Chronic Obstructive Pulmonary Disease

Practical Approaches to Diagnosis and Management

MARCH 20, 2014
9:15 AM – 10:30 AM
Houston, Texas

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Educational Partner
Miller Medical Communications, LLC.
Session 2: Chronic Obstructive Pulmonary Disease: Practical Approaches to Diagnosis and Management

Learning Objectives

1. Evaluate the role of spirometry in chronic obstructive pulmonary disease (COPD) diagnosis and monitoring.
2. Review recommended pharmacologic interventions to reduce COPD symptoms and decrease exacerbations.
3. Select appropriate patient counseling strategies.

Faculty

Barbara P. Yawn, MD, MSc, FAAPP
Director of Research Olmsted Medical Center
Adjunct Professor
Department of Family and Community Health
University of Minnesota
Rochester, Minnesota

Dr Barbara Yawn is a family physician with many years of both practice and research experience. She has published more than 350 articles in peer reviewed journals, including many regarding obstructive lung disease such as asthma and COPD. She served on the National Heart, Lung, and Blood Institute national asthma guidelines Committee in 2007, and on the World Health Organization’s COPD and asthma guidelines committees.

Much of her respiratory-related research is designed to develop tools and methods to translate guidelines into everyday practice to improve patient outcomes. Her research is funded by the National Institutes of Health, the Agency for Healthcare Research and Quality, and the Centers for Disease Control and Prevention. She has been a frequent speaker at Pri-Med and has given many presentations on COPD in the United States and internationally. Her role as a primary care educator includes not only podium talks, but webinars, interactive virtual presentations, and group mentoring. Dr Yawn hopes to make COPD a comfortable and productive part of every primary care physician’s practice, while also facilitating other clinicians’ important roles in chronic disease management.

Fernando J. Martinez, MD, MS
Professor, Department of Internal Medicine
Associate Chief for Clinical Research
Division of Pulmonary and Critical Care Medicine
Director, Pulmonary Diagnostic Services
University of Michigan Health System
Ann Arbor, Michigan

Dr Fernando Martinez is professor of internal medicine and associate chief for clinical research in the division of pulmonary and critical care medicine at the University of Michigan Health System, medical director of pulmonary diagnostic services, and co-medical director of lung transplantation.

After graduating from the University of Florida School of Medicine in Jacksonville, he completed his residency in internal medicine at Beth Israel Hospital, New York City, and his fellowship in pulmonary medicine at the Boston University Pulmonary Center, Massachusetts.
Dr Martinez's main research interests include COPD, interstitial lung disease, lung transplantation, and lung volume reduction. He is a member of numerous societies, including the American Thoracic Society (ATS), the European Respiratory Society, American College of Chest Physicians, and the Fleischner Society. Previously, he was a member of the ATS committees that generated guidelines for the management of COPD, respiratory infections, and cardiopulmonary exercise testing; he is the former chair of the ATS assembly on clinical problems. He is currently a member of the GOLD (Global Initiative for Chronic Obstructive Lung Disease) science committee. Dr Martinez sits on a number of scientific journal editorial boards, including for COPD: Journal of Chronic Obstructive Pulmonary Disease and American Journal of Respiratory and Critical Care Medicine.

Faculty Financial Disclosure Statements
The presenting faculty reported the following:

Dr Yawn receives research funding from Boehringer Ingelheim; advisor and speaker honoraria from Amgen, Carden Jennings Publishing Co, Ltd, CSA Medical, Inc, Forest Laboratories, Inc, GlaxoSmithKline, Ikaria, Inc, Merck & Co, Inc, Nycormed, and PeerVoice; and honoraria for serving in expert capacity at US FDA meetings from Boehringer Ingelheim, GlaxoSmithKline, and Ikaria, Inc.

Dr Martinez receives honoraria/travel costs for European meeting attendance from Boehringer Ingelheim and Nycormed; and honoraria for steering committee participation from GlaxoSmithKline and Janssen Pharmaceuticals, Inc.

Education Partner Financial Disclosure Statement
The content collaborators at Miller Medical Communications, LLC, have no financial relationships to disclose.

Suggested Reading List


Gibson PG, Simpson JL. The overlap syndrome of asthma and COPD: what are its features and how important is it? Thorax. 2009;64(8):728-735.


