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## Case Report

# FDG avid solitary pulmonary nodule mimicking lung cancer<sup>☆</sup>

Alaa Khalid Alduraibi, MBBS

Department of radiology, Collage of medicine, Qassim university, Buraidah, Saudi Arabia

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### ABSTRACT

A healthy 49-year-old nonsmoker lady, who was found to have an incidental finding of a lung lesion on a chest X-ray. A Chest CT scan was performed and revealed left upper lobe, 1.5 cm solitary nodule with ground glass borders that highly suspicious for Bronchioloalveolar carcinoma and warranted further investigation to rule out malignancy. The FDG PET and/or CT scan was performed for staging and further evaluation and it displayed avidity of the nodule with a standardized uptake value (SUV) of 6.2, no abnormal uptake elsewhere in the body. CT guided biopsy was arranged and the histopathology result revealed eosinophilic pneumonia.

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## Introduction

A solitary pulmonary nodule (SPN) is defined as a focal round or oval lung lesion with a diameter lesser than 3 cm, which is completely surrounded by lung tissue that is not associated with lymph node enlargement, atelectasis, or pneumonia [1]. Fluorine-18 (<sup>18</sup>F) fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET) has been increasingly used to differentiate between benign, and malignant pulmonary nodules. The images are interpreted both qualitatively and semi-quantitatively based on a standardized uptake value (SUV) indicating relative FDG uptake.

In addition to visual image interpretation, semiquantitative analysis using SUVs is performed to improve diagnostic accuracy. Mostly, an SUV threshold of 2.5 is applied to differentiate between benign, and malignant lesions.

## Case report

In this case, an incidental finding of a lung lesion was detected on a routine chest X-ray of a non-smoker healthy 49-year-old woman. No associated symptoms were noted, and physical examination results were unremarkable. A chest

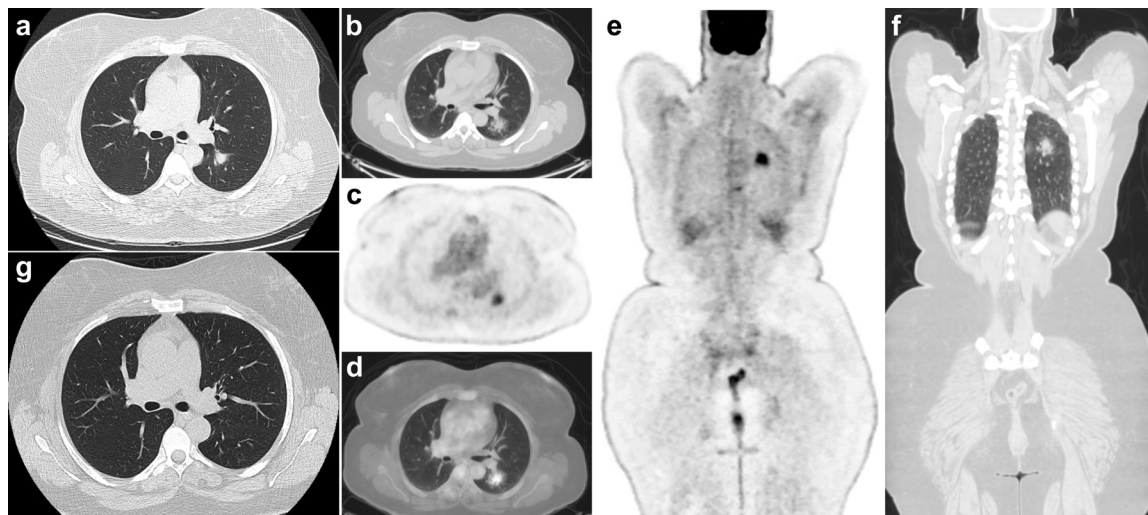
Abbreviations: SPN, Solitary pulmonary nodule; FDG-PET, fluoro-2-deoxy-D-glucose positron emission tomography; SUV, Standardized uptake value.

<sup>☆</sup> Competing Interests: Dr Alaa Khalid Alderaibi declare that they have no conflict of interest.

