Failure to recognize muscular artifacts on the EEG may cause a wrong diagnosis of myoclonic status epilepticus

Keywords:
Myoclonus
Myoclonic status epilepticus
Drug
Quetiapine
EEG

To the editors

Baysal Kirac et al. reported six adults with myoclonic status epilepticus (MSE) who did not have a prior diagnosis of epilepsy. In four out of six, MSE was precipitated by drugs [1]. The one and only example of EEG provided involved a patient who had dementia and a family history of juvenile myoclonic epilepsy and developed MSE one month after quetiapine was started. According to the authors, the video-EEG revealed very frequent bursts of rapid generalized poly-spikes lasting 1–3 s, which ceased after intravenous administration of diazepam. In the EEG, the bilateral "polyspikes" can be seen in the temporal and suprasylvian derivations but not in the midline EEG electrodes (Fig. 1). It is not possible to have generalized polyspikes and MSE without the involvement of the vertex region. In our opinion, these discharges reflect muscular artifacts in the EEG that have been misinterpreted as polyspikes. Myoclonic jerks disappeared after intravenous diazepam. The level of consciousness must be taken into account to evaluate the response because, in cases of action myoclonus, myoclonic jerks stop when the patient relaxes and falls asleep.

In the context of massive myoclonus, it is essential to carefully analyze the vertex region because it is generally devoid of muscular artifacts [2]. Secondly, the EEG pattern of myoclonic jerks is rather polyspike-waves and not only polyspikes. Maulsby proposed a set of guidelines for the assessment of spikes and sharp waves in EEG tracings. As Maulsby states: "Most Spike or sharp wave discharges of clinical import are followed by a slow wave or series of slow deflections. If it does not have a slow after-wave, be more suspicious of artifact or of a sudden alteration in voltage of physiological background rhythms" [3].

These two crucial points are illustrated by two cases (Fig. 1). Case 1 is a 44-year-old woman with genetic (idiopathic) generalized epilepsy. She had seizure worsening in the context of psychological harassment from her ex-husband, with eight generalized tonic-clonic seizures in one week and MSE with jerking of her chin. Case 2 is not MSE but Lance-Adams syndrome with disabling postanoxic myoclonus. This 38-year-old man had a cardiac arrest due to drowning five years earlier. In both cases, polyspike-waves are present in the midline EEG electrodes, and bilateral myoclonic jerks are recorded simultaneously.

The EEG is a readily accessible, cost-effective, and efficient means of evaluating brain function. But, the recording of an EEG if often made complex by the presence of a variety of artifacts [4–6], and also by benign variants such as wicket spikes [6–7]. The exact incidence of misinterpretation of the EEG is unknown [4]. Misinterpretation may lead to diagnostic and therapeutic mistakes, especially using antiseizure medications and even anesthetics drugs in case of psychogenic nonepileptic status epilepticus [4]. To avoid misinterpretation of muscular artifacts as polyspikes, do not forget to analyze the vertex region and artifacts should be thoughtfully excluded. As long recommended by the classical teaching, "Every spikey-looking wave is an artifact unless there are one or more good reasons for suspecting otherwise" [3].

Author statement

Dr. Gelisse: Acquisition of data; Analysis and interpretation; Writing - reviewing and editing.
Dr. Genton: Critical revision of the manuscript for important intellectual content.
Dr. Crespel: Critical revision of the manuscript for important intellectual content; Study supervision.

All co-authors have been substantially involved in the study and preparation of the manuscript. No undisclosed persons have had a primary role in the study or manuscript preparation. All co-authors have approved the submitted version of the paper and accept responsibility for its content.

Declaration of competing interests

Dr. Gelisse reports no conflicts of interest relevant to this article.
Dr. Genton reports no conflicts of interest relevant to this article.
Dr. Crespel reports no conflicts of interest relevant to this article.
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10 January 2020

Fig. 1. A: EEG recordings from Baysal Kirac et al. [1] "on monopolar montage showing very frequent bursts of rapid generalized poly-spikes with normal background activity. Note that myoclonic jerks correlated with spike activities". However, there is no poly spike component on Fz-Cz and Cz-Pz. B: Patient 1 with myoclonic status epilepticus. On the left EEG recorded at 15 mm/s, revealed bursts of generalized poly-spike-waves. Each burst was associated with myoclonic jerks of the chin. On the right EEG recorded at 30 mm/s, bursts of polyspikes-waves with symmetric contraction on both sides of the chin. There is no activity in the deltoid muscles. C: Patient 2 with Lance-Adams syndrome. Action myoclonus recorded in the right and left deltoid, related to poly spike-waves that are clearly visible at the vertex. Muscular artifacts, especially over the temporal regions.