

QIBA Quantitative DCE-MRI Subcommittee

Wednesday, January 06, 2010

11 AM CST

Call Summary

In attendance

Gudrun Zahlmann, PhD (co-chair)
Edward Jackson, PhD (co-chair)
Edward Ashton, PhD
Orest Boyko, MD
Geoffrey Clarke, PhD
Gregory Karczmar, PhD
Michael Knopp, MD, PhD

David Purdy, PhD
Mark Rosen, MD, PhD
Annette Schmid, PhD
Mitchell Schnall, MD, PhD

RSNA

Susan Anderson, MLS
Joe Koudelik

UPenn data analysis update (Drs Ashton and Rosen)

- Siemens VA 30 scanner used for first phantom image acquisition; data uploaded to FTP site for Dr Ashton (VirtualScopics) to analyze; first round of analysis completed
 - VA 30 data shows flip angle issues and software not reading T1s; corrections have been made in analysis phase
- Siemens VB 15 (newer scanner) being used for second round of QIBA phantom study acquisitions; no ambiguity of phantom chamber positions noticed; Dr Rosen to determine whether data was sent to Dr Ashton; Dr Rosen will re-send on DVD or upload latest two datasets to FTP site if necessary
- UPenn to hold second phantom while VB 15 data analysis is completed in the event rescanning is needed; Duke (Dr Cecil Charles) next to receive phantom from UPenn
- Drs Ashton and Rosen to discuss next steps off-line

UChicago update (Dr Karczmar)

- T1 plots show issues, but do fit signal model and match Dr Ashton's analysis
- UChicago to rescan the MDACC modified QIBA phantom (phantom containing orientation markings); Dr Jackson to resend phantom to Dr Karczmar

Data analysis outline

- Dr Ashton to provide more detailed data analysis outline and circulate; initial outline incorporated within the DCE-MRI study poster presented at RSNA 2009, now posted to the QIBA Wiki for reference at:
 - "QIBA Quantitative MRI Poster for RSNA 2009 Annual Meeting"
 - <http://qibawiki.rsna.org/index.php?title=DCE-MRI>

QIBA DCE-MRI phantom and imaging procedure (Dr Jackson)

- Discussion on whether the IRAT-modified QIBA phantom is best suited for DCE-MRI testing and validation of systems; issues include:
 - Limited internal sample number of eight compartments
 - Difficult phantom handling due to needed rotation of the phantom
 - Not robust enough for site-to-site shipping due to internal component movement (also encountered with the ADNI phantom)
- Proposed replacement phantom, designed by Dr Evelhoch, contains a series of vials within a flood uniform field phantom

- Concept of the revised phantom: Four pseudo-rotations with 8 different vial concentrations would duplicate the current phantom with fewer issues and complexity of design to assess signal intensity v. R1
- Goal is a fit-for-purpose phantom of simple design for best handling and shipping
- Group consensus was to continue with the current QIBA phantom design for now, while examining a replacement based on the Evelhoch design

Requirements of a new phantom

- Need large, loadable internal compartments providing adequate 3D density ranges for assessment of broader R1 measures
- Need asymmetrical design to assist with identifying compartment orientation e.g. top-left, etc
- Dr Jackson to pursue developing a design drawing of new phantom based on three rotations, four not needed
- Vial spacing needs to be examined to minimize Gibbs effects
- Spatial accuracy component not needed on this phantom
- Define geometry and dimensions; bring back to group for feedback
- Could be manufactured at MDACC (or at phantom manufacturer)
- UPenn pursuing support for site-validation study; funding may be available for prototype and phantom development also (per Dr Schnall)
- Other funding options to be discussed when cost estimates available
- Comments and suggestions on proposed design should be directed to Dr Jackson

Next Steps:

- UPenn dataset analysis update
- Dr Ashton to provide more details on data analysis steps and process if needed
- Comments to Dr Jackson from committee on proposed phantom design requested
- Dr Jackson will proceed with more refined and formal drawing of phantom and will provide rough cost estimate for prototype phantom
- Discuss cost estimates and funding including ACRIN proposal for phantom manufacturing
- RSNA staff to post RSNA 2009 committee poster on wiki
- Next call scheduled for Wednesday, January 20th at 11 am CST