Improving Outcomes Through Evidence Based Diagnosis and Management of COPD

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Disclosures

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- DMSB: PTC Therapeutics
Learning Objectives

- Identify guideline-recommended objective measures for assessing current disease severity and risk for worsening disease and future exacerbations
- Provide individualized therapeutic recommendations, education, and training for patients following hospitalization for a COPD exacerbation
- Identify nonpharmacologic strategies for long-term management of COPD and associated benefits to health outcomes
- Describe comorbidities that impact risk for worsening disease and future exacerbations in patients with COPD

COPD Is Underdiagnosed

- COPD is a common preventable and treatable disease
- Characterized by persistent airflow limitation that is usually 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 severity in individual patients

In 2011, 15 million people in the US were estimated to have COPD. However, lung function tests show that up to twice as many people may have COPD, but are undiagnosed.

Burden of COPD

- 3rd leading cause of death
  - 133,575 deaths from COPD in 2010
  - Mortality rate has declined in men and some age groups since 1999, but continues to rise in women
- Total economic cost estimate in 2010 was $50 billion
  - $30 billion in direct healthcare costs
  - $20 billion in indirect costs
- Annual visits for COPD to:
  - Physician: 16 million
  - ED: 2.3 million
  - Hospital: 1 million

Ongoing Efforts to Improve Diagnosis and Management of COPD

- US DHHS effort to promote respiratory health
  - Goals of the Healthy People 2020 Program
    - Increase the rate of COPD diagnosis
    - Improve activity of adults with COPD
    - Reduce ED visits, hospitalizations, and deaths from COPD
- Updates to CMS Readmissions Reduction Program
  - CMS will reduce payments to hospitals for COPD readmissions within 30 days
  - Maximum penalty at 3% of a hospital's Medicare reimbursement

ED, emergency department.


CMS, Centers for Medicaid & Medicare Services; DHHS, Department of Health and Human Services.

Disease Overview

Pathophysiological Features of Airflow Obstruction in COPD

Normal

Airway held open by alveolar attachments

COPD

Disrupted alveolar attachments (emphysema)
Mucosal inflammation, fibrosis
Mucus hypersecretion

Airway obstructed by:
- Loss of attachments
- Mucosal inflammation + fibrosis
- Mucus obstruction of lumen

Patients with COPD Exhibit Different Phenotypes

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma COPD overlap syndrome</td>
<td>Mixed phenotype in COPD is defined as an airflow obstruction that is not completely reversible, accompanied by symptoms or signs of increased obstruction reversibility.</td>
</tr>
<tr>
<td>Emphysema-hyperinflation</td>
<td>Patients who present with dyspnea and intolerance to exercise as the predominating symptoms, which are frequently accompanied by signs of hyperinflation. Patients with emphysema phenotype present a tendency towards a lower BMI.</td>
</tr>
<tr>
<td>Frequent exacerbator</td>
<td>Patients reporting ≥2 exacerbations per year that are &gt;4 weeks apart. Patients may appear stable over time.</td>
</tr>
</tbody>
</table>

BMI, body mass index.

Exacerbation of COPD

An exacerbation of COPD is an acute event characterized by a worsening of the patient’s respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication.

Impact of COPD Exacerbations

- Exacerbations of COPD associated with:
  - Reduced lung function, health status, and physical activity
  - Increased risk of subsequent exacerbations and death
  - Development of complications
  - Worsening of comorbid conditions
- Frequent exacerbations associated with ↑ airway inflammation in the stable state
- Mortality from COPD exacerbations:
  - In-hospital for a hypercapnic exacerbation with acidosis is ~10%
  - All-cause mortality 3 years after hospitalization as high as 49%
  - Higher than mortality observed at 12 months following hospitalization for myocardial infarction

