Case Report

^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography in extensive bland portal vein thrombosis from retroperitoneal adenocarcinoma

ABSTRACT

A 73-year-old woman undergoing hormone therapy for previously treated localized breast cancer presented at oncology follow-up 4 years after mastectomy/radiation therapy with weight loss, night sweats, and abdominal pain. Contrast computed tomography (CT) abdomen revealed a soft-tissue mass posterior to the pancreas, several enlarged retroperitoneal lymph nodes, and a dilated portal vein. On 18F-fluorodeoxyglucose positron emission tomography/CT, metabolic activity extended along the portal vein, outlining most of the liver venous system. This "tree-like" appearance was diagnostic of recent portal vein thrombosis by vascular compression from the retroperitoneal mass. Biopsy of the mass later confirmed undifferentiated adenocarcinoma without breast cancer marker expression.

Keywords: 18F-fluorodeoxyglucose positron emission tomography/computed tomography, portal vein thrombosis, tumor thrombosis, venous thrombosis

A 73-year-old woman known for a remote history of pulmonary sarcoidosis and an invasive ductal carcinoma of the breast, positive for estrogen and progesterone receptors, treated by segmental mastectomy, radiation therapy, and ongoing hormone therapy presented at oncology follow-up with systemic symptoms of fatigue, weight loss and night sweats as well as postprandial abdominal pain 4 years after breast cancer diagnosis. Contrast computed tomography (CT) abdomen revealed a soft-tissue mass posterior to the pancreas, several enlarged retroperitoneal lymph nodes, and dilated portal vein. Focused abdomen ultrasound proved portal vein thrombosis. Recurrence of breast cancer, lymphoma, and sarcoidosis was entertained as diagnostic possibilities. 18F-fluorodeoxyglucose positron emission tomography (18F-FDG PET)/CT was performed [Figure 1], revealing intense activity in the retroperitoneal mass and lymph nodes. Moreover, metabolic activity extended along the portal vein, branching within the hepatic parenchyma to involve most of the liver intrahepatic venous system, however with distinctively less uptake than the extrahepatic tumors. This "tree-like" appearance was diagnostic of acute portal vein thrombosis. The intrahepatic component is presumed nontumoral (bland) thrombosis, from vascular occlusion of the extrahepatic portal system by the retroperitoneal mass. Biopsy of the mass later confirmed undifferentiated adenocarcinoma without breast cancer marker expression, presumably from the pancreatic origin.

Due to neutrophils and macrophages activated by the acute inflammatory phase of venous thrombosis, FDG-PET sports high sensitivity and specificity.[1-4] Various cancers are associated with bland or tumor thrombosis, including

Guillaume Chaussé, Gad Abikhzer, Stephan Probst, Jerome Laufer

Department of Radiology, Division of Nuclear Medicine, Mcgill University, Montreal, QC, Canada

Address for correspondence: Dr. Guillaume Chaussé, Department of Nuclear Medicine, Jewish General Hospital, G19, 3755 Cote-st-Catherine Road, Montreal, QC, Canada.
E-mail: guillaume.chausse@mail.mcgill.ca

Access this article online	
Website: www.wjnm.org	Quick Response Code
DOI: 10.4103/wjnm.WJNM_8_18	

How to cite this article: Chaussé G, Abikhzer G, Probst S, Laufer J. ^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography in extensive bland portal vein thrombosis from retroperitoneal adenocarcinoma. World J Nucl Med 2019;18:192-3.

