Case Report

Rare solitary focal tuberculous involvement of liver masquerading as hepatic metastasis on FDG PET/CT in a case of fibular round cell tumor

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ABSTRACT

Finding of focal 18F-fluoro-deoxyglucose (FDG) uptake in liver on FDG positron emission tomography/computed tomography (FDG PET/CT) in a known case of malignancy is often considered to be metastases. We report a similar finding on FDG PET/CT in a case of Ewing's sarcoma of thigh, which turned out to be of tuberculous etiology, an unusual cause of false positive FDG uptake in the liver.

Keywords: 18F-fluoro-deoxyglucose, focal uptake, liver, metastases, tuberculosis

INTRODUCTION

Solitary FDG avid liver lesion in oncological setting is often metastatic in nature. At the same time, such lesions are less likely to be of tuberculous etiology. However, we report an unusual scenario in a 15 year old boy, of a solitary liver lesion in a case of round cell tumor, which on follow up imaging, turned out to be hepatic tuberculosis.

CASE REPORT

A 15-year-old boy, presented with a right leg swelling, which increased in size over 2 months. There was no history of fever or weight loss. Radiograph of right lower limb showed a lytic sclerotic mass in proximal meta-diaphysis of right fibula, which on biopsy was suggestive of Ewing's sarcoma. Whole body 18F-fluoro-deoxyglucose positron emission tomography/computed tomography (FDG PET/CT) was performed as a part of staging work-up. Maximum intensity projection (MIP) image [Figure 1a] showed intense focus of tracer uptake in the right leg (arrow) and liver (arrow-head). Axial fused PET/CT images revealed intense tracer uptake in destructive lytic-sclerotic soft tissue mass in upper end of right fibula, with a maximum standardized uptake value (max SUV in milliCurie/kilogram of body weight) of 7.8. An intense solitary focus of FDG uptake was seen in hypodense lesion in caudate lobe of liver [Figure 1c - arrow], which was presumed to be metastatic on the basis of imaging findings. It measured 16 mm in transverse dimensions with a max SUV of 8.2. Rest of the study was unremarkable, except for reactive mediastinal nodes. Subsequently, patient underwent induction chemotherapy for 6 weeks. Follow-up FDG PET/CT study after treatment completion showed complete regression of tracer concentration at primary site in tibia on MIP image [Figure 1b - arrow], as well as reduction in size of the soft tissue mass with post treatment healing changes in the fibula seen on axial CT images. Contrary to this, the focal hepatic lesion in caudate lobe of liver showed significant increase in size and metabolic activity [Figure 1b - arrow head]; measuring 31 mm, with max SUV of 14.6 on axial fused PET/CT images [Figure 1d - arrow]. This prompted a histological correlation and fine-needle aspiration (FNA) was done from the liver lesion. Microscopic examination showed collection of epitheloid cells on Papanicolaou Stain [Figure 2a - arrows and Figure 2b] with pale oval shaped cells showing slipper shaped nuclei [Figure 2b - inset]. These findings were confirmatory for tuberculous etiology. Patient was immediately started on antituberculosis treatment, and follow-up is awaited.

DISCUSSION

Hepatic tuberculosis is rare and constitutes 1% of all cases of tuberculosis.[1] In 70% patients, it is associated with disseminated

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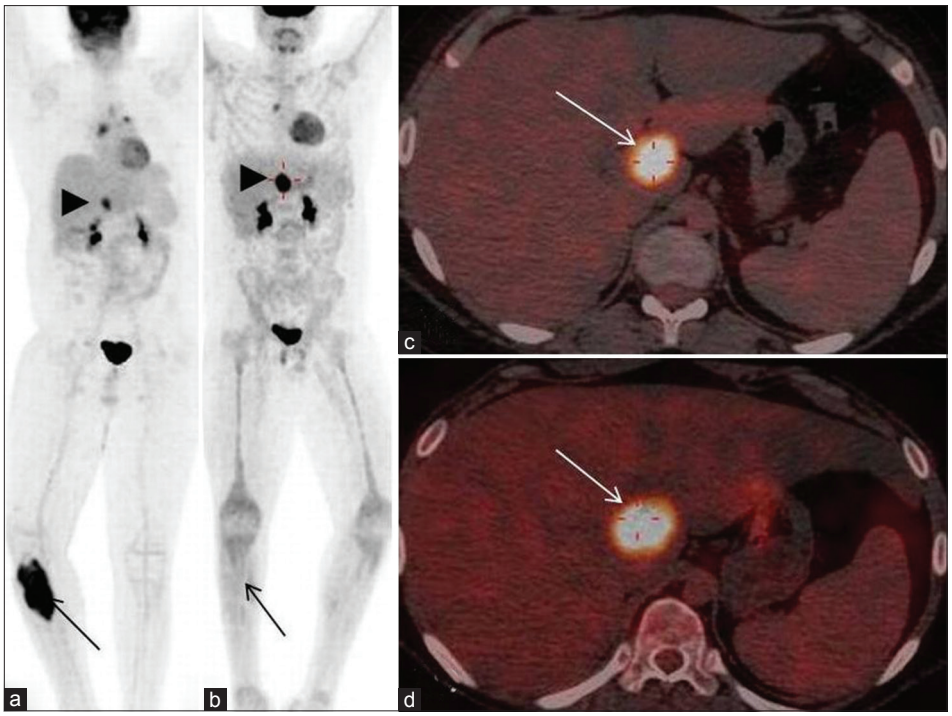

