Chronic Obstructive Pulmonary Disease

As its name implies, Chronic Obstructive Pulmonary Disease (COPD) occurs as a result of the narrowing of the airways which results in progressive breathlessness as the disease worsens. The term is used to describe a group of diseases including emphysema and chronic bronchitis.

The condition is characterised by respiratory symptoms which include:

- Cough which is chronic and persistent
- The production of excessive sputum
- Wheezing
- Tiredness
- Recurrent chest infections

Overall the appearance is one of worsening breathlessness accompanied, as the disease progresses, by distress and discomfort.

The chest may appear barrel-shaped and the lips may adopt a dusky blue hue. The respiratory disease may put a strain on the heart resulting in signs of heart failure including a rapid pulse and swelling of the ankles (oedema).

The respiratory tree is an amazing structure and air is exchanged between the outside and the body continuously.

Air passes down the trachea during inspiration (breathing in), into the two main bronchi (left and right) and into the bronchioles. After further divisions the bronchioles become very...
small (**terminal bronchioles**) and end in groups of air sacs called **alveoli** which have an appearance similar to bunches of grapes. It is estimated that there are 300 million alveoli in a single lung (which sounds incredible).

The alveoli are very delicate and are wrapped in capillaries. Oxygen and carbon dioxide exchange occur between the lung and the circulation. The alveoli may be damaged easily.

**The most significant cause of COPD is smoking, responsible for the disease in most people.** Other factors include persistent inhalation of dusts in some types of industrial activity, fumes from some chemicals and air pollution.

The pathological changes are those of chronic bronchitis, with lung inflammation, excessive mucus production and a condition called **emphysema**. Emphysema is a long-term condition causing shortness of breath through destruction of the alveoli and the smaller bronchioles resulting in the formation of cavities and localised collapse of the lung.

People with COPD and associated loss of lung function breathe fast to compensate and it is for that reason that they appear breathless.

Although the symptoms of COPD are chronic, patients may get an exacerbation of the disease, usually when they contract a bacterial or viral infection. This results in further deterioration in lung function and severe breathlessness. Such episodes may be very serious or even fatal.

The diagnosis of COPD can be made simply by a test called **spirometry**. The it may be done in the surgery and the results can be used to make a diagnosis and assess the severity of the condition. Other tests will include a chest X-ray and the measurement of blood gas levels. In established cases other tests to measure the rate of deterioration will be appropriate.

**Treatment of COPD may be difficult and disappointing, especially in the later stages of the disease.**

The first principle of treatment is to **stop smoking** or remove the patient from an environment where **dust or fumes** is a significant contributor. **Inhalers** form an important element of disease control.

Bronchodilator inhalers relax the muscle in the walls of the bronchi, easing the shortness of breath and wheezing.

They may be of one of two types, **beta-agonists** such as salbutamol or terbutaline (which are usually blue inhalers) or **anticholinergic drugs** such as ipratropium or tiotropium (which may be green inhalers).

Both types are effective and may help at any stage in the disease. **Corticosteroids**, given by inhaler, may also help with the control of the disease and work by stabilising the bronchial muscle to reduce contractility and also to reduce lung inflammation. Beclometasone and budesonide are probably the best-known inhalers and they are usually brown.

**There are now a host of longer acting beta-agonist and steroid combination inhalers which are very effective and have a much longer-lasting effect.**

Sometimes other drugs such as the bronchodilators theophylline or aminophylline may be used and are usually administered as tablets.

In acute exacerbations of COPD the normal treatment is by high dose, short-term (5-7 days) steroids such as prednisolone normally combined with antibiotic therapy when infection is present and the vigorous use of bronchodilators.
In chronic and acute COPD **oxygen** may be required either long- or short-term. It may be administered either directly from cylinders or by the use of a machine called an **oxygen concentrator**.

The machine concentrates the oxygen in the air and delivers the enriched air through a mask or nasal cannulae.

**Pulmonary Rehabilitation**

...is a specialised programme of exercise and education. The purpose of the programme is to reduce shortness of breath and to increase exercise capacity and is combined with dietary review to reduce obesity where present.

Occasionally surgery to remove any large cavities may be considered because such cavities, which are non-functional areas, may compress more normal lung.

The overall purpose of the programme is to achieve the best lung function possible with the remaining functional lung tissue.

**Surgery** including **pneumonectomy** (removal of part of a lung such as a cavity) or **lobectomy** (removal of a lobe of lung) or even **lung transplant** may be an option but only for a very small number of people.

Because of the increased risk of serious consequences associated with catching influenza, all COPD patients should receive influenza immunisation annually.

It is estimated that about 1.2 million people have COPD in the UK, although figures do vary. COPD is therefore the second most common lung disease after asthma.

Unfortunately COPD gradually worsens over time and, of course, is aggravated by continuing to smoke, severe airflow obstruction, breathlessness, poor exercise capacity and frequent acute exacerbations with infection. Despite all treatment, progress may be inexorable and can ultimately lead to death of the sufferer.

However, it is a largely preventable condition and risk is considerably reduced if **smoking is avoided**.

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