

## Incidental Detection of Urinary Bladder Herniation in <sup>18</sup>F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography Mimicking as Metastatic Deposit in the Inguinal Canal

### Abstract

Although <sup>18</sup>F-fluorodeoxyglucose (FDG) is the most extensively used tracer in oncological positron emission tomography/computed tomography (PET/CT) studies, various physiological as well as benign pathological conditions are known to cause false-positive results. This report describes <sup>18</sup>F-FDG PET/CT done in an elderly man with primary hepatocellular carcinoma, revealing a metastasis mimicking lesion in the left inguinal canal, which was identified as the herniated portion of the urinary bladder. Though rare, bladder herniation, especially with a narrow neck, can be a pitfall in the evaluation for metastatic disease. The study also highlights the utility of delayed imaging in the evaluation of pelvic pathology.

**Keywords:** <sup>18</sup>F-fluorodeoxyglucose, bladder herniation, hepatocellular carcinoma, inguinal canal, pitfall

A 65-year-old man, a diagnosed case of primary hepatocellular carcinoma (HCC) posttreatment with stereotactic body radiation therapy and oral sorafenib, was found to have left portal vein thrombosis on conventional contrast-enhanced computed tomography (CT), with suspicion of tumor recurrence. <sup>18</sup>F-fluorodeoxyglucose positron emission tomography (FDG PET)/CT done for recurrence evaluation showed tracer avid lesion in the liver at the site of original primary, suggestive of local recurrence. In addition, focally intense tracer uptake noted the left inguinal canal at the root of scrotal sac [Figure 1]. To rule out the rare chance of metastasis, a delayed regional image of the pelvis was acquired, which revealed an unusual herniation of the urinary bladder into the inguinal canal with a narrow neck, with filling of contrast into the herniated portion [Figure 2]. Despite being the most extensively used tracer in oncological PET imaging, <sup>18</sup>F-FDG show false-positive uptake from a variety of benign pathological as well as physiological conditions. In this patient with HCC evaluated for recurrence, the highly tracer avid portion of the bladder herniation, with a narrow neck cutting it from the rest of the bladder,

mimicked a metastatic inguinal canal lesion. A delayed image showing clearance of the urinary tracer activity and filling of contrast in the outpouching identified the incidental bladder herniation. <sup>18</sup>F-FDG PET/CT is well established in oncological imaging. However, understanding of the physiological variants of FDG uptake is imperative in avoiding false-positive interpretations, especially in metastatic workup. Inguinal hernia (IH) with urinary bladder content is a rare condition found in 1%–5% of IHS, most data reporting 1%–3%. Metastatic deposits from HCC in the inguinal canal, although uncommon, are not very rare.<sup>[1,2]</sup> Apart from metastatic deposits and rare spermatic cord malignancies,<sup>[3]</sup> inflammation in the herniated bowel loops, postsurgical mesh repair at the inguinal canal,<sup>[4]</sup> missed ectopic testis,<sup>[5]</sup> and as in this case an undiagnosed bladder herniation are the potential pitfalls of <sup>18</sup>F-FDG PET/CT in the evaluation for metastasis<sup>[6,7]</sup> in the inguinal canal. Although urinary bladder accounts for only ~1%–4% of inguinal canal herniation,<sup>[8]</sup> suspicion should be held to avoid misinterpretation, leading to false-positive results. This report thus demonstrates the possibility of misinterpreting PET images without

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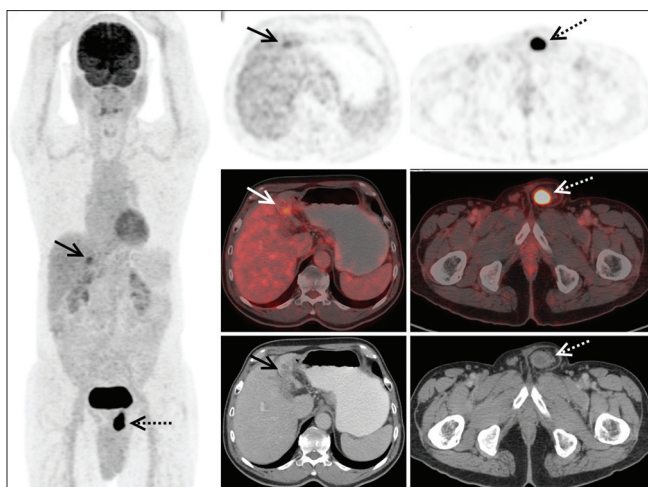
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**Figure 1:** 18F-Fluorodeoxyglucose positron emission tomography/computed tomography showing a tracer avid (maximum standard uptake value 4.3) ill-defined hypodense lesion in the left lobe of the liver at the site of original primary as shown with solid arrow in the maximum intensity projection (a) and axial positron emission tomography (b), fused positron emission tomography/computed tomography (c), and corresponding computed tomography (d). In addition, focally intense tracer uptake noted in the well-defined rounded hypodensity (broken arrows) in the left inguinal canal at the root of scrotal sac as shown in the maximum intensity projection (a), axial positron emission tomography (e), fused positron emission tomography/computed tomography (f), and corresponding computed tomography (g) images

combining relevant CT data and the importance of delayed imaging in pelvic pathologies.

#### Declaration of patient consent

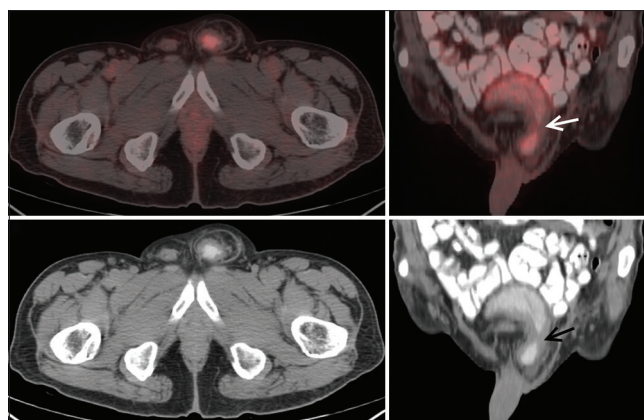
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.



**Figure 2:** Delayed regional image of the pelvis showing clearance of tracer uptake and filling of contrast in the portion of herniated urinary bladder in the left inguinal canal, with a narrow neck (arrow) connecting it with the urinary bladder as shown in the delayed axial (a) and coronal (c) positron emission tomography/computed tomography and their corresponding computed tomography images (b and d, respectively)

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