COPD in Transitions of Care – an opportunity for Pharmacists

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Objectives and Agenda

- Recognize the burden of disease in older adults
- Acknowledge Burden on our Health Care System
- Describe the pharmacology of treatments and their impact on the disease process
- Demonstrate the varied administration methods for treatments and the importance in post acute care
- Recognize the new Treatment Guidelines for COPD
- Define the role of the pharmacist
COPD Defined.

- Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.
The most common respiratory symptoms include dyspnea, cough and/or sputum production. These symptoms may be under-reported by patients.

The main risk factor for COPD is tobacco smoking but other environmental exposures such as biomass fuel exposure and air pollution may contribute. Besides exposures, host factors predispose individuals to develop COPD. These include genetic abnormalities, abnormal lung development and accelerated aging.
COPD Has Been Shown to Be a Common and Costly Condition

- COPD is the 3rd leading cause of death in the United States\(^1,2\)
- COPD is the 2nd leading cause of disability\(^3\)
- By 2010, there were 14.8 million diagnosed COPD patients in the US\(^4\)
- COPD accounts for an estimated $29.5 billion in direct healthcare expenses\(^5\)

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Age-Standardized Death Rates for Chronic Obstructive Pulmonary Disease (COPD)—United States, 1999-2014

COPD as the underlying cause of death was defined by ICD-10 codes J40-J44.
Death rates are reported per 100,000 population and were age-standardized to the 2000 US projected population.
COPD in Long Term Care

- One of every six admissions to nursing homes was for patients with a history of emphysema or COPD\(^1\)

- In the last 12 months of COPD patients’ lives, one recent study reported there was a 40% likelihood of being admitted to a LTC facility\(^2\)

- Approximately 22% of the respiratory-related healthcare costs are nursing home costs; a greater amount was spent on hospitalizations (approximately 50%)

COPD in Long Term Care

- The majority of persons with COPD have cardiovascular disease including coronary artery disease, heart failure, and hypertension.
- Stroke occurs in a significant portion of persons with COPD.
- About 25% of persons with COPD have concurrent asthma.
- Age-related and steroid-induced osteoporosis occur frequently in persons with the disease, and COPD is a risk factor for nursing home–associated pneumonia.
- A significant number of persons with COPD have obstructive sleep apnea.

COPD in Long Term Care

- Depression and anxiety are also common in COPD; one study found that 40% of persons with COPD have depressive symptoms.
- Diabetes mellitus occurs in about 25% of persons with COPD.
- Malnutrition is a significant issue in some individuals with COPD.
- Substantial chronic airway obstruction leads to greater energy requirements due to the increased work of breathing, as well as inactivity from deconditioning.

Economic Burden of COPD

- Annual cost in the US: $30.4 billion
  - Direct cost: $14.7 billion
  - Indirect cost: $15.7 billion
  - Emergency services, hospitalization

- Per capita Medicare expenditure nearly 2.5 times higher with a COPD diagnosis than without
  - $8,482 vs. $3,511 without COPD

- Diagnosis of chronic respiratory disease is associated with a 172% increase in mean health care costs

Correlation Between Disease Severity and Total Treatment Cost

- Retrospective pharmacoeconomic analysis
  - 413 patients, 5 years

- Stage 1 (Mild) COPD: $1,681/patient/year
- Stage 2 (Moderate) COPD: $5,037/patient/year
- Stage 3 (Severe) COPD: $10,812/patient/year

Stepwise Approach to Treatment

- Early and accurate diagnosis
- Prevention of disease progression (deterioration of pulmonary function)
- Relief of symptoms
- Improvement in exercise tolerance and health status

Stepwise Approach to Treatment

- Prevention and treatment of exacerbations and complications
- Improvement in quality of life
- Reduction in mortality

Includes drug therapy, smoking cessation, oxygen, pulmonary rehabilitation, and nutritional intervention.

GOLD GUIDELINES

Maintenance Therapy for Long-term COPD Care—Considerations

- Focus of COPD care is shifting from acute treatment to long-term maintenance\(^1\)\(^-\)\(^3\)

- Many patients did not receive any maintenance COPD therapy\(^4\)

- GOLD can be used to inform the prescribing of maintenance therapy\(^3\),\(^5\)

- When selecting an inhaled COPD therapy, drug delivery and training should be considered\(^5\)

Maintenance Therapy for Long-term COPD Care—Considerations

- In the hospital prior to discharge, patients should start long-acting bronchodilators, either beta₂-agonists and/or anticholinergics with or without inhaled corticosteroids.

- Add 1 or more classes of long-acting bronchodilators when needed.

