CHEST

Chest CT Signs in Pulmonary Disease
A Pictorial Review

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CT scanning of the chest is one of the most important imaging modalities available to a pulmonologist. The advent of high-resolution CT scanning of the chest has led to its increasing use. Although chest radiographs are still useful as an initial test, their utility is limited in the diagnosis of lung diseases that depend on higher resolution images such as interstitial lung diseases and pulmonary vascular diseases. Several metaphoric chest CT scan signs have been described linking abnormal imaging patterns to lung diseases. Some of these are specific to a disease, whereas others help narrow the differential diagnosis. Recognizing these imaging patterns and CT scan signs are thus vitally important. In the present article, we describe a comprehensive list of the commonly encountered metaphoric chest CT scan signs and their clinical relevance.

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CT imaging of the chest plays a vital role in the diagnosis of various lung diseases. Although pulmonary diseases can vary in clinical presentation, the associated imaging patterns can be grouped into a few distinct patterns. Various metaphoric signs have been described to identify and simplify these patterns. Some of these signs, which have been well described in the imaging literature, are pathognomonic for a disease, whereas others can help narrow the list of differential diagnoses. These signs also help to create a unique association between an imaging pattern and the underlying disease process.

Understanding these imaging findings, and their subsequent pattern recognition, is thus of vital importance to a pulmonologist. The present review is a pictorial essay of the important chest CT scan signs and the associated pulmonary diseases. Some of these signs have been described in chest radiographs as well as in CT imaging. We have included these signs in this review, having recognized an increasing trend of CT imaging being used as the initial imaging modality.

General Considerations: The Secondary Pulmonary Lobule

It is important to review the basic structure of a secondary pulmonary lobule (SPL) and its radiologic appearance on a high-resolution CT (HRCT) scan image before we discuss the various CT scan signs. The SPL is a fundamental unit at the

ABBREVIATIONS: GGO = ground glass opacity; HRCT = high resolution CT; PJP = *Pneumocystis jirovecii* pneumonia; SPL = secondary pulmonary lobule

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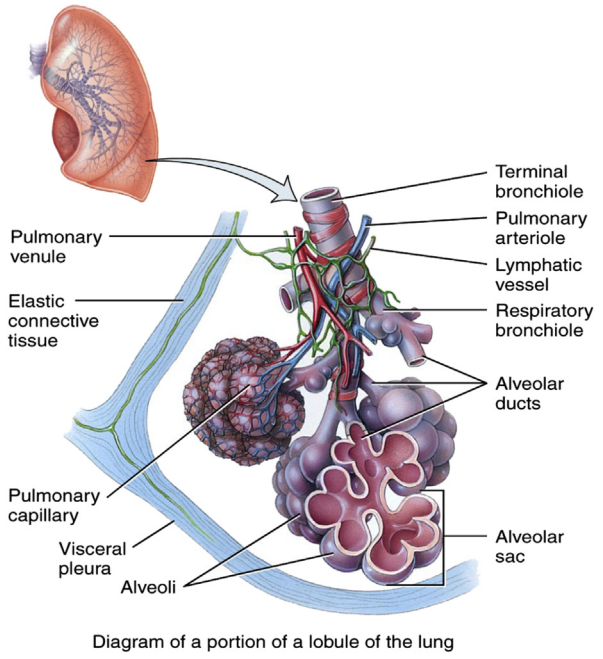

Figure 1 – *Graphic illustrating the structure of a secondary pulmonary lobule. (Reprinted with permission from Tortora and Derrickson.*[1] *© 2009 John Wiley & Sons.)*

subsegmental level of the lung (Fig 1).[1] It is surrounded by fibrous septa on all sides, known as interlobular septa.[2] The SPL is irregularly polyhedral in shape, measuring between 1 and 1.25 cm in the largest dimension and contains approximately 12 pulmonary acini. The pulmonary acini are supplied by the respiratory bronchioles and comprise the largest lung unit that participates in gas exchange. The "lobular" bronchiole (which is a preterminal or terminal bronchiole), the accompanying pulmonary arteriole, and the central lymphatics that run in the peribronchovascular interstitium form the centrilobular or core structure of the SPL. The pulmonary vein and the lymphatic channels, which drain into the subpleural plexus, are contained within the interlobular septa.

HRCT scans of the lung are able to identify the three basic components of the SPL: the lobular parenchyma, the centrilobular structures, and the interlobular septa. These structures can be differentially made prominent by various disease states to form distinct patterns. Some of these patterns have been described as

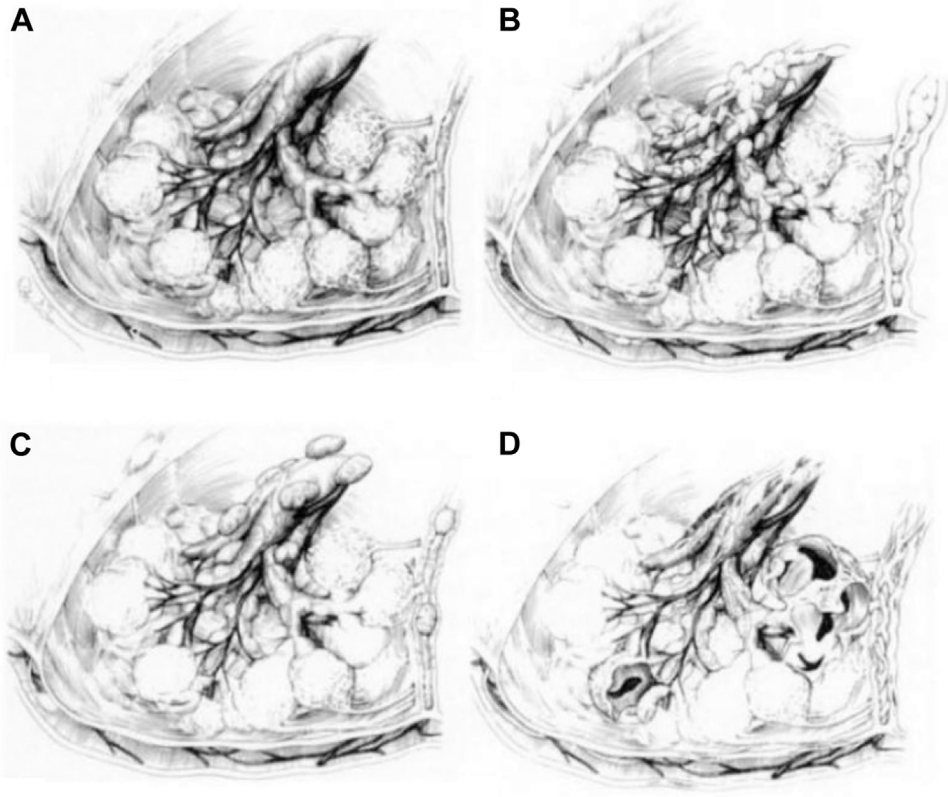

Figure 2 – *A-D, Normal secondary lobule and disease distribution in abnormal lobules. A, Normal. B, Lymphangitic carcinomatosis. C, Sarcoidosis. D, Lymphangioleiomyomatosis. (Reprinted with permission from Bergin et al.*[3]*)*