Title

The relations between “Scalp” EEG and HFOs along with the improvement of epilepsy -A new biomarker in epilepsy treatments-

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Abstract (248 words)

Rationale

Recently, the utility of “scalp” HFOs has been reported and applied to various fields in epilepsy. We focused on the relations between the scalp EEG and HFOs for better control of epilepsy.

Methods

Five young patients with focal epilepsy underwent yearly scalp EEG for 2-5 years. HFOs coincident with focal spikes were analyzed by time-frequency analysis in all electrodes. The number of electrodes which showed significantly increased amplitude over 80 Hz was counted and then compared with epilepsy control as well as conventional scalp EEG.

Results

A total of 14 EEGs were analyzed and the number of electrodes with HFOs over 80 Hz decreased with the age in all patients. The extension of such electrodes was broader on earlier EEG but settled into electrodes around the spike. Generally, the number of electrodes decreased dramatically from late teens to around zero and the period of dramatic decrease was accorded with good control of seizures. The frequency of spikes on EEG also decreased in three patients, but the rate was not dramatic as that of HFOs. The frequency did not change in other two patients even though the number of HFOs became zero.

Discussion

The number of HFOs may reflect epileptogenicity at the time of recording EEG and could be the indicator for treatment of epilepsy. In this study, the number of electrodes and their distribution includes more information than conventional scalp EEG. The number of electrodes with significant HFOs is a candidate for “new biomarker” of epilepsy treatment.

One Table (Patients List) is attached