Medical Management of Hospitalized Patients with Asthma or Chronic Obstructive Pulmonary Disease

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• Asthma • COPD • Acute exacerbation • ACOS • Hospital medicine
• Hospitalized patients

BRIEF PATHOPHYSIOLOGY OF ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

- Both asthma and chronic obstructive pulmonary disease (COPD) are treatable chronic inflammatory diseases of the lungs. Asthma is a common respiratory condition with reversible airflow obstruction, whereas COPD typically manifests as irreversible or partially reversible airflow obstruction.
- Pathologically, asthma and COPD are forms of chronic bronchiolitis with abnormal airway hyperreactivity, varying degrees of smooth muscle involvement, mucus production, and chronic bronchoconstriction. COPD is further distinguished by alveolar destruction leading to emphysema (which worsens air-trapping brought on by bronchoconstriction).
- In asthma, the outpatient therapeutic and management goals are to reduce impairment caused by breathlessness, to reduce risks such as respiratory failure, and to maintain drug therapy. Treatment is directed at reducing airway inflammation and reducing bronchospasm. The most common triggers are environmental allergens, air pollution, and viral infections.
- In COPD, the outpatient therapeutic and management goals are to reduce symptoms and risks from exacerbations, and to maintain drug therapy. In contrast with asthma, COPD is a disease caused by chronic and often daily exposure to

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noxious particles or gases. The small airways in COPD are gradually destroyed leading to chronic bronchitis and emphysema.[1]
- COPD is typically preventable with removing exposure to the noxious substance. Emphysema is not present in asthma but is a key pathologic feature of COPD.
- At present, there is no cure for either of these conditions.
- The goals during hospitalization for asthma and COPD are similar: to prevent acute respiratory failure and complications from hospital management.

HOSPITALIZATION OF ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE EXACERBATIONS

Overview

- The imminent danger during acute exacerbation of asthma or COPD is unrecognized and sustained cerebral hypoxia from acute respiratory failure, primarily from ventilation-perfusion mismatching and hypoventilation. Profound respiratory fatigue and exhaustion from increased work of breathing for days before admission contribute to the acute danger of an exacerbation.
- In asthma and COPD, the immediate goal is to guard against hypoxia with supplemental oxygen and to relieve dyspnea with short-acting beta-agonist bronchodilators with or without ipratropium bromide. The main goal is to avoid further respiratory compromise and failure.
- The 30-day mortality from acute COPD exacerbation is between 11% and 26% (more fatal than acute myocardial infarction), and approximately 340 patients with COPD and 10 asthmatics die each day in the United States.[2–4]
- The management of both diseases is similar. The fundamental difference from the home setting is close respiratory monitoring by registered nurses and respiratory therapists. In addition, noninvasive ventilation (NIV), particularly for patients with COPD, is available, and prevents the need for invasive mechanical ventilation, and associated risk of pneumonia. In severe stage 4 COPD, direct admission for hospice can be considered.
- Patients with asthma and COPD are hospitalized when they cannot manage at home, often indicated by the failure to improve with frequent albuterol use over a 2- or 3-day period. In both diseases, antibiotics and intravenous corticosteroids may shorten duration of symptoms and length of hospital stay, and prevent respiratory failure.
- On hospital discharge, patient with asthma or COPD benefit from outpatient transitional care services and instructions for follow-up care to ensure patient safety and prevent hospital readmission.

Identification of patients with undiagnosed asthma or COPD

Differentiating asthma from COPD in an undiagnosed hospital patient can be difficult. This problem has led to the recognition of asthma–COPD overlap syndrome (ACOS) (discussed later). The diagnosis of asthma or COPD is based primarily on clinical features of each individual case.

A focused and detailed clinical history along with inpatient spirometry near the end of the patient's hospital may assist with the diagnosis of asthma or COPD (**Table 1**). However, severe asthma may be indistinguishable from moderate and severe COPD on spirometry alone. The finding of a low carbon monoxide diffusing capacity suggests pulmonary emphysema and COPD, but these data are often not available. Emphysema on thoracic imaging can assist with the diagnosis of COPD. A low carbon monoxide