AbstractID: 11534 Title: Impact of VOI Size on PET image quantification following Partial Volume Correction

Objectives: Partial volume correction (PVC) techniques based on a-priori knowledge of object size and scanner's point spread function (PSF) have been previously proposed and evaluated. This approach however results in sharp peaks at the object edges in the corrected images which overestimates the corresponding mean activity concentration (AC). The aim of this abstract is to investigate the effect of varying the size of a VOI on determining the accuracy of mean AC in a lesion following PVC. **Methods:** An IEC phantom containing six spheres (1-3.7cm) was scanned on a GE DRX PET/CT scanner. The sphere to background ratio (SBR) was (4:1, 6.5:1, 11.1:1). In each case, the background AC was set to 0.1uCi/cc to emulate the background AC of clinical PET studies. PET data was acquired in 3D mode for 3 minutes. For PVC, the measured AC was divided by the convolution of the scanner's PSF with a binary map of the true sphere size obtained from CT. The PSF used included the effects of the reconstruction filter. Concentric VOIs of decreasing diameters (100-10% the sphere diameter) were then drawn in the center of each sphere to calculate the mean AC following PVC. Plots of the mean AC versus sphere size for the different VOIs were generated and compared to the true value. **Results:** For an SBR of 4:1 and sphere size of 10mm, the improvement in mean AC between the 100 and 50% diameter VOI was 24% .This value dropped to 3% between a 50 and 20% VOI diameter. For an SBR of 6.5:1 these values were 15 and 0% respectively. **Conclusion:** Decreasing VOI size improves the accuracy of mean AC following PVC in PET imaging, especially for small SBRs and tumor sizes. This improvement diminishes for VOI sizes smaller than 50% the true object size.