



Radiologic-Pathologic Correlation

Intraparenchymal pulmonary lipoma: pathologic-radiologic correlation of a rare presentation of a common neoplasm



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ABSTRACT

We report a rare case of pulmonary intraparenchymal lipoma. Lipomas are benign adipocytic tumors, which are ubiquitous in distribution, particularly in the subcutis and soft tissue. Visceral lipomas, in particular, pulmonary lipomas, are rarely reported. Even rarer are intraparenchymal lipomas, such as this case, of which less than 10 have been reported in the medical literature. The radiologic (computed tomographic scan) findings of pulmonary lipoma may be somewhat difficult to evaluate. In this case, on initial review, the computed tomographic findings were not diagnostic, but retrospective analysis revealed attenuation values suggestive of an adipocytic lesion. A high index of suspicion and careful attention to attenuation values are therefore required for radiologic diagnosis. Excision is necessary for histologic confirmation, which is generally relatively straight forward, although admixture with fibrous tissue and some cytologic atypia may pose diagnostic challenges.

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1. Introduction

Lipomas are benign fatty tumors that can arise in nearly any location. Superficial locations, including the trunk and neck, particularly in the subcutis, are frequent sites [1]. Although they appear to be ubiquitous, visceral lipomas are reported infrequently. In the tracheobronchial tree, hamartomas (which may have a variable lipomatous component) are seen with some frequency. Conversely, lipomatous tumors have been reported rarely, with fewer than 100 cases described in the literature predominantly mostly as single case reports and small series [1]. Even rarer are pulmonary parenchymal lipomas, with fewer than 10 cases reported in the literature [2]. Here, we present a male patient who underwent wedge excision of multiple lung nodules with variable radiologic appearances, which were found to represent metastatic colorectal adenocarcinoma, a benign intraparenchymal lymph node, and intraparenchymal pulmonary lipoma. The background lung parenchyma showed changes of siderotic mineral dust airway disease, consistent with Welder's occupational lung disease. We correlate the radiographic and pathologic findings of a rare presentation of a common neoplasm and review the literature pertaining to pulmonary parenchymal lipoma.

2. Case report

2.1. Clinical features

A 68-year-old man presented to the cardiothoracic surgery clinic for management of multiple bilateral pulmonary nodules. The nodules

were incidentally discovered during evaluation of hematuria of unknown cause, when a computed tomographic (CT) scan of the lower chest and abdomen revealed 3 nodules in the lower lung lobes bilaterally. This discovery prompted a dedicated CT scan and positron emission tomography (PET) scan of the chest, which identified a spiculated, metabolically active 0.8-cm nodule at the right hilum in addition to the previously seen nodules. The patient's medical history was significant for a chest skin lesion, which was excised and found to be malignant melanoma in situ 2 months before current presentation. Additional history included a 25 pack-year smoking history and occupational history of being a retired welder. Given the concern for both primary and metastatic malignancy, the patient was advised to undergo thoracotomy for biopsy of accessible lesions, with possible lobectomy. At surgery, 4 separate nodules were palpated in the right lower lobe and excised, followed by mediastinal lymph node dissection.

2.2. Radiology findings

Contrast-enhanced high-resolution computed tomographic (HRCT) scan of the chest was performed after intravenous administration of 85 mL of iohexol (350 mg iodine per milliliter of Omnipaque; GE Healthcare, Waukesha, WI) (Fig. 1). The scan showed an irregular nodule in the medial basal segment of the right lower lobe just inferior to the hilum, which measured approximately 0.8 cm in maximum axial dimension and 29 Hounsfield units (HU) in attenuation. There was another 0.9 cm nodule along the subpleural aspect, which measured 80 HU in attenuation. There were 2 additional small nodules in the right lower lobe, which measured 0.3 and 0.4 cm. Three additional small nodules were scattered elsewhere in the lungs. Evaluation of the mediastinal soft tissues revealed no adenopathy.

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A PET scan was performed subsequently. After a 6-hour fast, the patient was intravenously injected with 13.1 mCi of F-18 fluorodeoxyglucose (FDG) (Fig. 2). There was a 0.8 cm-sized nodule, which demonstrated FDG uptake, with a maximal standardized uptake value (SUV) of 3.8, located just inferior to the right hilum in the right lower lobe, corresponding with the contrast CT finding. The other nodules including the 0.9 cm subpleural nodule did not reveal abnormal uptake.

2.3. Pathology findings

Three separate wedges of lung tissue were received for histologic examination. The largest (from the right lower lobe, along the major fissure) measured $4.5 \times 2.5 \times 1.5$ cm and was received fresh for intraoperative consultation. There were 2 nodules, measuring 0.8 and 0.9 cm in maximum dimension, respectively. The smaller nodule had a firm tan-white appearance, whereas the larger nodule was soft and lobulated. Frozen section analysis of the smaller nodule revealed an adenocarcinoma, composed of cells with elongated hyperchromatic nuclei and brisk mitoses, arranged in a glandular and cribriform pattern; necrotic debris was evident. This lesion corresponded with the 0.8 cm nodule with low attenuation and high SUV uptake seen in the HRCT and PET scans, respectively. The larger nodule revealed only scant fibrofatty tissue on the frozen section, and a definitive diagnosis was deferred. The permanent sections showed a subpleural nodule that was well circumscribed and consisted exclusively of lobules of mature, benign-appearing adipocytes (Fig. 3). Careful examination of all sections did not reveal any areas of sclerosis, cellular atypia, or mitoses. Other elements such as cartilage or fibrous tissue were also notably absent. This lesion correlated with 0.9 cm lesion with high attenuation seen on HRCT.

