



Cancer Integrin Imaging with [⁶⁸Ga]Ga-Trivehexin PET/CT for a Patient with Breast Cancer and Neuroendocrine Neoplasm: A Case of Both (¹⁸F)FDG PET/CT and [⁶⁸Ga]Ga-DOTATATE Positive but Integrin αvβ6 Negative Lesion on [⁶⁸Ga]Ga-Trivehexin PET

Meme Kanseri ve Nöroendokrin Neoplazmlı Hastada İntegrin PET Görüntülemesi: [¹⁸F] FDG PET/BT ve [⁶⁸Ga]Ga-DOTATATE Pozitif, ancak [⁶⁸Ga]Ga-Trivehexin PET/BT'de İntegrin αvβ6 Negatif Lezyon

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Abstract

Integrins play crucial roles in the migration of tumor cells during angiogenesis and metastasis. Consequently, αvβ6-integrin-targeted positron emission tomography (PET) radiopharmaceuticals have been developed and tested in humans, with clinical trials highlighting their applications in idiopathic pulmonary fibrosis and carcinomas. However, data on integrins are limited, and the role of [⁶⁸Ga]Ga-Trivehexin tomography/computed tomography (CT) PET/CT is not well-established. Some studies have suggested that [⁶⁸Ga]Ga-Trivehexin PET/CT is more specific than ¹⁸F-fluorodeoxyglucose (¹⁸F-FDG) PET/CT, which can yield false-positive results. It has been shown to be more efficient in evaluating pancreatic lesions and head and neck tumors. The role of [⁶⁸Ga]Ga Trivehexin PET/CT in neuroendocrine tumors is not yet clearly defined. In our case, integrin was negative in the pancreatic neuroendocrine tumor but positive in the breast lobular tumor. Additionally, we observed that the lobular carcinoma lesion in the right breast is somatostatin receptor-positive on [⁶⁸Ga]Ga-DOTATATE PET/CT.

Keywords: Neuroendocrine tumor, integrin positron emission tomography, [⁶⁸Ga]Ga-Trivehexin positron emission tomography/computed tomography

Öz

İntegrinler, anjiyogenez ve metastaz sırasında tümör hücrelerinin göçünde önemli bir rol oynar. Bu nedenle, αvβ6-integrin hedefli pozitron emisyon tomografisi (PET) radyofarmasötikleri geliştirilmiştir ve klinik çalışmalar bu ajanların idiyopatik pulmoner fibrozis ve kansinomlarda etkinliğini vurgulamaktadır. Ancak, integrinler hakkındaki veriler hala sınırlıdır ve [⁶⁸Ga]Ga-Triveheksin PET/bilgisayarlı tomografi (BT)'nin rolü iyi tanımlanmamıştır. Bazı çalışmalar, [⁶⁸Ga]Ga-Triveheksin PET/BT'nin, yanlış pozitif sonuçlar verebilen (¹⁸F)FDG PET/BT'ye göre daha spesifik olduğunu öne sürmektedir. Pankreas lezyonları ve baş-boyun tümörlerini değerlendirmede başarılı olduğunu gösterilmiştir. Ancak [⁶⁸Ga]Ga-

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Trivehexin PET/BT'nin nöroendokrin tümörlerdeki rolü henüz net olarak tanımlanmamıştır. Bizim olgumuzda, pankreatik nöroendokrin tümörde integrin negatif, ancak meme lobüler tümöründe pozitif bulunmuştur. Ayrıca, sağ memedeki lobüler karsinom lezyonunun [⁶⁸Ga]Ga-DOTATATE PET/BT'de somatostatin reseptörü+pozitif olduğunu gözlemledik.

Anahtar kelimeler: Nöroendokrin tümör, integrin pozitron emisyon tomografisi, [⁶⁸Ga]Ga-Trivehexin pozitron emisyon tomografisi/bilgisayarlı tomografi

