



Hypermetabolic Axillary Lymph Nodes Associated with COVID-19 Vaccination in Breast Cancer Management

Meme Kanseri Yönetiminde COVID-19 Aşısına Bağlı Hipermetabolik Aksiller Lenf Nodları

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Abstract

A 42-year-old female patient diagnosed with invasive ductal breast ca underwent ¹⁸F-fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) scan for staging. A 1.5 cm diameter hypermetabolic lesion was observed in the lower inner quadrant of the right breast that was compatible with primary tumor [maximum standardized uptake value (SUV_{max}): 10.5]. No pathological ¹⁸F-FDG uptake was observed in lymph nodes whose fatty hilum was seen in the right axilla. However, in the left axilla and left deep axilla, hypermetabolic lymph nodes with a maximum diameter of 19 mm and fatty hilum were observed (SUV_{max}: 8.0). In a detailed CT evaluation, these lymph nodes have thicker walls than the ones in the right axilla. The patient was questioned again and coronavirus disease-2019 (COVID-19) vaccination history (with BNT162b2, COVID-19 mRNA vaccine) was determined that was administered to the left arm 5 days ago. Tru-cut biopsy was performed from the left axillary lymph nodes and proved to be reactive lymphoid tissue and there was no primary or metastatic tumor in these axillary lymph node tissues. The patient was given neoadjuvant chemotherapy 4.5 months after the first ¹⁸F-FDG PET/CT, and the second was performed for the treatment response evaluation. Significant regression was determined from the findings. The patient underwent right total mastectomy. She was being followed up with adjuvant chemotherapy and radiotherapy. In conclusion, hypermetabolic lymph nodes in the axillas should be interrogated for vaccination in patients with breast cancer. Hypermetabolic lymph nodes observed on the same side of the vaccinated arm in the ¹⁸F-FDG PET/CT scan may be related to vaccine-induced reactive lymph node enlargement. Lymph node metastasis may be excluded, especially if there are hypermetabolic lymph nodes with preserved fatty hilum in the contralateral axilla on the same side as the vaccinated arm. Active lymph nodes reactive to the vaccine become inactive after a while.

Keywords: Axillary lymph nodes, COVID-19 vaccination, breast cancer, ¹⁸F-FDG PET/CT

Öz

Kırk iki yaşında, invaziv duktal meme kanseri tanısı alan, evreleme için ¹⁸F-florodeoksiglukoz (FDG) pozitron emisyon tomografi/bilgisayarlı tomografi (PET/BT) taraması yapılan kadın hastada, sağ meme alt iç kadranda primer tümörle uyumlu 1,5 cm çaplı hipermetabolik lezyon izlendi [maksimum standartlaştırılmış alım değeri (SUV_{maks}): 10,5]. Sağ aksillada yağlı hilusu görülen lenf nodlarında patolojik ¹⁸F-FDG tutulumu izlenmedi. Ancak sol aksilla ve sol derin aksillada yağlı hilusu gözlenen 19 mm çaplı hipermetabolik lenf nodları mevcuttu (SUV_{maks}: 8,0). Ayrıntılı BT değerlendirmesinde, bu lenf bezlerinin duvarları sağ aksilladakilerden daha kalındı. Hasta tekrar sorgulandı ve 5 gün önce sol koluna uygulanan koronavirüs hastalığı-2019 (COVID-19) aşısı öyküsü (BNT162b2, COVID-19 mRNA aşısı ile) belirlendi. Sol aksiller lenf nodlarından yapılan tru-

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cut biyopsi sonucu reaktif lenfoid doku olarak geldi ve primer veya metastatik tümör izlenmediği rapor edildi. Hastaya neoadjuvan kemoterapi verildi. İlk ^{18}F -FDG PET/BT'den 4,5 ay sonra, tedaviye yanıt değerlendirmesi için ikincisi yapıldı. Bulgularda belirgin regresyon gözlemlendi. Hastaya sağ total mastektomi yapıldı. Hasta kemoterapi ve radyoterapi ile takip ediliyor. Sonuç olarak, pandemi günlerinde meme kanserli hastalarda aksiller hipermetabolik lenf nodları COVID-19 aşısı açısından sorgulanmalıdır. ^{18}F -FDG PET/BT taramasında aşı kolun aynı tarafında gözlenen hipermetabolik lenf nodları, aşya bağlı reaktif lenfadenomegali ile ilişkili olabilir. Özellikle memedeki kitleye göre kontralateral ancak aşı yapılan kol ile aynı taraftaki aksillada görülen yağlı hilusu korunmuş hipermetabolik lenf nodları, reaktif olarak değerlendirilerek lenf nodu metastazı dışlanabilir. Olguda aşya bağlı reaktif (aktif) lenf nodlarının zamanla inaktif hale dönüşmesi gözlenmektedir.

