Case Report

Incidental ^{18}F-Fluorodeoxyglucose Avid Cardiac Mass on Positron Emission Tomography-Computed Tomography in a Patient with Head-and-Neck Carcinoma: Metastasis or Something Else?

Abstract

High ^{18}F-Fluorodeoxyglucose (^{18}F-FDG) uptake in a cardiac mass is considered to be a marker of malignancy, but that is not always true. We here present such a case of incidentally detected ^{18}F-FDG cardiac mass on staging positron emission tomography-computed tomography in a woman with head-and-neck cancer, confirmed to be myxoma on contrast-enhanced magnetic resonance imaging and subsequent histopathology.

Keywords: *^{18}F-Fluorodeoxyglucose, cardiac mass, magnetic resonance imaging, myxoma, positron emission tomography-computed tomography*

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Introduction

Cardiac masses are often incidental findings on echocardiography or imaging performed for some other indication.[1] Most of these masses are thrombus or vegetation rather than the tumor.[2] However, in the case of tumors, metastasis is much more likely than primary cardiac tumors, especially in the elderly.[3] Imaging plays an important role in the characterization of the masses, with computed tomography (CT),[4] magnetic resonance imaging (MRI),[5] and PET,[6] all shown to be useful. While a high ^{18}F-Fluorodeoxyglucose (^{18}F-FDG) uptake in a cardiac mass is considered to be a harbinger of malignancy,[7] it is not always true.[8,9] We present such a case of incidentally detected an ^{18}F-FDG cardiac mass on staging positron emission tomography-CT (PET-CT) in a woman with head-and-neck cancer, confirmed to be something else on histopathology.

Case Report

A 76-year-old woman presented with an ulceroproliferative growth of the left lower alveolus. She had a history of addiction to oral tobacco. There was no other significant medical history, including any cardiac ailment. Biopsy from the growth showed Grade II squamous cell carcinoma. She underwent ^{18}F-FDG PET-CT for staging workup [Figure 1]. Maximum intensity projection PET images (a) showed focal ^{18}F-FDG uptake in the left alveolar region (*broken arrow*). Furthermore, noted was another patchy area of ^{18}F-FDG uptake in the cardiac region (*arrow*). Transaxial PET-CT image (b) showed the primary left lower alveolar and retromolar trigone lesion (*arrow*) with bony erosion (maximum standardized uptake value [SUVmax] 6.3). Interestingly, two lesions were seen in the left atrium (c-f). The larger one (*arrow*) measured about 41 mm × 35 mm in size, with poor enhancement, focal internal calcifications, and intense ^{18}F-FDG uptake (SUVmax 9.1). Another lesion (*bold arrow*) was smaller and elongated, showed no significant enhancement or ^{18}F-FDG uptake. Differentials of atrial myxoma versus tumor thrombus were given for the ^{18}F-FDG avid left atrial lesion, while the non-^{18}F-FDG avid lesion was reported as bland thrombus. Transthoracic echocardiography was performed but was noncontributory. Contrast-enhanced cardiac MRI was further performed for characterization [Figure 2]. The ^{18}F-FDG avid lesion (*arrow*) was hypointense on T1-weighted images (a), hyperintense on T2-weighted images (b and c), with heterogeneous

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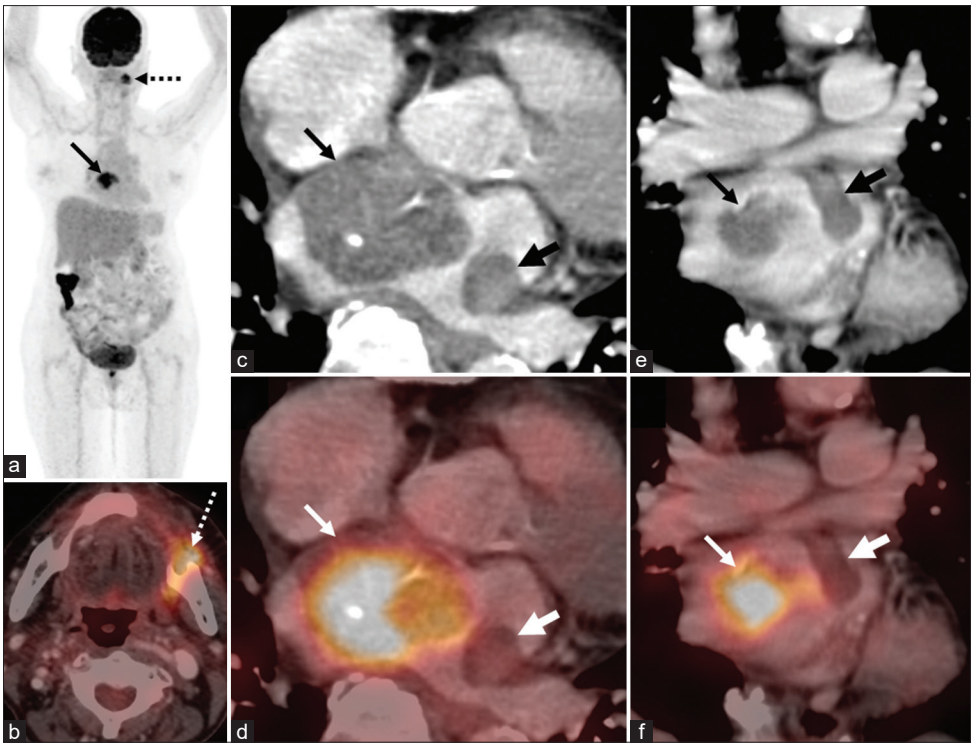

