Demonstration of 68Ga-prostate-specific Membrane Antigen Uptake in Metastatic Pancreatic Neuroendocrine Tumor

Abstract

We present the case of a 47-year-old female with metastatic pancreatic neuroendocrine tumor (NET). The patient was treated with long-acting octreotide which failed to halt disease progression. The patient was being considered for 177Lu-peptide receptor radionuclide therapy, and a 68Ga-DOTANOC positron emission tomography-computed tomography (PET-CT) was acquired initially, which showed good uptake in the primary and metastatic lesions. Metastatic pancreatic NETs have limited treatment options, and given the background that these tumors are highly vascular and prostate-specific membrane antigen (PSMA) expression is known in the endothelium of tumor neovasculature, we decided to perform a 68Ga-PSMA-HBED-CC PET-CT scan. It revealed radiotracer uptake in the metastatic liver lesions although not as high as 68Ga-DOTANOC-PET-CT. PSMA expression needs to be researched further, especially in high-grade NETs where somatostatin expression may be poor.

Keywords: *68Ga-prostate-specific membrane antigen positron emission tomography-computed tomography, neuroendocrine tumor, theranostics*

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Prostate-specific membrane antigen (PSMA) positron emission tomography-computed tomography (PET-CT) has been extensively used in the management of patients with prostate cancer. This tracer also offers an important example of the concept of theranostics. However, PSMA expression has also been reported previously in other malignancies such as bladder, breast, gastric, colon, rectum, lung, renal cell carcinoma, hepatocellular carcinoma, multiple myeloma, and follicular lymphoma and in few nonneoplastic conditions.[1-9] Very few studies have shown expression of PSMA in neuroendocrine tumors (NETs).[10] It is well known from some earlier studies that PSMA expression is seen in the endothelium of tumor neovasculature. Since NETs have very high vascularity, PSMA expression may be seen in the same. In this case, PSMA-PET-CT showed uptake in the primary tumor in the pancreas and metastatic liver lesions. The uptake was high in the periphery of the tumor concordant with the expected distribution of neovasculature. However, the intensity of the uptake was low as compared to 68Ga-DOTANOC. The

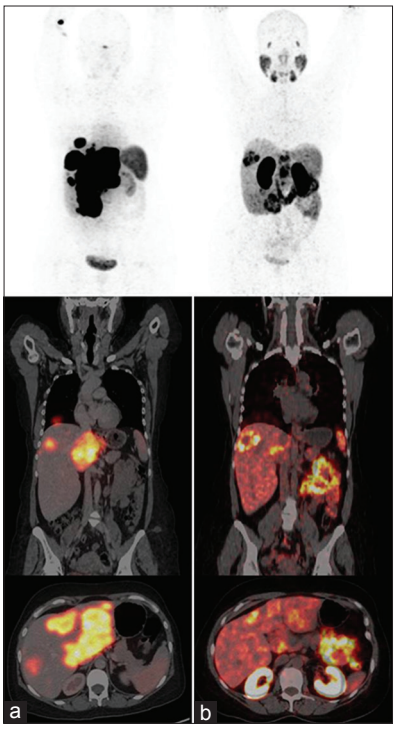

Figure 1: 68Ga-DOTANOC positron emission tomography- computed tomography (a) and 68Ga-prostate- specific membrane antigen-11 positron emission tomography-computed tomography (b) in a case of metastatic pancreatic neuroendocrine tumor, showing increased tracer uptake in multiple liver lesions. However, the intensity of uptake was less in 68Ga-prostate-specific membrane antigen when compared to 68Ga-DOTANOC images

How to cite this article: Prabhu M, Damle NA, Gupta R, Arora S, Arunraj ST, Bal C. Demonstration of 68Ga-prostate-specific membrane antigen uptake in metastatic pancreatic neuroendocrine tumor. Indian J Nucl Med 2018;33:257-8.

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Access this article online

Website: www.ijnm.in

DOI: 10.4103/ijnm.IJNM_6_18

Quick Response Code:

number of lesions seen on PSMA-PET/CT was much less than that seen on DOTANOC-PET/CT [Figure 1]. However, it remains to be seen how much uptake will be seen in high-grade NETs which are known to be poorly DOTANOC avid. This finding may encourage researchers to consider this modality from the theranostic point of view in a disease with limited treatment options.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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