Risk Factors for COPD

- Smoking is the predominant risk factor\textsuperscript{1,2}
  - Implicated in >90% of US patients with COPD

- Others include\textsuperscript{1}:
  - Air pollution
  - Poor nutrition
  - Childhood respiratory infections
  - Preexisting bronchial hyperreactivity
  - $\alpha_1$-Antitrypsin deficiency (genetic, rare)
  - Occupational and environmental exposure (eg, coal dust, silica)

Age-Related Decline in FEV$_1$ Is Accelerated in Smokers

Adapted with permission from Fletcher C, Peto R. BMJ. 1977;1:1645-1648.
Age-Related Decline in FEV$_1$ Is Accelerated in Smokers
Mechanisms of Airflow Limitation 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

Pharmacological Reviews December 2004, 56 (4) 515-548; DOI: https://doi.org/10.1124/pr.56.4.2
Pharmacotherapy: Anticholinergic Agents

- Block bronchoconstriction
  - Increase FEV\textsubscript{1}
  - Have been shown to reduce exacerbation rate
  - May be associated with lower treatment costs\textsuperscript{1,2}

- Anti-cholinergics are considered first line\textsuperscript{3-5}
  - Minimal side effects
  - Do not cross blood-brain barrier
  - Minimal gastrointestinal absorption

- Extended therapy associated with improved baseline pulmonary function\textsuperscript{6}

Cholinergic Tone

Long-Acting $\beta_2$-Adrenergic Agonists

- Effective in improving FEV$_1$ and FVC, and may reduce COPD exacerbations
- May provide relief from nocturnal symptoms
- Can be used with ipratropium if short-acting $\beta_2$-agonist used frequently for rescue
- Unlike short-acting $\beta_2$-agonists, **NOT** for rescue

Inhaled Corticosteroids

- If response to anticholinergic and other bronchodilator therapy is suboptimal, inhaled corticosteroid therapy may provide benefit in some patients\(^1\)
  - Indicated only in patients
    - who are already receiving chronic low-dose corticosteroid therapy, or
    - who have a documented objective response to corticosteroid therapy

Inhaled Corticosteroids

- 4 major studies have been conducted\(^2\text{–}^5\)
  - No effect on mortality, rate of decline of FEV\(_1\)
  - No significant increase in FEV\(_1\) short term

Short-Acting $\beta_2$-Adrenergic Agonists

- If response to initial anticholinergic therapy suboptimal, add $\beta_2$-adrenergic agonist$^{1,2}$
- Combination MDI (ipratropium and albuterol)$^{1,3,4}$:
  - Greater efficacy, equivalent safety
  - Lower rate of exacerbations
  - Lower total treatment costs
  - Improved cost-effectiveness

MDI, metered-dose inhaler

Roflumilast therapy has a limited role in patients with severe COPD, and no role in patients with mild to moderate COPD.

It will not decrease the number of hospitalizations.

It will slightly lower the number of exacerbations requiring oral corticosteroid treatment, but only in select patients (i.e., those with a combination of severe COPD, current bronchitic symptoms, and a previous exacerbation).
Theophylline

- If response to initial anticholinergic/β₂-agonist therapy suboptimal, consider adding theophylline.

- Long-acting formulations generally preferred.
  - Modest bronchodilation, mild anti-inflammatory effects.

- Useful for noncompliant patients and those who have trouble with inhalation aerosols and those preferring oral drugs.

- Titrate dose to serum level up to a maximum of 12 μg/mL.
  - Some patients experience side effects at lower serum levels.

Anti-Inflammatory Agents

- If bronchodilator response is suboptimal, consider adding an anti-inflammatory drug
  - Corticosteroids (oral/inhaled)

- Useful in few patients
  - Consider 2-week trial of oral corticosteroid (40 mg prednisone QD)
  - Discontinue if no response
  - If patient responds, taper to minimal effective dose level and switch to inhaled corticosteroid

Anti-Inflammatory Agents

- **Limited role in chronic COPD**
  - 10% improve FEV$_1$ 20%$^2$
  - May actually detect “hidden” asthma$^3,4$

- **Cromolyn, nedocromil, and leukotriene modifiers have not been proven effective in COPD$^1$**

Long-Term Oxygen Therapy

- Indicated for $\text{PaO}_2 < 55 \text{ mm Hg or SaO}_2 < 88\%$

- Improves$^{1-4}$:
  - Survival in hypoxemic patients
  - Cognitive function, affect
  - Exercise performance
  - Sleep quality
  - Activities of daily living

Administration

- MDI (Metered Dose Inhaler) vs. HHN (Hand Held Nebulizer)
  - A HHN is not superior to an MDI
    - The problem is technique (consider a spacer)
  - With optimal technique a MDI delivers close to 12% of the drug to the lung.
  - In general, the HHN dose needs to be 6 to 10 times higher than the MDI to deliver the same degree of bronchodilation.

- Consider nursing administration time

- Consider the patient
What does all of this mean to us?

A New Focus on management and an effort to reduce hospitalizations
  - Impact to SNF
  - Impact on therapeutic decisions

Assessing devices and matching them to patients

COST EFFECTIVENESS
Post Acute and Long Term Care

- Formulary development
- Assessment surveys or work ups
- Cost management
  - Working with industry
  - Education
  - Discounts to Nursing Homes?
  - Product placement
Post Acute and Long Term Care

Today:

- Hospitals work to discharge
  - May or may not reconcile the medication list when sent to the nursing home
  - Goal is to maximize pulse ox and limit resources
    - (related to payment mechanisms)
  - Not effective at medication counseling
- LTC – day 1 – clean up the profile on admission, limit cost
Post Acute and Long Term Care

Tomorrow:
- Hospitals work to discharge
  - Better data and reconciliation
  - Recognition of penalties for re-hospitalizations
  - May add resources for medication counseling

LTC:
- Day 1 – clean up the profile on admission
- Plan of Care for discharge
- Reconciliation and Counseling critical
- On the hook for re-hospitalizations
Questions