IMAGES IN OBSTETRICS AND GYNECOLOGY

[68Ga]Ga-RM2 PET/CT reveals small distant metastases not detected by conventional imaging in primary estrogen receptor-positive breast cancer

Kerstin Michalski[1,2] · Katharina Müller-Peltzer[3] · Ingolf Juhasz-Böss[5] · Philipp T. Meyer[1] · Juri Ruf[1,4] · Jasmin Asberger[5]

Presentation

Here we report the case of a woman with primary estrogen receptor (ER)-positive breast cancer (BC) in which positron emission tomography (PET)/computed tomography (CT) using the gastrin-releasing peptide receptor (GRPR) antagonist [68Ga]Ga-RM2 led to an upstaging and change of management by revealing small distant metastases not detected by conventional imaging (Fig. 1)

A 43-year-old patient with newly diagnosed cancer of the right breast (cT2 cN0 Mx; ER > 95%, progesterone receptor > 95%, Her2-neu score: 1, MIB-1 proliferation index 60%) underwent preoperative a [68Ga]Ga-RM2 PET/CT imaging on compassionate use basis. The PET scan showed a small subcarinal, distant lymph node metastasis and a highly suspicious lesion in the left proximal femur, both not detected on conventional imaging (CT, MRI and bone scan). Given the upstaging from UICC stage II to stage IV [1], primary breast surgery was postponed. In regards to an oligometastatic concept, the patient underwent neoadjuvant chemotherapy, followed by breast-preserving surgery with sentinel lymph node dissection as well as radiotherapy of the breast, the axilla, the subcarinal lymph node and the femur.

Discussion

[68Ga]Ga-RM2 PET/CT is a promising technique for staging of primary BC with positive ER status [2, 3]. In this case, the PET scan led to an additional metastasis-directed therapy. Thus molecular imaging with [68Ga]Ga-RM2 PET/CT might improve risk stratification and, ultimately, prognosis of patients with primary ER-positive BC.

✉ Jasmin Asberger
 jasmin.asberger@uniklinik-freiburg.de

1 Department of Nuclear Medicine, Medical Center, Faculty of Medicine, University of Freiburg, University of Freiburg, Freiburg, Germany

2 Department of Nuclear Medicine, University Hospital Würzburg, Würzburg, Germany

3 Department of Diagnostic and Interventional Radiology, Medical Center, Faculty of Medicine, University of Freiburg, University of Freiburg, Freiburg, Germany

