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Effect of sleep stages on distribution of interictal fast ripples

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## **Abstract**

**Rationale:** Recently, we reported that less suppressive effect of REM sleep on epileptic ripples may provide a specific marker of epileptogenicity (Sakuraba et al., 2015). We investigated that effect of sleep stages on distribution of interictal fast ripples (FRs) and correlation to epileptogenic area.

**Methods:** The subjects comprised 7 patients with drug-resistant epilepsy who underwent extraoperative intracranial EEG monitoring and became seizure freedom after surgery. Interictal FRs were automatically detected from different sleep stages. The relationship of high-rate FR electrodes to the area of surgical resection was compared between REM and NREM sleeps. Upon the result, further analysis was performed by dividing the FR into two frequency ranges; 200 – 299Hz and 300 – 399Hz. Then, the relationship of FR occurrence to the area of surgical resection was compared between REM and NREM sleeps for each frequency range.

**Results:** High-rate FR were identified in 20 (15.9%) and 4(1.9%) electrodes inside and outside the resection during NREM sleep, respectively, and in 12 (9.5%) and 0 (0%) electrodes inside and outside the resection during REM sleep, respectively. The relationship of the high-rate FR electrodes to the area of surgical resection was not different between NREM and REM sleeps. The occurrence of FRs was associated with

the area of resection during REM sleep at the 200 – 299Hz ( $P < 0.0001$ ), but not at the 300 – 399Hz frequency range.

Conclusions: Influence of sleep stages is probably smaller on the FR than on ripples.