

Abstracts for HFO symposium Freiburg 2016

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Identification of scalp HFOs

Against previous expectations, epileptic HFOs, especially ripples, can be recorded from outside the scalp by means of EEG and magnetoencephalography (MEG). Ripples can be found in focal and generalised types of epilepsy. A big challenge lies in distinguishing ripples from background noise and muscle artefacts. The signal-to-noise-ratio can be improved by using sleep recordings, by understanding the signal and noise characteristics and by using advanced measures like beamformer-based virtual sensors in MEG. The potential clinical role of HFOs recorded from the surface needs to be explored. Some preliminary evidence shows a yield for diagnosis in people with Rolandic spikes, for treatment evaluation in West syndrome and for presurgical evaluation in focal epilepsy. Non-invasive recording of HFOs can increase our understanding of epilepsy by comparing the occurrence of HFOs to information from metabolic or pathological markers.

Clinical challenge - Current evidence from intra-operative recordings

Most evidence that HFOs, especially fast ripples (FRs), represent epileptiform brain tissue stems from longterm depth EEG and electrocorticography (ECoG). Some centers use intra-operative ECoG to tailor resection based on interictal spikes. Several studies found that FRs in the pre-resection intra-operative ECoG predict postsurgical outcome. For *post*-resection ECoG, we showed that residual FRs, but *not* ripples nor spikes predicted post-surgical seizure recurrence. Comparison to pre-resection ECoG suggests that post-resection FRs, given the presence of pre-resection FRs, predict surgical outcome best. We found new spikes appearing at the resection border, which warns against 'spike hunting'. This was not found for HFOs. Post-resection ECoG is of importance to verify that all tissue producing FRs has been removed. A randomized control trial has started comparing the intra-operative use of HFOs to spikes. For onsite HFO-analysis, we need to stop propofol, incorporate HFO knowledge into the whole clinical picture and distinguish epileptic HFOs from physiological HFOs and artefacts.