DEBATE: EEG IS USUALLY NECESSARY WHEN DIAGNOSING EPILEPSY – YES

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Electroencephalography (EEG) is usually necessary diagnostic tool for the evaluation of seizures. Clinicians use EEG especially to answer these questions: Is the paroxysmal event epilepsy vs nonepileptic attacks (syncope, non-epileptic psychogenic seizure etc.)? What type of epilepsy is it (etiology, seizure type, syndrome)? What is the prognosis (especially after a single seizure, or after surgery)? What is the effect of antiepileptic treatment (especially in status epilepticus, could they be stopped the treatment)? (1).

The purpose of EEG recording is to detect interictal activity and localize the region of interictal activity and/or ictal activity and ictal events (2).

The interictal EEG serves several purposes that can aid in diagnosing epilepsy: Aids in establishing whether epilepsy is present, helps classify whether focal or generalized seizure disorder is present, assist defining of seizure syndrome (3). It is essential to diagnose specific electro-clinical syndromes such as Lennox-Gastaut syndrome, Landue Kleffner syndrome or electrical status epilepticus of slow wave sleep. The interictal EEG is also help to establish the diagnosis of epilepsy syndrome highly characteristic EEG findings, such as benign rolandic epilepsy, benign occipital epilepsy, childhood and juvenile absence epilepsy and juvenile myoclonic epilepsy (4).

A routine EEG recording in a patient with epilepsy will have no epileptiform abnormality in about 50% of cases. It is necessary to increase the sensivity by activation methods. The EEG recording during sleep is especially useful when there is a suspicion of epilepsy with partial seizures or syndrome of benign childhood epilepsy with centrotemporal spikes (2). Hyperventilation and photic stimulation is particularly useful in the diagnosis of generalized epilepsy. Hyperventilation increases generalized spike-wave activity 50-80% of patients with absence epilepsy (5). However, hyperventilation increases the yield of focal interictal epileptiform discharges in less than 10% of patients (3). Photic stimulation usually increases EEG abnormalities especially in idiopathic generalized epilepsy, and most patients have childhood or juvenile absence epilepsy, juvenile myoclonic epilepsy or epilepsy with grand mal seizures on awaking (6). Using activation procedures, abnormalities found in 90% of patients with epilepsy (7).

Evaluating the risk of second seizure after a first unproved seizure is important in deciding whether to start drug treatment or not. The interictal EEG is useful for the evaluation of the risk. Five of six studies found that the presence of EEG abnormalities were associated with a higher risk of recurrence (3). The relative risk associated with abnormal EEG 1.9 at idiopathic group and 1.4 in symptomatic group (8). When EEG performed within 24-48 hours of a first seizure, EEG shows substantial abnormalities in about 70% of cases. The yield may be lower with long delay after the seizure. When standard EEG is negative, systematic case serie have shown that sleep deprived EEG will detect epileptiform discharges in an additional 13-31 cases (9). Van Donselaar et al was also found that 83% of patients with interictal epileptic discharges after a first seizure will be have subsequent seizure (10). Therefore routine EEG is useful after a first seizure presentation. Although the sensivity of routine EEG after a single seizure is about 30% according to some studies, the positive predictive value of it is >80%. These epileptic discharges help to characterize the seizure type and epilepsy syndrome in 15-30%. Routine EEG is usually indicated in the evaluation of first seizure when the etiology is unknown (4).

EEG can be also used to estimate the probability of seizure recurrence if antiepileptic drug treatment is discontinued after a seizure period. Four studies were investigated whether the presence of EEG abnormality predicts an increased

risk of relapse. The existence of EEG abnormalities indicated an increased risk of three of four studies (3). In one study, only generalized interictal epileptiform discharges in patients with tonic clonic seizures indicated risk of relapse significantly. However, nonspecific slowing and nonspecific focal abnormalities did not predict increased risk (11).

In patients who are refractory status epilepticus and general anesthesia treatment during status epilepticus, EEG is the only indication of whether the treatment is successful or seizure activity is continuing. It is also helpful as an aid to assessing the depth of anesthesia. In nonconvulsive status epilepticus, EEG is the only diagnostic tool and it is also important for the evaluation of treatment in this condition (1).

In conclusion, EEG is usually necessary in the correct diagnosis and classification of epilepsy. When the true diagnosis and classification can be done, correct treatment is applied.

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