Integrated 68Ga-HBED-CC-PSMA-PET/MRI in patients with suspected recurrent prostate cancer.


Abstract

AIM: Evaluate the diagnostic accuracy of 68Ga-labeled HBED-CC-PSMA-PET/MRI for detection of recurrent PCa in comparison to PET/CT.

METHODS: 48 patients with suspected recurrent PCa underwent PET/CT after injection of the 68Ga-HBED-CC-PSMA ligand followed by integrated PET/MRI. Image analysis was performed by nuclear medicine physicians and radiologists with respect to the detection of lymph node metastases, bone metastases and local recurrence of the tumour. Image quality was evaluated visually based on a three-point ordinal scale.

RESULTS: From 48 patients initially examined, 25 were finally eligible for qualitative and quantitative image evaluation. In 14 patients, neither PET/CT nor PET/MRI found tumour lesions, and 9 patients were excluded from image analysis due to a pronounced extinction artifact around the urinary bladder (halo). In comparison to 68Ga-HBED-CC-PSMA-PET/CT, 68Ga-HBED-CC-PSMA-PET/MRI identified 14 vs. 9 local recurrences in the prostate bed and 23 vs. 20 PET-positive lymph nodes, and 4 vs. 4 PET-positive bone lesions, respectively. While the improved detection of suspicious lymph nodes was primarily attributable to the PET component, the advantageous detection of tumour recurrences in the prostate bed was chiefly referable to the superior soft-tissue contrast of the MR component of integrated PET/MRI. Analysis of SUV$_{\text{max}}$ revealed that 68Ga-HBED-CC-PSMA-PET/MRI provided significantly higher SUV$_{\text{max}}$ compared to 68Ga-HBED-CC-PSMA-PET/CT (17.6, range 2.0-49.6, and 15.1, range 3.5-36.8, respectively, p = 0.0019).

CONCLUSION: 68Ga-HBED-CC-PSMA-PET/MRI was found to be superior as compared to 68Ga-HBED-CC-PSMA-PET/CT in the detection of PSMA-expressing prostate bed recurrences.

KEYWORDS: PET/CT; PET/MRI; PSMA; prostate cancer

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