COPD:
Update in Pulmonary Medicine

Clare Ramsey, MD, MSc, FRCPC
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COPD is a common chronic disease and is now the fourth leading cause of death amongst Canadians.[1] COPD is a chronic inflammatory disease of the airways leading to partially reversible airflow obstruction and lung hyperinflation that is progressive. Underdiagnosis of COPD is common and when diagnosed, the disease is often advanced. In developed countries, smoking is the most common cause of COPD and therefore screening smokers for COPD should result in earlier detection. The Canadian Thoracic Society recommends screening patients with spirometry who are > 40-years-of-age and who are smokers or ex-smokers if they have any of the following symptoms:

- regular cough,
- regular phlegm production,
- wheezing on exertion or at night,
- shortness of breath with simple chores, or
- frequent colds that persist longer than most people they know.[2]

A post-bronchodilator forced expiratory volume in one second (FEV1)/forced vital capacity (FVC) < 0.70 is required for the diagnosis of COPD.

In developed countries, smoking is the most common cause of COPD.

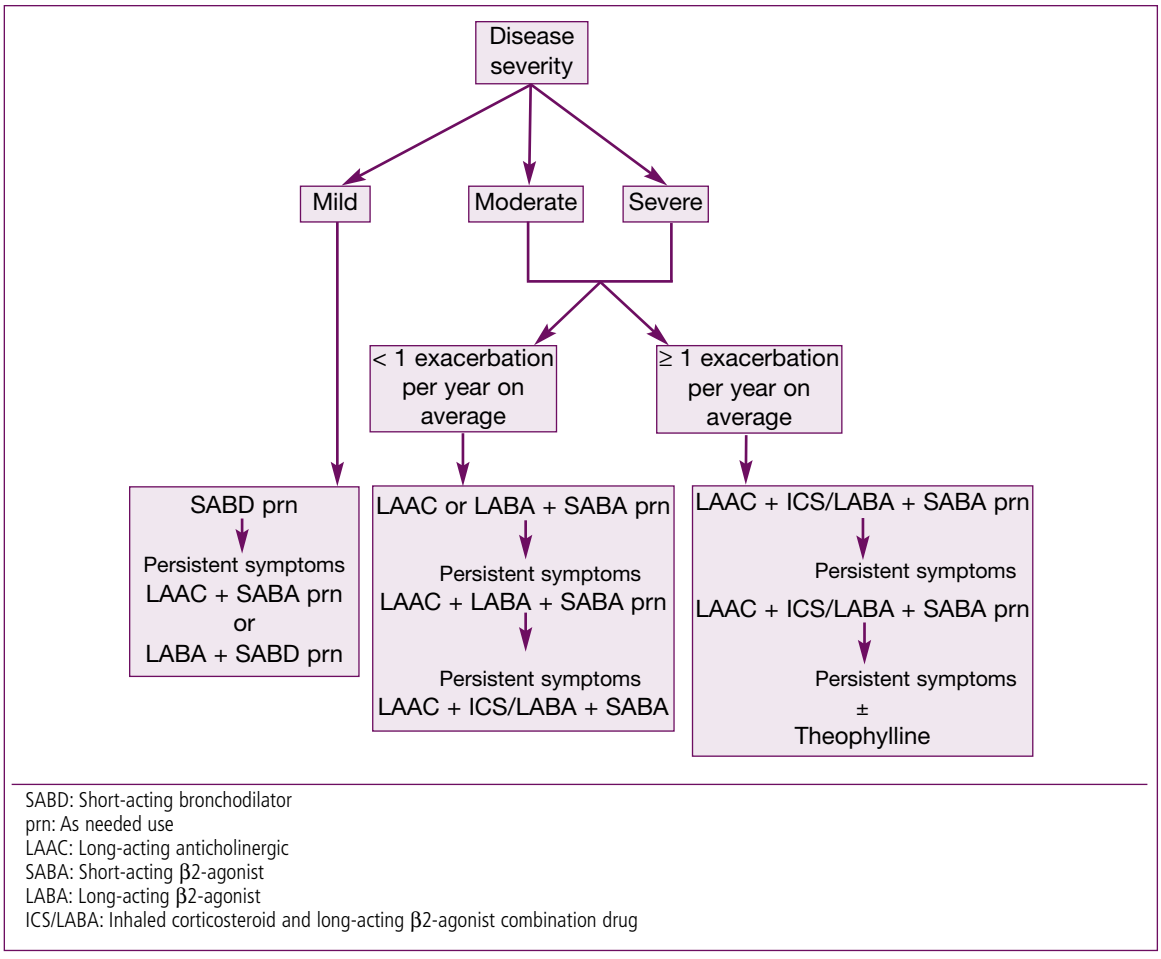
Table 1
Severity of COPD based on spirometry[2]

COPD category	Post-bronchodilator spirometry*
Mild	FEV1 > 80% predicted
Moderate	50% < FEV1 < 80% predicted
Severe	30% < FEV1 < 50% predicted weeks
Very severe	FEV1 < 30% predicted

*In all categories post-bronchodilator FEV1/FVC must be < 0.70
FEV1: Forced expiratory volume in 1 second
FVC: Forced vital capacity

How is severity of disease determined?

