CONDITION

Empyema

Empyema is a collection of infected fluid or pus between a lung and the chest wall.

WHAT IT IS
Infected pus collecting between the lung and chest wall

BODY SYSTEM
Lungs and breathing

MAIN SYMPTOMS
Fever, chest pain, cough, shortness of breath

WHAT CAUSES IT
Usually bacterial infection after pneumonia

HOW IT IS DIAGNOSED
Chest imaging and laboratory testing of pleural fluid

MAIN TREATMENT
Antibiotics plus drainage of infected fluid

CAN IT BE CURED?
Yes, usually with antibiotics and drainage

IS IT AN EMERGENCY?
Sometimes, severe breathlessness or confusion needs emergency care

LONG-TERM OUTLOOK
Recovery is common, but treatment may take weeks

Overview

Empyema is a collection of infected fluid or pus in the pleural space, the narrow space between a lung and the inside of the chest wall. Normally, this space contains only enough fluid to help the lung move smoothly.

Empyema most often develops when pneumonia spreads into the pleural space. Fluid, bacteria, dead cells and proteins then collect around the lung.

The fluid may begin as a thin liquid but become thicker and form separate pockets called loculations . Inflamed tissue may also form a firm layer around the lung, preventing it from expanding fully.

Antibiotics like amoxicillin or doxycycline may not clear a large collection of pus on their own. Most people need hospital treatment with antibiotics and a procedure to drain the fluid.

Prompt treatment improves the chance of controlling the infection and restoring breathing.

Symptoms

Symptoms may begin during pneumonia or after the original infection seemed to improve. They can develop quickly or progress over several weeks.

Common symptoms include:

A slower infection may cause weight loss, night sweats or persistent illness. Older adults and people with weakened immune systems may not have a high fever. Confusion, reduced alertness or a sudden loss of independence can be the main signs in an older person.

Similar symptoms can occur with pneumonia, a blood clot in the lung and other conditions, so symptoms alone cannot confirm empyema.

- Fever, chills or sweating
- Sharp chest pain that worsens with coughing or a deep breath
- Shortness of breath
- Cough, sometimes with mucus
- Marked tiredness, weakness or reduced appetite

Causes and risk factors

Empyema is usually caused by bacteria spreading from pneumonia into the pleural space. It may also occur after chest surgery, a chest injury or, less often, an infection elsewhere in the body.

More than one type of bacterium may be involved, including bacteria that grow without oxygen. Cultures may not identify the cause, particularly if antibiotics were started before the fluid was collected.

Factors linked with a higher risk include:

Tuberculosis and fungal infections can occasionally cause pleural infection. They may be considered based on travel, local infection patterns, immune health and the duration of illness.

Empyema itself is not contagious, although the respiratory infection that preceded it may sometimes spread between people.

- Recent or severe pneumonia

- Difficulty swallowing or inhaling food, drink or saliva into the lungs
- Diabetes
- A weakened immune system
- Long-term lung conditions
- Heavy alcohol use
- Poor dental health
- Recent chest surgery or injury

Diagnosis

A healthcare team will ask about symptoms, recent infections and medical history. They will listen to your chest and check your breathing, oxygen level, temperature, heart rate and blood pressure.

A chest X-ray may show fluid around a lung but cannot always determine whether it is infected. Ultrasound shows the collection and any separate pockets more clearly. It also helps clinicians place a needle or drainage tube safely.

A CT scan provides more detail about the pleural space, lung and chest wall and may help plan drainage or surgery.

The key test is usually thoracentesis , also called pleural aspiration. A needle is guided into the pleural space and a fluid sample is removed. Local anaesthetic numbs the area.

Visible pus confirms empyema. Otherwise, laboratory tests examine the fluid's acidity, glucose, proteins, cells and bacteria. Infected fluid is often more acidic than normal. A Gram stain and culture may identify the bacteria and guide antibiotic choice.

Blood tests check for inflammation and the effects of infection. Blood cultures may also be taken, especially if infection may have entered the bloodstream.

Treatment and management

Empyema usually requires hospital treatment. The goals are to control the infection, remove infected fluid and allow the lung to expand.

Antibiotics are started promptly, often through a vein when someone is acutely unwell. Initial treatment covers bacteria likely to be involved and may be adjusted after laboratory results. Treatment is often longer than for uncomplicated pneumonia, with duration based on

recovery, test results and drainage.

Most people also need a flexible chest tube inserted through the chest wall, usually with ultrasound or CT guidance. It connects to a collection system and may remain for several days. Pain relief is provided because the tube can cause soreness.

