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# Letter from the Editor

The lung parenchyma consists of a large number of thin-walled alveoli, forming an enormous surface area that serves to maintain proper gas exchange. Diseases of the lung parenchyma can be classified using a number of different schemas. One approach relies on 3 distinctive CT features: interstitial disease, alveolar disease, or destructive disease. While such classification is useful in daily practice, these basic processes overlap, rendering chest imaging one of the most complicated subspecialties of diagnostic radiology. This issue focuses on the range of pathological processes that affect the lung parenchyma, with particular emphasis on diseases of the lung interstitium.

The term "airspace disease" indicates replacement of alveolar air by fluid, pus, blood, cells, or other material. The differential diagnosis of airspace disease is wide and differs according to its acuity or chronicity. When the disease process persists beyond 4-6 weeks after treatment, it is considered chronic. The differential diagnosis and characteristic imaging findings of chronic airspace disease is highlighted in the first review authored by radiologists from the Department of Diagnostic Radiology at the University of Texas MD Anderson Cancer Center, Houston, TX.

Following the review of chronic airspace disease is a thorough and systematic review of processes that alter the pulmonary interstitium on CT imaging. Dr. Jane Ko and her colleagues from the Division of Thoracic Imaging at NYU Langone Medical Center discuss the clinical and imaging features of entities such as pulmonary lymphoma and lymphoproliferative disorders, lung cancer, organizing pneumonia, infection, vasculitis and pulmonary hemorrhage, infection, sarcoidosis, Kaposi's sarcoma, and more. The overlap of imaging features of these conditions renders the integration of imaging with the clinical findings essential for narrowing the differential diagnosis and establishing the correct diagnosis.

Sarcoidosis presents with a spectrum of clinical symptoms and a correspondingly large number of radiographic manifestations. Awareness of the gamut of the radiographic findings is critical in helping physicians come to a diagnosis since sarcoidosis—lacking a specific diagnostic test—is often a diagnosis of exclusion. Dr. Iranmanesh and Dr. Washington from the division of cardiothoracic imaging at Duke University Medical Center have contributed a comprehensive pictorial review on this multifaceted disease. Numerous figures illustrate the range of thoracic imaging manifestations of sarcoidosis to facilitate the diagnosis of this intriguing disease.

Immune-mediated lung diseases are a complex group of diseases characterized by inflammatory cellular infiltration of the lungs that can result in progressive airway remodeling and parenchymal injury. The fourth article in this issue explores a variety of inflammatory lung conditions including hypersensitivity pneumonitis, asthma, allergic bronchopulmonary aspergillosis, and the diverse group of eosinophilic lung diseases. Dr. Jacobs and Dr. Kligerman from the Department of Radiology at the University of California San Diego elucidate this group of conditions, emphasizing the different imaging features of these rare entities. Familiarity with the imaging findings of immune-mediated lung disease allows early treatment that can prevent disease progression and irreversible pulmonary fibrosis.

Inhalation of smoke from cigarettes is one of the most common causes of lung injury. Although smoking is most closely allied with emphysema and chronic bronchitis, it is also associated with other diffuse, and sometimes lethal, lung diseases. Dr. Brett Elicker and his colleagues from the departments of radiology and pathology at the University of California San Francisco discuss the clinical, pathologic, and imaging features of the different patterns of lung injury associated with smoke inhalation. The figures underscore the critical role high-resolution chest CT plays in the diagnosis of smoking-related lung diseases.

Next, the focus shifts to the heterogenous group of connective tissue diseases that commonly cause chronic lung disease. Dr. Joanna Kusmirek and Dr. Jeffrey Kanne, from the Department of Radiology at the University of Wisconsin School of Medicine and Public Health, describe these systemic inflammatory conditions that result in immune-mediated damage to tissues. Rheumatoid arthritis, systemic sclerosis, mixed connective tissue disease, and systemic lupus erythematosus are all reviewed and beautifully illustrated. Several tables summarize the most common patterns of thoracic involvement in connective tissue disease and highlight the typical high-resolution CT findings for different interstitial processes.

Lung cancer remains the most common cause of cancer death worldwide with adenocarcinoma, the most common histological subtype. Different histological subtypes of adenocarcinoma exhibit different radiological features including a ground glass nodule, an infiltrative process, and sometimes an air-space opacity that mimics pneumonia. The seventh article is a collaboration between Drs. Hutchinson and Ko from the NYU Langone Medical Center, and Drs. Shroff and

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Truong, from the University of Texas MD Anderson Cancer Center. The authors have provided a superb update on the current subtypes along the lung adenocarcinoma spectrum in terms of histological and imaging features, their pattern of growth on imaging, management, staging, and evolving knowledge of tumor genetics.

The correct interpretation of thoracic imaging studies requires the recognition and understanding of the radiologic signs that are characteristic of many complex disease processes. Radiologic signs are especially useful because recognition of these signs allows the differential diagnosis to be narrowed and, in some cases, enables determining the accurate diagnosis. Dr. Shroff and his associates from The University of Texas MD Anderson Cancer Center review several classic and newer CT signs in the lungs that are beautifully illustrated.

The issue closes with a case — achalasia and a tortuous megaesophagus — that is indirectly associated with interstitial lung disease. Achalasia is typically characterized by dysphagia, heartburn, regurgitation or vomiting, and noncardiac chest pain. Aspiration in patients with achalasia, however, can affect the lung parenchyma by causing recurrent aspiration pneumonitis.

I wish to thank the authors for sharing their broad experience and deep expertise in these outstanding articles. I trust this issue of Seminars in Ultrasound CT and MRI will prove to be a useful and valuable reference to the complex topic of interstitial lung diseases.

Gabriela Gayer, MD, Editor
*Sheba Medical Center, Ramat Gan, Israel*
*E-mail address:* gayer@post.tau.ac.il