

Inguinal Herniation of the Bladder Mimicking Malignancy in FDG PET/CT: Original Image

Mesanein FDG PET/CT'de Maligniteyi Taklit Eden İnguinal Herniasyonu

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Geliş Tarihi/Received: 17.04.2011

Kabul Tarihi/Accepted: 13.10.2011

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ABSTRACT Whole body positron emission tomography /computed tomography (PET/CT) was requested for restaging in a 73-year-old male who underwent wedge resection and radiotherapy for lung cancer. While there was no pathological fludeoxyglucose (FDG) uptake at the operation site, in the mediastinal lymph nodes, and in the bilateral surrenal regions, a mass like focal intense FDG uptake was noted in the left inguinal region. The differential diagnosis included a second primary tumor, metastatic lymphadenopathy, strangulated hernia of the bowel, bladder diverticulum or inguinal herniation of the urinary bladder. A delayed PET/CT exam of the pelvic region after filling the bladder was performed. A full bladder could not be achieved despite well hydration, but delayed images showed some expansion of the FDG accumulation at the left inguinal region. On CT and fused images, we got the impression that there was an anatomical connection between the bladder and the hypermetabolic focus. Bladder herniation was considered based on the CT and fused images. Ultrasound examination confirmed the diagnosis. In conclusion, filling the patients' bladder may help to differentiate this benign condition from malignancies.

Key Words: Positron-emission tomography; hernia, inguinal; urinary bladder

ÖZET Akciğer kanseri nedeniyle kama rezeksiyonu ve radyoterapi uygulanan 73 yaşında erkek hastadan yeniden evreleme için tüm vücut pozitron emisyon tomografisi/bilgisayarlı tomografi (PET/CT) istendi. Ameliyat bölgesinde, mediastinal lenf düğümlerinde ve her iki sürrenal bölgede patolojik fludeoksiglukoz (FDG) tutulumu yokken, sol inguinal bölgede kitle benzeri fokal yoğun FDG tutulumu gözlemlendi. Ayırıcı tanıda sekonder primer tümör, metastatik lenfadenopati, bağırsağın boğulmuş hernisi, mesane divertikülü veya mesanein inguinal herniasyonu düşünüldü. Mesane doldurulduktan sonra pelvik bölgenin gecikmeli PET/CT incelemesi yapıldı. İyi hidrasyona rağmen mesane tam olarak doldurulamadı; fakat gecikmeli görüntüler, sol inguinal bölgede FDG birikiminin biraz genişlediğini gösterdi. BT ve birleşmiş görüntülerde, mesane ile hipermetabolik odak arasında anatomik bir bağlantı olduğu izlenimi edinildi. BT ve birleşmiş görüntülerde mesane herniasyonu düşünüldü. Ultrason muayenesi tanıyı doğruladı. Sonuç olarak, hastanın mesanesini doldurmak iyi huylu ve kötü huylu durumların ayırımında faydalı olabilir.

Anahtar Kelimeler: Pozitron emisyon tomografi; fitik, inguinal; mesane

Türkiye Klinikleri J Med Sci 2012;32(3):895-7

Positron emission tomography combined with computerized tomography (PET/CT) is a useful tool in cancer patients for diagnosis, staging, restaging and assessment response to therapy.¹ However, benign conditions could be a source of misinterpretation of the images.²⁻⁴ We presented an original image of a potential rare source of the false positive result in the inguinal region.

doi: 10.5336/medsci.2011-24353

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Whole body PET/CT was requested for restaging in a 73-year-old male who underwent wedge resection and radiotherapy for lung cancer. The images were acquired 60 min after the intravenous injection of fludeoxyglucose (FDG). While there was no pathological FDG uptake at the operation site, in the mediastinal lymph nodes and in the bilateral surrenal regions, a mass like focal intense FDG uptake was noted in the left inguinal region. The differential diagnosis included a second primary tumor, metastatic lymphadenopathy, strangulated hernia of the bowel or inguinal herniation of the urinary bladder. In order to fill the bladder with urine, we advised the patient to drink water. A delayed PET/CT exam of the pelvic region was performed. Although the bladder filling was incomplete, the delayed images showed some increase in the size of FDG accumulation in the left inguinal region. On CT and fused images, we got the impression that there was an anatomical connection between the bladder and the hypermetabolic focus (Figure 1). Bladder herniation was considered based on the CT and fused images. Ultrasound examination confirmed the diagnosis (Figure 2).

