Functional and structural differences between right - and left - unilateral mesial temporal lobe epilepsies

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Hippocampal sclerosis has been the most common etiology of the mesial temporal lobe epilepsy (MTLE) and regarded as the most crucial anatomical region. However, it is not just a focal disease and other cortical and subcortical areas seem to be affected in MTLE. Using resting functional MRI (fMRI) and voxel-based morphometry (VBM), we aimed to investigate the functional and structural changes in patients with unilateral MTLE with hippocampal sclerosis according to the each side. The study group consisted of 10 MTLE patients associated with unilateral HS (right n=6, left n=4). All participants were right-handed and well-controlled, seizure-free state. We obtained T1 and T2* weighted images from 3T MRI (Verio, Siemens, Germany). As a result, no characteristic difference was observed in the analysis of resting fMRI. Each patient showed individual, inconsistent functional connectivity pattern. However, decreased volumes in the widespread extra-hippocampal regions (bilateral insula, bilateral thalamus and contralateral hippocampus in the right MTLE and left insula, contralateral hippocampus in the left MTLE) were observed in the VBM analysis. These differences could not be attributed to a different present disease severity, epilepsy duration, or seizure frequency, since those factors did not differ significantly between the left and right-sided MTLE/HS subgroups. Due to lack of the number of patients, further study will be required for the concrete conclusion; however, these differences could be theoretically explained by different neuronal networks, connections among brain areas and structural changes may precede functional changes.