Postictal EEG Activity in Pediatric and Adult Patients Undergoing Epilepsy Surgery: A Network Perspective

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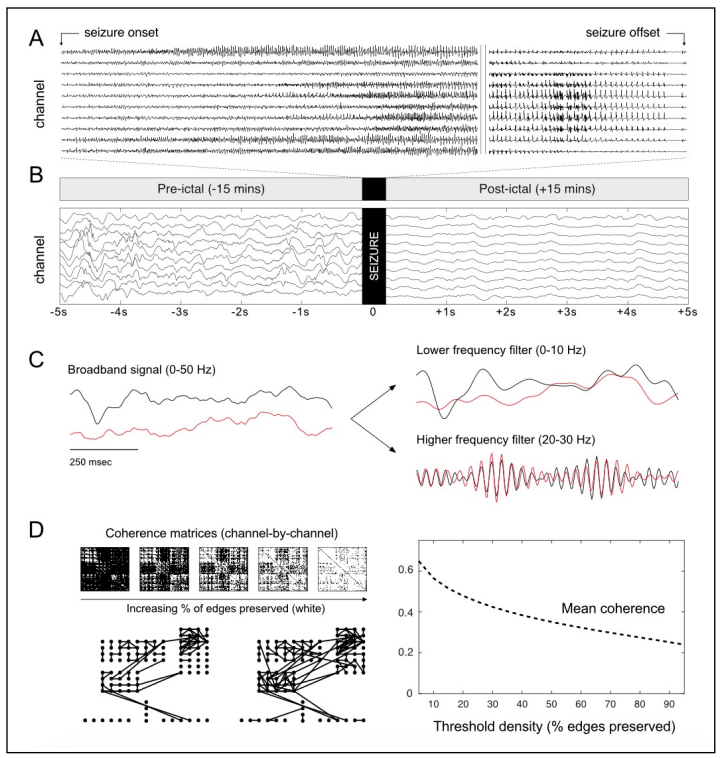
Introduction

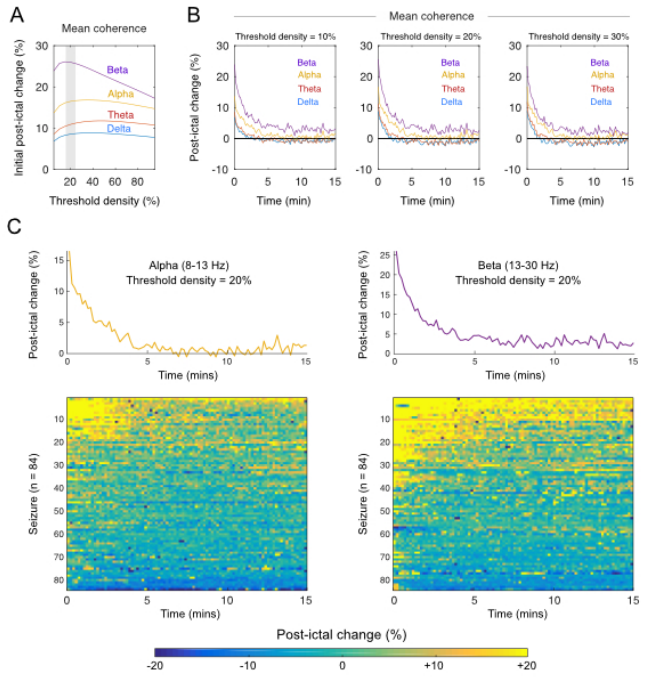
In patients with recurrent seizures, the postictal window can be associated with a spectrum of behavioral and physiological alterations [1]. Analyzing electrographic changes in the peri-ictal window may help better characterize the epileptogenic brain tissue prior to epilepsy surgery [2]. The purpose of this study was to compare pre- and post-ictal functional connectivity networks among patients undergoing intracranial evaluation.

Learning Objectives

(1) Understand the concept of network connectivity and epileptogenic networks
(2) Appreciate the significance of postictal activity in characterizing epileptic networks

Methods (1)



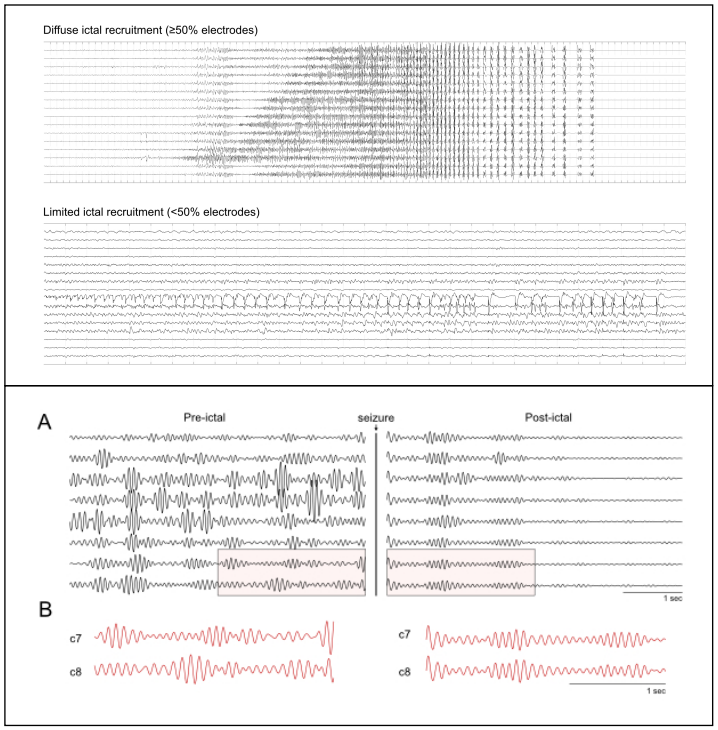


A) The mean peri-ictal shift (%) was computed across edge density thresholds. The maximal initial change was seen at threshold = 20%. B) Post-ictal shifts in coherence are seen across the frequency spectrum, but are largest in the beta range (13-30 Hz). C) Post-ictal alpha and beta coherence for all seizures (above) and individual seizures (below).

Results

Results (1)

Results (2)



Conclusions

The postictal window was associated with a shift towards increased network connectivity and node clustering. The magnitude of peri-ictal shifts was correlated with the frequency band analyzed and the surgical outcome of the patient. We hypothesize that postictal deactivation of subcortical relay nuclei may contribute to the differences observed across surgical outcome groups.

References

(1) Fisher RS et al. *Epilepsy Behav* 2000; 1: 52-59.
(2) Remi J et al. *Epilepsy Behav* 2010; 19: 114-117.

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