Pulmonary hamartoma with tuberculosis masquerading as metastasis

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A 54-year-old male was diagnosed to have urinary bladder carcinoma. He was planned for transurethral resection of the bladder tumor. On a routine pre-operative chest X-ray, he was found to have a suspicious opacity in the left lung field. He had no history of cough, fever, chest pain, dyspnea or hemoptysis. There was no peripheral lymphadenopathy. There was no past history of tuberculosis. Routine blood investigations, including hemogram, and renal and liver function tests were normal. Contrast-enhanced computerized tomography (CECT) scan of the chest revealed a 2 × 2 cm, well-defined, homogenous, oval nodule in anterior segment of left upper lobe with no evidence of calcification. Rest of the lung fields were normal. The lymph nodes in left paratracheal and subcarinal region were enlarged, 1.5 × 1.5 cm in size, with no necrosis or calcification. An ^{18}Fluro-Deoxy-D-Glucose Positive emission tomography (^{18}F-FDG-PET)/CT scan was done to characterize the nodule, which revealed significant uptake in the lesion (standardized uptake value$_{max}$ 4.9) and in the mediastinal lymph nodes [Figure 1]. CT-guided Fine Needle Aspiration Cytology of the nodule, done twice, was inconclusive and revealed necrosis in both the instances.

Clinical Questions

Based on the clinical and investigative findings, what is your provisional diagnosis?

How do you plan to proceed?

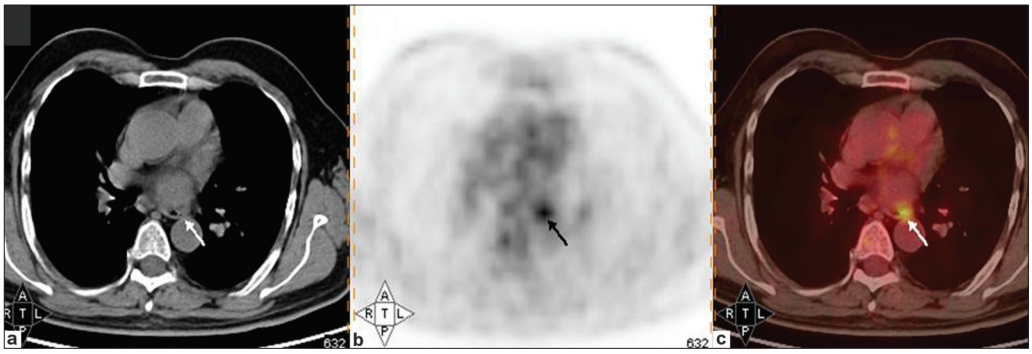

Figure 1: (a) CT, (b) PET and (c) ^{18}F-FDG-PET/CT scan images of the patient, showing the increased uptake of FDG in the pulmonary nodule (arrow)

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Answers

Considering the clinical scenario of a known case of urinary bladder carcinoma with solitary pulmonary nodule (SPN) and the high uptake on ^{18}F-FDG-PET/CT scan, metastasis should be offered as the first possibility.

In view of repetitive, inconclusive histology, the patient should be planned for excision of the nodule, both with diagnostic and therapeutic intention.

Wedge resection of the nodule was done. The enlarged lymph nodes in the left paratracheal, pretracheal and subcarinal areas were also excised.

The histopathology report was a surprise. The nodule, 2.5 cm in largest diameter, showed extensive hyaline cartilage, lobules of fat and cystic spaces lined by respiratory epithelium, consistent with a pulmonary hamartoma [Figure 2a]. There were features of granulomatous inflammation with the presence of epitheloid cells and focal necrosis in the adjacent pulmonary parenchyma [Figure 2b]. The mediastinal lymph nodes also revealed granulomatous inflammation and extensive necrosis. The features were consistent with tuberculosis.

Discussion

SPNs are defined as focal lesions in the lung which measure less than 3 cm in diameter.[1] These nodules are caused by a variety of disorders which can range from benign disorders like infection, inflammation, vascular abnormalities to frank malignancy.[1,2] The goal of investigating an SPN is to differentiate a benign nodule from a malignant one as soon and as accurately as possible.

The diagnostic algorithm in SPNs usually begins with structural imaging studies. Chest X-ray and CECT are useful but magnetic resonance imaging (MRI) has a limited role. Radiological differentiation between benign and malignant nodules is done on the basis of size, margins, contour, internal characteristics, but the interpretation can be fallacious.[1-3]

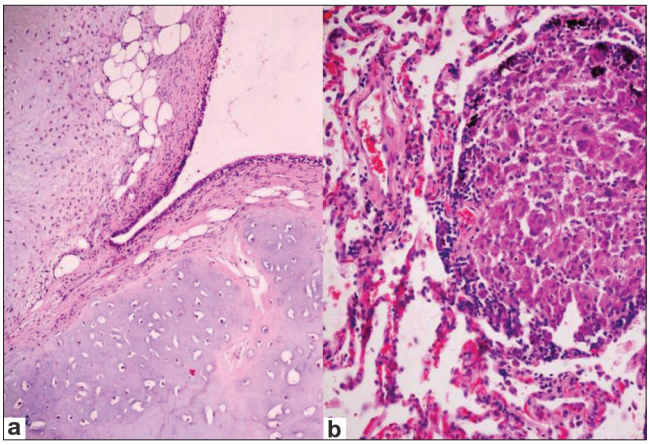

Figure 2: Section from the pulmonary mass showing hyaline cartilage, adipose tissue and spaces lined with respiratory epithelium (Hematoxylin and Eosin, ×100). (b) Section from adjacent lung showing epithelioid cell granulomas (Hematoxylin and Eosin, ×200)

Recent attention has focused on using ^{18}F-FDG-PET/CT scan to characterize SPNs. It has been reported to have a sensitivity and specificity rate of 80–90% compared to 50–60% for CT to differentiate benign nodules from the malignant ones.[2-4] The investigation relies on the uptake of FDG by the SPNs, with malignant/metastatic lesions revealing increased uptake of FDG as compared to benign lesions.[4-6] However, even ^{18}F-FDG-PET/CT scan is not infallible. False-negative findings on ^{18}F-FDG-PET/CT can be seen in patients with bronchioalveolar carcinoma, carcinoid tumors, etc. due to their low metabolic activity despite being malignancies. False-positive findings are seen in infections or inflammatory conditions.[3]

In the presented case, considering the clinical scenario of a known case of urinary bladder carcinoma with SPN, we offered metastasis as the first possibility. The histopathologic diagnosis of hamartoma came as a surprise. Hamartomas are benign lesions containing normal pulmonary tissue. CT findings such as internal fat or popcorn-like calcifications help to distinguish hamartomas from malignancies.[1,2] However, in the present case, the lesion did not have any such features on CT scan. CT also failed to reveal any signs of associated pulmonary tuberculosis. Hamartomas have been described as lesions that do not show any significant uptake on ^{18}F-FDG-PET/CT scan.[5,6] The significant uptake on ^{18}F-FDG-PET/CT scan, which we now attribute to the tubercular infection, also misled us to the diagnosis of a metastasis and the patient had to be subjected to surgery.

One should be careful while interpreting PET scans; especially in areas where prevalence of tuberculosis is quite high which may be a cause for false-positive ^{18}F-FDG-PET/CT scan.

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