Prostate-specific membrane antigen-expressing melanoma metastases in a patient with prostate cancer and melanoma- a case report

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INTRODUCTION: ^{68}Ga-prostate-specific membrane antigen (PSMA) positron emission tomography (PET) with computed tomography (CT) has a high clinical relevance for detecting sites in patients with suspected recurrence of prostate cancer.[1] However, PSMA expression is not restricted to prostate cancer metastases

CASE PRESENTATION: We report the case of a 79-year-old patient with a history of prostate cancer and melanoma and elevation of serum prostate-specific antigen. As suggested by the German guideline for prostate cancer, 68Ga-PSMA- PET/CT was performed due to suspected recurrence of prostate cancer and revealed PSMA-expressing lesions in the left axilla and lumbar spine. Surprisingly, histopathological assessment revealed PSMA-positive melanoma metastases – and not prostate cancer – in both locations. The bone metastasis was stained with a PSMA-directed antibody. While tumor cells were negative, tumor capillaries as well as macrophages showed strong PSMA expression. In our interdisciplinary tumor board, a systemic therapy with immune checkpoint inhibitors and radiotherapy of the bone lesion were recommended. The patient and his family decided to initiate the recommended treatment closer to home.

DISCUSSION: In our case of a patient with a history of prostate cancer and melanoma, two PSMA-expressing lesions turned out as melanoma metastases. While the left axillary lymph node metastasis was clearly atypically located for prostate cancer, the spinal metastasis could have easily been mistaken for a prostate cancer metastasis. While ^{68}Ga-PSMA PET/CT is known as a reliable diagnostic measure to detect metastases of prostate cancer,[1] PSMA expression is not restricted to prostate cancer. In literature, PSMA uptake on PET/CT has also been described in healthy organs, benign diseases, tumors as well as other malignancies.[2] To date, only three case reports are published on PSMA-positive melanoma metastases, but none of them reported bone metastases.

CONCLUSION: With our case, we want to raise awareness that –despite being named “prostate-specific”- PSMA expression is not restricted to prostatic tissue but can also occur in melanoma metastases. Therefore, histopathological confirmation of PSMA-positive metastases, particularly in patients with a history of different malignancies, should be performed to avoid misinterpretation of ^{68}Ga-PSMA PET/CT results.

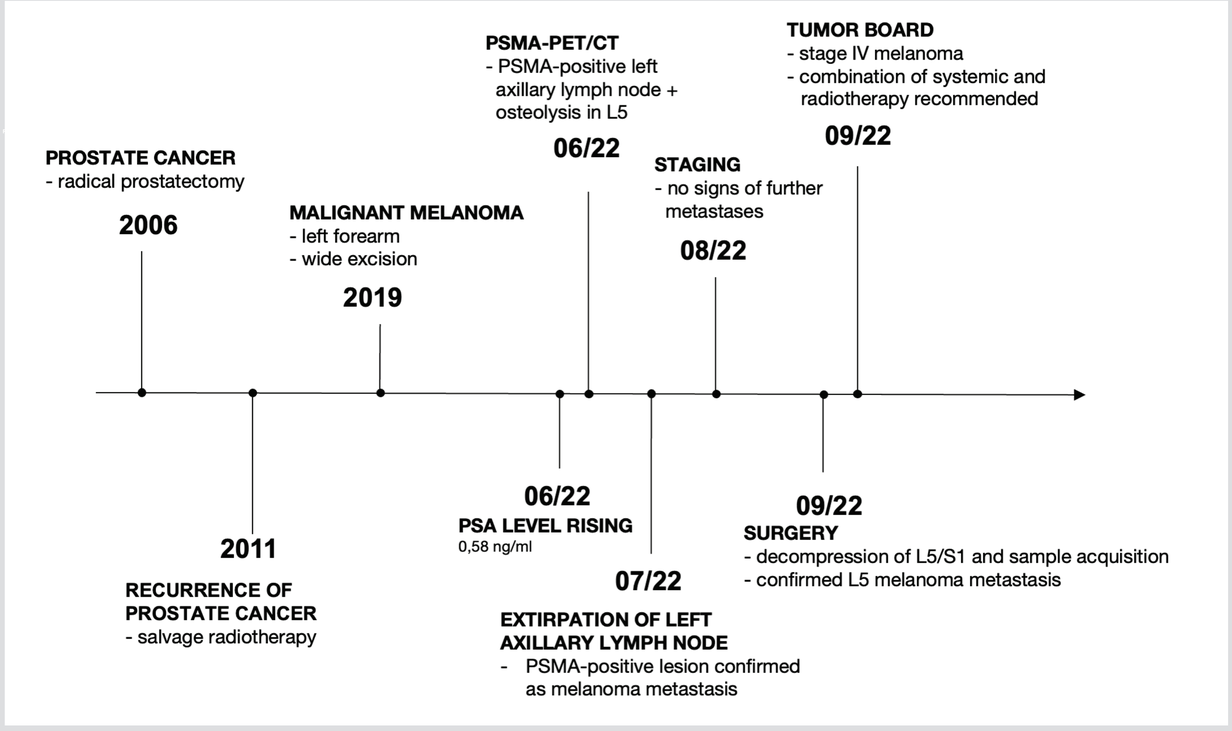

Figure 1: Diagnostic and therapeutical measures for prostate cancer and melanoma in our patient