Bladder hernias account for 0.5% and 3% of all lower abdominal hernias and 1% to 4% of inguinal hernias.^{5,6} They are common in men aged 50 to 70 years.⁶ Although this condition may cause serious complications such as acute renal failure due to obstruction, rupture, infection, carcinoma, vesicocutaneous fistula and calculus, clinical symptoms are rare.⁷ Besides, it frequently becomes evident in imaging procedures and during surgery. The clinical symptoms are two-phase or double micturition.^{8,9} Demonstrating the direct communication of the inguinal cystic lesion with the bladder, similar echogenicity of the bladder and the herniated segment on CT and sonographic modalities help to diagnose this condition as well as providing information about complications such as necrosis, calculus etc.¹⁰ Akkaş BE et al. confirmed the diagnosis by Technetium-99m-labeled Diethylene Triamine Penta-Acetic Acid (Tc99m-DTPA) renal scintigraphy in a similar case.¹¹ We preferred ultrasound for the definitive diagnosis of this benign condition since it is easy to perform and does not necessitate addi-

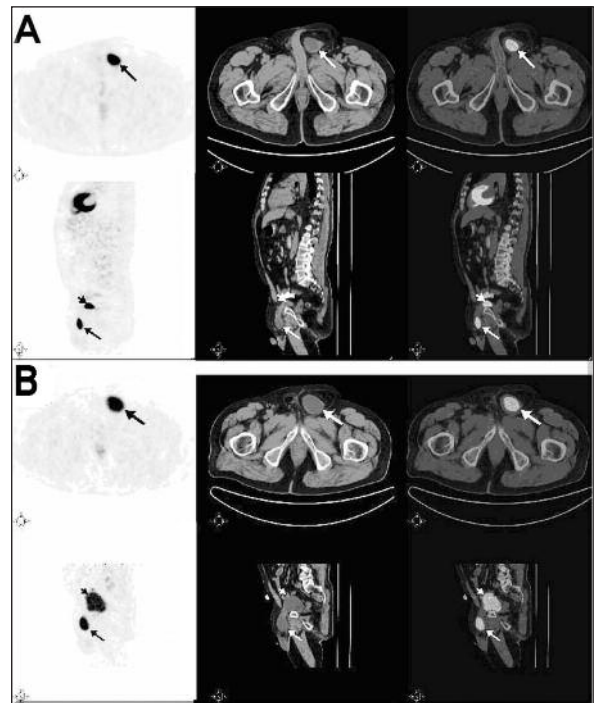


FIGURE 1: A. Axial and sagittal FDG PET/CT images demonstrate a hypermetabolic focus in the left inguinal region (long arrows). B. Delayed FDG PET/CT images show some enlargement of this FDG accumulation. Sagittal images also reveal the association between the focal activity in the inguinal region (long arrows) and the bladder (short arrows).

