

An Overview of COPD Management



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Sandra's Cough

Sandra, 70, has smoked one pack of cigarettes a day for 45 years. She typically has a mild chronic cough and sputum production.

Five years ago, she noticed she become dyspneic when climbing stairs.

The situation has since worsened, as she now becomes short of breath performing light housework or walking one block.

On exam:

- Thin
- No clubbing
- Poor air entry bilaterally with evidence of hyperinflation
- Chest X-ray: Flattened diaphragms with hyperinflated lungs
- Spirometry: Severe airflow obstruction (FVC= 1.40 L; FEV₁=0.80 L; FEV₁/FVC = 0.57)
- After bronchodilator: 8% improvement in FEV₁
- Oxygen saturation on room air at rest: 92%

What is Sandra's diagnosis?
For the answer, go to page 76.

FEV₁: Forced expiratory volume in one second
FVC: Forced vital capacity



Chronic obstructive pulmonary disease (COPD) is a respiratory disorder largely caused by smoking. It is characterized by:

- progressive, partially reversible airflow obstruction,
- systemic manifestations and
- increasing frequency and severity of exacerbations.

The primary risk factor for COPD is smoking. Deterioration of pulmonary function secondary to smoking occurs progressively over time. However, significant symptoms are often not noted until the fifth or sixth decade of life.

Despite a recent decrease in the prevalence of smoking in Canada, COPD remarkably remains the only major cause of death whose prevalence continues to rise. As such, COPD is currently the fourth leading cause of death in Canada.

What is the basic workup for COPD?

All patients in whom COPD is suspected should have spirometry done to confirm airflow obstruction. Oxygen saturation should be measured with a pulse oximeter on room air at rest.

More on Sandra

As judged by her symptoms and her spirometry, Sandra has severe COPD.

Counselling and smoking cessation should be the first priority in her management. She does not yet require home oxygen (saturation is 92% on room air), but her saturations should be re-assessed in four to six months.

For Sandra's treatment, go to page 77.

What therapy is recommended for COPD?

Management of COPD depends on the severity of the patient's symptoms; however, basic management can include education, bronchodilators and pulmonary rehabilitation.

Among the several therapeutic options available for COPD, only two therapies prevent or delay mortality—cessation of smoking and long-term home oxygen for hypoxemic patients.

Education and smoking cessation

Education and smoking cessation remain the cornerstone of COPD management.

Physician advice is a significant motivator for cessation and a recent trial demonstrated the efficacy of a three-minute physician intervention in encouraging cessation. Other options include nicotine patches and/or bupropion.

Home oxygen therapy

Current recommendations support the use of long-term home oxygen in patients with stable COPD and severe hypoxemia (partial pressure of oxygen in arterial blood [PaO_2] \leq 55 mmHg) or for patients whose PaO_2 is 55 mmHg to 59 mmHg and who have bilateral ankle edema or cor pulmonale and pulmonary hypertension or polycythemia.

What about bronchodilators?

Bronchodilators will reduce lung volume and lung hyperinflation, even in patients with fixed airflow obstruction. Reduction of lung hyperinflation will significantly decrease dyspnea.

The new medications used to treat COPD are long-acting beta-2 agonist (LABA) bronchodilators, long-acting anticholinergic bronchodilators and combination inhaled corticosteroid (ICS)/LABA bronchodilators.



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Beta-2 agonists

Beta-2 agonists act directly on beta-2 receptors on the bronchiole smooth muscle, resulting in bronchodilation and subsequent improvement in objective measures of airway function, exercise tolerance and dyspnea.

Side-effects include stimulation of the cardiovascular system resulting in tachycardia, palpitations and, possibly, hypokalemia.

Anticholinergics

Anticholinergics inhibit parasympathetic activity and sympathetic cholinergic activity by blocking muscarinic receptors. This results in both bronchodilation and a decrease in secretions.

Adverse events are not common; however, urinary retention and glaucoma are rarely associated.

Inhaled corticosteroids

ICSs should not be considered first-line therapy, as they have been found no better than placebo in improving pulmonary function and in slowing the disease process. It is suggested use of ICS be reserved for patients with severe COPD, who have a history of three or more exacerbations per year.

Side-effects include oral candidiasis (5%) and dysphonia. At higher dosages, systemic effects of adrenal suppression have also been noted to occur.

Combination ICS and LABA

The combination products have shown to be better than placebo in improving pulmonary function, decreasing dyspnea and improving quality of life. Trials also suggest combination ICS/LABA products improve pulmonary function to a slightly greater extent when compared to LABA used alone.

However, studies thus far have not shown combination products to improve dyspnea, quality of life or decrease exacerbation rates compared to LABA alone.

Treating Sandra

Sandra would benefit from drug therapy. Based on her severity, it would be beneficial to start treatment with tiotropium, 18 µg one puff daily, along with salbutamol, two puffs every four hours, as needed.

In several weeks, if she remains short of breath, salmeterol, 50 µg twice daily (or formoterol, 12 µg twice daily), should be added.

Sandra would benefit greatly from smoking cessation and from an in-patient- or outpatient-based pulmonary rehabilitation.

She should also receive a yearly flu shot and a 23-valent pneumococcal vaccine every seven to 10 years.

Take-home message



- First-line therapy should focus on smoking cessation counselling, education and influenza/pneumococcal immunizations.
- The Canadian COPD Guidelines suggests a stepwise approach to pharmacologic therapy is most appropriate. Start with short-acting bronchodilators or a single long-acting bronchodilator and add medications successively if symptoms remain severe.
- Pulmonary rehabilitation is useful for patients who remain symptomatic.
- Home oxygen may be indicated for patients whose PaO₂ is < 60 mmHg.

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