Risk Factors for COPD Exacerbations

- Continued exposure to:
  - Cigarette smoke
  - Industrial particulates
  - Indoor/outdoor pollution
- Worsening symptoms (dyspnea, cough, and secretions)
- Declining lung function
- Viral upper respiratory infections
- Previous exacerbation/hospitalization
- Increase in rescue medication use
- Maintenance medication nonadherence
- Poor device technique and inadequate medication administration

References:
Prevention of Acute Exacerbations of COPD (AECOPD)

Patient with COPD

At risk for AECOPD

Nonpharmacologic therapies

Recommended
• Annual influenza vaccine
• Pulmonary rehab (AECOPD ≤ 4 weeks)
• Education and case management

Suggested
• Pneumococcal vaccine
• Smoking cessation
• COPD action plan

Not Suggested
• Education or case management alone
• Education with action plan but without case management
• Telemonitoring

Inhaled therapies

Recommended
• LABA vs placebo
• LAMA vs placebo, LABA, or SAMA
• ICS/LABA combination vs placebo, LABA, or ICS alone
• LABA (anticholinergic or ICS) or anticholinergic monotherapy

Suggested
• SAMA + SABA vs SABA
• SAMA + LABA vs LABA
• SAMA vs SABA
• LABA vs SAMA
• LAMA/ICS/LABA vs placebo

Oral therapies

Recommended
• Long-term macrolides
• PDE4 inhibitors
• Theophylline
• N-acetylcysteine
• Carbocysteine

Suggested
• Systemic corticosteroids in an attempt to decrease AECOPD >30 days after initial event
• Statins

Not Recommended
• Systemic corticosteroids in an attempt to decrease AECOPD >30 days after initial event
• Statins

The majority of patients with COPD exhibit ≥3 comorbidities. All except which one of the following have been associated with greater likelihood of disease progression and readmission?

A. Congestive heart failure
B. Depression
C. Diabetes
D. Osteoporosis
The majority of patients with COPD exhibit ≥3 comorbidities

A subset of these have been associated with ↑ likelihood of disease progression and readmission for exacerbation
- Congestive heart failure
- Lung cancer
- Anxiety
- Depression
- Skeletal muscle weakness
- Osteoporosis

Impact of Comorbidities on Disease Progression and Future Exacerbations


Case Study: 58-year-old Female
Case Study: 58-year-old Female

- **History**
  - Previous 35 pack-year history
  - Is currently participating in a smoking cessation program, but reports occasional lapses
  - Current diagnosis of GOLD group B
  - Referred to pulmonary rehabilitation

- **Current medications**
  - LAMA maintenance therapy
  - SABA prn

- **Current presentation**
  - Presents to ED with coughing and dyspnea lasting for ~2 hours despite repeated SABA treatments by inhaler

Assessment and Management of COPD Exacerbations
COPD Care Map: Initial Presentation to the ED

Point of Entry
ED
(self-admitted or clinician referral)

Assess Severity of Acute Exacerbation

Implement/Modify Therapy to Treat Acute Symptoms

Diagnostic Options
- Arterial blood gases, pulse oximetry
- Chest X-ray, ECG, Other

Therapeutic Options
- Modify bronchodilator therapy
- Systemic steroids
- Antibiotic therapy?
- Consider NIV
- Other

(Consider admission criteria)

Assessing Exacerbations

Medical History
- Severity of COPD based on degree of airflow limitation
- Duration of symptoms
- Number of previous episodes (total/hospitalizations)
- Comorbidities
- Present treatment regimen
- Previous use of mechanical ventilation

Signs of Severity
- Use of accessory muscles
- Paradoxical chest wall movements
- Oxygen desaturation
- Development of peripheral edema
- Hemodynamic instability
- Deteriorated mental status

ECG, electrocardiogram; NIV, non-invasive ventilation.

Management of Acute Exacerbations

- Assess severity of symptoms, chest radiograph, and blood gases and/or O₂ saturation
- Provide O₂ as indicated
- Bronchodilation
  - Increase doses/frequency of short-acting bronchodilators
  - Combine SABAs with anticholinergics
  - Use spacers or air-driven nebulizers
- Corticosteroids: oral preferred
- Consider antibiotics, oseltamivir phosphate, NIV, SC heparin, or low-molecular-weight heparin
- Identify and treat associated conditions

SC, subcutaneous.

