

Pulmonary cryptococcosis and tuberculoma mimicking primary and metastatic lung cancer in ¹⁸F-FDG PET/CT

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ABSTRACT

¹⁸F-fluorodeoxyglucose positron emission tomography (FDG-PET) has been widely incorporated in cancer management. Although, it has increased sensitivity, ¹⁸F-FDG is not tissue specific thus posing diagnostic dilemma in certain situations. False positivity in pulmonary nodules have been seen in various inflammatory, infective as well as post operative conditions while false negativity is common with adenomas, low grade lymphomas, bronchoalveolar carcinomas and carcinoid tumors. We present two cases of granulomatous diseases as pulmonary cryptococcosis and tuberculosis showing false positivity in a resected colorectal cancer patient and highlight the importance of recognition of this entity in an endemic region for granulomatous infections.

Keywords: Cryptococcosis, tuberculosis, positron emission tomography, computed tomography.

¹⁸F-fluorodeoxyglucose positron emission tomography (FDG-PET) has been increasingly used in the staging of primary lung cancers as well as in ruling out any pulmonary metastases. FDG accumulation in various infective conditions has however been seen to be increased causing diagnostic dilemma while differentiating from malignancies. We present cases of histopathologically confirmed pulmonary cryptococcosis and tuberculosis in a resected colorectal cancer patient that mimicked pulmonary malignancy at ¹⁸F-FDG PET/CT studies.

CASE REPORT 1

A 39 year old immunocompetent male patient with history of mild cough and sputum production had undergone a chest radiograph which revealed a nodule in the left upper lobe of the lung. A PET-CT scan was performed at another institution which confirmed the radiographic finding of a nodule. The nodule measured 9 × 7 mm on axial sections and showed an increased uptake (Fig. 1 and 2). All other investigations were normal. A wedge resection of the lung was then contemplated. A diagnosis of pulmonary cryptococcosis was made based on hematoxylin and eosin (HE) stain and Periodic acid-schiff stain (PAS) stain of the biopsy specimen (Fig. 3). Post operative period was uneventful and patient recovered fully.

CASE REPORT 2

A 38 year-old male patient with a history of rectal carcinoma who had undergone surgery and received 5 cycles of FOLFOX6 (fluorouracil, leucovorin and oxaliplatin) came to the clinic for another cycle of

chemotherapy. A chest CT scan demonstrated a 1.4×2.2 cm nodule in the middle lobe of the right lung. A whole body PET-CT scan was performed which showed the nodule with increased FDG uptake. A metastatic recurrence was suspected. Patient refused surgery and was kept on FOLFOX with cetuximab. Patient's condition deteriorated and a repeat CT scan demonstrated the nodule increased in size which was then biopsied under CT guidance. Histopathology of the biopsy specimen revealed the diagnosis of pulmonary tuberculosis. Other investigations were within normal limit. Patient was then kept on anti tubercular treatment with gradual improvement in symptomatology and resolution of the lesion on CT during the immediate follow up.

DISCUSSION

PET-CT has been widely integrated in oncology in the management of pulmonary nodules due to its increased

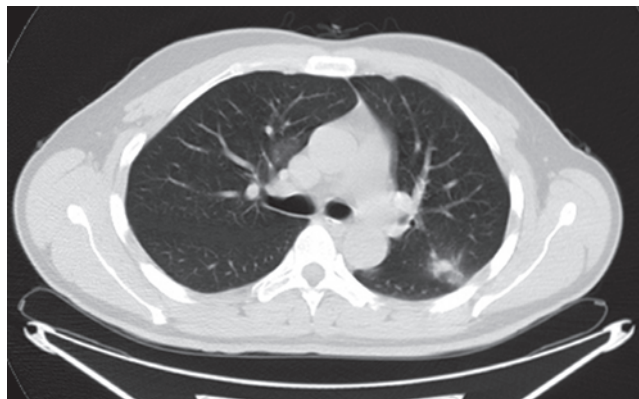


Fig. 1. CT scan of the chest demonstrates a sub pleural nodule in the left upper lobe of the lung. Ground glass opacity is seen surrounding the nodule.