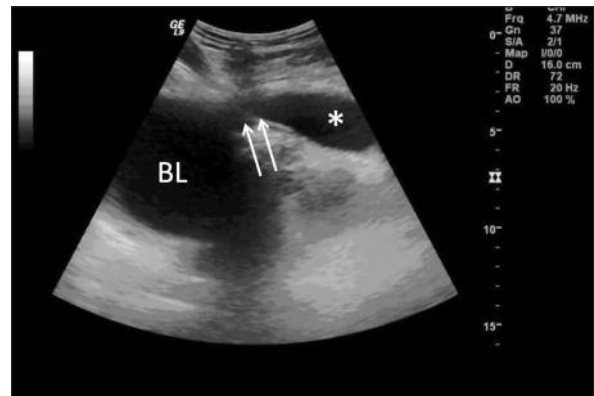


FIGURE 2: Ultrasonographic examination shows a direct fluid-filled communication (white arrows) between the herniated inguinal segment (asterisk) and the bladder (BL). At the lower right of the image is a magnified view of the herniated segment (asterisk) showing the hyperechoic bladder mucosa (white arrowheads) and the hypoechoic muscularis layer (open white arrow).

tional ionizing radiation. Urinary bladder diverticulum is defined as a protrusion of bladder mucosa through its muscular layer which does not contain a muscular layer.¹² In our case, all layers of the blad-

der, including bladder mucosa and muscular layers were present at the herniated segment, which excludes bladder diverticulum. In conclusion, although inguinal herniation of the bladder is a rare benign

disease, it could mimic malignant pathologies in FDG PET images.¹³ Filling the patients' bladder with urine by oral hydration may help to differentiate this benign condition from malignancies.

REFERENCES

1. Almuhaideb A, Papathanasiou N, Bomanji J. 18F-FDG PET/CT imaging in oncology. *Ann Saudi Med* 2011;31(1):3-13.
2. Shreve PD, Anzai Y, Wahl RL. Pitfalls in oncologic diagnosis with FDG PET imaging: physiologic and benign variants. *Radiographics* 1999;19(1):61-77; quiz 150-1.
3. Ak İ. [A potential pitfall associated with F-18 FDG imaging in a patient with malignant disease: osteoid osteoma: original image]. *Türkiye Klinikleri J Med Sci* 2009;29(4):1026-8.
4. Yurdakul AS, Kanbay A, Geçgil E, Öztürk C. [A case of false positive FDG PET/CT scan due to foreign body granuloma mimicking malignant disease: case report]. *Türkiye Klinikleri J Med Sci* 2009;29(5):1326-9.
5. Conde Sánchez JM, Espinosa Olmedo J, Salazar Murillo R, Vega Toro P, Amaya Gutiérrez J, Alonso Flores J, et al. [Giant inguino-scrotal hernia of the bladder. Clinical case and review of the literature]. *Actas Urol Esp* 2001; 25(4):315-9.
6. Koontz AR. Sliding hernia of diverticulum of bladder. *AMA Arch Surg* 1955;70(3):436-8.
7. Hinojosa D, Joseph UA, Wan DQ, Barron BJ. Inguinal herniation of a bladder diverticulum on PET/CT and associated complications. *Clin Imaging* 2008;32(6):483-6.
8. Fisher PC, Hollenbeck BK, Montgomery JS, Underwood W 3rd. Inguinal bladder hernia masking bowel ischemia. *Urology* 2004;63(1):175-6.
9. Ciancio G, Burke GW, Nery J, Huson H, Coker D, Miller J. Positional obstructive uropathy secondary to ureteroneocystostomy herniation in a renal transplant recipient. *J Urol* 1995; 154(4):1471-2.
10. Casas JD, Mariscal A, Barluenga E. Scrotal cystocele: US and CT findings in two cases. *Comput Med Imaging Graph* 1998;22(1):53-6.
11. Akkaş BE, Vural GU, Aslan S, Sasani C, Erçakmak N. [Bladder herniation detected by pet/ct in a patient with thyroid papillary carcinoma]. *Turk J Nucl Med* 2009;18(3):98-101.
12. Hsu HL, Huang KH, Chang CC, Liu KL. Which one is true bladder?--a giant urinary bladder diverticulum. *QJM* 2011;104(2):169-70.
13. Fuerxer F, Brunner P, Cucchi JM, Mourou MY, Bruneton JN. Inguinal herniation of a bladder diverticulum. *Clin Imaging* 2006; 30(5):354-6.