

QIBA COPD/Asthma Committee

Tuesday, March 2, 2010

11 AM CST

Call Summary

In attendance

Philip Judy, PhD (co-chair)
David Lynch, MD (co-chair)
Andrew Buckler, MS
James Crapo, MD
Michael McNitt-Gray, PhD

RSNA

Fiona Miller
Joe Koudelik

Dr Judy provided an overview of the COPDGene standard and modified phantoms

- Air hole CT number comparisons done on four phantoms using Toshiba platform
 - ACR accreditation phantoms
 - COPDGene original phantom
 - COPDGene modified with annulus phantom
 - Kyoto Kagaku phantom
- Air and water differences discussed
- CT numbers lower with air hole in the COPDGene annulus modification, but not as low as in humans
- ACR accreditation phantom also scanned on Toshiba platform using the “Inspiration” COPDGene protocol; COPDGene protocol included two recon filters: standard and sharp
- Beam scatter may lower air hole CT numbers in COPDGene phantoms; less by 12 HU within the COPDGene modified phantom; mimics what’s seen in human tracheas

Air hole tolerances examined

- Air hole mean in ACR accreditation phantom to be between -1005 and -970 HU; the industry standard is one order of magnitude less
- Air hole size affect possible
 - ACR air hole the smallest of the group at 25mm; 30mm air holes for all others
 - Consider whether the ACR phantom air hole is too small
 - Systematic investigation needed to examine air-hole size issues
- Tolerances of ACR phantom not theoretically based, but based on expectations from vendor performance, i.e. what vendors could provide
- More sensitive way to identify histogram-related artifacts at lower HU scale needed; e.g. histogram “moments” needed to identify oddities quantitatively
- Need to engage manufacturers using the ACR accreditation phantom; need vendors to match the air hole HU units; performance benchmarks need to be articulated
- Specifications for vendors to ‘try-on’ proposed; simply to determine their performance compared to other platforms
- QIBA Profile compliance would be another pathway besides the ACR accreditation phantom
- ACR accreditation and specialized phantom deemed useful
- Approach manufactures with phantom(s) to determine what is possible, and then suggest system tweaking to produce -1000 HU for air hole CT measures.
 - Consider whether these system adjustments still allow for ACR accreditation, or whether this will disrupt systems enough to fail
- Pursuing ACR accreditation and compliance with the QIBA quantitative imaging Profile may introduce too many protocol performance constraints and might lead to vendor push-back

Siemens Sensation 64 platform discussion

- Most scanners show variability within lung median, but the Sensation 64 platform is an example of extreme histogram and attenuation shift
- Median lung density should not depend on choice of reconstruction filter
- Data suggests that the Sensation 64 platform is under-sampling; need to publicize possible issues
- Dr McNitt-Gray offered to scan COPDGene annulus to on UCLA Sensation 64 scanning
- Dr Judy to follow-up with the Fallon Clinic (Worcester, MA) to rescan all four phantoms with another Sensation 64 platform for additional comparison
- Dr Judy to distribute image set of all four phantoms to the group for feedback

Next Steps

- Drs Judy, Crapo and Hoffman to follow-up off-line and discuss standardization or the Iowa modified Catphan phantom
- Dr Judy to follow-up with the Fallon Clinic (Worcester, MA) to rescan all four phantoms with another Sensation 64 platform for additional comparison
- Dr Judy to distribute image set of all four phantoms to the group for feedback