The second wedge biopsy (from the right lower lobe, below pulmonary vein), also sent for frozen section analysis, contained a 0.4 cm adenocarcinoma with similar features to those described above (Fig. 4A and B) (corresponding with one of the small nodules seen on HRCT). Immunohistochemical stains performed on the permanent sections of the adenocarcinoma nodules revealed positivity for CK20, CDX-2, and villin; the tumor cells were negative for CK7 and TTF-1, favoring metastatic adenocarcinoma of lower gastrointestinal tract origin. A subsequent colonoscopy revealed a rectal growth, histologically confirmed to be adenocarcinoma.

The third wedge biopsy (from the right lower lobe, not otherwise specified) contained a well circumscribed nodule, which was histologically confirmed to be a benign intraparenchymal lymph node.

Additional findings included the presence of widespread foci of pigmentation and associated multinucleate giant cells in adjacent lung parenchyma, some surrounding terminal bronchioles, with accompanying centrilobular emphysema (Fig. 4C). Special stains revealed the presence of abundant iron granules within the pigmented areas (Fig. 4D). Immunohistochemical stains for melanoma (MART-1, melan A, tyrosinase, and HMB45) were negative.

3. Discussion

Lipomas are the most commonly encountered benign neoplasms and are composed of mature adipocytes [1]. They are more frequent in women than in men and are most commonly seen in superficial portions of the trunk and neck, although they are ubiquitous in distribution [1]. In the lung, lipomas are seen rarely; pulmonary hamartomas are far more common. Hamartomas are composed of variable amounts of adipose tissue and smooth muscle, but the most

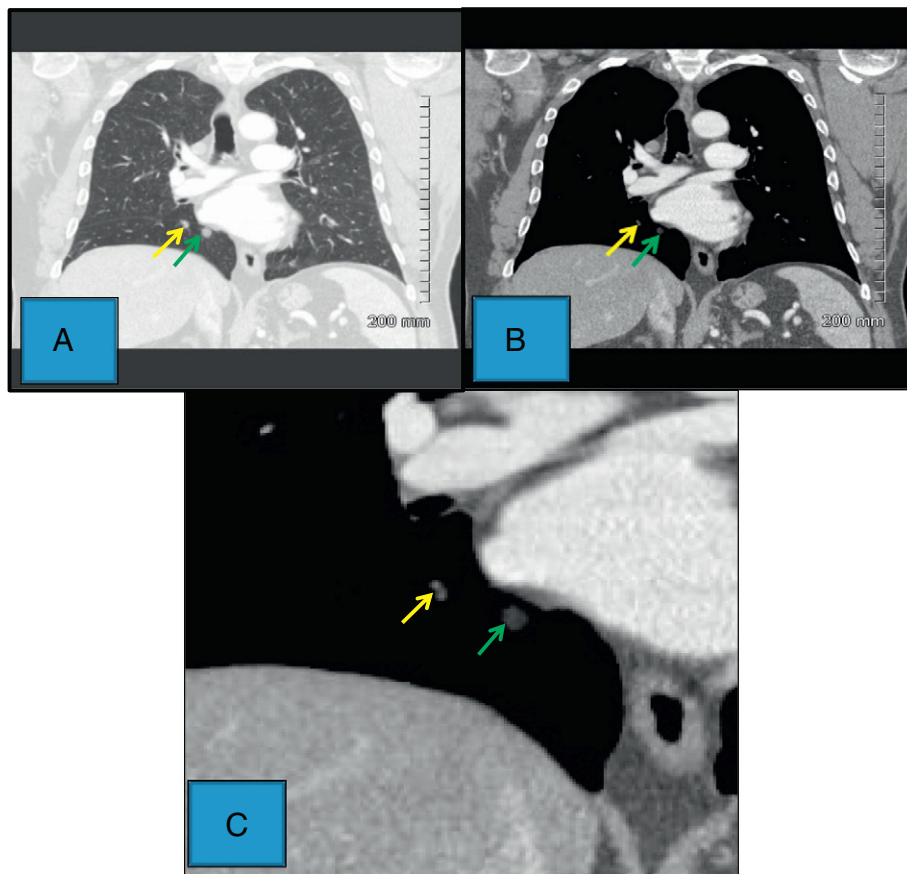


Fig. 1. Coronal reconstruction image of the contrast-enhanced CT of the chest (A) and mediastinal window (B) reveals 2 nodules; the smaller nodule (yellow arrow) is solid, corresponding to adenocarcinoma, and the second larger nodule (green arrow) shows fat attenuation, corresponding to lipoma. C, A higher magnification view better demonstrates the fatty attenuation of the larger nodule (lipoma).

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