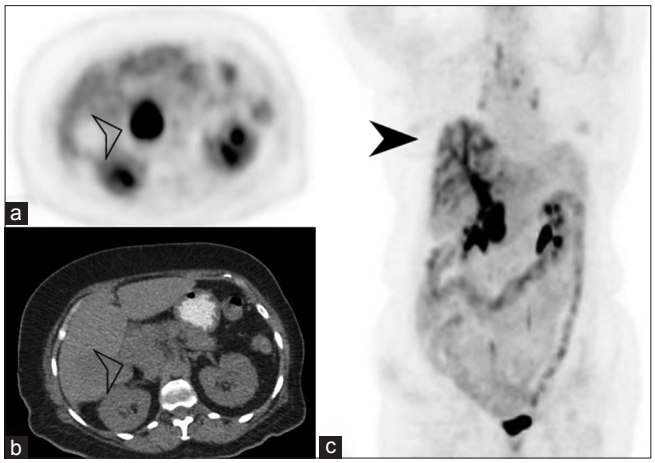

Figure 1: (a) Transaxial 18F-fluorodeoxyglucose positron emission tomography image of the retroperitoneal mass. (b) Corresponding transaxial computed tomography image. (c) Maximum Intensity Projection of positron emission tomography image. 18F-fluorodeoxyglucose positron emission tomography/computed tomography reveals intense activity in the retroperitoneal mass (arrowhead frames) and lymph nodes (not displayed). Moreover, metabolic activity along the portal vein, "tree-like" branching within the hepatic parenchyma to involve most of the liver intrahepatic venous system (black arrowhead) is distinctively less intense than the extrahepatic tumor. This appearance was diagnostic of acute portal vein thrombosis

hepatocellular carcinoma, pancreaticobiliary carcinoma, renal cell carcinoma, and various adenocarcinomas.[5-9] As proposed by recent literature, FDG-PET may differentiate direct tumor invasion from bland thrombus. Despite the fact that both acute bland thrombosis and tumoral growth display metabolic activity, there seems to be a significant discrepancy in the intensity of uptake in most cases, the former being less intense than the latter.[10] In addition, venous thrombosis uptake subsides in the chronic phase to normal values at approximately 3 months, allowing for proper distinction from malignancy in the absence of targeted treatment.[1-4] As opposed to previously reported extensive portal vein tumor thromboses,[6] the current case illustrates the interesting pattern of branching metabolic activity in an extensive portal vein thrombosis with mild intrahepatic intensity suggestive of bland thrombosis, highlighting once more the instrumental role of FDG-PET in thrombosis and cancer staging. Unfortunately, in this case, cancer stage was not suitable for curative intent, and the patient received appropriate palliative therapy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Houshmand S, Salavati A, Hess S, Ravina M, Alavi A. The role of molecular imaging in diagnosis of deep vein thrombosis. Am J Nucl Med Mol Imaging 2014;4:406-25.
2. Rondina MT, Lam UT, Pendleton RC, Kraiss LW, Wanner N, Zimmerman GA, *et al.* (18)F-FDG PET in the evaluation of acuity of deep vein thrombosis. Clin Nucl Med 2012;37:1139-45.
3. Hess S, Madsen PH, Iversen ED, Frifelt JJ, Høilund-Carlsen PF, Alavi A, *et al.* Efficacy of FDG PET/CT imaging for venous thromboembolic disorders: Preliminary results from a prospective, observational pilot study. Clin Nucl Med 2015;40:e23-6.
4. Bagni O, Filippi L, Pelle G, Scopinaro F. (18)F-FDG PET/CT imaging of massive portal vein tumor thrombosis from ileal adenocarcinoma. Hell J Nucl Med 2014;17:52-3.
5. Sun L, Guan YS, Pan WM, Chen GB, Luo ZM, Wei JH, *et al.* Highly metabolic thrombus of the portal vein: 18F fluorodeoxyglucose positron emission tomography/computer tomography demonstration and clinical significance in hepatocellular carcinoma. World J Gastroenterol 2008;14:1212-7.
6. Cowell GW, Thomson LK, Digby M, Poon FW. Acute portal vein thrombosis: An important mimic of malignancy on FDG PET/CT. BMJ Case Rep 2011;2011. pii: bcr0720114482.
7. Nguyen BD. Pancreatic neuroendocrine tumor with portal vein tumor thrombus: PET demonstration. Clin Nucl Med 2005;30:628-9.
8. Hanajiri K, Mitsui H, Maruyama T, Kondo Y, Shiina S, Omata M, *et al.* 18F-FDG PET for hepatocellular carcinoma presenting with portal vein tumor thrombus. J Gastroenterol 2005;40:1005-6.
9. Shimoda M, Iso Y, Tomita S, Fujimori T, Murakami K, Sawada T, *et al.* Middle bile duct cancer with portal vein tumor thrombus. World J Surg Oncol 2008;6:48.
10. Kurtovic J, Van Der Wall H, Riordan SM. FDG PET for discrimination between tumor extension and blood thrombus as a cause for portal vein thrombosis in hepatocellular carcinoma: Important role in exclusion of transplant candidacy. Clin Nucl Med 2005;30:408-10.