[68Ga]Ga-PSMA-11 PET/CT-Positive Hepatic Inflammatory Pseudotumor: Possible PSMA-Avid Pitfall in Nuclear Imaging.

Illustrated Post

Title

[68Ga]Ga-PSMA-11 PET/CT positive hepatic inflammatory pseudotumor: possible PSMA-avid pitfall in nuclear imaging

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Text

Prostate-specific membrane antigen (PSMA) is a trans-membrane glycoprotein highly overexpressed in many cancers and benign conditions. [68Ga]Ga-PSMA-11 PET/CT represents a successful diagnostic imaging method in nuclear medicine for prostate cancer.

This is a case of a 64-year-old woman enrolled in the MORE study, a prospective study examining the in vivo and in vitro PSMA-expression in patients with non-prostatic neoplasms with histopathology as reference standard, actively recruiting in Bologna, Italy. The study protocol was approved by the local Ethics Committee (code 538/2021/Oss/AOUBo) and subjects sign a written informed consent. Contrast-enhanced MRI revealed a lesion in ~~Vs~~ segment 5 of the liver, with late enhancement in wash-in and wash-out phases, consistent with ~~for~~ hepatocarcinoma (HCC).

[68Ga]Ga-PSMA-11 PET/CT (injected dose …….) performed 17 days later, showed increased PSMA uptake at the ~~Vs~~ segment 5 (SUVmax~~Vs~~, 11.3; SUVmax liver background, 7.9), matching the MRI lesion. 8 days after a wedge resection of the ~~Vs~~ segment 5 of the liver ~~wedge resection~~ was performed.

Yellowish well-defined 2 cm nodule made of inflammatory component (mainly of histiocytes xanthogranulomatous-cells, multinucleated giant cells macrophages containing biliary pigment, with stromal fibrosis and fibroblastic proliferation) was observed, within a non-cirrhotic liver parenchyma. Plasma cells, eosinophilic nodular deposits, surrounded by foamy macrophages or neutrophils and activated myofibroblasts were also observed. Immunohistochemistry showed no cytokeratins+ epithelial cells within the lesion, while histiocytic component was CD68PGM1+/s100- with IgG4/IgG ratio <40%. Final diagnosis was hepatic inflammatory pseudotumor (fibrohistiocytic type) *(1)*.

Both PSMA immunohistochemistry and immunofluorescence were performed: results are listed in Figure 1.

Interestingly, only endothelial cells within the pseudotumor expressed PSMA, while inflammatory cells and normal liver endothelial cells were negative. Hypothetically endothelial cells within the lesion are stimulated by tumoral microenvironment to express PSMA, even if the mechanism beyond is still not known.

Hepatic inflammatory pseudotumor is a rare disease with less than 300 cases described in literature. Differential diagnosis between pseudotumor and HCC with CT and MRI imaging is challenging. One multicentric study showed that 50% of patients with a final diagnosis of pseudotumor received a previous HCC misdiagnosis at CT/MRI *(2)*. However, the prognosis and the treatment are different, often resolvable with more conservative approaches, avoiding ~~useless~~ unnecessary invasive procedures.

The hereby described clinical case highlights that liver lesion's characterization is challenging with PSMA-ligands due to the presence of several PSMA-avid diseases (e.g. HCC, prostate cancer metastases, hemangioma) along with physiological PSMA uptake in the liver parenchyma. Moreover, unlike prostate cancer where PSMA is overexpressed directly by cancer cells, in inflammatory pseudotumor PSMA is expressed by endothelial cells. Therefore, PSMA analysis via immunohistochemistry may support conventional imaging for liver lesions characterization. ~~even if PSMA expression, assessed in vivo with PET or in vitro through immunohistochemistry, may support conventional imaging for liver analysis.~~

DISCLOSURE

No other potential conflicts of interest relevant to this article exist.

