

Chronic Obstructive Pulmonary Disease

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Chronic Obstructive Pulmonary Disease (COPD) is a consolidated term for the group of diseases that causes airflow limitations; persistent cough accompanied by mucus and shortness of breath (SOB) characterize the symptoms of COPD. The COPD is divided into sub types such as emphysema, chronic bronchitis, and persistent obstructive asthma.



In Australia, 1 in 20 Australians age 45 have COPD, and COPD ranks 5th as the leading cause of death in 2015. Cigarette smoking is the most frequent risk factor for COPD as it is present in 25% of smokers. Although commonly associated with a history of smoking, some people specifically in developing countries develop COPD, not due to exposure to first hand or second-hand smoke instead with contact to biomass smoke for heating and cooking. Other non-modifiable risk factors include age and genetics. COPD can be managed and treated, with proper care and management most people can achieve reduced symptoms occurrence and better quality of life.

Types

- **Chronic Bronchitis** is a productive cough for three months in the previous two years with whom other causes are not considered. Symptoms can develop as early as 36 years of age for smokers. Bronchial tubes constrict in bronchitis, and lungs create more mucus further blocking the narrowed bronchial tubes. These scenarios cause chronic cough in affected people.

- **Emphysema** defines the structural changes in the lungs including abnormal and permanent enlargement of airspace; it causes obliteration of the delicate walls and elastic fibers of air sacs called alveoli. Further, it causes airway collapse resulting in impaired airflow from the lungs.

Symptoms

Physicians are most likely to diagnose the patient with COPD if the patient is a smoker or previous smokers, older than 35 years old, and have occupational or environmental exposures to toxic fumes or COPD triggers. The three significant symptoms of COPD are dyspnea (difficulty breathing), chronic cough, and sputum or phlegm production. Other definitive symptoms are below:

- Breathlessness
- Cough
- Recurrent respiratory tract infection
- Productive cough
- Wheezing, high-pitched whistling sound
- Chest heaviness
- Frequent respiratory infections
- Fatigue
- Shortness or difficulty breathing in heavy or regular activities.
- Cyanosis (Bluish discoloration of the nails), an indication of pure oxygen circulation in the body

People who may have COPD can experience exacerbation where the symptoms are becoming worst and may persist for several days.

Causes

The leading cause of COPD is related to exposure to tobacco smoke, either active (first hand) or passive (second-hand or third-hand smoke). Other environmental and occupational exposures to include biomass fuel and chemical fumes. Amount of exposures to smoking determines the severity of COPD. Other causes of COPD are related to genetics; some individuals have flawed DNA called “alpha-1 antitrypsin deficiency” this translates to lack protein in the lungs to perform in protecting the lungs from damage.

Diagnosis

- **Physical Examination and History:** Physician assesses the patient for difficulty in breathing, chronic cough with phlegm and copious sputum production for the past months. The doctor also asks about the exposure of the patient to first hand or second-hand tobacco smoke or occupational and environmental fumes like biomass smokes, chemical fumes, dust, and toxic substance.
- **Radiography (X-ray/CT Scan):** Is the use of the little amount of radiation to visualize the lungs; these are used to evaluate for other causes of breathing difficulty such as lung cancer, tuberculosis, and heart failure), radiography is also used to determine the severity and complications of COPD.

- **Pulmonary Function Tests:** is a non-invasive procedure to check the performance of the lungs against its expected outputs. It accurately measures the parameters related to lung volume, capacity, rates of flow and gas exchange.
- **Pulse oximetry:** is a painless procedure using a clip-like device put commonly into fingers or ear lobe with a goal of measuring the circulation of oxygen into the body remote from the heart such as the limbs.
- **Arterial blood gas:** It is performed by drawing blood from the arteries in the body mainly in the wrist. It measures the levels of gases together with oxygen in the blood and can rule out other causes of breathing difficulty, chronic and productive cough or narrowed airways.

Management and Treatment

- **Non-Drug Management** The principal goals of managing COPD include the following,
 - Reduction of symptoms
 - Reduce the frequency or severity of attacks and salvage the decline in lung function
 - Improve tolerance to exercise and activities of daily living
 - Improve quality of life
 - Slow disease progression.

Recommended actions are the following:

- Quitting Smoking or Eliminating exposure to tobacco smoke: Quitting active or passive exposures to tobacco smoke partially prevents or restricts the already occurred lung damage. Since tobacco smoking is the main culprit for the occurrence of COPD, smoking cessation is the only intervention that was shown to improve the course of COPD.
- Physical Activity: Sedentary lifestyle aggravates attacks of COPD; research shows that performing routine exercises and regular activities decrease the risk of hospitalization among COPD patients.
- Pulmonary Rehabilitation: can be consist of the following:
 1. Exercise training
 2. Education
 3. Behavior modification
 4. Outcome assessment ; Examples of pulmonary rehabilitation exercises include aerobic and strength training of the upper and lower limbs, also involved are breathing exercises and targeted inspiratory muscle training. Pulmonary rehabilitation improves the quality of life among COPD patients regardless of severity.
- Immunization: Doctors recommend that patients with COPD receive the vaccine for influenza. Influenza vaccination reduces the risk of acute exacerbations among COPD patients.
- **Maintenance of Drug Treatment and Management**
 - Bronchodilators and metered dose inhalers: anticholinergic and beta-adrenergic drugs relax muscles around the air sacs and bronchioles allowing symptom relief to the patient. Examples of anticholinergic drugs are ipratropium, umeclidinium, and tiotropium [4]. Inhaled beta-adrenergic drugs such as albuterol act much better and relieve the shortness of breath faster than

anticholinergic drugs making it useful during acute attacks; in include salmeterol, formoterol, arformoterol, vilanterol, olodaterol, and vilanterol.

- Steroids: are helpful for patients with moderate and severe COPD with symptoms that cannot be controlled by bronchodilators and metered dose inhalers. It is often used in frequent flare-ups. Although they do not by itself treat lung function deterioration, they are very helpful in preventing flare-ups and exacerbations of COPD symptoms. It can be given by mouth as oral medications or maybe in the form of inhalants.
- Oxygen therapy: some people may need oxygen therapy to maintain adequate oxygen circulation in the body. Some may only need briefly, but for some severe COPD cases, long term or life-time oxygen therapy may be suggested to prolong and maintain the quality of life.