CONDITION

Pulmonary edema

Pulmonary edema is a buildup of fluid in the lungs that makes breathing difficult.

WHAT IT IS
Fluid buildup in the lung air sacs

BODY SYSTEM
Lungs, heart and circulation

MAIN SYMPTOMS
Breathlessness, cough, low oxygen, frothy sputum

WHAT CAUSES IT
Heart pressure buildup or lung injury

HOW IT IS DIAGNOSED
Examination, oxygen measurement and chest imaging

MAIN TREATMENT
Breathing support, fluid removal and cause-specific care

CAN IT BE CURED?
Sometimes - when the cause is reversible

IS IT AN EMERGENCY?
Yes - sudden breathlessness or pink frothy sputum

LONG-TERM OUTLOOK
Often improves; underlying cause shapes recovery and recurrence

Overview

Pulmonary edema means that fluid has collected inside the lungs. The fluid enters the tiny air sacs called alveoli, where oxygen normally passes into the blood. This makes it harder to breathe and can lower the amount of oxygen reaching the body.

Pulmonary edema is a condition caused by another health problem. It is not the same as pneumonia, although both can cause breathlessness and abnormal chest imaging.

The most common form is related to the heart. If the heart cannot pump effectively, pressure builds in the blood vessels of the lungs and pushes fluid into the air spaces. This is called cardiogenic pulmonary edema.

Pulmonary edema can also happen when the lung tissue or blood vessels are directly injured. This is called non-cardiogenic pulmonary edema. Possible triggers include a severe infection,

inhaled toxins, major trauma and acute respiratory distress syndrome, or ARDS.

Symptoms may develop suddenly over minutes or hours. This is an emergency because oxygen levels can fall quickly. Fluid may also build more gradually, especially in people with heart failure.

Symptoms

Sudden pulmonary edema often causes severe breathlessness. You may feel as though you cannot take in enough air, even while resting. Breathing may become fast, noisy or difficult when lying flat.

Other possible symptoms include:

When fluid builds more slowly, symptoms can be less dramatic. You may become short of breath during activities that were previously comfortable. You may need extra pillows to sleep or wake at night feeling breathless.

If heart failure is responsible, you may also notice swollen ankles or legs, rapid weight gain from retained fluid, tiredness or a reduced ability to exercise.

These symptoms are not specific to pulmonary edema. Asthma, pneumonia, blood clots in the lungs and other heart or lung conditions can cause similar problems. Testing is needed to find the cause.

- Cough, sometimes with pink or blood-tinged frothy sputum
- Wheezing, gasping or a bubbling sound when breathing
- Sweating, pale or clammy skin and marked anxiety
- A fast, pounding or irregular heartbeat
- Blue or grey lips or skin from very low oxygen
- Confusion, drowsiness, weakness or fainting

Causes and risk factors

Heart-related pulmonary edema develops when pressure rises in the blood vessels between the heart and lungs. Common reasons include:

Kidney failure can contribute by causing the body to retain salt and water. It may also make heart-related fluid buildup harder to control.

Non-cardiogenic pulmonary edema results from damage that makes the lung's blood vessels

unusually leaky. Causes include severe infection or sepsis, aspiration of stomach contents, pancreatitis, major trauma, near-drowning and inhalation of smoke or toxic chemicals. Some medicines and drug overdoses can also cause it.

Acute respiratory distress syndrome is a severe form of widespread lung injury that can produce pulmonary edema without high pressure from the heart.

High-altitude pulmonary edema can occur after a rapid climb to high elevation, usually with strenuous activity or poor acclimatisation. A previous episode increases the chance of another one.

Risk is shaped by the underlying cause. For example, coronary artery disease, uncontrolled high blood pressure and existing heart failure increase the chance of heart-related episodes. Pulmonary edema itself is not contagious.