Chronic Obstructive Pulmonary Disease - Practical Approaches to Diagnosis and Management

SESSION 2
9:15–10:30am

Chronic Obstructive Pulmonary Disease - Practical Approaches to Diagnosis and Management

SPEAKERS
Barbara P. Yawn, MD, MSc, FAAPP
Fernando J. Martinez, MD, MS

Learning Objectives

Upon completion of this activity, participants should be better able to:

- Evaluate the role of spirometry in COPD diagnosis and monitoring
- Review recommended pharmacologic interventions to reduce COPD symptoms and decrease exacerbations

Friday Afternoon 4:45 PM Visit

- Nancy—56 yo with cc of bronchitis
- Wants antibiotics before the weekend
- Coughing more for 2 weeks, productive-yellow
- ?Fever, some breathlessness up stairs

- Does not want to go to the ED again
- Does not want chest x-ray
- The last kind she received worked

Presenter Disclosure Information

The following relationships exist related to this presentation:

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Off-Label/Investigational Discussion

In accordance with pmiCME policy, faculty have been asked to disclose discussion of unlabeled or unapproved use(s) of drugs or devices during the course of their presentations.
What should we do?
- Take more history
  - Smoker 35 pack-years
  - Third episode of "bronchitis" in past 2 years
    - Colds last for weeks
    - Always worse than others
  - Decrease in activities due to trouble breathing with walking. Now SOB with 6 stairs
  - Has "smoker’s cough" for past 3 years
  - Mother developed "asthma" at age 60 and died of CHF at age 68

Think chronic lung disease!

Definition of COPD
- Chronic Obstructive Pulmonary Disease
  - Common, preventable and treatable disease
  - Characterized by:
    - persistent airflow limitation
    - progressive and
    - associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases
- Exacerbations and comorbidities contribute to the overall burden of disease in individual patients

Mechanisms Underlying Airflow Limitation in COPD

Small Airways Disease
- Airway inflammation
- Airway fibrosis, luminal plugs
- Increased airway resistance

Parenchymal Destruction
- Loss of alveolar attachments
- Decrease of elastic recoil

AIRFLOW LIMITATION

Key Barriers to COPD Diagnosis
- Failure of patients to notice and report symptoms
  - Early symptoms often do not interfere with completing activities of daily living
  - Symptom severity increases very slowly
- Failure of health professionals to inquire about respiratory issues
  - Tools to help—the COPD Population Screener
  - Be specific
- Misdiagnosis of COPD as asthma or bronchitis
- Underuse of spirometry

Why Is COPD Underdiagnosed?
Clinicians Tell All

Survey of 278 Clinicians

The COPD Population Screener (COPD-PS)
Asthma vs COPD

<table>
<thead>
<tr>
<th>Feature</th>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Often in midlife</td>
<td>Often in childhood</td>
</tr>
<tr>
<td>Family History</td>
<td>Variable</td>
<td>Often</td>
</tr>
<tr>
<td>Medical or Social History</td>
<td>Smoking (often &gt;20 pack years)</td>
<td>Atopy (ie, allergy and/or eczema)</td>
</tr>
<tr>
<td>Patients report</td>
<td>Most notable during exercise</td>
<td>Most notable at night or early morning</td>
</tr>
<tr>
<td>symptoms as...</td>
<td>“Mostly bad days”</td>
<td>“Mostly good days”</td>
</tr>
<tr>
<td>Airflow Obstruction</td>
<td>May be some reversibility with bronchodilatation</td>
<td>Largely reversible with bronchodilatation</td>
</tr>
</tbody>
</table>

Key Indicators of COPD

**Symptoms**
- Chronic cough
- Chronic sputum production
- Dyspnea:
  - Progressive, persistent
  - Worse with exercise and respiratory infections

**Risk Factors**
- Host factors
  - Genetics (eg, alpha-1 antitrypsin deficiency), hyper-responsiveness, lung growth
- Exposures
  - Tobacco, smoke from cooking fires, occupational dust, flour, chemicals

COPD Mis-Diagnosis

Hypothetical Male Patient With COPD Symptoms
- 42% diagnosed as COPD by physicians

Hypothetical Female Patient With COPD Symptoms
- 32% diagnosed as COPD by physicians

COPD symptoms in women were most commonly misdiagnosed as asthma

Nancy needs spirometry!

