



Contribution ID: 6

Type: **Parallel Talk**

Estimation of volumetric dose distribution delivery deviations from dose planned in ^{131}I hyperthyroidism treatment: preliminary results

During more than 60 years of Hyperthyroidism radioiodine treatment has been no general agreement on the applied dose or calculus methodology. The EANM Dosimetry Committee recommend in 2013 an "Standard Operational Procedures for Pre-Therapeutic Dosimetry (SOP)" based on the assessment of the individual ^{131}I uptake and kinetics. To estimate the 3D dose delivery deviations from prescribed dose during patient specific application of this SOP, a computer Matlab application was developed and verified. It was design to execute: radiopharmaceutical curve fitting, cumulated activity calculations, functional thyroid mass estimation, obtain the therapeutic planning activity to warranty the prescribed dose and produce the 3D planning dose map and related dosimetry

parameters. 6 patients with 150-400Gy prescribed dose data planning (average 241,67Gy) were analyzed using the developed application. The developed system was verify successfully using a test image phantom and 6 known pharmacokinetics data. The program fitting results were compared with Microcal (TM) Origin (version 6.0), showing not statistical differences ($p < 0.01$). The tridimensional thyroid volume cumulated activity and dose distributions were heterogeneous. 3D dose distribution showed standard deviations between 20.41-108.3Gy (18.01-27.08% of prescribed dose). The differences between maximum and minimum dose value per voxel/MBq were 74-129%, corresponding to 112Gy and 495Gy respectively for the total dose administrated. According to the result, between 50,2% and 71,4% of patient's thyroid will be treat with a dose of $DP \pm 20\%$ of planned dose, the rest will be overdose or sub dose.

Conclusions: the 3D treatment planning dose distribution were completely no-homogenous, the significant difference observed should be study in the future more deeply in order to optimized the hyperthyroidism iodine treatment.

Index Terms: optimization, patient's specific treatment, I-131, Hyperthyroidism

Primary authors: LÓPEZ DÍAZ, Adlin (Nuclear Medicine Department, Hospital "Hermanos Ameijeiras", Havana, Cuba); MIGUEL MARTÍN, Juan (Nuclear Medicine Department, Hospital "Hermanos Ameijeiras", Havana, Cuba); FERNÁNDEZ, Viviana (Nuclear Medicine Department, Hospital "Hermanos Ameijeiras", Havana, Cuba); PÉREZ, Amalia (National University of "San Martín", Buenos Aires, Argentine)

Presenter: LÓPEZ DÍAZ, Adlin (Nuclear Medicine Department, Hospital "Hermanos Ameijeiras", Havana, Cuba)

Session Classification: Parallel Session - MP

Track Classification: Medical Physics