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^{64}Cu-DOTATATE PET in Neuroendocrine Tumor Patients: What We Learned From the First 1,200 Patients

A. Kjaer[1], E. Carlsen[1], M. Loft[1], C. Johnbeck[1], T. Binderup[1], S. Langer[2], B. Federspiel[3], U. Knigge[4]; [1]Clinical Physiology, Nuclear Medicine & PET, Rigshospitalet & University of Copenhagen/Denmark, [2]Oncology, Rigshospitalet & University of Copenhagen/Denmark, [3]Pathology, Rigshospitalet & University of Copenhagen/Denmark, [4]Endocrinology & Surgery, Rigshospitalet & University of Copenhagen/Denmark

BACKGROUND: In 2009 we introduced somatostatin receptor imaging with the PET ligand ^{64}Cu-DOTATATE. Here we present our experience from more than 1,200 patients.

METHODS: Description of performance and practical workflow based on first 1,200 patients. In addition, data from a study comparing on a head-to-head basis 1h and 3h post-injection imaging with regard to lesion detection rates and tumor-to-normal ratios are presented.

RESULTS: ^{64}Cu-DOTATATE is produced in batches for up to 15 patients and have a shelf life of 24h. Accordingly, the patients may be scanned whenever convenient during the day/evening on the day of tracer production. Compared to ^{68}Ga-labeled tracers that are typically radiolabeled locally for 1-2 patients at a time, we have freed up substantial radiochemist time.

Sensitivity and specificity calculated on basis of the first 112 patients when using a composite standard of truth (CT only, follow up on imaging/biopsy) were 97% (CI: 91-99%) and 100% (CI: 96-100%), respectively. Lesion detection rate of ^{64}Cu-DOTATATE was superior to ^{68}Ga-DOTATOC.

Comparison of lesion detection rate of ^{64}Cu-DOTATATE at 1h and 3 h post injection demonstrated the same performance at the two time points (822 concordant and 5 discordant lesions). Regarding the tumor-to-normal ratios in different organs, it remained high from 1 to 3 h. The liver background activity remained low from 1-3 h. It was on par or lower than reported for the 68Ga-labeled PET tracers.

Following PET/CT scans of more than 1,200 patients with ^{64}Cu-DOTATATE, we have not observed any major side-effects.

CONCLUSION: ^{64}Cu-DOTATATE is a safe and sensitive PET tracer for somatostatin receptor imaging. It has an excellent lesion detection rate and imaging can be performed from 1-3 h with same performance. In addition, ^{64}Cu-DOTATATE is logistically convenient due to the long half-life and shelf-life of 24h. We therefore use ^{64}Cu-DOTATATE as the routine somatostatin receptor imaging method at our institution.

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