

# Frequency-independent characteristics of HFO in epileptic and non-epileptic region

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## Abstract

*Rational:* The purpose of the presented study is to find out whether there are frequency-independent HFO parameters which potentially differ in epileptic and non-epileptic region.

*Methods:* We studied 31 consecutive patients with medically intractable focal (temporal and extratemporal) epilepsies. Automated detection was used to detect HFO. The characteristics (rate, amplitude and duration) of HFO within three groups /the seizure onset zone (SOZ), the irritative zone (IZ) and areas outside SOZ and IZ zones (nonSOZ/nonIZ)/ were statistically compared.

*Results:* HFO were detected in all (SOZ, IZ, and nonSOZ/nonIZ) areas with higher absolute HFO rate for events in ripple (R) range than in fast ripple (FR) range. In all patients FR were significantly more frequent and shorter in SOZ than in nonSOZ/nonIZ region. In the group of patients with favorable surgical outcome the relative amplitude of FR was higher in SOZ in comparison with IZ and nonIZ/nonSOZ region, whilst, in patients with poor outcome the results were inverse. The rate of ripples did not significantly differ among regions, whilst the duration was significantly shorter and relative amplitude higher in epileptic region.

*Discussion:* HFO parameters (rate, amplitude and duration) differ in epileptic and non-epileptic region. To sum it, FR are more frequent, shorter and with higher relative amplitude (especially in patients with favorable surgical outcome) in the SOZ area than in other regions. These results might be contributive in planning neurosurgical resection, showing negative predictive value (more disperse or multifocal epileptogenic zone) in patients with higher amplitude of FR outside SOZ.