OC14

^{68}Ga-Pentixafor-PET/CT for Imaging of Chemokine Receptor 4 Expression in Neuroendocrine Tumors – a head-to-head comparison with DOTATOC and FDG PET/CT

Michael Lassmann[1], Rudolf A. Werner[1,2], Alexander Weich[3], Hans-Juergen Wester[4,5], Michael Scheurlen[3], Takahiro Higuchi[1,2], Samuel Samnick[1], Christina Bluemel[1], Martina Rudelius[6], Andreas K. Buck[1], Constantin Lapa[1] & Ken Herrmann[1,7]

[1]Department of Nuclear Medicine, University Hospital Wuerzburg, Wuerzburg, Germany; [2]Comprehensive Heart Failure Center, University Hospital Wuerzburg, Wuerzburg, Germany; [3]Department of Internal Medicine II, Gastroenterology, University Hospital Wuerzburg, Wuerzburg, Germany; [4]Scintomics GmbH, Fürstenfeldbruck, Germany; [5]Pharmaceutical Radiochemistry, Technische Universität Muenchen, Munich, Germany; [6]Institute for Pathology, University Hospital Wuerzburg, Wuerzburg, Germany; [7]Department of Molecular and Medical Pharmacology, David Geffen School of Medicine at UCLA, Los Angeles, USA.

Introduction

Diagnostic imaging of neuroendocrine tumors (NETs) is the domain of somatostatin receptor (SSTR) agonists as well as FDG PET/CT in dedifferentiated tumors. SSTR also serves as target for receptor directed peptide therapy. More recently, specific ligands targeting the chemokine receptor 4 (CXCR4) were introduced potentially offering an additional theranostic option in NETs. Here we evaluated the CXCR4 expression using ^{68}Ga-Pentixafor PET/CT in NET patients in comparison to ^{68}Ga-DOTATOC and ^{18}F-FDG PET/CT.

Material and methods

Eleven consecutive patients with histologically proven advanced NETs were retrospectively analyzed (three female; mean age, 69 ± 10 years; Ki67 36 ± 36%). 5/11 (45%) suffered from pancreatic NETs, 3/11 (27%) from ileum NETs, 2/11 (18%) from cancer of unknown primary and 1/11 (9%) was classified as a gastric NET. DOTATOC, FDG and Pentixafor PET/CT were performed in all patients within 4 weeks to confirm target expression of SSTR, CXCR4 and to detect dedifferentiated tumor lesions. Image analysis was performed visually. Immunohistochemical CXCR4 expression was evaluated in biopsy samples using monoclonal anti-human anti-CXCR4 antibodies.

Results

7/11 (63%) initially presented with lymph node metastases, 3/11 (27%) with bone metastases, 9/11 (82%) with liver metastases, 2/11 (18%) with lung metastases and 1/11 (9%) with a brain metastasis. On visual analysis, Pentixafor was positive in 4/11 (36%), FDG in 9/11 (82%) and DOTATOC in 9/11 (82%) patients, respectively. Of the nine SSTR positive patients seven and three were also FDG- and CXCR4-positive. Two DOTATOC negative patients were FDG positive and one of them also Pentixafor positive. Three patients were positive on all three PET/CT scans. In 2/4 Pentixafor-positive patients, biopsy samples revealed intense CXCR4 expression.

Conclusions

In this pilot study, one third of NET patients were CXCR4 positive. However, one NET patient without SSTR expression was Pentixafor positive. Hence, CXCR4-directed radionuclide therapy can be envisioned for selected patients with SSTR-negative tumors.

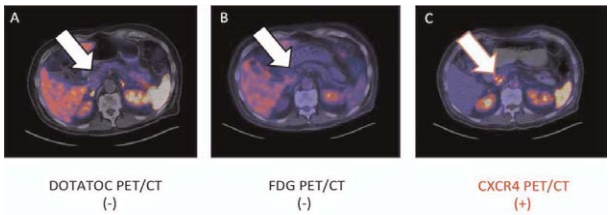

Figure 1 DOTATOC (A), FDG (B) and pentixafor/CXCR4 (c) PET/CT of a 69-year old male patient suffering from a pancreatic NET with a Ki67 0f 85%. Papilla of the pancreas demonstrated neither uptake in the DOTATOC nor in the FDG PET/CT (black arrows) whereas a Pentixafor scan was positive (red arrow)

DOI: 10.1530/endoabs.47.OC14