QIBA Quantitative CT Committee

Monday, December 21, 2009
11 AM CDT

Call Summary

In attendance

Andrew Buckler, MS (co-chair)
P. David Mozley, MD (co-chair)
Lawrence Schwartz, MD (co-chair)
Patricia E. Cole, PhD, MD
Charles Fenimore, PhD
John Fraunberger
David Gustafson, PhD
Philip F. Judy, PhD
Grace Kim, PhD
James Mulshine, MD
Kevin O'Donnell
Nicholas Petrick, PhD
Anthony Reeves, PhD
Yuanxin Rong, MD, MPH
Daniel Sullivan, MD

RSNA

Fiona Miller
Susan Anderson, MLS
Joe Koudelik

Update on *Optics Express* paper (Mr Buckler)

- Paper to be published in special issue of *Optics Express*, using interactive science publishing, highlighting open-source test data in quantitative imaging
- Dr Fenimore, Petrick, Reeves and Mozley contributing; contributors will upload DICOM headers and images to website identified by Mr Buckler
    - Dr Fenimore to talk with Dr Clarke about use of images and attribution to RIDER before January
    - Dr Reeves also will supply material by January; Dr Petrick hopes to complete work by Dec 23
    - Dr Mozley to upload images by January

Group 1A analysis (Dr Petrick)

- Data was distributed to committee after Dec 14 call; feedback welcome
- Dr Petrick to address how to converge analysis and will continue work on ANOVA analysis and statistical significance analysis
- Plan to submit for RSNA 2010 meeting
- Will aim to publish report, possibly in *Radiology*

Roadmapping activity (Mr Buckler)

- Along with experimental groundwork and three Profiles (2 in oncology, 1 in COPD) under development, roadmapping is continuing group activity
- Two documents reviewed by Mr Buckler:
    - Narrative paper *Consensus Position on the Assessment of Quantitative Imaging Biomarkers with Implication to Process Roadmap*
    - Excel spreadsheet of roadmapping steps and activities overall and by modality
- *Consensus Position on the Assessment of Quantitative Imaging Biomarkers with Implication to Process Roadmap* is relevant to any biomarker; a simple format outlining QIBA aims. The purpose of this paper is to converge the thoughts of otherwise diverse stakeholders who are interested and active in the definition, validation, and qualification of imaging as a biomarker. The approach is to create a series of connected thoughts that present linked propositions understood and agreed to by the stakeholders so as to reach agreement on the collaborative activities needed to advance specific biomarkers as well as the field in general.

- Quantitative imaging can provide numeric readouts which may be incorporated into *phenotyping* (assessed by ROC curves relative to the alternative of not using the imaging readouts) and/ or *longitudinal measurements of disease progression* (including therapy response assessment),
- Progression:
    - May include an aggregation of all mechanisms of action, e.g. volume, or specific mechanisms of action
    - Requires sensitivity to time course and magnitude of biological change
    - Shows relative performance as a Kaplan-Meier plot similar (but different than) a survival curve
- Recommendation of excellent talk presented at RSNA/AAPM symposium by R. Mark Henkelman, PhD of Toronto on *Advances in QI: Linking the Phenome to the Genome*
- Roadmap section of paper merges two roadmap iterations:
    - Drs Sullivan and Dorfman document published as TRWG result
    - Version of the roadmap which was discussed in recent *Academic Radiology* article (and whose origin can be traced to Dr Mozley's initial ideas on Roadmapping from our discussions during the fall of 2008)
- Suggestions:
    - Use term 'Progression of disease/modification' instead of current 'Progression' to encompass others areas than oncology including COPD and osteoarthritis
    - Emphasize value of quantitative imaging early in document and define terms
    - Begin paper with Roadmapping discussion and then discuss phenotyping and progression concepts
- Spreadsheet:
    - QIBA may have involvement in some columns; other stakeholders' involvement may be represented in other columns
        - May be useful to highlight areas within QIBA scope
    - Users of the data we accumulate may include three groups: CDER, CDRH and CMMS and their equivalents in other countries to inform drug development, device optimization/commercialization and reimbursement
    - Consider stages for qualified biomarkers including use as secondary endpoint, e.g. use of imaging related to inflammation in multiple sclerosis
    - Suggestions:
        - Change 'trial' to 'trials' in column H; multiple trials assumed
        - Reverse columns H&I to show progression from preclinical to translational
        - Use term 'Feature/Metric' instead of current 'Feature' to emphasize quantitative metric
        - Map out and add texture to points along the path to ultimate endpoint
        - Work on single table per disease, e.g. rows 23-25 on COPD

Next Steps

- Dr Petrick will continue with analysis and methodology write-up
- Dr Petrick to address how to converge analysis and will continue work on ANOVA analysis and statistical significance analysis
- Changes and/or suggestions requested on Roadmapping documents; submit in Track Changes mode or e-mail comments to Mr Buckler
- Committee requested to suggest 'authoritative citations' for spreadsheet and to help identify authoritative or definitive documentation