Eur J Nucl Med Mol Imaging (2015) 42 (Suppl 1):S1–S924
DOI 10.1007/s00259-015-3198-z

EANM'15

Annual Congress of the European Association of Nuclear Medicine

October 10 - 14, 2015
Hamburg, Germany

Abstracts

European Journal of Nuclear Medicine and Molecular Imaging
Volume 42, Supplement 1
10.1007/s00259-015-3198-z

This supplement was not sponsored by outside commercial interests. It was funded entirely by the association's own resources.

Springer

in all the patients and dual labeling method (blue dye/ nanocolloid) in less than one half of them. To delineate the relation of patients', tumors' and scintigraphic characteristics with positive SLN status, we examined all variables by univariate logistic regression with odds ratios representing effect size. RESULTS: Overall identification rate of SLN was 98.5%. Positive SLN (metastatic, one or more) was seen in 47 (23.4 %) patients. Drainage to one regional basin was seen in 176 (87.6 %) and multiple drainage regions (up to three) - in 24 patients (11.9%). In transit lymph nodes were detected in 20 patients. Univariate regression analysis with 201 cases included in model revealed Breslow thickness, nodular melanoma histological subtype and acral localization- to be significant independent predictors of SLN status ($p<0.05$). CONCLUSION: Beside the well established primary tumor thickness as the predictor of SLN positivity, we observed acral body site location and nodular melanoma to significantly enhance the risk for regional metastases. Our data confirm that multidisciplinary approach of SLNB is relevant as a diagnostic and staging procedure in cutaneous melanoma patients.

1101 - Tuesday, October 13, 2015, 8:00 AM - 9:30 AM, Hall 1
CME 9 - Radionuclide Therapy & Thyroid & Translational Molecular Imaging: Theranostics: What We Have and What We Can Achieve

OP373
Established and Innovative Applications for Diagnosis
W. Weber, **USA**

OP374
Theranostics in Clinical Experience: From Nets to Prostate Cancer
S. Ezzeddin, **GERMANY**

OP375
Theranostic Targeting Vectors and Nanoparticles
F. Kiessling, **GERMANY**

1102 - Tuesday, October 13, 2015, 8:00 AM - 9:30 AM, Hall 2
Joint Symposium 9: EANM/ESSR/ESSKA: Evaluation of the Painful Knee Arthroplasty

OP376
Normal Knee Joint Biomechanics and Surgical Techniques of Knee Arthroplasty
R. Nizard, **FRANCE**

OP377
What the Surgeon Wants to Know from Imaging in Painful Knee Arthroplasty
M. T. Hirschmann, **SWITZERLAND**

OP378
Radiologic Imaging
A. Hirschmann, **SWITZERLAND**

OP379
Hybrid Imaging in the Painful Knee Arthroplasty: Role and Limits
H. K. Mohan, **UK**

1105 - Tuesday, October 13, 2015, 8:00 AM - 9:30 AM, Hall G2
Do.MoRe: Quantitative Molecular Imaging

OP380
Y-90 imaging for dosimetry in radioembolization: comparison between scatter corrected bremsstrahlung SPECT/CT and time-of-flight PET/CT

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Aim: To compare quantitative imaging of Y-90 by scatter-corrected bremsstrahlung SPECT (SPECT+SC) and PET with time-of-flight (PET+TOF) for dosimetry applications. Methods: A torso phantom with 0.74 GBq of Y-90 in liver and 60 mL tumor (5:1 tumor-to-liver) was imaged with a Siemens Symbia SPECT/CT and Biograph mCT PET/CT using a prolonged acquisition (90 min in both) such that the total counts were similar to a 20 min patient scan with 4 times the activity, which is typical for imaging following radioembolization with glass microspheres. A high-energy collimator and 105-165 keV window was used for SPECT. The in-house 3-D OSEM SPECT reconstruction used an analytical projector coupled with object-specific scatter estimates from Monte Carlo (MC) updated after 10 iterations. 3-D OSEM PET reconstruction was performed with 1 - 5

