

## S9-Ictal Intracranial Electroencephalography Wavecluster Analysis of High-frequency Oscillations and Conventional Frequency Activities

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**Objective:** We investigated the correlation between high-frequency oscillations (HFOs), conventional frequency activities (CFAs) and seizure onset zones (SOZs) in 20 medically intractable epilepsy patients.

**Methods:** 20 patients with medically intractable underwent chronic (iEEG) using subdural electrodes. Ictal activities within  $\pm 4$ s of video-iEEG ictal onset were extracted by wavelet clustering and thresholding in 11 bandwidths including extended fast ripple (550-799 Hz), high fast ripple (350-549 Hz), low fast ripple (250-349 Hz), high ripple (140-249 Hz), low ripple (100-139 Hz), high gamma (60-99 Hz), low gamma (30-59 Hz), beta (13-29 Hz), alpha (8-12 Hz), theta (4-7 Hz) and delta (1-3 Hz). Cluster epileptogenicity indices (CEIs) and amplitudes of waveclusters were calculated. The temporal analysis window was locked to the timing of the maximum CEI wavecluster. Percentages of zones within seizure onset zone were calculated for all bandwidths.

**Results:** Percentages of zones with maximum CEI waveclusters were significantly higher in comparison to the random distribution in delta, beta, ripple and fast ripple ( $p=0.018, 0.003, 0.165, 0.006, 0.006, 0.049, 0.174, 0.052, 0.033, 0.461, 0.192$  and  $0.015$  from higher to lower bandwidths, Mann-Whitney U test). Percentages of zones with maximum amplitude waveclusters were significantly higher in comparison to the random distribution in most bandwidths except alpha ( $p=0.026, 0.01, 0.028, 0.001, 0.002, 0.005, 0.013, 0.035, 0.429, 0.007$  and  $0.04$  from higher to lower bandwidths, Mann-Whitney U test).

**Conclusions:** The automatic quantitative ictal iEEG analysis may be effective in delineating the seizure onset zone.

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