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An FDG-PET/CT-Positive Lesion Mimicking Local Recurrence of Colon Cancer 5 Years after Radical Colectomy

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Conflict of interest: None declared

Patient: Female, 75
Final Diagnosis: False positive findings
Symptoms: —
Medication: —
Clinical Procedure: —
Specialty: Surgery

Objective: Mistake in diagnosis

Background: Radical resection of colorectal cancer yields satisfactory results. Even if the cancer recurs, long-term survival is expected through further surgical resection of the recurrent disease. For early detection of recurrent lesions, we routinely perform periodic blood tests and imaging studies, in which ^{18}F-fluorodeoxyglucose-glucose positron emission tomography (FDG-PET) plays an important role, for lesion differentiation. We encountered a case of a benign lesion, which had been clinically diagnosed as recurrence of resected colon cancer by FDG-PET/computed tomography (CT).

Case Report: A 69-year-old woman underwent radical resection of stage II sigmoid colon cancer. Five years after the operation, local recurrence was suspected on the basis of follow-up CT examination findings. Since the standardized uptake value (SUV) on FDG-PET/CT was 13.3, we diagnosed the lesion as a postoperative local recurrence and performed surgical resection of the lesion. The lesion was conclusively diagnosed as benign fatty tissue, including a fibrovascular component, by histopathological examination.

Conclusions: FDG-PET is a very useful technique for differentiating benign from malignant disease. In colorectal cancer, FDG-PET not only enables the differentiation of malignancy in the primary tumor, but also the confirmation of metastasis and postoperative recurrence. However, even if the SUV is high, as in the presented case, the lesion may eventually be diagnosed as benign. Therefore, further advances in the PET technique are expected along with the development of more useful modalities.

MeSH Keywords: Colorectal Neoplasms • Positron-Emission Tomography • Neoplasm Recurrence, Local

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/891129

Background

Recurrence develops within 3 years after radical surgery for colon cancer in 83.6% of recurrent colon cancer cases and is very rarely detected after 5 years (3.6% of cases) [1–3]. Therefore, regular follow-up with various diagnostic modalities until 5 years after surgery is a reasonable strategy to detect recurrent disease. The commonly used imaging modalities in such cases include ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI). However, ^{18}F-fluorodeoxyglucose glucose-positron emission tomography (FDG-PET) is more effective in determining the presence of malignancy, especially in cases of colorectal cancer (CRC).

Here, we report a case of a lesion mimicking recurrent colon cancer, which was detected and diagnosed by FDG-PET/CT 5 years after surgery. Subsequent histopathological analysis yielded a diagnosis of benign disease. This interesting case did not conform to clinical common sense concerning the detection and definition of recurrent disease described above.

Case Report

A 69-year-old woman visited the gastrointestinal department of our hospital because her fecal occult blood test had revealed abnormalities during multiphasic health screening. She did not have any history of previous abdominal or pelvic surgery. Colonoscopic examination detected a sigmoid colon tumor with a narrow lumen, through which the scope could not pass. The histopathological analysis of the biopsied specimen resulted in a diagnosis of well-differentiated adenocarcinoma. CT did not show serosa invasion or distant metastases. The cancer was classified as stage II according to the TNM classification system. Therefore, the disease was determined to be treatable by radical resection.

The patient then underwent radical sigmoidectomy by laparotomy, including the D3 dissection of 18 regional lymph nodes. Subsequent histopathological examination of the resected specimen revealed cancer invasion up to the subserosal layer. However, no metastasis to regional lymph nodes or distant organs, and no lymphovascular invasion were detected, suggesting that the cancer was completely eradicated. Thereafter, the patient visited our hospital every 3 months for hematologic and biochemical examinations (including tests for serum tumor marker levels) and every 6 months for CT to detect possible disease recurrence. One and a half years after the operation, CT showed an obscure and non-tumorous lesion with blood vessels on the left of the abdominal aortic bifurcation (Figure 1A), which was determined to represent the postoperative inflammatory change in the connective tissue. Subsequently, the shape of the lesion changed gradually over

