Literature

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Treatment Options

for Patients with Emphysema

Treatment Options for Patients with Emphysema

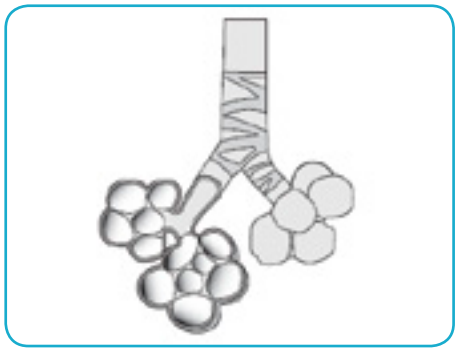
COPD

COPD (Chronic Obstructive Pulmonary Disease) is the occurrence of chronic bronchitis or emphysema, a pair of commonly co-existing diseases of the lungs in which airways become narrowed, This leads to a limitation of the flow of air to and from the lungs, causing shortness of breath (dyspnea).

Emphysema

Emphysema is a chronic disease of the lungs. It is most commonly caused by smoking but there is also a group of people who have a rare genetic disorder, known as alpha-1-antitrypsin deficiency, which increases the risk of emphysema. Within the normal lung, there are millions of small air sacs called alveoli. In a healthy lung, the alveoli are elastic and form a dense structure. The alveoli provide a large surface area for gases to be exchanged in-between the air and the blood: oxygen passes into the bloodstream from the air and carbon dioxide is breathed out.

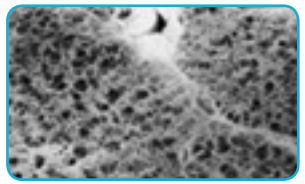
In emphysema, the walls separating the alveoli become diseased and so the alveoli merge to become large sacs. This results in less surface area and so less ability for oxygen to enter the body and carbon dioxide to leave.



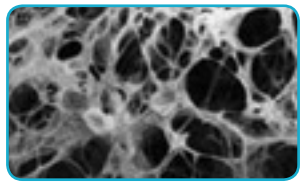
Normal alveoli (with large surface area)

Alveoli with emphysema (enlarged with small surface area)

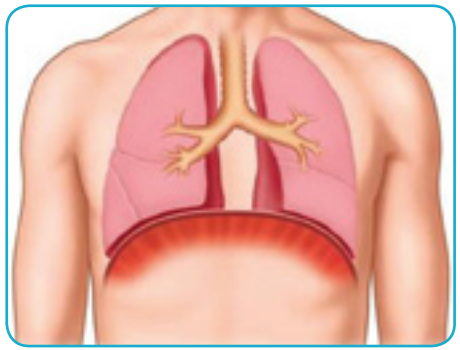
Normally, to breathe out, the elastic nature of the lungs helps to squeeze the air out. In emphysema, the lung tissue becomes less elastic, so air becomes trapped in the large alveoli making it difficult to breathe out. This results in part of the lung becoming enlarged, called hyperinflation. This leads to compression of healthier part of the lung and reduces gas exchange still further. The lung enlargement also has an effect on the diaphragm. The diaphragm is a large muscular structure separating the chest from the abdomen. This muscle is also used for breathing. If the lung is enlarged, it causes the diaphragm to become flat and this makes breathing more difficult.



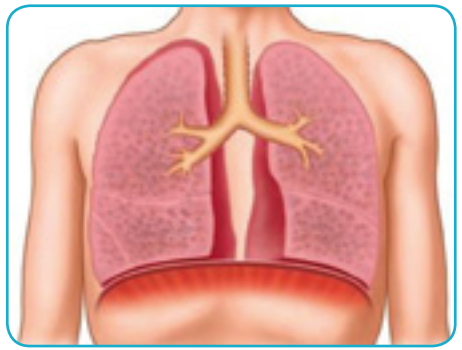
Normal lung tissue



Lung tissue with emphysema



Normal lungs



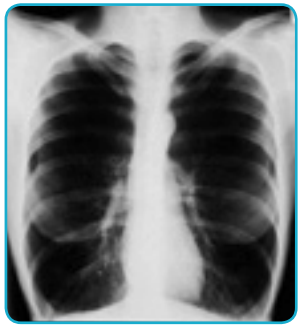
Enlarged lungs with trapped air due to emphysema

Symptoms

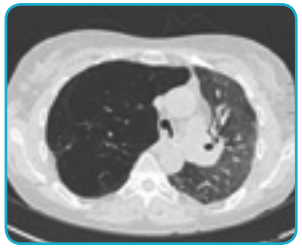
The key symptom of emphysema is shortness of breath which may get worse over time. Because oxygen cannot easily get into the body and carbon dioxide cannot easily get out, you may become easily fatigued when walking or doing other activities.

