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In response: Neuronal networks in epileptic encephalopathies with CSWS

To the Editors:

In his commentary of our article,[1] Prof. Péter Halász points out an important issue of the nature of epileptiform discharges during electrical status epilepticus in sleep (ESES) and offers a thorough review of the topic. Furthermore, due to the diversity of the epileptiform discharges, which are mainly focal/regional discharges or bilateral spike-waves,[2] he raises doubt about the existence of unitary mechanism of ESES and suggests that most of the discharges might reflect a more confined regional network.[3]

A better understanding of the morphology and localization of the epileptiform discharges during ESES is an important issue. However, as noted by Dr. Halász, there are only few studies analyzing the potential fields of ESES discharges.[4] We concur with Dr. Halász that heterogeneity of discharges can be responsible for differences in clinical presentations of patients with ESES, and can be used as an argument against the existence of the unitary mechanisms of ESES discharges.

Similar to the observations of previous authors,[2,3,5–7] we observed that most our patients exhibited regional discharges with mainly centrotemporal or parietooccipital predominance. However, we did not focus on detailed and systematic analyses of the morphology and localization of discharges. The aim of our previous study was to investigate the unifying mechanisms that generate background oscillations, as opposed to epileptiform discharges, of patients with ESES. As such, localization of the discharges or differences in seizure forms were not taken into account.

We would argue that the delta frequency oscillations observed during the acute phase of continuous spikes and waves during sleep (CSWS) represent a unified network signal that is significantly associated with the coherent sources we observed.[8] Furthermore, we believe that the complexity of the observed network may explain the diversity of neurophysiologic deficits characteristic of this condition.

The high temporal resolution that electroencephalography (EEG) provides, in conjunction with advancements in source analysis methods, allowed a description of the hierarchical association. This enabled us to identify the thalamus, together with the mesial temporal and parietal regions, as the epicenter of the network. Based on the results obtained from the directionality analyses, we concluded that the posteromedial cortical region is merely a precipitator, which acts on the thalamocortical network and facilitates the development of epileptiform discharges.

We strongly agree that the detailed and systematic analyses of the morphology of spike and wave discharges, in addition to studies focused on networks underlying epileptiform discharges in ESES, are topics of great interest, both of which we hope will be the focus of future research pursuits.

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Disclosure

None of the authors has any conflict of interest to disclose. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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