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## EEG biomarkers in epileptic children during the treatment

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**Introduction & Aim:** Antiepileptic Drug (AED) therapy in epileptic children can be optimized via an anticipation of AED efficacy during early stages of therapy. We hypothesize that the comprehensive EEG evaluation can determine AED efficacy in epileptic children. Thus, this study aimed to investigate the alteration of characteristics of interictal EEG during AED therapy.

**Methods:** 43 children aged 3-9 were investigated. EEGs were recorded three times: Prior to Valproic Acid-Depakin (Dep) mono-therapy and twice under Dep therapy (at three and six/eight months). Baseline EEG was analyzed for quantitative characteristics of interictal EEG such as Absolute Values of the Power (AVP) spectra and EEG topography/brain mapping. The study involved epileptiform EEG and clinical condition assessments.

**Results:** Dep decreased AVP spectra in a low-frequency range, suppressed spontaneous epileptic discharge, and spike-wave complex 3/s. Dep partially decreased spikes-polyspikes, sharp waves, and generalized paroxysmal bursts during functional trials. Dep did not diminish Rhythmic Monomorphic Theta-Waves (RMT) of tempo-parietal localization observed by brain mapping. The presence of RMT correlated with the re-occurrence of seizures if Dep was withdrawn.

**Conclusions:** The findings of this study suggest that the presence of RMT with tempo-parietal localization on the interictal EEG can anticipate re-occurrence of seizures if Dep dose will be reduced or withdrawn. The efficacy of AED-therapy can be revealed via reduction of low-frequency waves and suppression of epileptiform EEG elements parallel to clinical improvement. Thus, optimal treatment strategies can be tailored based on the evaluation of background EEG characteristics using spectral analysis, EEG mapping and the quantitative EEG approach.

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