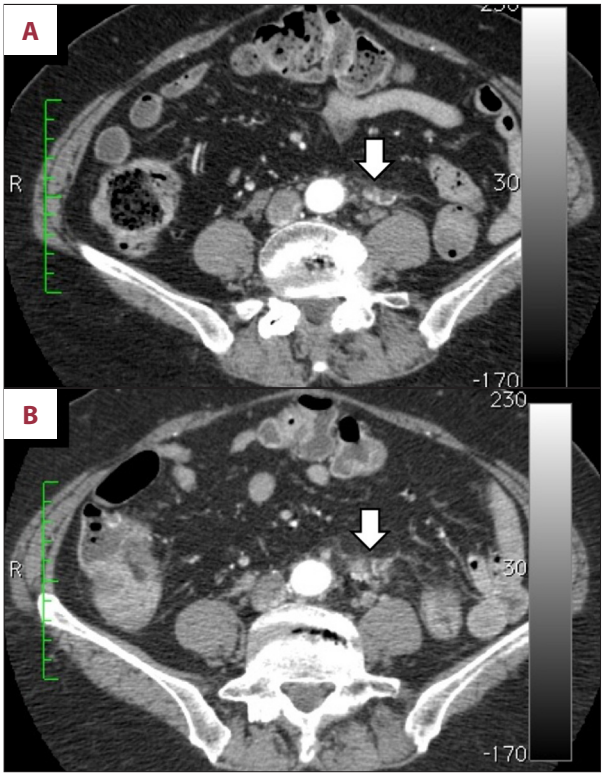

Figure 1. (**A**) Axial view computed tomography (CT) scan in the early phase obtained one and a half years after radical colectomy. Indistinct interstitial changes with enhanced vessels are observed adjacent to the abdominal aorta (white arrow). (**B**) CT scan obtained 3 years after the operation. The lesion changed in shape, but was not confirmed to be a tumor (white arrow).

time. Three years after the operation, the lesion had grown in size, but the radiological diagnosis remained benign disease (Figure 1B). Five years after the operation, when regular follow-up visits to our hospital are generally discontinued, the appearance of the lesion changed to that of a solid tumor with spicule formation (Figure 2A), suspected to be a local recurrence of the colon cancer that had been operated on 5 years ago. Serum carcinoembryonic antigen and carbohydrate antigen 19-9 levels were within their respective normal ranges throughout the clinical course. To confirm the presence of malignancy in the lesion, the patient underwent FDG-PET/CT. High FDG uptake was noted in the tumor (Figure 2B) (the standardized uptake value [SUV] was 7.0 in the early phase and 13.3 in the delayed phase). Since no other lesions were detected, the tumor was diagnosed as a local recurrence of the previously treated colon cancer. Five years and 7 months after the colectomy, we performed a laparotomy and resection of the lesion. The lesion, which was visualized on CT and FDG-PET, had an indistinct border and was confirmed to be only an induration. The lesion was resected with sufficient margins from the left ureter on the left side to the abdominal aorta and its bifurcation on the right side. In terms of macroscopic findings, the

