

QIBA Quantitative CT Committee Update

Monday, March 8, 2010

11 AM CST

Call Summary

In attendance

Andrew Buckler, MS (co-chair)
Kristin Borradaile, MS
David A. Clunie, MBBS
Charles Fenimore, PhD
John Fraunberger
David Gustafson, PhD
Philip F. Judy, PhD
John Lu, PhD
Michael McNitt-Gray, PhD
Kevin O'Donnell
Nicholas Petrick, PhD
Anthony Reeves, PhD

Yuanxin Rong, MD, MPH
Daniel C. Sullivan, MD
David Vining, MD
Hiro Yoshida, PhD

RSNA

Fiona Miller
Susan Anderson, MLS
Joe Koudelik

Update on VOLCAMAN '10 (Dr Reeves)

- VOLCAMAN is based on the VOLCANO study which used computer-aided algorithms to evaluate lesion size, to determine how well machines could detect change in lesions; VOLCAMAN '10 will use only manual mark-up/measurements
 - VOLCANO dataset was based on 50 lesion pairs, some with no change, with different slice thicknesses; data subsets to eventually be made public
 - Mainly low-dose cases
 - One FDA phantom case as a reference point
 - VOLCANO has logged 13 participants who used 18 methods; VOLCANO still open for participation
 - Publication forthcoming on comparison of methods
- VOLCAMAN '10, a web-based system, will use the same dataset but will use expert radiologist manual readings; will look at inter-reader variability and differences compared with computer-aided algorithms
- The experts will self-train before the reading session(s)
- May consider reads of only 25 lesion pairs to reduce time requirements for readers
- Study design and website nearly complete
- Encourage wide participation from expert readers; may consider comparison between expert physicians, medical physicists and other readers
- Readers may be offered co-authorship of publication as incentive and will be able to receive feedback comparing their performance with other (anonymized) readers
- Interested participants encouraged to contact Dr Reeves about participation in VOLCAMAN
- Results may provide good basis for comparison with reader study from Q-CT Group 1A
 - There were 6 readers in 1A study (inter- and intra-reader variability using phantom data)
 - Projecting 5 readers for 1B performing both linear and volumetric measures

Discussion of performance of volumetric imaging analysis (Mr Buckler)

- Need to understand how each of the recently reported efforts (Biochange, Volcano, Nelson trial, 1A, The Merck data study, and VOLCAMAN) as well as those which are in progress (1B and 1C) relate to each other in terms of building a base of evidence on how the biomarker performs
- Discussion of use of Kaplan Meier curve (time-to-event plot, usually used for survival) to show performance of longitudinal change marker; used to compare candidate progression biomarkers
- Interest in how to evaluate performance of biomarker (e.g. noise, bias, precision) while comparing effectiveness with state-of-the-art methods
- The Kaplan Meier is a function of the threshold, which in turn is determined by noise, bias, and precision. That is, the threshold is tight if the biomarker has good noise, bias, and precision characteristics, or it is wide
- A tight threshold suggests that the biomarker may be more sensitive, that is, it will see an event sooner than if the threshold is wide
- Chart requires at least two time points; format is not be directly applicable to experiments where only one time point is assessed, however, the single time point studies we do inform the noise, bias, and precision numbers that help us to set the threshold for multiple time point studies
- All studies ultimately need to get to this point. Some studies set up a threshold for volume versus Single Longest Diameter; others then apply it.

Next Steps

- Interested participants encouraged to contact Dr Reeves (reeves@ece.cornell.edu) about participation in VOLCAMAN '10
- Dr Vining may recruit additional readers from MD Anderson CC if needed
- Continued discussion on concordance of all of the related efforts: Biochange, Nelson, 1A, retrospective data studies, VOLCAMAN, 1B, 1C... and others
- Need to discuss/finalize plans for abstracts for this year's annual meeting
- Next call scheduled for Monday, Mar 15 at 11 am CDT