PET-based human dosimetry of 18F-galacto-RGD, a new radiotracer for imaging alpha v beta3 expression.

Abstract:

(18)F-Galacto-RGD is a new tracer for PET imaging of alpha v beta3, a receptor involved in a variety of pathologic processes including angiogenesis and metastasis. Our aim was to study the dosimetry of (18)F-galacto-RGD in humans.

METHODS: Eighteen patients with various tumors (musculoskeletal tumors [n = 10], melanoma [n = 5], breast cancer [n = 2], or head and neck cancer [n = 1]) were examined. After injection of 133-200 MBq of (18)F-galacto-RGD, 3 consecutive emission scans from the thorax to the pelvis were acquired at 6.7 +/- 2.9, 35.6 +/- 7.6, and 70.4 +/- 12.2 min after injection. Blood samples (n = 4) for metabolite analysis were taken 10, 30, and 120 min after injection. The OLINDA 1.0 program was used to estimate the absorbed radiation dose.

RESULTS: Reversed-phase high-performance liquid chromatography of serum revealed that more than 95% of tracer was intact up to 120 min after injection. (18)F-Galacto-RGD showed rapid clearance from the blood pool and primarily renal excretion. Background activity in lung and muscle tissue was low (percentage injected dose per liter at 71 min after injection, 0.56 +/- 0.15 and 0.69 +/- 0.25, respectively). The calculated effective dose was 18.7 +/- 2.4 microSv/MBq, and the highest absorbed radiation dose was in the bladder wall (0.22 +/- 0.03 mGy/MBq).

CONCLUSION: (18)F-Galacto-RGD
demonstrates high metabolic stability, a favorable biodistribution, and a low radiation dose. Consequently, this tracer can safely be used for noninvasive imaging of molecular processes involving the alpha v beta3 integrin and for the planning and monitoring of therapeutic approaches targeting alpha v beta3.