CONDITION

Mucormycosis

Mucormycosis is a rare but serious mold infection that can invade tissue and blood vessels.

WHAT IT IS
Rare invasive mold infection damaging tissue and blood vessels

BODY SYSTEM
Sinuses, eyes, brain, lungs, skin, or digestive system

MAIN SYMPTOMS
Facial swelling, fever, breathing trouble, painful skin changes

WHAT CAUSES IT
Infection with molds in the Mucorales group

HOW IT IS DIAGNOSED
Tissue biopsy with microscopy and fungal culture

MAIN TREATMENT
Urgent antifungal medicine and removal of infected tissue

CAN IT BE CURED?
Sometimes - early combined treatment can clear infection

IS IT AN EMERGENCY?
Yes - suspected infection needs urgent hospital assessment

LONG-TERM OUTLOOK
Recovery possible, but advanced infection can be fatal

Overview

Mucormycosis is an uncommon infection caused by a group of molds called Mucorales. These molds live widely in soil and decaying plant material. Most people breathe in or touch their spores without becoming ill.

The infection mainly affects people whose immune defenses are weakened or whose diabetes is not well controlled. It can also enter through damaged skin after a serious injury, burn, or contact with contaminated material.

Mucormycosis can grow quickly. It may invade blood vessels, cutting off the blood supply to nearby tissue. This can cause tissue to die, which is called necrosis . The infection most often affects the sinuses and nearby eye or brain, the lungs, or the skin. Less often, it affects the digestive system or spreads through the bloodstream.

Suspected mucormycosis needs urgent hospital assessment. Early antifungal treatment and surgery, when needed, improve the chance of controlling it. It does not usually get better without medical treatment.

Symptoms

Symptoms depend on where the infection develops. They may resemble other infections, so symptoms alone cannot confirm mucormycosis.

Infection of the nose and sinuses may spread toward an eye or the brain. Possible symptoms include:

Dark tissue is a possible late sign, but it is not always present. Treatment should not wait for this change to appear.

Lung infection can cause fever, cough, chest pain, shortness of breath, or coughing up blood. These symptoms may continue despite treatment for a suspected bacterial infection.

Skin mucormycosis may begin around a cut, burn, injection site, or other injury. The area can become painful, swollen, blistered, or unusually dark. An ulcer may form, and the affected area may spread quickly. Some people have little pain if nearby nerves have been damaged.

Digestive-system infection can cause abdominal pain, swelling, vomiting, or bleeding from the bowel. It is uncommon and is seen mainly in people who are very unwell, including some premature babies.

If the infection spreads to the brain or other organs, it may cause confusion, unusual sleepiness, seizures, weakness, or loss of consciousness.

- One-sided facial pain, swelling, or numbness
- Blocked nose or dark, bloody nasal discharge
- Headache, fever, or pain around an eye
- Eyelid swelling, double vision, or reduced vision
- Dark patches inside the nose or mouth

Causes and risk factors

Mucormycosis happens when Mucorales spores enter the body. This is usually through breathing, but spores can also enter damaged skin or, rarely, be swallowed. The infection does not normally spread from one person to another.

The molds are common in the environment. Finding mold near a home or workplace does not mean that someone will develop mucormycosis.

Risk is higher when the body cannot control fungal growth effectively. Important risk factors include:

People without these risk factors can occasionally develop skin infection after a major injury or natural disaster. However, mucormycosis remains unusual in people with healthy immune systems and intact skin.

Mucormycosis has also occurred in some people with COVID-19, especially when diabetes was not controlled or corticosteroids were used. COVID-19 alone does not mean that someone has or will develop this infection.

- Poorly controlled diabetes, especially diabetic ketoacidosis
- Blood cancers or a very low neutrophil count
- Stem cell or solid-organ transplantation
- Medicines that suppress the immune system, including corticosteroids like prednisone or hydrocortisone
- Iron overload or treatment with deferoxamine
- Severe malnutrition
- Major burns, wounds, surgery, or contaminated traumatic injuries
- Premature birth, particularly in very low-birth-weight babies

Diagnosis

Diagnosis needs to happen quickly, but no single symptom or routine blood test can reliably confirm mucormycosis.

