Interesting Image
Mol Imaging Radionucl Ther 2021;30:63-66 DOI:10.4274/mirt.galenos.2020.86729

^{68}Ga PSMA Uptake at Roux-en-Y Eso-jejunostomy Junction Mimicking the Recurrence of Gastric Carcinoma in PET/CT

^{68}Ga PSMA PET/BT Görüntülemede Roux-en-Y Oeso-jejunostomi Anastomoz Hattında Gastrik Karsinomun Nüksünü Taklit Eden PSMA Tutulumu

Esra Arslan[1], Tamer Aksoy[1], Merve Cin[2], Coşkun Çakır[3], Fadime Didem Can Trabulus[3], Tevfik Fikret Çermik[1]

[1]*University of Health and Sciences Turkey, İstanbul Training and Research Hospital, Clinic of Nuclear Medicine, İstanbul, Turkey*
[2]*University of Health and Sciences Turkey, İstanbul Training and Research Hospital, Department of Pathology, İstanbul, Turkey*
[3]*University of Health and Sciences Turkey, İstanbul Training and Research Hospital, Clinic of Surgery, Istanbul, Turkey*

Abstract

A 67-year-old male patient had undergone total gastrectomy and Roux-en-Y eso-jejunostomy 3 years ago for the treatment of tubular adenocarcinoma located at the corpus of the stomach. The patient was diagnosed with Gleason score 8 (4+4) metastatic prostate cancer during the follow-up period and received hormone therapy. Owing to his elevated prostate-specific antigen levels (77 ng/mL), his clinician referred him gallium-68 (^{68}Ga) prostate-specific membrane antigen 11 (PSMA) positron emission tomography/computed tomography (PET/CT) for restaging. PET/CT showed multiple ^{68}Ga PSMA receptor-positive skeletal lesions and linear PSMA activity at the eso-jejunostomy junction. He was then referred to undergo ^{18}fluorine-fluorodeoxyglucose (^{18}F-FDG) PET/CT to screen for gastric carcinoma recurrence. PET/CT images demonstrated no ^{18}F-FDG avid lesion. However, endoscopy and biopsy performed with samples from the eso-jejunostomy junction revealed superficial benign squamous epithelial fragments.

Keywords: ^{68}Ga-PSMA, ^{18}F-FDG, PET/CT, gastric carcinoma, prostate carcinoma

Öz

Altmış yedi yaşında erkek hastaya mide korpusunda tespit edilen tubular adenokarsinom nedeniyle 3 yıl önce total gastrektomi ve Roux-en-Y oeso-jejunostomi yapılmıştır. Takip süresince hasta Gleason skoru 8 (4+4) metastatik prostat kanseri tanısı da alarak hormonoterapi uygulandı. Prostat spesifik antijen düzeylerinde (77 ng/mL) yükselme saptanması nedeniyle yeniden evreleme amaçlı galyum-68 prostat spesifik membran antijeni 11 (PSMA) pozitron emisyon tomografi/bilgisayarlı tomografi (PET/BT) görüntüleme için hasta kliniğimize refere edildi. ^{68}Ga PSMA PET/BT görüntülemesinde oeso-jejunostomi kavşağında lineer PSMA aktivitesi ve multipl PSMA reseptör pozitif iskelet lezyonları saptandı. Gastrik karsinomun nüksü şüphesi nedeni ile hasta ^{18}F-FDG PET/BT incelemesi açısından yeniden kliniğimize sevk edildi. ^{18}F-FDG PET/BT görüntülerinde FDG pozitif malign prosesi düşündürebilecek lezyon görülmedi. Oeso-jejunostomi anastomoz hattından yapılan endoskopi ve biyopsi incelemesinde yüzeyel benign skuamöz epitelyal fragmanlar saptandı.

Anahtar kelimeler: ^{68}Ga-PSMA, ^{18}F-FDG, PET/BT, mide kanseri, prostat kanseri

Address for Correspondence: Esra Arslan MD, University of Health and Sciences Turkey, İstanbul Training and Research Hospital, Clinic of Nuclear Medicine, İstanbul, Turkey
Phone: +90 212 459 64 55 **E-mail:** dresraarslan@gmail.com ORCID ID: orcid.org/0000-0002-9222-8883
Received: 10.11.2019 **Accepted:** 02.04.2020

