CONDITION

Opportunistic infections

Opportunistic infections occur when weakened immune defenses allow certain germs to cause illness.

WHAT IT IS
Infections taking advantage of weakened immune defenses

BODY SYSTEM
Any body system, especially lungs, brain, skin, and gut

MAIN SYMPTOMS
Fever, cough, breathlessness, mouth sores

WHAT CAUSES IT
Bacteria, viruses, fungi, or parasites during immune weakness

HOW IT IS DIAGNOSED
Blood, fluid, tissue, imaging, and organism-specific tests

MAIN TREATMENT
Targeted antimicrobial treatment and immune recovery

CAN IT BE CURED?
Sometimes - infection clears, underlying immune weakness may persist

IS IT AN EMERGENCY?
Sometimes - severe breathlessness, confusion, seizure, or rapid decline

LONG-TERM OUTLOOK
Often treatable; ongoing immune weakness raises recurrence risks

Overview

Opportunistic infections are infections that take advantage of weakened immune defenses. They are not one specific disease. They are a group of infections caused by bacteria, viruses, fungi, or parasites.

Some of these germs rarely cause serious illness in people with healthy immune systems. Others are common germs that become more severe, spread to unusual parts of the body, or return from an inactive state when immunity is reduced.

For example, the fungus Candida may cause severe mouth or swallowing problems. Pneumocystis pneumonia can affect the lungs. Cytomegalovirus, or CMV, may damage the eyes or other organs. Toxoplasmosis can affect the brain. These are examples, not a complete list.

Opportunistic infections are closely associated with advanced untreated HIV, but HIV is only one possible reason for weakened immunity. Cancer treatment, organ or stem cell transplantation, immune-suppressing medicines, and some inherited immune conditions can also increase risk.

These infections matter because they may progress quickly or cause organ damage. However, many can be treated, and some can be prevented with planned monitoring, preventive medicines, vaccination, or treatment of the underlying immune problem.

Symptoms

Symptoms depend on the germ, the affected organ, and the strength of your immune system. An infection may begin with mild or unclear symptoms. Fever may sometimes be absent when immune defenses are very weak.

Possible symptoms include:

Some opportunistic infections reactivate a germ already inside the body. For example, chickenpox virus can later return as shingles. Tuberculosis and certain parasites may also remain inactive before causing symptoms.

Contact your healthcare team promptly about new symptoms if you have been told that your immune system is severely weakened. Waiting for symptoms to become intense may delay important testing.

- Fever, chills, unusual sweating, or marked tiredness
- Cough, chest discomfort, shortness of breath, or reduced exercise tolerance
- White patches in the mouth, mouth pain, or painful swallowing
- Persistent diarrhea, abdominal pain, nausea, or weight loss
- Headache, confusion, weakness, poor balance, or seizures
- Blurred vision, floating spots, eye pain, or loss of vision
- A painful, blistering, spreading, or slow-healing skin rash
- Swollen glands or unexplained lumps

Causes and risk factors

The immediate cause is an infection with a particular germ. The reason it becomes opportunistic is that the immune system cannot control that germ as effectively as usual.

Risk is higher in people with:

A CD4 cell is a type of white blood cell that helps organize immune responses. HIV can reduce the number of these cells. The lower the count becomes, the less able the body may be to control certain infections.

Neutrophils are white blood cells that are especially important for fighting bacteria and fungi. A low neutrophil count is called neutropenia. It can occur during some cancer treatments and may make even a mild fever medically important.

Risk is shaped by more than immune test results. Previous infections, vaccination history, medicines, travel, environmental exposure, and the length of immune suppression also matter. Different immune problems create different infection risks.

- Advanced or untreated HIV, especially with a low CD4 count
- Low infection-fighting white blood cells after chemotherapy
- An organ or stem cell transplant
- Medicines that suppress immunity, including some corticosteroids and biologic medicines
- Certain blood cancers or inherited immune disorders
- Severe illness, poor nutrition, or major damage to protective skin and tissue barriers

Diagnosis

There is no single test for all opportunistic infections. Testing is chosen according to your symptoms, immune condition, and the part of the body that may be infected.

