



Alterations in ^{18}F -FDG Uptake Patterns may Limit Cross-sectional Evaluation of Adrenal Adenomas Using Single ^{18}F -FDG PET/CT Imaging

^{18}F -FDG Tutulum Paternlerinde Gözlenen Değişiklikler, Adrenal Adenomların ^{18}F -FDG PET/BT ile Kesitsel Olarak Değerlendirilmesini Sınırlayabilir

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Abstract

Adrenal adenomas are observed in up to 7% of the population and are predominantly non-functional, increased ^{18}F -fluorodeoxyglucose (FDG) uptake is seen in only a small portion of them on ^{18}F -FDG positron emission tomography/computed tomography (PET/CT) imaging. In this report, we present the sequential ^{18}F -FDG PET/CT imaging findings of 2 patients with radiologically or pathologically confirmed adrenal adenomas who had severely altered ^{18}F -FDG uptake patterns in adrenal lesions in different imaging studies of the same patient. In light of these findings, we wanted to highlight that evaluating adrenal adenomas as cross-sectional with semi-quantitative PET/CT parameters obtained from single imaging may cause misinterpretation.

Keywords: Adrenal adenoma, ^{18}F -FDG, positron emission tomography

Öz

Adrenal adenomlar popülasyonun yaklaşık %7'sine kadar gözlenen ve ağırlıklı olarak fonksiyon göstermemektedir. ^{18}F -florodeoksiglukoz (FDG) pozitron emisyon tomografisi/bilgisayarlı tomografi (PET/BT) görüntülemesinde bunların sadece küçük bir bölümünde artmış ^{18}F -FDG tutulumu gözlenmektedir. Bu raporda, adrenal lezyonlarda ^{18}F -FDG tutulum paternlerini belirgin şekilde değiştiren radyolojik veya patolojik olarak doğrulanmış adrenal adenomu olan 2 hastanın ardışık ^{18}F -FDG PET/BT görüntüleme bulgularını sunuyoruz. Bu bulgular ışığında adrenal adenomların tek görüntülemeden elde edilen semi-kantitatif PET/BT parametreleri ile kesitsel olarak değerlendirilmesinin yanlış yorumlamalara yol açabileceğini vurgulamak istedik.

Anahtar kelimeler: Adrenal adenom, ^{18}F -FDG, pozitron emisyon tomografi

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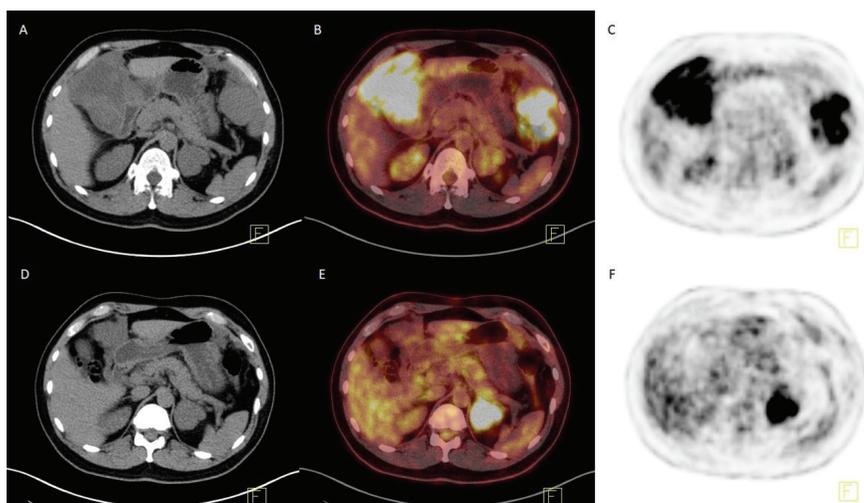


