Chronic Obstructive Pulmonary Diseases:
Journal of the COPD Foundation

Images in COPD

Asthma-COPD Overlap Syndrome

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Abbreviations: chronic obstructive pulmonary disease, **COPD**; forced expiratory volume in 1 second, **FEV_1**; forced vital capacity, **FVC**; total lung capacity, **TLC**; asthma-COPD overlap syndrome, **ACOS**; high-resolution computed tomography, **HRCT**; computed tomography, **CT**

Citation: Marron RM, Vega Sanchez ME. Images in COPD: asthma-COPD overlap syndrome. *Chronic Obstr Pulm Dis.* 2019;6(2):200-202. doi: https://doi.org/10.15326/jcopdf.6.2.2018.0169

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Keywords:

asthma-COPD overlap syndrome; chronic obstructive pulmonary disease; COPD; ACOS; high-resolution computed tomography; CT densitometry

Case Study

A 69-year-old man with a 40 pack-year history of cigarette smoking presents with paroxysmal dyspnea and wheezing.

The patient was diagnosed with chronic obstructive pulmonary disease (COPD) 15 years ago. During the last year he has required multiple courses of steroids and antibiotics for exacerbations of his lung disease. He reports a history of allergic rhinitis. His physical examination is significant for scant wheezing and an oxygen saturation of 95% on room air. His pulmonary function test shows evidence of moderate airflow obstruction (forced expiratory volume in 1 second [FEV_1] / forced vital capacity [FVC] of 55%, FEV_1 1.79 liters or 59% predicted). He has a significant bronchodilator response with an FEV_1 improvement of 19%. His lung volume measurement reveals a normal total lung capacity (TLC) and a high residual volume (137% of the predicted value). His diffusing capacity for carbon monoxide is reduced to 53% of the predicted value. His laboratory values are notable for an absolute eosinophil count of 600 cells per microliter and an elevated IgE of 1130 IU/mL.

Diagnosis: Asthma-COPD Overlap Syndrome

There is little consensus for the definition of asthma-COPD overlap syndrome (ACOS) or for methods of diagnosing the condition.[1,2] A significant percentage of patients diagnosed with obstructive lung disease have ACOS[2,3] but the prevalence varies from 2.1% to 55% depending on the diagnostic criteria used.[4] Clinical suspicion for ACOS should be high in individuals 40 years of age and older with dyspnea on exertion, a significant smoking history (>10 pack years), and fixed airway obstruction on pulmonary function tests who also report a clinical history or symptoms consistent with asthma (wheezing, nocturnal symptoms, improvement with inhaled corticosteroids).[5] Patients with ACOS typically report more wheezing and dyspnea, have more frequent exacerbations, and report a poorer health-related quality of life than patients with COPD alone.[6,7] Despite the condition's prevalence, most clinical trials studying COPD or asthma exclude patients that likely have ACOS.[8] As a result, there is a lack of data regarding outcomes and treatment options for patients with this disease. In addition to having fixed airway obstruction on spirometry and a smoking history (or equivalent air pollution exposure), patients with ACOS typically have a history of asthma earlier in life and/or have significant improvement in their FEV_1 measurement after bronchodilator administration.[1,2,8]

Other diagnostic criteria include a history of atopy or allergic rhinitis, the presence of an elevated peripheral eosinophil count, and elevated serum IgE.[1,8,9] Radiology investigations have suggested that patients with ACOS have less emphysema on high-resolution computed tomography (HRCT) of the thorax than patients with COPD alone, and have greater variations in air trapping after bronchodilator administration.[2,4] This suggests that CT densitometry may characterize ACOS as a distinct phenotype from COPD.[10] A recent clinical study concluded that patients with ACOS have greater airway wall thickness and higher pulmonary microvascular density on CT than COPD patients.[6] Treatment of ACOS typically includes an inhaled corticosteroid with or without a long-acting beta agonist as it is widely assumed this will be of benefit, however this has not been validated in a prospective clinical trial.[3,4,6,8,9]

