CONDITION

Pulmonary embolism

A pulmonary embolism is a blood clot that blocks blood flow through an artery in the lungs.

WHAT IT IS
Blood clot blocking an artery in the lungs

BODY SYSTEM
Lungs, heart and circulation

MAIN SYMPTOMS
Sudden breathlessness, chest pain, fast heartbeat, coughing blood

WHAT CAUSES IT
Usually a deep vein clot travelling to the lungs

HOW IT IS DIAGNOSED
CT pulmonary angiography or ventilation-perfusion scan

MAIN TREATMENT
Anticoagulants; clot-removal treatment for severe cases

CAN IT BE CURED?
Yes, most clots resolve with treatment

IS IT AN EMERGENCY?
Yes, suspected symptoms need immediate assessment

LONG-TERM OUTLOOK
Most recover; some have lasting breathlessness or recurrence

Overview

A pulmonary embolism, often shortened to PE, is a blood clot that blocks an artery in the lungs. The clot usually starts in a deep vein in the leg or pelvis. This is called deep vein thrombosis, or DVT. Part of the clot can break away, travel through the bloodstream, and become lodged in the lungs.

A PE can reduce blood flow through part of a lung. A large clot, or several clots, can also strain the right side of the heart. The effect can range from a small blockage with mild symptoms to a life-threatening circulation problem.

Prompt assessment matters because treatment can prevent the clot from growing and reduce the chance of more clots. Most people survive and recover when PE is recognised and treated. Recovery time and the risk of future clots differ from person to person.

Symptoms

Symptoms often begin suddenly, but they may also develop over hours or days. The symptoms can resemble those of pneumonia, a heart problem, or a chest muscle injury.

Possible symptoms include:

Not everyone has all these symptoms. A small PE may cause mild breathlessness or no clear symptoms. A larger PE may cause severe breathing difficulty, fainting, confusion, or collapse.

Chest pain and sudden breathlessness should not be self-diagnosed. Other serious conditions can cause similar symptoms.

- Unexplained shortness of breath
- Chest pain, often sharp and worse when breathing in
- A fast or irregular heartbeat
- Coughing, sometimes with blood
- Feeling light-headed, faint, weak, or unusually anxious
- Sweating or looking pale or clammy
- Low oxygen levels
- Pain, swelling, warmth, or redness in one leg from a DVT

Causes and risk factors

Most pulmonary emboli come from a DVT in the leg or pelvis. Blood clots are more likely to form when blood flow slows, a blood vessel is damaged, or the blood has an increased tendency to clot.

Risk may be higher during or after:

Older age, obesity, smoking, heart failure, and some long-term inflammatory conditions can also add to risk. Some people inherit changes that make their blood more likely to clot. These are called inherited thrombophilias.

Sometimes no clear trigger is found. This may be called an unprovoked PE. It does not mean that you caused the clot or failed to prevent it.

- Major surgery, especially involving the abdomen, pelvis, hip, or knee
- A hospital stay or long period with little movement

- A serious injury, particularly a broken bone
- Cancer or some cancer treatments
- Pregnancy and the weeks after giving birth
- Use of medicines containing oestrogen, including some contraceptives and hormone therapy
- A previous DVT or PE
- Long journeys with prolonged sitting, particularly when other risks are present

Diagnosis

A healthcare professional will assess your symptoms, medical history, risk factors, oxygen level, heart rate, and blood pressure. No single symptom can confirm or exclude a PE.

A D-dimer blood test may be used when the initial assessment suggests that PE is possible but not highly likely. D-dimer is a substance released when clots break down. A low result can help rule out PE in suitable situations. A raised result does not confirm PE because infection, pregnancy, surgery, inflammation, and age can also raise it.

The main imaging test is CT pulmonary angiography, or CTPA. This is a CT scan performed after contrast dye is injected into a vein. It shows blood vessels in the lungs and can reveal a blockage.

A ventilation-perfusion scan, also called a V/Q scan, may be used when CTPA is unsuitable. It compares airflow and blood flow in the lungs. An ultrasound of the legs may find a DVT, especially if leg symptoms are present or chest imaging cannot be done immediately.

An electrocardiogram, chest X-ray, blood tests, and heart ultrasound may help assess heart strain or identify another cause. These tests do not usually confirm PE by themselves.

Testing during pregnancy is selected carefully to balance the need for a reliable diagnosis with limiting radiation exposure.

Treatment and management

The main treatment is anticoagulation. Anticoagulants like warfarin or apixaban are often called blood thinners, although they do not make blood thinner or directly dissolve an existing clot. They reduce the blood's ability to form clots, preventing the PE from getting larger while the body gradually breaks it down. They also lower the risk of another clot.

Treatment may begin with tablets or an injected anticoagulant. The most suitable option depends on factors such as kidney function, pregnancy, cancer, other medicines, bleeding risk, and the ability to take tablets reliably.

Anticoagulation commonly continues for at least three months. Some people need longer treatment because their clot had no temporary trigger, a continuing risk factor remains, or they have had more than one clot. Longer treatment is balanced against the risk of bleeding and is reviewed over time.

People with a severe PE and unstable blood pressure may need treatment to remove or break down the clot quickly. Options include clot-dissolving medicine, called thrombolysis, a catheter procedure, or surgery. These treatments can cause serious bleeding and are generally reserved for situations where the PE is immediately threatening the circulation.

A filter placed in the body's largest vein may occasionally be considered if anticoagulation cannot be given or has not prevented further PE in a carefully selected situation. Filters are not routine treatment.

Follow-up may include reviewing symptoms, checking for bleeding, making sure the anticoagulant is being taken safely, and deciding how long treatment should continue.

