

## Diagnosis to lung cancer after positive FDG PET scan: Pulmonary aspergilloma

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### Abstract

Early diagnosis and treatment of lung cancer, one of the leading causes of cancer-related death, is important to improve morbidity and mortality. Therefore, any suspect solitary pulmonary nodule should prompt the pursuit for a definitive histological diagnosis. We describe the case of a 55-years-old male ex-smoker, who was admitted to our hospital due to recurrent hemoptysis and dry cough. A CT scan showed an irregular nodule of increasing size (28 mm in diameter) in the left lower lobe (LLL). A whole-body PET-CT scan was performed and confirmed an avid FDG uptake of the nodule in the LLL, highly suspicious of lung cancer, without any evidence of lymphogenic or hematogenic metastasis. Bronchoscopy was not diagnostic and due to severe adhesions after prior chest trauma and the central location of the nodule, a lobectomy of the LLL was performed. Surprisingly, histology showed a simple aspergilloma located in a circumscribed bronchiectasis with no evidence of malignancy. This is a report of an informative example of an aspergilloma, which presented with symptoms and radiological features of malignant lung cancer. Lung cancer is one of the leading causes of cancer-related death for men and women in industrialized countries. Early diagnosis and treatment are crucial to improve morbidity and mortality. Positron emission tomography (PET) is a quantitative molecular imaging technique that has significantly improved diagnosis, staging and evaluation of treatment options for lung cancer patients. Its sensitivity to detect pulmonary malignancies is about 96%. Nevertheless, a variety of non-malignant, mainly granulomatous, infectious, and inflammatory conditions can also lead to an increased fluorodeoxyglucose (FDG) uptake and may thus mimic lung cancer. Therefore, the reported specificity of FDG PET is markedly lower, around 78%, than its sensitivity. Thus, with the growing and more widespread usage of FDG PET scans, an increasing number of less common, non-malignant, but nevertheless PET positive findings, are getting detected. Here we describe the case of a PET positive, irregular pulmonary nodule turning out to be an aspergilloma. The patient was then admitted to our hospital due to another episode of recurrent hemoptysis and dry cough following an acute lower respiratory tract infection one month before admission. Additionally, he now reported of occasional chest pain for two months. Shortness of breath, fever, night sweats, or weight loss was not present. The recent CT scan showed an irregular nodule of increasing size in the LLL without signs of mediastinal or hilar lymphadenopathy. Lung function testing showed a mild restriction without any evidence of obstruction (FEV1 73% predicted, TLC 74% predicted). Routine blood tests showed no pathological results, especially inflammatory markers, i.e., C-reactive protein and white blood count, were within normal values. A whole-body PET-CT scan was performed and confirmed an avid FDG uptake of the nodule in the LLL, highly suspicious of lung cancer, without any evidence of lymphogenic or hematogenic metastasis. Since bronchoscopy was not diagnostic and the nodule was not accessible for CT guided biopsy due to its central location, the patient was transferred to the department of thoracic surgery to obtain a definitive histological diagnosis. Due to severe adhesions after prior chest trauma and thoracotomy and due to the central location of the nodule, a complete lobectomy of the LLL had to be performed. Surprisingly, histology showed a simple aspergilloma located in a circumscribed bronchiectasis with no evidence of malignancy. The postoperative course was uneventful and up to now, 2 years after the operation, the patient is free of any pulmonary signs and symptoms. Our case of an aspergilloma is an interesting example of an unexpected histological result of a PET-positive, progressing nodule, highly suspicious of lung cancer. Aspergilloma, also known as mycetoma or “fungus ball”, is associated with the growth of fungus (mainly *Aspergillus* species) and usually develops in preformed cavities, commonly in pulmonary emphysema bullae or residual cavities following abscessing infections. *Aspergillus fumigatus*, the most common species together with *Aspergillus flavus* and *Aspergillus niger*, is typically inhaled as small (2–3 µm) spores and settles in a preformed cavity of the lungs, where it grows free, multiplies and forms a fungus ball, usually without tissue infiltration. Thus, the typical radiological feature of an aspergilloma is a round to oval solid mass, which is separated from its cavity wall by an airspace of variable extent (“air crescent sign”).