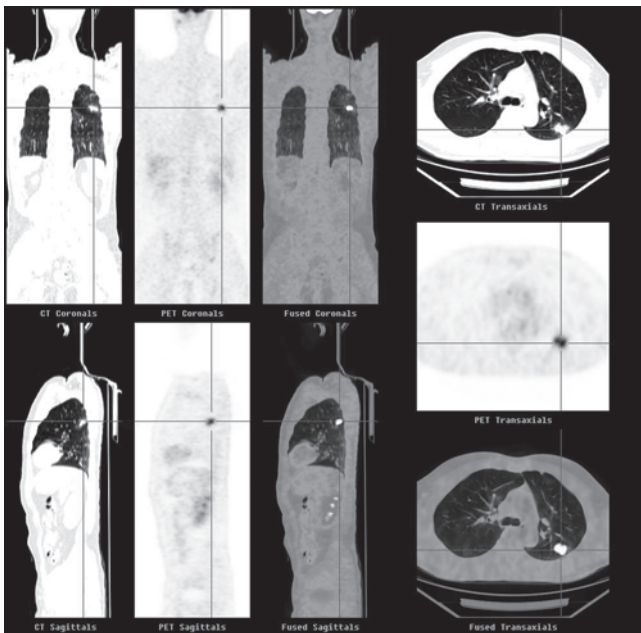


Fig. 2. Whole body PET, CT, and fused PET/CT images show the pulmonary nodule with increased ^{18}F -FDG uptake.

specificity and sensitivity in differentiating malignant from benign nodules.¹ Various infective conditions (mycobacterium, fungal, bacterial infection), sarcoidosis, radiation pneumonitis and post surgical conditions have however been reported to show false positivity with an increased ^{18}F -FDG uptake.^{2,3} Pulmonary cryptococcosis have varied radiologic presentation and is rare in immunocompetent individual. Very few studies have addressed the PET-CT findings in immunocompetent patients having pulmonary cryptococcosis. Studies by Igai *et al*⁴ have reported all cases of pulmonary cryptococcosis in their series having accumulation of FDG similar to our first case mimicking lung cancer requiring surgical resection. Pulmonary tuberculoma commonly causes an increased FDG

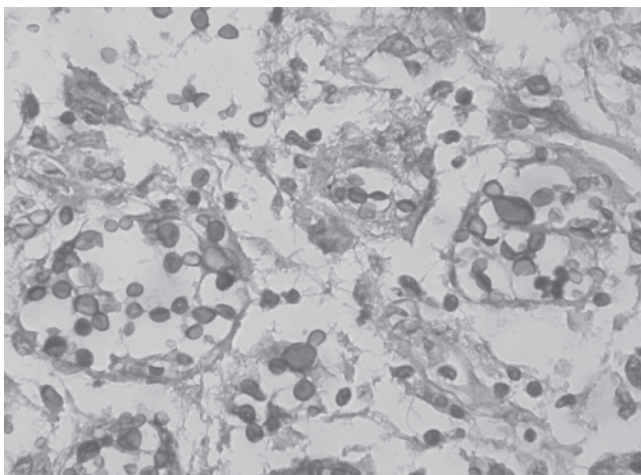


Fig. 3. Periodic acid-schiff (PAS) stain demonstrates the cryptococcal yeast in alveolar capillaries. Mucoid capsule are stained with PAS, a characteristic unique to cryptococcus. (PAS, $\times 400$)

uptake.⁵ Diagnostic dilemma leading to over diagnosis or over staging occurs especially in patients who were previously diagnosed with a primary malignancy as in our first case resulting in overt management.⁶ Dual time point imaging has been documented to have a distinctly added value with inflammatory lesions demonstrating increased washout.⁷ Certain studies however have shown equivocal results while some advocate that the efficacy of using dual-phase FDG PET for diagnosing pulmonary nodules with an initial mean standardized uptake value (SUV) less than 2.5 is limited in geographic regions with a high prevalence of granulomatous diseases such as tuberculosis and in patients at high risk of granulomatous inflammation.^{8,9}

Positive FDG PET results must be interpreted with caution and a histopathologic confirmation may be required in individuals with pulmonary nodules hailing from or having history of travel to an endemic region for granulomatous infections even if they have an extra pulmonary malignancies.

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