F-18 FDG Accumulation in a Bladder Herniation Mimicking Recurrence of Seminoma: Case Report

Bir Mesane Herniasyonunun İçinde Seminoma Rekürrensini Taklit Eden F-18 FDG Birikimi

Gözde DAĞLIÖZ GÖRÜR, MD, Assis.Prof.,[a]
Metin HALAÇ, MD, Assoc.Prof.,[b]
Fatma BERK, MD, Assoc.Prof.,[a]
Kerim SÖNMEZOĞLU, MD, Prof.,[b]
Haluk SAYMAN, MD, Prof.,[b]
İlhami USLU, MD, Prof.[b]

[a]Department of Nuclear Medicine, Kocaeli University Faculty of Medicine, Kocaeli
[b]Department of Nuclear Medicine, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul

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Yazışma Adresi/*Correspondence:*
Gözde DAĞLIÖZ GÖRÜR, MD, Assis.Prof.
Kocaeli University Faculty of Medicine, Department of Nuclear Medicine, Kocaeli, TÜRKİYE/TURKEY
gozdedaglioz@yahoo.com

ABSTRACT Positron emission tomography using F-18 fluorodeoxyglucose (FDG-PET) has an evolving role in the management of oncological patients. Normal FDG biodistribution and potential pitfalls must be considered for accurate interpretation. A 74-year-old patient with a history of seminoma was referred to PET/CT department to evaluate intraabdominal lymphadenopathies and a hypermetabolic mass lesion in the left inguinoscrotal region, which raised the suspicion of seminoma recurrence. Main excretion of FDG via urine makes renal collecting systems, ureters and bladder possible sites of confounding findings on PET images. In this paper, we presented F-18 FDG accumulation in a bladder hernia, which is a rare condition that may be misdiagnosed as recurrence. Familiarity with this incidental finding can avoid false interpretations.

Key Words: Positron-emission tomography; fluorodeoxyglucose F18; urinary bladder; hernia; seminoma

ÖZET F-18 florodeoksiglukoz pozitron emisyon tomografisi (FDG-PET), onkoloji hastalarının değerlendirilmesinde giderek artan bir öneme sahiptir. FDG'nin normal biyodağılımı ve potansiyel eksiklikleri, doğru bir değerlendirme yapabilmek için göz önünde tutulmalıdır. Daha önceden seminom tanısı almış olan 74 yaşında bir hasta, intraabdominal lenfadenopatilerin ve sol inguinoskrotal bölgede seminom rekürrensi şüphesi uyandıran hipermetabolik bir kitle lezyonunun değerlendirilmesi amacıyla PET/BT ünitesine sevkedilmişti. FDG atılımının asıl olarak idrar yoluyla gerçekleşmesi, böbrek toplama sistemi, üreterler ve mesaneyi PET görüntülerinin değerlendirilmesinde zorluk oluşturabilecek potansiyel alanlar olarak karşımıza getirmektedir. Bu makalede, F-18 FDG'nin mesane hernisinde birikimine ilişkin nadir görülen ve yanlışlıkla rekürrens olarak değerlendirilebilecek bir olgu sunulmuştur. İnsidental olarak görülebilecek olan bu bulgunun anlaşılması, benzer durumlardaki yanlış değerlendirmelerden kaçınılmasını sağlayacaktır.

Anahtar Kelimeler: Pozitron emisyon tomografi; fluorodeoksiglukoz f18; mesane; fıtık; seminom

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Herniation of bladder into the inguinal canal is rare and occurs in 1% to 3% of all inguinal hernias. Bladder hernias are most prevalent among men between 50 and 70 years of age. Most bladder hernias are asymptomatic and are usually diagnosed incidentally. Some patients need to compress the groin after micturition to complete urination (two-stage micturition). Some patients will complain of fluctuation of scrotal size after voiding or catheterization.[1] Diagnosis may be important before any surgical procedure of groin to avoid complications.

