Interesting Image

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

Meme Kanseri ve Nöroendokrin Neoplazmlı Hastada İntegrin PET Görüntülemesi: [^{18}F]FDG PET/BT ve [^{68}Ga]Ga-DOTATATE Pozitif, ancak [^{68}Ga]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 [^{68}Ga]Ga-Trivehexin tomography/computed tomography (CT) PET/CT is not well-established. Some studies have suggested that [^{68}Ga]Ga-Trivehexin PET/CT is more specific than ^{18}F-fluorodeoxyglucose (^{18}F-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 [^{68}Ga]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 [^{68}Ga]Ga-DOTATATE PET/CT.

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

Öz

İntegrinler, anjiyogenez ve metastaz sırasında tümör hücrelerinin göçünde önemli bir rol oynar. Bu nedenle, αvβ-6integrin hedefli pozitron emisyon tomografisi (PET) radyofarmasötikleri geliştirilmiştir ve klinik çalışmalar bu ajanların idiyopatik pulmoner fibrozis ve karsinomlarda etkinliğini vurgulamaktadır. Ancak, integrinler hakkındaki veriler hala sınırlıdır ve [^{68}Ga]Ga-Triveheksin PET/bilgisayarlı tomografi (BT)'nin rolü iyi tanımlanmamıştır. Bazı çalışmalar, [^{68}Ga]Ga-Triveheksin PET/BT'nin, yanlış pozitif sonuçlar verebilen (^{18}F)FDG PET/BT'ye göre daha spesifik olduğunu öne sürmektedir. Pankreas lezyonları ve baş-boyun tümörlerini değerlendirmede başarılı olduğunu gösterilmiştir. Ancak [^{68}Ga]Ga-

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Triveheksin PET/BT'nin nöroendokrin tümörlerdeki rolü henüz net olarak tanımlanmamıştır. Bizim olgumuzda, pankreatik nöroendokrin tümörde integrin negatif, ancak meme lobuler 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-Triveheksin pozitron emisyon tomografisi/bilgisayarlı tomografi

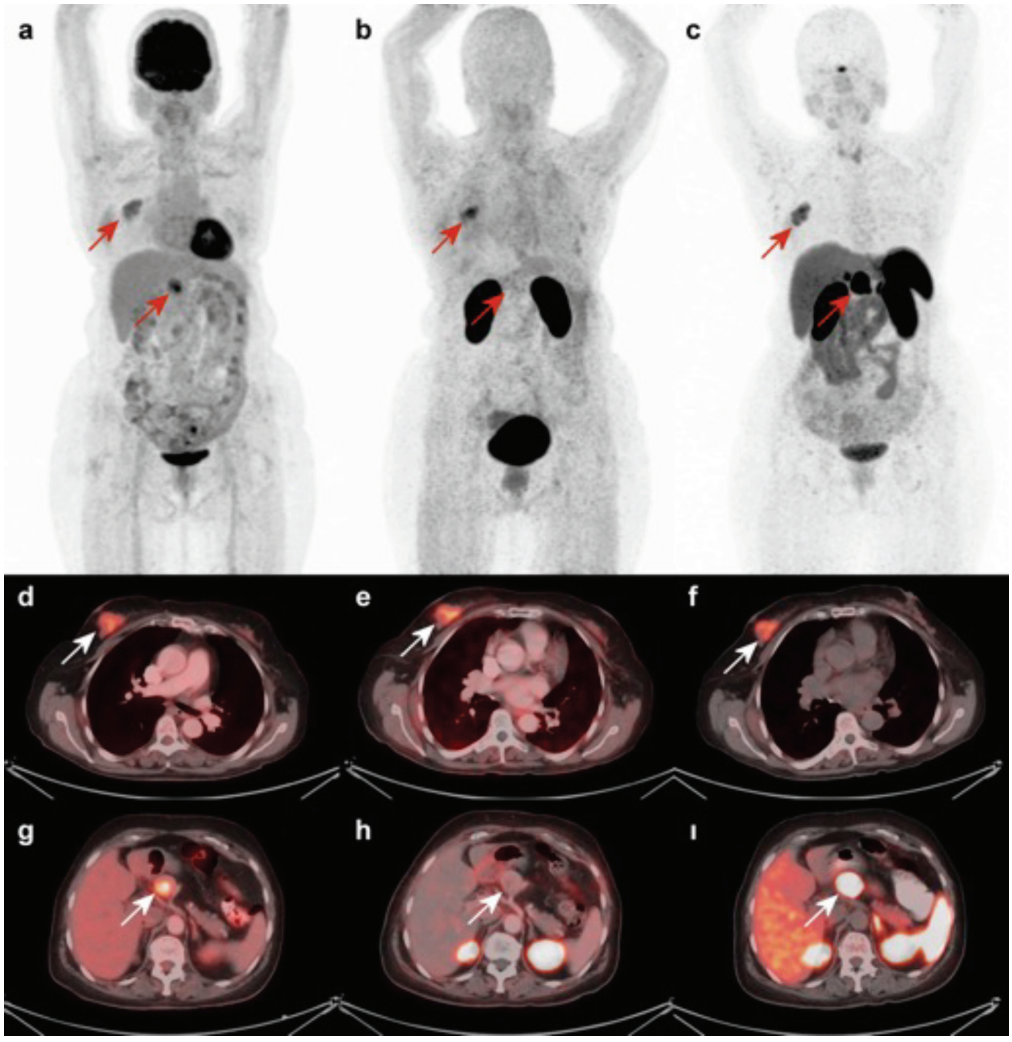

Figure 1. A 71-year-old woman presented with breast lobular carcinoma for evaluation staging with ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) (a). In the ^{18}F-FDG PET/CT scan, a hypermetabolic mass consistent with the known primary malignancy was 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 ^{18}F-FDG PET/CT false positivity in the pancreatic head mass, a [^{68}Ga]Ga-Trivehexin PET/CT (b) scan was conducted. The [^{68}Ga]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 [^{68}Ga]Ga DOTATATE PET/CT (c) was performed, which demonstrated intense somatostatin receptor expression in the right breast mass (f) and pancreatic head lesion (ı). Integrins, particularly αvβ6-integrin, are involved in tumor cell migration, angiogenesis, and metastasis. Recently, αvβ6-integrin-targeted PET radiopharmaceuticals like [^{68}Ga]Ga-Trivehexin have shown promise in imaging certain cancers and fibrotic diseases (1,2). Comparative studies suggest that [^{68}Ga]Ga-Trivehexin may offer advantages over conventional ^{18}F-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 [^{68}Ga]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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