Pain and Epilepsy

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WARSAW, 2020

Objective

- The comorbidity of epilepsy and pain disorders as well as effectiveness of certain therapeutic approaches in both conditions attracted attention to epilepsy–pain interactions.
- This lead to the discovery of significantly shared pathophysiological mechanisms although many aspects remain largely unknown.

Backgroung

- Epileptic pain is a rare seizure symptom mostly causing wrong diagnosis and delayed treatment
- Epileptic pain is usually seen in focal seizures
- Epileptic pain is a neglected, semiologic symptom with localization and lateralization value in the somatosensorial seizures
- Epileptic pain occurs mainly as peripherally localized, cephalic or abdominal pain

Nevin Kuloğlu Pazarcı et al., 2017

Backgroung

- **Ictal pain is one of several types of somatic sensations felt during partial seizures, other sensations being tingling paresthesias, thermal sensations, and sexual sensations Ideomotor apraxia and disturbances in body image can also be observed.** (Sveinbjornsdottir S, Duncan JS)**.**
- **In a general series of patients with epilepsy ictal pain is a rare phenomenon. In a large series of patients with epilepsy, only 2.8% (24 of 858 patients) experienced pain as a prominent part of their seizures** (Gowers W., Young GB, Blume WT.)
- **Among patients with somatosensory seizures, however, it is one of the more common sensations** (Gowers W., Young GB, Blume WT.)
- **Epileptic pain can be experienced anywhere in the body and, based on the principal location, is divided into three categories: lateralized peripheral, cephalic, and abdominal. Most patients report unilateral sensations, but bilateral pain also has been described** (Young GB, Barr WK, Blume WT., Otani K, Imai K, Futagi Y, Yanagihara K.)
- **Of the patients who experienced pain (24 patients), 46% reported headaches. Of the remaining patients who experienced pain, 42% (10 of 24) had unilateral face and body pain, and only 12% (3 of 24) had abdominal pain** (Young GB, Blume WT.)

- **Epileptic pain is commonly caused by epileptic discharges in the parietal lobe, but temporal lobe seizure origin also has been postulated** (Sveinbjornsdottir S, Duncan JS, Young GB, Blume WT.)
- **Although epileptic pain is usually associated with other seizure symptoms, it can sometimes be the only manifestation of epilepsy** (Mauguiere F, Courjon J.)**. In such cases, seizures are often misdiagnosed, and patients go through unnecessary diagnostic procedures before the correct diagnosis is made**

Abdominal epileptic pain

- Recurrent episodes of abdominal pain are common in children and adults. Several pathological conditions can lead to paroxysmal gastrointestinal symptoms, such as porphiria, cyclical vomiting, intestinal malrotation, peritoneal bands, and abdominal migraine (Zdraveska N, Kostovski A., 2010) .
- Psychological and emotional factors may also play an important role in some patients with gastrointestinal disorders. However, in a number of patients the episodic nature of abdominal pain can be suggestive for a diagnosis of epilepsy.
- From another hand, abdominal epilepsy is so uncommon that some experts question whether it exists. Abdominal epilepsy is an exceptionally rare syndrome of epilepsy that's more likely to occur in children.
- Epileptiform EEG abnormalities, loss or alteration of consciousness, and a good response to antiepileptic drugs are other features that can lead to a diagnosis of focal epilepsy with ictal abdominal pain (Franzon RC, Lopes CF, Schmutzler KM, Morais MI, Guerreiro MM)

- Abdominal epileptic pain was usually perceived as a severe and sharp sensation (“like a knife”), mostly in a periumbilical localization, but it was also experienced in the whole abdomen or in just one quadrant of the abdomen and was of variable duration.
- Abdominal pain is mainly associated with epileptic discharges of the temporal lobe, in particular, of the amygdala. (Along with the hippocampus, these structures are termed the mesial temporal lobe.) Other studies, however, have reported abdominal pain due to extra-temporal seizure origin. Although some researchers found abdominal pain due to seizures of parietal origin, Nair et al. reported patients with abdominal pain of possible frontal origin.
- Two factors must be taken into account that may confound the precise localization of the (cerebral) focus of abdominal pain: the etiology of epilepsy with abdominal pain and the methods for focus localization (surface vs depth EEG).

