

## Research abstract

### Intracranially recorded ictal DC shifts and HFOs as surrogate markers of epileptogenicity in human focal epilepsy

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[Rational] Our previous study of 16 intractable focal epilepsy patients revealed that intracranially recorded ictal direct current (DC) shifts and high frequency oscillations (HFOs) contributed to delineate the epileptogenic zone (Kanazawa et al., 2015). In this study, we analyzed additional patients to ensure the role of ictal DC shifts and HFOs.

[Methods] Following the previous study, 14 patients underwent chronic intracranial recording for epilepsy surgery from August 2012 to August 2015. Nine patients fulfilling the following criteria were included.

Electrocorticogram (ECoG) was recorded with a band-pass filter of 0.016-300 (or 600) Hz and sampling rate of 1000 (or 2000) Hz. Two or more habitual seizures were recorded. Maximum 10 seizures were analyzed in each patient

in terms of the occurrence rate and the distribution of DC shifts and HFOs. DC shifts were defined as slow potentials longer than 3 sec with reproducibility in location, waveform, duration and amplitude. HFOs were defined as fast oscillatory activity higher than 100 Hz.

[Results] The mean number of analyzed seizures was 5.6 per patient. Ictal DC shifts were observed in all the nine patients, and in 94.0% of the analyzed seizures. HFOs were observed in eight out of nine patients, and in 76.0% of the analyzed seizures. Five out of eight patients showed the distribution of DC shifts more localized to the focus than that of conventional ECoG change.

[Discussion] Combined with 16 patients in the previous study, 25 patients showed that ictal DC shifts could delineate the seizure onset zone.