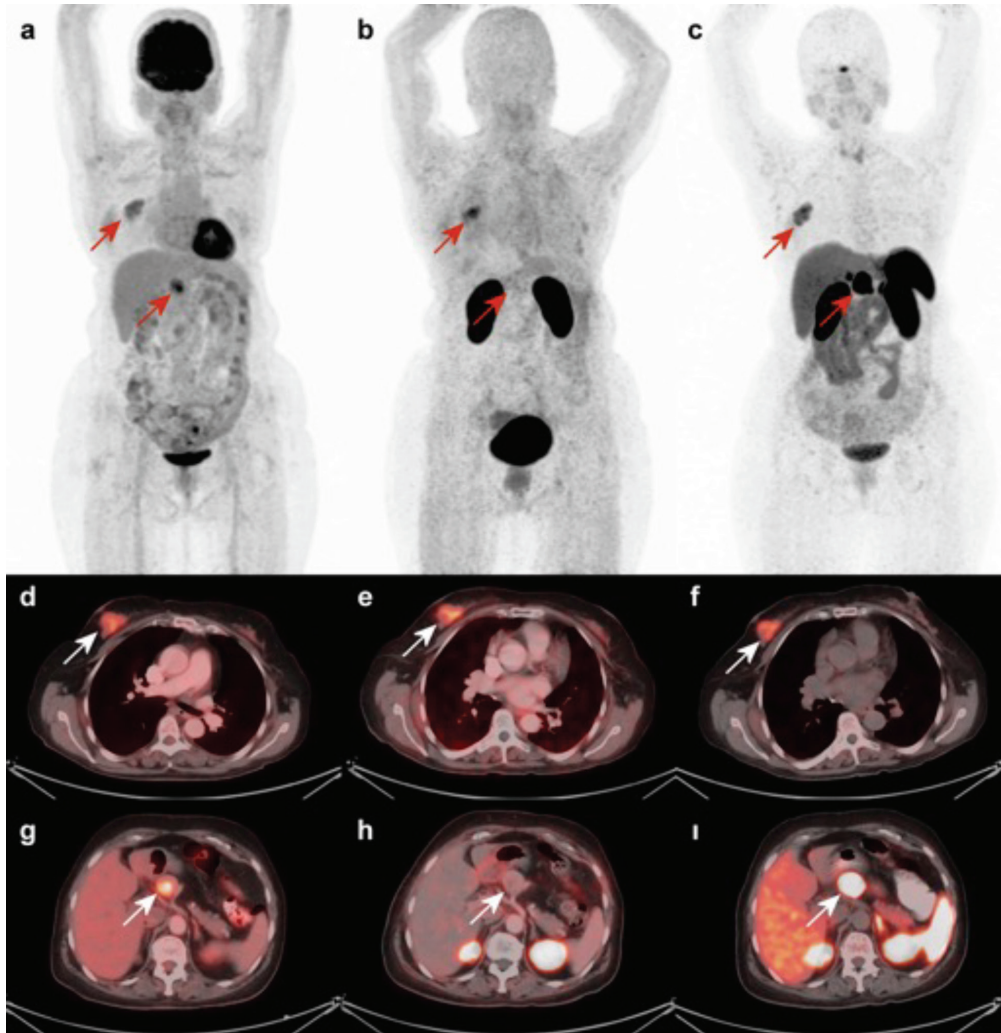


Figure 1. A 71-year-old woman presented with breast lobular carcinoma for evaluation staging with ¹⁸F-fluorodeoxyglucose (¹⁸F-FDG) positron emission tomography/computed tomography (PET/CT) (a). In the ¹⁸F-FDG PET/CT scan, a hypermetabolic mass consistent with the known primary malignancy was observed in the retroareolar region of the right breast (d). Additionally, in the head-body of the pancreas, a well-defined hypermetabolic lesion was identified (g). Given the possibility of ¹⁸F-FDG PET/CT false positivity in the pancreatic head mass, a [⁶⁸Ga]Ga-Trivehexin PET/CT (b) scan was conducted. The [⁶⁸Ga]Ga-Trivehexin PET/CT showed increased activity uptake in a portion of the right breast mass (e), and no activity uptake was observed in the pancreatic head mass (h). Based on these findings, a biopsy was performed to further investigate the pancreatic mass, which revealed a grade 2 neuroendocrine tumor. Additionally, a [⁶⁸Ga]Ga DOTATATE PET/CT (c) was performed, which demonstrated intense somatostatin receptor expression in the right breast mass (f) and pancreatic head lesion (i). Integrins, particularly αvβ6-integrin, are involved in tumor cell migration, angiogenesis, and metastasis. Recently, αvβ6-integrin-targeted PET radiopharmaceuticals like [⁶⁸Ga]Ga-Trivehexin have shown promise in imaging certain cancers and fibrotic diseases (1,2). Comparative studies suggest that [⁶⁸Ga]Ga-Trivehexin may offer advantages over conventional ¹⁸F-FDG PET/CT by reducing false-positive findings. Despite promising results in pancreatic, head and neck lesions, its diagnostic performance in NETs is not yet clearly defined (3,4,5). This study presents a case in which a pancreatic neuroendocrine tumor was integrin-negative, whereas a concurrent lobular carcinoma of the breast showed integrin positivity, also demonstrating somatostatin receptor on [⁶⁸Ga]Ga-DOTATATE PET/CT.

Ethics

Informed Consent: Patient consent was obtained for this study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: O.Y., M.K., Concept: G.B., N.A.S., K.A., L.K., Design: N.A.S., L.K., Data Collection or Processing: G.B., Analysis or Interpretation: G.B., N.A.S., L.K., Literature Search: N.A.S., K.A., Writing: G.B., N.A.S., K.A.

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

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