- Needs pre- and post-bronchodilator to see about reversibility and if she meets obstruction definition
- Needs FEV1 and FVC to determine severity and how to begin maintenance therapy

Spirometry: Obstructive Disease

<table>
<thead>
<tr>
<th>Volume, liters</th>
<th>Normal</th>
<th>Obstructive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td>4</td>
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<tr>
<td>6</td>
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</tbody>
</table>

FEV1 = 4 L
FVC = 5 L
FEV1/FVC = 0.8

FEV1 = 1.8 L
FVC = 3.2 L
FEV1/FVC = 0.56

Algorithm for Interpreting Spirometry Results

Acceptable Spirogram

Obstructive defect

Pure obstruction

Mild obstruction/ restrictive defect or hyperinflation

Further testing

Obstructive

Restrictive

Normal

Asthma

COPD
Nancy's Numbers

- You do spirometry on Nancy and get the following results:
  
  **Good quality tracing—rated B**

<table>
<thead>
<tr>
<th>Pre-bronchodilator</th>
<th>Post-bronchodilator</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1: 2.2 L (65% pred)</td>
<td>FEV1: 2.7 L (68% pred)</td>
</tr>
<tr>
<td>FVC: 4.0 L</td>
<td>FVC: 4.1 L</td>
</tr>
<tr>
<td>FEV1/FVC: 0.55</td>
<td>FEV1/FVC: 0.66</td>
</tr>
</tbody>
</table>

Avoid Interpretation Pitfalls

- **Common Interpretation Errors Among Family Physicians (N=12 practices) new to spirometry use**
  - Interpreting a normal result as an obstructive pattern
  - Interpreting a poor effort as a restrictive pattern
  - Diagnosing COPD in the absence of an FEV1/FVC ratio <70%

COPD Management

- **Suspect COPD**
- **Spirometry**
- **Select Rx based on:**
  - Symptoms
  - FEV1
  - Exacerbations
- **Modifications**
  - Inadequate response
  - Adequate response
  - Why inadequate?
    - Adherence
    - Triggers
    - Comorbidities
    - Psycho-social
    - Inhaler technique
    - Exacerbations
    - Disease progression

Assessment of COPD

- **Assess symptoms**
  - Dyspnea: Progressive, persistent, and characteristically worse with exercise
  - Chronic cough: May be intermittent and may be unproductive
  - Chronic sputum production: COPD patients commonly cough up sputum
- **Use mMRC, CAT, or CCQ to assess the patient’s level of symptom burden.**

Modified MRC (mMRC) Questionnaire

- Please tick in the box that applies to you:
  - **mMRC Grade 0**: I only get breathless with strenuous exercise.
  - **mMRC Grade 1**: I get short of breath when hurrying or walking up a slight hill.
  - **mMRC Grade 2**: I get short of breath when walking at my usual pace, or if I have to stop for breath when walking on my own pace on the level.
  - **mMRC Grade 3**: I get short of breath after walking about 100 meters or after a few minutes on the level.
  - **mMRC Grade 4**: I am too breathless to leave the house or I am breathless when dressing or undressing.

Assessment of COPD

- Assess symptoms
- Assess airflow limitation using spirometry

GOLD 1: Mild \( \text{FEV}_1 \geq 80\% \) predicted
GOLD 2: Moderate \( \text{FEV}_1 \) 50% to 79% predicted
GOLD 3: Severe \( \text{FEV}_1 \) 30% to 49% predicted
GOLD 4: Very severe \( \text{FEV}_1 < 30\% \) predicted

Nancy, cont’d

- mMRC is 2
- Exacerbations? Probably 2 per year
- \( \text{FEV}_1 \)—68% of predicted
- On no therapy until you treated “bronchitis” and began SABA

SABA = short-acting beta2 agonist

Combined Assessment of COPD

Assess symptoms first

- If mMRC 0-1 or CAT < 10: Less Symptoms (A or C)
- If mMRC > 2 or CAT ≥ 10: More Symptoms (B or D)

Combined Assessment of COPD

Assess risk of exacerbations next

- If GOLD 1 or 2 and only 0 or 1 exacerbations per year: Low Risk (A or B)
- If GOLD 3 or 4 or 2 or more exacerbations per year or 1leading to hospital admission: High Risk (C or D)

Pharmacological Therapy of Stable COPD: GOLD 2011

When assessing risk, choose the highest risk according to GOLD grade or exacerbation history

- Patient is now in 1 of 4 categories:
  A: Less symptoms, lower risk
  B: More symptoms, lower risk
  C: Less symptoms, higher risk
  D: More symptoms, higher risk
Additional Investigations

Chest X-ray: Seldom diagnostic, but valuable to exclude alternative diagnoses (CHF, lung cancer) and establish presence of significant comorbidities

Alpha-1 Antitrypsin Deficiency Screening: In COPD patients of Caucasian descent <45 yrs old, with strong family history of COPD

Lung Volumes and Diffusing Capacity: Help to characterize severity, but not essential to patient management

Oximetry and Arterial Blood Gases: Pulse oximetry can be used to evaluate a patient's oxygen saturation and need for supplemental oxygen therapy