Corticosteroids to Prevent Relapse of Exacerbations

Prednisone vs PBO: Probability of Remaining Relapse Free for 30 Days

Tick marks represent censored data. \( P = .04 \) by the log-rank test.

PBO, placebo.
Oral Corticosteroids are Preferred Route of Delivery for Patients with Exacerbations

- Study of patients who were referred for a COPD exacerbation warranting hospitalization (N=435)
  - N=107 patients received 60 mg prednisolone IV for 5 days
  - N=103 patients received 60 mg prednisolone orally for 5 days
- Therapies resulted in equivalent rates of:
  - Treatment failure within 90 days
  - Improvement in FEV₁ and QOL
  - Length of stay
- Oral route may be preferable in treatment of patients with COPD exacerbations due to convenience and cost

FEV₁, forced expiratory volume in 1 second; IV, intravenous; QOL, quality of life.

5-day Course of Corticosteroids Should be the Norm in Patients with COPD Exacerbations

- 2013 trial of 341 patients with COPD exacerbations
  - Patients had GOLD Stage 3-4 COPD
  - Average FEV₁ of 31% predicted
- Randomized to 5 or 14 days of prednisone (40 mg)
- No difference noted in time to exacerbation within 180 days (primary endpoint)
- Lung function, mortality, need for mechanical ventilation, and symptom scores were all similar between groups
- Adverse events rare and occurred equally in both groups
- Hospital stays averaged 1 day shorter with 5-day regimen

What is the Right Dose of Corticosteroids to Prevent Future Exacerbations?

- Considerations for systemic corticosteroid administration
  - Optimal formulation (e.g., methylprednisolone or prednisone)
  - Dose
  - Route of administration (IV or oral)
  - Treatment duration
- Treatment of an AECOPD with higher doses of systemic corticosteroids does not improve patient outcomes
  - ICU treatment with >240 mg/day* methylprednisolone or equivalent was associated with worse outcomes and more frequent adverse events compared with lower doses

*Methylprednisolone, 125 mg every 6 hours, or 60 mg every 6 hours during the first 2 days of treatment.
ICU, intensive care unit.

Association of Antibiotic Therapy and Outcomes of Patients with COPD Exacerbation

- Retrospective study of patients >40 years old hospitalized for a COPD exacerbation and treated with systemic corticosteroids (N=53,900)
- Addition of antibiotics was associated with:
  - 40% reduction in in-hospital mortality
  - 13% reduction in 30-day readmission for COPD

Goals of In-hospital Management of Patients with COPD

- Control exacerbation/restore patient function
- Assess risk for future exacerbations
- Address the patient’s current disease management
  - Medications
  - Lifestyle (particularly smoking status)
- Consider patient comorbidities
- Evaluate home care environment
- Implement discharge and transitional care plans designed to prevent readmission
- Ensure appropriate follow-up within 1 week

Diagnosis of COPD and Confirmatory Testing
• Importance of spirometry for confirmation of COPD diagnosis
  – Spirometry is required to confirm diagnosis
  – Overlap in symptoms of COPD and asthma necessitates spirometric criteria to distinguish between the conditions
  – Testing is generally not performed in the acute setting
    ▪ Urgency of treatment intervention
    ▪ Testing accuracy would be compromised
  – Confirmatory spirometry is not generally performed even after the patient has been stabilized

