

QIBA Perfusion, Diffusion and Flow – MRI Biomarker Committee (BC) Call

Wednesday, May 9, 2018 at 11 AM (CT)

Call Summary

Participants

Michael Boss, PhD (Co-Chair)
Mark Brown, PhD
Thomas Chenevert, PhD
Catherine Coolens, PhD
Amita Dave, PhD
Xavier Golay, PhD

Harrison Kim, PhD, MBA
Daniel Krainak, PhD
Dariya Malyarenko, PhD
Krishna Nayak, PhD
Nancy Obuchowski, PhD

Nicolas Rognin, MSc, PhD
Samir Sharma, PhD
Ying Tang, PhD
Elisabeth Wilde, PhD
Ona Wu, PhD

RSNA

Joe Koudelik
Susan Stanfa

Moderator: Dr. Boss

QIBA Dashboard

- A new version of dashboards, created by the QIBA Process Committee and piloted by Dr. Boss, were distributed to scientific liaisons and CC leaders; Dr. Boss to work with PDF-MRI TF leaders to update this document

Round-6 DSC Phantom Project Update (Dr. Wu)

[Some of the information below was taken from Dr. Wu's slide presentation]

- Acknowledgments for phantom development, MRI protocol, software and round robin testing were provided
- Goals of this project were presented
- Goal one: Develop a prototype DSC phantom from which a gradient of susceptibility values can be measured
 - Used DWI phantom shell containing 13 vials
 - Experimented with different solutions and found one that had at least one year stability: agarose + GdCl₃ + stabilizer
- Goal two: Create generic acquisition across multiple vendors (phantom scanning with DSC MRI protocol)
 - Round robin testing was performed
 - DSC acquisition: larger FOV to mitigate ASSET artifacts (adjustments for multivendor harmonization)
- Goal three: Develop software for analyzing data
 - Creation of MATLAB GUI
 - Inspired by Drs. Malyarenko's and Chenevert's DWI analysis for ROI placement
 - Interactive GUI (also non-interactive option available) for ROI placements of the same diameter ROI
 - Will automatically calculate the $\Delta R2^*$ values and plot them
 - Results can be saved
 - Accompanying software to calculate $R2^*$ from ME-GRE data
 - Accepts both DICOM and NiftI formats
 - P-code + software manual available on request
 - Currently being double checked to handle enhanced MRI format
 - If program does not work for user's DICOM, recommend converting to NII with data in expected temporal order
 - ME-GRE Software: Similar ROI interface, processing interface different

- Goal four: Estimate reproducibility and feasibility of performing these measurements across multiple centers at multiple time points
- Summary
 - Phantom, analysis software and protocols were developed that can be used to assess for stability of DSC-EPI sequence
 - Scanners with poor ICC across serial acquisitions should perhaps be avoided for clinical trials
 - However, phantom shell is probably worst case scenario for EPI-GRE studies
 - Future susceptibility phantoms should avoid screws between hemisphere shells and reposition low concentration vials away from susceptibility sources
 - 0% concentration solution should be used for reference vials in place of GdCl
 - Human subjects will likely have fewer sources of susceptibility distortion
 - Therefore, if scanners have excellent reproducibility across time with DSC phantom, the scanner will perform well for human subjects
- Dr. Obuchowski suggested using metrics related to Claims, such as within subject correlation, instead of Interclass Correlation Coefficient (ICC)
- Ground truth is complicated and worthy of exploration, possibly with NIST measurement assistance
- Suggestion for commercialization of this phantom for more widespread adaptation (by HPD or NIST as provider)
- Recommendations to use smaller vials (recommend sourcing off the shelf vial to keep costs down) and redesign central plate to minimize distortion
- DSC phantom questions can be send to [Dr. Wu](#)

Plan for May 23 PDF-MRI BC T-con

- Dr. Nayak to present Round-6 DCE project
- A topic for discussion at the QIBA Annual Meeting will be the reorganization of the PDF-MRI BC; update will be provided

Next PDF-MRI BC Call: Wednesday, May 23, 2018 at 11 AM CT

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