Therapeutic Options: Key Points

- Smoking cessation has the greatest capacity to influence the natural history of COPD
- Pharmacotherapy and immunizations improve the lives of people with COPD
- Regular physical activity and should repeatedly be encouraged to remain active

Manage Stable COPD: Goals of Therapy

- Assess and relieve symptoms
  - Individual tools for assessment
  - Improve exercise tolerance
  - Pulmonary rehab
  - Improve health status
- Prevent disease progression
  - Exposure to smoking, occupational
  - Prevent and treat exacerbations
  - Pharmacotherapy, exposures
  - Reduce mortality

Nonpharmacologic Management: GOLD Overview

- Active reduction of risk factors
- Administer vaccinations
- Increase physical activity
- Add pulmonary rehabilitation
- Consider evaluation for need for supplemental oxygen
- Consider surgical eval

Recommended Pharmacotherapy

LAMA (scheduled)

LABA (scheduled)

SABA = short-acting beta2-agonist
SAMA = short-acting muscarinic antagonist (anticholinergic)
**Recommended Pharmacotherapy**

- **A**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (prn)
  - LABA or ICS (scheduled)
  - LAMA = long-acting muscarinic antagonist (anticholinergic)

- **B**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (prn)
  - LABA or ICS (scheduled)
  - LAMA = long-acting muscarinic antagonist (anticholinergic)

- **C**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (scheduled)
  - LABA or ICS (scheduled)
  - LAMA = long-acting muscarinic antagonist (anticholinergic)

- **D**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (scheduled)
  - LABA or ICS (scheduled)
  - LAMA = long-acting muscarinic antagonist (anticholinergic)


**Pharmacotherapy (Summary)**

- **A**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (scheduled)
  - LABA or ICS (scheduled)

- **B**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (scheduled)
  - LABA or ICS (scheduled)

- **C**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (scheduled)
  - LABA or ICS (scheduled)

- **D**
  - Short-acting bronchodilator (prn)
  - SABA or SAMA (scheduled)
  - LABA or ICS (scheduled)


**Adverse Effects of Therapy**

- **β2-Agonists**
  - Anticholinergics
  - Inhaled Glucocorticoids
  - PDE-4 inhibitor (Roflumilast)

<table>
<thead>
<tr>
<th>Effect</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachycardia</td>
<td>Dry mouth</td>
</tr>
<tr>
<td>Palpitations</td>
<td>Urinary retention</td>
</tr>
<tr>
<td>PVC*</td>
<td>Glaucoma</td>
</tr>
<tr>
<td>Tremors</td>
<td>Systemic effects: bruising, bone density, cataract</td>
</tr>
<tr>
<td>Hypokalemia</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Depression/Suicidal ideations</td>
</tr>
</tbody>
</table>

*PVC=premature ventricular contraction

**Therapeutic Options: Other Pharmacologic Treatments**

*Influenza vaccines* can reduce serious illness. Pneumococcal polysaccharide vaccine is recommended for COPD patients 65 years and older and for COPD patients younger than age 65 with an FEV1 <40% predicted.

The use of *antibiotics*, other than for treating infectious exacerbations of COPD and other bacterial infections, is currently not indicated.

**Manage Stable COPD: Nonpharmacologic Treatments**

<table>
<thead>
<tr>
<th>Patient</th>
<th>Essential</th>
<th>Recommended</th>
<th>Depending on Local Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Smoking cessation (can include pharmacologic treatment)</td>
<td>Physical activity</td>
<td>Flu vaccination Pneumococcal vaccination</td>
</tr>
<tr>
<td>B, C, D</td>
<td>Smoking cessation (can include pharmacologic treatment) Pulmonary rehabilitation</td>
<td>Physical activity</td>
<td>Flu vaccination Pneumococcal vaccination</td>
</tr>
</tbody>
</table>


Activity in People With COPD

- COPD patients are very inactive
- This inactivity is present in all GOLD stages

Therapeutic Options: Rehabilitation

- All COPD patients benefit from exercise training programs with improvements in exercise tolerance and symptoms of dyspnea and fatigue
- Although an effective pulmonary rehabilitation program is 6 weeks, the longer the program continues, the more effective the results
- If exercise training is maintained at home, the patient’s health status remains above pre-rehabilitation levels
- Nutrition counseling and education

Address Comorbidities of COPD

Must-Haves for COPD

- Spirometry
- Smoking cessation
- Pulmonary rehabilitation
- Pharmacotherapy
- Assessment and therapy of comorbidities
- Good across-group communications
- Team approach

COPD Management

Question & Answer