Anahtar kelimeler: Aksiller lenf nodları, COVID-19 aşısı, meme kanseri, ^{18}F -FDG PET/BT

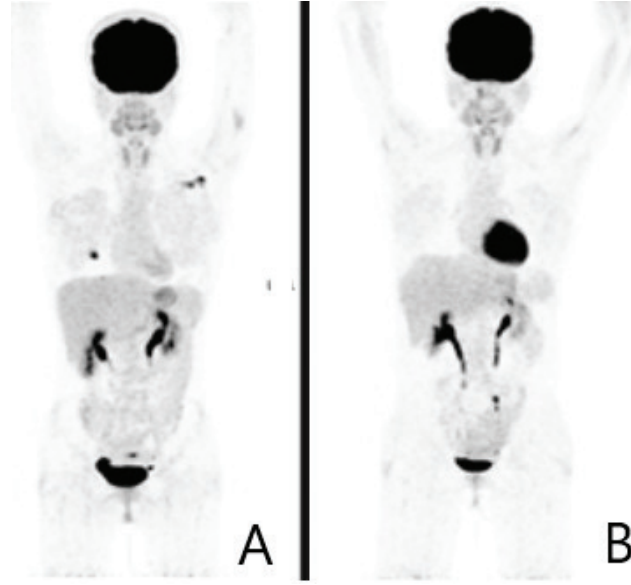


Figure 1. A) ^{18}F -fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) scanning for staging purposes. A hypermetabolic lesion was observed in the lower inner quadrant of the right breast that was compatible with primary tumor [maximum standardized uptake value (SUV_{max}): 10.5]. No pathological ^{18}F -FDG uptake was observed in the right axilla. However, hypermetabolic lymph nodes were observed in the left axilla and left deep axilla (SUV_{max} : 8.0) which were confirmed to be related to the vaccination administered to the left arm 5 days ago (1,2,3,4,5). No other pathological ^{18}F -FDG uptake was observed in all other body parts of the patient. B) The second ^{18}F -FDG PET/CT scan for neoadjuvant chemotherapy response evaluation, 4.5 months after the first scan. No ^{18}F -FDG avid malignancy finding was observed.

