Clinical Case Report

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Intense ^{18}F-FDG activity in aortoiliac bypass graft mimicking infection

A case report

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Abstract

Rationale: ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) has the potential to become an important imaging tool for the diagnosis of suspected aortoiliac bypass graft infection (AGI).

Patient concerns: A 76-year-old man presented with incidental findings of intense ^{18}F-FDG activity in previous operation site of aortobiiliac bypass graft in the initial staging of small cell lung cancer (SCLC).

Diagnoses: Based on ^{18}F-FDG PET/CT examination, preliminary differential diagnosis was AGI.

Interventions: We performed laboratory tests and ^{67}Galliun-citrate (^{67}Ga) single photon emission computed tomography/computed tomography (SPECT/CT).

Outcomes: He had no constitutional symptoms and abnormal laboratory test results suggesting AGI. CT scan of the abdomen and pelvis showed no abnormal findings. Also, ^{67}Ga planar scintigraphy and SPECT/CT imaging of the abdomen and pelvis failed to show abnormal ^{67}Ga uptake in the same site of aortobiiliac bypass graft with ^{18}F-FDG uptake.

Lessons: We present a case with postoperative inflammatory aortobiiliac bypass graft which was misdiagnosed as AGI based on intense ^{18}F-FDG activity seen at PET/CT imaging.

Abbreviations: ^{18}F-FDG = ^{18}F-fluorodeoxyglucose, ^{67}Ga = ^{67}Gallium–citrate, AGI = aortoiliac bypass graft infections, PET/CT = positron emission tomography/computed tomography, SCLC = small cell lung cancer, SPECT/CT = single photon emission computed tomography/computed tomography.

Keywords: ^{18}F-FDG, ^{67}Ga, aortoiliac graft infection, PET/CT, SPECT/CT

1. Introduction

^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) scanning is a new tool for the diagnosis of aortic bypass graft infection (AGI).[1] However, ^{18}F-FDG PET/CT is based on the uptake of radioactive labeled FDG (a glucose analog) in metabolically active cells. Increased ^{18}F-FDG uptake can be observed in infectious and inflammatory processes. Herein, we present a case of postoperative inflammatory aortobiiliac bypass graft which was misdiagnosed as AGI based on intense ^{18}F-FDG uptake seen at PET/CT imaging.

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2. Case report

A 76-year-old man admitted due to initial staging of small cell lung cancer (SCLC). He presented with cough and dyspnea for 1 month. Incidental finding of ^{18}F-FDG uptake in the abdomen and pelvis (arrow) was observed in the initial staging with PET/CT (Fig. 1A). ^{18}F-FDG uptake was seen in the SCLC of right lung and mediastinum. Metastatic lesions in the right lower neck and liver were also observed. Transverse fusion images revealed the site of ^{18}F-FDG uptake in the abdomen and pelvis was previous operation site of aortobiiliac bypass graft (arrow) due to infrarenal abdominal aortic aneurysm 14 months ago (Fig. 1B). CT of the abdomen and pelvis failed no abnormal findings in the sites of aortobiiliac bypass graft (Fig. 2). Right hydroureteronephrosis was seen, it was due to urethral orifice obstruction by irregular enhancing nodule of prostate gland. Transrectal biopsy specimens were negative for malignancy. He had no constitutional symptoms and abnormal laboratory parameters suggesting AGI.

The patient was referred for ^{67}Gallium–citrate (^{67}Ga) imaging to rule out AGI. ^{67}Ga planar scintigraphy and single photon emission computed tomography/computed tomography (SPECT/CT) of the abdomen and pelvis was performed 48 hours after the intravenous injection of ^{67}Ga (148 MBq). ^{67}Ga planar scintigraphy showed similar ^{67}Ga uptake in mediastinum and right lower neck seen at ^{18}F-FDG PET/CT. In the abdomen and pelvis, ^{67}Ga uptake which was suspicious for a physiologic bowel uptake was seen (arrow) (Fig. 3A). Transverse and coronal fusion images of SPECT/CT revealed no definite abnormal ^{67}Ga uptake in the sites

