QIBA Ultrasound Shear Wave Speed (SWS): System Dependencies Subcommittee

Friday, June 29, 2012; 11 AM CT

Call Summary

In attendance

Mark Palmeri, MD, PhD (Co-Chair)
Keith Wear, PhD (Co-Chair)
John Benson
Paul L. Carson, PhD, (QIBA Sci. Coord)
Shigao Chen, PhD
Claude Cohen-Bacrie, MS
David Cosgrove, MD
Liexiang Fan, PhD
Caterina M. Gallippi, PhD
Timothy J. Hall, PhD
Stephen McAleavey, PhD
Andy Milkowski, MS
Nicolas Rognin, MSc, PhD
Laurent Sandrin, PhD
Ron Tosh, PhD
Hua Xie, PhD

RSNA

Julie Lisiecki

Moderator: Mark Palmeri, MD, PhD

Update on Literature Search (Dr. Xie)

- Dr. Xie is compiling references, including descriptions
- Metanalysis and identification of references emphasized
- Currently, there is no clinical or technical record on how to perform the scan
- Expansion of MRE data, organized by parameters, would be helpful to document

Searchable database of current methodologies (Dr. Palmeri)

- This task may be assigned to the Clinical Subcommittee
- A preliminary searchable database will be posted to the QIBA wiki for review and comment
- Group members to send items to Dr. Palmeri (Mark.Palmeri@duke.edu) or Dr. Wear (Keith.Wear@fda.hhs.gov)
- Additional information categories for the database established, including the methodology for a specific system being used, and whether or not it agrees with manufacturer-recommended protocols (see below for more information being provided by manufacturer representatives).

Comparison of Measurements

- Data should be recorded in the database in the form it was originally reported (e.g. shear wave speed or Young's modulus, etc.)
- In order to facilitate comparisons, data might also be converted and recorded in a standard form (e.g. shear wave speed) (in addition to being recorded in its originally reported form)
- **A European document on elastography with focus on methodology is due for imminent release**

PowerPoint Presentation (Mr. Cohen-Bacrie)

- Brief presentation summarizing spectral Doppler vs. color elastography.
- Covered imaging of elastography vs. quantification
- Proposed a framework to differentiate dependencies, such as temporal, spatial, etc.

Discussion of System versus Biological Confounders

System Dependency	**Biological Confounder**
Shear Wave Excitation Frequency Content	Interstitial Pressure, including arterial, venous and inflammatory origins
Operator Variability, including choice of ROI, hand-held compression, instructing patient breath hold, etc.	Tissue nonlinearity (compression and pressure dependence)

Shear Wave Reconstruction Accuracy, including impact of reflected shear waves, noise, finite PRF / spatial sampling, motion, averaging, dealing with phase velocity, etc.	Target organ depth
Operator instructions, including how many measurements to make, where to make measurements, how to reduce to a single value (median, mean, outlier removal, etc.)	Heterogeneous ROI (i.e., structures that will complicate shear wave propagation)
Diffraction effects (measurement dependence on ROI depth)	Tissue properties that might affect dispersion (e.g., steatosis)

Group Goals

- To move the industry forward and establish commonalities for adoption of a standardized methodology
- Focus on deliverables using the list of dependencies to see what relates to systems
- Identify largest sources of variance and attempt to control or modify those that influence measurements

Next steps:

- Dr. Hua Xie to continue compilation of references
- Group to send database entries to Dr. Palmeri: mark.palmeri@duke.edu or Dr. Wear: Keith.Wear@fda.hhs.gov.
- System Representatives could provide recommended protocols for their systems; please send these to either Dr. Wear or Dr. Palmeri before the next telecon.

Next calls:

- QIBA US SWS Technical Committee - **Monday, July 9, 2012 at 1:00 PM CT** (Mr. Milkowski to moderate)
- Phantom Subcommittee - **Monday, July 16, 2012 at 1:00 PM CT** (Drs. Hall and Garra to moderate)
- System Dependencies Subcommittee - **Friday, July 20, 2012 at 11:00 AM CT** (Dr. Wear to moderate)

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