P047_Slow spindles’ cortical generators overlap with the epileptogenic zone in temporal epileptic patients: an electrical source imaging study

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Objective: to determine whether temporal epileptic patients and normal volunteers display similar sleep spindles’ cortical generators as determined by electrical source imaging (ESI), and whether such generators overlap in epilepsy patients with the epileptogenic zone identified by ESI.

Methods: twelve healthy subjects and twelve temporal lobe pharmaco-resistant epileptic patients underwent a 256-channel EEG recording during a daytime nap. Sleep spindles were analyzed off line, distinguishing slow (10-12 Hz) and fast (12-14 Hz) ones, and the final averaged signal was projected onto a MNI (Montreal Neurological Institute) space to localize cortical generators. The same procedure was performed for averaged epileptic spikes, obtaining their cortical source. Intra- and inter-group statistical analysis were conducted.

Results: multiple, concomitant generators were detected in both populations for slow and fast spindles. Slow spindles in epileptics displayed higher source amplitude in comparison to healthy volunteers (Z = 0.001), as well as a preferential localization over the affected temporal cortices (p = 0.039). Interestingly, at least one of slow spindles’ generators overlapped with the epileptogenic zone.

Conclusion: slow spindles, but not fast ones, in temporal epilepsy are mainly generated by the affected temporal lobe.

Significance: these results point to the strict relation between sleep and epilepsy and to the possible cognitive implications of spikes arising from memory-encoding brain structures.