A clinician may arrange a CT or MRI scan to look for infection in the sinuses, eye socket, brain, lungs, or other organs. Scans help show its location and extent, but they cannot identify the mold by themselves.

Confirmation usually requires a biopsy , meaning that a small sample of affected tissue is removed. A laboratory examines the sample under a microscope for fungal growth invading tissue and blood vessels. Part of the sample is usually placed in a fungal culture to try to grow and identify the organism.

A negative culture does not always rule out mucormycosis. The mold may be damaged during collection, or it may not grow in the laboratory. For this reason, microscope findings, culture

results, scans, symptoms, and risk factors are considered together. Molecular tests that detect fungal genetic material may help in some specialist laboratories.

Doctors may also test blood sugar, kidney function, blood cell counts, and other measures. These tests do not confirm the infection, but they help identify risk factors and guide safe treatment.

Treatment and management

Treatment usually begins in hospital as soon as mucormycosis is strongly suspected. Waiting for every test result can allow the infection to spread.

An intravenous antifungal medicine is commonly used first. Liposomal amphotericin B is a standard initial treatment for many people. Kidney function and blood levels of minerals such as potassium and magnesium need close monitoring during treatment.

Isavuconazole or posaconazole may be used in certain situations, including when another medicine is unsuitable or after the infection has started to respond. The exact choice and length of treatment are based on the infection site, laboratory findings, other health conditions, and response to treatment. Common antifungals such as fluconazole do not reliably treat mucormycosis.

Surgery is often an important part of care. A surgeon removes infected and dead tissue because antifungal medicine may not reach tissue whose blood supply has been destroyed. Sinus or skin infections may require more than one operation. In severe cases, surgery can affect appearance or function, but its purpose is to stop further spread.

Treatment also includes correcting factors that help the fungus grow when this can be done safely. This may involve bringing high blood sugar or diabetic ketoacidosis under control, helping a low white blood cell count recover, or reviewing immune-suppressing medicines. These changes must be managed by the clinical team because suddenly stopping essential medicines can be dangerous.

Complications

Mucormycosis can damage tissue at the original infection site or spread into nearby structures. A sinus infection may affect the eye, causing loss of vision, or reach the brain. Lung infection can cause bleeding, breathing failure, or damage to lung tissue.

Infection can also enter the bloodstream and spread to several organs. This is called disseminated mucormycosis and is especially difficult to treat.

Other possible complications include:

Advanced mucormycosis can be fatal. The outlook is generally better when the infection is found early, remains limited to one area, and the underlying risk factor can be improved.

- Lasting facial, eye, nerve, skin, or lung damage
- Loss of tissue or a limb after extensive infection
- Kidney or electrolyte problems related to antifungal treatment
- Complications from major or repeated surgery
- Return of infection if immune defenses remain weak

Prevention

Mucormycosis cannot always be prevented. Mucorales molds are common in the environment, and there is no vaccine.

Most people do not need to avoid normal contact with soil, plants, or compost. People with severe immune suppression may be advised to reduce exposure to dusty construction sites, excavation areas, water-damaged buildings, and floodwater. If exposure cannot be avoided, protective footwear, gloves, and a well-fitting respirator may reduce contact, although they cannot remove all risk.

Cuts and burns should be cleaned promptly and kept covered while healing, especially after contact with soil or floodwater. Medical advice is appropriate if a wound becomes increasingly painful, swollen, discolored, or slow to heal.

Keeping diabetes as well controlled as possible lowers an important risk. Corticosteroids and other immune-suppressing medicines should be used only as directed. Do not stop a prescribed medicine without medical advice.

Hospitals use air filtration, building-dust controls, sterile supplies, and infection-control procedures to protect people at particularly high risk.

