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LETTER / *Thoracic imaging*

Pulmonary metastasis of uterine leiomyosarcoma presenting as centrilobular nodules with ''tree-in-bud'' pattern

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Clinical case report

A 59-year-old woman had a chest and abdominal CT scan as part of a staging assessment for uterine cancer. The investigation was negative except for a small cluster of micronodules in the left upper lobe centred around branched linear opacifications in continuity with the peripheral pulmonary arteries (Fig. 1). The sub-pleural space was preserved. These were therefore centrolobular micronodules with a ''tree-in-bud'' appearance suggesting a respiratory cause such as bronchiolitis. The patient was immunocompetent and had no respiratory symptoms however, and her laboratory tests showed no signs of inflammation. A PET-CT scan was performed and showed moderate hyperintensity at this point with a max standardized uptake value (SUV) of 4.75 (Fig. 2a). In view of the context of malignancy, a transthoracic lung needle biopsy was performed (Fig. 2b) at 6 weeks using an 18 Gauge Coaxial system (Quick-Core, Cook®). The procedure was uncomplicated and histological examination (Fig. 3) showed a proliferation of fusiform cells with a high mitotic index. By immunohistochemistry these tumour cells expressed smooth muscle markers including alpha-actin and were negative for epithelial markers. This analysis therefore confirmed a metastatic site of the uterine cancer, a high-grade leiomyosarcoma.

Discussion

Centrolobular micronodules with a ''tree-in-bud'' appearance are the pathological representation of centrolobular bronchioles, whose diameter when normal (< 1 mm) prevents

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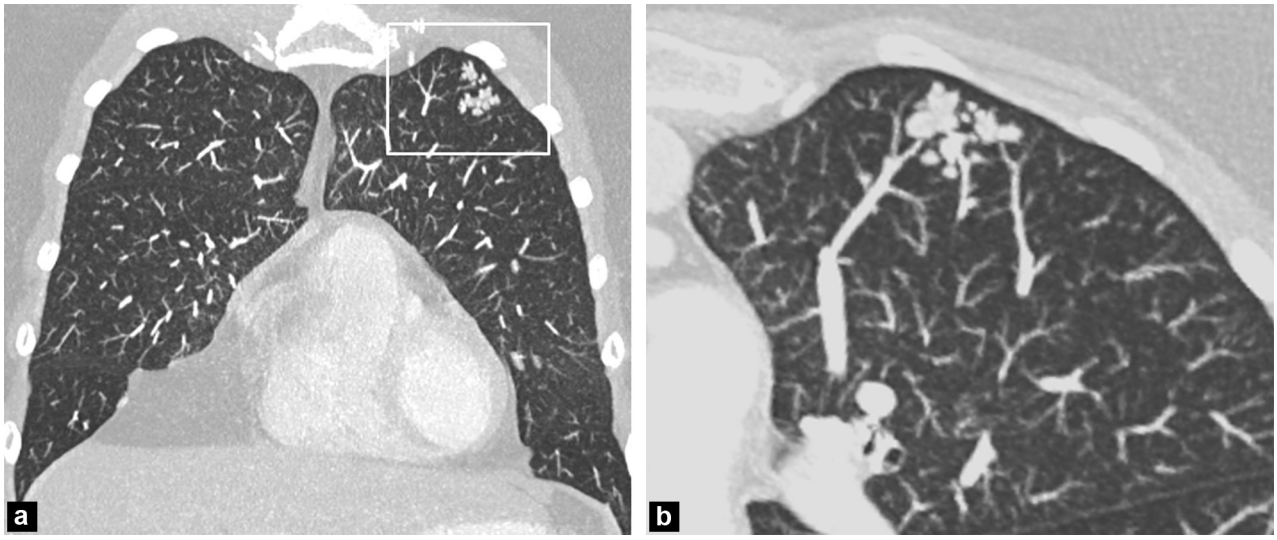

Figure 1. Contrast-enhanced CT scan. Thin slices with maximal intensity projection (MIP) reconstruction. a: coronal view: micronodular infiltrate in left pulmonary apex; b: axial view focused on the infiltrate: well-defined micronodules with tree-in-bud pattern connected to pulmonary arteries.

