Pulmonary Embolism



A pulmonary embolism occurs when a blood clot moves through the bloodstream and becomes lodged in a blood vessel in the lungs. This can make it hard for blood to pass through the lungs to get oxygen. Diagnosing a pulmonary embolism can be difficult because half of patients with a clot in the lungs have no symptoms. Others may experience shortness of breath, chest pain, dizziness, and possibly swelling in the legs. If you have a pulmonary embolism, you need medical treatment right away to prevent a blood clot from blocking blood flow to the lungs and heart.

Your doctor can confirm the presence of a pulmonary embolism with CT angiography, or a ventilation perfusion (V/Q) lung scan. Treatment typically includes medications to thin the blood or placement of a filter to prevent the movement of additional blood clots to the lungs. Rarely, drugs are used to dissolve the clot or a catheter-based procedure is done to remove or treat the clot directly.

What is a pulmonary embolism?

Blood can change from a free flowing fluid to a semi-solid gel (called a blood clot or thrombus) in a process known as coagulation (http://www.radiologyinfo.org) . Coagulation is a normal process and necessary to stop bleeding and retain blood within the body's vessels if they are cut or injured. However, in some situations blood can abnormally clot (called a thrombosis) within the vessels of the body. In a condition called deep vein thrombosis (http://www.radiologyinfo.org) , clots form in the deep veins of the body, usually in the legs. A blood clot that breaks free and travels through a blood vessel is called an embolism (http://www.radiologyinfo.org) .

A pulmonary embolism occurs when a blood clot breaks loose, travels through the bloodstream and becomes lodged in the small blood vessels of the lungs. Less commonly, material other than blood clots can block blood flow, including fat, collagen or other tissue, and air bubbles.

A pulmonary embolism can be life-threatening or cause permanent damage to the lungs. The severity of symptoms depends on the size of the embolism, number of emboli, and a person's baseline heart and lung function. Approximately half of patients who have a pulmonary embolism have no symptoms. Others may experience:

- Shortness of breath or difficulty breathing
- Chest pain, especially sharp pain with a deep breath
- Cough or coughing up blood
- Swelling, tenderness, or discoloration of the legs
- Irregular or rapid heartbeat and/or pulse
- Dizziness and lightheadedness.

Some medical conditions and treatments that may put you at increased risk for developing blood clots and pulmonary embolism include:

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- Cancer
- A personal or family history of venous blood clots or pulmonary embolisms
- Heart disease
- Broken hip, leg or other trauma
- Surgery
- Inactivity: e.g. due to surgery, injury, bedrest, prolonged sitting (long car trips or flights), or paralysis
- Smoking
- Certain medications such as birth control pills, hormone replacement therapy, or Tamoxifen
- Pregnancy and childbirth
- Advanced age
- Obesity

How is a pulmonary embolism diagnosed and evaluated?

Your doctor will usually begin by obtaining your medical history, as this may provide information about factors that caused the clot. In addition to performing a physical exam, your doctor may order one or more of the following tests:

- Blood tests
- Chest x-ray (https://www.radiologyinfo.org/en/info/chestrad)
- ECG (electrocardiography)
- Venous ultrasound (https://www.radiologyinfo.org/en/info/venousus) *:* This test uses sound waves to confirm the presence of a blood clot. A Doppler ultrasound (http://www.radiologyinfo.org) study may be part of an ultrasound examination. Doppler ultrasound is a special technique that allows the doctor to see and evaluate blood flow through arteries and veins throughout your body. If the results are inconclusive, your doctor may use venography (https://www.radiologyinfo.org/en/info/venography) or MR angiography (https://www.radiologyinfo.org/en/info/angiomr) .
- CT Angiography (https://www.radiologyinfo.org/en/info/angioct) *:* This non-invasive test uses x-rays and an iodine-containing contrast material to produce pictures of the chest highlighting the blood vessels in the chest and lungs.
- V/Q Lung scan (http://www.radiologyinfo.org) : This nuclear medicine exam uses a small amount of radioactive material (called a radiotracer) and a special camera to create pictures that show how blood and air are flowing throughout the lungs.

How is a pulmonary embolism treated?

Treatment for a pulmonary embolism typically includes keeping blood clots from getting bigger, preventing clots from traveling to the lungs and preventing new clots from forming.

- Blood thinning medications (anticoagulants (http://www.radiologyinfo.org)): These drugs prevent clots from enlarging and new clots from forming. They are the mainstay of treatment for pulmonary embolism and deep vein thrombosis. However, because they increase the risk of bleeding, some patients cannot use them.
- Inferior vena cava filter placement (https://www.radiologyinfo.org/en/info/venacavafilter) *:* An IVC filter is a small metal device that is placed in the large vein of the abdomen (called the inferior vena cava or IVC). The filter traps and prevents large blood clots or clot fragments from the lower half of the body from traveling to the heart and lungs. This procedure is used in patients who don't respond to or cannot be given blood thinners.
- Clot dissolving medications (thrombolytics (http://www.radiologyinfo.org)): These drugs dissolve or break apart blood clots that are causing severe symptoms and other serious complications. Clot-busting drugs are typically used only in life-threatening situations.
- Catheter-directed thrombolysis or embolectomy (https://www.radiologyinfo.org/en/info/thrombo) *:* This minimally invasive

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treatment removes (embolectomy) or dissolves (thrombolysis) abnormal blood clots (http://www.radiologyinfo.org) in blood vessels to improve blood flow and prevent damage to tissues and organs. Once a catheter is inserted through an incision in the skin and advanced to the site of the blockage, medicine or a mechanical device is delivered through the tube to break up or remove the clot. This is only done in patients with serious complications related to pulmonary embolism.

Which test, procedure or treatment is best for me?

- *Acute Nonspecific Chest Pain-Low Probability of Coronary Artery Disease (https://www.radiologyinfo.org/en/info/acs-acute-nonspecific-chest-pain)*
- *Radiologic Management of Venous Thromboembolism-Inferior Vena Cava Filters (https://www.radiologyinfo.org/en/info/acs-rad-mgt-thromboembol)*
- Suspected Lower Extremity Deep Vein Thrombosis (https://www.radiologyinfo.org/en/info/acs-lower-extremity-deep-vein-thrombosis)
- *Suspected Pulmonary Embolism (https://www.radiologyinfo.org/en/info/acs-suspected-pe)*

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