BACKGROUND

The diagnosis of chronic obstructive pulmonary disease (COPD) is a clinical art, with the important management goals of early diagnosis and appropriate staging. A broad definition of the disease, as suggested by international guidelines, includes a finding of airflow obstruction that is not fully reversible plus an appropriate risk factor and chronic symptoms, including cough, sputum production, dyspnea, or chest tightness. The following case highlights the importance of spirometry in diagnosing COPD and in selecting appropriate therapy. The recent multinational participants of the GOLD (The National Heart, Lung, and Blood Institute/World Health Organization Global Strategy for the Diagnosis, Management, and Prevention of COPD) workshop recommended a clear and comprehensive COPD management plan that includes the assessment and monitoring of disease, reduction of risk factors, and management of stable disease. Effective management was also defined to include preventing disease progression, alleviating symptoms, improving exercise tolerance, improving health status, preventing and treating complications, preventing and treating exacerbations, and reducing mortality. Thus, while smoking cessation remains the vital component in any comprehensive approach to the patient with COPD, the clinician must be cognizant of the full range of diagnostic challenges and therapeutic goals for these difficult-to-treat patients.

HISTORY

The patient is a 48-year-old woman with progressive breathlessness and increased cough for 2 days. While admitting to at least 2 years of breathlessness with moderate exertion, she attributes these symptoms to poor conditioning from decreased activity and increased weight. She is currently breathless at climbing 1 to 2 flights of stairs. She walks at a normal pace on level ground and sleeps well without breathlessness or cough. An intermittent daytime wheeze has been noted. She has had no nasal symptoms or signs suggestive of gastroesophageal reflux.

Her previous primary care practitioner prescribed a short-acting beta-agonist (MDI) to be used intermittently. However, the patient has used it infrequently as she has noted "no change."

She has smoked 2 packs of cigarettes each day for 30 years (ie, 60 pack-years). Because of her respiratory symptoms, she recently decreased her smoking to half a pack to 1 pack per day. She has gained 30 pounds over the past year as her cigarette consumption decreased. She has a cat and dog in her home. She works as a glass etcher but has no other chemical exposures.

There is no previous history of allergy, asthma, or cardiovascular disease. There is no family history of allergy, pulmonary disease, or skin disease.

PHYSICAL EXAMINATION

Vital signs are in the normal range. No obvious respiratory distress shown. Head and neck examinations negative. Thoracic excursions are symmetric. Percussion is in the normal range but there are signs of mildly decreased breath sounds and prolonged expiration. No wheezes or rales are audible. Heart and abdominal examinations are in normal ranges. No cyanosis, clubbing, or edema.
CASE STUDY

DISCUSSION
The patient describes breathlessness, a chronic symptom suggestive of COPD in the setting of an appropriate risk factor (cigarette smoking), making her a candidate for diagnostic testing to ensure early diagnosis. While the physical examination in such a patient might suggest the presence of wheezing and airflow obstruction, it is a crude and insensitive means of detecting severe disease. In a recent meta-analysis of 44 studies examining the value of clinical examination in diagnosing airflow obstruction, no single item or combination of items ruled out airflow obstruction. Objective wheezing, barrel chest deformity, rhonchi, hyperresonance, subxyphoid apical impulse, or objective measurement of prolonged expiration were the most useful signs in suggesting the presence of airflow obstruction. Given the current definition of COPD and the limitations of the clinical examination, objective confirmation of airflow obstruction is required to assure an accurate diagnosis of COPD that is easily done with spirometry, a widely available, standardized, and inexpensive diagnostic study. Unfortunately, spirometry in the evaluation of women with respiratory symptoms seems to be particularly underutilized. This is particularly distressing because recent data suggests that women are at greater risk than men for development of early-onset severe COPD and also have increasing COPD-related mortality.

The spirometric results document a decreased FEV₁/FVC, confirming the presence of airflow obstruction. The FEV₁ as a percent predicted has been utilized by numerous international societies to define severe, moderate, and mild disease. These criteria, although arbitrary in nature, identify groups of patients with increasing healthcare costs and progressively worsening health-related quality of life. Our patient's postbronchodilator FEV₁ would be classified as moderately decreased. Note: The symptomatology was limited despite significant airflow obstruction on spirometry, attesting to the value of spirometric testing in patients at risk for COPD.

