CONDITION

Pneumocystis jirovecii pneumonia

A fungal lung infection that mainly affects people with weakened immune systems.

WHAT IT IS
Opportunistic fungal lung infection

BODY SYSTEM
Lungs and breathing

MAIN SYMPTOMS
Shortness of breath, dry cough, fever, fatigue

WHAT CAUSES IT
Fungal infection during weakened immunity

HOW IT IS DIAGNOSED
Respiratory sample microscopy or PCR testing

MAIN TREATMENT
Antimicrobial medicine, oxygen, and sometimes corticosteroids

CAN IT BE CURED?
Yes - infection usually clears with treatment

IS IT AN EMERGENCY?
Sometimes - severe breathlessness needs emergency care

LONG-TERM OUTLOOK
Often good with treatment and restored immunity

Overview

Pneumocystis jirovecii pneumonia is a lung infection caused by the fungus Pneumocystis jirovecii . It is often shortened to PJP. Older sources may call it PCP, meaning Pneumocystis pneumonia.

PJP is an opportunistic infection . This means it mainly causes illness when the immune system is too weak to control it. It is uncommon in people with healthy immune systems.

The infection causes inflammation and fluid-like material to collect inside the tiny air sacs of the lungs. This can make it harder for oxygen to pass into the blood. Symptoms may begin gradually, especially in people living with HIV, but they can develop more quickly in people whose immunity is weakened for other reasons.

PJP matters because it can become severe without treatment. Prompt diagnosis and

appropriate antimicrobial medicine improve the chance of recovery. People at high risk can often take preventive medicine while their immune system is suppressed.

Symptoms

The most common symptoms are shortness of breath, a dry cough and fever. The cough usually produces little or no mucus.

Other possible symptoms include:

Symptoms often develop over several days to weeks. In people living with HIV, they may build slowly and initially appear only during exercise. In people with cancer, a transplant or medicine-related immune suppression, breathing problems can worsen over a few days.

Some people have low blood oxygen even when they do not look severely unwell. This is one reason suspected PJP needs medical assessment rather than monitoring at home without advice.

- Unusual tiredness or weakness
- Faster breathing or heartbeat
- Chest discomfort
- Reduced appetite or unintended weight loss
- Difficulty completing normal activities because of breathlessness

Causes and risk factors

PJP is caused by breathing in Pneumocystis jirovecii . Many people are exposed to the organism without becoming ill. Researchers continue to study whether later infection is usually caused by a new exposure, reactivation of an earlier infection, or both.

The main risk is a weakened immune system, particularly reduced activity of CD4 T cells. These white blood cells help organize the immune response to infection.

People at increased risk include those who:

Corticosteroids like prednisone or hydrocortisone can increase risk when taken in immune-suppressing amounts for a sustained period, especially alongside other treatments that weaken immunity. Short courses do not carry the same level of risk.

PJP is not usually approached like a routine contagious respiratory infection. Person-to-person spread may occur, but most everyday contact does not place someone with a healthy immune

system at significant risk.

- Have untreated or advanced HIV
- Take prolonged or intensive immune-suppressing medicines
- Have received an organ or stem cell transplant
- Are being treated for certain blood cancers or solid tumours
- Have some inflammatory or autoimmune conditions
- Have a severe immune-system condition

Diagnosis

PJP symptoms can resemble other types of pneumonia, medication reactions and inflammation caused by an underlying condition. No symptom alone can confirm it.

Assessment usually includes measuring your temperature, breathing rate and blood oxygen level. A clinician may check oxygen both at rest and during gentle activity. An arterial blood gas test, which uses blood from an artery, can show how well the lungs are moving oxygen into the blood.

A chest X-ray may show widespread hazy changes in both lungs. A CT scan gives more detailed images and may find abnormalities when an X-ray is unclear. Imaging supports the diagnosis but cannot confirm the organism by itself.

Confirmation usually requires finding Pneumocystis in a respiratory sample. The sample may be obtained through:

PCR is sensitive, but a positive result does not always prove that Pneumocystis is causing the symptoms. Some people carry small amounts without active pneumonia. The result must be interpreted alongside symptoms, imaging and immune status.

A blood test called beta-D-glucan may support the diagnosis. It is not specific to PJP and can be raised with other fungal infections or for non-infectious reasons.

Testing may also look for bacterial, viral or other fungal infections. If there is no known reason for immune suppression, HIV testing is commonly offered as part of the assessment.

- Induced sputum: inhaled salty mist helps produce mucus from deep in the lungs
- Bronchoscopy: a thin flexible camera collects fluid from the airways
- Microscopy: the laboratory looks directly for the organism
- PCR testing: a laboratory test looks for the organism's genetic material

Treatment and management

PJP is treated with antimicrobial medicine. The preferred treatment for many people is trimethoprim-sulfamethoxazole, often called TMP-SMX or co-trimoxazole. Although Pneumocystis is a fungus, standard antifungal medicines do not reliably treat it. TMP-SMX acts on metabolic pathways the organism needs to survive.

Treatment usually lasts several weeks. The route and length are chosen according to severity, immune status, response and local guidance. Severe infection is generally treated in hospital, with medicine initially given through a vein if tablets cannot be absorbed or breathing is significantly affected.

Other medicines are available when TMP-SMX cannot be used or causes important side effects. The choice depends on the severity of the infection and factors such as allergies, blood counts, kidney function and other medicines.