Cephalic epileptic pain

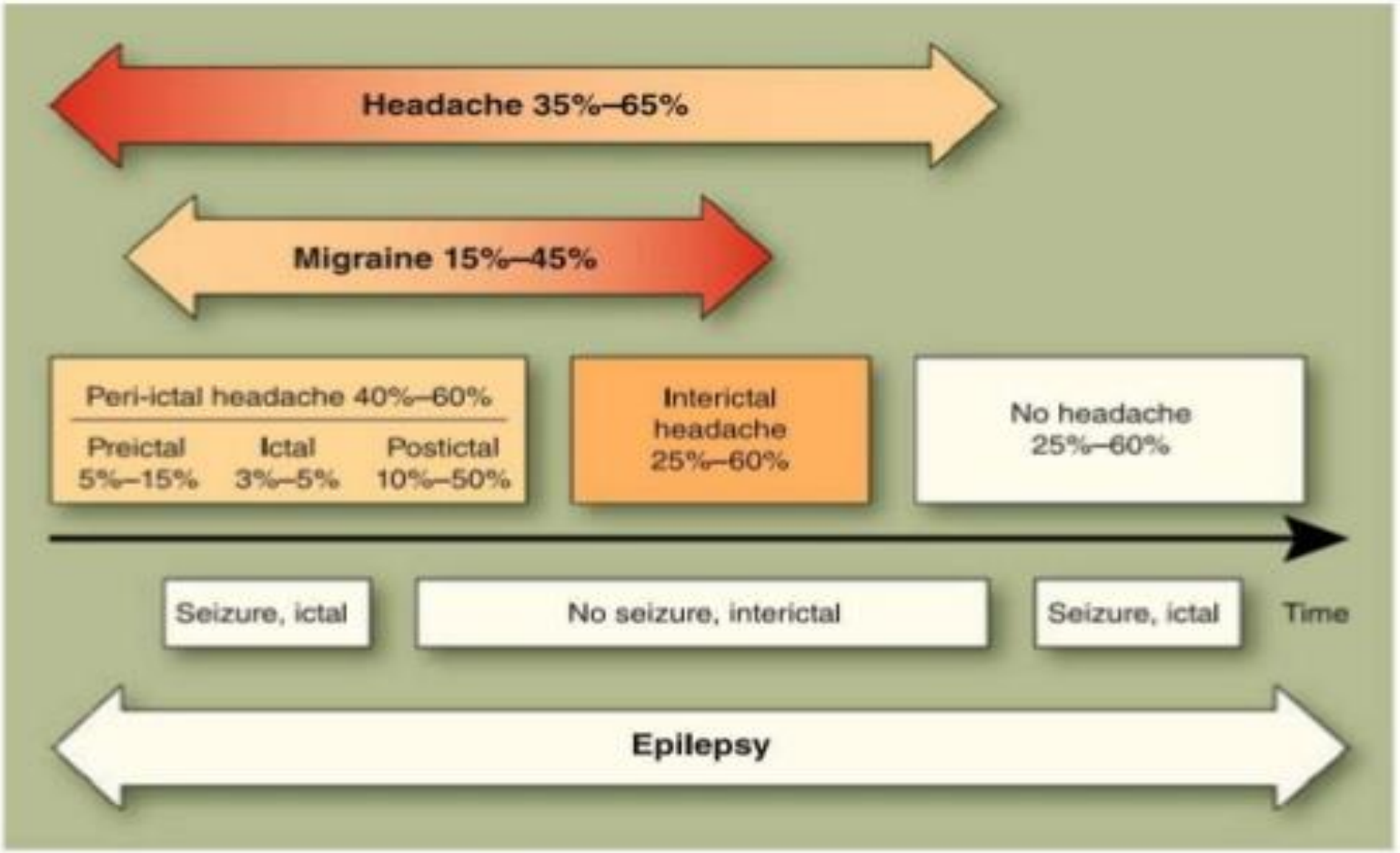
- **Cephalic epileptic pain has the‘‘autonomic’’nature. There is the ability of the epileptic cortical focus (originating seizures) and of cortical spreading depression (originating headaches) to trigger each other (though not to the same extent).**
- **Several well-described cases of headache as sole manifestation of an epileptic seizure has been documented, and the term ‘ictal epileptic headache’ has been proposed to identify the patients with an EEG-recorded epileptic seizure with migraine/headache-like features.**
- **The suggested definition ictal epileptic headache includes headache “as sole ictal manifestation” and without presenting “specific 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 AED administration.**
- **Aside from the feature of sole ictal manifestation, ictal epileptic headache is different from hemicrania epileptica, because it necessitates the presence of ictal epileptiform EEG discharges and response to intravenous AED administration.**