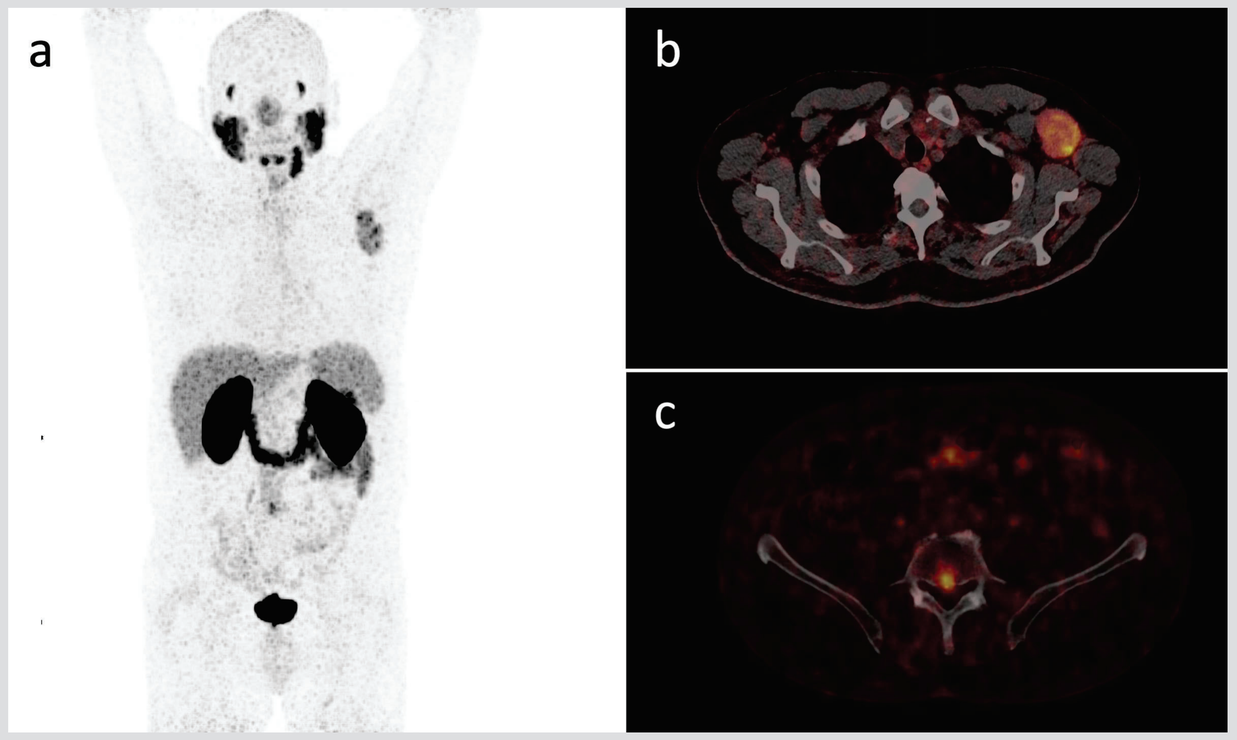

Figure 2: ^{68}Ga-PSMA PET/CT conducted to detect recurrence of prostate cancer. (a) Maximum intensity projection of PSMA-PET in our then 79-year-old patient. (b, c) Fused axial PET/CT slices through the PSMA-expressing left axillary melanoma metastasis and L5 vertebral body melanoma metastasis.

