A Rare Case of Liver Metastasis from Prostate Cancer Mimicking Hepatocellular Carcinoma on Immunohistochemistry: Role of F-18 Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography in Diagnosis

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Abstract

We present a case with space-occupying lesion in cirrhotic liver, diagnosed as hepatocellular carcinoma on immunohistochemistry, who underwent F-18 fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT) and showed FDG-avid lesions in liver as well as in the prostate. These findings guided in establishing the diagnosis of prostate cancer, metastasizing to liver by performing additional immunohistochemical markers. PET/CT was also useful in identifying coexisting non-Hodgkin's lymphoma.

Keywords: *F-18 fluorodeoxyglucose positron emission tomography/computed tomography, hepatocellular carcinoma, hepatocyte antibody stain, prostate cancer, P504s*

Introduction

Prostate cancer is the most frequently diagnosed cancer in men in 105 countries.[1] Prostate cancer patients usually present with lower urinary tract symptoms (LUTSs). It commonly metastasizes to regional pelvic lymph nodes and bones. Metastases to visceral organs are relatively rare, particularly in the absence of lymph nodal and bone metastases.[2] If a patient presents with symptoms related to metastatic sites or other comorbidities in the absence of LUTS, this may lead to misdiagnosis. We present a case with space-occupying lesion in cirrhotic liver, diagnosed as hepatocellular carcinoma (HCC) on immunohistochemistry (IHC), who underwent F-18 fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT) and showed FDG-avid lesions in liver as well as in the prostate. These findings guided in establishing the diagnosis of prostate cancer, metastasizing to liver by performing additional immunohistochemical markers. PET/CT was also useful in identifying coexisting non-Hodgkin's lymphoma.

Case Report

A 77-year-old male presented with vague abdominal pain. CT scan of abdomen showed cirrhotic liver with hypodense lesion in the right lobe and right pleural effusion. The possibility of HCC was considered and serum alpha-fetoprotein level was not raised (3.3 ng/ml). FNAC from liver lesion showed carcinomatous cells [Figure 1a and b] and IHC showed positivity for cytokeratin, arginase, and glutamine synthetase; weak positivity for hepatocyte antibody [Figure 1c]; and negativity for vimentin, and inhibin, consistent with HCC. However, in view of weak positivity for hepatocyte antibody, correlation with imaging findings were suggested. Hence, the patient was referred for F-18 FDG PET/CT [Figure 2a; maximum intensity projection image] and it revealed cirrhotic liver, with a lesion in right lobe showing low FDG uptake [Figure 2b and c; thin arrows]. Increased FDG uptake was also seen in the left half and median lobe of prostate gland showing mild heterogeneous enhancement [Figure 2d and e; black arrows]. In addition, intensely FDG-avid soft-tissue deposits were noted in intraspinal extradural location at level of D5–D8 vertebrae, right paravertebral region, and along adjoining right-sided lower ribs/pleura [Figure 2f and g; white arrows]

How to cite this article: Senthil R, Nair AV, Pratap T, Gangadharan VP, Mahadevan P. A rare case of liver metastasis from prostate cancer mimicking hepatocellular carcinoma on immunohistochemistry: Role of F-18 fluorodeoxyglucose positron emission tomography/computed tomography in diagnosis. Indian J Nucl Med 2019;34:54-6.

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Access this article online

Website: www.ijnm.in

DOI: 10.4103/ijnm.IJNM_110_18

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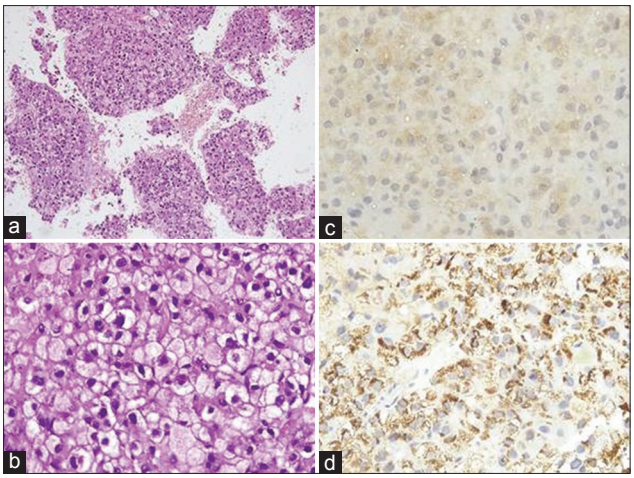

