

QIBA Dynamic Susceptibility Contrast (DSC-MRI) Biomarker Committee (BC) Call

Wednesday, June 9, 2021 at 11 a.m. (CT)

Call Summary

Participants

Ona Wu, PhD (Co-Chair)
Michael Boss, PhD
Lisa Cimino, RT

Rafat Damseh, PhD
Zhaoyang Fan, PhD

Mo Kadbi, PhD
Nancy Obuchowski, PhD

RSNA

Joe Koudelik
Susan Stanfa

Implementation of the DSC-MRI Profile in the GABLE Study

- Consensus is still needed on several aspects of the study, which will evaluate lesions from the time of diagnosis, during immediate treatment, and afterward, to identify a biomarker that could predict survival
- Study results will indicate whether DSC is a valuable biomarker for distinguishing true progression from pseudoprogression in patients with newly diagnosed GBM

Progress Update on the DSC-MRI White Paper and Remaining Tasks

- The DSC-MRI BC [white paper draft](#) can be found in the group's Google Drive
- Edits suggested by DSC-MRI BC members were reviewed and discussed
- While rCBV is the clinical marker, this Profile focuses on measuring its imaging biomarker, which is the Area Under the Curve-Tissue Normalized (AUC-TN)
- The Profile's longitudinal claims are based on estimates of perfusion AUC-TN wCV for ROIs of specified range located in the enhancing tumor and in normal tissue
- The 95% confidence for true change is based on a study that showed reproducibility of the AUC-TN value in enhancing tumor tissue was ~ 0.31 and the wCV was 0.40 in normal tissue
- There have been many advances in DSC-MRI since the initial Profile draft was written; the opportunity to obtain data using modern acquisition techniques is one of the motivations for participating in the GABLE study
- Text needs to be added to the "Defining repeatability/reproducibility" section
- This paper contains thorough guidance on possible sources of variability, e.g.:
 - Measuring the lesion in an inconsistent fashion and lacking enough pixels to accurately represent the lesion
 - Automated standardization and normalization methods; if too much variation is introduced, a larger sample size would be needed
 - Disparities in performance due to flip angle
 - Differences in subject placement and physiology
 - Different actors (acquisition device, radiologist, image analysis tool, etc.) at the two timepoints (i.e., the same scanner and image analysis tool must be used for both exams of each patient)
 - Software variance includes variation in integration of AUC and some algorithms will contain more noise than others
 - Scanner variance may be affected by differences in hardware and acquisition protocol, which can be measured using a physical phantom
- Controlling for variability with a physical phantom
 - Anonymization of vendors will occur prior to submitting the paper for publication
 - Images appeared very similar across all scanners with the exception of the GE 750W for which susceptibility artifacts were detected
 - One site had greater susceptibility distortion due to a missing screw in their round robin study phantom

- It was recommended in the paper that digital reference objects (DROs) be downloaded from <http://qibadscdro.rsna.org/home>, but a “502 Bad Gateway” message appears upon attempt to access the URL
 - Staff to contact RSNA IT department to address the issue
- Dr. Wu to continue working on the phantom section and Dr. Erickson to further develop the DRO section
- Details to be added to “Future directions” section
 - Open Science Initiative for Perfusion Imaging (OSIPI) (Drs. Bell and Sourbron)
 - Code
 - Clinical data sets
 - Phantoms
 - Human phantom datasets
 - Harmonization with other efforts, e.g., BTIP, OSIPI, QIBA (Drs. Bell, Boxerman, and Wu)
 - Including information on 1.5T test-retest reproducibility data (GABLE study) will enhance the paper’s utility; the need for test-retest literature will be stated, citing Dr. Dave’s white paper on this topic
 - Intent to develop cross-sectional Claims in efforts to determine/characterize abnormal tissue for single exams
 - Ms. Cimino to assist with vendor perspectives
 - Dr. Fan to contribute to this section as well
- DSC-MRI Profile Claim language and URL to [Profiles page](#) on the QIBA Wiki to be added prior to the “Sources of repeatability/reproducibility” section; recommendation to reference Dr. Kinahan’s FDG-PET white paper as a model
- Newer references to be added, as many recent papers, e.g., related to simulation, have been published

Next DSC-MRI BC Call: Wednesday, July 14, 2021 at 11 a.m. CT

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