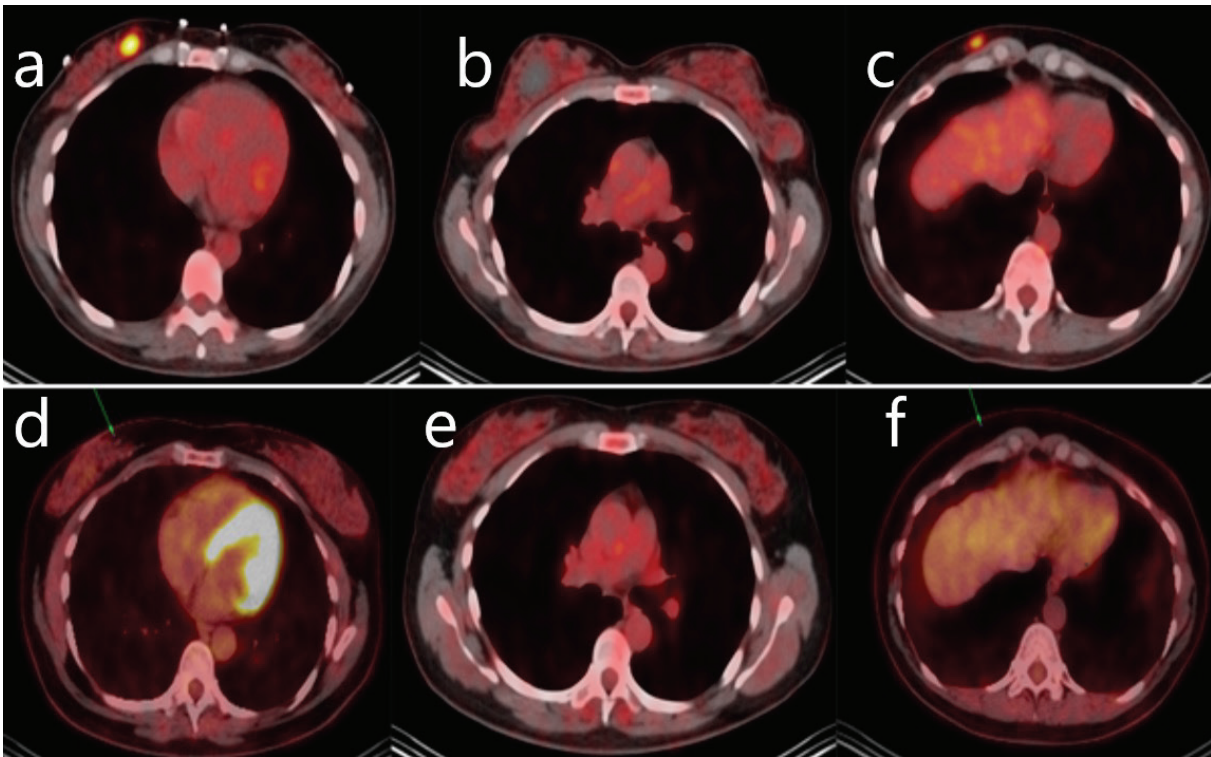


Figure 2. ^{18}F -FDG PET/CT scanning performed for staging at the beginning (a, b, c) and 4.5 months after the first one performed for neoadjuvant treatment response evaluation (d, e, f). A hypermetabolic lesion was observed in the lower inner quadrant of the right breast that was compatible with primary tumor (SUV_{max} : 10.5) (a). The primary tumor was reduced in size and its ^{18}F -FDG uptake was markedly decreased after neoadjuvant chemotherapy (d). Several hypometabolic cystic lesions were also observed in both breasts at the beginning. These lesions were interpreted as benign cystic lesions (fibrocystic changes?) (b). The hypometabolic cystic lesions were reduced in size at the second imaging (e) and confirmed by the postoperative pathology report. A 12 mm diameter hypermetabolic nodular lesion was observed in subcutaneous fatty tissue under the skin at the level of the 6th rib on the right anterior wall of the thorax at the initial imaging (SUV_{max} : 4.7) (c). This lesion was interpreted as an intramammary lymph node metastasis (c). This nodular lesion disappeared on second imaging (f).

