Quantitative Imaging Biomarkers Alliance RSNA

Application for QIBA Round-2 Project Funding

Title of Proposal: : *Evaluation of the Variability in Determination of Quantitative PET Parameters of Treatment Response across Performance Sites and Readers*		
QIBA Committee/Subgroup: FDG PET		
NIBIB Task Number(s) which this project addresses: (multiple, notably variance in quant estimates Rx response by PET)		
Project Coordinator or Lead Investigator Information:		
Last Name: Wahl	First Name: Richard	Degree(s): MD
e-mail:	Tel #:	
Institution/Company: Johns Hopkins University + 14 Additional FDG PET Tech (Analysis) Sites		
Amount Requested:		

Project Description-

There is very limited data on the performance of varying readers and quantitative imaging workstations in determining cancer treatment response using FDG PET/CT. We propose a study design using well-defined anonymized pre-treatment and post-treatment FDG PET scans of cancer patients as an analysis set. All studies will have been performed at Johns Hopkins, and all will have been done using a 3D PET scanner with LySO crystals and modern iterative image processing. No scans from 2D PET will be used.

We will determine how reproducible quantitative analysis of several major PET parameters are across sites and readers. A detailed statistical plan is included. Our primary metric will be % change in SUV max, determined pre- and post-Rx in the "hottest tumor" as defined by the reader. If the tumor has disappeared fully with treatment, background will be noted in the liver.

Secondary metrics will include absolute SUV peak, SUL max, SUL peak, and TLG (as determined by site), normal liver SUV and SUL in a 3 cm diameter sphere, as well as SD of this region of interest. We will also secure correlative measurements of tumor size when available. In this way, we will determine what component of variability there is in the reader/workstation/lesion selection elements of quantitative assessments of treatment response, when all sites have the same realistic human FDG PET/CT digital data set available. This analysis will target 15 performance sites, and 30 experienced imaging specialists. Such information will inform our field and help us determine if current tools and training are sufficient for deployment in a more general manner of quantitative PET/CT of treatment response, by precisely defining the variability in estimates of % decline in SUV across sites.