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

Friday, February 9, 2018; 11 AM CT

Call Summary

In attendance			**RSNA**
Mike Averkiou, PhD (Co-Chair)	Christian Greis, PhD	Nancy Obuchowski, PhD	Joe Koudelik
Todd Erpelding, PhD, MSE (Co-Chair)	Tim Hall, PhD	Lihong Pan, PhD	Julie Lisiecki
Paul Carson, PhD	Gerard (Ged) Harrison, BS	Thierry Rognard	
Madison Gallagher	Hui Jiang, PhD	Theresa Tuthill, PhD	
	Wayne Monsky, MD, PhD	Stephanie Wilson, MD	

Moderator: Dr. Averkiou

Discussion included:

- Dr. Averkiou provided an update on the group's work regarding a standardized protocol for the phantom measurements
- Discussion focused around the issue of contrast recirculation
- There is a need to eliminate the point of the curve where recirculation is taking place
- The fitted curve curves may be expanded beyond the last data point
- Recirculation issues are encountered with in vivo clinical data only; this is not expected with in vitro data (e.g. phantom data), thus there is no need for a recirculation phantom
- Dr. Averkiou pointed the group to a 2010 reference for review which discussed the different scanner models, their physical basis, and the explanation of the extracted parameters (PMID: 20529706)
- Various analysis software packages were also discussed:
    - Work with a single analysis software for ease of use and similar output *or*
    - Work with multiple analysis software and compare results
    - Most preferred the option to work with multiple packages to better determine the variability amongst different packages
- The Time-Intensity-Curve (TIC) Analysis works as follows:
    - Collect a loop, form a TIC, and fit a curve on the data
    - Extract quantification parameters
        - Parameter 1: Rise time or "wash-in" time (from zero to the maximum intensity)
            - This is one of the most basic parameters
        - Parameter 2: Mean-transit time
            - Mathematically, this is the first moment of the curve and is inversely proportional to flow
        - Parameter 3: Area under the curve
        - Parameter 4: Peak intensity
- It is necessary to develop a common set of TIC parameters (common data elements) extracted from the different software analysis programs that the BC will agree upon
    - Once parameters are agreed upon, they will be used to standardize the phantom and the data collection procedure
    - Dr. Averkiou to send out specifications for the phantom and 2 – 3 TIC curves for BC members to test prior to the next call on March 9th
- Some quantification software packages measure relative change and the numbers of the y-axis are not consistent between different packages
    - The basic premise is that higher bubble concentration leads to higher intensity
    - Inter-vendor variability is important to include in the Profile to indicate to users what discrepancies are expected
    - Inter-model (curve fit) and inter-institution variability will also be considered
    - More emphasis is needed on the issue of peak intensity and the committee should further discuss this

AIUM meeting:

- There will be a QIBA meeting at AIUM (March 24 – 28, 2018): a doodle poll will be sent to BC members to determine the best date and time
- Dr. Averkiou will review CEUS and doppler sessions, as well as presenter sessions to avoid conflicting with them

- As a reminder, the CEUS Profile will focus on the following:
    - Bolus technique using wash-in/ wash-out analysis
    - Clinical emphasis on perfusion of liver lesions and in vitro or other applications s deemed appropriate by the clinical focus task force

Action Items:

- Dr. Wilson will review her five systems and will report back to the group regarding mean transit time on March 9th
    - Dr. Wilson favors peak intensity measurements, as mean transit time can be quite difficult
- Dr. Averkiou will provide a paper for distribution to the BC
- Dr. Carson will email Kathi Minton at the AIUM regarding meeting room availability and request a Doodle poll of the BC for most accommodating time meeting time

Ultrasound CEUS BC QIBA wiki page: http://qibawiki.rsna.org/index.php/Ultrasound_CEUS_BC

WebEx Calls:

- **March 9:** CEUS BC **April 6**: SWS BC **April 13:** CEUS BC

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