

White matter abnormalities and changes of gray matter concentration in hippocampus, amygdala, and entorhinal cortex of temporal lobe epilepsy patients

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Many neurodegenerative diseases exhibit volume and shape changes in specific brain regions. However, neuroanatomical changes may be so mild, not detectable by visual inspection. Voxel-based morphometry (VBM) is an image analysis technique that uses automatically segmented gray and white matter (GM/ WM) images for comparisons without investigator bias. In this study, we used VBM to find abnormalities of WM and changes in gray matter concentration (GMC) in hippocampus, amygdala, and entorhinal cortex of patients with temporal lobe epilepsy (TLE). We used T1-weighted magnetic resonance images (MRI) of 12 TLE patients and 18 healthy control subjects. Student's t-test statistical models of differences between patients' and controls' GM and WM concentrations were obtained using a general linear model (GLM). Compared to controls, TLE presented decrease in WM volume. In addition, there was GMC reduction in hippocampus mostly in anterior regions. Subtle decreases in GMC of amygdala and entorhinal cortex were also detected.