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Pretherapy Initial Dosimetry Results in Prostat Cancer Radionuclide Therapy with Lu-177-PSMA-DOTA-617

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Abstract : 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. Methods and Materials: The study comprised 7 patients suffered from prostate cancer with progressive disease and candidate to undergo Lu-177-DOTA-617 therapy following to PSMA- PET/CT imaging for all patients. (5.2±0.3 mCi) was intravenously injected. To evaluate bone marrow absorbed dose 2 cc blood samples were withdrawn in short variable times (3, 15, 30, 60, 180 minutes) after injection. Furthermore, whole body scans were performed using scintillation gama camera in 4, 24, 48, and 120 hours after injection and in order to quantify the activity taken up 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 PSMA- PET/CT images taking in a consideration: organ thickness, body thickness, and Hounsfield unites from CT scan. OLINDA/EXM dosimetry program was used for curve fitting, residence time calculation, and absorbed dose calculations. Findings: Absorbed doses of bone marrow, left kidney, right kidney, liver, left parotid, right parotid, total body were 1.28±0.52, 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. Conclusion: Our first results clarify that Lu-177-DOTA-617 is safe and reliable therapy as there were no complications seen. In 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.

Keywords : Lu-177-PSMA, prostate cancer, radionuclide therapy
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