Use of [^{177}Lu]Lu PSMA-617for treatment of Carcinoma Breast: Tumor lesion dosimetric analysis in a single patient

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Background

The documented uptake of Ga-68 PSMA analogues in neo-vasculature of breast cancer highest in triple negative tumor encourages therapeutic use of [^{177}Lu]Lu PSMA analogues. In this study we evaluated the biodistribution and tumor lesion radiation absorbed doses in a breast carcinoma patient with therapeutic dose of [^{177}Lu]Lu PSMA-617.

Method

A female breast carcinoma patient 38 years of age and 68 kg weight was treated with 6520 MBq of [^{177}Lu]Lu PSMA -617. Biodistribution was assessed with serial planar whole-body scintigraphy at 20 min, 1, 4, 24 and 48 h and 8th day post injection (p.i.). Percent of injected activity in local breast lesion was determined to generate time activity curves. OLINDA/EXM software was used to determine residence times by applying bi-exponential curve fitting and using unit sphere model for radiation absorbed dose calculation in breast lesion.

Results

Immediate accumulation of [^{177}Lu]Lu PSMA-617 was seen in kidneys, urinary bladder, liver and breast tumor lesion along with blood pool activity in heart and major blood vessels. Later activity increased in salivary, lacrimal glands, kidneys, urinary bladder, liver, small intestine and breast tumor till 48 h followed by clearance from breast lesion and other organs except small intestine till 8th day p.i. Tumor absorbed dose to tumor tissue was found to be 0.333 mSv/MBq and a total of 2.08 Gy from 6.25 GBq of [^{177}Lu]Lu PSMA -617.

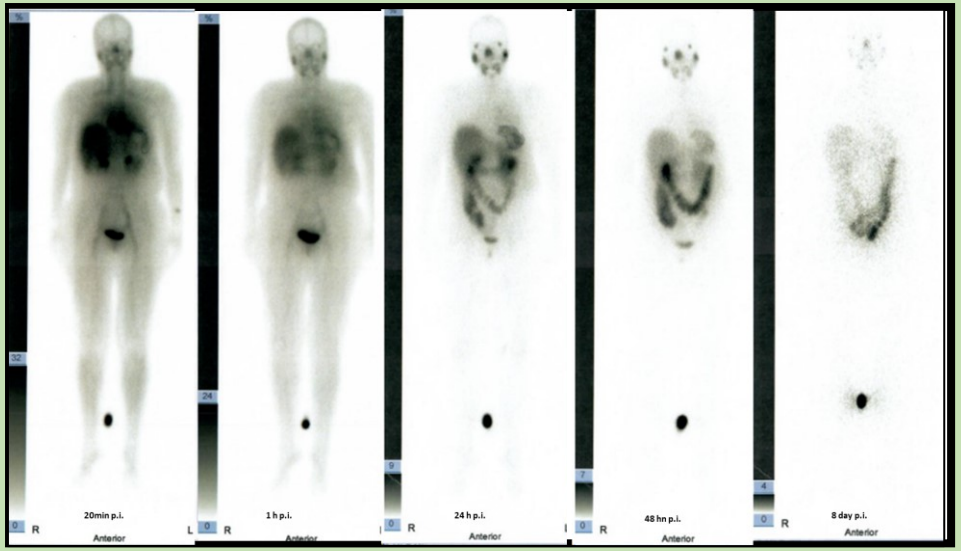

Figure: Uptake of [^{177}Lu]Lu-PSMA-617 in breast carcinoma lesion at (A) 23 min p.i. (B) 1 h p.i. (C) 24 h p.i. (D) 48 h p.i.

Conclusion

Biodistribution of [^{177}Lu]Lu PSMA-617 was found similar to mCRPC patients. However, tumor absorbed doses are found to be very low and does not support use of [^{177}Lu]Lu PSMA-617 for therapy in breast carcinoma patients.