QIBA Contrast Enhanced Ultrasound (CEUS) Biomarker Committee (BC) Call

Friday, September 14, 2018; 11 AM CT

Call Summary

In attendance

Mike Averkiou, PhD (Co-Chair)
Todd Erpelding, PhD (Co-Chair)
Paul Carson, PhD
Gilles Casqueiro, MSE
J. Brian Fowlkes, PhD
Ged Harrison, BS
Hui Jiang, PhD
Zaiyang Long, PhD
Andy Milkowski, MS
Nancy Obuchowski, PhD
Lihong Pan, PhD
Thierry Rognard
Theresa Tuthill, PhD
Stephanie Wilson, MD

RSNA

Joe Koudelik
Julie Lisiecki

Moderator: Dr. Averkiou

Bubble Conference highlights:

- The International Contrast Ultrasound Society, (ICUS), is a model and advocacy organization for ultrasound, and are the organizers of the Bubble Conference
    - Micro-bubble contrast agents are used in cases where traditional contrast cannot be used, and have been shown to be safe and effective
- Dr**.** Averkiou discussed the paper he presented at the Bubble Conference, entitled, "QIBA (*Quantitative Imaging Biomarker Alliance*) CEUS Perfusion Quantification Standardization," which is based on the QIBA CEUS BC work
- He explained what the CEUS BC is trying to quantify and that the group is starting with bolus injections, though other approaches may be considered in the future
- Due to the large number of cardiologists in attendance, there were questions regarding flash replenishment as well as standardizing measurement parameters
    - It was noted that standardizing measurement parameters may not be affected by the discussion of bolus vs. flash replenishment
- Standardization was highlighted and how the CEUS BC is working to figure out what needs to be adjusted among systems, software, etc., in order to provide reproducible results

Reproducibility Study Update:

- Dr. Averkiou shared results of system performance on three different systems
- 10-20% intra-system variability encountered
- He explained that these results were not an evaluation of system performance but rather an evaluation of how to measure reproducibly and make system adjustments if necessary

Phantom studies:

- The goal of these phantom studies is to determine injection noise and a suitable model to test performance parameters
- Canon is planning on running the same set of curves hoping to obtain reproducible results
- Bracco is trying to recreate the phantom with similar curves, where time parameters and variability are similar
- All groups are working on addressing inter-operating differences such as:
    - Where adjustments need to be made
    - Where reference points are needed
    - How injection is done in the clinic (without a pump) in order to mimic this process accurately
- It is uncertain where the variability is coming from
    - Different systems have differing levels of noise, which may impact their intensity curves
    - Variability = noise + variability of the curve-fit model to feed those parameters
- Good progress has been made on multiple systems producing the same answer
    - It has also been helpful to use saline instead of de-ionized water

RSNA 2018 Poster:

- Dr. Averkiou has agreed to update the 2017 poster and provide newer results
- He will circulate his edited version amongst BC members for any edits

- Dr. Fowlkes suggested that it would be good practice to de-identify the systems, software tools, and micro-bubbles that were included in the reproducibility study for the poster and any future publications
    - It is only necessary to provide the number of platforms and key results
    - It may also be helpful to speak with the Shear Wave Speed BC, as they have also had to de-identify systems and software for a recent publication submitted by Dr. Palmeri to *Radiology*
- Manufacturers and vendors on the call also supported de-identification of data, indicating that this provides a more level playing field and an unbiased view when validating study results
- Mr. Milkowski offered to help with anonymization efforts
- Terms suggested included:
    - "participating systems" to replace "competing systems"
    - Systems A, B, C
    - Software analysis programs 1, 2, 3
- As noted, the different vendors are not competing for anything by participating, but rather collaborating to work toward standardization, which will benefit patient treatment and make manufacturing more efficient
- Mr. Milkowski suggested that sharing the research in the form of anonymized charts demonstrating the reproducibility study, is very helpful in changing vendor mindsets
- It was noted that even the smallest system changes are big change for manufacturers, but showing its impact can move change along more quickly
- Dr. Carson suggested adding some background detail regarding what the goals and expected outcomes are for the BC effort, such as standardization of Profiles and a reduction in the variance between systems
- DICOM headers will also need to be addressed

WebEx Calls: **Sept 21**: US Coordinating Ctte **Oct 12**: US CEUS BC **Oct 31:** Deadline for RSNA print-ready posters

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