

AbstractID: 12123 Title: Implementating in vivo perfusion measurements using DCE MRI

Although it may appear relatively straightforward to extract quantitative metrics from static or dynamic imaging data, a variety of details are critical to the establishment of a data acquisition, analysis, and interpretation methodology that can significantly influence the fidelity of a clinical or fundamental investigation of imaging as a biomarker. While typical users will find available commercial tools and apply them, understanding these fundamental steps will help both the local investigator as well as national efforts to standardize the methodologies and understand the limits of information that can usefully be extracted by a given technique. As an example, the use of MRI-based Dynamic Contrast Enhanced (DCE-MRI) imaging and analysis of perfusion-related metrics is described. The optimization of an image acquisition protocol, which varies by the tissue being studied, is presented. The steps to process this temporal data are described, including image registration for analysis of intrahepatic perfusion. The variables typically associated with DCE analysis, including K^{trans} , blood flow, blood volume, and mean transit time, are defined. The dependence of these variables on image quality and temporal sampling are briefly mentioned. The step-by-step analysis of the data to extract regional information is presented. An example paradigm relating the analyzed metrics to external variables (e.g. local radiation dose) is shown.

Learning Objectives:

1. To understand practical issues to extract quantitative imaging metrics
2. To understand how to increase robustness and objectiveness in the analysis
3. To understand limitations of derived quantitative imaging metrics