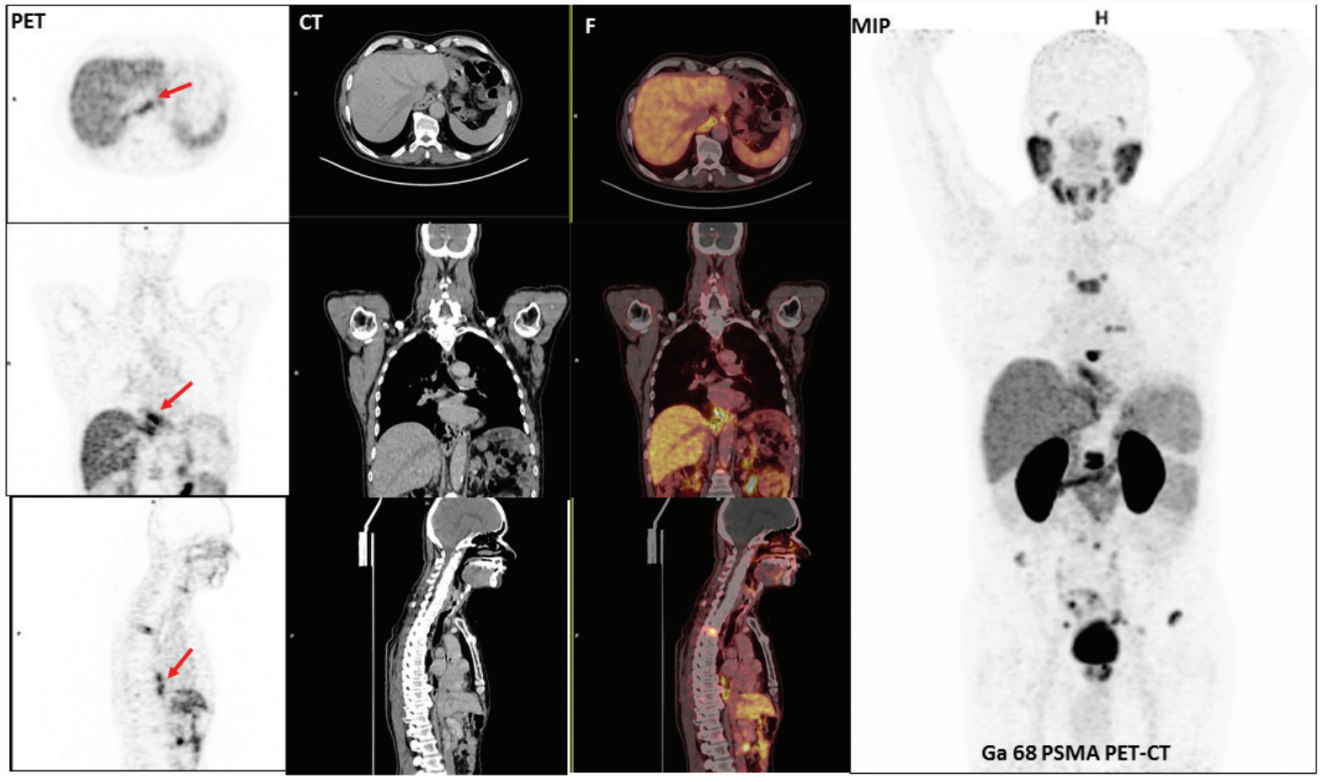

Figure 1. Gallium-68 (^{68}Ga) prostate-specific membrane antigen 11 (PSMA) positron emission tomography/computed tomography (PET/CT) shows increased uptake at multiple metastatic skeletal lesions in the vertebral column and pelvic bones as well as linear PSMA accumulation at the eso-jejunostomy line (red arrows). PSMA is a type 2 transmembrane protein that acts as a glutamate carboxypeptidase enzyme (1,2). Owing to its high expression in prostate cancer cells, PSMA is often used conveniently as a target for diagnostic and therapeutic purposes in nuclear medicine. Normal ^{68}Ga PSMA uptake might be seen in the following structures, with descending avidity: Kidneys (8 times higher than hepatic uptake), submandibular glands, parotid glands (3 times higher than hepatic uptake), descending duodenum, lacrimal glands, spleen, descending colon, Waldeyer ring in the neck, vocal cords, liver, and rectum (3). In case of benign lesions, most ^{68}Ga PSMA uptake is of low intensity or non-focal, with some notable exceptions (e.g., cutaneous, vertebral, and hepatic hemangiomas) exhibiting prominent uptake (4). Prostate cancer commonly spreads to the bones and lymph nodes. Although the spread of prostate cancer to the gastrointestinal tract is very rare, the possibility of metastasizing to the stomach should be kept in mind when a patient presents with gastrointestinal symptoms or hemorrhage (5). A few reports have demonstrated prostate carcinoma metastases in the stomach (5,6,7,8). A study by Shetty et al. (9) reported mild PSMA uptake in the gastric cardia in a case of high-grade invasive gastric adenocarcinoma. In another study, they found PSMA to be expressed by endothelial cells in keloids, granulation tissue from heart valves and pleura, and different phases of the cycling endometrium. It was reported that PSMA was not expressed by endothelium associated with Barrett's mucosa, even in the presence of associated dysplasia (10). It should be kept in mind that patients should be evaluated individually as PSMA uptake might be seen in both benign and malignant lesions.