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FIGURE

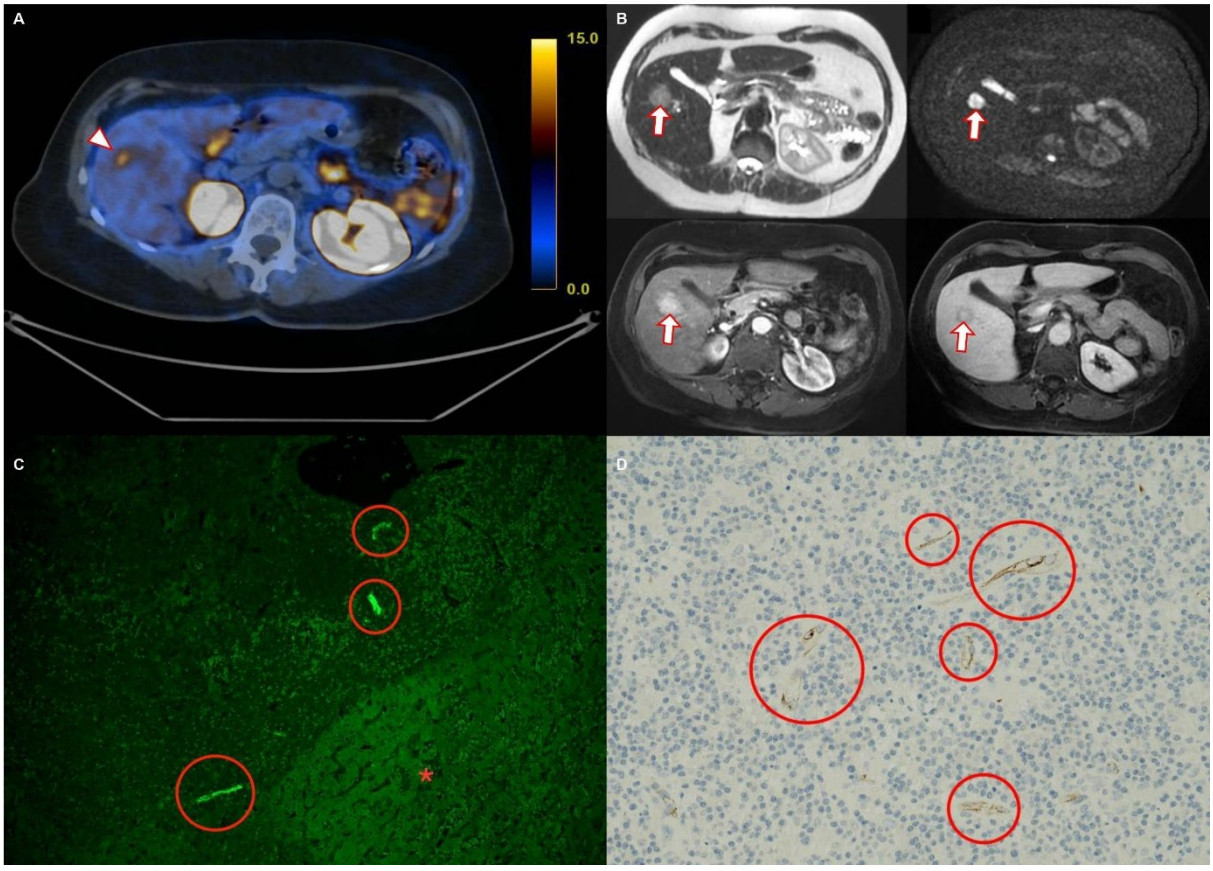

FIGURE LEGEND

(A) Axial fused [68Ga]Ga-PSMA-11 PET/CT showed increased PSMA uptake (SUVmax, 11.3), at ~~Vs~~ segment 5 (arrowhead). **(B)** Gadolinium-ethoxybenzyl-diethylenetriamine pentaacetic acid MRI showed a nodule in ~~liver segment~~ ~~Vs~~ segment 5 (arrows), hyperintense in the T2-weighted image, highly hyperintense in the diffusion-weighted image and in the arterial with targetoid sign in the transitional phase. **(C)** Negative PSMA-Immunofluorescence(10x) in normal liver parenchyma (asterisk) with adjacent inflammatory infiltrate and sparce but strongly positive endothelial cells in the intralesional microvascular component (circles). **(D)** PSMA-Immunohistochemistry(20x) sparce positive endothelial cells in the intralesional microvascular component (circles); negative inflammatory cells.