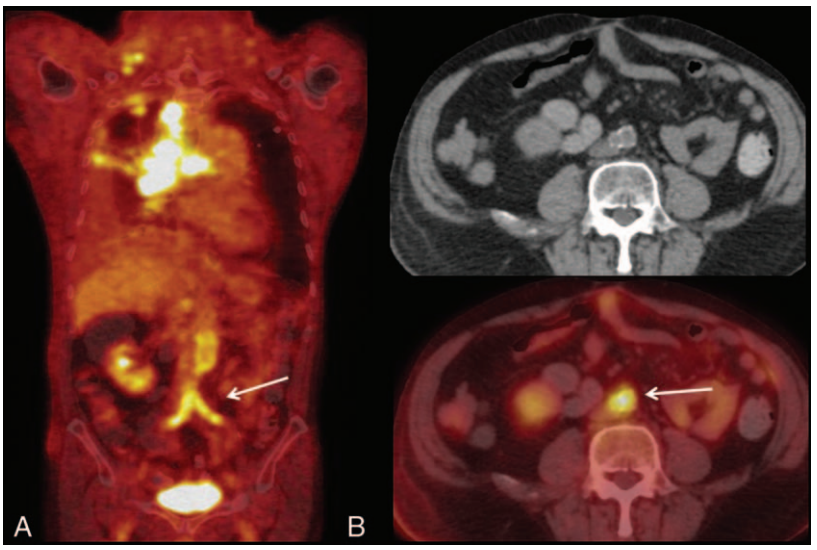

Figure 1. (A) Coronal fusion images of ^{18}F-FDG PET/CT showed intense ^{18}F-FDG uptake in the lesions (right lower neck, right lung, mediastinum, and liver) of small cell lung cancer. Also, there was incidental finding of ^{18}F-FDG uptake in the abdomen and pelvis (arrow). (B) Transverse fusion images revealed the site of ^{18}F-FDG uptake was previous aortobiiliac bypass site (arrow). ^{18}F-FDG = ^{18}F-fluorodeoxyglucose, PET/CT = positron emission tomography/computed tomography.

of aortobiiliac bypass graft (Fig. 3B and C). At the last follow-up, there has been no evidence of AGI, and the patient remains asymptomatic for infection. The institutional review board of the Inha University Hospital did not require ethical approval for

Figure 2. Computed tomography of the abdomen and pelvis failed no abnormal findings in the same sites of aortobiiliac bypass except right hydroureteronephrosis.

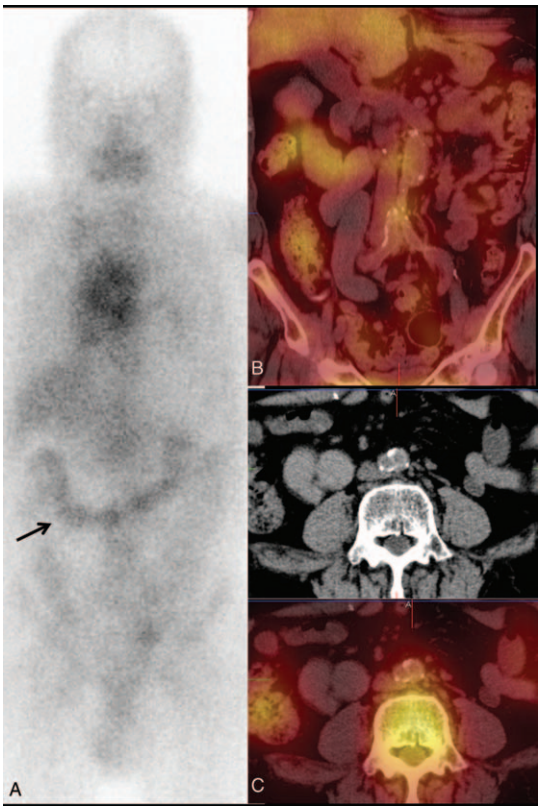

Figure 3. (A) ^{67}Ga planar scintigraphy showed similar ^{67}Ga uptake in mediastinum and right lower neck seen at ^{18}F-FDG PET/CT, and there was suspicious physiologic uptake in bowel. (B and C) Coronal and transverse fusion images of ^{67}Ga SPECT/CT revealed no definite abnormal ^{67}Ga uptake in the previous aortobiiliac bypass sites with intense ^{18}F-FDG uptake seen at PET/CT imaging. ^{18}F-FDG = ^{18}F-fluorodeoxyglucose, ^{67}Ga = ^{67}Gallium–citrate, PET/CT = positron emission tomography/computed tomography, SPECT/CT = single photon emission computed tomography/computed tomography.

reporting individual cases. Informed consent was given by the patient.

3. Discussion

AGI is associated with high morbidity and mortality. Therefore, a diagnostic tool is needed with the ability to discriminate well between the presence and the absence of AGI. ^{18}F-FDG PET/CT has been suggested as a means to detect AGI. However, patterns of ^{18}F-FDG uptake in uninfected grafts largely overlap with those of infected vascular grafts.[2] This limits the diagnostic value of ^{18}F-FDG PET/CT in identifying or ruling out AGI.[3] In the initial staging of our patients with SCLC, intense activity of ^{18}F-FDG in aortobiiliac bypass graft was incidental finding. There were no constitutional symptoms, signs, and CT findings suggesting AGI. We needed other imaging modalities including assessment of the patient's general condition and microbiological work-up. In this case, we used ^{67}Ga imaging for accurate diagnosis of AGI, because ^{67}Ga imaging has been widely used for detecting infection focus.[4–7] The negative uptake of ^{67}Ga in this case supported ^{18}F-FDG uptake mimicking AGI. The addition of SPECT/CT imaging provided addicted values in anatomic information for interpreting physiologic bowel activity of ^{67}Ga.[8,9]

This case shows intense ^{18}F-FDG activity in the sites of aortobiiliac bypass graft does not usually mean infected grafts. This false-positive ^{18}F-FDG uptake may be due to postoperative changes or a chronic inflammatory reaction induced by the graft itself. Our case implies that an accurate diagnosis of AGI cannot be reached with positive ^{18}F-FDG PET/CT imaging alone but requires clinical history, laboratory test results, and overlapping imaging findings.

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