

Clinical practice guidelines for managing COPD in a primary care setting

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Chronic obstructive pulmonary disease (COPD) produces significant morbidity and mortality in countries around the world. Apart from the costs for direct patient care, COPD imposes a further burden on patients in the form of lost wages and the physical and emotional toll taken by the disease. It usually starts in the fourth decade of life after considerable toxic exposure. COPD is an indolent killer and is underdiagnosed and inadequately treated for a variety of reasons.¹

Toxic and genetic factors combine to produce inflammatory changes in the respiratory tree, which lead to the progressive and not fully reversible airflow limitation of COPD. Clinically, chronic cough, sputum production, and shortness of breath are consistent findings at all stages of COPD. The progression of the disease is related to mucus hypersecretion and ciliary dysfunction, which trigger sputum production. The airflow limitations are caused by airway remodeling. Histologic changes in the alveolar walls result in gas exchange abnormalities. Vascular changes lead to ominous pulmonary hypertension and cor pulmonale.

Several risk factors predict the development of COPD. Exposure to tobacco smoke is implicated in 80% to 90% of affected patients worldwide, and smoking is considered the primary risk factor for COPD.² Small percentages of patients have occupational or environmental exposures to toxic substances and irritants. One percent of patients with COPD have alpha₁-antitrypsin deficiency.

In 1999, the National Heart, Lung, and Blood Institute (NHLBI) and the World Health Organization (WHO) formed a consensus panel made up of experts from around the world and named the Global Initiative for Chronic Obstructive Lung Disease (GOLD). The panel produced a report, updated most recently in September 2005, titled *Global Strategy for the Diagnosis, Management, and Prevention of COPD*.¹ This

guideline emphasizes the need to detect and accurately stage COPD so that appropriate pharmacologic and nonpharmacologic therapies can minimize the impact of exacerbations and reduce hospitalizations. A new report is due out in 2006, but the main practice guideline is expected to remain unchanged.

Diagnosis of COPD

All patients with COPD have a chronic cough, sputum production, and some shortness of breath with exertion. The patient may present with these findings long before disease can be documented by pulmonary function testing, but such tests must be performed. COPD progresses at different rates in different patients. In some the disease advances quickly, while others experience a more indolent course. Toxic exposure drives most pathology in

The quality care perspective

From the AAPA Quality Care Committee

The GOLD clinical practice guideline summarized in the accompanying CSAC Special Report is one of several sets of evidence-based clinical practice guidelines for the management of COPD. This disease is the fourth leading cause of death in the United States, and adherence to practice guidelines is an important way to minimize COPD-related morbidity and mortality.

In COPD, as in many other diseases, clinical performance measures are being developed to assess how effectively clinicians and practices manage patient care. The measures developed for COPD are correlated with evidence-based practice guidelines. Clinical performance measures provide a way to track the quality of care provided and help to ensure that patients with COPD receive appropriate interventions. Measured interventions include spirometry testing, assessment of signs and symptoms, tobacco cessation intervention, oxygen saturation assessment, bronchodilator therapy, periodic arterial blood gas measurement, oxygen therapy, and influenza and pneumococcal immunization. For more information and to get a copy of the COPD performance measure tool, please see www.ama-assn.org/ama1/pub/upload/mm/370/copdmini032206.pdf.

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patients with COPD, and elimination of toxic exposure can often slow the progression of the disease.

Staging the disease

COPD is staged based on the results of pulmonary function testing. This testing should be done for all patients with chronic cough, sputum production, and shortness of breath. The forced expiratory volume in 1 second (FEV₁) should be measured against the forced vital capacity (FVC), the volume of air exhaled from the lungs with complete expiration. By definition, obstructive diseases have a greater impact on the volume of air expired than on changes in vital capacity. The clinician can intervene at any stage of COPD, and the choice of medication depends on the stage (see Figure 1, page 29).

The primary care provider must have timely access to pulmonary function testing for all symptomatic patients as part of the initial workup for COPD. Testing should include a bronchodilatory challenge. If the results of this challenge indicate that the obstructive disease is completely reversible, a diagnosis of asthma should be favored over one of COPD. If the obstruction is only partially reversible, a diagnosis of COPD should be considered. The degree of reversibility, even if only partial, may indicate a positive prognosis if the patient can reduce risk factors.

Stage 0 Early in COPD, patients have classic signs and symptoms (cough, sputum production, shortness of breath) but normal results on pulmonary function tests. Thus, the absence of measurable airway obstruction is designated stage 0, and the patient is said to be *at risk*.

Stage I Mild COPD manifests with chronic cough and sputum production. Patients have some shortness of breath but may not be aware that their pulmonary function is measurably decreased. FEV₁/FVC is less than 70% of predicted normal values. FEV₁ may equal or exceed 80% of predicted values.

Stage II Moderate COPD is characterized by chronic cough and sputum production, and shortness of breath may limit exertion. Patients may present with only shortness of breath. The FEV₁/FVC is less than 70% of predicted (as in stage I), but the FEV₁ is at least 50% of predicted.

Stage III Severe COPD involves progressive airway limitation, and clinical signs and symptoms worsen. The FEV₁ falls below 50%—but not below 30%—of predicted. Clinically, the patient has more exacerbations with continuing problems of cough and sputum production. This progression markedly impairs quality of life.

Stage IV In very severe COPD, the FEV₁ is less than 30% of predicted or patients are in a chronic state of respiratory failure even if the FEV₁ is greater than 30% of predicted. Hypercapnia and hypoxia are present, and supplemental oxygen therapy may be required to main-

tain an O₂ saturation higher than 90%. Severe, recurrent exacerbations markedly affect quality of life and threaten survival.