- Heart failure, including a sudden worsening of existing heart failure
- A heart attack or reduced blood flow to the heart muscle
- Heart valve problems
- Very high blood pressure
- An abnormal heart rhythm
- Disease of the heart muscle

Diagnosis

Sudden breathing difficulty is assessed and treated at the same time. The healthcare team will check your breathing rate, heart rate, blood pressure, temperature and blood oxygen level. They will listen for crackling sounds in the lungs and look for signs of excess fluid or poor circulation.

A chest X-ray can show fluid in the lungs and may help identify an enlarged heart, pneumonia or fluid around the lungs. Bedside lung ultrasound can also detect patterns linked with lung fluid. A CT scan is sometimes used when the diagnosis or cause remains uncertain.

An electrocardiogram, or ECG, records the heart's electrical activity. It may show a heart attack or abnormal rhythm. An echocardiogram uses ultrasound to examine how the heart pumps and whether its valves are working properly.

Blood tests may check kidney function, electrolytes, blood counts and signs of infection or heart injury. A BNP or NT-proBNP test measures substances released when the heart is under strain. The result can support a diagnosis of heart failure, but it does not provide the answer by

itself.

An arterial blood gas may be taken in severe cases. This measures oxygen, carbon dioxide and acidity directly from an artery.

The overall diagnosis is based on symptoms, examination, oxygen measurements and imaging. Further tests are used to separate heart-related pulmonary edema from lung injury and to identify the trigger.

Treatment and management

Acute pulmonary edema is generally treated in hospital. The immediate goals are to support breathing, improve oxygen levels and correct the cause.

Supplemental oxygen may be given when blood oxygen is low. If breathing remains difficult, a tight-fitting mask can provide positive airway pressure. This helps keep the air sacs open and can reduce the work of breathing. Some people need a breathing tube and mechanical ventilation.

For heart-related pulmonary edema, diuretics are commonly used to help the kidneys remove excess salt and water. They are sometimes called "water tablets like furosemide or hydrochlorothiazide ." Medicines that widen blood vessels may be used in certain situations, particularly when blood pressure is high. Treatment is adjusted carefully because low blood pressure, kidney problems and electrolyte changes can affect which options are safe.

The trigger also needs treatment. This may include care for a heart attack, an abnormal heart rhythm, a heart valve problem or a severe rise in blood pressure.

Diuretics are not the main treatment for every type of pulmonary edema. When direct lung injury is responsible, care focuses on oxygen and breathing support while treating the injury. For example, bacterial infection may require antibiotics like amoxicillin or doxycycline , while sepsis needs urgent treatment of both infection and circulation problems.

High-altitude pulmonary edema requires immediate descent when possible and oxygen. Delaying descent to continue a climb is unsafe.

After the acute episode, treatment may include changes to long-term heart, kidney or lung care. Do not stop or change prescribed medicines because symptoms improve. Follow the discharge plan and arrange the recommended follow-up.

Complications

The main immediate complication is hypoxaemia, meaning too little oxygen in the blood. Severe oxygen shortage can affect the brain, heart, kidneys and other organs.

Breathing may become so difficult that respiratory failure develops. This means the lungs cannot provide enough oxygen or remove enough carbon dioxide without support.

Possible complications also include:

The risk of complications is greater when treatment is delayed or when the underlying heart or lung problem is severe. Many people improve with prompt care, but the outcome is closely tied to what caused the fluid buildup.

- Abnormal heart rhythms
- Low blood pressure or shock
- Kidney or liver injury
- Cardiac arrest
- Ongoing breathing problems after severe lung injury

Prevention

Pulmonary edema cannot always be prevented. Sudden infections, lung injuries and some heart events may occur despite appropriate care. Inherited heart conditions and congenital valve problems cannot be prevented, although monitoring and treatment may reduce complications.

If you have heart failure, following your agreed care plan can lower the chance of fluid buildup. This may include taking medicines as prescribed, attending follow-up visits and checking your weight or symptoms at home. Follow limits on salt or fluid only if your healthcare team has recommended them for you.

