AbstractID: 11425 Title: A Comparison of Perfusion Parameters from the Kinetic Modeling of Head and Neck Cancers in DCE CT

Purpose: While various kinetic models are used for estimating perfusion parameters from contrast-enhanced CT scans, the difference amongst the model results are not well researched. The aim of this study was to determine the discrepancy between two of the most commonly used kinetic models: maximum-slope and deconvolution.

Methods: Seven patients with head and neck tumors underwent dynamic CT scans with an injected contrast agent. Contrast enhancement curves were obtained by segmenting arteries, veins, and tumor ROIs from the CT scans. The maximum-slope model was used to calculate the blood flow, while the Patlak analysis interpolated the blood volume ratio and the permeability. The central volume theorem determined the mean transit time. These parameters were also generated via a deconvolution method implemented in the GE's Advantage Perfusion 4 software.

Results: The mean population values of all parameters - blood flow (BF), blood volume (BV), permeability (P) and mean transient time MTT) - were similar between the maximum slope and deconvolution methods (BV: 116 vs 107 ml/100g/min, BV: 6.9 vs 7.9 ml/100g, P: 29 vs 20 ml/100g/min, MTT: 4.9 vs 7.3 s). However, on the individual patient level the difference were significant (BF difference: 70% ±60 %, BV difference: 35% ± 30%, P difference: 75% ± 60%. and MTT difference: 35% ± 25%.

Conclusion: No significant differences were found amongst the mean population perfusion parameters. However, on the individual patient level, the differences were significant between the maximum slope and deconvolution-based CT perfusion methods.