Severity of COPD Symptoms: Classification Using Spirometry

<table>
<thead>
<tr>
<th>Category</th>
<th>Severity</th>
<th>Spirometry (% predicted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 1</td>
<td>Mild</td>
<td>FEV₁ ≥80% FEV₁/FVC &lt;0.70</td>
</tr>
<tr>
<td>GOLD 2</td>
<td>Moderate</td>
<td>50% ≤ FEV₁ &lt;80% FEV₁/FVC &lt;0.70</td>
</tr>
<tr>
<td>GOLD 3</td>
<td>Severe</td>
<td>30% ≤ FEV₁ &lt;50% FEV₁/FVC &lt;0.70</td>
</tr>
<tr>
<td>GOLD 4</td>
<td>Very severe</td>
<td>FEV₁ &lt;30% FEV₁/FVC &lt;0.70</td>
</tr>
</tbody>
</table>

FVC, forced vital capacity.
Tools for Assessment of COPD Symptoms

- mMRC Dyspnea Scale
  - Assesses severity of patient breathlessness
  - 5 grades: 0 no breathlessness to 4 very severe
- COPD Assessment Test (CAT)
  - 8-question assessment that assigns a score of 1 to 5 to each question
  - Measures frequency of symptoms
  - Higher scores denote a more severe impact of COPD on a patient’s life

Both have been validated and relate well to other measures of health status and predict future mortality risk.


mMRC Questionnaire

PLEASE TICK THE BOX THAT APPLIES TO YOU (ONE BOX ONLY)

| mMRC Grade 0 | I only get breathless with strenuous exercise. | ☐ |
| mMRC Grade 1 | I get short of breath when hurrying on the level or walking up a slight hill. | ☐ |
| mMRC Grade 2 | I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level. | ☐ |
| mMRC Grade 3 | I stop for 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. | ☐ |
**CAT Questionnaire**

Example: I am very happy | I am sad
---|---
I never cough | I cough all the time | 3
I have no phlegm (mucus) in my chest at all | My chest is full of phlegm (mucus) | 2
My chest does not feel tight at all | My chest feels very tight | 3
When I walk up a hill or one flight of stairs, I am not breathless | When I walk up a hill or one flight of stairs, I am very breathless | 4
I am not limited doing any activities at home | I am very limited doing activities at home | 2
I am confident leaving my home despite my lung condition | I am not at all confident leaving my home because of my lung condition | 2
I sleep soundly | I don't sleep soundly because of my lung condition | 3
I have lots of energy | I have no energy at all | 2

**Risk in COPD**

<table>
<thead>
<tr>
<th>Category</th>
<th>Exacerbations Per Year</th>
<th>Hospitalizations Per Year</th>
<th>3-year Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 1</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>GOLD 2</td>
<td>0.7 - 0.9</td>
<td>0.11 - 0.2</td>
<td>11%</td>
</tr>
<tr>
<td>GOLD 3</td>
<td>1.1 - 1.3</td>
<td>0.25 - 0.3</td>
<td>15%</td>
</tr>
<tr>
<td>GOLD 4</td>
<td>1.2 - 2.0</td>
<td>0.4 - 0.54</td>
<td>24%</td>
</tr>
</tbody>
</table>


Case Study: 58-year-old Female
Exam and Test Results

- **Symptoms**
  - Cough productive with white sputum
  - Audible wheezing during the past 2 to 3 nights (according to husband)
  - Mild chest tightness
  - Dyspnea

- **Physical exam**
  - Wheezing and decreased breath sounds on lung exam
  - Temperature: 98.9°F oral
  - HR: 68
  - BP: 128/72

- **SpO₂**: 86% on room air

- Poor response to initial dose of short-acting bronchodilators

BP, blood pressure; HR, heart rate.
Based on the information provided, what would be your next step with this patient?

A. Administer oxygen, repeat SABA, and reassess response
B. Administer oxygen, repeat SABA, add SAMA, and reassess response
C. A + admit patient
D. B + admit patient
E. Order additional testing

Treatment of COPD
The use of long-acting maintenance therapy is recommended for patients in which of the following?