Figure 1: Cell block from liver lesion carcinomatous cells arranged in sheets and pseudoacinar pattern, few of them displaying vacuolated/clear cytoplasm (a and b). It also showed weak positivity for hepatocyte antibody (c) and positivity for P504S (d) which is prostate-specific cytokeratin immunohistochemistry marker

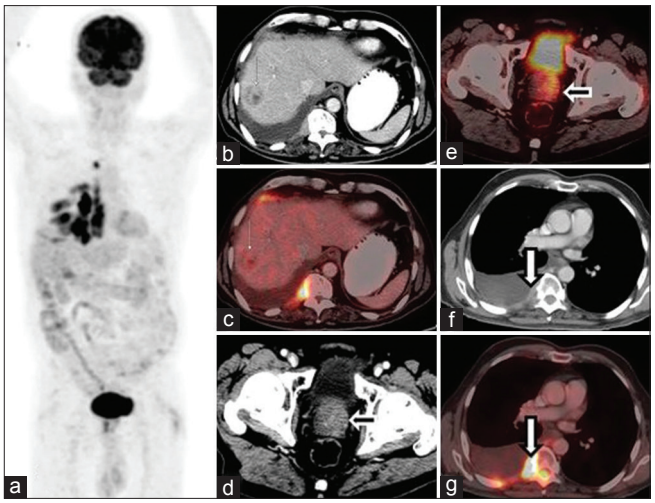

Figure 2: Whole-body F-18 fluorodeoxyglucose positron emission tomography/computed tomography study (a; maximum intensity projection image) shows cirrhotic liver, with lesion in right lobe showing low fluorodeoxyglucose uptake (b and c; thin arrows). Increased fluorodeoxyglucose uptake noted in the left half and median lobe of prostate gland showing mild heterogeneous enhancement (d and e; black arrows). Intensely fluorodeoxyglucose-avid soft-tissue deposits noted in intraspinal extradural location at level of D5–D8 vertebrae, right paravertebral region, and along adjoining right-sided lower ribs/pleura (f and g; white arrows) along with right pleural effusion

as well as right pleural effusion. Possibility of coexisting prostate cancer was also considered and further evaluation was suggested for intraspinal/paravertebral deposits. Serum prostate-specific antigen (PSA) was elevated (82.6 ng/ml) and biopsy from prostate showed adenocarcinoma prostate with Gleason score of 4 + 5 = 9 [Figure 3a and b]. Since the liver lesion showed only weak positivity for hepatocyte antibody, additional prostate-specific IHC markers were performed on cell block from the liver lesion, which showed P504S positivity [Figure 1d], consistent with metastases from prostate cancer. Meanwhile, the patient developed difficulty in walking. Magnetic resonance imaging spine showed elliptical T2 intermediate signal and a mildly enhancing extradural lesion in the posterior aspect of thoracic spinal canal extending from D5 to D9 level, suggestive of metastatic deposit. However, in view of different metabolic signature on FDG PET/CT (intense FDG uptake in intraspinal and paravertebral soft tissue versus low-to-moderate grade FDG uptake in liver and prostate lesions), trucut biopsy from paravertebral soft tissue was performed, which showed lymphoid cells [Figure 3c] and positivity for CD 20 [Figure 3d], CD 10, bcl 2, and leukocyte common antigen, consistent with non-Hodgkin's lymphoma.

