

AbstractID: 2092 Title: 4D PET/CT: Comparing the image quality of 2D and 3D gated with non-gated PET images

4D-gated PET/CT has been proposed as a technique that minimizes respiratory blurring producing more accurately quantifiable lesions. Our objective was to compare the image quality of 2D and 3D-gated PET with the standard non-gated PET (NGPET). 6 spheres (0.5 to 20 cc) filled with 1.5 uCi/cc of FDG were positioned on a 2cm peak to peak sinusoidally translating platform with a cycle time of 4sec. Gated PET data was then acquired in 2D and 3D modes for 0.5, 1, 2, and 3min. 2D and 3D PET data from bin 1 of each acquisition duration was then reconstructed with a cine CT retrospectively framed into bins that match the PET data using motion traces recorded by the RPM system. Similar ROIs were drawn on 4 contiguous PET slices and the standard deviation (STD) of the activity concentration was averaged and recorded. These values were compared to those obtained from corresponding NGPET generated by summing all PET bins and reconstructed using a helical CT. The STD increased with decreasing scan duration for all spheres of both 2D and 3D gated acquisitions. The average STD of the 3D data of all spheres was 76% that of 2D. For all spheres, the STD of 0.5 min 3D was smaller than 3 min 2D. The STD of every NGPET duration was higher than its corresponding gated acquisition. Gated PET results in improved image quality over NGPET. 3D-gated acquisitions might be superior to 2D but must be clinically verified to assess the impact of patient scatter.