PasqualeParisia,*,PasqualeStrianob,AlbertoVerrottic,MariaPiaVillaa,VincenzoBelcastro, 2013

Headaches and their relationships to epileptic seizures

- **The interrelations between headache/migraine and epileptic seizures are an interesting topic, still lacking a systematization, which is the objective of the present revision.**
- **There are pre-ictal, ictal, post-ictal and inter-ictal headaches.**
- **Headache and epilepsy are comorbid, episodic disorders sharing common pathophysiological mechanisms leading to neuronal hyperexcitability that explains the use of AEDs in both disorders.**
- **Their overlap is further supported by the presence of common genetic mutations and shared clinical features of migraine and epilepsy especially in patients with occipital lobe seizures.**
- **Although there is no conclusive evidence of a real causal relationship between headache and epilepsy, the association of these episodic neurological disorders is an interesting issue, and further laboratory and clinical studies would demonstrate the real connection of headache and epilepsy** (Belcastro V, Striano P, Parisi P., 2012)

Prevalence of headache and migraine in epilepsy and its relationship with ictal and interictal period



Bianchin MM et al, Migraine and Epilepsy : A Focus on Overlapping Clinical, Pathophysiological, Molecular, and Therapeutic Aspects. Curr Pain Headache Rep (2010)

Case report

- A 8-year-old right-handed girl was admitted to the hospital with headache, nausea, vomiting and weakness in right extremities. She was seen at our hospital in December 2018, January and March 2019. Attacks typically occurred spontaneously. Weakness in the extremities was lasting up to 30 min, but headache, nausea, vomiting, general weakness was still present up to few hours.
- Anamnesis. The girl was the first child in the family. She was born at term after uneventful pregnancy and delivery. In the early childhood (1 y.o.) occurred first unprovoked epileptic episode with focal seizures (weakness in right extremities). The EEG demonstrated epileptic phenomena. Valproic acid was prescribed. But after some period, parents have made the decision to stop the AED treatment. She was seizure-free up to 2018, according to the parents' information.
- Febrile seizures, chronic headache, head trauma and brain infections were denied. She had no family history of epilepsy or migraine. The neurological exam was normal, but she had speech delay.

Case report

- During the first hospitalization in December 2018 our diagnostic algorithm included following steps:
- The neurological exam was normal
- Neurological Brain CT-scan to exclude the hemorrhage,
- Post-ictal surface electroencephalography (EEG) was normal,
- ECG, heart Ultrasound, 24-hours monitoring of blood pressure – normal,
- Ultrasound dopplerography of cerebral vessels – normal,
- Blood tests (hematology and chemistry, electrolities) was normal with one exception – the lactate dehydrogenase was increased, that can be the marker mitochondrial dysfunction.
- Symptomatic treatment was effective

Case report

- The following episodes in January and March 2019 with the same clinical sings prompt us to exclude the following conditions:
- Moyamoya disease,
- MELAS (Mitochondrial encephalopathy, lactic acidosis, stroke-like episodes)
- MRI – hydrocephalus without intracranial hypertension,
- MRI-angiography – normal,
- Post-ictal surface EEG – without epileptic activity
- Lactic acid – normal,
- Muscle biopsy wasn't done.

Case report

- As patient had epileptic seizures in anamnesis, cerebrovascular pathology was excluded, there were no evidence of mitochondrial disease, even though, there were not enough criteria to diagnosed epileptic origin of this attacks, there was a decision made to start AEDs.
- During AEDs treatment there were no similar episodes anymore.
- The tricky things at this case report are following:

- unusual clinical signs, as the dominant symptom was headache accompanied with nausea, vomiting and weakness in the extremities
- surface post-ictal EEG wasn't informative at this case

So, such clinical symptoms can be misdiagnosed and delayed treatment

Dziękuję za uwagę