

QIBA COPD/Asthma Airways Discussion

March 28, 2012 at 2 PM CT

Call Summary

In attendance

Presenter: Sean Fain, PhD

Heather Chen-Mayer, PhD

Martin Connell, BSc

Harvey Coxson, PhD

Barbara Croft, MD

Raul San Jose Estepar, PhD

Bernice Hoppel, PhD

Zachary Levine, PhD

Josh Levy

David A. Lynch, MB

Frank Ranallo, PhD

RSNA

Julie Lisiecki

Agenda

2:00-2:15 – Summary of STR Meeting (postponed to 4/11)

2:15-2:45 – Presentation of results from NIBIB subcontract to UW – Madison (Dr. Fain)

1. Airway and density measures of phantom
2. Dose dependence and Exact (FBP) vs. Iterative reconstruction (ASIR)

2:45-3:00 pm – Update on Airway and Density Measurement Software for phantom-based validation (Dr. Fain)

Introduction by Dr. Fain

- Dr. Judy and Dr. Coxson suggested the development of a public archive for phantoms and formation of a subgroup of the QIBA COPD/Asthma Technical Cttee to address acquiring consistent measurements from the phantom across platforms
- Digital image repository would aid in determining whether algorithm software is measuring correctly

Overview of Airway Inspector Software by Dr. Estepar

- Dr. Estepar, developer of Airway Inspector, gave an overview of next steps for the software
- Currently a gap exists between the fully-automatic version in Volumetric CT and the contiguous scan
- Dr. Estepar is trying to create a tool to bridge the gap and provide different approaches to airway measurement
 - Part of the tool function relies on a slicer tool which is no longer available
 - Airway Inspector's priority is moving to the latest version to continue needed support
 - Goal to make Airway Inspector more robust, less vulnerable to noise, and with improved automation
 - "Cloud"-based solution of particular interest as it would allow virtual project management from one site

Airway Inspector Measurement Methods

- Window = +150 HU, corresponds to wall threshold (Varied in some cases)
- Phase congruence (PC) method or Full Width and Half-Max (FWHM)

Summary/ Conclusions from Presentation for both FBP and ASIR:

- "Airway" lumen diameters measured accurately within 5-10% for 6 mm diameters and tube currents >25 mA (FBP), ≥25 mA (ASIR)
- Lumen diameters are systematically underestimated for 3 mm tubes by ~20%
- Wall thickness is consistently overestimated below 1.5 mm
- Largest source of error from underestimation of lumen diameter

Next Steps:

- **Digital image repository would form the basis for identifying the best measurement algorithms.**
- **Also would be a means of establishing the sensitivity of measures on CT scan parameters and vendor platforms.**
- Review / discussion of STR meeting on next call

Next call:

- Next COPD/Asthma Technical Committee update call: **Wednesday, April 11th, 2 pm CT**