FDG Avid Intracholecystic Papillary Neoplasm Mimicking Hepatic Metastasis in a Patient with Head-and-neck Cancer

Abstract

A 75-year-old male with head-and-neck squamous cell cancer received a staging f-18-fluorodeoxyglucose (18F-FDG) positron emission tomography-computed tomography (PET/CT) scan which showed additional focal abnormal uptake in the right hepatic lobe. The patient was treated for probable metastatic disease. Restaging FDG PET/CT scan revealed resolution of uptake in the head-and-neck and persistent focal uptake in the presumed liver metastasis. An abdominal CT with intravenous contrast revealed an enhancing mass in the gallbladder, without extension into the liver. Cholecystectomy revealed an intracholecystic papillary neoplasm of the gallbladder. The initial appearance of hepatic metastasis was due to a misregistration artifact.

Keywords: *Fluorodeoxyglucose, gallbladder neoplasm, misregistration, positron emission tomography-computed tomography*

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Misregistration artifacts are characterized as areas of unexpected focal radiotracer uptake that exhibit misalignment on fused positron emission tomography-computed tomography (PET/CT) images and resolve after proper coregistration of consecutive CT imaging.[1,2] While CT acquisition can take seconds, PET takes several minutes at each bed position. Any patient movement during image acquisition can lead to delocalization

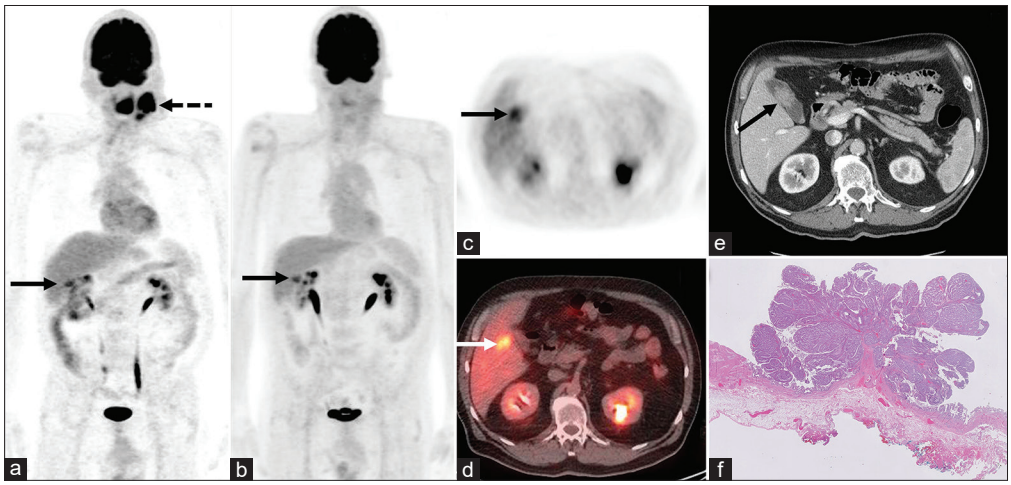

Figure 1: Representative images from whole body f-18-fluorodeoxyglucose positron emission tomography-computed tomography (f-18 FDG PET/CT) scan, the whole body maximum intensity projection (MIP) image, and axial PET and fused axial PET/CT images (a, c, and d), respectively, acquired 1 h after intravenous injection of 11.3 mCi of F-18 FDG. Focal hypermetabolism is seen in the left tonsillar primary and an adjacent left cervical metastatic lymph node dashed arrow in (a). Focal increased uptake is also seen in the right lobe of the liver, segment V with max SUV 5.8 solid arrows in (a, c, and d) raising concern for hepatic metastasis. A targeted chemoradiation regimen was established for presumed metastatic disease. Follow-up FDG PET/CT imaging revealed complete resolution of primary neck tumor and nodal metastasis, and persistent focal FDG avidity within the right hepatic lobe, max SUV of 6.7 arrow in (b). Follow-up CT of the abdomen and pelvis with IV contrast revealed an enhancing, frond-like 3.3 cm mass in the gallbladder lumen arrow in (e). Differences in apparent malignancy location are likely due to misregistration effect between the PET and CT images. Pathology evaluation after laparoscopic cholecystectomy further revealed noninvasive epithelial proliferation with a papillary configuration, consistent with an intracholecystic papillary neoplasm of the gallbladder (f). Different phenotypes (such as intestinal, gastric foveolar, and biliary) were present in one tumor with no evidence of high-grade dysplasia

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of perceived radiotracer accumulation, resulting in PET/CT misregistration.[3] With respect to the hepatobiliary system, misregistration artifact is commonly caused by respiration or bowel peristalsis.[4,5] The former can be reduced through shallow breathing during the CT portion of the PET/CT, while the latter can be prevented through observation of nonattenuation correction imaging.[6] These scans are often used to evaluate malignancy and most commonly use fluorodeoxyglucose (FDG) as the radiotracer.[3,7] Since structural changes of malignancy are preceded by functional changes in glucose uptake, the use of FDG PET/CT imaging through FDG avidity can help establish disease baseline, progression, or regression chronologically.[8] Intracholecystic papillary neoplasm (ICPN), specifically, is a rare and preinvasive neoplastic tumor of the gallbladder.[9,10] The prevalence of the detection of this tumor has increased in the last several years due to advances in imaging for gallbladder pathology.[11] ICPN has been previously characterized to have moderate FDG-avidity; however, its significance may be nonspecific and may be seen in other tumors of the gallbladder.[10,12,13] In addition, a prior case report showed an ICPN that was initially mistaken for metastatic disease on PET/CT imaging.[10] Care must be taken when assessing FDG avidity in the GI tract as various etiologies can display FDG uptake. This case [Figure 1] highlights the importance of recognizing misregistration artifacts during PET/CT acquisition, as well as reporting ICPN as an FDG avid primary gallbladder tumor.

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.

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Conflicts of interest

There are no conflicts of interest.

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