CONDITION

Pulmonary actinomycosis

Pulmonary actinomycosis is a long-lasting bacterial lung infection that can damage nearby tissue.

WHAT IT IS
Chronic bacterial lung infection with invasive inflammation

BODY SYSTEM
Lungs and chest

MAIN SYMPTOMS
Persistent cough, fever, chest pain, coughing blood

WHAT CAUSES IT
Actinomyces bacteria entering lung tissue

HOW IT IS DIAGNOSED
Lung tissue microscopy and anaerobic bacterial culture

MAIN TREATMENT
Prolonged antibiotics, sometimes drainage or surgery

CAN IT BE CURED?
Yes - antibiotics usually clear the infection

IS IT AN EMERGENCY?
Sometimes - severe breathlessness or heavy coughing of blood

LONG-TERM OUTLOOK
Usually good with complete treatment; relapse can occur

Overview

Pulmonary actinomycosis is a long-lasting infection caused by Actinomyces bacteria. These bacteria normally live harmlessly in the mouth and digestive tract. They can cause infection if they enter damaged lung tissue, often after saliva or material from the mouth is breathed into the lungs.

The infection tends to grow slowly. It causes inflammation and may form areas of damaged tissue, pus-filled pockets called abscesses, or thick scar-like tissue. Without treatment, it can extend across normal tissue boundaries into the lining of the lung, ribs, or chest wall.

Pulmonary actinomycosis can look like pneumonia, tuberculosis, or lung cancer on a chest scan. Its symptoms are also not specific to this condition. For these reasons, diagnosis often requires a tissue sample rather than imaging alone.

It is not considered contagious. Actinomyces bacteria do not usually spread between people through coughing, touching, or sharing household items.

Symptoms

Symptoms often develop over weeks or months. Some people have mild symptoms at first, while others become more unwell.

Common symptoms include:

These symptoms can occur with many lung conditions. Having them does not mean that you have pulmonary actinomycosis.

If the infection reaches the chest wall, it may cause swelling, tenderness, or an opening that drains fluid through the skin. This is uncommon and usually reflects a more advanced infection.

- A persistent cough, with or without mucus
- Fever, night sweats, or tiredness
- Chest pain, sometimes worse with deep breathing
- Coughing up blood or blood-streaked mucus
- Reduced appetite or unplanned weight loss
- Shortness of breath

Causes and risk factors

Pulmonary actinomycosis is usually caused by several types of bacteria growing together, including Actinomyces . These are anaerobic bacteria, which means they grow best where there is little oxygen.

The infection commonly begins when saliva, food, or stomach contents enter the airways. This is called aspiration. Most people clear small amounts without developing an infection. The risk is higher when oral health is poor, lung tissue is already damaged, or normal swallowing and coughing are impaired.

Factors associated with pulmonary actinomycosis include:

Not everyone with the condition has an obvious risk factor. It is also possible to have one or more risk factors and never develop the infection.

- Severe tooth decay, gum disease, or infrequent dental care

- Difficulty swallowing or a reduced cough reflex
- Heavy alcohol use, sedation, or episodes of reduced consciousness
- Existing lung damage, such as bronchiectasis or emphysema
- A blockage in an airway, including an inhaled foreign object
- Conditions or treatments that weaken immune defences

Diagnosis

Diagnosis begins with a review of your symptoms, dental health, swallowing, medical history, and medicines. A chest X-ray or computed tomography scan, usually called a CT scan, can show the location and extent of abnormal lung tissue.

A scan cannot confirm pulmonary actinomycosis. The findings may resemble a tumour, an ordinary lung abscess, or another infection. Further testing is often needed to rule out these possibilities.

Doctors may collect samples through bronchoscopy. During this procedure, a thin flexible camera is passed through the nose or mouth into the airways. A sample may also be taken with a needle through the chest wall or during surgery.

The sample is examined under a microscope. A pathologist may find colonies of branching bacteria surrounded by clumped inflammatory material. These clumps are traditionally called "sulfur granules" because of their yellow colour, but they do not contain sulfur.

Part of the sample may be sent for anaerobic culture, which attempts to grow the bacteria without oxygen. Culture can identify Actinomyces and other bacteria involved in the infection. However, cultures are often negative because the bacteria are difficult to grow, oxygen can damage them, or antibiotics like amoxicillin or doxycycline were taken before sampling.

Finding Actinomyces in coughed-up mucus does not always prove infection. The bacteria normally live in the mouth and may contaminate a sputum sample. Tissue findings, the type of sample, imaging, symptoms, and culture results are considered together.

Treatment and management

Antibiotics are the main treatment. Penicillin-based antibiotics are commonly used because Actinomyces bacteria are usually sensitive to them. If these medicines are unsuitable, the treating team can select an alternative based on allergy history, test results, and the other bacteria found.

Treatment is usually longer than for routine bacterial pneumonia. Some people with severe or extensive infection begin with antibiotics given into a vein and later change to tablets. The total length of treatment is based on the infection's extent, response on scans, symptoms, and whether infected tissue was removed. It may continue for several months.

It is important to take antibiotics for the agreed period, even when symptoms improve earlier. Stopping before the infection is adequately treated can allow it to return. Contact the prescribing team if side effects make it difficult to continue rather than stopping on your own.

Surgery is not needed in every case. It may be considered when:

Follow-up may include appointments, blood tests, and repeat chest imaging. Scan abnormalities can take longer to improve than fever or cough.