There can often be a discrepancy between a patient's FEV1 and their symptoms and thus it is important to use both measures when assessing disease severity. In the most recent Canadian guidelines, patients are classified with more severe disease at a higher FEV1 than previously. Classification of COPD severity using post-bronchodilator spirometry is shown in Table 1.[2] COPD management is based on the severity of disease, as determined by FEV1, degree of dyspnea (Medical Research Council dyspnea scale)[3] and frequency of acute exacerbations.



SABD: Short-acting bronchodilator
prn: As needed use
LAAC: Long-acting anticholinergic
SABA: Short-acting β2-agonist
LABA: Long-acting β2-agonist
ICS/LABA: Inhaled corticosteroid and long-acting β2-agonist combination drug

Figure 1. Treatment algorithm based on COPD severity.[2]

How do I approach the management of stable COPD?

The management of COPD patients should be approached in an individualized, step-wise manner including:

- education,
- smoking cessation,
- pharmacotherapy,
- non-pharmacotherapy and
- prevention of exacerbations.

Many patients with COPD have comorbid conditions which need to be addressed and managed in addition to their respiratory symptoms. The most common comorbidities include CVD and mood disorders (anxiety and depression).[4,5]

Smoking cessation

Smoking cessation is the single most important step in preventing and delaying the progression

of COPD. Thus, unless contraindicated, patients should be offered pharmacotherapy to assist with smoking cessation, as all drugs have been associated with improved quit rates. There are several types of pharmacotherapy including nicotine replacement therapy (inhaler, patch, gum), bupropion and a newer agent varenicline. Varenicline is an $\alpha 4\beta 2$ nicotinic partial agonist and antagonist which blocks binding of nicotine to its receptor and thus blocks the reinforcing effects of smoking. It also releases dopamine, curtailing withdrawal symptoms and reducing cravings. Studies have shown better abstinence rates compared to both placebo and bupropion.[6,7] In addition, frequent reminders about smoking cessation, avoidance of triggers, helplines and counselling sessions aid in sustained abstinence.

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Pharmacotherapy for COPD

Pharmacotherapy for COPD is designed to be a step-wise approach, dependant on the severity of disease, symptoms and clinical response to therapy. The approach to initiating and altering bronchodilator and anti-inflammatory therapy based on disease severity and symptom response is outlined in Figure 1.

Non-pharmacotherapy for COPD

Education, disease self-management and in end-stage disease, discussion of end of life issues are important components of COPD care. In addition, enrollment in a pulmonary rehabilitation program, or if no formal program is available, encouraging patient to remain active with the use of home-based exercise programs, should be encouraged. Studies have shown that the magnitude of effect on symptoms and quality of life are similar to those achieved with pharmacotherapy. Patients should be referred to a pulmonary rehabilitation program if they continue to have symptoms and exercise limitation despite optimizing pharmacotherapy.

When should a COPD patient be referred to a specialist?

When patients have any of the following features it is appropriate to consider referral to a specialist:[2]

- diagnosis is uncertain,
- onset of symptoms at an early age,
- accelerated decline in lung function (> 80 mL/year),
- failure to respond to therapy,
- symptoms are disproportionate to severity of airflow obstruction and
- severe or recurrent exacerbations.

Acute exacerbations of COPD

Acute exacerbations of COPD are defined as a worsening of baseline symptoms (cough, dyspnea, sputum production) necessitating increased pharmacotherapy. Acute exacerbations are associated with an accelerated decline in lung function and increased mortality.[8,9] Thus, it is important to

recognize and treat exacerbations; however, it is even more important to prevent exacerbations both with pharmacotherapy and vaccinations. This includes long-acting bronchodilators in patients with at least moderate COPD and combination therapy with inhaled corticosteroids and long-acting β-agonists in patients with previous exacerbations. Unless contraindicated, COPD patients should receive yearly influenza vaccines and a pneumococcal vaccine at least once.[2]

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Dr. Ramsey is an Assistant Professor, Departments of Medicine and Community Health Sciences, Sections of Respiratory and Critical Care Medicine, University of Manitoba, Winnipeg, Manitoba.

Take-home message

1. Patients > 40-years-of-age with a smoking history and any symptoms should have screening spirometry to diagnose COPD
2. A post-bronchodilator FEV1/FVC < 0.7 is necessary for the diagnosis of COPD
3. Both FEV1 and symptoms should be used in assessing disease severity and initiating pharmacotherapy
4. Smoking cessation is the most important factor in preventing and slowing progression of COPD
5. Pulmonary rehabilitation is an important component of COPD management
6. Preventing and treating acute exacerbations of COPD improves mortality and morbidity

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