

Obstructive Jaundice: An Unusual Presentation of Neuroendocrine Differentiation in Prostatic Adenocarcinoma

Abstract

An elderly male on androgen deprivation therapy for prostatic adenocarcinoma presented with obstructive jaundice. Since biopsy from the head of the pancreas showed neuroendocrine carcinoma (NEC), he was diagnosed with second primary pancreatic NEC. Ga-68 DOTANOC positron emission tomography/computed tomography (PET/CT) done subsequently showed enlarged mildly DOTANOC-avid retroperitoneal nodes infiltrating the pancreas. These nodes were found to be progression of prostate-specific membrane antigen (PSMA) nonavid retroperitoneal nodes visualized in his Ga-68 PSMA PET/CT performed at another institution before 4 months, when there was no lesion in the pancreas. This observation revised the diagnosis from second primary pancreatic NEC to progression of neuroendocrine differentiation in preexisting prostatic adenocarcinoma.

Keywords: Ga-68 DOTANOC, Ga-68 prostate-specific membrane antigen, jaundice, neuroendocrine differentiation, positron emission tomography/computed tomography, prostatic adenocarcinoma

A 68-year-old male presented with obstructive jaundice having total and direct serum bilirubin of 9.5 mg/dl and 5.3 mg/dl, respectively. He had been on treatment with androgen deprivation therapy (ADT) over 2 years for prostatic adenocarcinoma. His magnetic resonance imaging suggested a lesion involving head and uncinate process of the pancreas [arrows in Figure 1a, b and d], resulting in cutoff of common bile duct (CBD) and pancreatic duct [arrows in Figure 1c]. Endoscopic ultrasound-guided biopsy from the head of the pancreas revealed neuroendocrine carcinoma (NEC), leading to a working diagnosis of pancreatic NEC as second primary. He was then treated with CBD stenting and was referred for DOTANOC positron emission tomography/computed tomography (PET/CT) [Figure 2a] to assess the pancreatic NEC. It showed low-grade DOTANOC uptake (maximum standardized uptake value [SUVmax] 3.2) in enlarged retroperitoneal nodes [arrow head in Figure 2b] with infiltration into the head and body of the pancreas [arrow head in Figure 2c]. The pancreas showed diffuse enlargement and low-grade DOTANOC uptake suggesting pancreatitis [Figure 2c], which has resulted in CBD cutoff and

obstructive jaundice. An intensely DOTANOC-avid (SUVmax 7.5) left adrenal metastasis [arrow in Figure 2d] was also visualized. Apart from these findings, DOTANOC nonavid enlarged left renal hilar nodes [arrow in Figure 2b], right adrenal metastasis [arrow head in Figure 2d], few mesenteric nodes, and pleural effusion were also visualized. No abnormality was detected in the prostate.

Four months back, the patient had undergone Ga-68 prostate-specific membrane antigen (PSMA)-PET/CT [PSMA-2, Figure 3a] at another institution for raising serum prostate-specific antigen (16.1 ng/ml). It had showed disease progression by means of appearance of PSMA-avid perinephric deposits, paraesophageal, left renal hilar [arrow in Figure 3b], and retrocaval lymph nodes and increase in the size of PSMA-avid right adrenal metastases [arrow head in Figure 3d] compared to another Ga-68 PSMA-PET/CT (PSMA-1, images not shown) 1 year ago. Few other new PSMA nonexpressing retroperitoneal nodes were also noted in the para-aortic, aortocaval regions [arrow head in Figure 3b and c]. On comparative analysis, it was noted that the newly detected retroperitoneal nodes in the PSMA-2 PET/CT had

