Dear Editor,

Epilepsy is a clinical diagnosis. Electroencephalography (EEG) has remained the most important investigative tool to provide supportive evidence and other characteristics in diagnosing and classifying the epileptic state. However, a routine EEG is insufficient to assess the epileptic state, especially with the ongoing, dynamic nature of the epileptic disorder. More important, a routine EEG fails to comment on the severity or future course of the epileptic state, especially regarding possible progress toward intractability, that occurs in as many as one-third of patients. Anecdotal experiences (including the author’s) claim that the EEGs of patients with severe or intractable epilepsy are not significantly different in either background or paroxysmal (especially interictal) activity from EEGs of patients who respond to medication. Advances in neuroimaging have also failed to provide superior assessment of the epileptic state in comparison with routine EEG. Furthermore, there have been no findings pertaining to the dynamic nature of epilepsy.

This letter presents a novel approach to a comprehensive assessment of an epileptic state, which may also aid in understanding its ongoing nature.

Sleep and epilepsy are known to bear an inherent, intricate, and complex relation with one another; sleep influences the epileptic state and vice versa. There is robust literature that non–rapid eye movement (NREM) sleep increases seizure susceptibility (excitatory or proepileptic influence), whereas rapid eye movement (REM) sleep increases seizure resistance (inhibitory or antiepileptic influence). In keeping with this ideology, REM sleep deprivation is associated with increased cortical excitability and increased proepileptic influence. As a general mechanism, epileptic activation during NREM sleep has been found to be linked to phasic activation of reactive delta bursts, which is believed to hold a global relation to sleep, valid for almost all epilepsies.

REM sleep is also reduced in several forms of intractable epilepsy, and its restoration or enhancement contributes to the therapeutic efficacy of alternative therapies, such as ketogenic diet, vagal nerve stimulation, and temporal lobe surgery, in intractable epilepsy. Based on this strong clinical relation between REM sleep and intractable epilepsy, REM sleep has been proposed as a biomarker of intractability in epilepsy. Polysomnography (PSG) has been suggested as a superior investigative tool compared with EEG in assessment of the epileptic state. Thus, it can be postulated that seizure susceptibility, and/or severity, bears an explorative relation with reduction or disruption of REM sleep.

In keeping with the dynamic and ongoing nature of epilepsy and its strong relation with REM sleep, it is postulated that PSG studies of REM sleep (latency, duration, number of REM sleep periods, number of NREM–REM cycles, PGO spikes, EEG desynchronization and muscle atonia), in parallel with seizure profile (frequency, duration, severity, and other characteristics), can demonstrate a dynamic assessment of the epileptic state, that can in turn give an idea of its nature and course.

At some centers, a sleep record is routinely included in the EEG investigation, but this is insufficient to yield any indication of the severity of the epileptic state, and none about intractability. PSG studies are being done in some forms of epilepsy, like juvenile myoclonic, albeit for academic or research purposes, and for studying associated sleep parameters. This letter proposes its application in regular clinical practice for assessment of severity and/or intractability of the epileptic state. The fact that many antiepileptic drugs also affect sleep architecture has to be borne in mind during PSG assessment of patients with epilepsy.

Therefore, it is recommended that prospective studies be designed in accordance with the above postulation. A graphical record, of the relationship between changes in REM sleep and seizure profiles, can be constructed and used for dynamic assessment of the epileptic state, with a high degree of accuracy. It is believed that these studies will be the first of their kind in clinical practice. It is further believed that this approach to the assessment of an epileptic state will aid clinicians in designating a status to the epileptic state with confidence. Thus, a PSG, with assessment of REM sleep, can aid clinicians to suspect progression to intractability early in the course of the epileptic state, keeping in mind that an early diagnosis is associated with

Harinder Jaseja

1Vellore EEG Center, Gwalior, Madhya Pradesh, India

Corresponding Author:
Harinder Jaseja, Vellore EEG Center, C-8, Harishanker Puram, Gwalior, Madhya Pradesh, 474002, India.
Email: dr_jaseja@yahoo.com
superior prognosis because of early intervention(s). Time and/or economic issues should not pose any constraint in the wake of the significance of the assessment of the epileptic state by a PSG, which is recommended in epileptic states suspected of intractability, or in patients not responding adequately to antiepileptic drug(s).

References


