

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

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Abstract

Our research uses magnetic resonance imaging and statistical tools to compare patients with TEMPORAL LOBE EPILEPSY WITH AND WITHOUT hippocampal atrophy, SEARCHING FOR DIFFERENCES RELATED TO GREY AND WHITE MATTER ATROPHY.

Key words:

Magnetic Resonance Imaging, Temporal Lobe Epilepsy, Morphometry

Introduction

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

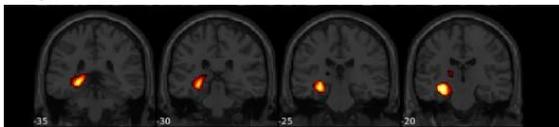
Results and Discussion

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].

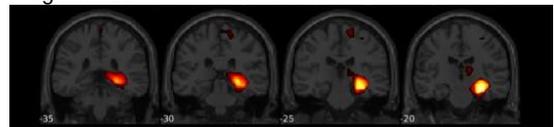
Grey matter atrophy was mainly identified ipsilateral to HA in the right and left groups. While bilateral group presented more widespread and bilateral pattern of alterations, NEG group exhibited small inter-hemispheric cluster. (Image 1)

Image 1. Grey matter atrophy regions

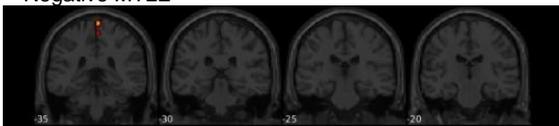
a. Left MTLE



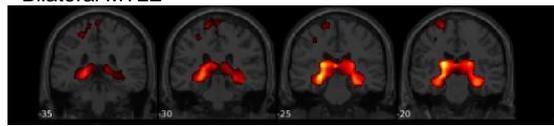
b. Right MTLE



c. Negative MTLE



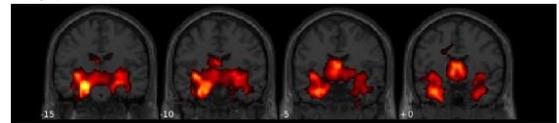
d. Bilateral MTLE



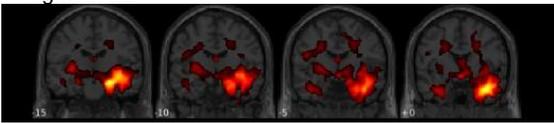
We identified a more widespread pattern of WM atrophy in all groups, with larger clusters on left TLE. (Image 2).

Image 2. White matter atrophy regions

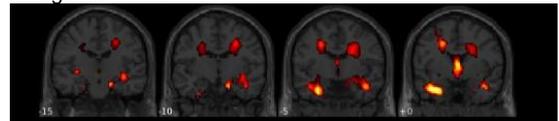
a. Left MTLE



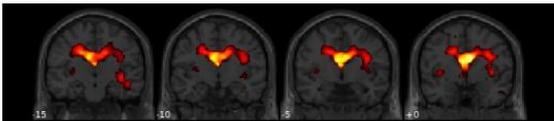
b. Right MTLE



c. Negative MTLE



d. Bilateral MTLE



Conclusions

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.

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