QIBA Dynamic Contrast-Enhanced (DCE) MRI Biomarker Committee (BC) Call

Monday, April 12, 2021 at 11 a.m. (CT)

Call Summary

In attendance			**RSNA staff**
Caroline Chung, MD (Co-Chair)	John Carrino, MD, MPH	Nancy Obuchowski, PhD	Joe Koudelik
Hendrik Laue, PhD (Co-Chair)	Hyunki (Harrison) Kim, PhD, MBA	Mark Shiroishi, MD	Susan Stanfa
Michael Boss, PhD	Cristina Lavini, PhD	Divya Yadav, MD	

Update on DCE-MRI Profile

- The **Public Comment Resolutions Sheet** was referenced to address comments; details on resolutions reached through committee discussion and consensus are included
- DCE-MRI BC members are welcome to work on edits to the **Profile**

OSIPI DCE-MRI Challenge: Launches in May and Closes in November 2021

- With a growing attention to reproducible research at ISMRM, community challenges with public datasets can play an important role in validating and benchmarking image quantification methods
- While DCE-MRI has been widely used to evaluate a diversity of brain pathologies, there is a lack of standardized analysis methods, limiting its application in clinical practice, multi-institutional studies, or clinical trials
- The OSIPI-DCE challenge has been designed for evaluating 1.5T and 3T DCE-MRI methods that estimate the volume transfer constant (K^{trans}) in brain tumors
- Dr. Kim to send OSIPI challenge info to staff for distribution
- The challenge will run over the course of 9 months, but each group will be granted 3 months from the time of their registration to submit their reports and results
- Awards will include a $500 prize and a published paper; this opportunity may be especially helpful to students

The following comments submitted during the public comment period were addressed:

Daniel J. Margolis, MD | Weill Cornell Medical College

- View sharing is discouraged in the Q/A section without justification; view sharing along with radial acquisition and compressed sensing should be listed as having insufficient information to provide a recommendation
    - View sharing is discussed in another section of the Profile; a reference to this other section where view sharing is discussed will be noted in the Q/A section

John Jordan, MD | Chief of Neuroradiology and Magnetic Resonance Imaging at Providence Little Company of Mary Medical Center Torrance

- Consideration of automated segmentation methods was suggested, as they would be faster than manual segmentation and are needed for development of more precise, reproducible biomarkers and metrology
    - It was also noted that automated segmentation methods could require longer 'training periods' and applicability to other systems and data sets may be problematic
    - The DCE-MRI BC determined that due to its breadth, especially for different organs/tumors, this is beyond the scope of the profile
    - Different software may produce even more variable results than manual segmentation; consistent segmentation, especially over timepoints was deemed imperative

- In the absence of robust data indicating otherwise, reducing contrast agent dose to below 0.1 mmol/kg may decrease the sensitivity for accurate delineation of tumors and/or their changing features with treatment/time; repeatability could also be further compromised
    - While GDD is of concern, there were reservations regarding the initial development of the biomarker in the absence of evidence that can validate the utility of reductions in dose
    - Dr. Lavini to review publication using lower dose for quantitative imaging, and the effects of AIF on the reproducibility of K^{trans}

- It is reflected in the Profile that parallel imaging, while less problematic at 3T, should be minimized particularly in neuroimaging due to decreased signal to noise, potential variability among scanners, and reconstruction artifacts
    - This technique would be less desirable when seeking to establish precise and reproducible biomarkers
    - Dr. Laue to contact commenter to confirm that the DCE-MRI BC has correctly interpreted this statement

Jinnan Wang, PhD | Director, MR R& D Collaborations at Siemens Healthineers

- Limiting TR to less than 5ms in prostate imaging at 1.5T, would prevent the use of Dixon imaging; Dixon imaging would be supported by relaxing the requirement to 7 ms
    - Dr. Laue to contact commenter and investigate details regarding Dixon imaging

- All Claims explicitly suggest using an individual AIF, but the referenced publications used population-based or study-averaged AIF; also, in other sections of the profile, population-based AIFs are declared acceptable
    - Recommendation to remove the restriction to using an individual AIF
    - Dr. Laue to review publications including Peled, et al. **Selection of Fitting Model and Arterial Input Function for Repeatability in Dynamic Contrast-Enhanced Prostate MRI.** *Acad Radiol.* 2019; 26(9):E241-E251.

Next call: Monday, April 26, 2021 at 11 a.m. (CT) [2nd & 4th Mondays of each month]
