

AbstractID: 7589 Title: Evaluation of Reproducibility of fMRI Maps in Patients with Proven Low-Grade Brain Neoplasms

Purpose: The focus of this project is to demonstrate the test re-test reliability of fMRI in subjects with benign and biopsy proven low-grade neoplasms.

Methods and Materials: FMRI activation maps with different thresholds were generated for 6 subjects with benign and biopsy proven low-grade brain neoplasms using a GE Signa 1.5T MRI scanner and birdcage head coil. The imaging protocol included a 3DSPGR T1 brain volume, a coronal T2 anatomical acquisition(24 slices), and 8 functional scans. The 8 functional scans consisted of four functional task repeated twice. Each task verified one of the following: language, language comprehension, fine motor control, and visual perception with Blood Oxygen Dependent(BOLD) responses.

Preprocessing steps included dicom to afni conversion, motion correction and spatial smoothing(9mm Gaussian filter). A correlation analysis was performed which allowed the reference timing of the BOLD response in the expected areas to be confirmed. A measure of reproducibility was calculated using the Euclidean distance between the center of mass of the activated volumes in two independent scans and measuring the number of reproducible activated voxels, R_{size} .

Results and Discussion:

Activated clusters were observed for each functional scan. Activated clusters were not observed in all subjects for each task. R_{size} was calculated to measure the reproducibility. These measurements will vary between 0.0(worst) and 1.0(best). The Text Listening Task provided the best reproducibility of activated clusters with an average value of 0.94 ± 0.05 and 0.90 ± 0.06 for the left and right temporal lobe, respectively. Activation of clusters amongst subjects varied greatly for the visual perception scan. Previous published results had similar findings.

Conclusions:

Similar comparisons of reproducibility will be made for more subjects. R_{overlap} , another parameter used for testing reproducibility will be calculated. The minimum number of clusters used and the cluster radius will be further examined to obtain more activated clusters.