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IMAGE OF THE MONTH

Twins in spirit: DOTATATE and high-affinity DOTATATE

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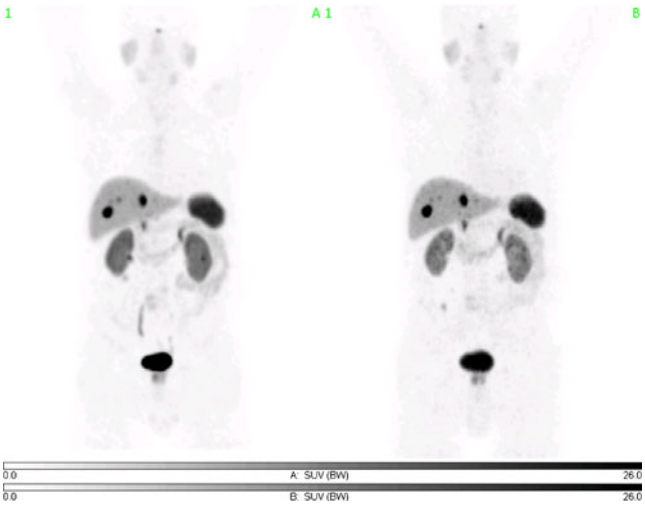
Since the introduction of somatostatin receptor (sst) imaging using ^{123}I-Tyr^3-octreotide [1], peptide receptor imaging and radiotherapy (PRRT) has become an established modality in the management of neuroendocrine tumours (NET) [2].

Based on the findings of a previous study [3] investigating metal-labelled DOTA-octreotides substituted at Tyr^3, we hypothesized that derivatives of DOTA-iodo-Tyr^3-octreotide might be excellent candidates for sstr imaging and therapy. Consequently, we evaluated ^{68}Ga-DOTA-iodoTyr^3-octreo tate (^{68}Ga-HA-DOTATATE; HA, high affinity) in vitro and in a preliminary PET study. As hypothesized, ^{68}Ga-HA-DOTATATE showed high affinity for human sst2,5 as well as diagnostic and logistical advantages, i.e. unlimited precursor availability. The (Leu^8,D-Trp^{22}, [^{125}I]Tyr^{25})-SST28 IC50 values (in nanomoles) for Ga-HA-DOTATATE were >10.000 (sst1), 0.64±0.23 (sst2), >1,000 (sst3 and sst4) and 59.7±15.1 (sst5), and for Ga-DOTATATE were >10,000 (sst1), 0.67±0.25 (sst2), >1.000 (sst3), 822±327 (sst4) and >1,000 (sst5).

In a first PET study a 73-year-old patient suffering from a NET with unknown primary and liver metastases was investigated with ^{68}Ga-HA-DOTATATE and ^{68}Ga-DOTATATE. Both agents showed a possible small primary tumour in the midgut and five liver metastases that showed somewhat higher ^{68}Ga-HA-DOTATATE uptake (mean SUVmax 23.8 vs. 21.6). The visual detectability of three small liver metastases with low uptake was superior with ^{68}Ga-HA-DOTATATE.

In summary, ^{68}Ga-HA-DOTATATE provides high-quality images comparable to or better than those with ^{68}Ga-DOTATATE. Further clinical studies are needed to confirm these first results and explore the use of HA-DOTATATE agents for PRRT.



A- MIP ^{68}Ga-DOTATOC
B- ^{68}Ga-HA-DOTATOC

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