QIBA Contrast Enhanced Ultrasound (CEUS) Biomarker Committee (BC) Call
Friday, February 9, 2018; 11 AM CT

Call Summary

In attendance

| 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 |

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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:
  o Bolus technique using wash-in/ wash-out analysis
  o 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
  o 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


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**WebEx Calls:**

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

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