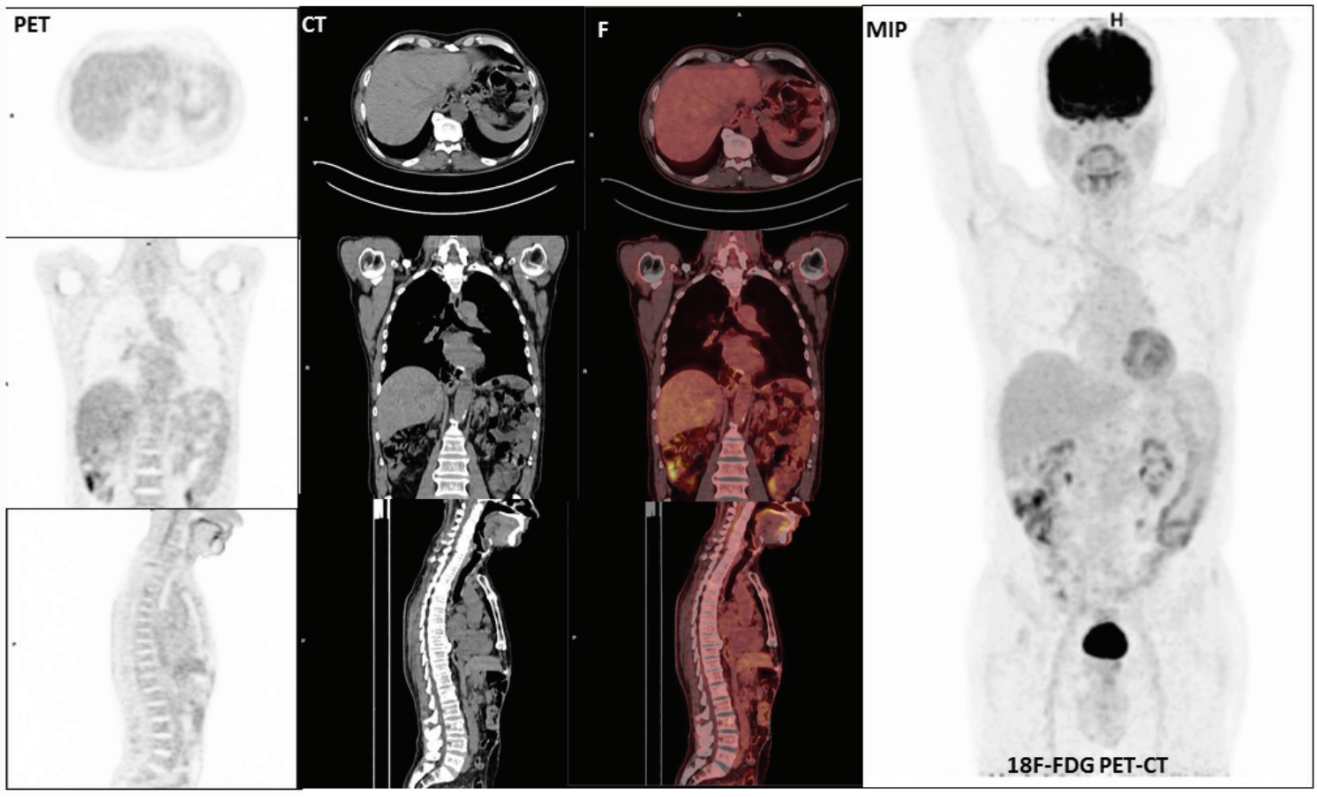

Figure 2. No abnormal ^{18}fluorine-fluorodeoxyglucose (^{18}F-FDG) uptake at the eso-jejunostomy line was detected in ^{18}F-FDG PET/CT computed tomography images.

