

SUMMARY

Quantitative EEG studies in drug-free and treated states of patients with epilepsy

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Idegtudományi Doktori Iskola

Klinikai orvostudományok tudományág

The epileptic brain is characterized by changed, primarily abnormally increased neuronal synchronization. Increased seizure liability and EEG synchronization also exist in the interictal state. Quantitative EEG examinations sensitively show the changes of the rate of the EEG synchronization, therefore they are suitable for the characterization of the interictal state and for the investigation of the effect of EEG synchronization modifying drugs. The Low Resolution Electromagnetic Tomography (LORETA) EEG source localization method demonstrates the synchronously activated cortical neuronal populations in the three-dimensional space. LORETA is eligible for localizing the generators of the pathological cortical activity in epileptic patients.

1. In our first study the effect of lamotrigine monotherapy on the waking EEG background activity was investigated in patients with idiopathic generalized epilepsy by using quantitative EEG. Our results showed that lamotrigine partially normalized the spectral composition of EEG background activity. **Lamotrigine decreased the pathological cortical synchronization in a use-dependent manner in treated, seizure-free patients.**

2. In our second study we localized the cortical effect of lamotrigine in idiopathic generalized epilepsy (IGE) patients before, and after successful treatment using LORETA EEG source localization method. Decreased activity in the theta and alpha bands was observed in the treated group compared to the untreated one. The effect in the posterior parts of the cortex was statistically significant. We demonstrated that lamotrigine decreased the theta activity in several cortical sites, where abnormally increased theta activity was previously found in untreated IGE patients.

3. In our third study we localized the uppermost synchronized cortical generators of the generalized spike-wave activity in absence status of middle-aged or old, severely ill patients using LORETA source localization method. The EEG functional connectivity was investigated by LORETA Source Correlation method. **The uppermost synchronized cortical**

generators of 1-6 Hz frequency band were localized in the frontal and temporal cortical areas belonging to the limbic system. In the 12-14 Hz frequency band the abnormally synchronized generators were found in the antero-medial frontal cortex.

TÁRGYSZAVAK-KEYWORDS

Epilepszia, EEG, kvantitatív EEG, lamotrigin, forráslokalizáció, LORETA, absence status

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