



¹⁸F-FDG PET/MR Refines Evaluation in Newly Diagnosed Metastatic Urethral Adenocarcinoma

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Abstract

We described the clinical impact of ¹⁸F-FDG PET/MR in refining the evaluation of a 39-year-old female with newly diagnosed metastatic urethral adenocarcinoma. We detailed the diagnostic imaging workup focusing our attention on the CT, MR, and ¹⁸F-FDG PET/MR different findings. In this case, ¹⁸F-FDG PET/MR imaging evaluation resulted not only effective but also altered staging and spared additional invasive procedures in the assessment of a metastatic urethral adenocarcinoma. Combining a highly sensitive PET with the increase tissue resolution of MR (PET/MR) may improve abdominal and pelvic lesion detection outperforming PET/CT for this indication.

Keywords Urethral adenocarcinoma · ¹⁸F-FDG · PET/MR · PET/CT · MR · CT

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Fig. 1 A 39-year-old female diagnosed with poorly differentiated urethral adenocarcinoma had workup with CT and MR at outside institution that showed, respectively, hypodense (a, white arrows) and T2 hyperintense (b and c, yellow arrows) lesions concerning for liver metastases. Furthermore, a right pelvic mass was initially considered to be the right ovary (d, yellow measurement) and a non-specific mild adenopathy in the right inguinal region was described

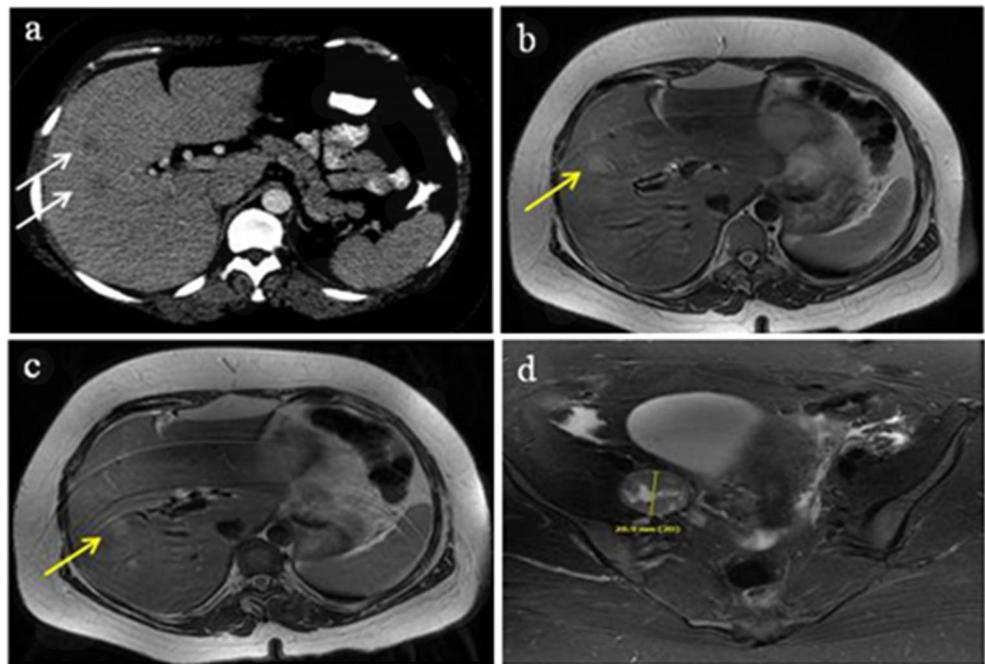
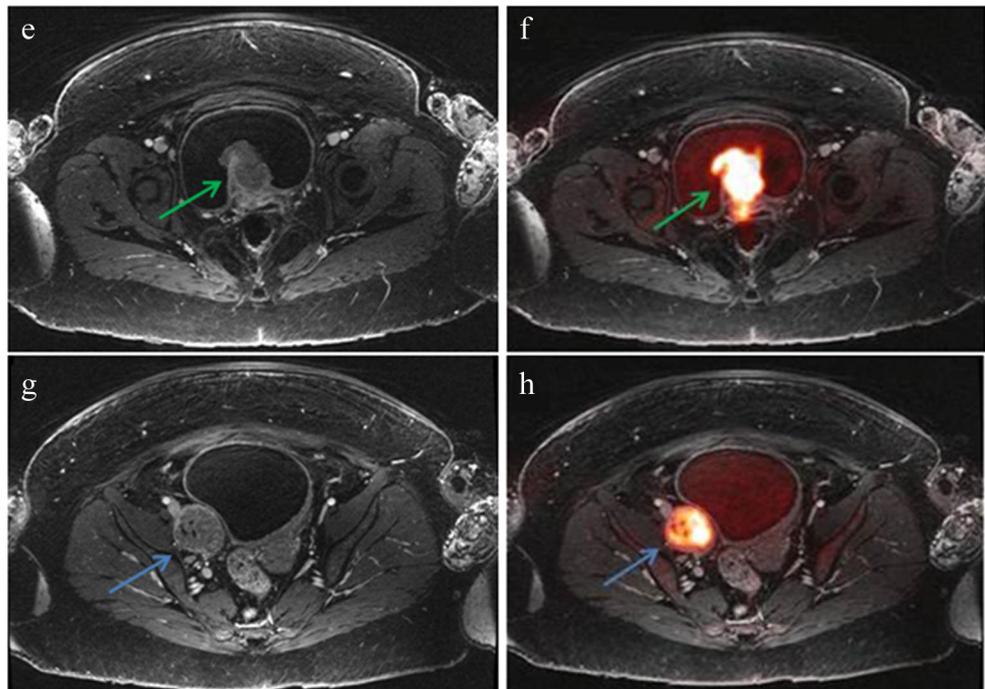