Figure 1: MIP image showing focal intense tracer uptake at the primary site in right tibia (a - arrow) with another focus of FDG uptake in liver (a - arrowhead), which was confirmed on axial fused PET/CT image (b - arrow). Post chemotherapy MIP image shows complete regression of FDG uptake in right tibia (c - arrow); however, there is increase in size and metabolic activity of FDG uptake in liver (d - arrow, compared with b)

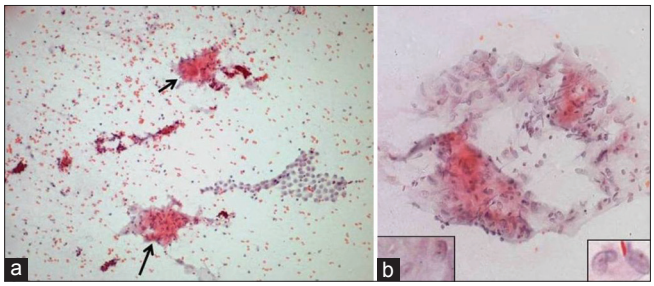

Figure 2: Photomicrographs (a: ×100, Papanicolaou Stain) show epithelioid cells (a - arrow), with pale elongated oval shaped cells (b - ×200, Papanicolaou Stain) showing slipper or sole of the foot shaped nuclei (b - inset)

miliary or pulmonary tuberculosis.[2] On morphologic imaging, it commonly appears as miliary tubercles, abscesses or as cholangitis.[3] Very rarely, multiple tuberculomas are seen;[4] however, there is no report which shows solitary focal hepatic tuberculosis. On FDG PET, there is intense tracer uptake in tuberculous lesions due to GLUT receptor expression on lymphocytes.[5] This forms the basis of multiple reports of tuberculosis mimicking malignancy on FDG PET;[6,7] majority of these in cases with FDG avid disseminated nodal disease, few with skeletal lesions, but none demonstrating focal solitary lesions. Report of hepatosplenic tuberculosis shows diffuse "hot" liver on FDG PET/CT.[8] Only a single report, similar to our case, shows hepatic tuberculosis in the setting of malignancy, seen as focal FDG uptake on PET/CT; but, the patient had past history of disseminated tuberculosis,[9] unlike our case where there was no past history or stigmata on examination to suggest old tuberculosis.

Considering the fact that liver is not the most common of metastatic sites for Ewing's family of tumors, an upfront histological confirmation should ideally be obtained if the imaging findings suggest an unusual pattern of disease spread. However, the focal nature of uptake and the intensity of metabolic activity, depicted by max SUV, which was identical for the primary site and metastatic lesion, tilted the odds more in favor of metastases. There were other factors which also were considered, like the focality of lesion which also favors metastatic disease. Delbeke *et al*., have shown that a focal pattern of FDG uptake in liver favors a metastatic etiology over infection.[10] Furthermore, the fact that such a lesion was seen in the setting of Ewing's sarcoma which also demonstrates high grade FDG avidity,[11] ruled it more in favor of metastases on baseline imaging.

Hence, an isolated focal hepatic FDG avid lesion, in a clinically unremarkable scenario like ours, is bound to pose a diagnostic dilemma. Post chemotherapy scan showed complete regression of primary lesion; however, the focal liver lesion showed metabolic and morphological progression. Treatment failure at the metastatic site with good response at primary site, indicated that the liver lesion was non-metastatic which was proven on FNA.

Thus, focal solitary liver lesion in an oncological setting, though FDG avid, should not be assumed to be metastatic particularly in tumors such as Ewing's sarcoma which do not have a high propensity for hepatic metastases at presentation. Clinically, occult focal tuberculosis of liver, which also shows similar uptake

pattern on FDG PET, though rare, should be kept at the back of the mind and a tissue diagnosis should be asked for before starting treatment.

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