Volumetric CT Group 1C update WebEx
Friday, December 19, 2008
11:15am CT

Call Summary

In attendance:

Charles Fenimore, PhD (Moderator)
Andrew Buckler, MS
Michael McNitt-Gray, PhD
Nicholas Petrick, PhD
Fiona Miller (RSNA)
Susan Anderson (RSNA)
Joe Koudelik (RSNA)

Statement of focus and scope of study (Dr. Fenimore)

- Instrumental variability is group 1C goal
- Posted on website (http://qibawiki.rsna.org/index.php?title=VolCT_-_Group_1C)
- Work continues on matrix of anticipated overall measurement problems
- Mr. Buckler suggested populating all the rows and columns to clarify the work of Groups 1A, B and C

Challenges and Issues for Group 1C to Address

Item #4 ***Variation due to modality physics***

- Discussion to decide whether to consider and how widely
- Implications of ways to collect data to allow for future comparisons
- Cone beam (16 and higher) may be different that 4-6 slice system; keep cone beam on the horizon
- Most cone beams now are being used for therapeutics and not limited to diagnostics
    - The correction on most scanners is not a user-selected variable:
        - Does scanner have a cone-beam correction?
        - How to turn correction on/off
        - Examine 4, 16, 64, 120, 240 slice cone beam CT scanners as future project.
- Can we provide guidance?
    - RIDER project is considering producing a manual to deal with mitigation measures, e.g. patient breathing or breath holds

Item #5 ***Variation in scanner design***

- Addressing this variation is the heart of the work we are proposing; 1C effort is characterizing across a range of designs
    - In the future, may have other measurements
- NLST protocol has point spread function
    - Do we need to include a pocket phantom to extract this?

    - With pocket phantom, we could acquire data to hold, not necessarily use. Could identify as an area for future work
- Consider phased approach, thinking forward to image quality standards
    - In 4-5 years, we could have image quality metrics
    - Specify not in terms that manufacturers use but move towards standard measures such as NEQ (noise equivalent quanta) DQE (Detective Quantum Efficiency).
    - If QIBA is encouraging certain directions and a roadmap, add this to head of list.
    - It is difficult to figure reconstruction; using a physical measurement is better.
- Could use FDA phantom to collect data and correlate with tumor volumes; next logical step for 1A.
- Measure:
    - water phantom; (Dr. Petrick noted they are collecting on a Philips scanner at his institution)
    - line pattern phantom;
    - 3-D
- Consider workload burden and time of participants to collect this data
    - The time commitment is relatively straightforward and not that great; the bigger commitment is acquiring patient phantom data which can take 95% of the time
    - Suggestion to use graduate students to analyze data (UCLA is doing this)
    - AAPM has a task force looking at 3-D noise spectrum and phantoms.
- Agree to pass some work on as "future areas of interest"
    - e.g. Image quality metrics for specific clinical trial tasks
- Explore variation by using one type of scanner and conducting measurements in five different places around the country or doing multiples of measurements on same equipment.
- Adding factors increases complexity; we don't want to probe all variations in this particular study.
    - Primary sources of variation for Group 1C to address in Volumetric CT acquisition protocols:
        - exposure is important
        - slice thickness
        - pitch within range
        - reconstruction--is it important to probe across manufacturers?
- Example of NLST: used water phantoms, found very little variation
- Bigger source of variation is how scanner is used rather than scanner design
- What is difference in acquisition between different scanners claiming to do the same thing? Probe this variation.
- Decision to keep this item in list; use multiple scanners of same design

Variation in field of view

- Control for variation in field of view
- Should be specified, e.g. "reconstruct from rib-to-rib"

- Recommend as a mitigation measure “reconstructed field of view/display field of view?

Next steps

- Dr. McNitt-Gray to email ACRIN document to Dr. Fenimore and post on the QIBA Wiki
- Next call scheduled for Tuesday, January 13th, 2009 at 2 PM EST