Abstract:

PURPOSE: Scintigraphy with maltotriose-[123I]Tyr3-octreotate ([123I]Mtr-TOCA) is compared with [111In]DTPA-Phe1-octreotide ([111In]OC) to assess the differences in pharmacokinetics and imaging properties as well as to estimate the therapeutic potential of the corresponding [131I]Mtr-TOCA. METHODS: Six patients with somatostatin receptor (sstr)-positive tumours were assessed using a dual-head gamma camera. After injection of 137 +/- 28 MBq [123I]Mtr-TOCA, dynamic data acquisition of the upper abdomen (30 min) was performed followed by whole-body scans at 0.5 h, 1 h, 3 h and 20 h as well as by SPECT imaging (tumour) at 2 h. [111In]OC scintigraphy was performed by acquiring whole-body scans (4 h, 24 h) and SPECT (24 h). Using a region of interest (ROI) method, tissue and tumour bound activity was assessed and dosimetry performed. RESULTS: [123I]Mtr-TOCA shows rapid tumour uptake. Up to 4 h, tumour/organ (tu/org) ratios are stable and generally higher than with [111In]OC. From 3 h to 20 h, tu/org ratios increase for spleen, remain stable for liver and decrease significantly for all other tissues. In contrast, with [111In]OC, tu/org ratios decrease slightly between 4 h and 24 h for liver, spleen and kidney and increase for all other tissues. On [123I]Mtr-TOCA scintigraphy, a total of 27 lesions are
detected, whereas 33 lesions are detected on $[\text{111In}]\text{OC}$ scintigraphy ($p=0.50$). Effective patient absorbed dose is 1.9 +/- 0.9 mSv per 100 MBq $[\text{123I}]\text{Mtr-TOCA}$. CONCLUSION: Compared with $[\text{111In}]\text{OC}$, $[\text{123I}]\text{Mtr-TOCA}$ enables faster imaging of sstr-positive tumours with a lower radiation burden to the patient. $[\text{123I}]\text{Mtr-TOCA}$ and $[\text{111In}]\text{OC}$ allow for tumour imaging with almost identical contrast and diagnostic yield. As regards peptide receptor radionuclide therapy, radioiodinated Mtr-TOCA is hampered by limited intratumoural activity retention.