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Radiographic and Pathologic Manifestations of Uncommon and Rare Pulmonary Lesions

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Abstract

Pulmonary opacities/nodules are common findings on computed tomography examinations, which may represent an underlying infections or malignancy. However, not every pulmonary nodule or opacity represents malignancy or infection. We present a pictorial essay illustrating common as well as obscure noninfectious, nonmalignant pulmonary lesions. Lesions discussed include organizing pneumonia, Langerhans cell histiocytosis, pulmonary amyloidosis, hyalinizing granuloma, tumourlet (benign localized neuroendocrine cell proliferations), atypical alveolar hyperplasia, inflammatory myofibroblastic tumour, papillary alveolar adenoma, plasma cell granuloma, juvenile xanthogranuloma, and sclerosing hemangiomas. We discuss the clinical presentation, prevalence, radiographic clues, pathology, and diagnostic pitfalls of these rare lesions.

Résumé

Les examens de tomodensitométrie permettent souvent de détecter les opacités ou les nodules pulmonaires, signes d'une possible infection ou tumeur sous-jacente. Toutefois, la présence d'opacités ou de nodules ne signifie pas nécessairement qu'il y a tumeur ou infection. Notre essai descriptif traite des lésions pulmonaires courantes, mais aussi des lésions non infectieuses et non cancéreuses difficilement décelables. Nous y abordons entre autres la pneumopathie organisée, l'histiocytose des cellules de Langerhans, l'amylose pulmonaire, le granulome hyalinisant, la tumorlet (prolifération localisée de cellules neuroendocrines non cancéreuses), l'hyperplasie alvéolaire atypique, la tumeur myofibroblastique inflammatoire, l'adénome alvéolaire papillaire, le granulome plasmocytaire, le xanthogranulome juvénile et les hémangiomes sclérosants. Nous discutons du tableau clinique, de la prévalence, des indices radiographiques, de la pathologie et des pièges diagnostiques de ces lésions rares.

Key Words: Atypical alveolar hyperplasia; Computed tomography; Hyalinizing granuloma; Inflammatory myofibrolastic tumour; Juvenile xanthogranuloma; Langerhans cell histiocytosis; Organizing pneumonia; Papillary alveolar adenoma; Plasma cell granuloma; Pulmonary amyloidosis; Pulmonary nodule; Sclerosing hemangiomas; Tumourlet

Indistinct pulmonary opacities and pulmonary nodules are very common findings on computed tomography (CT) studies. Studies have estimated that pulmonary nodules are seen in up to 51% of smokers aged 50 years old or older [1]. Moreover, with the implementation of new more sophisticated of CT scanners, smaller nodules are being detected with a greater frequency, with identification of nodules and opacities as small as 1-2 mm. The mainstay of the radiologist is to determine the clinical importance of indistinct opacities and pulmonary nodules, and determine which represent early malignancy necessitating surgical biopsy/intervention [1]. However, not every pulmonary opacity represents a potential pulmonary malignancy.

A small minority of pulmonary opacities and nodules represents distinct entities, which are separate from infection or malignancy. It is important for the diagnostic radiologist to be aware of these lesions, which may mimic underlying

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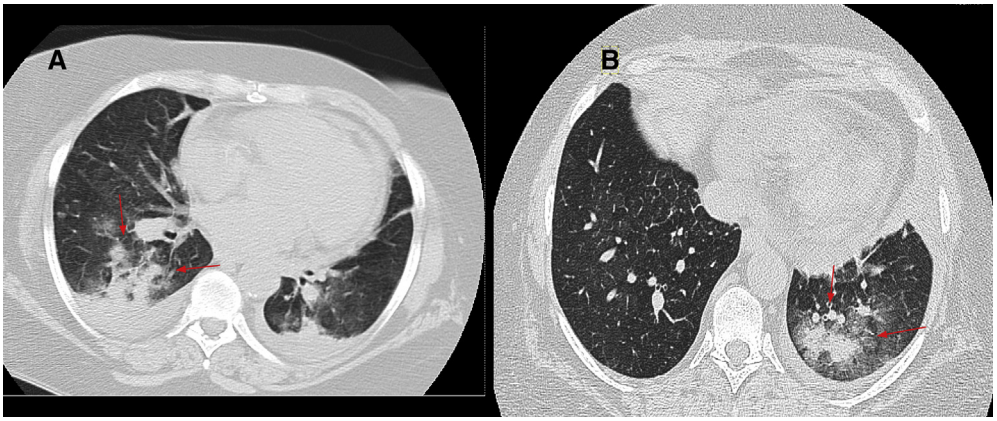