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F-18 fluorodeoxyglucose-positron emission tomography (FDG-PET) plays an important role in the detection and assessment of various cancers including seminoma. There are several common causes of false-positive diagnoses associated with FDG-PET, namely, the normal physiologic uptake of the gastrointestinal or genitourinary tract and benign infectious or inflammatory lesions.

In this case report, F-18 FDG accumulation in a bladder hernia of a patient with seminoma that could be misinterpreted as recurrence is presented.

CASE REPORT

A 74-year-old patient with a history of left radical orchiectomy for seminoma and right nephrectomy for kidney metastasis was referred to PET/computed tomography (CT) department for evaluation of intraabdominal lymphadenopathies. For the scan, 50 ml of oral CT contrast agent diluted in 1500 ml water was administered starting at midnight. The patient was injected 9.8 mCi (362.6 MBq) of F-18 FDG and was imaged using an integrated PET/CT camera (Siemens Biography LSO HI-REZ PET/CT scanner, Chicago, IL). The CT portion of the study was done without intravenous contrast medium, just to define anatomic landmarks and to make attenuation correction on PET images. On PET/CT scanning, bilateral common iliac, interaortacaval and left paraaortic hypermetabolic lymphadenopathies, which were considered metastases were imaged. A hypodense circular mass lesion in the left inguinoscrotal region, which also appeared hypermetabolic on maximum intensity projection (MIP) and PET/CT images, raised the suspicion of recurrence of seminoma (black arrows, Figure 1a, 1b). There was no contrast medium in the mass and standardized uptake value (SUV) was similar to that of the bladder. Despite metal artifacts of bilateral hip prosthesis, CT images revealed the angulation of bladder into the left inguinal canal (black arrow, figure 1c) but the connection of the mass with bladder on continuing transverse, sagittal slices and MIP image could not be identified (Figure 1a).

The following ultrasonography examination revealed that the mass (51.3 x 88.9 mm) was anechoic surrounded by a tissue similar to bladder and urine filled vesical herniation protruding to scrotum (Figure 2).

DISCUSSION

Whole-body PET scan with FDG is a functional imaging technique that relies on changes in metabolism for detection of disease. A thorough understanding of normal distribution of FDG in the body along with the knowledge of normal variations is essential to accurately assess the extent of the disease and to avoid misinterpretations.

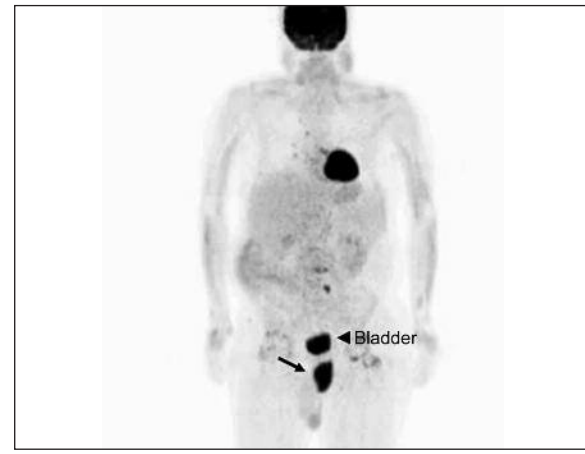

FIGURE 1a: MIP image showing a circular hypermetabolic lesion in left inguinoscrotal region.

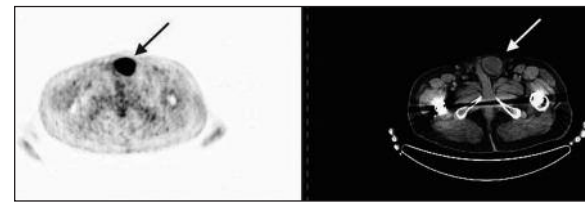

FIGURE 1b: PET and CT images of inguinoscrotal region showing a hypermetabolic hypodense circular lesion surrounded by thick well-defined walls with no contrast media inside.

