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CASE REPORT

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Usefulness of dynamic fluorodeoxyglucose positron emission tomography/computed tomography in diagnosing pulmonary arteriovenous malformation mimicking a lung tumour

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Abstract

A 61-year-old male patient with known kidney dysfunction who underwent a non-contrast thorax CT and was then referred to our department for metabolic assessment of solitary pulmonary nodule (SPN). The patient underwent dynamic FDG PET/CT to differentiate benign from malignant SPN. This case illustrates the usefulness of dynamic FDG PET/CT imaging when assessing SPN especially in patients with suspicion for pulmonary arterio-venous malformation accompanying renal failure or contrast allergy.

Keywords: FDG PET/CT • Solitary pulmonary nodule • Pulmonary arterio-venous malformation

INTRODUCTION

Pulmonary arterio-venous malformations (PAVMs) are rare pulmonary vascular anomalies that connect a pulmonary artery to a pulmonary vein bypassing the normal pulmonary capillary bed and causing an intrapulmonary right-to-left shunt [1]. Despite most patients being asymptomatic, some patients may show symptoms such as cough, chest pain, palpitation, epistaxis, haemoptysis and difficulty breathing. Herein, we present the imaging characteristics of PAVM with dynamic FDG PET/CT.

CASE REPORT

A 61-year-old male patient with known kidney dysfunction (blood urea nitrogen level, 52 mg/dl; creatinine level, 3.2 mg/dl) was admitted to the hospital with complaints of dry cough and chest pain for 2 months. Non-contrast thorax CT was performed and revealed a solitary pulmonary nodule (SPN) of ∼3 cm in diameter in the right middle lobe. Further evaluation was performed using static and dynamic F-18 FDG PET/CT scans to differentiate benign from malignant SPN. When F-18 FDG was intravenously administered, and then, dynamic images were immediately acquired to evaluate the perfusion status of solitary pulmonary nodule for 30 min in a 3D mode in 10 frames of 180 s. After the dynamic studies, static FDG PET/CT (not shown) was performed 60 min after FDG injection. It revealed solitary nodule measuring 3 cm in diameter with mild FDG uptake (SUVmax: 1.8) in the right middle lobe and biopsy was needed for the diagnosis of SPN. However, based on the dynamic FDG PET/CT findings of SPN (Figs 1 and 2), the possibility of pulmonary vascular anomalies was considered and the patient underwent pulmonary angiography with pre- and post-procedural hydration. It revealed afferent and efferent vessels with high contrast accumulation consistent with PAVM (not shown). The patient underwent elective thoracotomy and right middle lobe lobectomy. The histopathological findings also confirmed the diagnosis of PAVM. Owing to dynamic FDG PET/CT findings of SPN, the biopsy of SPN was not recommended and possible complication of PAVM such as bleeding was avoided.

DISCUSSION

PAVMs are commonly multiple and vary in their number, distribution, and size. More than 80% of PAVMs are congenital, and of these, 47%–80% are associated with Osler, Rendu and Weber disease or hereditary haemorrhagic telangiectasia. Chest radiography and contrast-enhanced computed tomography are essential initial diagnostic tools but pulmonary angiography is the gold standard. The characteristic presentation of PAVMs on non-contrast CT is a homogeneous, well-circumscribed, non-calcified nodule up to several centimetres in diameter or the presence of a serpiginous mass connected with blood vessels. Contrast injection shows enhancement of the feeding artery, the aneurysmal part, and the draining vein on early phase sequences [1]. A recent study reported that dynamic F-18 FDG PET imaging is valuable in differentiating benign from malignant SPNs [2]. In another study