Figure 1. (A, B) Axial computed tomography on lung windows (kilovoltage peak: 120 milliamperes: 158). Patient is a 60-year-old female with history of renal transplant and worsening dyspnea. Interstitial lung disease was suspected and high-resolution computed tomography was performed. An axial slice on lung windows shows peribronchial opacities with subpleural sparing, and peripheral ground-glass opacities or the reverse halo sign (red arrows). Incidental note is made of small bilateral right greater than left pleural effusions. The focal opacities resolved once additional immunosuppresion was administered, however, there were residual ground-glass opacities resembling nonspecific interstitial pneumonia, and a biopsy was performed.

neoplasm or infection. Several of these entities include more common etiologies such as organizing pneumonia, Langerhans cell histiocytosis (LCH), pulmonary amyloidosis, and rare entities such as hyalinizing granuloma, tumourlet (benign localized neuroendocrine cell proliferations), atypical alveolar hyperplasia, inflammatory myofibrolastic tumour, papillary alveolar adenoma, plasma cell granuloma, juvenile xanthogranuloma, and sclerosing hemangiomas. Diagnosis of all of these entities can be challenging and often requires a combination of clinical history, radiographic studies, pathology specimens, and advanced immunohistochemical stains.

We present a radiographic and pathologic review of reactive and benign pulmonary neoplastic lesions, including the complex histopathology/immunohistochemical techniques utilised to confirm an underlying diagnosis. We discuss the clinical presentation, prevalence, radiographic clues, pathology, and diagnostic pitfalls of some relatively common pulmonary lesions that may mimic malignancy or infection such as organizing pneumonia, LCH, and pulmonary amyloidosis. Then we focus on rare pulmonary lesions, which are distinct from underlying pulmonary malignancy and infection.

Organizing Pneumonia

Organizing pneumonia (formally known as cryptogenic organizing pneumonia) or bronchiolitis obliterans organizing pneumonia is increasingly recognized as a major cause of diffuse infiltrative lung disease [2]. The average age of onset is approximately 55 years old with men and women affected equally [3]. Clinically, patients present with symptoms such as shortness of breath, fever, malaise, and weight loss. Often these symptoms are preceded by a respiratory tract infection [4]. There is no known association with cigarette smoking, and studies have demonstrated that most patients do not have a smoking history [3].

Imaging findings of cryptogenic organizing pneumonia are well described. Chest radiography findings include bilateral patchy airspace consolidation predominantly in the

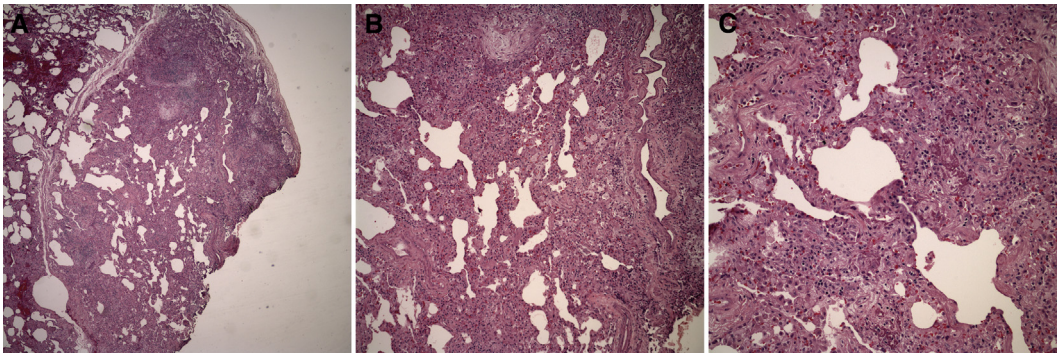

Figure 2. Representative hematoxylin and eosin sections from a biopsy of the same patient in Figure 1. (A) Low-power image with a patchy distribution of the inflammatory process with areas of less involved lung tissue (left). (B) Medium-power image demonstrating a chronic inflammatory process involving the distal airways (bronchioles and alveoli) and imparting a solid appearance to the lung tissue. Also noted are areas of young loose fibromyxoid connective tissue (top). (C) Lymphocytes and foamy macrophages along with fibrin plugs occupy the terminal airways and the alveolar spaces. These combined findings are characteristic of organizing pneumonia.