

## What is pulmonary emphysema?

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Pulmonary emphysema is the destruction of the parenchyma, that is, the alveolar walls. Most closely linked to smoking, emphysema is a disease that decreases a person's ability to breathe. It is one of the diseases included under the term chronic obstructive pulmonary disease (COPD). Emphysema limits patients' normal daily functioning, causing chronic fatigue that can be triggered by even the least strenuous activities, such as washing one's face, tying shoes, etc.

The alveolar-wall destruction seen in patients with emphysema makes the lungs lose their elasticity, which leads to air becoming trapped in the lungs. This is called hyperinflation, or air trapping, and causes worsened lung function due to changes to normal breathing.

### **What are COILs?**

These are small, coil-like devices made of a material called nitinol (a nickel-titanium alloy), which adapts to the shape of the lung and retains the same form over time. The material does not affect magnetic fields, and patients treated with COILs can go through airport metal detectors and scanners and also have MRIs.

COILs are placed in both lungs. First, ten COILs are placed in one lung, and then two months later, ten more are placed in the other. This leads to a reduction in residual lung volume and improved tolerance of exercise and other types of physical exertion.

### **What does the COIL technique involve?**

COILs are inserted with the assistance of a fiberoptic bronchoscope with the patient under general anesthesia and following intubation using a laryngeal mask. Fluoroscopy is also needed to perform the procedure, and the coils collapse the areas of the lungs where air had once been trapped. The coils are placed through a fiberoptic bronchoscope, thus eliminating the need for surgical incision or other interventions. The instruments and stents are inserted through the nose.

### **What is life like after having this technique done?**

Patients experience gradual improvement as the amount of trapped air decreases; this is because they begin to use the normal musculature. The primary muscle, the diaphragm, becomes less and less compressed, leading the patient to develop a better tolerance of exertion and improve their quality of life.

### **What are endobronchial valves?**

These are small plastic valves with a metallic structure made of a titanium/nickel-based alloy that allow air to enter but not escape (unidirectional). They are used in patients who have emphysema with air trapping and make it possible to reduce the volume of trapped air, which brings about an improvement in the symptoms.

### **Placement:**

Endobronchial valves are placed through a flexible bronchoscope, that is, a small flexible tube inserted through the patient's nose while they are under sedation. The patient feels no pain, and no incisions or other surgical procedures are needed, as the flexible bronchoscope gives access to the segmental bronchi. The valves are placed in the lobe segment until the lobe has been completely sealed off. Treatments using valves are normally performed on just one lobe of one of the patient's lungs. The treatment is reversible.