Interesting Image

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Pseudoprogression Shown on ^{18}F-FDG PET/CT After Pembrolizumab Treatment in a Case of Metastatic Bladder Cancer

Metastatik Mesane Kanserli Bir Olguda Pembrolizumab Tedavisi Sonrası ^{18}F-FDG PET/BT'de Gösterilen Psödoprogresyon

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Abstract

A 57-year-old man diagnosed with a metastatic bladder tumor was initiated on pembrolizumab treatment. ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) imaging performed to evaluate treatment response showed numerical-dimensional and metabolic increase in the metastatic lesions. In the ^{18}F-FDG PET/CT imaging performed 8 weeks later due to suspicion of pseudoprogression, a significant regression of the lesions was observed, and the patient was diagnosed with pseudoprogression. Pseudoprogression should be kept in mind when ^{18}F-FDG PET/CT is performed after the use of immunotherapy, and evaluation with follow-up PET/CT is recommended to confirm that the patient has hyperprogression or pseudoprogression.

Keywords: Immunotherapy, pseudoprogression, bladder cancer, pembrolizumab, PET/CT

Öz

Metastatik mesane tümörü tanılı 57 yaşında erkek hastaya pembrolizumab tedavisi başlandı. Tedavi yanıtının değerlendirilmesi için yapılan ^{18}F-florodeoksiglukoz (^{18}F-FDG) pozitron emisyon tomografisi/bilgisayarlı tomografi (PET/BT) görüntülemesinde, metastatik lezyonlarda sayısal-boyutsal ve metabolik artış izlendi. Psödoprogresyon şüphesi nedeniyle 8 hafta sonra yapılan ^{18}F-FDG PET/BT görüntülemesinde, lezyonların belirgin gerilediği görüldü ve psödoprogresyon tanısı konuldu. İmmünoterapi kullanımı sonrası yapılan ^{18}F-FDG PET/BT'de psödoprogresyon akılda tutulup hastanın hiper veya psödoprogrese olduğunu göstermek için takip PET/BT ile değerlendirme önerilir.

Anahtar kelimeler: İmmünoterapi, psödoprogresyon, mesane kanseri, pembrolizumab, PET/BT

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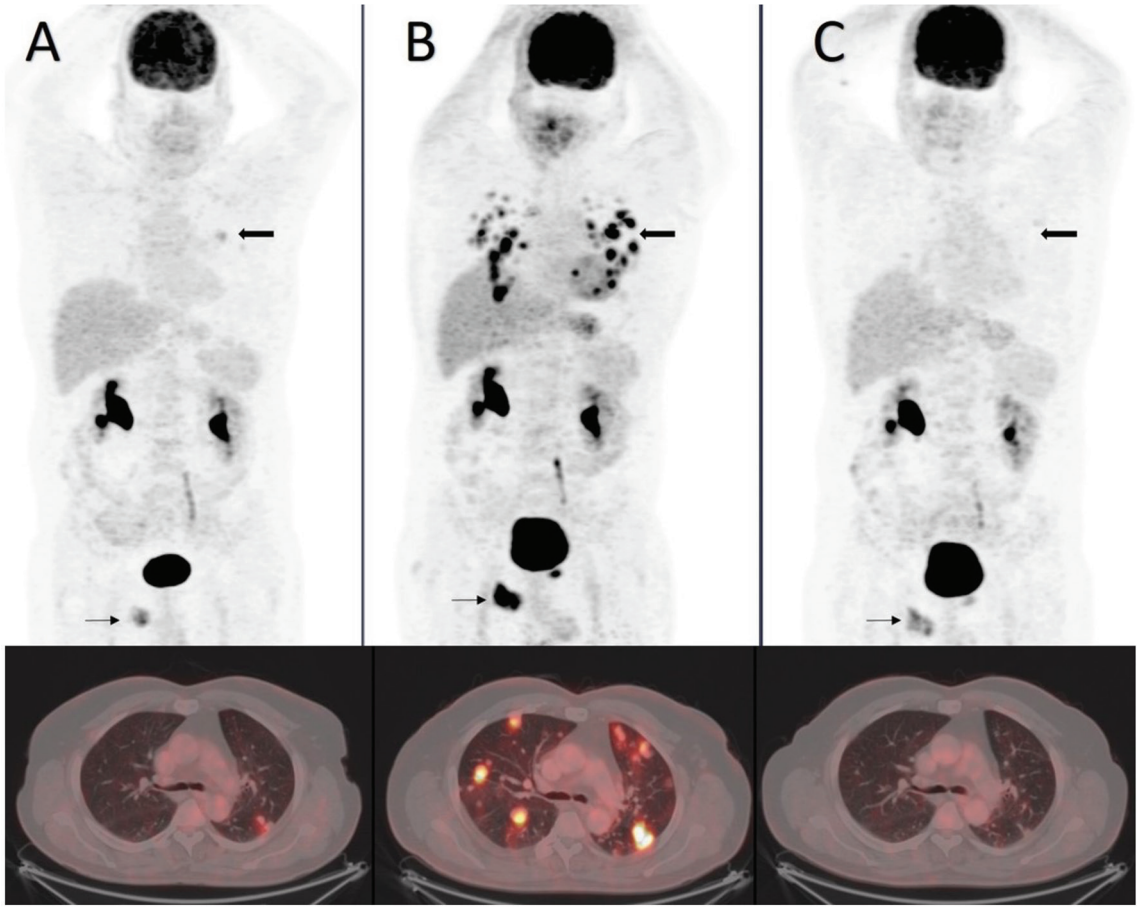

