Lateralising Seizure Onset in Temporal Lobe Epilepsy Using Scalp EEG Recordings and FFT (Fast Fourier Transform) Mapping

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**Purpose:** Presurgical evaluation of patients with intractable epilepsy includes seizure monitoring with video-EEG. EEG recordings with scalp-sphenoidal electrodes, are usually sufficient in patients with temporal foci. In some cases the visual analysis of the EEG will be inconclusive and intracranial EEG is needed. The question was whether quantitative EEG analysis of surface-EEG could enhance the diagnostic yield.

**Method:** Five patients with temporal lobe epilepsy, where scalp EEG was considered not conclusive, were chosen. Intracranial recordings with subdural electrodes were performed showing lateralisation of seizure onsets. The scalp EEG was retrospectively analysed with FFT mapping of different frequency bands (delta 0.5-3.5 Hz; theta 3.5-7.5 Hz; alfa 7.5-12.5 Hz, beta 12.5-30.0 Hz). Epochs of EEG sampled 20 seconds before clinical seizure onset were compared to epochs of EEG sampled 10 seconds after clinical seizure onset. The power of the different frequency bands was analysed comparing left- and right-sided electrodes.

**Results:** In 4 of the 5 patients, there was a side difference in theta power in the EEG epochs sampled 10 seconds after clinical seizure onset showing an increase in theta power on the seizure generating side. In one case no significant side difference could be detected in either of the frequency bands.

**Conclusion:** Quantitative EEG analysis can increase the diagnostic value of scalp-sphenoidal EEG recordings in the analysis of seizure onset.