Figure 1. Axial Images of the CT Scan of the Chest Showing Thickened Airways

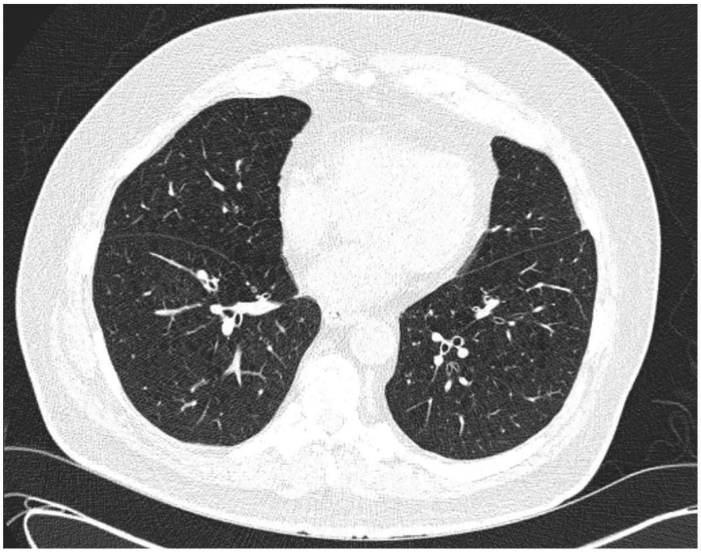


Figure 2. Axial Images of the CT Scan of the Chest Showing Upper Lobe Emphysema

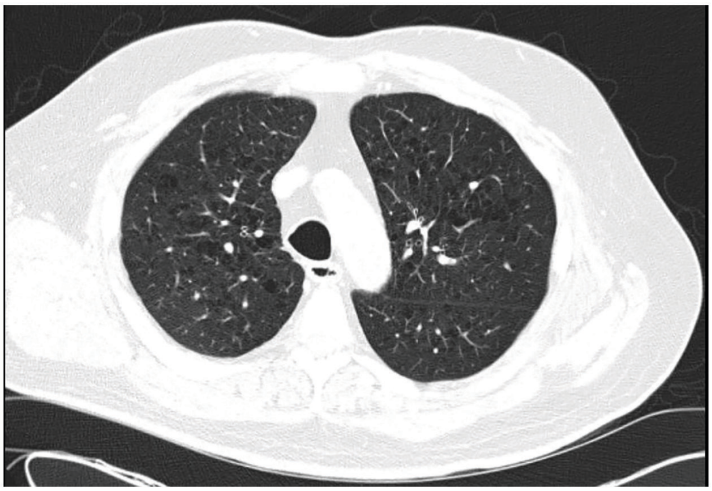
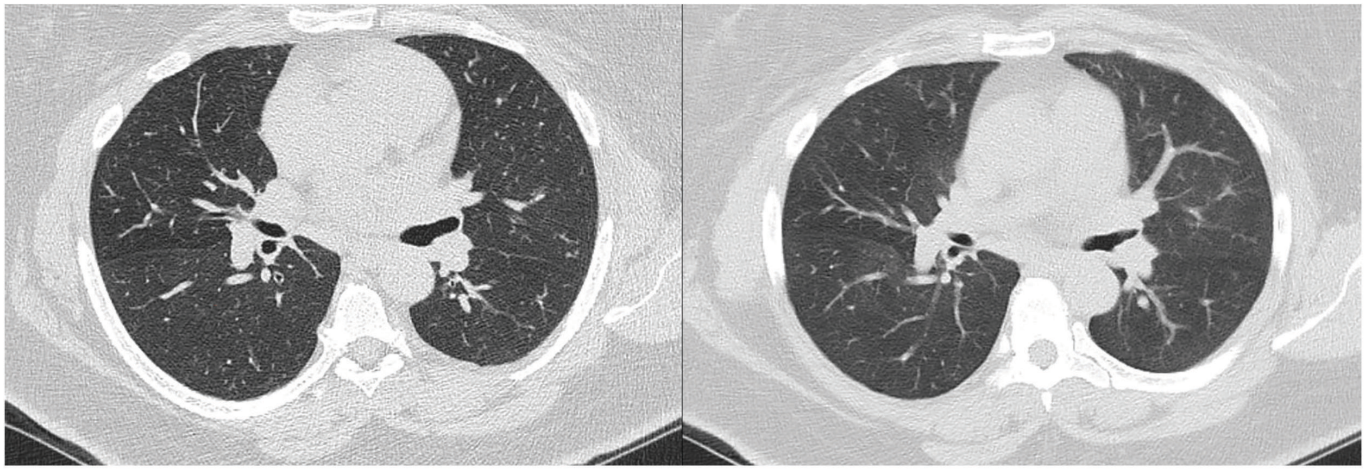


Figure 3. Axial Images of a CT Scan of the Chest During Inspiration (A) and During Expiration (B) Showing Air Trapping

A

B



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