

Detection of a primary tumor in the area of the renal artery with ^{18}F -FDG PET/CT in a patient with metastatic undifferentiated sarcoma and a history of mid-aortic syndrome

A case report

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Abstract

Background: We present a case of a 57-year-old woman patient with a history of mid-aortic syndrome, treated with several vascular procedures, who was referred for investigation of metastatic disease of an undifferentiated sarcoma of unknown origin.

Methods: Positron emission tomography/computed tomography (PET/CT) demonstrated multiple fluorodeoxyglucose (^{18}F -FDG) avid lung, liver, and osseous metastases as well as a focus of increased ^{18}F -FDG uptake in the area of the stented left renal artery.

Result: Histologic evaluation of soft tissue from the region of the left renal artery revealed atypical spindle cells, consistent with an intimal sarcoma, and with histopathological characteristics identical to those of lung metastases, indicating the ^{18}F -FDG avid lesion in the area of the renal artery as the origin of the metastatic disease.

Conclusion: This case highlights the capacity of ^{18}F -FDG PET/CT to detect primary tumors even of small size and in unusual localisations. Moreover, it provides further indications regarding the potential association between foreign body reaction on the basis of chronic inflammation and sarcoma development.

Abbreviations: ^{18}F -FDG = fluorodeoxyglucose, PET/CT = positron emission tomography/computed tomography.

Keywords: ^{18}F -FDG PET/CT, Cancer of unknown primary, Foreign body reaction, Intimal sarcoma, Mid-aortic syndrome

1. Introduction

Intimal sarcomas are very rare malignant mesenchymal tumors arising in large arterial blood vessels with a poor prognosis.^[1] The association between intimal sarcoma development and chronic foreign body reaction due to vascular prosthesis has been described.^[2,3] Fluorodeoxyglucose (^{18}F -FDG) positron emission tomography/computed tomography (PET/CT) is an imaging modality with high negative predictive value and specificity in detecting adult soft tissue sarcoma.^[4] However, few reports have indicated the capacity of ^{18}F -FDG PET/CT to detect intimal sarcoma in different sites.^[5,6,7] Herein, we present a case of an

intimal sarcoma arising in the site of a multiple stented renal artery detected with ^{18}F -FDG PET/CT.

2. Case presentation

A 57-year-old woman patient with a history of mid-aortic syndrome, treated with several vascular procedures of the aorta and the renal arteries underwent chest computed tomography (CT) due to dyspnea. CT revealed several pulmonary nodules in both lungs. Histologic evaluation of a lung lesion, excised for diagnostic purposes, showed atypical spindle cells, consistent with metastases of an undifferentiated sarcoma of unknown origin. The patient was then referred to our department for ^{18}F -FDG PET/CT for further investigation. ^{18}F -FDG PET/CT demonstrated increased tracer uptake in the lung metastases as well as several ^{18}F -FDG avid lesions in the liver and the pelvis skeleton compatible with multisystemic involvement of the metastatic disease. No evidence of a definite primary tumor was demonstrated with the exception of a focus of increased ^{18}F -FDG uptake in the area of the stented left renal artery, higher than expected in a usual foreign body reaction due to vascular prosthesis (Fig. 1). Histopathological evaluation of soft tissue from the left renal artery revealed a perivascular area with atypical spindle cells consistent with an intimal sarcoma, and with histopathological characteristics identical to those of the lung metastasis, indicating the ^{18}F -FDG avid lesion in the area of the stented renal artery as the origin of the metastatic disease (Fig. 2).

The patient written informed consent was waived due to the retrospective nature of the presented case. Patient information was anonymized and deidentified.

Editor: Saad Zakko.

The authors report no conflicts of interest.

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Medicine (2016) 95:34(e4622)

Received: 7 July 2016 / Received in final form: 25 July 2016 / Accepted: 27 July 2016