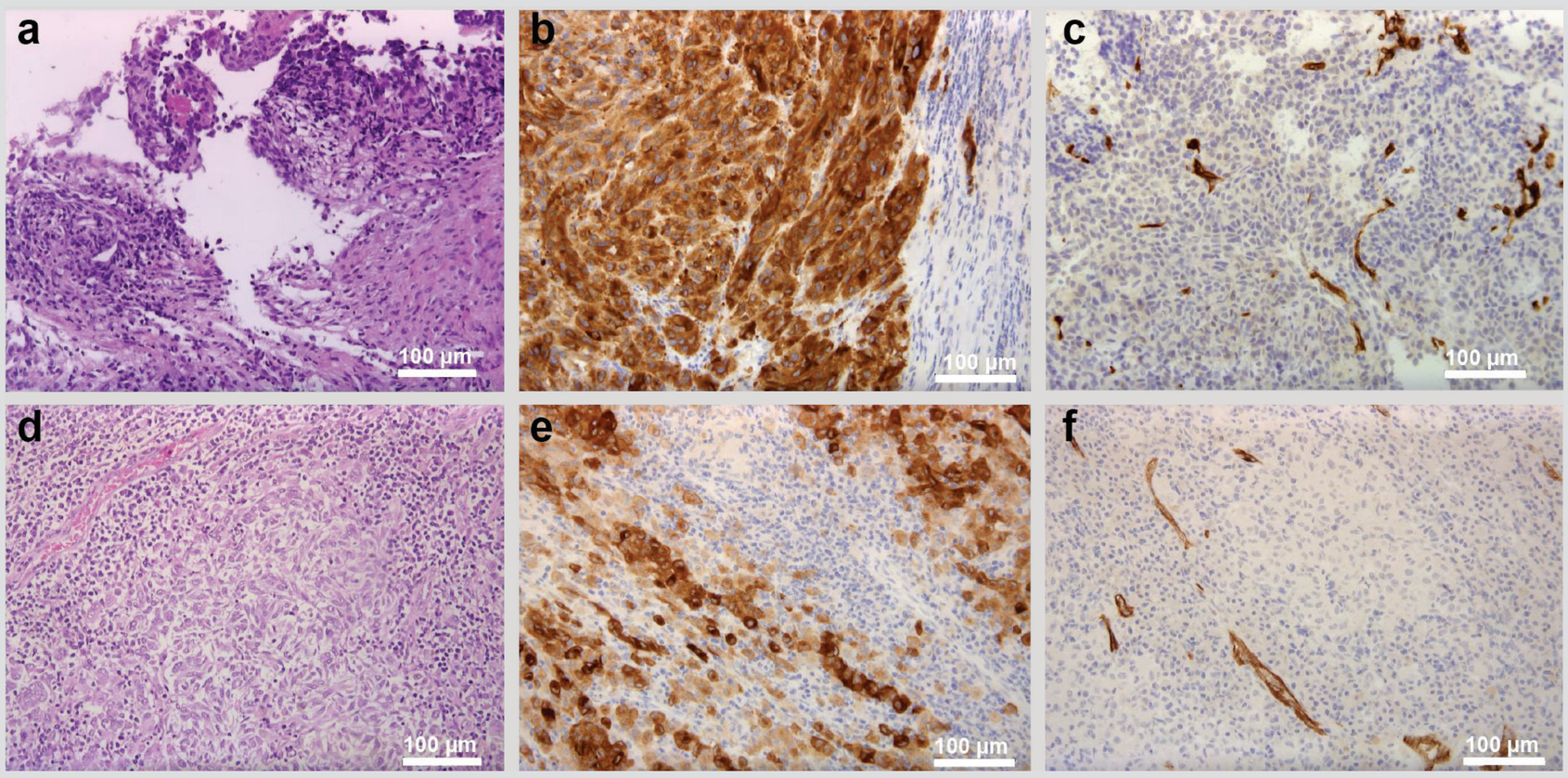

Figure 3: Pathological examination of melanoma metastases in the bone metastasis of the lumbar spine (upper row, a-c) and axillary lymph node metastasis (lower row, d-f). (a) + (d) Hematoxylin-eosin staining: tumor cells with moderately wide eosinophilic cytoplasm and pleomorphic nuclei. (b) + (e) Immunohistochemistry with Melan A-directed antibody showing strong expression of Melan A in brown color, consistent with melanoma metastasis. (c) + (f) Immunohistochemistry with PSMA-specific antibody. Strong brown color in tumor capillaries as well as macrophages indicates positivity to anti-PSMA antibody, while tumor cells are negative for PSMA. The length of the scale bar is 100µm.

LITERATURE:

[1] von Eyben FE, Picchio M, von Eyben R*, et al.* (68)Ga-Labeled Prostate-specific Membrane Antigen Ligand Positron Emission Tomography/Computed Tomography for Prostate Cancer: A Systematic Review and Meta-analysis. *Eur Urol Focus*. 2018;4(5):686-93.

[2] Sheikhbahaei S, Afshar-Oromieh A, Eiber M*, et al.* Pearls and pitfalls in clinical interpretation of prostate-specific membrane antigen (PSMA)-targeted PET imaging. *Eur J Nucl Med Mol Imaging*. 2017;44(12):2117-36.

The authors declare no conflicts of interest regarding this work. Please direct questions to: cindy.franklin@uk-koeln.de or johanna.hirsch@uk-koeln.de