Biodistribution and radiation dosimetry in healthy volunteers of a novel tumour-specific probe for PET/CT imaging: BAY 85-8050.

Abstract:
Novel tracers for the diagnosis of malignant disease with PET and PET/CT are being developed as the most commonly used (18)F deoxyglucose (FDG) tracer shows certain limitations. Employing radioactively labelled glutamate derivatives for specific imaging of the truncated citrate cycle potentially allows more specific tumour imaging. Radiation dosimetry of the novel tracer BAY 85-8050, a glutamate derivative, was calculated and the effective dose (ED) was compared with that of FDG. Five healthy volunteers were included in the study. Attenuation-corrected whole-body PET/CT scans were performed from 0 to 90 min, at 120 and at 240 min after injection of 305.0 ± 17.6 MBq of BAY 85-8050. Organs with moderate to high uptake at any of the imaging time points were used as source organs. Total activity in each organ at each time point was measured. Time-activity curves (TAC) were determined for the whole body and all source organs. The resulting TACs were fitted to exponential equations and accumulated activities were determined. OLINDA/EXM software was used to calculate individual organ doses and the whole-body ED from the acquired data. Uptake of the tracer was highest in the kidneys due to renal excretion of the tracer, followed by the pancreas, heart wall and osteogenic cells. The mean organ
doses were: kidneys 38.4 ± 11.2 ?Sv/MBq, pancreas 23.2 ± 3.8 ?Sv/MBq, heart wall 17.4 ± 4.1 ?Sv/MBq, and osteogenic cells 13.6 ± 3.5 ?Sv/MBq. The calculated ED was 8.9 ± 1.5 ?Sv/MBq. Based on the distribution and dose estimates, the calculated radiation dose of BAY 85-8050 is 2.67 ± 0.45 mSv at a patient dose of 300 MBq, which compares favourably with the radiation dose of FDG (5.7 mSv).