analysis of LOBV as function of FWHM of post reconstruction filter showed stronger filter (higher smoothing) caused an improvement in LOBV of lesions 13mm in diameter. Conversely, the LOBV value trend in lesions smaller than 10mm in diameter was inverse, and deteriorated with increasing FWHM. When reconstruction was made with TOF, LOBV values was higher than without TOF information in both SBRs. **Conclusion:** TOF and PSF reconstruction improve sub-centimeter lesion detectability. Our study encourage the utilization of next generation PET technology (TOF and PSF reconstruction) in clinical PET systems which lead to substantially improvement of sub-centimeter lesion detectability

EP-0023

Impact of matrix size on metabolic tumor volume (MTV) and total lesion glycolysis (TLG) in PSF-based PET image

I. Shiri[1], *A. Rahmim*[2,3], *S. Ashrafinia*[3], *P. Geramifar*[4], *A. Bitarafan-Rajabi*[1,5]; [1]*Department of Medical Physics, School of Medicine, Iran University of Medical Sciences, Tehran, IRAN, ISLAMIC REPUBLIC OF,* [2]*Department of Radiology, Johns Hopkins University, Baltimore, MD, UNITED STATES OF AMERICA,* [3]*Department of Electrical and Computer Engineering, Johns Hopkins University, Baltimore, MD, UNITED STATES OF AMERICA,* [4]*Research Center for Nuclear Medicine, Shariati Hospital, Tehran University of Medical Sciences, Tehran, IRAN, ISLAMIC REPUBLIC OF,* [5]*Cardiovascular Intervention Research Center, Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, IRAN, ISLAMIC REPUBLIC OF.*

Aim: Volume-based parameters such as MTV and total lesion glycolysis (TLG=MTV×SUV_{mean}) are potentially valuable imaging biomarkers in the evaluation of response to therapy and prognostication in cancer patients. The objective of the present study was to investigate the impact of matrix size on MTV and TLG as delineated from whole-body PET images. **Material and methods:** Twenty-six patient were included in this study. PET images were reconstructed using the 3D-OSEM algorithm with and without PSF modeling, with 2 iterations, 21 subsets, 4mm FWHM of Gaussian post-reconstruction filter and different matrix sizes (128×128, 168×168, 256×256, 336×336). Twenty-nine lesions were segmented using an automatic fuzzy locally adaptive Bayesian (FLAB) method. From these segmented lesions, metabolic tumor volume and TLG were calculated. **Result:** Values of MTV and TLG were significantly higher for PSF-based reconstruction at the same matrix size. The deviations in MTV and TLG, relative to clinical standard reconstruction (3D-OSEM-168), were significantly different, depending on matrix size. At higher matrix sizes, the SUVmean was overestimated while MTV and TLG were underestimated relative to 3D-OSEM-168. **Conclusion:** These findings demonstrate the dependency of volume-based parameters (MTV, TLG) on reconstruction algorithm and matrix size. Higher matrix sizes in PET imaging may improve image quality, but do alter quantification parameters such as MTV and TLG, and their accuracy must be considered, especially in treatment response assessment.

EP-03 **during congress opening hours, e-Poster Area**

Physics & Instrumentation & Data Analysis: Data Analysis & Management

EP-0024

Quantification of 177-Lu and 131-I: a phantom study

J. Kupferschlaeger, H. Dittmann, S. Poth, C. la Fougère; University Hospital Tuebingen/ Nuclear medicine, Tuebingen, GERMANY.

Aim: Absolute quantification is a necessary condition for the dosimetry of radionuclide treatments with 131-I and 177-Lu. Aim of this study was to investigate the accuracy of quantification, the determination of recovery coefficients (RC) for partial volume correction (PVC), the influence of CT high voltage (HV) and tube current on quantification, the influence of dead time and a comparison of planar and tomographic sensitivity. **Material and Methods:** For both isotopes we used the IEC-Phantom with hot-sphere and lung insert as well as the Anthropomorphic Torso Phantom (ATP) with lung, liver and 2 spherical inserts inside the liver. All measurements were performed on a Discovery 670 NM/CT PRO® (GE) SPECT/CT system. For each measurement we acquired CTs with different HV- and tube-current settings. Five energy windows were used in case of 177-Lu to extract the low energy (EM1:114 keV) and high energy emissions (EM2:208 keV). Dead time was determined by using vials with decaying activities over a period of 8 weeks. Quantification was done using the Q.Metrix® software (GE) with OSEM reconstruction including scatter-, CT-based attenuation correction and resolution recovery. VOI were defined for the spheres, the liver, the phantom and liver background and the cold lung inserts. For each VOI we recorded average and maximum activity concentration in Bq/ml. **Results:** CT HV and tube current has minor influence on quantification: maximum deviation is less than 2% from the activity concentrations using a reference CT for attenuation correction. The total activity in both phantoms and in the liver insert could be reproduced with a maximum error of 10% for 177-Lu(EM2) and 131-I whereas 20% for 177-Lu(EM1). RC for small lesions were always underestimated (< 0.8) in case of 131-I. RC were constant (~1) for lesion volumes larger 5 ml for 177-Lu(EM2). 177-Lu(EM1) reconstructions reveal smaller RC compared to 177-Lu(Em2). Scatter correction underestimates the scatter fraction: 20% to 50% of the background activity concentration was found in the cold lung inserts. Dead time correction is negligible in case of 177-Lu (count loss < 7% under treatment conditions) whereas dead time correction for 131-I should be considered during treatment (12% count loss for 250 MBq in the FOV). **Conclusions/Discussion:** Absolute quantification of SPECT data using the Q.Metrix® software is possible if all corrections are applied. This is valid for large structures like organs but PVC should be applied for quantification of small lesions. Further improvement of scatter correction is needed.

EP-0025

The quantitative SPECT/CT scoring of MIBG cardiac scintigraphy to identify patients with Lewy body diseases