<http://dx.doi.org/10.1097/MD.0000000000004622>

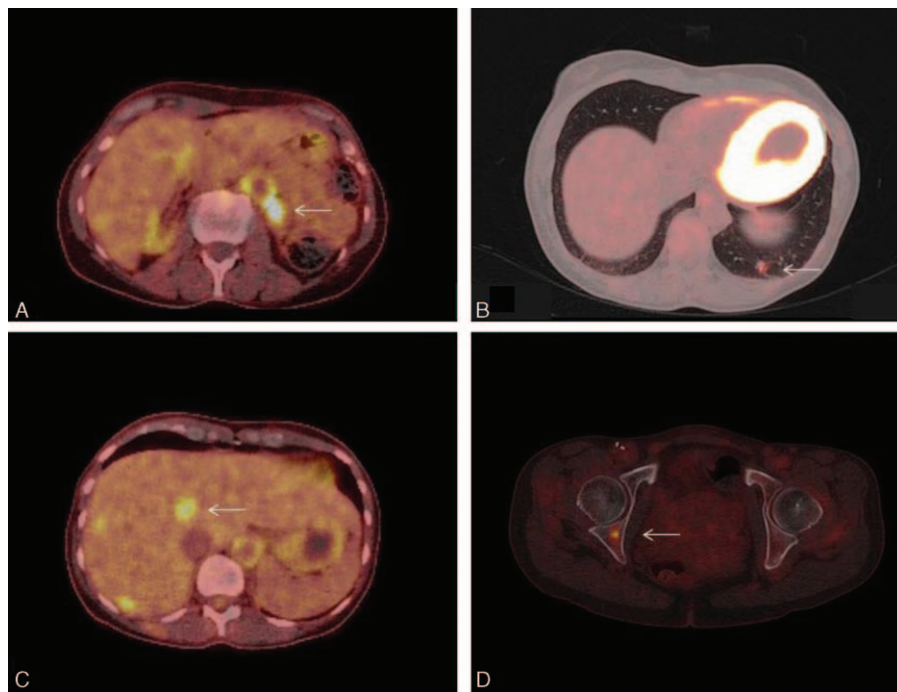


Figure 1. Transaxial ^{18}F -FDG PET/CT at the level of the abdominal aorta branching in the left renal artery (A), the lungs (B), the liver (C), and the pelvis (D). Focally increased ^{18}F -FDG uptake in the region of the stented left renal artery (arrow), with higher ^{18}F -FDG accumulation than expected in a usual foreign body reaction, proved to be an intimal sarcoma. Physiological, diffuse tracer uptake in the abdominal aortic graft, compatible with foreign-body reaction due to aortic graft replacement 1 year ago on the ground of mid-aortic syndrome (A). ^{18}F -FDG positive lung metastasis in the left lower lobe (arrow) (B). Multiple ^{18}F -FDG avid metastases in the liver (arrow) (C). Focal ^{18}F -FDG accumulation in an osseous metastasis in the right post acetabulum (arrow) (D). ^{18}F -FDG = fluorodeoxyglucose, PET/CT = positron emission tomography/computed tomography.

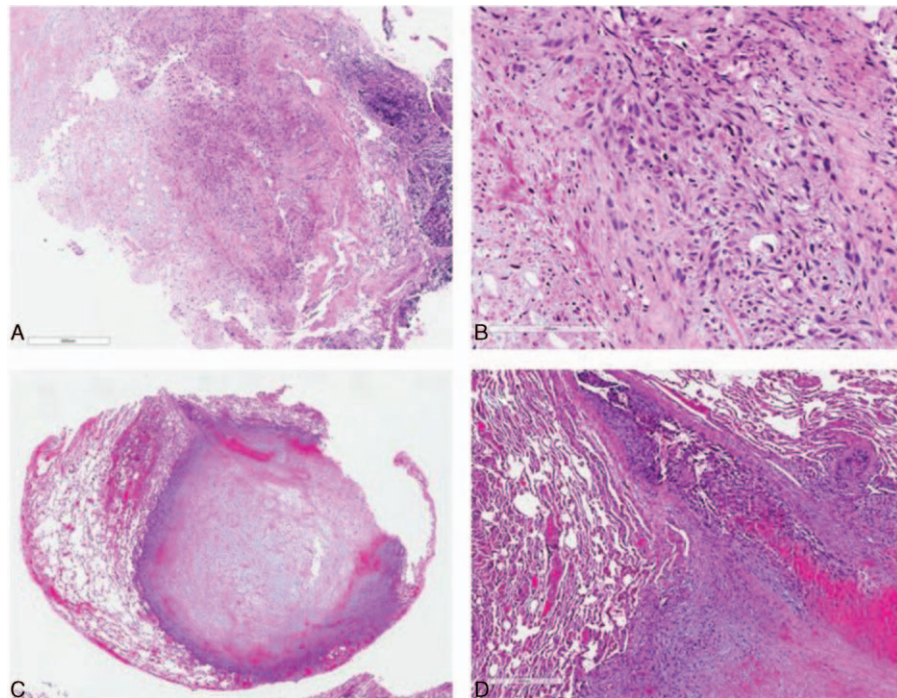


Figure 2. Histologic image of the tissue in the area of the left renal artery stained with hematoxylin and eosin (HE stain), showing an infiltration of atypical spindle cells around a vessel-like structure (A). (B) Magnification of the atypical spindle cells. Histologic image of the lung wedge resection (HE stain) with a centrally necrotic metastasis of a sarcoma without evidence of a specific lineage differentiation (C). (D) Magnification of the metastasis. Note the intravascular tumor manifestation where the metastasis evades from.

3. Discussion

Intimal sarcomas are very rare, malignant mesenchymal tumors of large arterial blood vessels with an often unspecific clinical presentation and a poor prognosis.^[1] Intimal sarcomas have been reported to arise in association with vascular prostheses suggesting a tumor inducing effect of foreign material on the endothelium.^[2,3] In this case report the development of an intimal sarcoma in a multiple stented renal artery due to mid-aortic syndrome is presented. To our knowledge, no case from intimal sarcoma in the area of the renal artery with a history of stenting has been described using ¹⁸F-FDG PET/CT. Although a direct causal relation cannot be proven, this case provides further indications regarding the potential association between sarcoma development and chronic foreign body reaction due to vascular prosthesis.

Vascular prostheses show physiologically increased ¹⁸F-FDG uptake in the graft material, even years after surgery without having a graft infection, most likely on the basis of a chronic inflammation proven to take place on the surface of such material.^[8,9] This knowledge could erroneously lead us to the assumption that the increased tracer uptake in the area of the stented renal artery is a foreign-body reaction manifestation. Therefore, caution is suggested in the interpretation of foreign body reaction in ¹⁸F-FDG PET in patients with cancer of

unknown primary origin and a history of repeated vascular prostheses.

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