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Lung cancer associated with cystic airspaces: a new radiological presentation of lung cancer

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TO THE EDITOR:

Lung cancer associated with cystic airspaces, also known as cystic or pericystic lung cancer, was once thought to be a rare presentation of lung malignancy; however, in recent years, these forms have become more commonly recognized.[1] This is likely due to the increased availability of contiguous thin-section CT scans of the chest for the follow-up of patients with general respiratory diseases, as well as to the introduction of lung cancer screening programs.[1]

Cystic/pericystic lung cancer is usually diagnosed late, representing as much as 22% of missed lung cancers in screening programs. This is probably due to the low awareness of this morphological subtype among radiologists and clinicians.[1,2] Current guidelines for lung nodule management consider differences between solid and subsolid nodules but fail to provide a management proposal for cystic and pericystic lung cancers.[2]

Cyst wall thickening or nodularity at the interface between normal and fibrotic/emphysematous lung parenchyma, as well as progressive wall thickening or nodularity abutting a cystic airspace, should raise the suspicion of cystic/pericystic lung cancer.[2]

The morphological classification of cystic/pericystic lung cancer was proposed in 2006 and updated in 2015.[3,4] According to the current classification, a type I lesion is a cystic airspace with an exophytic solid component, whereas a type II lesion is a cystic airspace with an endophytic solid component. A type III lesion presents as asymmetrical or circumferential thickening of the cyst wall. A type IV lesion is a multilocular cystic lesion with interposed solid tissue or a ground-glass component (Figure 1).[3-5] Differences among these types, as well as their growth rate, biological behavior, and prognosis, have yet to be determined.

These lesions were previously thought to arise from congenital cysts; however, recent studies have failed to find histopathological evidence to support that theory.[5] Currently, the two most accepted evidence-based theories are that there is a pre-existing cystic airspace in which malignancy develops or that there is formation of a cyst by a "check-valve mechanism" due to a small malignant lesion that only becomes visible after growth.[2,5]

Whatever the initial pathogenesis, the histology of cystic/pericystic lung cancer differs from that of the more commonly known cavitary lung cancer. Cavitation

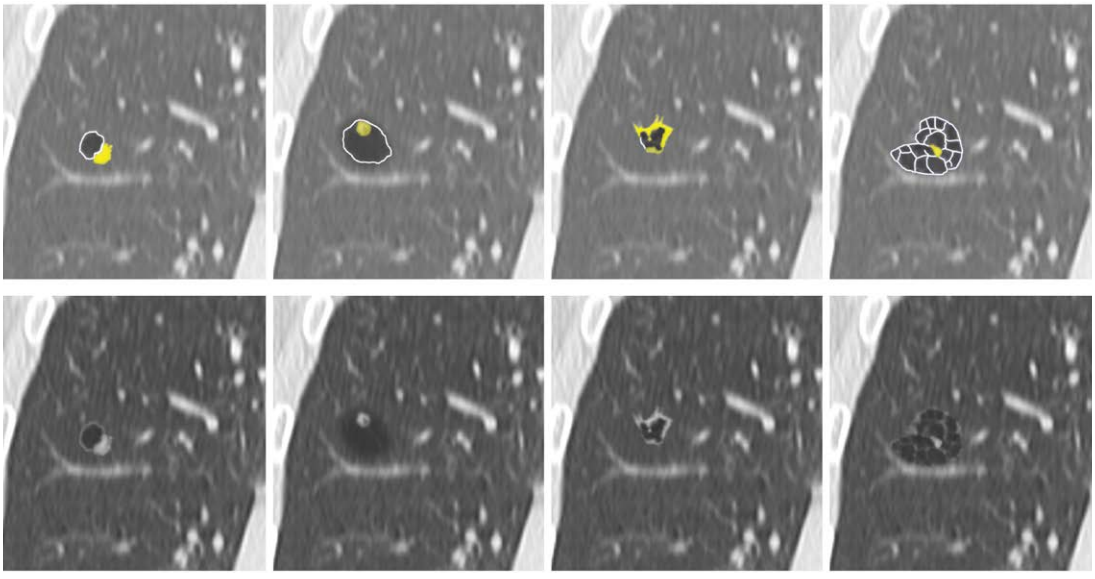

Figure 1. Morphological classification of cystic/pericystic lung lesions. The drawings in the first row of images simulate the different types of cystic/pericystic lung lesions on CT scans: type I—a nodular lesion outside the cyst wall; type II—a nodular lesion inside the cyst wall; type III—cyst wall thickening without a focal nodule; and type IV—a focal nodule within a complex multicystic lesion.

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is usually due to post-treatment necrosis, internal cyst formation, or internal desquamation of tumor cells with subsequent liquefaction.[5] The most common histological type of cavitary lung cancer is non-small cell lung carcinoma, especially squamous cell carcinoma, whereas the most common histological type of cystic/pericystic lung cancer is adenocarcinoma.[2,5]

The delay in diagnosis is due to significant overlap of radiological features between cystic/pericystic malignancies and inflammatory or infectious lesions. Common differential diagnoses include cavitary lesions, such as the ones seen in tuberculosis, squamous cell carcinoma, aspergilloma, and rheumatoid nodules, as well as rare mimickers, such as amyloid nodules and cystic lung metastasis. Cystic/pericystic cancer can be misdiagnosed as a severe form of emphysematous disease, distal airway enlargement, or fibrosis.[5]

When cystic/pericystic malignancy is suspected, histological confirmation and metabolic activity assessment are problematic because of the risk of false-negative results, which represent a potential harm to the patient. 18F-fluorodeoxyglucose positron emission tomography is usually only useful if the solid component of the cystic lesion is larger than 10 mm. Otherwise, the metabolic activity will be wrongly estimated as being mild or even absent. It is difficult to obtain a representative tissue sample from the focal thick wall or small-sized nodular component. In our experience, cystic/pericystic lesions in which positron emission tomography/CT or nondiagnostic biopsy reveals potential pitfalls should be discussed in a multidisciplinary meeting in order to make a decision for follow-up or surgical resection based on the clinical status of the patient and the expertise of the local surgical team.

Here, we sought to increase the awareness of cystic/pericystic lung cancer among radiologists and pulmonologists and highlight the importance of a timely and accurate diagnosis. As we move toward early lung cancer detection and lung cancer screening programs, further studies on these types of lesions are essential to improve knowledge, as well as diagnostic and treatment performance.

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