

“A pulmonary embolism (embolus) is a serious, potentially life-threatening condition. It is due to a blockage in a blood vessel in the lungs. A Pulmonary embolism (PE) can cause symptoms such as chest pain or breathlessness but may have no symptoms and be hard to detect. A massive PE can cause collapse and death. PE usually happens due to an underlying blood clot in the leg - deep vein thrombosis (DVT). Prompt treatment is important and can be life-saving. Pregnancy, various medical conditions and medicines, immobility and major surgery all increase the risk of a PE. Anticoagulation, initially with heparin and then warfarin, is the usual treatment for PE.”



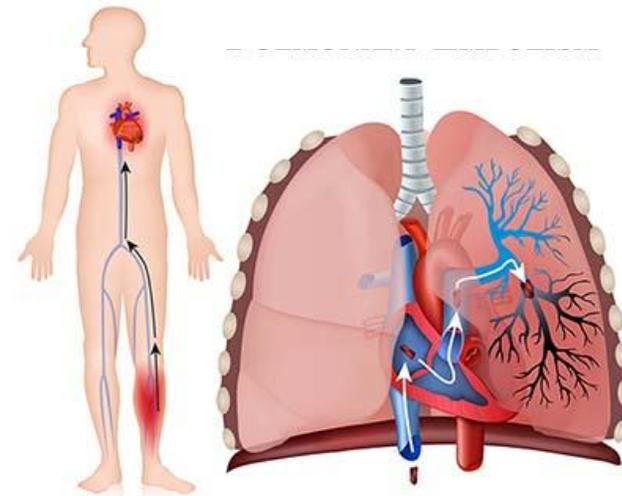
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WHAT IS PULMONARY EMBOLISM?



CHEST CARE CLINIC, KHARGHAR.

THIS INFORMATION IS INTENDED FOR PATIENT EDUCATION ONLY.

Pulmonary embolism (PE) is part of a group of problems together known as venous thromboembolism (VTE). Venous means related to veins. A thrombosis is a blockage of a blood vessel by a blood clot (a thrombus). An embolism occurs when part or all of the thrombus dislodges from where it formed and travels in the blood until it becomes stuck in a narrower blood vessel, elsewhere in the body. The thrombus usually leads to embolism although embolism can also happen spontaneously.

A deep vein thrombosis (DVT) is the usual cause of a PE. A DVT occurs in a vein in the leg. DVT is also part of VTE

SYMPTOMS OF PULMONARY EMBOLISM / DVT.

The symptoms will depend on how large or small the clot is, and on how well the person's lungs can cope with the clot. People who are frail or have existing illness are likely to have worse symptoms than someone who is fit and well. Symptoms often start suddenly. A small PE may cause:

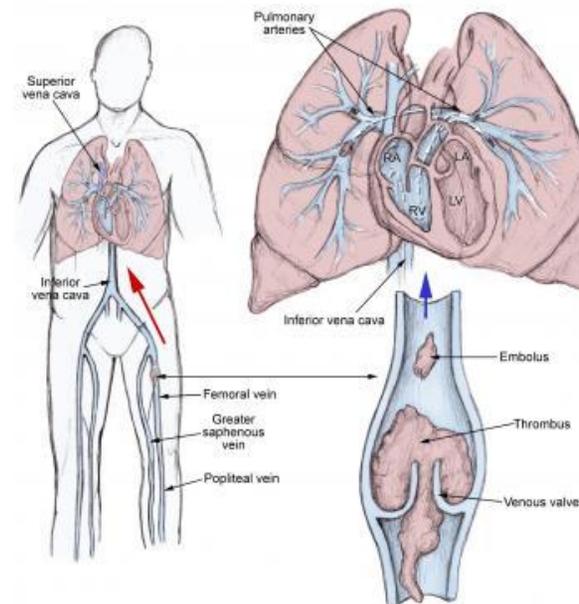
- No symptoms at all (common).
- Breathlessness - this can vary in degree from very mild to obvious shortness of breath.
- Chest pain which is pleuritic, meaning sharp pain felt when breathing in. Often you feel like you can't breathe deeply, as this causes you to catch your breath. This happens because the blood clot may irritate the lining layer (pleura) around the lung. Shallow breathing is more comfortable.
- Coughing up blood (hemoptysis).
- A mildly raised temperature (fever).
- A fast heart rate (tachycardia).

A massive PE or lots of clots (multiple emboli) may cause:

- Severe breathlessness.
- Chest pain - with a large PE the pain may be felt in the centre of the chest behind the breastbone.
- Feeling faint, feeling unwell, or a collapse. This is because a large blood clot interferes with the heart and blood circulation, causing the blood pressure to drop dramatically.
- Rarely, in extreme cases, a massive PE can cause cardiac arrest, where the heart stops pumping due to the clot. This can result in death, even if resuscitation is attempted.

