

## **Pulmonary hypertension**

Pulmonary hypertension is high blood pressure in the arteries that take blood from the right side of the heart to the lungs. The pulmonary arteries are the two main blood vessels that transport blood from the right ventricle to the lungs. In the lungs, the blood obtains oxygen and then flows to the left side of the heart, where the left ventricle pumps the oxygenated blood to the rest of the body. There may be no correlation between the blood pressure that is measured on the arm and the blood pressure that is measured in the pulmonary arteries, so that the diagnosis is difficult to make. There are two types of pulmonary hypertension.

### Primary pulmonary hypertension

Primary pulmonary hypertension is an uncommon lung disease in which the blood pressure in the pulmonary arteries goes up above normal for no apparent reason. The abnormal pressure associated with primary pulmonary hypertension is related to changes in the small blood vessels in the lungs. The thickening of the blood vessel walls and the formation of clots could be two causes for the increase in pulmonary blood pressure. These changes increase the resistance to the blood that flows through the vessels. This greater resistance demands greater effort from the right ventricle, which now has to work harder to make enough blood go through the lungs.

Over time, the right side of the heart "fails" or wears out from constantly pumping against high pressure. When this happens, the amount of blood that circulates through the lungs diminishes and patients begin to have symptoms.

### Secondary pulmonary hypertension

Secondary pulmonary hypertension is caused by an underlying disease that affects the lungs and the pulmonary blood vessels. There are many diseases that can make this happen. Some chronic lung diseases, such as asthma, emphysema, and obstructive sleep apnea, are some examples of lung diseases that can cause pulmonary hypertension, especially if untreated. Certain diseases that cause inflammation of the pulmonary arteries, such as lupus and infections, and certain medications can make the artery walls thicken, which in turn increases the resistance to the flow of blood and as a result pulmonary blood pressure increases. The repeated formation of blood clots in the lungs (called pulmonary embolisms) over time can cause pulmonary hypertension. Some heart defects from birth, in which the blood leaks between the left side and the right side of the heart, also increase the pressure in the pulmonary arteries.

### Symptoms of pulmonary hypertension

- Fatigue or tiredness tends to be the first symptom. Often patients think that it is because they are out of shape.

- Later on, the ankles may swell, the lips and skin become blue, and they may have chest pain.
- They may also have dizziness, difficulty breathing and fainting.

One of the difficulties in evaluating and treating pulmonary hypertension is that the diagnosis is often delayed due to the fact that the disease begins without being noted and then the symptoms progress slowly.

#### Evaluation of primary pulmonary hypertension

Since primary pulmonary hypertension is uncommon, the patient's medical history must be studied in depth, a complete physical examination and diagnostic tests must be done to evaluate the secondary causes of the pulmonary hypertension in order to be able to diagnose the disease. The evaluation of primary pulmonary hypertension may include a heart catheterization. In this procedure, the doctor introduces a thin and flexible tube through an artery or vein in the patient's arm, leg or neck, and then makes it go through the right ventricle and the pulmonary artery. This is the only way to measure the pressure in the pulmonary artery directly and find out what medical treatment is appropriate for that patient in particular.

#### Evaluation of secondary pulmonary hypertension

As with primary pulmonary hypertension, to make an initial evaluation, it is necessary to carefully study the medical history and perform a detailed medical examination, especially if the patient says that he is increasingly short of breath and has an underlying cause of pulmonary hypertension. An electrocardiogram (ECG) also can show whether there are changes that indicate an enlargement of the right side of the heart. A chest X-ray can show evidence of enlargement of the pulmonary arteries. Doppler echocardiography studies can show findings that help to confirm the diagnosis and offer an approximation to how high the pulmonary blood pressure is. Other diagnostic studies can be done for the purpose of confirming what specific disease is causing the secondary pulmonary hypertension.

#### Treatment of primary pulmonary hypertension

Since primary pulmonary hypertension is an uncommon and complicated disorder, patients with this disease are generally referred to cardiologists or pulmonologists who are familiar with the treatment choices. The objective of treatment for primary pulmonary hypertension is to widen the blood vessels. However, patients respond differently to the medications that widen the blood vessels. There is no single drug that works for all patients. Your doctor may use different medications before starting continual or long-term treatment. Doctors evaluate what treatment works best in the patient during a heart catheterization. The treatments include:

- Orally administered calcium channel blockers.
- Intravenous prostacyclin, which dilates the arteries. This therapy, although uncomfortable, improves pulmonary hypertension and allows for greater physical

activity. Prostacyclin is administered through a portable infusion pump that the patient takes with him.

- Anticoagulants designed to prevent the blood from clotting and allow it to flow more freely.
- Diuretics that reduce the amount of liquid in the body, thus lowering the amount of effort that the heart has to make.
- Oxygen, if breathing becomes difficult or if the oxygen levels in the bloodstream drop.

Treatment of secondary pulmonary hypertension

The treatment of secondary pulmonary hypertension seeks to treat the underlying cause of the increase in pulmonary blood pressure. Generally, the sooner the problem is identified, the greater the chances that pulmonary hypertension can be reversed.