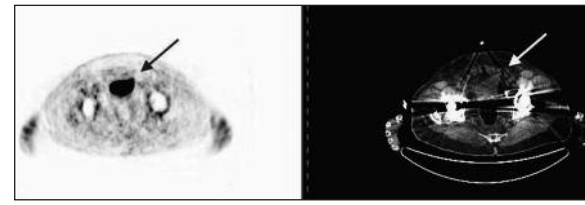

FIGURE 1c: PET and CT images of inguinal region showing the angulation of bladder into the left inguinal canal (note the metal artifacts of bilateral hip prosthesis).

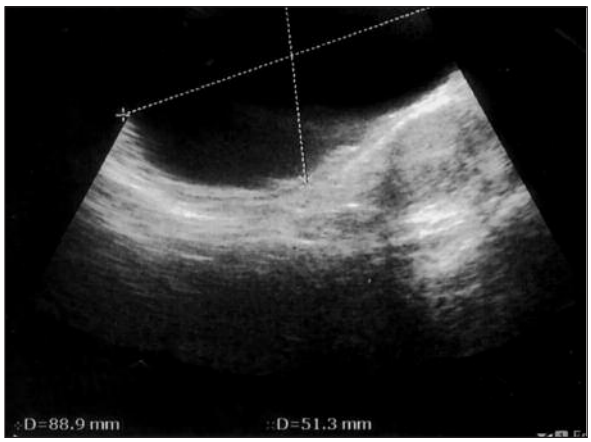

FIGURE 2: Ultrasonography of the mass (51.3 x 88.9 mm) which was anechoic surrounded by a tissue similar to bladder and filled with urine protruding to scrotum.

Main excretion of FDG via urine makes renal collecting systems, ureters and bladder possible sites of confounding findings on PET images. When no anatomical correlation is available, pooling of tracer in urinary system could be mistaken for malignancy in urinary system or nearby structures. PET/CT allows correct co-registration of anatomical and functional images and precise localization of hypermetabolic foci within the urinary tract such as extra renal pelvis or dilated ureters.[2,3]

Bladder can herniate into the inguinal canal or the scrotum. Ureter or intestinal loops may be present in the hernia sac. Several factors have been implicated in the pathophysiology of bladder herniation, including obesity, urinary outlet obstruction, loss of bladder tone and structural defects or senile atrophy in supporting tissues of abdominal walls. Orchiectomy or senile atrophy might have predisposed bladder hernia in our patient.

Bladder herniation is usually asymptomatic and is an incidental finding on routine imaging studies. Retrograde cystography is the radiological modality with the highest diagnostic value.[4] In addition, intravenous pyelography (IVP), pelvic ultrasonography (USG) and CT have been useful in diagnosis. Although CT is not the first line diagnostic tool, angulation of the base of the bladder anteriorly and inferiorly is the CT sign and especially in the patients with large lesions, it is possible to follow the bladder down into the inguinal or femoral canal.[5] Circular hypodense lesion surrounded by thick well-defined walls can suggest bladder hernia. Contrast medium in the herniated portion of bladder can prompt the diagnosis but the prone position of the patient during CT scanning and the wide hernia neck can ease the passage of contrast medium as in the presented case. Sagittal or coronal reconstructions may be useful.

USG can easily characterize the fluid nature of the mass. Changes in volume after micturition and continuity of the lesion cranially to the bladder can suggest bladder hernia.[6,7]

Bladder hernias are very rare but may cause misdiagnosis in PET/CT images especially of tumors in the pelvic area.[1,8,9] Previous pelvic surgery that can cause abdominal wall defects such as the radical orchiectomy in our patient can cause herniation of the bladder. A circular hypodense lesion in inguinoscrotal area surrounded by thick well-defined walls on CT images with SUV value as high as that of the bladder on PET images should arise the suspicion of bladder hernia before interpreting this activity as malignant. The angulation of the base of the bladder and/or hernia neck can be present on CT images.

Change in size of the mass after micturition on a repeated pelvic image may be helpful for accurate diagnosis in the PET/CT room, with no other diagnostic modality needed. Familiarity with this incidental finding especially in male senile patients or in patients with radical orchiectomy history can avoid false interpretations.

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