dose and Medical Physicist received 2 2,17 mSv and 66.1 mSv respectively. Technologists 3,4 and 5 received 1,85 mSv, 1,76 mSv and 1,82 mSv as whole body doses respectively

Conclusion. The personnel dose results are significantly lower than the recommended annual dose by International Commission for Radiological Protection. The higher value of gamma dose for PET/CT workers by comparison with the staff operating conventional Nuclear Medicine procedures is attributable to the higher specific gamma constant of ^{18}F, as well as the longer exposure time required for accurate positioning.

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PEDIATRIC NUCLEAR MEDICINE DOSIMETRY: A MONTE CARLO STUDY ON S-VALUE VARIABILITY DUE TO PATIENT SPECIFIC CHARACTERISTICS

Vasiliki Iliadou [a,*], Panagiotis Papadimitroulas [a,b], William D. Erwin [c], Theodora Kostou [a], George Loudos [d], George C. Kagadis [a,c]

[a] *Department of Medical Physics, School of Medicine, University of Patras, Greece*
[b] *BET Solutions, Athens, Greece*
[c] *Department of Imaging Physics, The University of Texas MD Anderson Cancer Center, Houston, TX, USA*
[d] *Department of Biomedical Engineering, Technological Educational Institute of Athens Greece*
* Corresponding author.

Introduction. Personalized internal radiopharmaceutical dosimetry is of great interest in the pediatric population, in whom the risk from exposure to ionizing radiation is greatly debated. Our proposed methodology is being evaluated based on the ground truth of realistic Monte Carlo (MC) simulations and anthropomorphic models.

Purpose. Our goal is to compute S-values and quantify the absorbed dose in the majority of organs according to the specified radiopharmaceutical biodistribution and personalized anatomical characteristics. The S-value calculation procedure is validated against already published data, while the S-value variability in children of different anatomical characteristics is studied.

Materials/Methods. A validation study was carried out for the calculation of S-values using monoenergetic photon sources (10 keV–1 MeV). Furthermore, S-values were calculated using the biodistribution of ^{123}I-mIBG derived from clinical data of a 7 years old patient at 4 different time points. Male/female pediatric computational models were used for ages 5, 8 and 14 years respectively, in order to calculate S-values' variability. The GATE MC toolkit was used for the calculation of organ absorbed doses.

Results. Calculated photon liver-to-kidneys S-values were compared to previously reported S-values. The differences were $\sim$2.6% for photons with energies 10 keV–100 keV, while a higher deviation (30%) was observed for 1 MeV photons. The comparison study for the three ages revealed several variations. S-values deviated $\sim$95% in liver, for girls with body masses ranging from 10.8 kg to 50.4 kg. Generally, children with similar body-masses had lower than $\sim$30% variations in specific organs.

Conclusion. Radiopharmaceutical dosimetry shows large variations due to the patients' anatomies, thus personalized characteristics should be considered. Our study is ongoing, extending our investigation to additional pediatric phantoms and for a variety of radiopharmaceuticals.

Disclosure. n/a.

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SCATTER CORRECTION FOR PLANAR AND SPECT IMAGING WITH FACTOR ANALYSIS

Peter Knoll [a,*], Siroos Mirzaei [a], Arman Rahmim [b]

[a] *Department of Nuclear Medicine, Wilhelminenspital, Vienna, Austria*
[b] *Division of Nuclear Medicine & Molecular Imaging, Department of Radiology, Johns Hopkins University, Baltimore, USA*
* Corresponding author.

Introduction. In order to achieve quantitative data in planar and SPECT imaging, various interactions of photons with matter have to be modelled and compensated. Although correction for photon attenuation has been addressed by including X-ray CT scans, accurate correction for Compton scattering remains an open issue.

Purpose. In this work we propose and assess a novel, user-independent framework applying factor analysis (FA).

Materials and methods. Extensive Monte Carlo simulations for planar and tomographic imaging were performed using the SIMIND software. Furthermore a Jaszczak phantom study (Data Spectrum Corporation, Durham, NC, USA) and ten clinical ^{99m}Tc MDP bone studies were performed using a large-field of view scintillation camera (General Electric's Infinia Hawkeye). In order to use FA for scatter correction, we subdivided the applied energy window into a number of sub-windows, serving as input data. FA results in two factor images (photo-peak, scatter) and two corresponding factor curves (energy spectra).

Results. The data obtained by FA showed good agreement with the energy spectra, photo-peak and scatter images obtained in all Monte Carlo simulated data sets. For the Jaszczak phantom, without scatter correction, the cold sphere contrast ranged from −47.7 to −4.75, while with FA scatter correction, it ranged from −51.5 to −7.52. The cold sphere sector contrast ranged from −16.6 to −0.18 for non-scatter corrected data, and for the FA data, from −16.6 to −0.23.

Conclusion. Factor analysis can be used as a user-independent approach for scatter correction in quantitative nuclear medicine imaging.

Disclosure. Nothing to disclose.

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A NOVEL STEREOTACTIC FRAME FOR TRUE PET GUIDED BIOPSIES

J. Cortes-Rodicio [a,*], G. Sanchez-Merino [a], M.A. Garcia-Fidalgo [a], I. Tobalina Larrea [b,c]

[a] *Servicio de Física Médica, OSI Araba, Hospital Txagorritxu, Vitoria-Gasteiz, Spain*
[b] *Servicio de Medicina Nuclear, OSI Araba, Hospital Santiago, Vitoria-Gasteiz, Spain*
[c] *Departament of Surgery, Radiology and Physical Medicine, Faculty of Medicine and Odontology, Campus of Vitoria-Gasteiz, University of the Basque Country UPV/EHU, Spain*
* Corresponding author.

Introduction. Most guided biopsies procedures are using a previously acquired PET/CT scan registered with procedural CT images. Other methods use radioactive sources coupled to the biopsy needle that are introduced in the patient. Many drawbacks arise in both cases: incorrect positioning, sterilized needles, expensive sources, radiation protection…

Purpose. We present a novel device to perform true PET guided biopsies that avoids the problems of other procedures.

Materials and methods. A 3D printed device was developed. It consists of four main components: A fixed circular base, an outer rotating crown with a U-shaped fixed piece, a header that moves along the U-shaped piece and a needle holder. The primary base contains three holders where radioactive markers doped with 18-FDG