A. GOLD group A  
B. GOLD group B  
C. GOLD group C  
D. GOLD group D

**GOLD Recommendations for Initial Pharmacotherapy**

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Recommended First Choice</th>
<th>Alternative Choice</th>
<th>Other Possible Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SAMA prn or SABA prn</td>
<td>LABA or LAMA or</td>
<td>Theophylline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SABA + SAMA</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>LAMA or LABA</td>
<td>LAMA + LABA</td>
<td>SABA and/or SAMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Theophylline</td>
</tr>
<tr>
<td>C</td>
<td>ICS + LABA or LAMA</td>
<td>LAMA + LABA or</td>
<td>SABA and/or SAMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LAMA + PDE4 or</td>
<td>Theophylline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LABA + PDE4</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>ICS + LABA and/or LAMA</td>
<td>ICS + LABA + LAMA</td>
<td>Carbocysteine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or ICS + LABA + PDE4</td>
<td>SABA and/or SAMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or LABA + LAMA or</td>
<td>Theophylline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LABA + PDE4</td>
<td></td>
</tr>
</tbody>
</table>

### Available Long-acting Bronchodilator Monotherapies

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Delivery</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arformoterol</td>
<td>LABA</td>
<td>Nebulizer</td>
<td>Sunovion</td>
</tr>
<tr>
<td>Formoterol</td>
<td>LABA</td>
<td>Nebulizer</td>
<td>Mylan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry powder inhaler (DPI)</td>
<td>Merck</td>
</tr>
<tr>
<td>Indacaterol</td>
<td>LABA</td>
<td>DPI</td>
<td>Novartis</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>LABA</td>
<td>DPI</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Aclidinium</td>
<td>LAMA</td>
<td>DPI</td>
<td>Forest</td>
</tr>
<tr>
<td>Tiotropium</td>
<td>LAMA</td>
<td>DPI</td>
<td>Pfizer/Boehringer</td>
</tr>
<tr>
<td>Olodaterol +</td>
<td>LABA</td>
<td>Soft mist inhaler (SMI)</td>
<td>Boehringer Ingelheim</td>
</tr>
</tbody>
</table>

### Available Long-acting Bronchodilator Therapies in Combination with ICS

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Delivery</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formoterol + budesonide</td>
<td>LABA + ICS</td>
<td>Metered dose inhaler (MDI)</td>
<td>AstraZeneca</td>
</tr>
<tr>
<td>Salmeterol + fluticasone</td>
<td>LABA + ICS</td>
<td>DPI</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Vilanterol + fluticasone</td>
<td>LABA + ICS</td>
<td>DPI</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Formoterol + mometasone*</td>
<td>LABA + ICS</td>
<td>MDI</td>
<td>Merck</td>
</tr>
</tbody>
</table>

*Off-label use. Not indicated for the treatment of patients with COPD.
PDE4 Inhibition

- May inhibit fibroblast-mediated contraction and formation of fibrotic tissues, which can disrupt lung function
- Roflumilast
  - Oral, selective, long-acting inhibitor of an enzyme called PDE4
  - Indicated for treatment to reduce the risk of exacerbations in patients with severe COPD associated with chronic bronchitis and a history of exacerbations

**Future of COPD Treatment**

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Delivery</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycopyrronium bromide</td>
<td>LAMA</td>
<td>DPI</td>
<td>Vectura, Sosei/Novartis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDI</td>
<td>Pearl</td>
</tr>
<tr>
<td>Indacaterol + glycopyrronium bromide</td>
<td>LABA + LAMA</td>
<td>DPI</td>
<td>Vextura, Sosei/Novartis</td>
</tr>
<tr>
<td>Umeclidinium + vilanterol</td>
<td>LABA + LAMA</td>
<td>DPI</td>
<td>GSK/Theravance</td>
</tr>
<tr>
<td>Olodaterol + tiotropium</td>
<td>LABA + LAMA</td>
<td>SMI</td>
<td>Boehringer Ingelheim</td>
</tr>
<tr>
<td>Aclidinium + formoterol</td>
<td>LABA + LAMA</td>
<td>DPI</td>
<td>Almirall/Forest</td>
</tr>
</tbody>
</table>

