Quantitative Imaging Biomarkers Alliance RSNA

Application for QIBA Round-2 Project Funding

Title of Proposal: Extension of Assessing Measurement Variability of Lung Lesions in Patient Data Sets: Variability Under Clinical Workflow Conditions		
QIBA Committee/Subgroup: Volumetric CT Technical Committee		
NIBIB Task Number(s) which this project addresses: Task 7 – Determine the minimum change that can be measured for the proposed method		
Project Coordinator or Lead Investigator Information:		
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Institution/Company: UCLA Department of Radiological Sciences		
Amount Requested:		

Project Description

The purpose of this project is to ***extend*** the data collection and statistical analysis of the QIBA Volumetric CT committee's 1B experiment, which is investigating the minimum detectable change in lesion size from patient datasets imaged on CT. That project used: (a) "Coffee Break" CT image datasets from 32 NSCLC patients who were imaged twice over a short (15 minute) interval on the same scanner using thin (1.25 mm) slices; (b) one lesion was identified for each patient, (c) Image data was marked up by five radiologists at RadPharm (now CoreLabs); (d) each reader marked the lesions on each of the repeat scans to obtain measures of volume, single longest diameter and bi-dimensional diameters. This data was previously collected and initial analyses have been performed.

In that previous project, each reader performed the image markup as an independent reading, with no access to the results or images of their markup of any previous session. This was done because the only data used in that study were limited to "Coffee Break" experiment cases. If readers were allowed to both: (a) know that these were cases with no change and (b) see their markings on one scan while making markings on the second scan, then those results would be considered very biased as readers would know what the answer should be (they would inherently know that the markings should match and that change should be zero). Using that independent reading paradigm, the initial results indicated that there were significant amounts of variation in measurement.

This project seeks to extend that previous effort by altering the reading paradigm to more realistically reflect conditions encountered in clinical trials and clinical practice. In the proposed project, readers would be allowed to read cases side by side and would be allowed access to both visual results of previous markings as well as the quantitative results of those measurements (diameter, volume, etc.). In order to reduce the potential of bias from reading repeat CT scans in a side by side paradigm, we propose to randomly introduce cases that do have some change in them; in this way, readers will not have the expectation that all cases will have "no change".