There may be symptoms of a DVT, such as pain at the back of the calf in the leg, tenderness of the calf muscles or swelling of a leg or foot. The calf may also be warm and red. A massive PE is so called not due to the actual size of the blood clot (embolus) but due to the size of its effect. A PE is high-risk if it causes serious problems such as a collapse or low blood pressure.

Mechanism of DVT and Pulmonary Embolism.



Diagnosis of Pulmonary Embolism

The diagnosis is often suspected on the basis of symptoms and your medical history. For example, someone who has had major surgery, been immobile in hospital and then gets sudden breathlessness, is likely to have a PE.

Various tests may be used to help confirm the diagnosis. These may include one or more of the following:

Ultrasound scan of the leg

A type of ultrasound called a duplex Doppler is used to show blood flow in the leg veins, and any blockage to blood flow. Ultrasound is useful because it is an easy, non-invasive test and may show up a DVT. If a DVT is found, then a PE can be assumed to be the cause of the other symptoms (such as breathlessness or chest pain). Treatment (with anticoagulant medication - see below) can be started immediately for both the DVT and the suspected PE. The treatment is generally the same for both.

However, if the ultrasound is negative, a DVT or PE is not ruled out, because some clots don't show up on ultrasound. Further tests will be needed.

Blood test for D-dimer

This detects fragments of breakdown products of a blood clot. The higher the level, the more likely you have a blood clot in a vein. Unfortunately, the test can be positive in a number of other situations, such as if you have had recent surgery or if you are pregnant. A positive test does not, therefore, diagnose a DVT or a PE. The test may, however, indicate how likely it is that you have a blood clot (the clot can be either a DVT or a PE). This can help decide if further tests are needed. A negative D-dimer result when you are at low risk of VTE means the chance of having a thrombus is extremely low. However, if your VTE risk is high then a D-dimer test cannot rule out the possibility of a thrombus and you will need other tests.

Ultrasound scanning of the heart (Echocardiography)

An echocardiogram is useful for people who may have a massive PE, as it can show the effect on the heart. If there is a massive PE then this puts strain on the right-hand side of the heart. It can be done at the bedside.

Isotope scan and CTPA scan

These are specialised scans which look at the circulation in the lung. They are useful, because they can show quite accurately whether or not a PE is present.

The isotope scan is also called a V/Q scan, or ventilation/perfusion scan. The CTPA scan is a type of CT scan looking at the lung arteries - the full name is computed tomographic pulmonary angiography scan. Both involve X-rays and the CTPA scan is the more accurate test. V/Q scans are used in some circumstances. For example, if you are allergic to the dye (contrast) used in CTPA scanning, if you have chronic kidney disease, or if CTPA is unavailable. These may not be possible in the pregnant women.

Electrocardiogram (ECG) looks for the abnormal electrical activity in the heart such as atrial fibrillation (AF) which can occur as a result of a PE. It also helps suspect the embolism with clinical criteria.

Blood tests to look for signs of a heart attack, infection or inflammation. Also, a test for arterial blood gases may be taken, which involves taking the blood sample from an artery rather than from a vein. This is to check the level of oxygen in the blood.

A **chest X-ray** to look for pneumonia or other chest conditions.

What are the treatment for the Pulmonary Embolism?

Pulmonary embolism may cause death very rapidly in a patient and needs to be suspected in the patient very early. There may be deficiency of oxygen to the brain and the other tissues that leads to

the damage to the organs may lead to death in few hours and days thereafter.

The main treatment is an anticoagulant which is a drug that causes chemical changes in your blood to stop it clotting easily. This makes the blood thinner and will stop the clot getting larger while your body slowly absorbs it. It also reduces the risk of further clots developing.

There are many types of anticoagulants, and your doctor will give you the best one for you. Your first treatment is likely to be injected, then later you're likely to take tablets.

You will usually be recommended to take these drugs for at least 3 months to prevent blood clots. Some people need to take them for longer or indefinitely. For example, people who have significant, life-threatening features with pulmonary embolism, recurrent clots or an unprovoked clot may be advised to stay on the drug for the rest of their lives.

Like any drugs, anticoagulants may have side effects, and effects will vary from person to person. One of the most important problems is bleeding more easily and excessively. Because of this, if you're prescribed warfarin, you may need regular blood tests to make sure you're on the best dose. There are newer anticoagulant tablets which don't need regular blood tests. Your doctor will make sure you take the best drug for you and your condition.

Anticoagulants interact with many other drugs, including herbal remedies. They can be affected by alcohol and certain foods.

In more severe cases of pulmonary embolism, other treatments may be needed to remove or break up a clot. This might be done with drugs called thrombolytics, or less commonly, surgery.

These are usually advocated in the life threatening scenarios with the thrombolytics which may have a high risk in elderly of bleeding spontaneously at normal sites in the body. Surgery needs to be done in specialized hands and can be done in major centers only.