Discussion

Prostate cancer is the most frequently diagnosed cancer in men in 105 countries.[1] Most of them present with LUTS and a significant number of prostate cancer patients have metastases at the time of diagnosis or during the disease course. Apart from regional lymph nodes, it most commonly metastasizes to bone (84%), followed by relatively low incidence in other sites such as distant lymph nodes (10.6%), liver (10.2%), thorax (9.1%), brain (3.1%), digestive system (2.7%), retroperitoneum (1.8%), and kidney and adrenal gland (1%).[2] Whenever patients present with symptoms related to metastatic sites or other comorbidities in the absence of LUTS, this may lead to misdiagnosis.

In our case, the prostatic lesion was not evident on initial CT abdomen and weak positivity for hepatocyte antibody on IHC in a lesion from cirrhotic liver led to the initial diagnosis of HCC. Even though F-18 FDG is not an ideal tracer to image prostate cancer, it outperforms CT in detecting unsuspected primary and metastatic prostate cancer, particularly in patients with aggressive histology and high serum PSA level.[3] This may be due to whole-body imaging and ability to provide additional functional information. In our case, identification of FDG-avid prostatic lesion not only helped in diagnosing prostate cancer but also guided in incorporating additional prostate-specific IHC markers and proved liver lesion as metastasis from prostate cancer.

Hepatocyte antibody, an IHC marker, is very useful in diagnosing HCC. However, its positivity has been reported in other tissues like small intestinal goblet cells as well as in few cancers such as lung, prostate, and adrenal carcinoma.[4-6] Hence, if there is any another known or suspicious primary malignancy on imaging, appropriate additional IHC markers should be included to rule out the possibility of metastases, even if the liver lesion is positive for hepatocyte antibody (particularly if weakly positive as in this case). In our case, liver lesion showed positivity for P504S/α-methylacyl CoA racemase, which is a relatively new highly sensitive and specific marker for prostate cancer, thereby confirming the diagnosis of prostatic cancer metastasis.[7,8] In addition, cells from liver lesion showed similar vacuolated cytoplasm as seen in cells from prostate

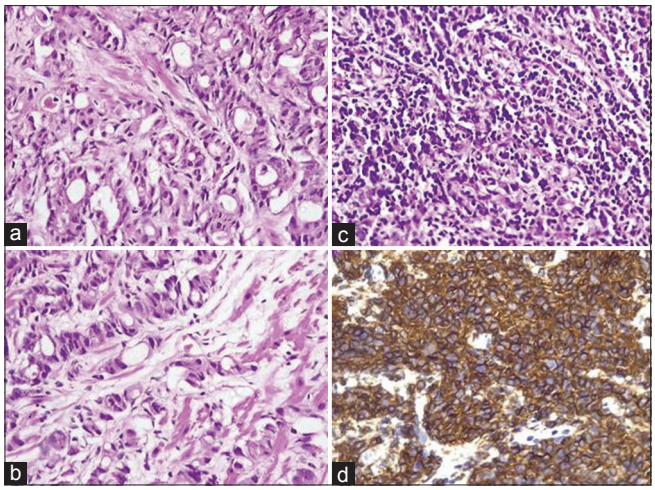

Figure 3: Prostatic biopsy shows carcinomatous cells arranged in fused glandular pattern, few of them showing vacuolated cytoplasm and hyperchromatic nuclei with Gleason score of 4 + 5 = 9 (a, b). Biopsy from paravertebral soft tissue showed lymphoid tissue (c) with positivity for CD 20 (d), suggestive of lymphoma

biopsy on microscopic examination, which also supports possible metastatic nature of liver lesion.

F-18 FDG PET/CT was also useful in demonstrating additional coexisting lymphoma in the intraspinal and paravertebral regions and reiterates the fact that if findings are atypical and show different metabolic signature, tissue diagnosis from various sites is essential. This case emphasizes the importance of whole-body F-18 FDG PET/CT and incorporation of appropriate IHC marker based on imaging findings to obtain the correct diagnosis.

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.

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