iterations (21 subsets) with resolution recovery and TOF. The tumor and healthy liver activity was quantified using a self-calibration based on the known liver activity. For PET, activity was also quantified directly using the image Bq/mL values provided by the system. Post-radioembolization SPECT/CT and PET/CT for 2 patients were also reconstructed as above and quantified using a calibration from the phantom experiment. 3-D dosimetry was performed using a previously developed MC algorithm. Results: Tumor contrast, background noise, tumor quantification error and healthy liver quantification errors were 56%, 14%, 30%, -8% respectively for SPECT without scatter correction, but improved to 94%, 12%, 4, -1% respectively for SPECT+SC after just 3 updates of the scatter estimate. The corresponding results for PET+TOF (1 iteration, 21 subsets) were 100%, 24%, -0.5%, 0.1%, without substantial improvement with more iterations. At equivalent noise, SPECT+SC had better contrast and quantification than PET+TOF. Using the direct PET quantification, activities were underestimated by up to 19%. In patients, the estimated liver activity compared to 'truth' (total administered activity accounting for lung shunt) was within 14% for SPECT without SC, 6% for SPECT+SC and 9% for PET+TOF. Using the direct PET quantification, patient liver activity was underestimated by up to 27%. There was good agreement between SPECT and PET based tumor and liver dose volume histograms only when SC was included (mean doses agreed to within 12%). Conclusions: For relatively large targets, quantitative accuracy and contrast of bremsstrahlung SPECT+SC approaches that of PET+TOF, but with less noise. Similarly in patients, dose estimates based on SPECT+SC agreed well with estimates based on PET+TOF. Further studies with small targets are needed to compare resolution.

OP381

Study of the impact of PSF and Noise on Dose Volume Histograms (DVH) for the dosimetry of Y-90

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Our aim was to evaluate the degradation of dose-volume histograms (DVH) induced by partial volume effect (PVE) and noise independently and for simulated SPECT and PET. Methods: First, we have analytically modelled uniform spheres (contrast=10) with different diameters: 1 cm, 5 cm and 10 cm (S1, S2, S3 respectively). We have analytically simulated the effects of PVE and noise. PVE was simulated with the convolution of a Gaussian point spread function (PSF) characterised by full width at half maximum (FWHM). The noise was simulated by a log-normal distribution characterised by relative standard-deviation (RSD). For the 3 spheres, PVE and noise were applied separately for distinct analysis, with 2 PVE: FWHM=5mm and 10mm, and 2 noises levels: RSD=0.10 and 0.3, representative of the clinical routine. Then we have simulated the degradation of SPECT and PET devices, according to what is observed in clinical routine, with respectively (FWHM=10 mm, RSD=0.10) and (FWHM=5 mm, RSD=0.3). The DVHs were computed from absorbed dose calculation using dose-point kernels (DPK) in each generated activity map, including the non-degraded one, with a homogenous water medium. Finally, DVHs were compared to theoretical ones, for the following absorbed dose criteria: D80, D50, Dmean and D20. Results: PVE decreased D80, D50 and had no impact on the other absorbed dose criteria, except for S1 for which D20 was underestimated of 66%. The more PSF was close to sphere's size, the more the effect of PVE was important. As an example, for all spheres, D80 (for which one PVE had a major impact) was underestimated between 38% and 8.1% and between 61% and 20% for FWHM of 5mm and 10mm respectively. Noise decreased D80 and increased D20 and had no influences on D50 and Dmean. For the most degrading noise level RSD=0.1, D80 was underestimated between 0.4% and 9.5%, D20 was overestimated for all spheres, between 6.4% and 12.2%. The simulated SPECT underestimated D80 up to 80%, D50 up to 82%, Dmean up to 79%, and D20 up to 78%. The simulated PET underestimated D80 up to 21%, D50 up to 17%, Dmean up to 12%, and D20 up to 4%. Conclusion: This study highlights the impact of PVE and noise on the DVHs, showing the importance of controlling and evaluating these effects to set-up absorbed dose protocols.

OP382

An inter-operator study of the accuracy of Y-90/In-111 DOTATATE dosimetry using an anthropomorphic phantom

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Aim: To determine the accuracy and inter-operator variability of dosimetry performed on patients undergoing Y-90/In-111 DOTATATE radiopeptide therapy using a 3D printed anthropomorphic phantom. Method: The 3D printed phantom was based on a cohort of neuroendocrine patients and contained liver, spleen, kidney and spherical hepatic lesions. Organs and lesions were filled with a representative concentration of Y-90 and In-111