Seek advice when breathlessness, swelling or weight begins to change rather than waiting for severe symptoms. Your care plan may give you a personal weight threshold or instructions for whom to contact.

Managing high blood pressure, heart rhythm problems, kidney disease and coronary artery disease can also reduce heart-related risk.

To reduce the risk of high-altitude pulmonary edema, ascend gradually and allow time to acclimatise. Do not continue climbing if breathlessness at rest, weakness or a persistent cough develops. People who have had a previous episode should seek specialist advice before another high-altitude trip.

Living with it and what to expect

Pulmonary edema may clear quickly once breathing is supported and the trigger is controlled. Recovery can take longer after a major heart event, severe infection or widespread lung injury. Some people need rehabilitation to rebuild strength after a hospital or intensive care stay.

Whether pulmonary edema returns depends mainly on its cause. An isolated, reversible trigger may never cause another episode. Chronic heart or kidney problems can lead to repeated fluid buildup, especially if the underlying condition becomes less stable.

After heart-related pulmonary edema, you may be asked to track breathlessness, swelling and weight. Small day-to-day weight changes are common, so use the threshold in your own care plan rather than choosing one yourself.

Follow-up may include blood tests, medication review, blood pressure checks and heart imaging. These are routine when you are otherwise stable. They help monitor kidney function, electrolyte levels and how well the underlying condition is controlled.

Most daily activity is guided by the condition that caused the episode. Some people return to their previous routine, while others need lasting changes to activity or treatment. Ask when it is safe to resume exercise, work, driving, air travel or travel to altitude.

When to get medical help

Call emergency services for sudden or severe breathlessness, especially if you cannot speak in full sentences or breathe comfortably at rest. Do not drive yourself.

Other emergency warning signs include:

While waiting for help, sit upright if that makes breathing easier. Follow an existing emergency plan if you have one.

Seek urgent same-day medical advice for new or steadily worsening breathlessness, increasing leg swelling, waking repeatedly because you cannot breathe, or a rapid weight increase beyond the limit in your care plan. A lower-than-usual oxygen reading also needs prompt advice if you have been told to monitor it.

Routine follow-up is appropriate when you are stable after treatment or need to review gradual changes in exercise tolerance, medicines or home monitoring. Routine appointments are not a substitute for emergency care when severe symptoms appear.

- Pink, blood-tinged or very frothy sputum

- Blue or grey lips or skin
- New confusion, severe drowsiness, collapse or fainting
- Chest pain, heavy pressure or symptoms suggesting a heart attack
- Severe breathing difficulty with sweating or clammy skin

Common questions

Is pulmonary edema the same as pneumonia?

No. Pulmonary edema is fluid in the lungs caused by pressure buildup or lung injury. Pneumonia is an infection of lung tissue. They can cause similar symptoms and can sometimes occur together, so examination and imaging are important.

Can pulmonary edema go away completely?

It can resolve when the fluid is removed and the trigger is treated. Whether it comes back depends on the cause. A reversible event may not recur, while ongoing heart or kidney disease can cause future episodes.

How quickly does pulmonary edema develop?

Acute pulmonary edema can develop over minutes or hours. Fluid related to ongoing heart failure may build over days or longer, causing gradually worsening breathlessness, swelling or difficulty lying flat.

Can I have pulmonary edema without swollen legs?

Yes. Sudden pulmonary edema can occur without obvious ankle or leg swelling. Leg swelling is more common when excess fluid has been building over time, but its absence does not rule out lung fluid.

What does pulmonary edema sound like?

Clinicians may hear crackles through a stethoscope. Severe fluid buildup can cause wheezing, gasping or a bubbling sound. Breathing sounds alone cannot confirm the condition.

Is pulmonary edema a type of heart failure?

No. Heart failure is a common cause, but pulmonary edema can also result from direct lung injury, severe infection, toxins, aspiration or high altitude. Finding the cause guides treatment and long-term care.

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