COPD Maintenance Treatment by Airflow Limitation/Risk

<table>
<thead>
<tr>
<th>FEV₁ % Predicted (Airflow Limitation)</th>
<th>Exacerbation Grade (Risk)</th>
<th>Treatment Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥80%</td>
<td>A (Low)</td>
<td>Smoking cessation; vaccinations; SABA prn</td>
</tr>
<tr>
<td>50%-80%</td>
<td>B (Medium)</td>
<td>Add to above: nebulized LABA-LAMA daily; pulmonary rehab; exacerbation action plan</td>
</tr>
<tr>
<td>30%-50%</td>
<td>C (High)</td>
<td>Add to above: ICS for exacerbation prone; referral to pulmonologist</td>
</tr>
<tr>
<td>&lt;30%</td>
<td>D (Very high)</td>
<td>Add to above: long-term oxygen therapy; consider surgical options</td>
</tr>
</tbody>
</table>

The Reversible Obstructive Airway Disease (ROAD) Program

- RTs provide inpatient COPD education
  - Anatomy and physiology of the respiratory system
  - Proper inhalation device use with return demonstration
  - Controlled breathing techniques
  - Infection control
  - Referral services
  - Medication reconciliation

- Patients given a written individualized action plan incorporating GOLD guidelines
- Participation in the program was associated with reduced hospital length of stay and readmission for COPD exacerbations

RT, respiratory therapist.
COPD Care Map: Transition Management

Transition Management

Patient Education/Counseling
- Cultural competency
- Health literacy

Home Care
- Update referral tracking and care information
- Communicate with specific providers
- Assess for barriers to care and refer to community/social services/other HCPs, if needed
- Provide patient education/ counseling
- Refer to pulmonary rehab, if applicable

Pharmacy
- Medication reconciliation

Medication Management
- Assess patient tolerability
- Assess patient response to medications
- Assess for nonadherence
- Reconcile any new medications

Collaborative Care Team:
- <1 Week postdischarge follow-up
- Consider 72-hour postdischarge follow-up call
- Reassess with spirometry if patient shows improvement
- Evaluate patient health literacy
- Consider including therapy known to reduce exacerbation risk (long-acting inhaled bronchodilators, with or without inhaled steroids, and possible PDE4 inhibitors)

Postdischarge Setting

Patient Education and Training
Which of the following components should be included in pulmonary rehabilitation programs for patients with COPD? (Choose all that apply)

A. Smoking cessation
B. Exercise training
C. Nutrition counseling
D. Patient education
E. Other
F. None of the above

Smoking Cessation

- Considered to be the most important therapeutic intervention in patients with COPD
- Has been shown to reduce COPD risk and mitigate the decline in pulmonary function
- Brief clinical interventions are clinically effective and cost effective
- Smoking cessation aids
  - Nicotine replacement gum, patch, inhaler
  - Bupropion
  - Varenicline

### The 5 A’s of Smoking Cessation

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask</td>
<td>About tobacco use with all patients (e.g., have you used any form of tobacco in the past 6 months?) and assess readiness to quit. If time allows, assess the person’s level of motivation to change behavior, using motivational interviewing techniques. Document tobacco use status.</td>
</tr>
<tr>
<td>Advise</td>
<td>Every tobacco user of the importance of quitting in a nonjudgmental and unambiguous manner.</td>
</tr>
<tr>
<td>Assess</td>
<td>How ready the patient currently is to quit tobacco use.</td>
</tr>
<tr>
<td>Assist</td>
<td>By providing minimal intervention. Refer to support and self-help resources, community clinics and services, other HCPs.</td>
</tr>
<tr>
<td>Arrange</td>
<td>Follow-up or referral</td>
</tr>
</tbody>
</table>

Available at: [http://mdquit.org/cessation-programs/brief-interventions-5](http://mdquit.org/cessation-programs/brief-interventions-5)

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### Components of a Comprehensive Pulmonary Rehabilitation Program

