First Results of ^{68}Ga-EMP-100 PET for Imaging c-MET Expression in Metastatic Renal Cell Carcinoma

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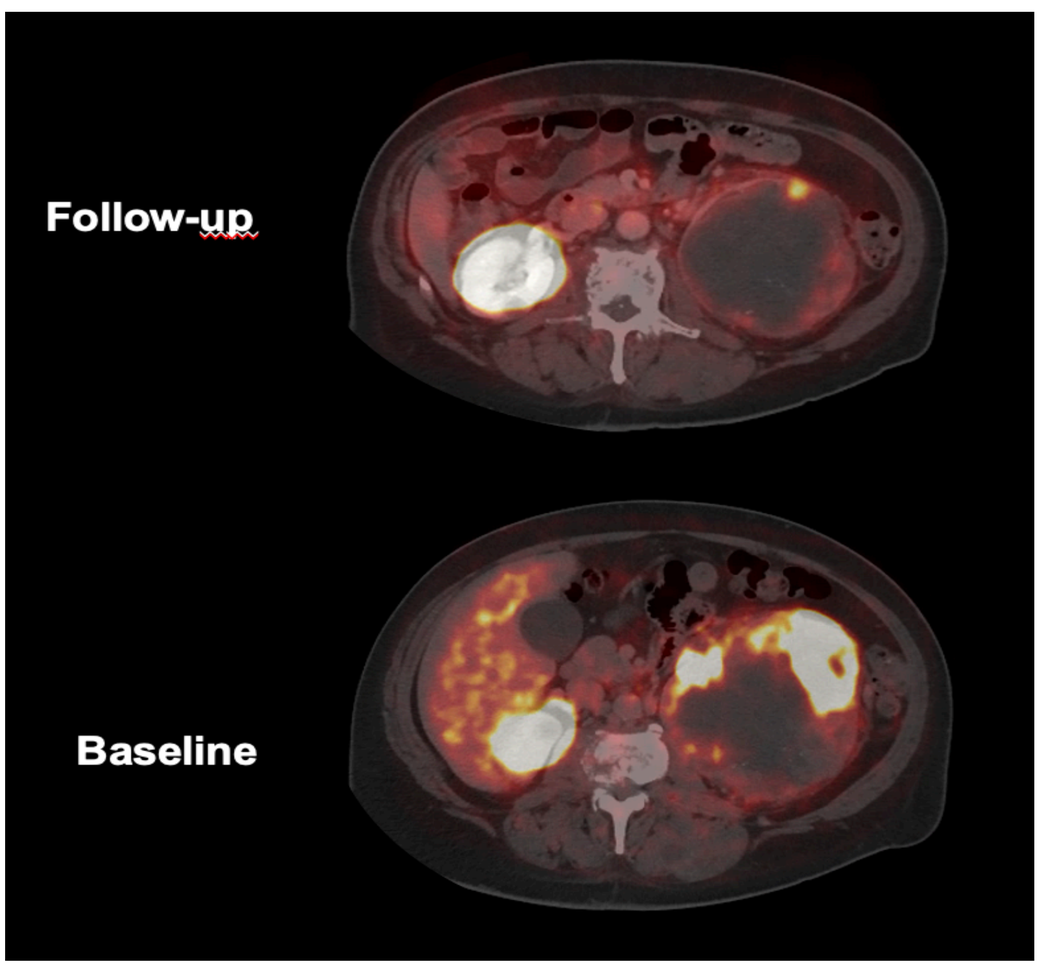
Background

c-MET as receptor tyrosine kinase is upregulated in renal cell carcinoma and has been shown to be correlated with patients' survival in metastatic renal cell carcinoma (mRCC). Prediction of treatment response to tyrosine kinase receptor inhibitors targeting c-MET such as cabozantinib is important to improve disease management in mRCC. ^{68}Ga-EMP-100 is a novel PET ligand that directly targets c-MET expression. Here we present the first data of ^{68}Ga-EMP-100 in mRCC comparing uptake characteristics on an intra- and interindividual level.