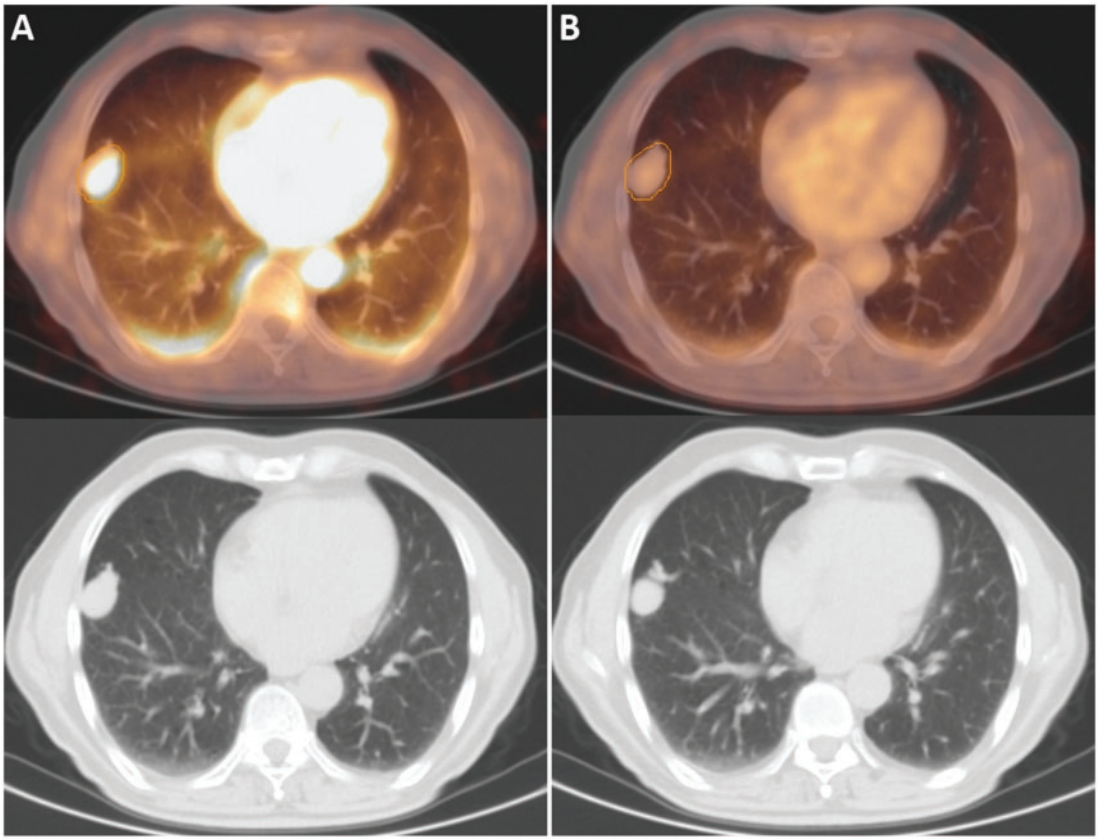

Figure 1: Axial fused PET/CT and CT images of the early dynamic FDG fluorodeoxyglucose positron emission tomography/computerized tomography (PET/CT) scan (**A**) showed increased FDG uptake (maximum standardized uptake value (SUVmax): 4.6) in a well-circumscribed right middle lobe nodule connected with blood vessels. Subsequent axial fused PET/CT and CT images of the late dynamic FDG PET/CT scan (**B**) demonstrated FDG washout (SUVmax: 2.2) in areas of solitary pulmonary nodule.

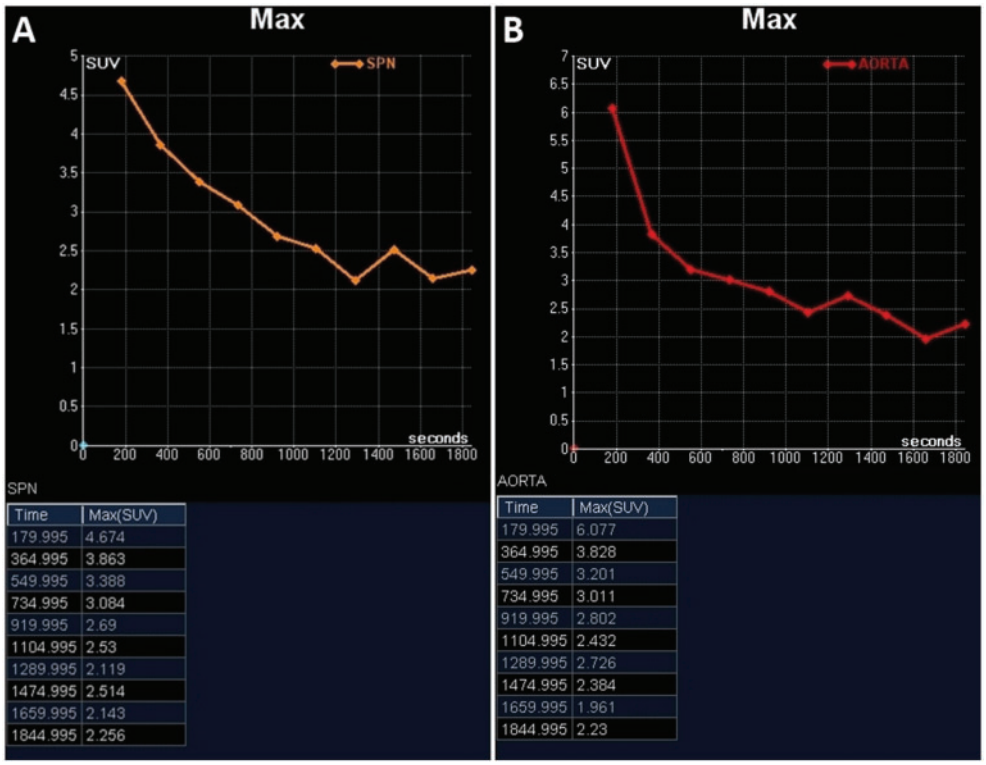

Figure 2: The slopes of the time–activity curve of the nodule (**A**) and aorta (**B**) were determined and pulmonary nodule had time–activity curve slope similar to aorta. The time–activity curve pattern of solitary pulmonary nodule indicates that the nodule is most likely associated with vascular anomaly.

reported that dynamic F-18 FDG PET can be applied for angiography with data reconstructed in time-based frames for direct visualization of arterial vessels [3]. However, 1 case report demonstrated that the usual static FDG PET/CT did not lead to a definitive diagnosis of a PAVM in patient with SPN [4]. Most patients should be treated, except for asymptomatic patients with small PAVMs and without evidence of hereditary hemorrhagic telangiectasia. Treatment options are angiographic embolization with metal coil, balloon occlusion and surgical excision [1]. Our patient underwent elective thoracotomy and right middle lobe lobectomy. In conclusion, our hypothesis is that the dynamic FDG PET/CT could play an important role in the diagnosis of pulmonary vascular anomalies especially in patients with SPN accompanying renal failure or contrast allergy. To our knowledge, this is the first case in the literature reporting dynamic FDG PET/CT findings of PAVM.

CONSENT

Informed consent has been obtained from the patient for publication of the case report and accompanying images.

Conflict of interest: none declared.

Reviewer information

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