

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

Friday, January 11, 2019; 11 AM CT

Call Summary

In attendance

Mike Averkiou, PhD (Co-Chair)

Todd Erpelding, PhD, MSE (Co-Chair)

Christian Greis, PhD

Tim Hall, PhD

Ged Harrison

Ken Hoyt, PhD, MBA

Hui Jiang, PhD

Ravi Managuli, PhD

Andy Milkowski, MS

Theresa Tuthill, PhD

Stephanie Wilson, MD

RSNA

Joe Koudelik

Julie Lisiecki

Moderator: Dr. Averkiou

RSNA 2018 CEUS Break Out Session Recap: Dr. Erpelding

- Break out session discussion at the QIBA f2f Working Meeting focused on review of amplitude-based parameters (PI, AUC) which have high test-retest variability in flow phantom experiments
 - The group hopes to determine what the sources of variability are in future BC discussions
- Dr. Kubale shared that RT is the most important parameter in his opinion
- Dr. Greis shared examples of Bracco calibration of 4 different ultrasound systems for bubble concentration vs. signal intensity based on similar phantom methods
- **Recommended action items were:**
 - Refine/investigate phantom experiment method with an aim to lower variability of amplitude-based parameters
 - Develop written Standard Operating Procedures (SOP) for QIBA CEUS flow phantom experiments with feedback from committee
 - Find a second site to repeat flow phantom experiments following the same protocol
 - Investigate normalization of time-intensity curves across vendors/platforms
 - More discussion needed regarding amplitude-based parameters
- Minutes from the break out session will be distributed to all BC members for reference

Update on latest experiments: Dr. Averkiou

- Focus has been on flow phantom activities using time intensity curves (TIC) to develop a Profile utilizing bolus injection
- Ready to move forward with completion of the phantom data
 - The phantom setup can be reviewed [here](#)
- Comparison with a second clinical site would be helpful to aid normalization of curves across different vendors
- Focus will remain on the liver for now, though the BC is considering other clinical applications
- Dr. Averkiou has also shared the phantom data with Bracco in order for them to perform the same tests for a comparison of the analysis data
- Philips, GE and Siemens will also be working with the phantom data to compare data
- Dr. Jiang (Siemens) has already set up the system and tested it
 - He noted that the phantom meets most of the Siemens protocol and had no negative feedback
- Dr. Averkiou has collected a new set of data on his lab's new Siemens system and noted that this scanner has its own method of producing a TIC, which differs from other methods
 - He intends to make the TIC available to Siemens for their own in-house analysis
 - He also suggests using MATLAB and VueBox to quantify the TIC and complete the analysis
- Dr. Hall mentioned that MATLAB has the option to utilize a free lifetime license to download MATLAB executables in the event that volunteers do not have access to a license for the full version of MATLAB
- Dr. Averkiou hopes to create an executable that is compatible with multiple computer languages and could use the graphical user interface (GUI) capabilities of MATLAB

Amplitude discussion:

- Input regarding amplitude is needed from imaging companies
- Variability observed regarding vendor calibration methods; need to know the expected level of variability at peak intensity and how to calibrate

- It will be necessary to convert the logarithmic value to an absolute K value
- A new study was suggested to address amplitude variability
 - One of the scanner manufacturer partners will need to implement this on their system, as Dr. Averkiou's lab does not have the funding to pursue this study
- Microbubble intensity is another topic that must be explored further
 - Dr. Averkiou to identify a single value (metric) in order to compare amplitude values between systems, which is different from the comparison of amplitude variability

Next call topic: Amplitude standardization between systems

The next scheduled QIBA ultrasound calls will be as follows at 11 am CT:

- **2/1/2019** – SWS BC call – *pending moderator availability*
 - **2/8/2019** – CEUS BC call
 - **2/22/2018** – US Coordinating Committee
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