- Cancer cannot be ruled out with less invasive tests
- An abscess or infected fluid needs to be drained
- There is major bleeding or severely damaged tissue
- The infection has not improved with appropriate antibiotics
- A blocked airway or foreign object must be removed

Complications

Pulmonary actinomycosis can spread directly into nearby tissue if it is not treated. Unlike many infections, it may cross the usual boundaries between the lung, its lining, and the chest wall.

Possible complications include a lung abscess, infection of fluid around the lung, damaged airways, or a channel connecting infected tissue to the skin. These channels are called sinus tracts and may drain pus.

Inflammation can damage nearby blood vessels and cause coughing of blood. Small streaks should be medically assessed, while a large or ongoing amount requires emergency care.

Spread through the bloodstream to distant organs is uncommon, but it can happen. The brain is one possible site. Treatment delays and incomplete antibiotic courses may also increase the chance of persistent or returning infection.

Prevention

Pulmonary actinomycosis cannot always be prevented. Actinomyces bacteria are a normal part of the mouth, and some people develop the condition without a clear avoidable cause.

Regular dental care and treatment of significant tooth or gum disease may reduce the chance that large numbers of oral bacteria enter the lungs. Daily toothbrushing and cleaning between the teeth also support oral health.

If you have swallowing problems or repeated episodes of food entering the airway, a swallowing assessment may identify safer ways to eat and drink. This is especially relevant after a stroke or with a neurological condition.

Reducing heavy alcohol use and avoiding non-prescribed sedating substances can lower the risk of aspiration during periods of reduced consciousness. These steps cannot guarantee prevention, but they address recognised pathways by which the bacteria may reach the lungs.

Living with it and what to expect

Most people improve with suitable antibiotics, although recovery is usually gradual. Fever and general illness may settle before coughing, tiredness, or chest discomfort. Lung changes visible on a scan can remain for weeks or months as inflammation resolves.

Treatment may continue after you feel better. Keeping follow-up appointments helps the clinical team judge whether the infection is clearing and whether antibiotic treatment can safely end. Tell them about missed doses, side effects, or new symptoms.

Some people are left with an area of lung scarring or damaged airways. This may cause an ongoing cough or repeated chest infections, especially if there was extensive disease before treatment. Others recover without important long-term breathing problems.

Pulmonary actinomycosis can return, particularly if treatment was incomplete, infected tissue remains, or an underlying aspiration problem continues. A new or worsening cough, fever, weight loss, or blood in the mucus after treatment deserves medical review.

The overall outlook is usually good when the condition is recognised and fully treated. Recovery may take longer when infection is extensive, has spread outside the lung, or occurs alongside serious health problems.

When to get medical help

Arrange a routine medical appointment if you have a cough lasting several weeks, repeated fever, unexplained weight loss, ongoing chest discomfort, or blood-streaked mucus. These symptoms have many possible causes, but they should not be ignored.

If you are receiving treatment, contact the treating service promptly if symptoms worsen,

fever returns, you cannot take the antibiotic, or you develop troublesome side effects. New swelling or drainage from the chest wall also needs prompt assessment.

Seek emergency help for:

Do not drive yourself for emergency assessment if you are severely breathless, faint, or coughing up a large amount of blood.

- Severe or rapidly worsening difficulty breathing
- A large amount of coughed-up blood or bleeding that continues
- Blue or grey lips, fainting, or new confusion
- Severe chest pain with breathlessness or collapse

Common questions

Is pulmonary actinomycosis cancer?

No. It is a bacterial infection. However, it can form a mass or other scan changes that look similar to lung cancer. A biopsy may be needed to distinguish them, and both conditions can occasionally be present at the same time.

Is pulmonary actinomycosis contagious?

It is not generally spread from person to person. The bacteria usually come from the affected person's own mouth or digestive tract and enter tissue after normal protective barriers are disrupted.

Can pulmonary actinomycosis be cured?

Yes, most cases can be cleared with appropriate antibiotics. Treatment often lasts several months because the infection is slow-growing and may be surrounded by dense inflamed tissue. Surgery is sometimes needed for complications or diagnostic uncertainty.

Why does treatment take so long?

The infection may form abscesses and thick areas of inflammation that antibiotics enter slowly. Treatment length is adjusted to the amount of disease, clinical improvement, imaging results, and whether infected tissue has been removed.

Can it come back after treatment?

It can return, especially if treatment ends too early or an underlying problem such as repeated aspiration remains. Completing treatment and attending follow-up imaging reduces the chance that persistent infection will be missed.

Can I have pulmonary actinomycosis without bad teeth?

Yes. Poor dental health is a recognised risk factor, but it is not present in every case. Swallowing problems, damaged lungs, airway blockage, and episodes of reduced consciousness are other possible factors, and sometimes no clear cause is found.

Sources

- Valour F, Sénéchal A, Dupieux C, et al. Actinomycosis: etiology, clinical features, diagnosis, treatment, and management . Infection and Drug Resistance . 2014;7:183-197.
- Mabeza GF, Macfarlane J. Pulmonary actinomycosis . European Respiratory Journal . 2003;21(3):545-551.
- Kim SR, Jung LY, Oh IJ, et al. Pulmonary actinomycosis during the first decade of the 21st century: cases of 94 patients . BMC Infectious Diseases . 2013;13:216.
- Kolditz M, Bickhardt J, Matthiessen W, Holotiuk O, Höffken G, Koschel D. Medical management of pulmonary actinomycosis: data from 49 consecutive cases . Infection . 2009;37(6):557-563.
- MSD Manual Professional Edition. Actinomycosis . Overview of diagnosis, complications, and treatment of actinomycosis.