Diagnosis

Your doctor may suspect you have emphysema if you are, or have been, a smoker and if you are becoming increasingly short of breath. Your doctor will perform some tests to determine if the symptoms are due to emphysema or to another respiratory disease such as asthma. These tests will include specific tests of your breathing, some X-rays and maybe some blood tests. A particular type of X-ray known as computer tomography (CT), which has the ability to look in more detail at the lungs, may be performed.



X-ray that demonstrate enlarged lungs due to emphysema



Cross sectional computer tomography with one sided enlarged lung due to emphysema

Treatment

If you suspect you have emphysema **you should seek medical attention as soon as possible**. There are some actions that can be taken to slow progression and help reduce symptoms and improve quality of life.

Stop smoking

The most important measure to slow emphysema progression is to stop smoking and avoid all exposure to cigarette smoke and lung irritants. You doctor will be able to put you in contact with help groups to support you to stop smoking.

Pulmonary rehabilitation

Specific exercise programs can be beneficial in improving muscle strength and overall fitness in order to make more economical use of the reduced lung function. Advice on breathing techniques may also be beneficial.

Flu vaccination/pneumococcal vaccination

If you have damaged lungs you are more at risk of contracting lung infection. You should therefore discuss with your doctor the value of receiving appropriate vaccinations to reduce this risk.

Medication

Your doctor will be able to advise you as to whether specific inhalers will help your symptoms. If you have some inflammation of the airways, inhalers may provide some benefit but unfortunately will not help with the mechanical effects of the lung enlargement which can be a part of emphysema.

Oxygen therapy

The feeling of shortness of breath does not necessarily mean that you will require oxygen treatment. This type of treatment is usually reserved for those patients where disease is severe. There are lightweight portable oxygen delivery systems available which allows patients to be more mobile rather than confined to their home.

Surgery

There are a few patients with a specific type of emphysema and who are otherwise medically fit, where a surgical operation may be helpful. This may involve removing part of the diseased lung though surgery (lung volume reduction surgery, LRVS). Alternatively, for a very few patients, lung transplantation may be possible. As with any surgical procedure, there is a risk of complications. A frequent complication is a prolonged air leak from the lung. Other frequent complications include pneumonia and bleeding. Only patients who are considered fit enough to withstand possible complications are considered for lung volume reduction surgery.

Endoscopic lung volume reduction

This is a procedure which is less invasive than LVRS and can be performed via a bronchoscope (a small flexible camera) that is passed into the lungs via the nose or mouth. Doctors have been using bronchoscopes for many years in order to look inside the lungs to help them make a diagnosis. Now it is possible to use the bronchoscope to treat emphysema. On average 2 to 5 small one way valves can be placed in the lung to allow air to escape from the enlarged, diseased part of the lung but not to re-enter it. This can result in a reduction in the volume of the disease part of the lung and can allow the more healthy part of the lung to expand.

Breathing may improve and the patient may be able to increase his exercise tolerance with improved quality of life. The procedure usually takes around 30 minutes to perform. Patients normally stay in hospital between 1 to 4 days. As of July 2012, more than 5000 patients have been treated with this procedure in many countries. The procedure has been tested in clinical trials in Europe and the US in 492 patients. Studies have demonstrated that patients can obtain benefits from this procedure. The results of US and European studies have been published in major scientific journals and scientific meetings.[1, 2]

Recently, the results of a new study were published. This study tested the valves and a diagnostic system to help to determine where to place valves for best effect. This study included 80 patients with follow up data and showed that when the diagnostic system was used to help determine where best to place the valves, patients can benefit and may obtain improvements in breathing, their ability to exercise and their quality of life.[3]

The valve is approved for treatment of hyperinflation associated with emphysema, including the genetic form of the disease type Alpha 1 antitrypsin deficiency syndrome and a study from Ireland has shown promising results.[4]

Whilst all procedures have a risk of complications, the risk of complications with this type of procedure is lower than when surgery is carried out. A smaller percentage of patients experience a temporary leakage of air from the lung into the chest lining (pneumothorax). If this does occur it can normally be simply treated during the hospital stay. In rare cases this can be serious/life-threatening complication. These complications have not prevented patients from getting good responses to the treatment. Infection may require a course of antibiotics. However, infection is a common problem in lung diseases generally and in the clinical trials where it compared patients who were treated with valves with those who were not treated with valves, there was no significant difference in the rates of infection between the two groups. The valves are designed to be removable in the rare event that it is required.

A part of an enlarged lung receives valves that empty the air in that part of the lung making healthier parts of the lung to function better

Lung before

and after valve treatment

Your doctor will discuss the best treatment options with you and refer you to a specialist and treatment center if needed.