

Research Abstract:

Alterations of spontaneous hemodynamic activity in the hippocampus and amygdala in temporal lobe epilepsy

Differentiating TLE with mesial temporal lobe sclerosis (MTS) from that without MTS, which are two distinct neurological syndromes, is important for prognosis following resective epilepsy surgery. This study identifies novel resting-state fMRI features that distinguish these two subgroups.

MRI results from thirty patients with TLE prior to the surgery and from thirty controls were obtained. Temporal lobe seizure and MTS status were verified with intracranial electroencephalography and histological evaluation of surgical tissue, respectively. Fractional amplitude of low-frequency fluctuation (fALFF) of the BOLD resting-state fMRI signal, a measure of local hemodynamic activity, was averaged for the hippocampus and amygdala of each hemisphere. Regions of interest were labeled ipsilateral or contralateral according to seizure lateralization. A paired *t*-test was used to test for fALFF differences between patient subgroups and controls.

Lower fALFF in the ipsilateral hippocampus and amygdala, compared to the control group, were observed only in the MTS subgroup. This study shows that the presence of mesial temporal fALFF abnormalities in TLE patients with MTS, but not those without MTS, is consistent with known radiological features, i.e., structural volume loss in MTS. This validates fALFF as a non-invasive measure of *functional* integrity to provide a differential diagnosis for temporal lobe epilepsy.

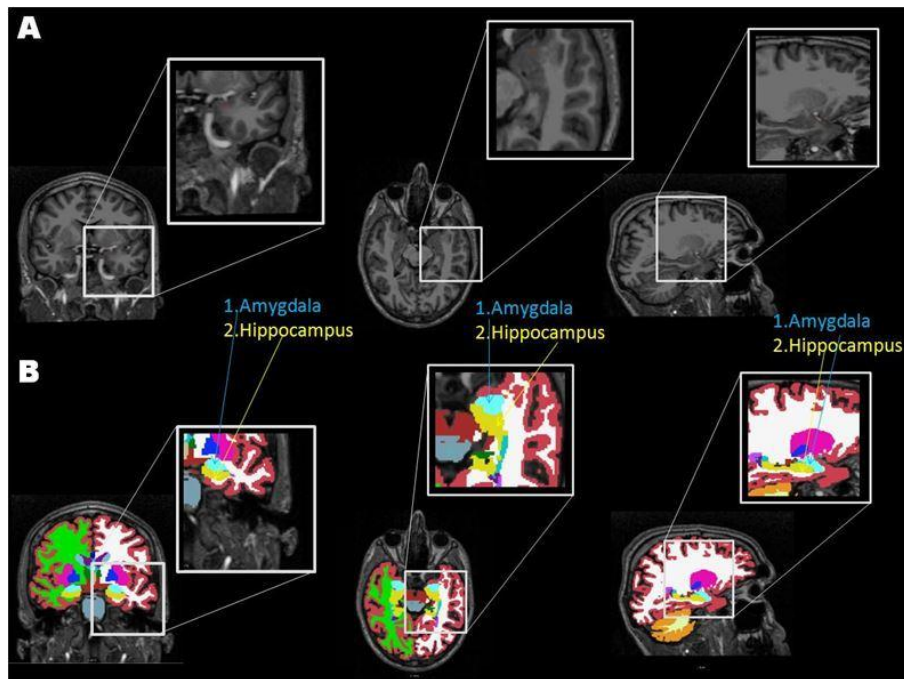


Figure 2. A. Coronal, axial, and sagittal view of amygdala and hippocampus is depicted. B. Coronal, axial, and sagittal view of amygdala and hippocampus is depicted using freesurfer segmentation (Desikan et al., 2006).