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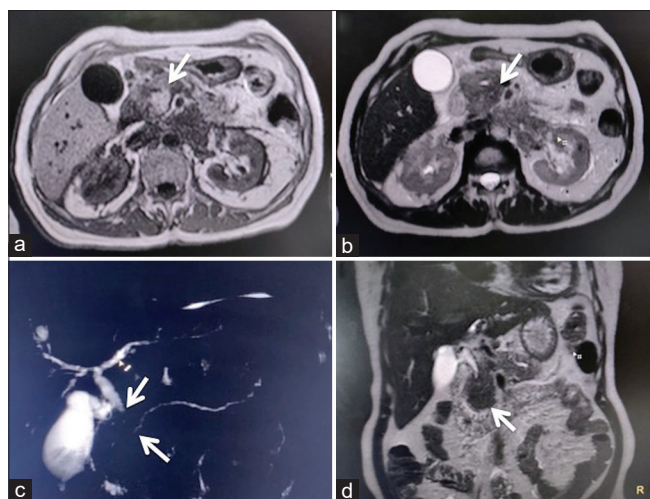


Figure 1: Axial T1-weighted magnetic resonance imaging (a) shows hyperintense lesion in the head of pancreas (arrow) and matched axial T2-weighted magnetic resonance imaging image (b) shows hypointense signal in the same lesion (arrow). Magnetic resonance imaging cholangiopancreatography image (c) shows tapering with cutoff of the distal common bile duct and pancreatic duct in the head of the pancreas (arrows). Coronal T2-weighted magnetic resonance imaging (d) shows a hypointense lesion in the head and uncinate process of the pancreas (arrow)

increased in size over the subsequent months causing pancreatic infiltration and obstructive jaundice. Since these lesions were NEC in nature, DOTANOC PET/CT showed only low-grade uptake in these lesions. Furthermore, all the PSMA-avid lesions in PSMA-2 PET/CT increased in size with no DOTANOC uptake. DOTANOC avidity in the newly detected left adrenal metastasis suggested well-differentiated neuroendocrine tumor. Based on these findings, the diagnosis was made in favor of neuroendocrine differentiation (NED) of prostatic adenocarcinoma with disease progression.

Neuroendocrine cells are scattered in all zones of prostatic glands comprising <1% of prostatic glandular epithelium. Prostatic adenocarcinomas may have NED commonly presenting post-ADT as an androgen receptor inhibition resistance phenomenon.^[1] Ga-68-DOTANOC PET/CT has been playing a significant role in diagnosis and management of this challenging condition.^[2-7] NED as the cause of metastatic recurrence diagnosed by Ga-68-DOTANOC in pancreatic adenocarcinoma with negative PSMA scan has been reported.^[4] Our case is different in that the patient had significant PSMA-avid lesions throughout the course of his illness, when the latest PSMA-PET/CT showed new PSMA-avid lesions along with non-PSMA-avid retroperitoneal lymphadenopathy.

Had the suspicion of NED been made based on PSMA-negative lymphadenopathy,^[8] an early attempt to diagnose NED could have been made with appropriate management decisions which would have possibly prevented or delayed the development of obstructive jaundice in our patient. Furthermore, the findings in Ga-68 DOTANOC PET/CT helped in revising the diagnosis to NED of prostatic adenocarcinoma from pancreatic