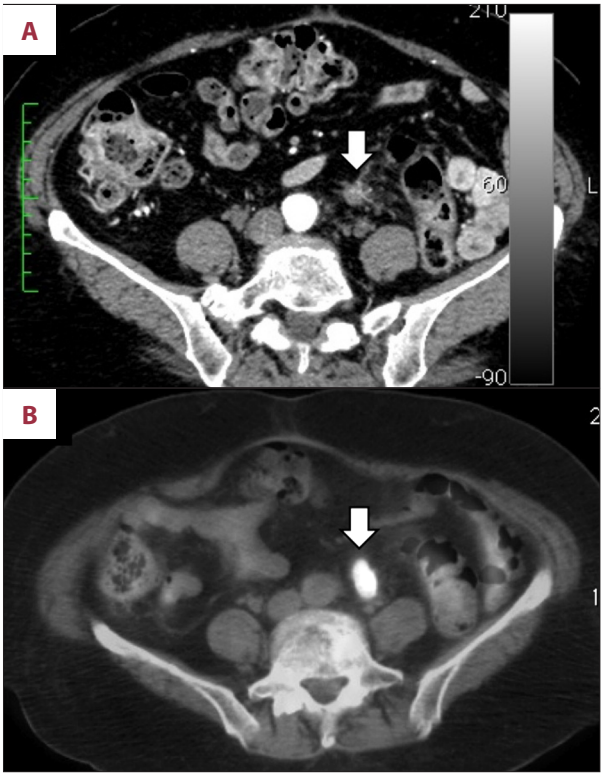

Figure 2. (**A**) Axial view computed tomography (CT) scan obtained 5 years after radical colectomy. The lesion appeared as a tumor with spicule formation (white arrow). (**B**) FDG-PET/CT in the delayed phase performed at the same time as the CT scan in Figure 2A was obtained. FDG accumulated in the tumor with a high standardized uptake value of 13.3 (white arrow).

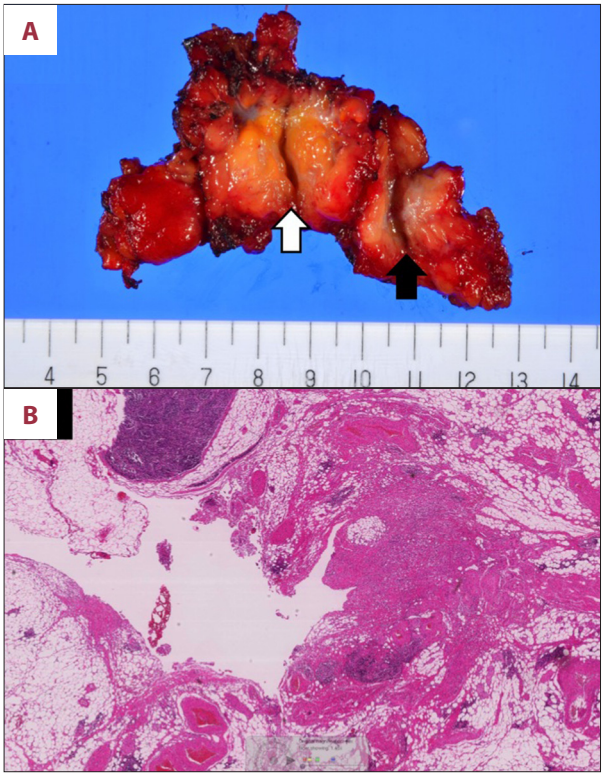

Figure 3. (**A**) Macroscopic view of the resected specimen. Both cut surfaces (white and black arrows) of the tumor include fatty tissue with irregular white fibrous tissue. (**B**) Microscopic view of the resected specimen. Cancer tissue and cells were not detected.

central cut surface of the specimen was composed of connective tissue, including white and firm scars (Figure 3A). The histopathological diagnosis was benign fatty tissue, including a fibrovascular component (Figure 3B).

Discussion

Despite improvements in the outcomes of radical resection of CRC and 5-year cumulative survival rates of 69.9% for all stages and 85.2–88.4% for stages I–II [1], 17.3% of operated patients (906 of 5230) develop recurrent diseases [2]. In most cases of recurrence (83.2%), the lesion is detected within 3 years after the radical operation. Detection of the first recurrence more than 5 years after surgery is very rare (3.6% of cases) [3]. If it is possible to completely resect the recurrent tumor, patient survival is expected to be longer [4].

Detection of recurrent lesions usually involves serum tumor marker level measurement, ultrasonography, CT, and MRI. In addition, the efficacy of FDG-PET has been confirmed [5–8]. Luboldt et al. reported that FDG-PET/CT provided promising accuracy for colorectal mass detection and that, in all carcinomas and adenomas with high-grade dysplasia, the SUV_{max} was ≥5 [9]. A review by Visioni and Kim stated that the sensitivity and specificity of PET-CT in detecting CRC recurrence were 89–95% and 83–92%, respectively [10]. One of the studies evaluated in that review [11] reported a positive predictive value of 96.4% and a negative predictive value of 76.9% for the diagnosis of CRC recurrence by PET-CT.

