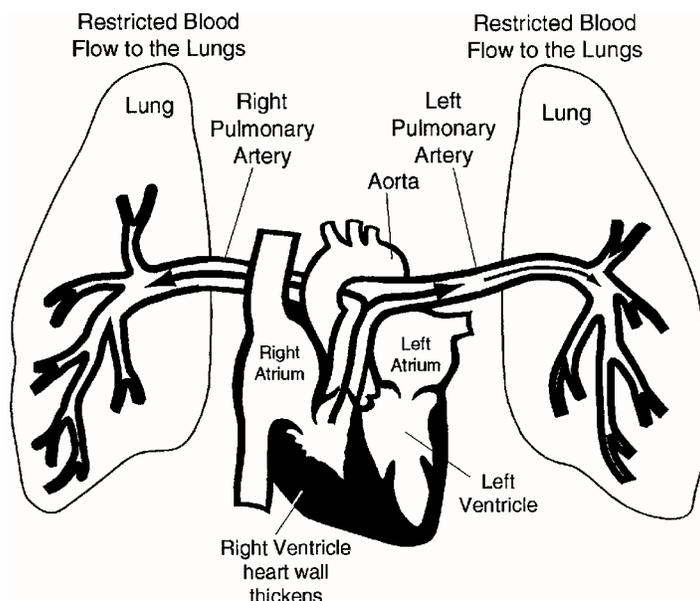


Pulmonary Hypertension

Pulmonary Hypertension is a rare lung disease in which the blood pressure in the main artery (**pulmonary artery**) to your lungs is very high. This high pressure results in changes in the lung's blood vessels and keeps the blood from flowing normally through these vessels.

The **right ventricle** and **right atrium** are the two chambers on the right side of the heart. High pressures in the lung's vessels causes these chambers to become enlarged and weak and to not pump as well, resulting in **right sided heart failure**.



Pulmonary Hypertension is a long-term or chronic disease. It affects both sexes, but is more common in women, and occurs between 30-45 years of age.

Signs and Symptoms:

- Fatigue
- Difficulty breathing (dyspnea)
- Palpitations
- Swelling of legs and ankles (edema)
- Chest pain
- Hoarseness
- Dizziness
- Fainting spells (syncope)
- Bluish Lips, skin (cyanosis)

Types of Pulmonary Hypertension:

Primary Pulmonary Hypertension

This type occurs with no known underlying disease. It is believed that there is some mechanism that triggers the disease to occur but your doctor may not have an explanation as to why you have developed pulmonary hypertension.

The use of certain weight loss drugs (Redux, Pondimin and fen-phen), street drugs such as Heroin or Cocaine, and AIDS and cirrhosis of the liver can trigger the disease.

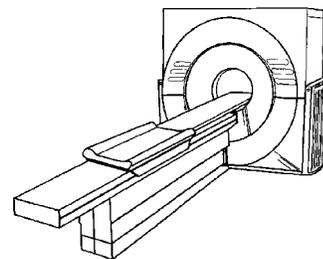
Secondary Pulmonary Hypertension

This type of pulmonary hypertension is a result of heart and lung disease. Examples of heart and lung diseases that can cause pulmonary hypertension include:

- ▶ Emphysema or asthma
- ▶ Blood clots that have traveled to the lung
- ▶ Collagen vascular diseases such as scleroderma
- ▶ Rheumatoid arthritis, systemic lupus
- ▶ Congenital heart diseases such as defects and shunts
- ▶ Lack of oxygen from obstructions during sleep known as sleep apnea.

Testing for Pulmonary Hypertension:

- **A complete history and physical exam** is done.
- **An electrocardiogram (ECG)** may show a strain on the right side of your heart.
- **Blood tests** are done to indicate how much oxygen is in your blood, or to test if you have a collagen vascular disease.
- **A chest x-ray** may show a large pulmonary artery and right-sided heart. This test may also show diseases of the lung such as emphysema.
- **A lung scan** is done to show the blood supply in your lungs
- **A CT or CAT scan** is a computerized x-ray that can get a better view of the lungs and your heart.
- **Echocardiogram** uses sonar (sound waves) to show the pumping function of your heart and how the valves work.
- **A pulmonary function test** is done to measure the volume of air in your lungs. Results are obtained by breathing into a mouth piece while exercising on a treadmill or bicycle.
- **An exercise tolerance test** will require you to walk on a treadmill as fast as you can for 6 minutes to evaluate how much exercise you can do before you have symptoms.
- **A right heart catheterization** is the most accurate way to diagnose pulmonary hypertension. A small tube or catheter is put into a vein in your neck and then guided into the right side of your heart and pulmonary artery to measure pressures.