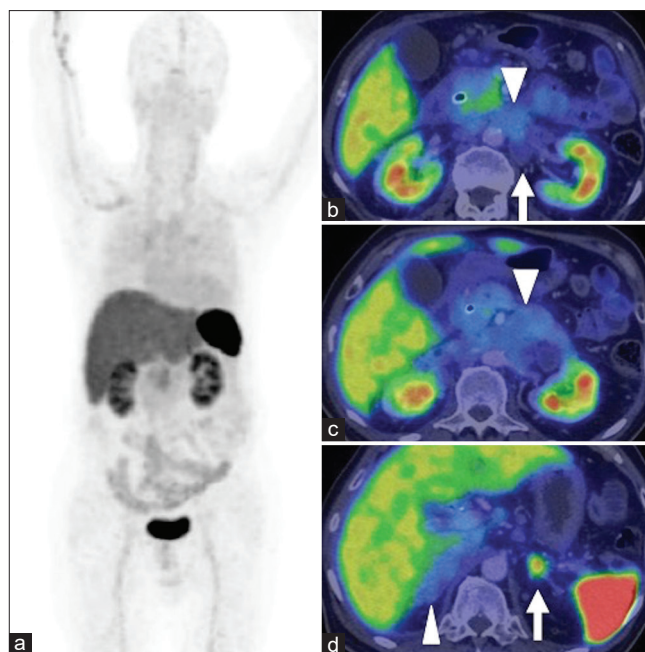


Figure 2: Maximum intensity projection image (a) of Ga-68 DOTANOC positron emission tomography/computed tomography. Axial fused positron emission tomography/computed tomography (b) shows faint DOTANOC-avid enlarged para-aortic node (arrow head); DOTANOC nonavid enlarged left renal hilar node is also visualized (arrow). Axial fused positron emission tomography/computed tomography (c) shows DOTANOC-avid para-aortic node infiltrating into the pancreas (arrow head) with diffuse uptake in the pancreas. Axial fused positron emission tomography/computed tomography (d) shows enlarged DOTANOC-avid left adrenal metastasis (arrow) and DOTANOC nonavid enlarged right adrenal metastasis (arrow head). Common bile duct stent is visualized in all these axial slices

NEC. The low-grade uptake in DOTANOC PET/CT was consistent with NEC rather than a well-differentiated neuroendocrine neoplasm. Although FDG PET/CT would have shown intense uptake in NEC lesions in our case, we deferred it since a pathological confirmation of NEC was already obtained. The newly detected DOTANOC-avid left adrenal metastasis represented a well-differentiated component of NED in prostatic adenocarcinoma consistent with the heterogeneity of these neoplasms. Our case reaffirms the fact that NED should be suspected when PSMA-negative lesions are visualized during the follow-up of patients with prostate adenocarcinoma, especially in post-ADT metastatic setting.

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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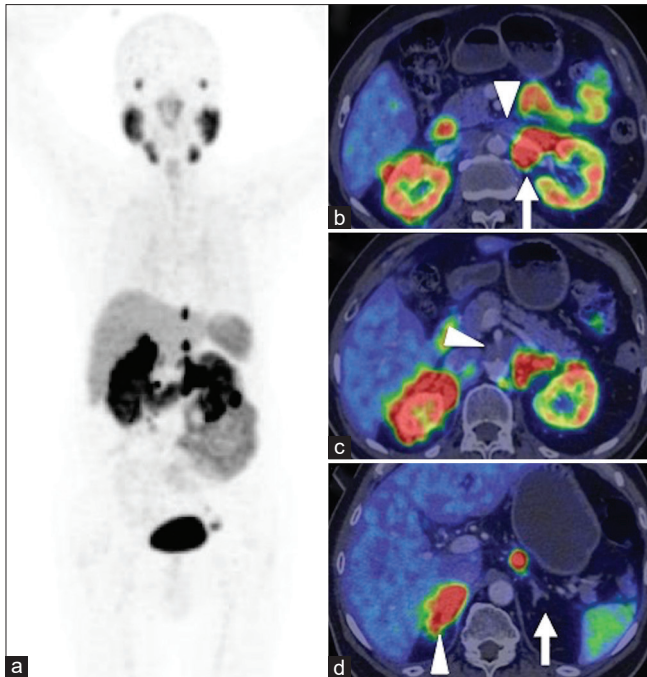


Figure 3: Maximum intensity projection image (a) of Ga-68 prostate-specific membrane antigen positron emission tomography/computed tomography (prostate-specific membrane antigen-2). The images B, C, and D represent matched sections corresponding to the Ga-68 DOTANOC positron emission tomography/computed tomography. Axial fused positron emission tomography/computed tomography (b) shows prostate-specific membrane antigen nonavid para-aortic node (arrow head) and intensely prostate-specific membrane antigen-avid left renal hilar node (arrow). Axial fused positron emission tomography/computed tomography (c) shows clear fat plane between the prostate-specific membrane antigen nonavid para-aortic node and the normal appearing pancreas (arrow head). Axial fused positron emission tomography/computed tomography (d) shows enlarged prostate-specific membrane antigen-avid right adrenal metastasis (arrow head) and normal appearing left adrenal (arrow)

Conflicts of interest

There are no conflicts of interest.

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