Although the reported lesion, in our case, was suspected by CT to be a recurrent tumor from the colon cancer operated on 5 years ago and was diagnosed clinically by FDG-PET/CT as recurrent disease, with a high SUV, the resected lesion was finally diagnosed as benign fibrous tissue on histopathological analysis. FDG-PET/CT is a sensitive tool for detecting malignancy, but FDG uptake is not tumor-specific. Gollub et al. reported that PET-CT did not detect 5 of 37 colon adenocarcinomas, 1 of which was found to be mucinous on histological analysis [12]. FDG uptake is also detected in healthy tissue or benign lesions in cases of inflammation or posttraumatic repair and could be mistakenly interpreted as representing cancer [13]. Examples of PET-positive benign diseases that mimic malignant tumors are suture granuloma [14], carbon particle-induced granuloma

[15], food residue granuloma [16], breast implant foreign bodies [17], hepatic focal fat [18], inflammatory pseudotumor [19], gelatinous degeneration of the bone [20], fibrous dysplasia of the bone [21], and vaginal gauze packing [22].

One study reported the differentiation of benign lesions from metastases on the rib according to the SUV_{max}, which was significantly higher in patients with metastasis (3.0±1.8) than in those with benign lesions (2.5±1.1); the cut-off SUV_{max} value was determined to be 2.4 [23]. In another study of primary ovarian cancer, the SUV_{max} of malignant lesions (7.55±4.29) was significantly higher than that of benign lesions (2.00±1.02), with an SUV_{max} cut-off value of 2.55 yielding a sensitivity, specificity, and accuracy of 82.4%, 76.9%, and 81.1%, respectively, for the detection of malignant and borderline tumors by FDG-PET/CT [24]. However, the authors of these 2 reports also stated that SUV_{max} alone was not sufficient to distinguish malignant lesions from benign ones.

Conclusions

FDG accumulation is observed in cases of accelerated glucose absorption and/or delayed glucose metabolism. However, these conditions are not specific to malignant lesions [25]. Since it is impossible even for FDG-PET to distinguish malignant from benign disease in all cases, further advancement of the PET technology is needed and more useful modalities should be established. Otherwise, meaningless surgeries in cancer-free patients will be inevitable.

Reference:

