Clin Physiol Funct Imaging (2009) **29,** pp382–384 doi: 10.1111/j.1475-097X.2009.00881.x

CASE REPORT

Giant cell arteritis on 18F-FDG PET/CT

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Accepted for publication
Received 15 August 2008; accepted 15 May 2009

Key words
fluorodeoxyglucose; giant cell arteritis; positron emission tomography/CT; renal transitional cell carcinoma; vasculitis

Summary

Purpose: We present a case of incidentally noted giant cell arteritis in a patient undergoing 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT imaging. The patient was originally referred to PET/CT for staging of his renal transitional cell carcinoma.

Methods: The patient was injected intravenously with 370 MBq of 18F-FDG. After a 60 min uptake period, PET/CT imaging was performed from the skull base to the mid thighs.

Results: A small para-aortic node in the region of the surgical bed showed increased tracer uptake of concern for malignancy. In addition, there were several non-calcified pulmonary nodules present, also concerning for malignancy. Incidentally noted was diffusely increased tracer uptake throughout the aorta and a thickened aortic wall on CT images. Diffuse tracer uptake was also present in the proximal branches of the aorta, including the carotid, iliac, femoral, and subclavian arteries. The patient had biopsy proven giant cell arteritis.

Conclusion: Increased 18F-FDG uptake by the aorta on PET/CT imaging is an abnormal finding that prompts a more thorough assessment for malignancy, and also can indentify important co-morbidities in cancer patients. Evaluation of aortic uptake should be a routine practice in the interpretation of 18F-FDG PET/CT scans.

Introduction

Cancer patients are living longer than ever before due to the significant advances in early detection, surgery, and chemoradiation therapies. This longevity makes it more likely that patients will ultimately die from an unrelated disease. Since a significant percentage of cancer patients undergo 18F-fluorodeoxyglucose (FDG) PET/CT imaging as part of their oncologic workup and ongoing monitoring, it is important to look for significant co-morbidities when interpreting PET/CT images. Focusing exclusively on the identification of malignancy creates a missed opportunity to identify important, treatable co-morbidities that can prolong and improve life.

Methods and results

A 71-year-old gentleman with a history of transitional cell carcinoma was referred to 18F-FDG PET/CT imaging for restaging. The tumor was in the lower pole his left kidney and was treated with nephrectomy. The patient was being treated with a tapering dose of prednisone for his biopsy proven giant cell arteritis, which at the time of the scan was 5 mg PO daily. The patient had not undergone any recent blood work to assess inflammatory markers. In addition, he had biopsy proven high-grade urothelial carcinoma arising in association with *in situ* high-grade papillary urothelial carcinoma.

Approximately 1 h after the intravenous injection of 370 MBq of 18F-FDG, the patient was imaged from the base of the skull to the mid thighs (GE Discovery LS 4-slice PET/CT). PET resolution was approximately 8 mm. CT was used for attenuation correction and anatomic fusion.

The images show a para-aortic lymph node in the region of the surgical bed which has increased uptake of the tracer. In addition, non-calcified pulmonary nodules were present that were of concern for malignancy.

There was notably increased tracer uptake by the aorta which was seen both on the coronal (Fig. 1) and sagittal (Fig. 2) views. In addition the patient had thickening of the aortic wall on CT (Fig. 3). These findings supported the patient's known diagnosis of giant cell arteritis. The PET/CT scan findings are important because it lets the clinician know that the giant cell arteritis involves the thoracic aorta.

Discussion

Giant cell arteritis is a common form of vasculitis that typically affects the cranial blood vessels but also can affect the aorta, leading to severe problems if left untreated. The prevalence in