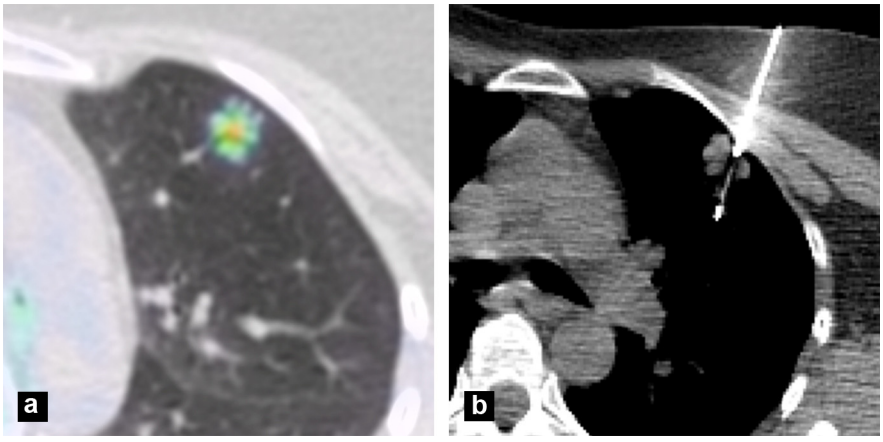

Figure 2. a: PET-CT: hypercaptation with standardized uptake value (SUV) of 4.75; b: transthoracic needle biopsy with 18G-needle.

them being visualised by computed tomography. These nodules reflect a spectrum of diseases resulting either in dilatation of the bronchiolar lumen (liquid, mucus, pus), or thickening of their wall, or as a result of peribronchiolar inflammation [1].

By high-resolution chest CT, these micronodules are centred around branched linear opacifications giving a ''tree-in-bud'' appearance. The nodules have variable but usually clear outlines. The sub-pleural space is preserved as it is for any centrolobular nodule.

This presentation almost always reflects respiratory disease, the leading cause being infectious. ''Tree-in-bud'' appearances can also be seen in sarcoidosis and in bronchial alveolar carcinoma [2]. Presentation may more rarely be due to metastatic lesions, particularly tumour microemboli in the arterial circulation. The presentation with ''tree-in-bud'' micronodules generally reflects the presence of tumour cell emboli or intimal thickening of the arterials reacting to the emboli themselves [3]. Many malignancies can give rise to this presentation: breast cancer, hepatocellular carcinoma, pancreatic, renal, prostatic or colonic adenocarcinoma, and an abdominal desmoplastic tumour [3—6]. Endobronchial metastases and thymus cancer have also been reported [7]. In our case, the uterine leiomyosarcoma had significant vascular tropism with invasion of the peri-uterine arterials on the hysterectomy specimen. The arteriolar tropism was more difficult to demonstrate on examination of the transthoracic needle biopsy.

As a result, whilst ''tree-in-bud'' centrolobular nodules usually reflect bronchiolar disease, particularly in infectious bronchiolitis, a metastatic cause is always possible. The appropriate maximal intensity projection (MIP) reconstructions must be performed to increase detection of the ''tree-in-bud'' appearance. If malignancy is present, the possibility of metastases must be considered and confirmed histologically if this changes the management.