Figure 1: Maximum intensity projection PET images (a) showing focal ^{18}F-FDG uptake in the left alveolar region (*broken arrow*) with another patchy ^{18}F-FDG uptake in the cardiac region (*arrow*). Transaxial PET-CT image (b) showing primary left lower alveolar and retromolar trigone lesion (*arrow*) with bony erosion. On transaxial (c and d) and coronal (e and f) contrast-enhanced CT and fused PET-CT images, two lesions are also seen in the left atrium. The larger one (*arrow*) measuring about 41 mm × 35 mm in size, with poor enhancement, focal internal calcifications, and intense ^{18}F-FDG uptake, raising differentials of atrial myxoma versus tumor thrombus, while the other lesion (*bold arrow*) is smaller and elongated, showing no significant enhancement or ^{18}F-FDG uptake, suggestive of bland thrombus. ^{18}F-FDG: ^{18}F-fluorodeoxyglucose, PET-CT: Positron emission tomography-computed tomography

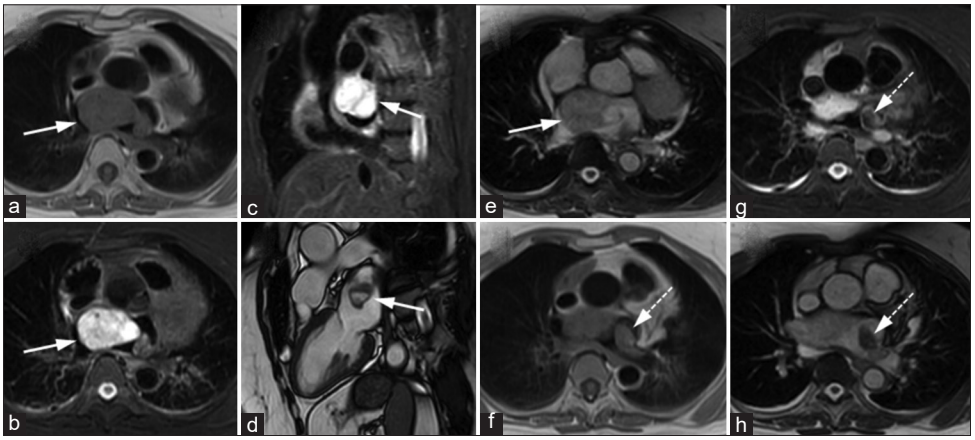

Figure 2: The larger left atrial mass (*arrow*) is hypointense on transaxial T1-weighted images (a), hyperintense on transaxial (b) and sagittal (c) T2-weighted images, with heterogeneous enhancement on coronal gadolinium-enhanced images (c) and is hyperintense relative to myocardium but hypointense relative to the blood pool in transaxial gradient-echo sequences (d). These findings suggest a diagnosis of atrial myxoma. The other left atrial lesion (*broken arrow*) is hypointense on both transaxial T1-weighted (f) and transaxial T2-weighted (g) images, with no significant gadolinium contrast enhancement (h), suggesting a chronic organized thrombus

enhancement on gadolinium-enhanced images (c), and was hyperintense relative to myocardium but hypointense relative to the blood pool in gradient-echo sequences (d). These findings suggested a diagnosis of atrial myxoma. The other non-^{18}F-FDG avid left atrial lesion (*broken arrow*) was hypointense on both T1-weighted (f) and T2-weighted (g) images, with no significant gadolinium contrast enhancement (h), suggesting a chronic organized thrombus. There was no other nodal or distant metastasis. However, as the larger tumor was intensely ^{18}F-FDG avid, a transcatheter biopsy was performed before starting curative-intent treatment for malignancy. The biopsy confirmed the diagnosis of myxoma. The patient then underwent concurrent chemoradiotherapy for head-and-neck malignancy. The myxoma was observed, with plans for surgery later, if feasible.

Discussion

^{18}F-FDG PET-CT is now an integral part of the management of many cancers. However, given the nonspecific nature of ^{18}F-FDG, some nonmalignant lesions can lead to false-positive findings.[7] In the present case, PET-CT performed for staging, showed an ^{18}F-FDG avid and another non-^{18}F-FDG mass in the left atrium. MRI has been done for further characterization and classified the ^{18}F-FDG avid mass as myxoma and the non-^{18}F-FDG lesion as chronic organizing thrombus. Diagnosis of myxoma was confirmed with biopsy.

Myxomas are the most common benign cardiac tumors, mostly manifesting in adulthood.[10] Most of them are sporadic, with about 7% associated with genetic syndromes such as the Carney complex.[11] While classical triad of symptoms such as obstruction to blood flow, embolic events, and fever/weight loss is seen in some, many remain asymptomatic. These are usually solitary and located in the atrium, most commonly left atrium.[12] On histopathology, myxomas present a heterogeneous appearance with cystic areas of polysaccharide-rich myxoid substance, hemorrhage and hemosiderin, fibrosis, and calcification. On PET-CT imaging, cardiac myxoma can show variable ^{18}F-FDG uptake.[9,13,14] Therefore, making a diagnosis just on basis of ^{18}F-FDG uptake could be fallacious. Contrast-enhanced MRI can be very helpful in such circumstances, as in the present case.[5] Surgery remains the treatment of choice and is curative. However, in the present case given the lack of symptoms, advanced age, and associated malignancy, observation was considered prudent.

In conclusion, cardiac myxoma can present as intensely ^{18}F-FDG avid mass on oncological PET-CT, and should not be labeled as metastasis. Contrast-enhanced MRI is useful for better characterization of such masses, supplemented with biopsy if indicated.

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 initial s will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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