

AbstractID: 13154 Title: Functional Diffusion Map Analysis in Assessing Brain Tumor Response to Therapy

Background: DTI has been used as a functional imaging tool in the assessment of tumor response to therapy, mostly by monitoring the changes in DTI matrices such as ADC and FA during the course of treatment. In this study, we studied the predictive value of various functional diffusion maps (fDM) generated using the ADC, FA and transverse diffusivity that were acquired pre- and post- anti-VEGA therapy in brain tumor patients.

Materials and Methods: Functional diffusion maps were generated by comparing the pre- and post- therapy DTI studies and the changes of DTI matrices such as ADC, FA and the transverse diffusivity. Prior to the creation of the fDMs, all images including the anatomical images (T1, T2, FLAIR and post-contrast T1) for each patient were co-registered to the DTI images for each visit and then across all visits. All fDMs were compared and correlated with the status of radiographic response.

Results: For core tumor volume defined by post-contrast T1 images, fDMs generated with ADC values correlated the best with the radiographic response, while there was no obvious difference between the fDMs generated with ADC (Fig1a) and those with the transverse diffusivity. The fDM generated with FA differed from those with ADC and may have predictive value in the direction of tumor progression.

Conclusion and Discussion: The fDMs are useful tools in the assessment of tumor response to therapy. fDM analysis of the pretumoral white-matter area may have the potential to assess the tumor cell progression in the WM tract.