While normalization of spirometry after administration of a short-acting beta-agonist may suggest an underlying diagnosis of asthma, some degree of bronchoreversibility is also often seen in patients meeting diagnostic criteria for COPD. In fact, an accurate diagnosis of asthma versus COPD can be quite difficult in patients with airflow obstruction. In these cases, additional diagnostic studies may help

Table. Spirometry and Other Tests

<table>
<thead>
<tr>
<th>Spirometric Measure</th>
<th>Baseline</th>
<th>After Albuterol Administration</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>% Predicted</td>
</tr>
<tr>
<td>FVC</td>
<td>2.58</td>
<td>3.75</td>
</tr>
<tr>
<td>FEV₁</td>
<td>1.33</td>
<td>2.92</td>
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<tr>
<td>FEV₁/FVC</td>
<td>0.52</td>
<td>0.78</td>
</tr>
<tr>
<td>FEFmax</td>
<td>3.45</td>
<td>6.43</td>
</tr>
</tbody>
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FVC = forced vital capacity; FEV₁ = forced expiratory volume in 1 second; FEFmax = maximal expiratory flow rate.
Clinicians differentiate asthma from emphysema or chronic bronchitis. For example, a measurement of diffusing capacity may identify a gas exchange defect more typical of emphysema. In our patient, the diffusing capacity, measured as part of the initial pulmonary function panel, was 60% predicted. In the context of her strong cigarette-smoking history, this suggests a component of emphysema. A radiologic evaluation, including high-resolution computed tomography (HRCT), could be employed to optimally define the presence of emphysema.19 When HRCT has been used to examine patients identified as having COPD in a primary care setting, emphysema and bronchiectasis are frequently identified.19 However, in this patient the expense of this diagnostic modality will not likely add important information at this stage of evaluation; thus, no HRCT was performed. Given the patient's younger age and advanced airflow obstruction, screening for alpha-1 antitrypsin deficiency is appropriate20; in our patient the level of 144 mg/dL was within the normal range.

Therapy
A long-acting beta-agonist combined with an inhaled corticosteroid (ICS) was initiated with improvement in exertional breathlessness. Because of the patient's persistent symptoms, an anticholinergic agent was added to her treatment with further relief of exertional limitation. The patient was referred to a comprehensive smoking-cessation program, as recent data have confirmed that smoking cessation can minimize lung function decline.21

Bronchodilators remain cornerstones of treatment in all published recommendations of treatment for COPD.22,23 They improve pulmonary function and exercise capacity, relieve symptoms, decrease frequency and severity of exacerbations, improve quality of life, and may decrease disease progression and mortality. Both anticholinergic agents and long-acting beta-agonists have demonstrated clinical value in the treatment of patients with symptomatic COPD and are considered first-line therapeutic alternatives in patients with persistent symptoms. This is particularly important in the presence of moderate disease, as verified by spirometry.21 Patients with bronchoreversibility, as seen in this patient, demonstrate a greater spirometric response to long-acting bronchodilators.24

The potential role of an ICS in a patient such as ours remains controversial. In patients with a confirmed diagnosis of COPD, clinicians currently believe an ICS is appropriate in the presence of severe disease (FEV₁ less than 50% predicted), recent hospitalization, or recurrent exacerbations.22,25 Also, in patients with asthma, an ICS is generally accepted as demonstrating particular efficacy.26 In our patient, given her younger age and evidence of bronchoreversibility, a trial ICS may be quite reasonable. Interestingly, some have suggested that bronchoreversibility in the setting of COPD is associated with increased sputum eosinophilia, a picture more typical of asthma.27 Whether these patients are more likely to exhibit spirometric or clinical response to an ICS remains controversial.22,23 A clear rationale exists for the combination of beta-agonists and an ICS in asthmatics with persistent symptoms; similar data have recently been published for this combination in patients with COPD.28 Further data are required to better define the role of such combination therapy in the COPD armamentarium.

References