4 Department of Nuclear Medicine, Klinikum Karlsruhe, Karlsruhe, Germany

5 Department of Obstetrics and Gynecology, Medical Center, Faculty of Medicine, University of Freiburg, University of Freiburg, Freiburg, Germany
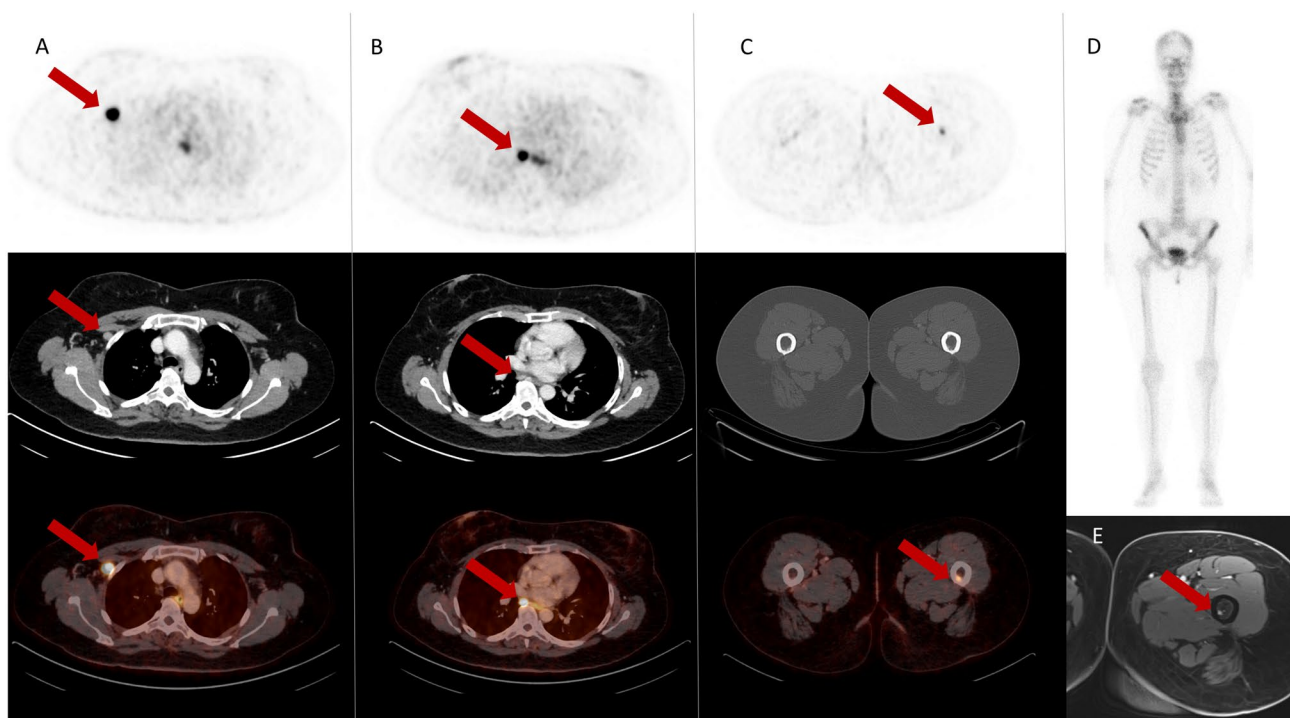
Fig. 1 PET/CT imaging with [^{68}Ga]Ga-RM2 (A-C; axial slices of PET [top], CT [middle] and fusion images [bottom]). An ipsilateral deep axillary enlarged lymph node with intense tracer uptake was detected, compatible with a local lymph node metastasis **A**. High tracer uptake was observed in a small subcarinal, distant lymph node metastasis **B**, confirmed by biopsy. Furthermore, high focal tracer uptake was found in the left proximal femur **C**. Despite an unsuspicious planar bone scan **D**, magnetic resonance imaging **E** was highly suggestive for a bone metastasis

Author contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by KM, KMP, PTM, JR, JA and IJB. JA and IJB cared fort he patient from gynecological side. The first draft of the manuscript was written by KM and JA and all authors critically revised the manuscript and approved the final version.

Data availability New imaging techniques can facilitate risk stratification for patients. Molecular imaging with [^{68}Ga]-RM2 PET/CT better detected primary metastasis of ER-positive BC in the described case. Therapy was adjusted accordingly. The approriate metastasis-directedtherapy can ultimately be expected to improve the patients prognosis.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical approval Not applicable.

Consent to participate Not applicable.

Consent to publish The authors affirm that the patient provided informed consent for publication of the images.

References

1. Brierley JD GM, Wittekind C, editors. TNM classification of malignant tumours.: John Wiley & Sons; 2017.
2. Stoykow C, Erbes T, Maecke HR, Bulla S, Bartholoma M, Mayer S et al (2016) Gastrin-releasing peptide receptor imaging in breast cancer using the receptor antagonist (68)Ga-RM2 And PET. Theranostics 6:1641–1650. https://doi.org/10.7150/thno.14958
3. Zang J, Mao F, Wang H, Zhang J, Liu Q, Peng L et al (2018) 68Ga-NOTA-RM26 PET/CT in the evaluation of breast cancer: a pilot prospective study. Clin Nucl Med 43:663–669. https://doi.org/10.1097/RLU.0000000000002209

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.