People with low oxygen levels may receive supplemental oxygen. Corticosteroids may be added early for moderate or severe PJP associated with HIV because they can reduce harmful lung inflammation. Their benefit is less certain in people without HIV, so that decision is made case by case.

Blood tests are often needed during treatment. These check blood cell counts, kidney and liver function, and levels of salts such as potassium. Possible side effects vary by medicine but can include nausea, rash, changes in blood counts or kidney problems.

For someone newly diagnosed with HIV, antiretroviral treatment is usually started promptly once immediate treatment plans are coordinated. Restoring immune function helps prevent another episode.

Complications

PJP can reduce blood oxygen and lead to respiratory failure, meaning the lungs cannot supply enough oxygen without support. Some people need high-flow oxygen, non-invasive breathing support or a ventilator.

Air can occasionally leak from the lung, causing a pneumothorax, or collapsed lung. This may cause sudden chest pain and a rapid increase in breathlessness.

Other complications include:

Severe PJP can be life-threatening, particularly when diagnosis is delayed or another major health condition is present. However, many people recover when the infection is identified and treated.

- A prolonged need for oxygen
- Secondary bacterial or other opportunistic infections
- Kidney, liver, blood count or electrolyte problems from treatment
- Recurrence if immune suppression continues without preventive medicine
- Inflammatory worsening after HIV treatment restores immune activity

Prevention

There is no vaccine against PJP, and exposure to Pneumocystis cannot be reliably prevented through ordinary hygiene or avoiding public places.

Preventive antimicrobial medicine, called prophylaxis, can greatly reduce risk in people with substantial immune suppression. TMP-SMX is commonly preferred because it also protects against some other infections. Alternatives may be used if it is not suitable.

Preventive treatment may be recommended for people with a very low CD4 count due to HIV, during certain cancer treatments, after transplantation or while receiving particular combinations of immune-suppressing medicines. The level of risk is influenced by the treatment, its duration and any additional medical conditions.

If you are prescribed prophylaxis, take it according to the agreed schedule and report side effects rather than stopping it without advice. Prevention may be stopped when the immune system has recovered enough, but this should be based on follow-up testing and the reason for immune suppression.

Living with it and what to expect

Improvement is not always immediate. Fever and breathing may begin to settle during the first days of effective treatment, but cough, fatigue and reduced exercise tolerance can continue for weeks. Symptoms can sometimes worsen briefly after treatment starts because the lungs remain inflamed.

Follow-up may include checking oxygen levels, blood tests and reviewing medication side effects. Repeat imaging is not always needed if symptoms are clearly improving, but it may be arranged when recovery is slow or another problem is suspected.

Many people return to their previous level of activity after recovery. How quickly this happens is influenced by how severe the pneumonia was and by the condition that weakened the immune system. After critical illness or a long hospital stay, rehabilitation may be needed to

rebuild strength.

PJP does not usually become a permanent infection after successful treatment. However, it can return if the immune system remains weak. Some people therefore continue preventive medicine until their immunity has recovered or their immune-suppressing treatment has changed.

Long-term planning focuses on controlling the underlying cause of immune suppression. For people living with HIV, consistent antiretroviral treatment can restore immune function and greatly reduce recurrence. Transplant, cancer and autoimmune treatment plans may require ongoing monitoring and periods of prophylaxis.

When to get medical help

Arrange prompt medical assessment if you have a weakened immune system and develop a new dry cough, fever, unexplained fatigue or increasing breathlessness. Do not wait for severe symptoms before seeking advice, because oxygen levels can fall gradually.

If you are being treated for PJP, contact your treatment team promptly if symptoms are not improving, breathing becomes more difficult, you cannot keep medicine down, or you develop a new rash. Treatment side effects may require testing or a change of medicine.

Seek emergency help for:

Routine follow-up is still important after symptoms improve. It is used to confirm recovery, monitor treatment effects and decide how long preventive medicine is needed.

- Severe or rapidly worsening difficulty breathing
- Blue, grey or unusually pale lips or skin
- Confusion, fainting or difficulty staying awake
- Sudden chest pain with increased breathlessness
- Signs of a severe allergic reaction, such as facial swelling or trouble breathing

Common questions

Is Pneumocystis pneumonia contagious?

It is not considered contagious in the same way as influenza or many bacterial pneumonias. Airborne spread between people may occur, especially where several highly immunocompromised people receive care, but healthy household members are unlikely to

become ill. Follow any infection-control advice given by your healthcare service.

Can a healthy person get PJP?

PJP is very uncommon in someone with a normally functioning immune system. When it occurs without a known risk factor, clinicians usually look for an unrecognized cause of immune suppression.

Is PJP the same as ordinary pneumonia?

No. Pneumonia is a general term for inflammation or infection in the lungs. PJP is one specific type caused by Pneumocystis jirovecii . It needs different tests and treatment from most bacterial pneumonias.

How long does recovery take?

The infection is treated over several weeks, but full recovery can take longer. Breathlessness and tiredness may improve gradually over weeks or occasionally months, particularly after severe infection. The underlying condition and previous lung health also affect recovery.

Can Pneumocystis pneumonia come back?

Yes. Recurrence is possible if the immune system remains weak. Preventive medicine and treatment of the underlying immune problem can lower this risk.

Are PJP and PCP the same thing?

Yes. PJP is the current abbreviation for Pneumocystis jirovecii pneumonia. PCP is an older abbreviation that originally referred to the organism's former name. Both terms may appear in medical records and online information.

Sources

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