Head-to-head comparison of 64Cu-DOTATATE and 68Ga-DOTATOC PET/CT: a prospective study of 59 patients with neuroendocrine tumors - DTU Orbit (10/12/2018)

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Somatostatin receptor imaging is a valuable tool in the diagnosis, follow-up and treatment planning of neuroendocrine tumor (NET) patients. Positron emission tomography (PET) based tracers using 68Ga as the radioisotope have in most centers replaced single-photon emission tomography (SPECT) based tracers as the gold standard. 64Cu-DOTATATE is a new PET tracer that has been shown to be far superior compared to the SPECT tracer 111In-DTPA-octreotide. Due to advantages of 64Cu compared to 68Ga, we hypothesize that the tracer could have a higher sensitivity than 68Ga-based tracers. To test this hypothesis, we compared on a head-to-head basis the diagnostic performance of 64Cu-DOTATATE with that of 68Ga-DOTATOC in NET patients.

Objectives 64Cu-DOTATATE is a new PET tracer for somatostatin receptor imaging. 64Cu-DOTATATE may potentially have a higher sensitivity than the current gold standards, due to advantages of 64Cu compared to 68Ga. The aim was to test this hypothesis on a head to head basis in neuroendocrine tumor patients (NET).

Methods Fifty-nine NET patients were scanned with 64Cu-DOTATATE and 68Ga-DOTATOC PET/CT and discordant lesions were verified through follow-up. Both scans were made within a week (1-5 days apart).

Results A total of 701 lesions were concordantly detected on both 64Cu-DOTATATE and 68Ga-DOTATOC PET/CT scans while additional 68 lesions were found by only one of the two scans. 64Cu-DOTATATE showed 42 discordant lesions of which 33 were found to be true positive on follow up. 68Ga-DOTATOC showed 26 discordant lesions, but only 7 were found to be true positive on follow up. False positives were mainly lymph node lesions. Eighty-three percent of the additional true positive lesions were found by 64Cu-DOTATATE. 64Cu-DOTATATE and 68Ga-DOTATOC discovered additional true lesions in 13 and 3 patients, respectively. All patients with additional lesions also had discordant lesions found by both scans.

Conclusions Although patient based sensitivity was the same for 64Cu-DOTATATE and 68Ga-DOTATOC in this cohort, more lesions were found by 64Cu-DOTATATE. Furthermore the shelf life of more than 24 hours and a scan window of at least 3 hours make 64Cu-DOTATATE logistically attractive to use in the clinic.