Diagnosis may involve blood tests, urine tests, sputum samples, stool samples, or swabs. A laboratory may look for the germ under a microscope, grow it in a culture, detect its genetic material with a PCR test, or test for parts of the organism called antigens.

Imaging such as a chest X-ray, CT scan, or MRI may show pneumonia, inflammation, abscesses, or changes in the brain and other organs. Imaging can locate a problem, but it does not always identify the germ.

Sometimes a sample must be taken from the affected area. This may involve a lumbar puncture to test fluid around the brain and spinal cord, a bronchoscopy to collect lung samples, or a biopsy to examine tissue. These procedures are recommended only when their likely benefit justifies their risks.

Tests may also assess why the infection occurred. These can include a full blood count, CD4 count, and tests for HIV or other immune conditions. A positive antibody test may show past

exposure rather than active infection, so results must be interpreted alongside symptoms and other findings.

Treatment and management

Treatment targets the specific germ. Depending on the cause, this may involve an antibiotic like amoxicillin or doxycycline , antiviral like acyclovir or oseltamivir , antifungal like fluconazole or terbinafine , or antiparasitic medicine. Some infections need a combination of medicines.

Treatment may be given by mouth, into a vein, or occasionally directly into an affected area. The route and length of treatment depend on the infection, its severity, the organs involved, and how quickly immune function is expected to recover.

Severe infections may require hospital care for oxygen, fluids, monitoring, or treatment of complications. Milder infections may sometimes be managed at home with close follow-up.

Improving immune function is also important. This might mean treating HIV, allowing blood counts to recover after chemotherapy, or addressing another underlying condition. After transplantation or during treatment for an inflammatory condition, immune-suppressing medicine may sometimes be adjusted. This must be done by the prescribing team because reducing it too quickly can cause transplant rejection or a flare of the underlying condition.

Some people need a lower-dose or longer-term preventive treatment after the main infection has been controlled. This is called secondary prophylaxis. It reduces the chance of the infection returning while immunity remains weak.

Medicines used for opportunistic infections can interact with cancer treatment, transplant medicines, HIV treatment, and other drugs. Tell your care team about prescription medicines, non-prescription products, vitamins, and supplements. Do not stop immune-suppressing treatment or change antimicrobial medicines on your own.

Complications

An opportunistic infection may spread beyond its starting point. Depending on the germ, complications can include pneumonia, breathing failure, bloodstream infection, vision loss, brain inflammation, seizures, or damage to the liver, kidneys, or digestive tract.

Sepsis is a dangerous whole-body response to infection that can affect circulation and organ function. It requires emergency treatment.

Some infections return if the underlying immune weakness continues. Others leave lasting

effects even after the germ has been controlled, such as reduced vision, nerve problems, or decreased lung function.

Treatment can also cause complications. Possible problems include kidney or liver injury, changes in blood cell counts, allergic reactions, and interactions with other medicines. Regular blood tests and follow-up may be needed to detect these effects.

When immune function begins to improve, inflammation can occasionally become more noticeable because the recovering immune system reacts strongly to a known or previously hidden infection. In people beginning HIV treatment, this is called immune reconstitution inflammatory syndrome, or IRIS. It needs medical assessment, but it does not usually mean that HIV treatment has failed.

Prevention

Not every opportunistic infection can be prevented. Some germs are already present in the body, and some exposures cannot be completely avoided. Inherited immune conditions themselves may not be preventable.

Risk can often be reduced. The most important steps depend on the reason your immunity is weakened. They may include effective HIV treatment, planned monitoring during cancer treatment, and careful management after transplantation.

Preventive measures can include:

Not every vaccine is suitable during severe immune suppression. In particular, some live vaccines may not be appropriate. Vaccination decisions should be based on your condition, medicines, and treatment timing.

