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Pre-therapy initial dosimetry results of Lu-177-PSMA-DOTA-617 in castration resistant prostate cancer

Abuqbeith Mohammad¹, Yeyin Nami¹, Aygun Aslan¹, Demirci Emre², Ocak Meltem¹ and Kabasakal Levent¹

¹Istanbul University, Turkey

²Istanbul Sisli Etfal Training and Research Hospital, Turkey

Aim: Targeted radionuclide therapy (TRT) is an increasingly used treatment modality for wide range of cancers. Presently dosimetry is highly required either to plan treatment or to ascertain the absorbed dose delivered to critical organs during treatment.

Materials & Methods: The study comprised of 7 patients suffering from prostate cancer with progressive disease and candidated to undergo Lu-177-DOTA-617 therapy following Ga-68-PSMA PET/CT imaging for all patients. 192.4 ± 11.1 Mbq (5.2 ± 0.3 mCi) was intravenously injected and to evaluate bone marrow absorbed dose 2 cc blood samples were withdrawn in short variable times (3, 15, 30, 60, 180. Minutes and 24, 48, 120. hours) after injection. Furthermore whole body scans were performed using scintillation gamma camera in 4, 24, 48 and 120 hour after injection and in order to quantify the activity takenup in the body, kidneys, liver, right parotid and left parotid, the geometric mean of anterior and posterior counts were determined through ROI analysis. After that, background subtraction and attenuation correction were applied using patients Ga-68-PSMA PET/CT images taken in a consideration; organ thickness, body thickness and Hounsfield unites from Computed Tomography scan. OLINDA/EXM dosimetry program was used for curvefitting, residence time calculation and absorbed dose calculations.

Results: Calculated absorbed dose of bone marrow, left kidney, right kidney, liver, left parotid, right parotid and total body. 1.39 ± 0.56 , 32.36 ± 16.36 , 32.7 ± 13.68 , 10.35 ± 3.45 , 38.67 ± 21.29 , 37.55 ± 19.77 , 2.25 ± 0.95 (mGy/mCi) respectively.

Conclusions: Our first results clarify that Lu-177-DOTA-617 is safe and reliable therapy as there were no complications seen. On the other hand, the observable variation in the absorbed dose of the critical organs among the patients necessitate patient- specific dosimetry approach to save body organs and particularly highly exposed kidneys and parotid gland.

Biography

Mohammad has completed his BSc in Alquds university / Medical Imaging 2010, and MSc in Nuclear Medicine and targeted therapy from Istanbul University 2015. In the same year he started to be PhD Candidate in Istanbul University / School of Medicine/Nuclear Medicine Dept. He has scientific interests in the field of internal therapy dosimetry and Molecular & Multimodality Imaging, dose- limiting tissues Protection during therapy and clinical trials using radioactive tracers.

qbeta95@hotmail.com

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