Living with it and what to expect

Treatment often continues for weeks or months. It usually lasts until symptoms and scans have improved, infected tissue has been removed or healed, and the immune problem that allowed the infection has recovered as much as possible. There is no single treatment length that applies to everyone.

During treatment, you may need repeated scans, blood tests, wound care, or further surgery. Blood tests monitor kidney and liver function, blood counts, and mineral levels. Tell the treatment team about vomiting, reduced urination, new weakness, numbness, palpitations, or other possible medicine effects.

Recovery depends on the infection site, how far it spread, and whether underlying risk factors can be corrected. Some people recover without major lasting effects. Others need rehabilitation, reconstructive surgery, vision support, breathing support, or help adapting to changes in appearance or physical function.

After treatment, follow-up remains important because the infection can return, particularly if immune suppression continues. Routine visits may include symptom review, examination, imaging, and blood tests. Keeping these planned appointments is different from seeking emergency care for new symptoms.

Emotional recovery can also take time. Major surgery, a prolonged hospital stay, or changes in vision and appearance may affect mood and confidence. Rehabilitation, psychological support, and practical help can be useful parts of recovery.

When to get medical help

Mucormycosis is a medical emergency when it is suspected. Seek emergency care now for:

If you have a major risk factor and develop persistent fever, new sinus pain, cough, chest pain, or worsening skin changes, arrange urgent same-day medical assessment. These symptoms have many possible causes, but serious infection needs to be excluded.

During recovery, contact your clinical team promptly if symptoms return or treatment side effects develop. Stable symptoms, planned blood tests, wound checks, and scan reviews can usually be handled through scheduled follow-up unless the team has given different instructions.

- New eye swelling, double vision, or loss of vision
- Rapidly increasing facial swelling or severe one-sided facial pain
- Black or rapidly darkening tissue in the nose, mouth, or a wound
- Coughing up blood or severe difficulty breathing
- Confusion, a seizure, fainting, or new weakness
- A painful wound that is spreading or changing color quickly

Common questions

Is mucormycosis contagious?

No. It does not normally pass between people or between people and animals. Infection usually follows contact with fungal spores in the environment.

Why is it called "black fungus"?

The name became common during reports of COVID-associated cases, but it is misleading. Mucorales are not classified as black fungi. The infection may cause dark dead tissue by blocking blood flow, but this sign is not present in every case.

Can a healthy person get mucormycosis?

It is possible but uncommon. Skin infection can develop after a serious contaminated injury, burn, or natural disaster even when the immune system was previously healthy. Most sinus, lung, and widespread infections occur in people with specific medical risk factors.

Is mucormycosis linked to COVID-19?

It can occur during or after COVID-19, but it is not a usual result of the virus. Reported cases have often involved additional risks such as poorly controlled diabetes, diabetic ketoacidosis, or immune suppression from corticosteroid treatment.

How long does treatment take?

Treatment often lasts several weeks or months. It continues until the infection has resolved and relevant immune or metabolic problems have improved. Some people change from intravenous treatment to antifungal tablets during recovery.

Can mucormycosis come back?

Yes. Recurrence is possible, especially if the underlying immune problem remains. Follow-up appointments, scans, and antifungal treatment should continue for as long as the specialist team recommends.

Sources

- Centers for Disease Control and Prevention: About Mucormycosis
- Centers for Disease Control and Prevention: Clinical Overview of Mucormycosis
- Cornely OA, Alastruey-Izquierdo A, Arenz D, et al. Global guideline for the diagnosis and management of mucormycosis. The Lancet Infectious Diseases. 2019;19(12):e405-e421 30312-3)

- Skiada A, Lass-Floerl C, Klimko N, Ibrahim A, Roilides E, Petrikkos G. Challenges in the diagnosis and treatment of mucormycosis. Medical Mycology. 2018;56 Suppl 1:S93-S101
- Skiada A, Pavleas I, Drogari-Apiranthitou M. Epidemiology and diagnosis of mucormycosis: an update. Journal of Fungi. 2020;6(4):265