

Comparison of cortical atrophy among patients with right, left, bilateral and without hippocampal atrophy temporal lobe epilepsy through voxel-based morphometry

Artoni G¹; Moreira JCV²; Alvim MKM³; Scárdua, FL⁴; Yasuda. CL⁵.

¹IMECC, UNICAMP; ²IC, UNICAMP; ³Neuroimage Laboratory, HC, UNICAMP.

Introduction: Although several studies have explored patterns of grey (GM) and white matter (WM) atrophy in temporal lobe epilepsy (TLE) patients, fewer have compared side and presence of atrophy. In this perspective, this study intends to investigate and compare TLE patients with a right, left, bilateral atrophy and negative (those without apparent hippocampal atrophy) (HA).

Materials and Methods: We selected 179 patients, divided in left, right, bilateral and negative TLE, respectively with 50, 45, 34 and 50 subjects. Two control subjects were matched for each patient (258 total controls). 3D T1 weighted images (isotropic 1mm³ voxels) were segmented into GM and WM tissues, according to a standard SPM12/CAT 12 protocol (<http://www.neuro.uni-jena.de/cat/>) (www.fil.ion.ucl.ac.uk), which included: spatial normalization [MNI-152], tissue segmentation and smoothing, Quality control of image segmentation was automatically performed. Statistical analyses of images were performed with SPM12. All steps are described in detail in [1].

Results: Grey matter atrophy was mainly identified ipsilateral to HA in the right and left groups. While bilateral group presented more widespread and bilateral pattern of alterations, NEG group exhibited small inter-hemispheric cluster (Figure1).

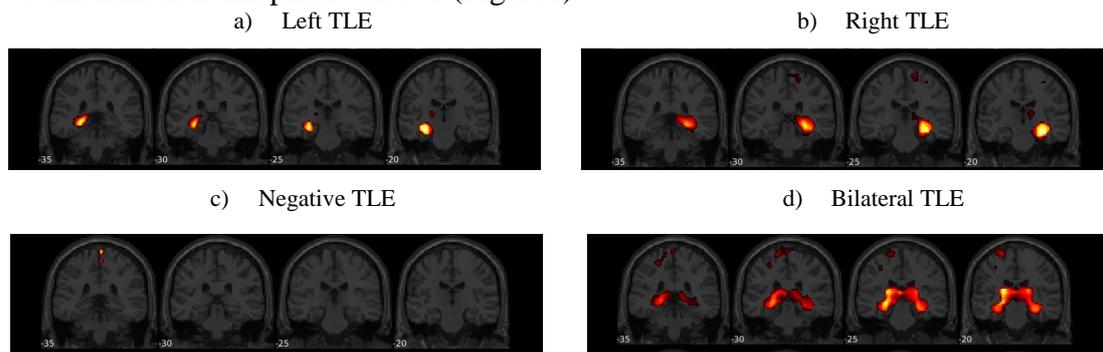


Figure 1 Grey matter atrophy regions

We identified a more widespread pattern of WM atrophy in all groups, with larger clusters on left TLE. (Figure 2).

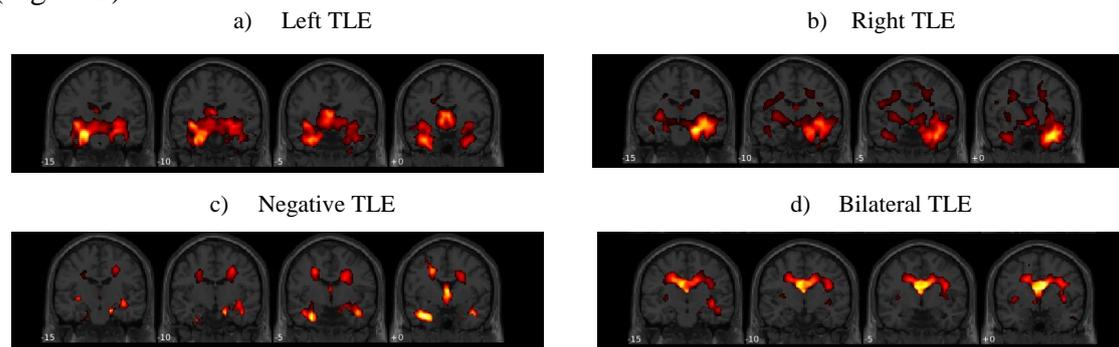


Figure 2 White matter atrophy regions

Discussion: The results we found highlight different patterns of GM/WM atrophy of patients with TLE. Our results suggest an association between GM atrophy and the presence of HA, as NEG group presented small spots of GM atrophy. On the contrary, WM atrophy was identified in four groups, regardless the presence of HA.

Conclusion: Our results suggest that GM atrophy may be associated with the presence of HA, while WM atrophy may result from seizures, as all 4 groups presented widespread areas of WM atrophy.

Reference: [1] Friston K et al., Book Statistical Parametric Mapping