Treatment of Pulmonary Hypertension:

There is no cure for pulmonary hypertension, but treatment is available. The goal of treatment is to lower the pulmonary artery pressure, and thus, relieve symptoms. In secondary pulmonary hypertension, treating the underlying disease, such as repairing a congenital heart defect, may reverse the pulmonary hypertension. The treatments explained in this notebook will help you live with the disease. Therefore, it is important to be under the care of doctors who specialize in this disease (cardiologist, pulmonologist).

Treatment for Pulmonary Hypertension may include:

- Oxygen
- Medications
- Lifestyle and dietary changes
- Surgery

Oxygen or O₂

Low oxygen levels may make pulmonary hypertension worse. You may need to use oxygen during activity, at night, or it may be required all of the time. Oxygen is inhaled through a nasal cannula, a tubing with opening that you wear under your nose.

Medications

(Please read more about these medicines in the section called Medications.)

- ACE inhibitors (Captopril, Enalapril, Lisinopril). This drug dilates the blood vessels to improve the heart function and blood flow.
- Anticoagulants (Coumadin) " blood thinners" are used to decrease the tendency of the blood to clot so that it flows more freely through the blood vessels. It is very important to have this drug monitored for bleeding complications by having routine bloodwork done.
- Diuretics (Lasix, Aldactone) are used to rid your body of excess fluid. They work to reduce swelling that is caused by pulmonary hypertension and right sided heart failure.
- Digoxin improves the pumping ability of your heart. It is important to have this drug level checked at regular intervals of time.
- Calcium Channel Blocker (Cardizem, Procardia, Norvasc) are drugs used at high doses to lower the pulmonary pressure.

- Flolan, also called epoprostenol or prostacyclin, has had a dramatic impact on the treatment of pulmonary hypertension. Flolan lowers the pressure in the lung. This drug lowers lung pressures by dilating the blood vessels. It also reduces blood clotting; and slows the growth of cells that contribute to the pulmonary hypertension. Please review the information on Flolan (Epoprostenol).
- Tracleer (Bosentan) Approved by the FDA 11/2001. This drug is an endothelin antagonist. Endothelin is the most potent vasoconstrictor (constricts the arteries) in the human body. Endothelin levels appear to be very elevated in people who have pulmonary hypertension. This drug counteracts this powerful substance that constricts the arteries. The drug is taken by mouth two times each day.
- **New Drugs:** Researchers are currently looking for ways to improve treatment of pulmonary hypertension. The Ohio State University Medical Center is involved in many new drug trials. Please speak to your doctor about current studies.

Lifestyle and Dietary Changes

Know the signs of pulmonary hypertension and let your doctor know right away if your symptoms get worse.

Check your weight each day and record in a diary. If you notice you gain more than 5 pounds in one week, call your doctor.

Get plenty of rest.

Exercise is okay but check with your doctor first. Avoid lifting weight greater than 20 pounds because this can increase the pressure inside your lungs.

Restrict your salt intake. To do this, buy items that say " low sodium" and avoid table salt and fast food.

Get an annual flu shot and a pneumonia vaccine every five years.

Because you have heart disease, you should take an antibiotic before you have any dental work. Your dentist can prescribe the appropriate antibiotic.

Avoid the following because they may cause more stress on your heart and lungs:

- Smoking or use of tobacco products
- Drinking alcohol
- Using diet pills, amphetamine like drugs or recreational drugs.
- Using decongestants. Check with your doctor first on an over-the-counter brand that is safe.
- Getting pregnant.
- Using birth control pills. Talk to your doctor about safe methods of contraception.

Avoid high altitudes and think ahead for airplane travel. You may need to wear oxygen during air travel.

Surgery

If the pulmonary hypertension is due to blood clots that have formed in the pulmonary artery, they may be surgically removed to improve blood flow. This is called a pulmonary thromboendarterectomy.

Single lung or double lung transplant is performed for advanced stages of pulmonary hypertension. The right side of the heart will likely return to normal function after the transplant. There is a long list of people waiting nationally on the transplant list but there is also a shortage of donors. Your doctor will talk to you about transplant if this is an option for you.

Heart/ Lung Transplant is a rare type of transplant that is done if the patient has lung failure and also failure of the left side of the heart.

If you would like more written information, please call the Center for Health Information at (614)293-3707. You can also make the request by e-mail: health-info@osu.edu.

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Division of Cardiothoracic Surgery
The Ohio State University Medical Center

- ▶ Upon request all patient education handouts are available in other formats for people with special hearing, vision and language needs, call (614) 293-3191.