- Smoking cessation
  - Most important therapeutic intervention
  - Health benefits are immediate and substantial
- Exercise training
  - Significant improvements of dyspnea, health-related QOL, mobility, and decreased loss of lung function
- Nutrition counseling
  - COPD-related malnutrition is frequently observed
  - May contribute to wasting of peripheral and respiratory muscles involved in breathing or immune impairment
- Education of the patient and family members about the disease

Health Outcomes Associated with Pulmonary Rehabilitation Programs

- Significantly improves exercise capacity and health status in patients who have had an acute exacerbation of COPD
- Reduces the number of readmissions in the year following initiation
- Although the minimum length for rehabilitation to be effective is 6 weeks, benefit to the patient increases the longer the program continues

Vaccinations to Prevent Future COPD Exacerbations

- Influenza vaccines
  - ↓ respiratory tract infections that result in hospitalization and death in patients with COPD
- Pneumococcal vaccines
  - ↓ rate of community-acquired pneumonia in COPD patients
  - Pneumococcal infections result in a significant percentage of acute exacerbations of COPD
- Vaccinations remain highly underused
  - 38.4% of patients with COPD admitted to a university medical center had a prior influenza vaccine
  - Only half of eligible patients presenting with an exacerbation to a set of urban hospitals had influenza and pneumococcal vaccines
Inhaler Device Selection

Misuse of handheld devices for COPD management has been shown to be as high as which of the following in hospitalized patients with COPD?

A. 55%
B. 65%
C. 75%
D. 85%
COPD patient population is diverse with various levels of functioning

- Handheld devices assume patient is able to use correctly

Misuse of Devices for COPD in Hospitalized Patients Is Common

Misuse Rate for Hospitalized Patients with COPD (N=40)

- COPD patient population is diverse with various levels of functioning
- Handheld devices assume patient is able to use correctly

Mishandling of Inhaler Devices by Elderly in a Primary Care Setting

Frequency of Critical Errors by Device According to Age Class

Satisfaction With Nebulized Therapy

- Overall, patients with mild-to-moderate COPD were/had:
  - “Highly satisfied with their current nebulized treatment” (89%)
  - “Easier breathing” (68%)
- Patients agreed that nebulization provided:
  - “Better control of symptoms” (85%)
  - “Greater confidence that the right amount of medication was being delivered” (84%)
- Caregivers of patients with COPD reported nebulization:
  - “Made it easier to care for their friend/family member” (86%)
Discharge Planning

- The use of maintenance bronchodilator therapy for COPD is low

- At discharge from exacerbation:
  - 45% of patients with COPD were prescribed maintenance bronchodilators
  - 23% of patients with COPD were not prescribed an inhaled therapy at all

- The use of long-acting maintenance bronchodilators are recommended for all patients with GOLD group B and above

Criteria for Patient Discharge

- Inhaled SABA is required no more than every 4 hours
- Able to:
  - Use long-acting bronchodilators
  - Walk across room
  - Eat and sleep without frequent awakening by dyspnea
- Clinically stable for 12 to 24 hours
- Patient understands correct use of all medications
- Follow-up and home care arrangements completed
- Confident that the patient can manage successfully at home

Summary

- COPD represents a significant health and economic burden due to its high prevalence, chronicity, comorbidities, complexities, and progressive nature
- Appropriate treatment requires accurate diagnosis using objective measures to assess disease severity and risk for future exacerbations
- Individual characteristics influence the ability to adhere to therapy once patients leave the hospital and should be taken into account as part of discharge planning
- A multidisciplinary team of HCPs can provide patients with the education and training required to achieve optimal control of their disease and avoid unnecessary hospital readmissions

Additional Resources

- COPD Foundation
  - www.copdfoundation.org
- Global Initiative for Chronic Obstructive Lung Diseases
  - www.goldcopd.org
- Society of Hospital Medicine (SHM) Project Boost
  - www.hospitalmedicine.org/boost
- Smoking Cessation
  - www.smokefree.gov
  - www.lung.org/stopsmoking

Questions and Answers
Thank You!