

AbstractID: 6934 Title: Potential of Dynamic Contrast Enhanced-Magnetic Resonance Imaging (DCE-MRI) Extracted Parameters to Estimate Treatment Response in Locally Advanced Head and Neck (LAHN) Cancer Patients

Purpose: To evaluate the use of DCE-MRI to measure changes in tumor physiology in LAHN cancer patients receiving TT and cisplatin based concurrent chemoradiation (ChemoRT).

Material and Methods: Eligible patients with LAHN were enrolled on an IRB approved clinical trial to establish the safety and efficacy of adding TT (bevacizumab and erlotinib) to ChemoRT. To quantify this efficacy, DCE-MR images were acquired on a 1.5T GE Signa Exite scanner before treatment started, at the end of the lead-in phase (2 weeks of TT alone), at the end of week 1 of ChemoRT, and at the end of the ChemoRT (70 Gy). The images were analyzed using a full Time Point (fTP) pharmacokinetic analysis implemented by CAD Sciences® (White Plains, NY) that measures the vascular permeability (PERM) and extracellular volume fraction (EVF). The T_{10} for the primary and nodes was determined from series acquired with varying TRs. A dynamic 3D spoiled gradient echo sequence was used before and after bolus injection of Gd DTPA (Magnevist®). Regions of interest (ROIs) were defined over the entire extent of the tumor and LN, respectively. Enhancement curve analysis, PERM and EVF statistics and ROI volume comparisons were performed.

Results: The T_{10} for tumor was 1500 msec, and 2000 msec for LN. All the fTP analyses used these values. Fifteen patients have been imaged to date. We found that coronal imaging allows better ROI selection without vascular averaging for this type of subjects. Detailed analyses of all time points have been completed on three patients, all with clinical complete response. Combined PERM and EVF analyses showed marked decreases with treatment ($p < 0.014$).

Conclusions: Preliminary results demonstrate the feasibility of using DCE-MRI to measure treatment induced changes in tumor physiology. Correlations between these changes and treatment outcome will be determined as data from the remaining patients is analyzed.