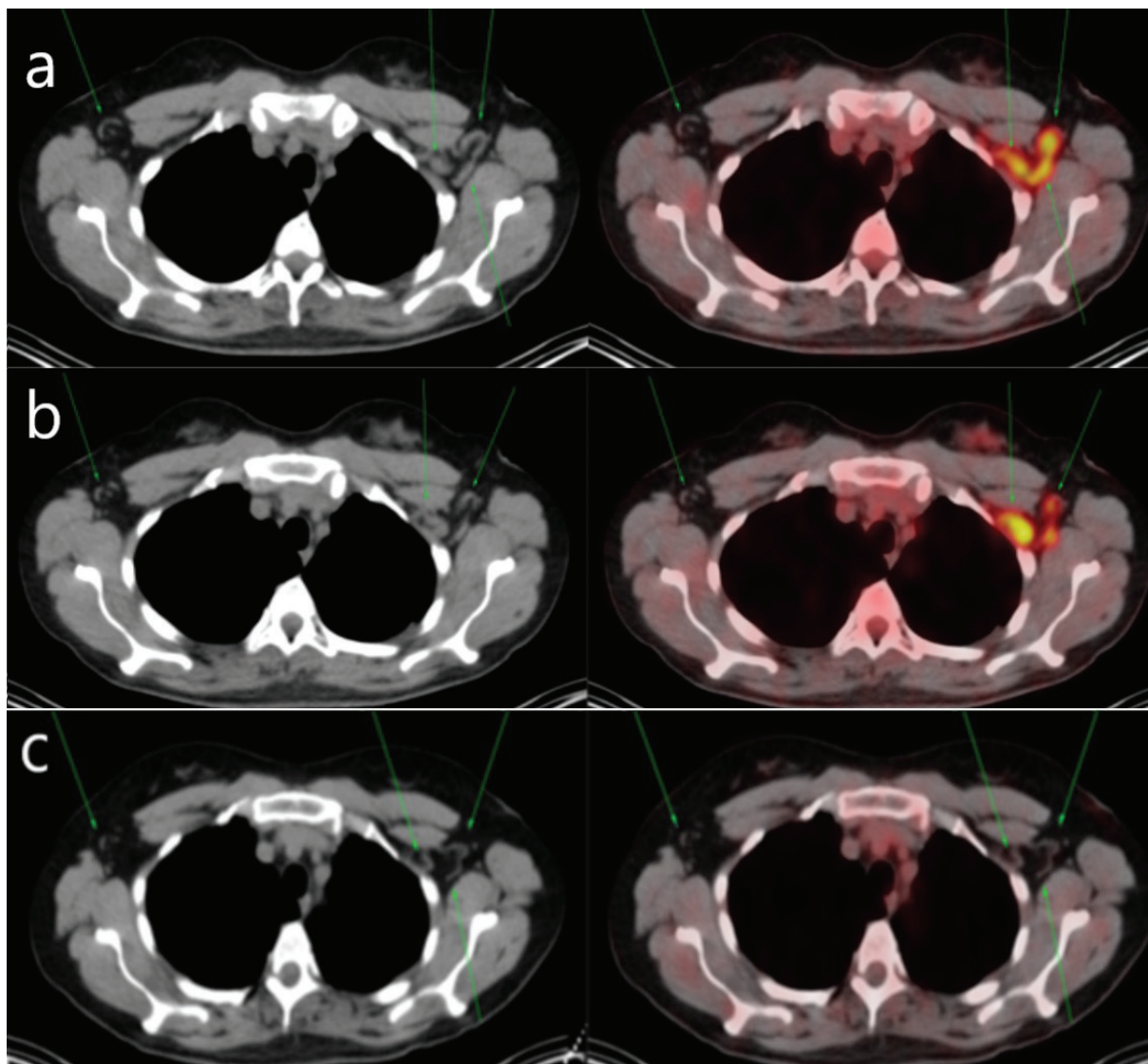


Figure 3. Hybrid images of ^{18}F -FDG PET/CT scanning performed for staging at the beginning (a, b). Initially, no pathological ^{18}F -FDG uptake was observed in lymph nodes that seemed inactive (non-metabolic) in the right axilla. However, there were hypermetabolic lymph nodes in the left axilla and left deep axilla ($\text{SUV}_{\text{max}}: 8.0$). On CT images of the same ^{18}F -FDG PET/CT scanning, the lymph nodes in the right axilla had fatty hiluses and thin walls, whereas the hypermetabolic lymph nodes in the left axilla and left deep axilla had fatty hiluses and thick walls ($\text{SUV}_{\text{max}}: 8.0$) (a, b). At the second ^{18}F -FDG PET/CT imaging after neoadjuvant chemotherapy, the lymph nodes in the left axilla were reduced in size and their ^{18}F -FDG uptake was markedly decreased. Yet, the ones in the right axilla stayed stable (c). At the initial imaging, active and inactive lymph nodes are seen together (a, b). The active to inactive transformation of the lymph nodes after vaccination has been visualized (a, b, c).

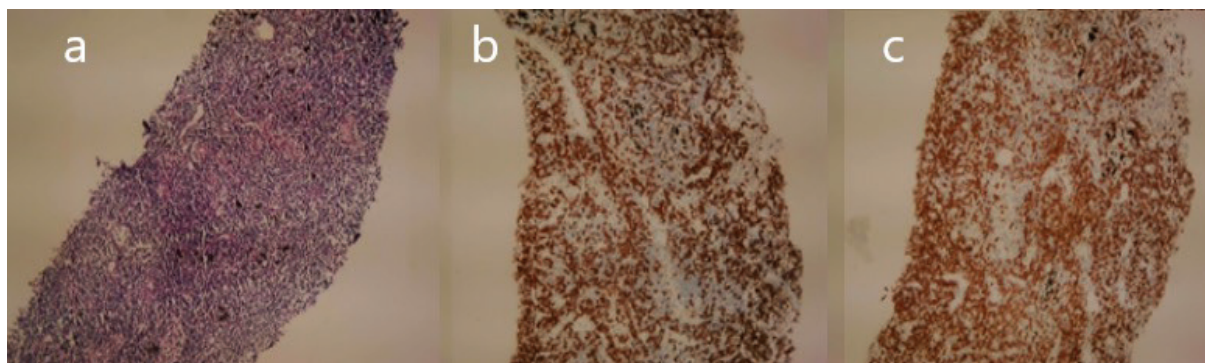


Figure 4. A mixed staining pattern was observed in staining with CD20 CD5 and pancytokeratin in immunochemical examination, (a) reactive lymph nodes including anthracnose pigment (x40; hematoxylin-eosin), (b) lymphoid cells stained positive with CD20 (x100; DAB), (c) lymphoid cells stained positive with CD3 (x100; DAB).

Hypermetabolic lymph nodes observed on the same side of the vaccinated arm in the ^{18}F -FDG PET/CT scan may be related to vaccine-induced reactive lymph node enlargement (1,2,3,4,5). Lymph node metastasis may be excluded, especially if there are hypermetabolic lymph nodes with preserved fatty hilum in the contralateral axilla on the same side as the vaccinated arm (2,3,4,5).

Ethics

Informed Consent: Written informed consent was obtained from the patient.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: C.T., E.M.S., Concept: C.T., A.D., E.M.S., F.S.P., S.S., Design: C.T., F.S.P., Data Collection or Processing: C.T., A.D., F.S.P., S.S., Analysis or Interpretation: C.T., A.D., E.M.S., F.S.P., S.S., Literature Search: C.T., Writing: C.T.

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