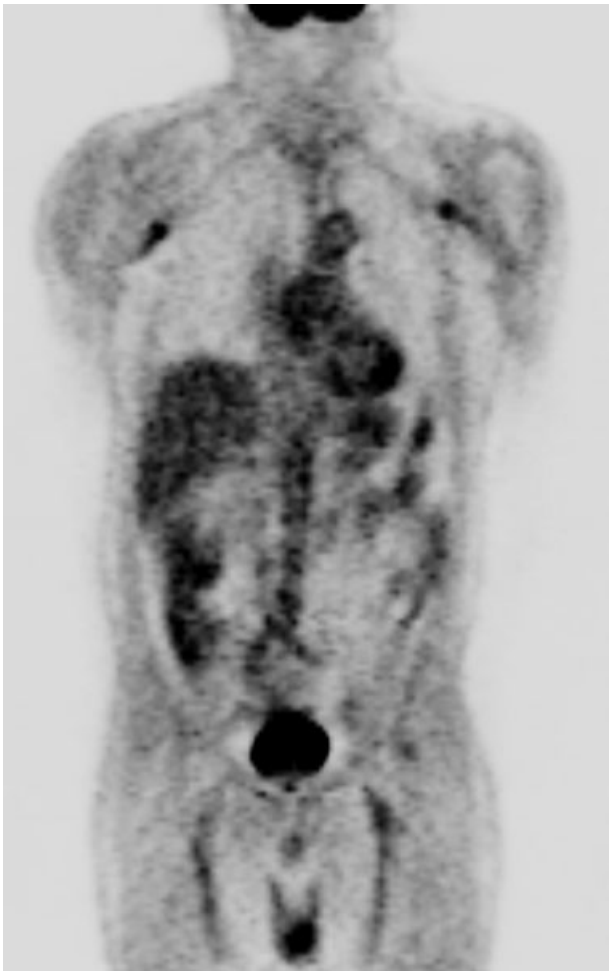

Figure 1 Coronal 18F-FDG PET images show prominent uptake of the tracer by the thoracic and abdominal aorta.

Figure 2 Sagittal views show a cross-sectional image of the thoracic aorta, which displays increased 18F-FDG uptake by the walls.

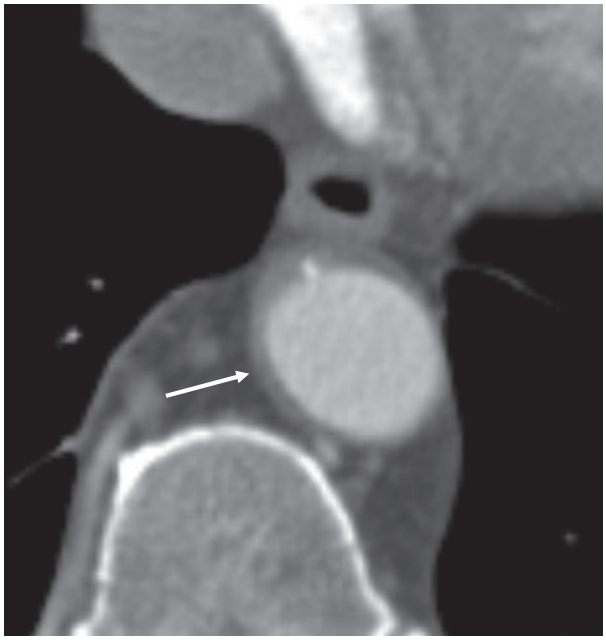

Figure 3 Axial CT shows thickening of the aortic wall in a patient with giant cell arteritis.

developed countries is estimated at 200 cases per 100 000 people over the age of 50-years-old. Latitude appears to be an important risk factor, with the prevalence in Sweden twice that of Spain or Italy.

The most common initial symptom is headache, followed by polymyalgia rheumatica, fever, visual complaints, and fatigue. Patients with giant cell arteritis are approximately 17 times more likely to develop thoracic aortic aneurysms or thoracic aortic dissection compared to the general population (Evans, 2000).

Because of its high complication rate, yet responsiveness to therapy with corticosteroids, a high clinical suspicion and aggressive workup is recommended. Some authorities recommend that PET imaging should be considered when working up patients with suspected giant cell arteritis because final histopathological confirmation of large vessel involvement is difficult (Janssen, 2008).

A recent study found that comparing the standardized uptake value (SUVmax) of the aorta with the SUVmax of the liver was helpful in the diagnosis of gaint cell arteritis (GCA). When the SUVmax(aorta) divided by the SUVmax(liver) was greater than 1, FDG PET had a sensitivity of 89%, and a specificity of 95% for the diagnosis of GCA (Hautzel, 2008).

Renal carcinoma has been shown to be associated with vasculitis as a paraneoplastic syndrome, which can resolve after excision of the tumor (Trassierra Villa, 2007). Renal cell carcinoma also appears to be increased in patients with Wegener's granulomatosis, although the incidence is still low (Trassierra Villa, 2007; Tatsis, 1999). The mechanism for this association is unclear, however, it is postulated that the

malignancy acts in some cases as a trigger for the development of vasculitis.

This association between vasculitis and malignancy should alert the interpreting physician to look for a possibly underlying malignancy when observing diffuse vascular uptake of F-18 FDG on PET imaging.

The role of imaging in patients with large vessel vasculitis is unsettled, however, it appears that an advantage of FDG PET imaging is in the assessment of large thoracic vessels and the risk for subsequent aortic complications (Blockmans, 2009).

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