AbstractID: 6978 Title: Clinical 3.0T fMRI Implementation for Surgical Planning In a Tertiary Care Center

Purpose:
There has been lot of progress during past decade in blood oxygenation level dependent (BOLD) functional MRI (fMRI) and Diffusion Tensor Imaging (DTI). However their clinical use has not been available to many tertiary care centers because of lack of support in paradigm generation, presentation and post processing. Recently, technical advances in 3.0 T clinical MRI scanners, paradigm presentation/post processing, and available medical physics support have made fMRI achievable for clinical MRI settings. The purpose of this study is to utilize 3.0T fMRI study for clinical neurological surgical planning in a tertiary care setting.

Method and Materials:
All clinical fMRI are done on a 3.0 T GE Signa scanner using an 8 channel head coil. IFIS/Brainvoyager (MRI Devices) is used for paradigm development/presentations and analysis. Visual, verb generating, left/right motor, passive listening, rhyming, semantic paradigms/protocols are developed for clinical fMRI. Post processing of BOLD fMRI data on the scanner console (Brainwave) communicates with paradigm generating PC directly. Real-time BOLD fMRI post processing is done with Brainwave (GE Medical Systems). Additional post processing, including 3D rendering of functional activation mapping of the brain, are done on the scanner console using Brainwave, or Brainvoyager on a standalone workstation. DTI is acquired and post processed using Functool MR tractography (GE Medical Systems) for fiber tracking.

Results:
15 clinical patients have been scanned using both BOLD fMRI and DTI for neurological surgical planning. Diagnostic results from 3.0T fMRI scan had significant impact on the planning of neurological procedures.

Conclusion:
Clinical fMRI at 3.0 T has been successfully implemented in a tertiary care center for neurological surgical planning. With the technical advances in clinical 3.0T scanner, paradigm software/hardware options, and medical physics support, fMRI is becoming robust and increasingly available for routine clinical use.

Conflict of Interest (only if applicable):