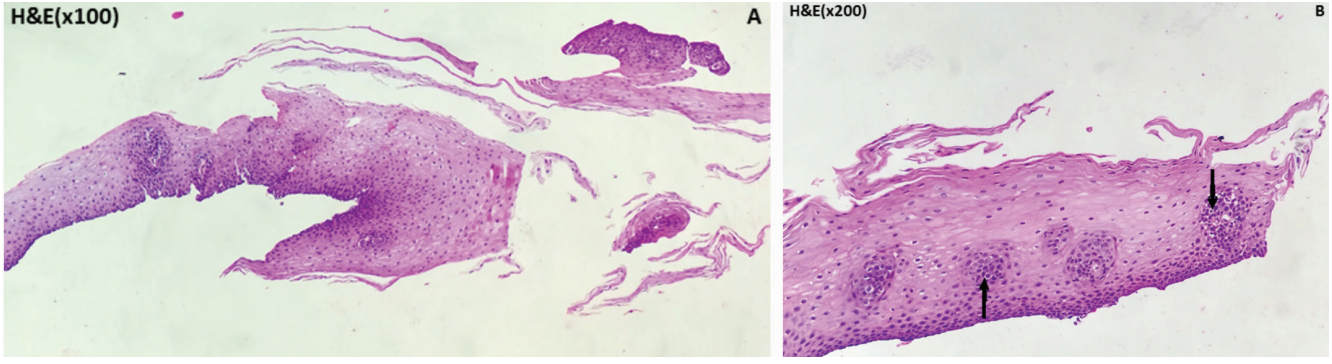

Figure 3. Owing to the suspicious PSMA 11 uptake at the eso-jejunostomy line, endoscopy and biopsy were performed with samples from this line. Benign squamous epithelial fragments stained with hematoxylin and eosin (H and E) with 100 times magnification (A). Black arrow shows benign squamous epithelial fragments stained with H and E with 200 times magnification (B).

Ethics

Informed Consent: The patient was asked for the verbal or written consent for the use of the individual clinical findings for research purposes.

Peer-review: Externally peer-reviewed.

Authorship Contributions

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

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

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Afshar-Oromieh A, Malcher A, Eder M, Eisenhut M, Linhart HG, Hadaschik BA, Holland-Letz T, Giesel FL, Kratochwil C, Haufe S, Haberkorn U, Zechmann CM. PET imaging with a [68Ga]gallium-labelled PSMA ligand for the diagnosis of prostate cancer: biodistribution in humans and first evaluation of tumour lesions. Eur J Nucl Med Mol Imaging 2013;40:486-495.
2. Demirci E, Sahin OE, Ocak M, Akovali B, Nematyazar J, Kabasakal L. Normal distribution pattern and physiological variants of 68Ga-PSMA-11 PET/CT imaging. Nucl Med Commun 2016;37:1169-1179.
3. Kirchner J, Schaarschmidt BM, Sawicki LM, Heusch P, Hautzel H, Ermert J, Rabenalt R, Antoch G, Buchbender C. Evaluation of Practical Interpretation Hurdles in 68Ga-PSMA PET/CT in 55 Patients: Physiological Tracer Distribution and Incidental Tracer Uptake. Clin Nucl Med 2017;42:322-327.
4. Hofman MS, Hicks RJ, Maurer T, Eiber M. Prostate-specific Membrane Antigen PET: Clinical Utility in Prostate Cancer, Normal Patterns, Pearls, and Pitfalls. Radiographics 2018;38:200-217.
5. Holderman WH, Jacques JM, Blackstone MO, Brasitus TA. Prostate cancer metastatic to the stomach. Clinical aspects and endoscopic diagnosis. J Clin Gastroenterol 1992;14:251-254.
6. Solis Lara HE, Villarreal Del Bosque N, Sada Treviño MA, Yamamoto Ramos M, Argueta Ruiz RDC. Gastric Metastasis of Prostate Cancer as an Unusual Presentation Using 68Ga-Prostate-Specific Membrane Antigen PET/CT. Clin Nucl Med 2018;43:156-159.
7. Onitilo AA, Engel JM, Resnick JM. Prostate carcinoma metastatic to the stomach: report of two cases and review of the literature. Clin Med Res 2010;8:18-21.
8. Hong KP, Lee SJ, Hong GS, Yoon H, Shim BS. Prostate cancer metastasis to the stomach. Korean J Urol 2010;51:431-433.
9. Shetty D, Patel D, Le K, Bui C, Mansberg R. Pitfalls in Gallium-68 PSMA PET/CT Interpretation-A Pictorial Review. Tomography 2018;4:182-193.
10. Gordon IO, Tretiakova MS, Noffsinger AE, Hart J, Reuter VE, Al-Ahmadie HA. Prostate-specific membrane antigen expression in regeneration and repair. Mod Pathol 2008;21:1421-1427.