1. Kotake K, Teramoto T, Kameoka S et al: Postsurgical Surveillance of Colorectal Cancer Study Group, Japanese Society for Cancer of the Colon and Rectum. Timing of relapse and outcome after curative resection for colorectal cancer: a Japanese multicenter study. Dig Surg, 2009; 26(3): 249–55
2. Kobayashi H, Mochizuki H, Sugihara K et al: Characteristics of recurrence and surveillance tools after curative resection for colorectal cancer: A multicenter study. Surgery, 2007; 141(1): 67–75
3. Watanabe T, Itabashi M, Shimada Y et al: Japanese Society for Cancer of the Colon and Rectum. Japanese Society for Cancer of the Colon and Rectum (JSCCR) guidelines 2010 for the treatment of colorectal caner. Int J Clin Oncol, 2012; 17(1): 1–29
4. Moritani K, Hasegawa H, Okabayashi K et al: Difference in the recurrence rate between right- and left-sided colon cancer: a 17-year experience at a single institution. Surg Today, Surg Today, 2014; 44(9): 1685–91
5. Sarikaya I, Bloomston M, Povoski SP et al: FDG-PET scan in patients with clinically and/or radiologically suspicious colorectal recurrence but normal CEA. World J Surg Oncol, 2007; 5: 64
6. O'Connor OJ, McDermott S, Slattery J et al: The Use of PET-CT in the Assessment of Patients with Colorectal Carcinoma. Int J Surg Oncol, 2011; 2011: 846512
7. Vikram R, Iyer RB: PET/CT imaging in the diagnosis, staging, and follow-up of colorectal cancer. Cancer Imaging, 2008; 8(Spec Iss A): S46–51
8. Sobhani I, Tiret E, Lebtahi R et al: Early detection of recurrence by 18FDG-PET in the follow-up of patients with colorectal cancer. Br J Cancer, 2008; 98(5): 875–80
9. Luboldt W, Volker T, Wiedemann B et al: Detection of relevant colonic neoplasms with PET/CT: promising accuracy with minimal CT dose and a standardized PET cut-off. Eur Radiol, 2010; 20(9): 2274–85
10. Visioni A, Kim J: Positron Emission Tomography (PET) for benign and malignant disease. Surg Clin North Am, 2011; 91(1): 249–66
11. Chen LB, Tong JL, Song HZ et al: 18F-DG PET/CT in detection of recurrence and metastasis of colorectal cancer. World J Gastroenterol, 2007; 13(37): 5025–29
12. Gollub MJ, Grewal RK, Panu N et al: Diagnostic accuracy of (18)F-FDG PET/CT for detection of advanced colorectal adenoma. Clin Radiol, 2014; 69(6): 611–18
13. Rosenbaum SJ, Lind T, Antoch G, Bockisch A: False-positive FDG PET uptake – the role of PET/CT. Eur Radiol, 2006; 16(5): 1054–65
14. Takahara K, Kakinoki H, Ikoma S et al: Suture Granuloma Showing False-Positive Findings on FDG-PET. Case Rep Urol, 2013; 2013: 472642
15. Lim ST, Jeong FJ, Kim DW et al: F-18 FDG PET-CT findings of intraperitoneal carbon particle-induced granuloma mimicking peritoneal carcinomatosis. Clin Nucl Med, 2008; 33(5): 321–24
16. Crucitti A, Grossi U, Leccisotti L et al: Food residue granuloma mimicking metastatic disease on FDG-PET/CT. Jpn J Radiol, 2013; 31(5): 349–51
17. Ulaner GA, D'Andrea G, Cody HS III: Breast implant foreign body reaction mimicking breast cancer recurrence on FDG PET/CT. Clin Nucl Med, 2013; 38(6): 480–81
18. Zissen MH, Quon A: Focal fat mimicking multiple hepatic metastases on FDG PET/CT imaging. Eur J Nucl Med Mol Imaging, 2009; 36(9): 1527
19. Lee JH, Lee KG, Park HK et al: Inflammatory pseudotumor of the kidney mimicking malignancy on 18F-FDG PET/CT in a patient with diabetes and hepatocellular carcinoma. Clin Nucl Med, 2012; 37(7): 699–701
20. Chong A, Song HC, Oh JR et al: Gelatinous degeneration of the bone marrow mimicking osseous metastasis on 18F-FDG PET/CT. Clin Nucl Med, 2012; 37(8): 798–800
21. Su MG, Tian R, Fan QP et al: Recognition of fibrous dysplasia of bone mimicking skeletal metastasis on 18F-FDG PET/CT imaging. Skeletal Radiol, 2011; 40(3): 295–302
22. Wu YC, Hsieh TC, Kao CH et al: Vaginal gauze packing mimicking malignancy in a patient with uterine cervical cancer: a pitfall of F-18 FDG PET/CT. Clin Nucl Med, 2010; 35(5): 381–83
23. Choi HS, Yoo leR, Park HL et al: Role of 18F-FDG PET/CT in differentiation of a benign lesion and metastasis on ribs of cancer patients. Clin Imaging, 2014; 38(2): 109–14
24. Kitajima K, Suzuki K, Senda M et al: FDG-PET/CT for diagnosis of primary ovarian cancer. Nucl Med Commun, 2011; 32(7): 549–53
25. Izuishi K, Yamamoto Y, Mori H et al: Molecular mechanisms of [18F]fluorodeoxyglucose accumulation in liver cancer. Oncol Rep, 2014; 31(2): 701–6