Fig. 2 The patient had a staging ^{18}F -FDG PET/MR scan at Stanford that showed focally increased hypermetabolism (SUVmax 46.0) within the known primary urethral mass (e and f, green arrows) and FDG-avid lymph nodes in the right inguinal and iliac regions concerning for nodal metastases. Interestingly, due to its size larger than 2 cm, the newly diagnosed FDG-avid right iliac lymph node (SUVmax 37.0) resulted in a significant impact of disease staging (g and h, blue arrows)



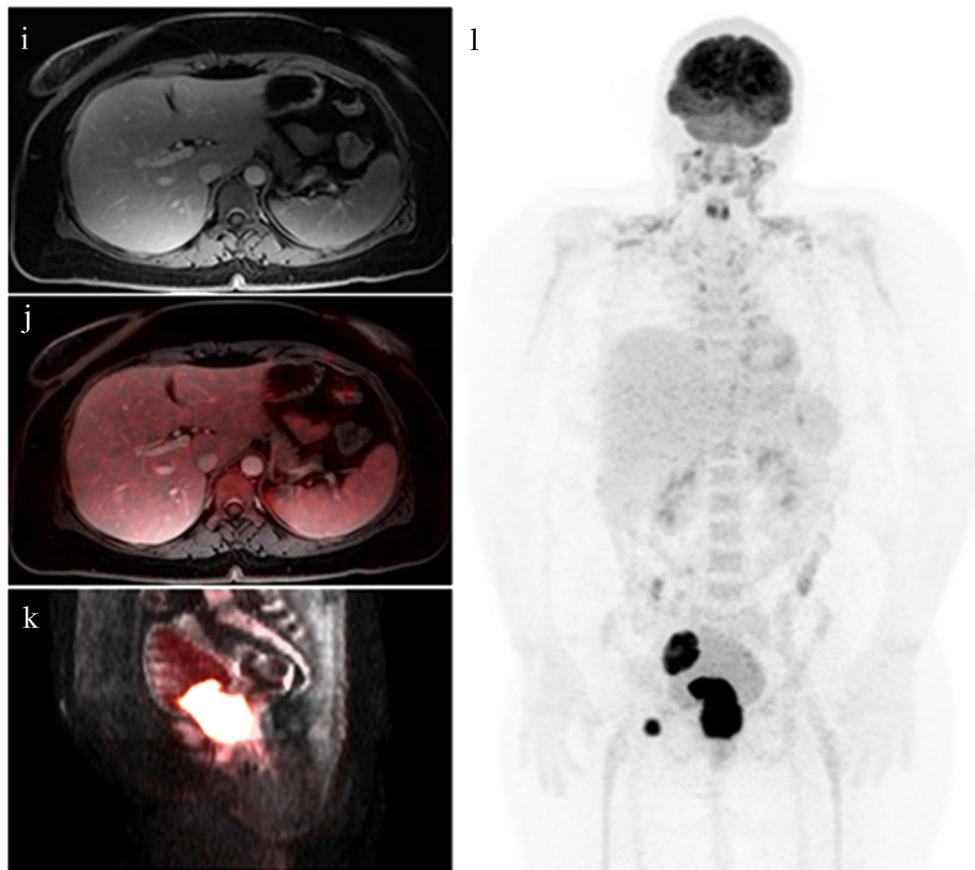


Fig. 3 Further, axial T1-weighted post-contrast liver imaging in the portal venous phase showed no suspicious hepatic lesions (**i**, T1-weighted portal-venous phase). The PET portion of the study showed no abnormal FDG uptake in the liver, thus confirming the negative MR findings in this region, sparing an unnecessary liver biopsy (**j**, axial PET/MR). Our purpose was to describe the clinical impact of ^{18}F -FDG PET/MR in the evaluation of a patient with a metastatic urethral adenocarcinoma (**k**, sagittal PET/MR; **l**, MIP). It is well-known that the radiopharmaceutical ^{18}F -FDG has high uptake within several neoplasms and greater sensitivity for malignancy [1, 2]. Due to its favorable test characteristics, ^{18}F -FDG PET/CT is established as an oncologic imaging technique in the detection of metastatic lymph nodes in patients with newly diagnosed urothelial and/or bladder

carcinomas [3, 4]. A significant innovation in the imaging field was the introduction of simultaneous PET/MR, that reduces the radiation exposure and combines the functional and metabolic information from PET with the excellent soft tissue contrast from MR. Further, compared with PET/TC and despite some disadvantages (access, cost, duration of the exam), PET/MR provides improved motion correction and functional imaging parameters (such as the perfusion or the diffusivity of the investigated tissue), thus refining the organs' functional assessment [5–7]. Combining a highly sensitive PET with the increase tissue resolution of MR (PET/MR) may improve abdominal and pelvic lesion detection with potential impact on disease outcome, outperforming PET/CT for this indication [8, 9]

Compliance with Ethical Standards

Conflict of Interest Laudicella R., Davidzon G., Vasanawala S., Baldari S., and Iagaru A declare that they have no conflict of interest.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study, formal consent is not required. All applicable international, national, and/or institutional guidelines for the care and use of animals were followed.

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