Management of COPD

Long-term treatment goals are to reduce the number of exacerbations, improve quality of life, reduce signs and symptoms, and prevent hospitalizations. The long-term management of COPD relies on several factors. First, pulmonary function tests must be used to assess and monitor disease progression. Second, patients must be educated to reduce avoidable risk factors. Finally, COPD requires proper therapeutic modalities to blunt the impact of disease progression. Inevitably, acute exacerbations manifest as short-term challenges that have to be controlled. So exacerbations must be managed to return patients to previous functionality.

Assessment and monitoring COPD progresses from cough and sputum production toward airway restriction and then respiratory failure. Other diseases that produce similar signs and symptoms but have infectious causes, such as tuberculosis, must be ruled out before management of COPD can proceed. The stage of COPD can be recognized only when signs and symptoms are linked to COPD and pulmonary function testing is done. Periodically, pulmonary function testing should be repeated to assess disease progression.

Education Helping patients to understand COPD, how it progresses, and how they can help to slow progression is an important part of management. Patients should avoid risk factors. With the exception of genetic factors, the vast majority of risk factors can be modified, no matter what the stage of disease. Obviously, smoking should always be discouraged.³ Other exposures should be analyzed and minimized as well.

Drugs and vaccines The treatment of COPD proceeds in a stepwise fashion, depending on the stage of the disease. Most efforts are aimed at decreasing symptoms and avoiding some complications. However, most medications will not alter the long decline that characteristically occurs in patients with COPD.

Pharmacologic treatments are prescribed to reduce symptoms and prevent exacerbations. Medicines can increase exercise tolerance and improve perceived quality of life, but they have little impact on disease progression. As COPD advances, medication use must be increased to control symptoms. Figure 1 presents medications in the order in which they are added to the treatment regimen.

- **Bronchodilators** help patients empty their lungs and reduce symptoms of breathlessness. They fall into three categories: beta-adrenergic agonists, anticholinergics, and nonselective phosphodiesterase inhibitors.

Continued on page 29

FIGURE 1

Therapy at each stage of COPD

Stage	0: At risk	I: Mild	II: Moderate	III: Severe	IV: Very severe
Characteristics	<ul style="list-style-type: none"> • Chronic symptoms • Exposure to risk factors • Normal spirometry 	<ul style="list-style-type: none"> • FEV₁/FVC <70% • FEV₁ ≥80% • With or without symptoms 	<ul style="list-style-type: none"> • FEV₁/FVC <70% • 50% ≤FEV₁ <80% • With or without symptoms 	<ul style="list-style-type: none"> • FEV₁/FVC <70% • 30% ≤FEV₁ <50% • With or without symptoms 	<ul style="list-style-type: none"> • FEV₁/FVC <70% • FEV₁ <30%; OR FEV₁ <50% plus chronic respiratory failure
Avoidance of risk factors; influenza vaccination					
			Add short-acting bronchodilator when needed		
				<ul style="list-style-type: none"> • Add regular treatment with one or more long-acting bronchodilators • Add pulmonary rehabilitation 	
					Add inhaled corticosteroids if repeated exacerbations
<ul style="list-style-type: none"> • Add long-term oxygen if chronic respiratory failure • Consider surgery 					
<p>Note: Treatments suggested are based on the results of randomized controlled trials where rich clinical data indicate consistent patterns (evidence category A).</p> <p>Adapted from Global Initiative for Chronic Obstructive Lung Disease.¹</p>					

- Beta-agonists stimulate receptors that relax bronchial smooth muscle. Short-acting (4-6 hours) and long-acting (more than 12 hours) beta-agonists are used alone or in combination. These medications are highly effective and well tolerated. Medications delivered by metered-dose inhaler or particulate inhaler are superior to nebulized forms. All are better than oral preparations, which have systemic effects. Longer-acting agents are more convenient, produce better compliance, and are well tolerated, but they are more costly. Bronchodilators should be used for symptomatic relief of measurable airway obstruction (stage II-IV COPD).
- Anticholinergics block parasympathetic receptors to produce bronchodilation. They are considered safe with few systemic side effects. Short-acting or long-acting preparations are used as monotherapy or combined with beta-agonists (stage II-IV COPD).
- Methylxanthines (such as theophylline) have a narrow therapeutic range where side effects occur at concentrations near or at the therapeutic dose. Toxicities manifest as cardiac arrhythmias, seizures, headaches, insomnia, nausea, and heartburn and may occur in the therapeutic range. Drug interactions are complicated through cytochrome P-450 metabolism. Methylxanthines have a limited role in moderately to severely ill patients. The long-acting agents are better tolerated.
- **Glucocorticoids** are available in oral and inhaled forms. Oral prednisone is widely used but has toxic effects on bones and integument. Oral glucocorticoids help patients to recover from acute exacerbations and aid in the restoration of lung function. They also prevent early symptomatic relapse. The data do not support long-term therapy with oral corticosteroids, but a small subset of patients may benefit from such therapy. Inhaled glucocorticoids are standard in the treatment of reactive airway disease. In stage III and IV COPD with three or more exacerbations per year; inhaled agents can help reduce exacerbations and add some symptomatic relief. They can be used in addition to bronchodilators or in a combined preparation.
- **Vaccines** are important in patients with COPD. Influenza vaccine should be administered to every patient annually or even twice a year. Pneumococcal vaccine has been used in patients with chronic respiratory disease. However, the GOLD Report could not recommend this vaccine based on current data.
- **Pulmonary rehabilitation** There are three components to pulmonary rehabilitation: education, nutritional counseling, and exercise training. Education helps patients understand the disease and adhere to treatment regimens. Nutritional counseling helps them manage their weight (up or down) to keep optimal body mass. Finally, adhering to a regular exercise routine can improve patients' quality of life. *Continued on page 56*