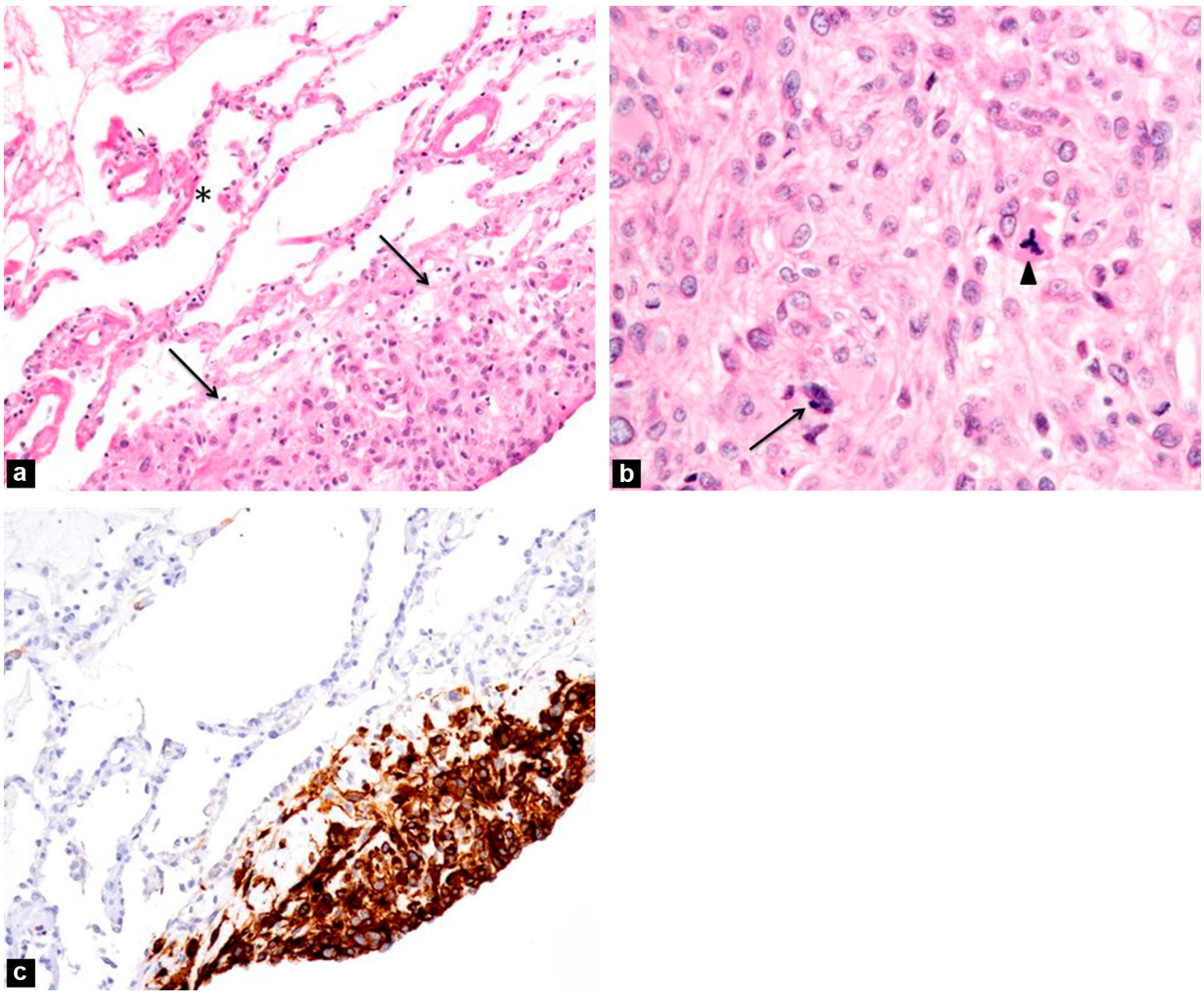

Figure 3. Histological features. Infiltration of pulmonary tissue by sarcomatous cells similar to uterine leiomyosarcoma. a: at low magnification, tumoral proliferation of fusiform cells (arrow) near normal pulmonary alveoli (*); b: at higher magnification, sarcomatous cells proliferation with nuclear atypia (arrow) and many abnormal mitosis (arrowhead); c: immunostaining for smooth muscular actin is strongly positive.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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