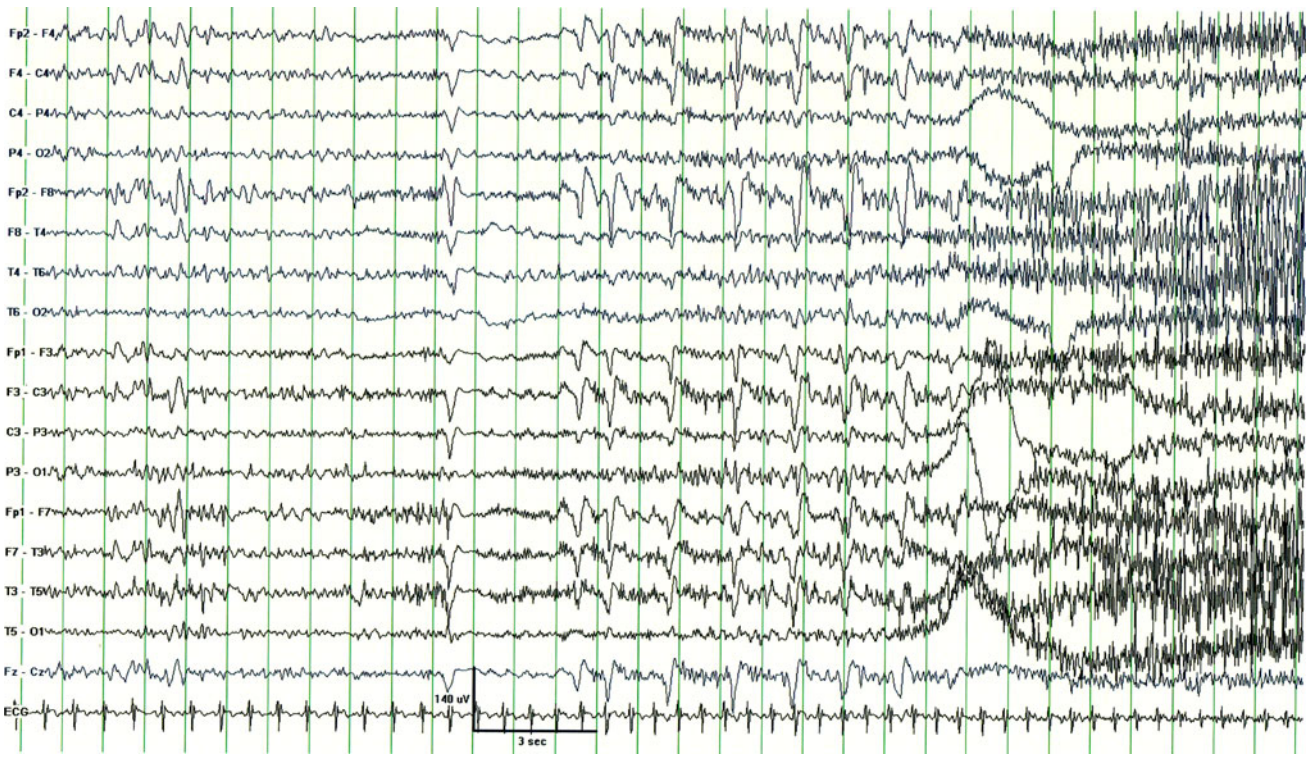

Fig. 1 Generalised tonic seizure preceded by a typical visual aura. The EEG recorded with a bipolar montage according to the International 10–20 system shows a activity characterised by bilateral 2–3 Hz delta waves localised over the fronto-temporal regions bilaterally lasting almost 6 s followed by a generalised fast rhythmic activity at 16–18 Hz lasting five seconds that grew in amplitude followed by generalised spike and polyspikes at 3–4 Hz lasting around ten seconds then obscured by muscular artefacts

observed more rarely than expected. Another indirect sign of association between these two syndromes is the response to antiepileptic treatment [10].

To date, there is a growing literature about cases of migralepsy however neither the ICHD-II nor the ILAE definitively clarified this issue. In fact, the ICDH-II includes migralepsy among the complications of migraine as a rare event in which a seizure occurs during migraine aura. On the other hand, terms migralepsy or hemicrania epileptica do not appear in the currently used ILAE classification. This confusion may be probably due to the lack of a typical interictal or ictal EEG pattern as well as the lack of a correlation between specific cortical localization of the EEG abnormalities and a synchronous headache or seizure onset. Nonetheless, the increasing risk of migraine in patients with epilepsy or vice versa has been extensively reported [8, 9, 11–14]. Recently as suggested by other authors, seizure associated with "migraine-like" manifestations may probably also represent an epileptic event that starts with an "ictal epileptic headache" [11, 14]. Considering the insufficient data available particularly of EEG records in the vast majority of cases described in the literature, these authors affirm that the existence of migralepsy is highly unlikely. Our patient who suffered of sporadic migraine with aura attacks and JME represents a further report on migraine with visual aura precipitating or preceding an epileptic seizure.

On the basis of the current literature and of the present case we believe that additional research is necessary to better understand the complex relationship between epilepsy and migraine because the pathophysiology of this syndrome remains still unclear and argued although both share genetic determinants [9, 15]. It should be advisable that any patients with suspicious history of both migraine and epilepsy undergo an ictal EEG recording during the typical attack as in the present case even though it is often improbable. As highlighted by Verrotti et al. [14] with this approach we will have the possibility to more consistently define whether the migralepsy exists and deserves its nosologic autonomy.

Conflict of interest All authors declare no conflict of interest.

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