E-mail address: [al.alderaibi@qu.edu.sa](mailto:al.alderaibi@qu.edu.sa)

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**Fig. 1 – (A)** CT chest transaxial view show a 1.5-cm solitary nodule with ground glass borders in the left upper lobe within the superior segment of the left lower abdomen abutting the major fissure, **(B-F)** FDG PET/CT scan trans-axial CT (**Figs. 1B**), trans-axial PET (**Figs. 1C**), axial fused (**Figs. 1D**), coronal PET (**Figs. 1E**), and coronal CT (**Figs. 1F**) show an FDG-avid nodule with an SUV of 6.2. **(G)** 6 month later CT chest trans-axial view show which showed a complete resolution of the lesion.

computed tomography (CT) scan (CT chest transaxial view [Fig. 1A]) was performed, which revealed a 1.5-cm solitary nodule (Hounsfield unit measurement was 34.6) with ground glass borders in the left upper lobe within the superior segment of the left lower abdomen abutting the major fissure. Imaging features are highly concerning for malignancy, which warrants further evaluation. The FDG PET and/or CT scan (trans-axial CT [Fig. 1B], trans-axial PET [Fig. 1C], axial fused [Fig. 1D], coronal PET [Fig. 1E], and coronal CT [Fig. 1F]) was performed for staging and further evaluation, and it revealed an FDG-avid nodule with an SUV of 6.2, no other abnormal uptake was observed elsewhere in the body. CT guided biopsy was arranged and the histopathology result revealed eosinophilic pneumonia. The patient was treated with steroids as per the recommendations. After 6 months, a follow-up chest CT scan of the trans-axial view (Fig. 1G) was performed, which showed a complete resolution of the lesion.

## Discussion

<sup>18</sup>F-FDG PET and/or CT has been used as a routine method for assessing tumors [4–6]. Compared to conventional imaging, PET and/or CT can not only display the morphologic features of the lesion, but also provide molecular-level information on the lesion glucose metabolism. The value of <sup>18</sup>F-FDG PET and/or CT in the diagnosis of SPN has been widely recognized, with sensitivity and specificity of 82%–96.8% and 71%–77.8%, respectively [7–9].

The images are interpreted both qualitatively and semi-quantitatively based on an SUV indicating the relative FDG uptake to improve diagnostic accuracy [2]. Mostly, an SUV threshold of 2.5 is applied to differentiate between benign and

malignant lesions [10]. Although glucose utilization by malignant tissues is generally higher, resulting in higher FDG uptake than in benign tissues [11], false-positive results can occur with infection or inflammation [12–14]. There have been multiple reports of benign thoracic conditions demonstrating hypermetabolism on F18-FDG PET, including granulomatous infections, benign tumors, autoimmune diseases, and organizing pneumonia [3,15,16]. The results of the PET study are reported as a probability rather than as positive or negative for malignancy [17]. In addition, we estimated the individual patient risk for malignancy by considering the respective pre-test probability, and the SUV in the particular SPN as measured by FDG PET. FDG PET facilitates high negative predictive values in cases with low SUV and high positive predictive values in cases exhibiting high SUV [10].

Simple pulmonary eosinophilia is an acute pulmonary eosinophilia in which the patients are typically asymptomatic and do not need any treatment since this condition resolves spontaneously within 1 month. In most cases, we frequently encounter the incidental detection of simple pulmonary eosinophilia during the metastasis work-ups of patients with cancer, and during cancer screenings for healthy patients [18]. The clinical significance of the detection of pulmonary eosinophilia lies in the distinction from malignancies such as bronchioloalveolar carcinoma or well-differentiated adenocarcinoma and metastasis.

The CT appearance of pulmonary eosinophilia consists of ground-glass opacity halos. Pulmonary nodules with ground-glass opacity halos can also be frequently seen in patients with bronchioloalveolar carcinoma and well-differentiated adenocarcinoma [19,20]. These 2 different conditions show similar findings on both CT and FDG-PET. Therefore, correlation of the PET findings with the CT findings or with the peripheral eosinophil counts could help physicians arrive at the correct diagnosis of simple pulmonary eosinophilia.

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## Conclusion

The FDG-PET is a useful study for characterizing the nature of indeterminate pulmonary lesions, although the specificity was not high there for reporting the results of the PET study as a probability rather than as positive or negative for malignancy would be more useful for further management decision making [17].

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## Patient consent statement

Consent to publish this case series was not obtained, as our Office of This work does not convey any personal information that would lead to the identification of the patients.

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## Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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## Patient consent

The author certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has and/or have given his and/or her and/or their consent for his and/or her and/or their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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