Thick pus or separate pockets may not drain freely. Two medicines may sometimes be given through the tube: one breaks down strands dividing the fluid, and the other thins the pus. This treatment is not suitable for everyone because it can increase bleeding risk.

Surgery may be needed if antibiotics and drainage do not control the infection, the lung remains trapped or a thick layer has formed around it. Video-assisted thoracoscopic surgery , or VATS, uses small cuts in the chest to wash out infected material and, when needed, remove restrictive tissue. Open surgery is sometimes required for complex cases.

Other hospital care may include oxygen, fluids, nutrition support, pain relief and treatment of related conditions. Gentle movement and breathing exercises may begin as you improve.

Complications

Empyema can spread infection into the blood and cause sepsis, a serious whole-body response to infection.

Inflammation may create a thick, scar-like pleural peel around the lung. This can trap the lung and cause continuing shortness of breath or reduced lung capacity.

Other possible complications include:

Monitoring, repeat imaging and timely changes in treatment help reduce these risks.

- Persistent or returning infection
- An abnormal connection between an airway and the pleural space
- Infection spreading into the chest wall
- Complications from chest drainage or surgery

Prevention

Empyema cannot always be prevented, even when pneumonia is recognised and treated appropriately.

Reducing serious respiratory infections may reduce the risk. Stay up to date with recommended influenza, COVID-19 and pneumococcal vaccines.

Seek medical assessment if pneumonia symptoms worsen or do not improve as expected. Complete prescribed antibiotic courses rather than stopping when you first feel better.

If you often choke while eating or have difficulty swallowing, assessment may reduce the risk of food or liquid entering the lungs. Dental care and support to stop smoking or reduce harmful alcohol use may also help.

Living with it and what to expect

Recovery often takes longer than recovery from uncomplicated pneumonia. Fever and breathing may improve after the infection is controlled and the fluid drains, but tiredness, chest discomfort and reduced stamina can last for weeks.

After leaving hospital, you may need to finish antibiotics and attend follow-up appointments. Your team may arrange another chest X-ray or other imaging to check that the fluid is resolving and the lung is expanding. Attend follow-up even if you feel much better.

Increase activity gradually. Short walks and normal daily movement may initially be easier than strenuous exercise. Pain around a chest-tube or surgical site should lessen, although numbness or sensitivity can last longer.

Some pleural thickening may remain visible on scans without causing major symptoms. In other people, scarring restricts the lung and needs further assessment. Recovery depends on the severity of infection, underlying health, how quickly drainage occurred and whether surgery was needed.

Many people return to their usual activities. Those with ongoing breathlessness, discomfort or reduced exercise tolerance may benefit from respiratory rehabilitation or specialist follow-up. Empyema does not usually return after the infection clears unless an underlying risk remains.

When to get medical help

Seek urgent medical assessment the same day if you have pneumonia or a recent chest infection and:

During recovery, contact your care team promptly for a new fever, increasing breathlessness, worsening wound pain, redness, swelling or discharge. A chest drain that moves, disconnects or stops working also requires immediate professional advice.

Call emergency services for severe difficulty breathing, blue or grey lips, new confusion, fainting, extreme drowsiness or signs of collapse. These may indicate dangerously low oxygen,

sepsis or another serious complication.

Persistent tiredness or mild discomfort can be discussed at routine follow-up if it is gradually improving and there are no urgent symptoms.

- Your fever returns or does not settle
- Your breathing or chest pain is getting worse
- You are becoming weaker rather than recovering
- You cannot keep fluids down or are passing much less urine
- You develop new symptoms after chest surgery or injury

Common questions

Is empyema the same as pneumonia?

No. Pneumonia affects the lung tissue, while empyema is infected fluid or pus around the lung. Both can occur together.

Can antibiotics cure empyema without a chest tube?

A very small, early collection may improve with antibiotics alone. Established empyema usually needs drainage because antibiotics may not clear a pocket of pus. Imaging and fluid test results guide this decision.

How long does empyema take to clear?

Fluid may drain over several days, but antibiotics and recovery often continue for weeks. Complex collections, a trapped lung or surgery can prolong recovery.

Will I need surgery?

Not necessarily. Many people improve with antibiotics and image-guided drainage. Surgery may be recommended if divided or thick fluid cannot drain, infection continues or restrictive tissue prevents the lung from expanding.

Can empyema come back?

Recurrence is uncommon after the infection and fluid have fully cleared. Risk may be higher if drainage was incomplete or an ongoing problem, such as repeated aspiration into the lungs, remains.

Is empyema cancer?

No. Empyema is an infection. Cancer can also cause fluid around a lung, and that fluid can occasionally become infected. Fluid testing and imaging help distinguish these conditions.

Sources

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