Figure 1. A 57-year-old man with high-grade papillary urothelial carcinoma who underwent transurethral resection of the bladder received gemstabin, cisplatin, and zolendronic acid due to lung and bone metastases in the initial staging. ^{18}Flourine-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) imaging [A: maximum intensity projection (MIP) and axial fusion] performed to evaluate treatment response showed increased ^{18}F-FDG uptake in multiple nodular lesions (thick arrows) [maximum standardized uptake value (SUV_{max}): 4.4], the largest of which was 11x8 mm in both lungs and lytic lesion (thin arrow) (SUV_{max}: 8.2) in the right ischium. Because there was a numerical progression in lung metastases compared with the previous PET/CT imaging (not shown), pembrolizumab treatment was initiated as second-line treatment. After 4 cycles of pembrolizumab treatment (after 3 months), PET/CT imaging (B: MIP and axial fusion) showed markedly increased intense ^{18}F-FDG uptake in multiple nodular lesions (thick arrows) (SUV_{max}: 15.4), the largest of which was 23x23 mm in both lungs and lytic-sclerotic lesions (thin arrow) (SUV_{max}: 15.6) in the left pubic-right ischial bones. In the multidisciplinary oncology council, the patient was considered pseudoprogression, and pembrolizumab treatment was continued. PET/CT imaging 8 weeks later (C: MIP and axial fusion) showed significant numerical and metabolic regression of nodular lesions (thick arrows) in both lungs, the largest of which regressed to 11x11 mm in size, and low ^{18}F-FDG uptake was observed in the nodules (SUV_{max}: 2.2). Reduced ^{18}F-FDG uptake was observed in the right ischial and left pubic bones (thin arrow) (SUV_{max}: 7) compared with the previous study. The patient was diagnosed with pseudoprogression, and treatment was continued. Immune checkpoint inhibitors have a wide range of indications, and their frequency of use is increasing (1). Overexpression of programed cell death protein-1 (PD-1)/programed cell death ligand 1 (PD-L1) in muscle invasive bladder cancer (MIBC) tissue was found to be associated with high ^{18}F-FDG uptake in the tumor (2). A recent study prospectively investigated the value of ^{18}F-FDG PET/CT for predicting lymph node metastasis (LNM) in MIBC patients receiving neoadjuvant pembrolizumab. PET/CT results were compared with histopathological findings, and the sensitivity to detect LNM was found to be 27% and 37.5%, and the specificities were 97% and 98% for ^{18}F-FDG PET/CT before and after pembrolizumab, respectively (3). Pseudoprogression describes the phenomenon of marked disease progression (increase in size and ^{18}F-FDG-affinity of lesions) on ^{18}F-FDG PET scan within 12 weeks of the start of immunotherapy, with a reduction in tumor burden if immunotherapy is continued (4). The incidence of pseudoprogression in urothelial cancer ranges from 1.5% to 17% (5). A new category of unconfirmed progression (iUPD) has been created in the immune-based therapeutics Response Evaluation Criteria in Solid Tumors and requires confirmation of progression (increase in size or number of lesions) on follow-up imaging. This treatment is usually recommended after 4-8 weeks following an initial study showing significant disease progression (6). The role of pseudoprogression on ^{18}F-FDG PET/CT in patients with MIBC treated with immunotherapy requires further investigation.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Authorship Contributions

Concept: H.K., C.G., Design: H.K., C.G., İ.H.D., Data Collection or Processing: F.K., V.Ş., İ.H.D., Literature Search: F.K., C.G., V.Ş., Writing: F.K., C.G.

Conflict of Interest: No conflicts of interest were declared by the authors.

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