Preventive medicines are used only when a person's specific risk is high enough to justify them. They are not needed for everyone with a weakened immune system.

- Taking prescribed preventive antimicrobial medicines consistently
- Receiving vaccines recommended for your immune condition
- Washing hands and handling food safely
- Avoiding close contact with people who have a known contagious illness
- Following advice about soil, dust, animal waste, untreated water, and travel
- Attending scheduled blood tests and immune monitoring
- Screening for certain inactive infections before immune-suppressing treatment

Living with it and what to expect

The course depends on the infection and whether immune function improves. Some infections clear after a defined treatment course and do not return. Others need months of treatment or ongoing suppression.

If immune weakness is temporary, such as after some chemotherapy treatments, infection risk may fall as blood counts recover. After transplantation or with a long-term immune condition, risk may continue and change over time. Regular monitoring helps match prevention and treatment to the current level of risk.

Many people return to their usual activities after treatment. Recovery may still take time, especially after pneumonia, hospitalization, or an infection involving the brain or nerves. Tiredness and reduced stamina can continue after the infection itself has improved.

Keep an up-to-date list of your medicines and previous opportunistic infections. Attend planned blood tests, scans, eye examinations, or specialist visits. Routine follow-up is used to check treatment response, medicine side effects, immune recovery, and the need for continued preventive treatment.

Seek advice before travel because some destinations bring exposure to region-specific fungi, parasites, or other infections. Travel plans may also affect vaccines and access to medication.

When to get medical help

If you have severe immune suppression, follow any written instructions from your treatment team. Fever or infection symptoms may require same-day assessment even when you do not feel very unwell.

Get prompt medical advice for a new or persistent fever, worsening cough, mouth sores, painful swallowing, diarrhea, weight loss, rash, unusual headache, or vision change. This is especially important during chemotherapy, after a transplant, with a very low CD4 count, or while taking strong immune-suppressing medicines.

Seek emergency help for:

Routine follow-up is appropriate when symptoms are stable and you are attending planned reviews. Do not wait for a routine appointment if you develop the urgent or emergency symptoms above.

- Severe difficulty breathing, blue or grey lips, or rapidly worsening breathlessness
- New confusion, extreme drowsiness, fainting, or difficulty waking

- A seizure, sudden weakness, or a severe headache with a stiff neck
- Sudden loss of vision
- Signs of shock, such as cold clammy skin with marked weakness
- Symptoms that are worsening quickly over minutes or hours

Common questions

Does having an opportunistic infection mean I have HIV?

No. HIV is one possible cause of reduced immunity, but cancer treatment, transplantation, immune-suppressing medicines, and inherited immune conditions can also raise the risk. Testing may be offered when the cause is not already known.

Are opportunistic infections contagious?

Some are, but many are not easily passed between people. The answer depends on the germ. Some infections come from the environment or from a germ already inside your body. Others, such as tuberculosis, may spread between people and require specific precautions.

Can a healthy person get an opportunistic infection?

Some of the same germs can infect people with healthy immune systems. However, they may cause milder illness or affect people only after a large exposure. Finding an unusual or severe infection may lead to tests for an underlying immune problem.

Can opportunistic infections be cured?

Some can be fully cleared with treatment. Others become inactive but remain in the body, or return while immunity is weak. Long-term preventive treatment may be needed until immune function improves.

Why does the same infection keep coming back?

The germ may remain in the body after symptoms improve, or you may be exposed again. Recurrence is more likely when the underlying immune problem continues. It can also happen if treatment cannot reach the infected area well or the germ becomes resistant to a medicine.

Should I stop my immune-suppressing medicine if I get an infection?

Do not stop it on your own. Suddenly stopping corticosteroids can be harmful, and changing transplant or inflammatory condition treatment can have serious effects. The relevant medical teams can balance infection control against the reason you need immune suppression.

Sources

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