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DOTATATE PET/CT Imaging In Prostate Cancer: Incidental Observations and Potential Future Implications

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BACKGROUND

Hormonally-refractory, lethal forms of PCa may express neuroendocrine features, including PCa with neuroendocrine differentiation (NEDPCa) and treatment emergent small cell neuroendocrine PCa (tSCNC). We hypothesize that some lethal metastatic PCa may show higher expression of SSTR than of PSMA and that a dual imaging approach with PET radiopharmaceuticals targeting these moieties will enable informed selection of patients for the future corresponding therapeutic radiopharmaceutical construct.

METHODS

Our center has performed hundreds of DOTATATE (68Ga or 64Cu) PET-CT scans for NETs. We have noted a wide variety of patterns of uptake in the prostate.

RESULTS

The data was mined from a deidentified file and is IRB exempt. Various patterns of prostate uptake have emerged as men age. These include increased uptake in the transitional zone indicative of benign prostatic hyperplasia (BPH), and uptake confined to the peripheral zone (which accounts for 70-75% of PCa's) In one patient, a new diagnosis of widespread metastatic prostate adenocarcinoma with bone metastases was identified by DOTATATE PET. The maximum SUV of the bone lesions was 17.2 and 10 in the prostate. In a review of 20 GEP NET patients with 68Ga DOTATATE scans, normal average values for SUVmax (+/- SD) were 6.9 (+/- 1.8) for liver, 22.1 (+/-10.7) for adrenal, 24.2 (+/- 7.9) for spleen, 21.9 (+/- 8.5) for kidney, 1.3 (+/- 0.8) for skeletal muscle, and 2.0 (+/- 0.4) for blood pool. There is a wide range of SUVmax for moderately and well-differentiated GEP NETs, averaging 37.7 (+/- 20.6). Uptake by the bone metastases was within 1 SD of the mean for moderately/well-differentiated GEP NETs, and within the mid-range of reports of SUVmax in primary and metastatic lesions with 68Ga PMSA-11. It was also within the range of tumor:liver ratios selected for the Netter-1 trial of 177Lu DOTATATE for treatment of GEP NET, which constituted the basis for FDA approval. In NED PCa, we hypothesize that uptake may be even higher, supporting the potential for efficacy of 177Lu DOTATATE treatment of mCRPC in select patients.

CONCLUSIONS

PCa as well as BPH demonstrate uptake of DOTATATE. Dual tracer PET imaging with SSTR and PSMA targeting agents may therefore inform which target would be better expressed and provide an ideal personalized medicine approach both in characterizing the phenotype of mCRPC, as well as in directing therapy, potentially toward 177Lu PSMA or 177Lu DOTATATE.

ABSTRACT ID 23743