

Refractory seizures disrupt brain connectivity in Temporal Lobe Epilepsy

Ribeiro, L F¹; Montanher, L¹; Cendes, F¹; Yasuda, CL¹
¹Neuroimaging Laboratory;

Introduction: Alterations of functional connectivity in TLE patients with unilateral hippocampal sclerosis (HS) have been repeatedly reported^[1]; however, little attention has been directed to evaluate the impact of seizure control on resting state functional connectivity. Therefore in this study, we investigate the influence of seizure control on resting state networks.

Materials and Methods: Resting-state fMRI was acquired on 3T-PHILIPS from 3 groups of patients TLE-HS [G1- refractory, 55 subjects; G2 – fluctuating, 42 subjects; G3 – sz-free 18] and 59 controls. To compare interactions of 12 RSNs (from resting-state functional-MRIs, parcellated in 70 regions of interest (ROIs)), images were processed with UF²C-toolbox^[1] (running on MATLAB2014/SPM12)(www.fil.ion.ucl.ac.uk), for ROI parcellation, matrix construction and statistical analysis (with intranetwork and internetwork connectivity). For each ROI, we extracted time-series which were used to generate individual matrices with Pearson's correlation tests. After converting to z-score, these matrices entered group analyses (patients x controls). Each group of patients was compared with a group of controls (two-sample T-test). Reported results have a 0.05 alpha, FDR corrected.

Results: We identified both intranetwork and internetwork dysfunctions (reduced connectivity) in all groups, compared to controls. We observed that G1 showed reduced connectivity in a larger number of networks in comparison with G2 and G3.

We did not identify increased or reversed connectivity in these TLE groups ($p < 0.05$, corrected with FDR).

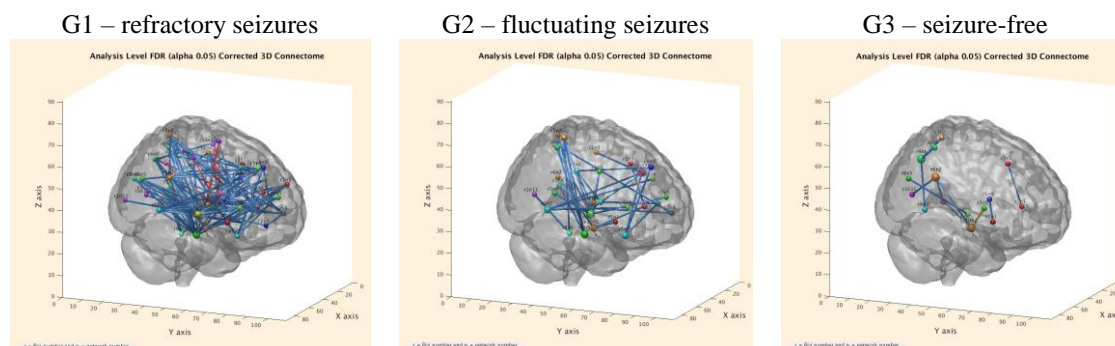


Figure 3. Mean connectivity of G1, G2 and G3 in comparison with controls

Discussion: Our preliminary results indicate a deleterious effect of pharmacoresistant seizures on brain connectivity, as we observed severe and widespread alterations in G1 and G2. Further analyses may investigate the association between FC and both cognition and aging processes.

Conclusion: patients with worst patterns of seizure control present reduced intranetwork and internetwork connectivity in comparison with seizure-free individuals.

Reference:

1. de Campos, B.M., et al. Hum Brain Mapp. 37(9): p. 3137-52., 2016