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Estimate Standard Uptake Value (SUV) in F¹⁸ FDG PET Tumor Imaging.

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OBJECTIVE: This study was to evaluate factors that may affect SUV in F¹⁸ FDG PET tumor imaging. **METHOD:** Twenty patients with single pulmonary nodules and five with multiple nodules were evaluated. Whole body scan was performed one hour post injection of 15 mCi of F¹⁸ FDG on a dedicated PET scanner (Siemens-CTI Exact). OS-EM reconstruction was employed. Reconstructed images were then transferred to a Siemens eSoft workstation for image display and analysis. Volume of lesion was adjusted around the hot nodule in the pulmonary area. The ROI was automatically defined by iso-contour (10%, 25%, 35%, and 50% respectively) and used to calculate activity in Bq/ml, lesion volume and average SUV within the region. 3-D image fusion started with manual registration based on axial, sagittal and coronal display of the PET and the CT data. The SUVs were calculated using ROI defined by 50% or 25% iso-contour. The same ROIs were applied to dedicated PET data and to transformed image from PET-CT fusion. **RESULT:** Average lesion size was 3.9 cm³ at 50% iso-contour and increased to 5.9 cm³ when the iso-contour was 10%. PET SUV measured 4.77 compared with 4.47 from PET CT fusion image with 50% isocontour and 3.36 compared with 3.79 respectively with 25% isocontour for a large lesion in right lung. Lesion volume decreased about 30%. **CONCLUSION:** Manually adjusting the iso-contour to fit the lesion based on visual inspection on PET images demonstrated significant difference between a pre-set threshold and image guided iso-contour on the lesion size, activity uptake and the average SUV. Measured SUV and lesion volume (50% isocontour) decreased when the PET CT fusion image was used in comparison with dedicated PET scan.