Methods

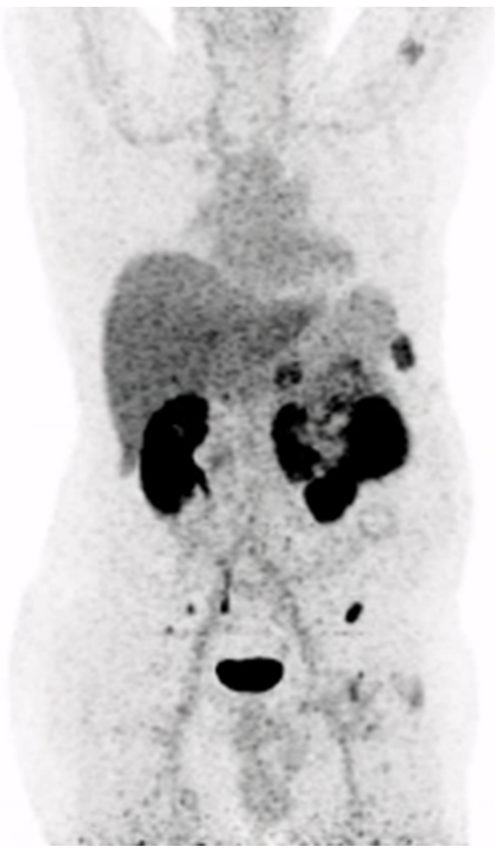
12 patients with mRCC prior or at assessment of further therapy options underwent ^{68}Ga-EMP-100 PET/CT imaging. Uptake of mRCC lesions were compared by SUV_{mean} and SUV_{max} measurements. Additionally, metastatic sites on PET were compared to contrast-enhanced computed tomography (CT) and the respective, quantitative PET parameters were assessed and then compared inter- and intra-individually.



Patient with baseline and follow-up ^{68}Ga-EMP-100 PET/CT: The primary tumor in the left kidney showed a significant size reduction with decreasing c-MET expression.

Results

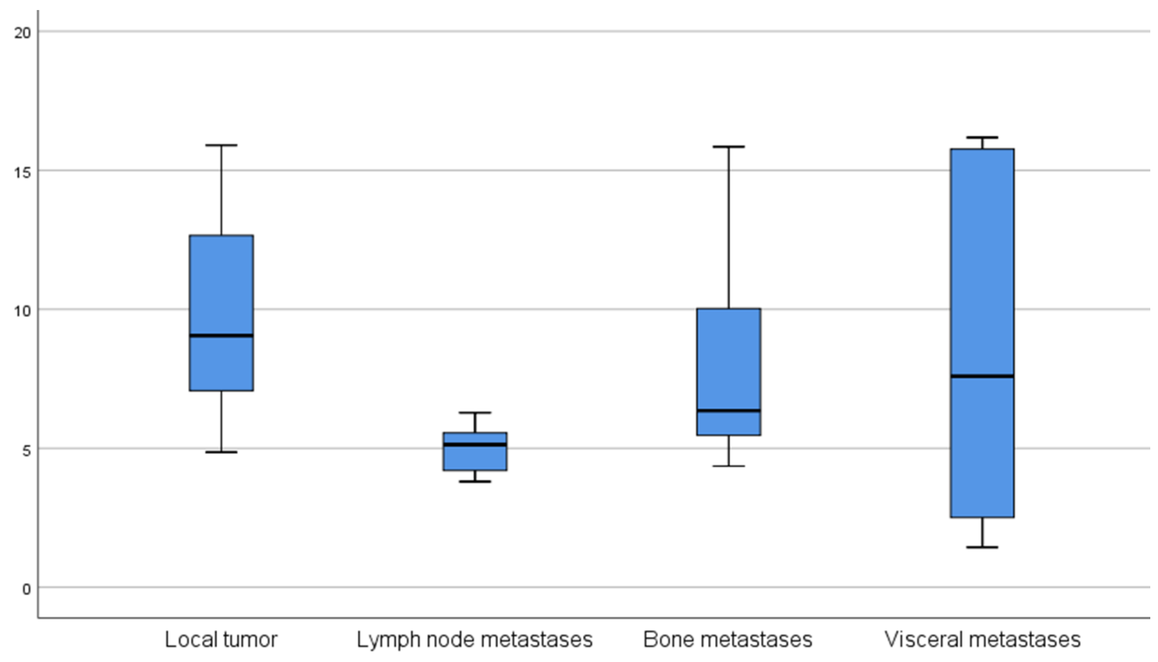
Overall, 87 tumor lesions were delineated: Of these, 79% were visually rated c-MET positive (median SUV_{max} of 4.4 / SUV_{mean} 2.5). The highest uptake intensity was found in tumors at the primary site (SUVmax 9.0 (4.9–29.2)), followed by bone metastases (SUVmax 5.6 (1.0–15.9)), lymph node metastases (SUVmax 3.9 (2.1–6.3)) and visceral metastases (SUVmax 3.82 (0.1–16.2)). The occurrence of visually PET-negative lesions (21%) was distributed heterogeneously on an intra- and inter-individual level; the largest proportion of PET-negative metastatic lesions were lung and liver metastases.The highest physiological 68Ga-EMP-100 accumulation was seen in the kidneys, followed by moderate uptake in the liver and the spleen, panccreas and the intestines.



Maximum intensity projection (MIP) in a patient with different metastatic sites of mRCC

Conclusion

^{68}Ga-EMP-100 which targets c-MET expression shows increased uptake in mRCC patients with high inter- and intraindividual differences. Our pilot study shows that ^{68}Ga-EMP-100 could be a promising molecular imaging tool for mRCC patients undergoing tyrosine kinase inhibitor therapies.



SUV_{max} in different tumor sites