QIBA Proton Density Fat Fraction Biomarker Committee (PDFF BC) Update Call

Thursday, April 4, 2019 at 3 PM (CT)

Call Summary

Participants			**RSNA**
Scott Reeder, MD, PhD	Dariya Malyarenko, PhD	Suraj Serai, PhD	Joe Koudelik
Takeshi Yokoo, MD, PhD	Michael Middleton, MD	Samir Sharma, PhD	Susan Stanfa
Mustafa Bashir, PhD	Nancy Obuchowski, PhD	Jean Tkach, PhD	
Gavin Hamilton, PhD	Hans Peeters, PhD	Andrew Trout, MD	
Harry Hu, PhD	Jonathan Riek, PhD		

Moderator: Takeshi Yokoo, MD, PhD

Review of Previous Call Summary

- The 02.07.2019 call summary was approved as presented

Multi-Vendor Calimetrix Phantom Study Update (Dr. Hu)

- "Multi-Site, Multi-Vendor, and Multi-Platform Reproducibility and Accuracy of Quantitative Proton-Density Fat Fraction (PDFF) at 1.5T and 3T with a Standardized Spherical Phantom: Results from a Study by the RSNA QIBA PDFF Biomarker Committee" presentation will be given at the ISMRM Annual Meeting, May 11-16, Montreal, QC, Canada
- Dr. Hu led this round-robin, multi-vendor study to determine bias in image acquisition and reconstruction; he collected all true phantom PDFF values (measurements) and performed ROI measurements
- The study and data analyses are not yet final, but considerable progress has been made on amassing data
- Three protocols were run at each site: vendor-specific, QIBA-recommended and LipoQuant
- Thirteen sites were included in this study and nine sites have participated to date
- The physical phantom has remained stable over the 6-month study with no signs of degradation
- The only reported "issue" occurred with PDFF vendor protocols for 1.5T and 3T Siemens machines at CHOP (Dr. Serai), Duke University (Dr. Bashir) and Nationwide Children's Hospital in Columbus, OH (NCH)(Dr. Hu)
    - Water and fat PDFF maps were swapped, rendering the data unusable
    - Siemens assisted with addressing the issue through a retrospective reconstruction patch for use at time of scanning
    - The reconstruction data from the 3T machine/protocols looked acceptable; but not from the 1.5T
    - Siemens to deliver software/algorithm (recon) to CHOP, Duke University and NCH; Siemens sites will return it after ISMRM and test it with the new algorithm (mini multi-site round robin)
        - The new data will be discussed during an upcoming call
        - Dr. Hu will touch base with Drs. Middleton and Yokoo to discuss how to re-optimize the 3T Siemens software issues observed
    - Siemens algorithm permitted for use only on a phantom; it is forbidden for the correction to be used with human subjects
    - Comparison with central recon vs. vendor recon identified that the reconstruction was an additional source of variability; greatest source of bias is yet to be determined

    - Since many factors may affect bias; independent factors need to be tested, such as scanner, imaging protocol, reconstruction process, software, reader, etc.
    - Dr. Hu to reach out to Dr. Obuchowski regarding statistical issues and predictive bias modeling

- Mayo Clinic to send the phantom back to Dr. Reeder at the University of Wisconsin in Madison for a re-scan
- PDFF BC members were encouraged to contact Dr. Hu with feedback on his presentation of the study results
    - Dr. Hu to update slides in response to the discussion
    - Caution voiced regarding the use of vendor and platform names, since this may result in vendor pushback and reduced QIBA engagement

Next call: Thursday, May 2, 2019 at 3 PM CT

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