Figure 1. A 40-year-old patient presented with abdominal pain and was diagnosed with metastatic gastrointestinal stromal tumor (GIST). Staging ¹⁸F-fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) images (**A, B, C**) revealed intra-abdominal hypermetabolic gross mass lesions as well as a well-defined nodular lesion with moderate ¹⁸F-FDG uptake in the left adrenal gland [maximum standardized uptake value (SUV_{max}): 4.6 g/mL]. On the subsequent ¹⁸F-FDG PET/CT images (**D, E, F**) taken after 4 months of imatinib treatment, metabolic regression as well as significant necrotic hypometabolic findings were observed in the abdominopelvic mass lesions. However, it was noted that intense ¹⁸F-FDG uptake developed in the left adrenal nodular lesion without significant morphological changes (SUV_{max}: 12.8 g/mL). Left adrenal tru-cut biopsy was performed because of the relatively rare occurrence of adrenal metastasis in GIST cases and suspicious findings observed during the course of the disease, and it was reported to be consistent with adrenal cortical adenoma without any further features.

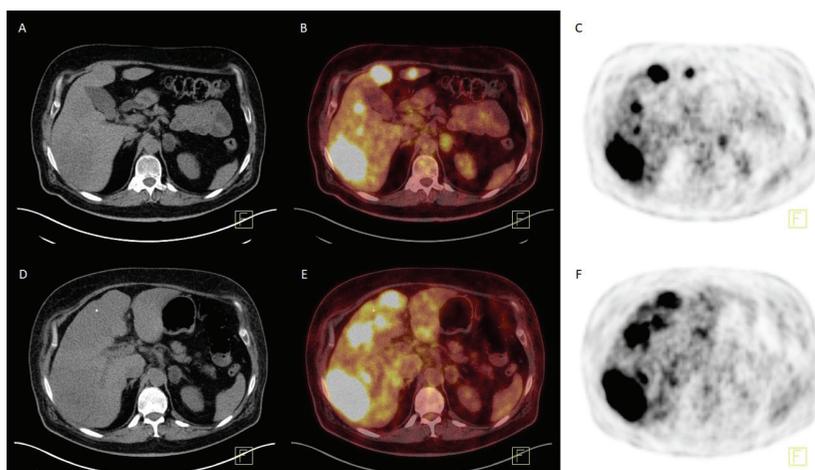


Figure 2. ¹⁸F-FDG PET/CT scan was performed on a 51-year-old patient who was diagnosed with anaplastic thyroid cancer from a nodule found in the left lobe of the thyroid gland. On the axial PET, CT, and fused PET/CT images obtained (**A, B, C**), a nodular lesion with increased ¹⁸F-FDG uptake was observed in the left adrenal gland, except for lung, liver, and bone metastases (SUV_{max}: 5.8 g/mL). Although progression was detected in metastatic foci in ¹⁸F-FDG PET/CT images (**D, E, F**) taken after chemotherapy (carboplatin and paclitaxel) regimen, it was noted that the metabolic activity of the morphologically stable left adrenal nodular lesion regressed (SUV_{max}: 3.7 g/mL). On magnetic resonance imaging, the lesion was reported to be compatible with adrenal adenoma. Increased ¹⁸F-FDG uptake is observed in only 5% of adrenal adenomas, which is common in oncologic imaging practice (1). In the literature, the effectiveness of semi-quantitative ¹⁸F-FDG PET/CT parameters, primarily SUV_{max}, in differentiating adrenal lesions as benign or malignant at different threshold values has been evaluated with various reports (2,3,4,5). Although there are several descriptions regarding the alterations in ¹⁸F-FDG uptake patterns observed in adrenal adenomas, especially possible circadian rhythm of the hormone-secreting tissues, as well as the differences in the cell content of the lesions (especially cell content with increased GLUT1 expression), information on this issue is still limited (6,7,8). Considering the variability of ¹⁸F-FDG uptake of adrenal adenomas as we presented in our cases and possible differences in clinical-technical characteristics between scans (serum glucose level, fasting period, injection time, and time between imaging and injection), we wanted to highlight the limitations in cross-sectional evaluation of adrenal lesions with a single PET/CT imaging.

Ethics

Informed Consent: Patient consent was obtained.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: F.T., Ü.Y., Concept: F.T., Ü.Y., Design: F.T., Ü.Y., Data Collection or Processing: F.T., Ü.Y., Analysis or Interpretation: F.T., Ü.Y., Literature Search: F.T., Ü.Y., Writing: F.T., Ü.Y.

Conflict of Interest: No conflict of interest was declared by the authors.

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