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Pulmonary sclerosing pneumocytoma presenting a peritumoral halo and an intervening lucent zone on computed tomography: Radiology–pathology correlation

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A 56-year-old woman presented with blood-tinged sputum. A chest radiograph showed a nodule in the right mid-lung zone. Chest computed tomography (CT) revealed a 1.6 cm well-demarcated nodule with eccentric calcification in the right middle lobe (Fig 1a). The lung window setting showed ground glass opacity (GGO) surrounding the nodule, creating a halo sign (Fig 1b). An intervening lucent area between the nodule and GGO was also noted. The nodule was suspected as being benign (e.g. a hamartoma); however, associated findings, such as GGO and peritumoral lucent components, could not be explained. On 2-[fluorine 18]fluoro-2-deoxy-D-glucose (FDG) positron emission tomography/CT, the nodule and GGO showed mild FDG uptake (maximum standardized uptake value 1.7–2.0). The possibility of malignancy showing lepidic growth could not be excluded. Thus, a right middle lobectomy was performed. Histopathological analysis revealed a well-circumscribed tumor with abundant hemorrhage. The tumor was composed of pneumocytes and round cells, suggesting pulmonary sclerosing pneumocytoma (PSP) (Fig 2a). TTF-1 and vimentin were positive on immunohistochemical staining. The halo sign on CT was correlated with hemorrhage in the lung

Keywords
Computed tomography; halo sign; lung; sclerosing pneumocytoma; sclerosing hemangioma

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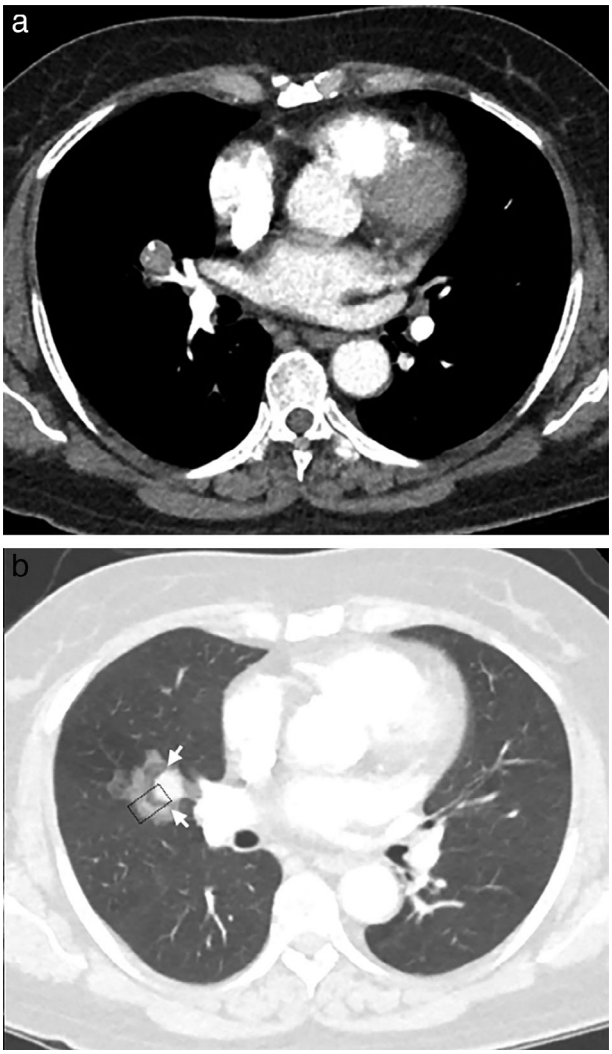

Figure 1 Computed tomography (CT) features of pulmonary sclerosing pneumocytoma in a 56-year-old woman who presented with blood-tinged sputum. (**a**) Contrast enhanced chest CT image showing a 1.6 cm well-demarcated nodule with peripheral calcification in the right middle lobe. (**b**) The lung window setting of the CT image shows ground glass opacity around the tumor (halo sign) and an intervening lucent zone (arrows).