Medicines commonly used for this include apixaban , dabigatran , fondaparinux and warfarin . Which one suits you, if any, is a decision for you and your doctor.

Complications

A large PE can prevent the heart and lungs from delivering enough oxygenated blood to the body. This can cause dangerously low blood pressure, heart strain, cardiac arrest, or death. Early treatment lowers these risks.

Anticoagulants increase the chance of bleeding. Minor bruising or slightly longer bleeding from a small cut can occur. Heavy, unexplained, or internal bleeding needs urgent assessment.

Some people continue to have breathlessness, tiredness, chest discomfort, or reduced exercise ability after treatment. This is sometimes called post-PE syndrome. These symptoms may have several causes, so persistent problems should be assessed rather than assumed to be part of recovery.

A small number of people develop chronic thromboembolic pulmonary hypertension, or CTEPH. In this condition, old clots and scar-like tissue continue to obstruct lung arteries, raising pressure in those vessels and straining the heart. Increasing breathlessness, fainting, or reduced stamina months after a PE should be investigated.

Another possible complication is a recurrent DVT or PE, particularly after anticoagulation ends or when an ongoing risk factor remains.

Prevention

Not every pulmonary embolism can be prevented. A clot may occur without an obvious trigger, and inherited clotting tendencies cannot be removed.

During a hospital stay or after some operations, a healthcare team may recommend anticoagulant medicine, compression devices, or both. Getting out of bed and moving as soon as it is safe can also reduce the time that blood flow remains slow.

During a long journey, change position and move your legs regularly when it is safe to do so. Drinking enough non-alcoholic fluid may help you avoid dehydration, but hydration alone does not prevent a clot.

If you have previously had DVT or PE, take prescribed anticoagulants exactly as directed. Do not stop them for dental work, surgery, pregnancy planning, travel, or because of bruising without getting medical advice. Stopping suddenly may leave you without protection from another clot.

Routine testing for inherited clotting conditions is not useful for everyone. Whether testing is appropriate depends on your personal and family history and whether the result would change care.

Living with it and what to expect

Many people improve steadily over several weeks or months, but recovery is not identical for everyone. Breathlessness, fatigue, or anxiety about another clot can continue after hospital treatment. A larger PE, other heart or lung conditions, and a long period of inactivity may slow recovery.

Activity is usually rebuilt gradually once treatment has started and symptoms are stable. Walking may be a practical first step, with distance and pace increased according to comfort and the advice given by your healthcare team. New or worsening chest pain, breathlessness, faintness, or leg swelling should not be treated as normal exercise discomfort.

If you take an anticoagulant, tell healthcare professionals, dentists, and pharmacists. Check before using over-the-counter painkillers, herbal products, or supplements because some increase bleeding or affect anticoagulants. Carrying an anticoagulant alert card or medical identification can help in an emergency.

Routine follow-up is important even when you feel well. It is used to review recovery, medicine safety, clotting and bleeding risks, and the planned treatment duration. Ongoing breathlessness or limited activity after about three months may lead to tests for heart strain, lung disease, or CTEPH.

A previous PE does not always prevent work, travel, exercise, pregnancy, or a full and active life. Planning may be needed when future situations increase clot risk.

When to get medical help

Call emergency services now for:

Do not drive yourself if you may have a PE.

If you take an anticoagulant, seek emergency help for vomiting or coughing blood, black or bloody stools, severe uncontrolled bleeding, a sudden severe headache, new weakness or confusion, or a significant head injury.

Contact your healthcare team promptly, but not usually through emergency services, if recovery has stopped improving, breathlessness is gradually worsening, one leg becomes swollen or painful, or bruising and minor bleeding are becoming difficult to manage.

Routine follow-up is appropriate for questions about treatment duration, return to work or exercise, travel plans, and medicine monitoring.

- Sudden or severe difficulty breathing
- Chest pain with breathlessness, sweating, or feeling faint
- Coughing up blood with chest pain or breathlessness
- Fainting, collapse, confusion, or blue-grey lips or skin
- Symptoms of PE when you have, or recently had, one-sided leg swelling or pain

Common questions

Can a pulmonary embolism go away?

Yes. The body can gradually break down the clot while anticoagulants prevent it from growing and reduce the chance of new clots. This may take weeks or months. Some people are left with persistent obstruction or symptoms and need further assessment.

How long does recovery from a pulmonary embolism take?

Some people feel much better within weeks, while others have tiredness or breathlessness for

several months. Recovery can be affected by the clot's size, strain on the heart, other health conditions, and fitness before the PE.

Can I have another pulmonary embolism?

A previous PE increases the chance of another blood clot. The level of risk is influenced by what caused the first clot, whether that risk remains, and whether anticoagulation is continuing. Follow-up helps balance recurrence risk against bleeding risk.

Can I exercise after a pulmonary embolism?

Many people can return gradually to physical activity after treatment has started and their condition is stable. Follow the plan provided at discharge, begin gently, and avoid pushing through new chest pain, marked breathlessness, or faintness.

Can I fly after a pulmonary embolism?

Flying may be possible after recovery has begun, but the timing should be discussed with your healthcare team. Recent PE, continuing symptoms, oxygen needs, and the length of the journey all matter. Do not change anticoagulant treatment specifically for travel without medical advice.

Is pulmonary embolism the same as a heart attack?

No. A heart attack usually happens when blood flow to heart muscle is blocked. A PE blocks an artery in the lungs and can strain the right side of the heart. Both can cause chest pain and breathlessness, and both require urgent assessment.

Sources

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