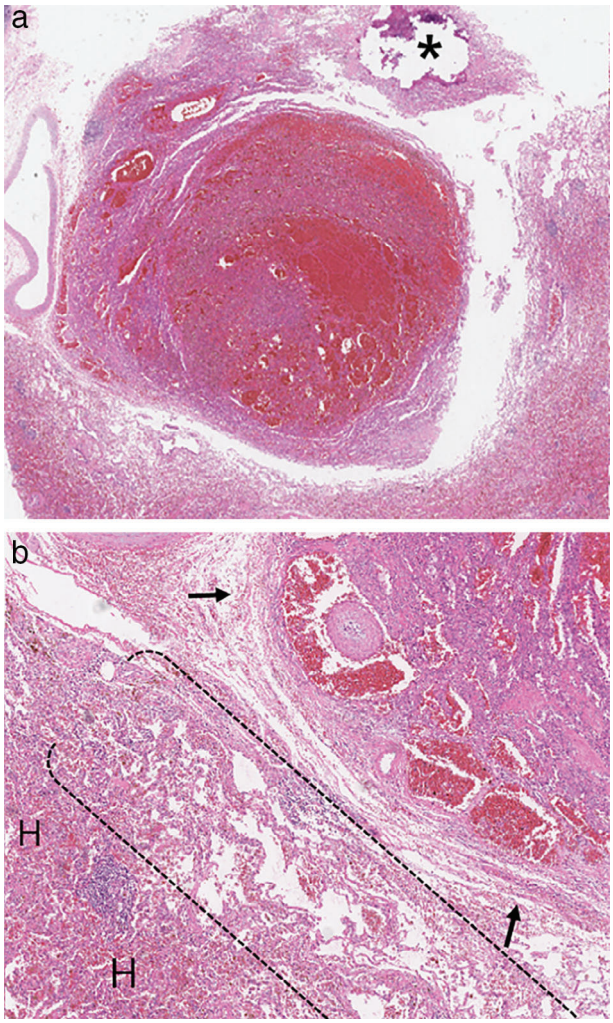

Figure 2 Pathologic features of pulmonary sclerosing pneumocytoma in a 56-year-old woman who presented with blood-tinged sputum. (**a**) Photomicrograph of the tumor (hematoxylin and eosin [H&E] stain, original magnification x 1.5) showing predominantly solid components with hemorrhage, surrounded by a pseudocapsule (compressed lung parenchyma). Note the calcific component (asterisk). (**b**) Histopathologic section (H&E stain, original magnification x 4) corresponding to the boxed area in Figure 1b. The nodule is well demarcated and surrounded by a pseudocapsule (arrows). The adjacent parenchymal area with hemorrhage (H) corresponds to the ground glass opacity halo on computed tomography (CT). Intervening dilated alveoli with less hemorrhaging (between dotted lines) corresponds to the peritumoral lucent zone between the nodule and halo on CT.

parenchyma on pathology. The lucent zone between the tumor and hemorrhage corresponded to dilated air space with less hemorrhage (Fig 2b).

PSP is a rare benign tumor that occurs predominantly in middle-aged women. In clinical practice, this tumor represents a diagnostic challenge because of its non-specific symptoms and imaging features. In a large study series of PSP, the halo sign was observed on CT in approximately 17% of cases.[1] Several studies have described a peritumoral lucent zone as an air-crescent or air-gap sign.[1–3] Although sporadically reported, a peritumoral lucent zone and GGO on CT reflect unique pathologic features of PSP. The difference between the tumor shrinkage rate and the pseudocapsule (compressed lung parenchyma) in PSP can cause bleeding, which is manifested on CT as GGO around the tumor.[3,4] Hemorrhage is followed by clearance through the airspace forming the peritumoral lucent zone.[3,4] Patients may manifest hemoptysis or blood-tinged sputum. On immunohistochemical analysis, a positive TTF-1 nuclear reaction in tumor cells suggests the primitive respiratory epithelium origin of PSP.[5]

In conclusion, PSP should be considered in middle-aged women whose chest CT shows a nodule with a GGO halo and peritumoral lucent zone. Knowledge of these findings could contribute to confident diagnosis of PSP and obviate unnecessary surgery.

Disclosure

No authors report any conflict of interest.

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