CONDITION

Aspergillosis

Learn about the allergic, chronic, and invasive forms of aspergillosis, including symptoms, risk factors, testing, treatment, and when to seek urgent care.

WHAT IT IS
Group of illnesses caused by Aspergillus mold

BODY SYSTEM
Lungs and breathing

MAIN SYMPTOMS
Cough, shortness of breath, fever, coughing up blood

WHAT CAUSES IT
Inhaled Aspergillus spores or immune overreaction

HOW IT IS DIAGNOSED
Imaging, blood tests, fungal testing, sometimes biopsy

MAIN TREATMENT
Antifungal and anti-inflammatory medicines

CAN IT BE CURED?
Sometimes - some forms need long-term management

IS IT AN EMERGENCY?
Sometimes - severe breathing difficulty or major bleeding

LONG-TERM OUTLOOK
Variable; chronic disease may progress and invasive disease may spread

Overview

Aspergillosis is a group of illnesses caused by Aspergillus , a common mold found indoors and outdoors. Its spores can be present in soil, compost, decaying leaves, household dust, and building materials. Most people breathe in these tiny spores without becoming ill.

The effects of Aspergillus depend mainly on a person's lungs, immune system, and underlying health. Aspergillosis is not one single disease. Its main forms include:

Aspergillosis matters because the different forms require different treatment. An allergic reaction is managed differently from an invasive infection. Symptoms can also resemble asthma, pneumonia, tuberculosis, or other lung conditions, so testing is important.

Aspergillosis generally does not spread from one person to another.

- Allergic aspergillosis , in which the immune system overreacts to the mold. Allergic bronchopulmonary aspergillosis, or ABPA, most often affects people with asthma or cystic fibrosis.
- Chronic pulmonary aspergillosis , a long-lasting lung infection that usually develops in lungs already damaged by another condition.
- Aspergilloma , sometimes called a fungal ball, which can grow inside an existing lung cavity.
- Invasive aspergillosis , a serious infection in which the mold grows into lung tissue and may spread elsewhere. It mainly affects people with severely weakened immune systems or certain critical illnesses.

Symptoms

Symptoms vary with the type of aspergillosis and the part of the body affected. Some people with an aspergilloma have no symptoms and learn about it after an imaging test for another reason.

ABPA can cause worsening asthma symptoms, including wheezing, cough, shortness of breath, and chest tightness. A person may cough up thick mucus plugs, sometimes described as brownish. Fever, tiredness, and repeated asthma flare-ups can also occur.

Chronic pulmonary aspergillosis usually develops over months. Possible symptoms include a lasting cough, shortness of breath, fatigue, weight loss, and coughing up blood. Symptoms may be mild at first and gradually worsen.

Invasive pulmonary aspergillosis can cause fever, cough, chest pain, shortness of breath, or coughing up blood. Fever may continue despite antibiotics like amoxicillin or doxycycline . Symptoms may be less typical in people whose immune systems cannot produce a strong inflammatory response.

If infection spreads beyond the lungs, symptoms depend on the affected organ. Infection involving the brain may cause severe headache, weakness, confusion, or seizures. Sinus infection can cause facial pain, nasal blockage, or swelling around the eye. Skin infection may cause painful or darkened sores.

Seek urgent medical advice the same day for new coughing up of blood, worsening breathing, persistent fever during cancer treatment or after a transplant, or rapidly worsening symptoms in someone with a weakened immune system.

Call emergency services for severe difficulty breathing, blue or gray lips, fainting, new confusion, seizures, or coughing up more than a small amount of blood. These symptoms need

immediate assessment, whatever their cause.

Causes and risk factors

Aspergillosis begins when a person inhales Aspergillus spores or, less commonly, when spores enter damaged skin. Exposure is difficult to avoid completely because the mold is widespread. Exposure alone does not mean that an infection will develop.

Risk factors differ by disease type. ABPA is associated mainly with asthma and cystic fibrosis. Some people develop other allergic airway or sinus conditions related to Aspergillus .

Chronic pulmonary aspergillosis is more likely when lung structure has been damaged. Associated conditions include previous tuberculosis, chronic obstructive pulmonary disease, bronchiectasis, sarcoidosis, lung cancer, and prior lung surgery. An aspergilloma may form when fungal material grows inside a cavity left by one of these conditions.

Invasive aspergillosis mainly affects people whose defenses against mold are severely reduced. Important risk factors include:

For people at very high risk, construction dust, soil, compost, and decaying plant matter can contain large numbers of spores. A clinical team may recommend specific precautions, such as avoiding dusty renovation areas. These measures should be matched to the person's level of risk.

- A very low neutrophil count; neutrophils are white blood cells that fight fungal infections
- Stem cell or solid-organ transplantation
- Blood cancers and some cancer treatments
- High-dose or prolonged use of medicines that suppress immunity
- Certain severe inherited immune disorders
- Advanced critical illness in some patients, including severe viral respiratory disease

Diagnosis

Diagnosis begins with a review of symptoms, health conditions, immune status, medicines, and possible prior lung disease. A clinician may listen to the lungs and check oxygen levels. No single test can diagnose every form of aspergillosis.

A chest X-ray may show an abnormal area, but computed tomography, or CT, provides more detail. CT can identify lung cavities, fungal balls, airway damage, nodules, or patterns that may

suggest invasive disease. Imaging findings are not always specific, so they must be interpreted with laboratory and clinical information.

Blood tests may look for:

A beta-D-glucan blood test may provide evidence of an invasive fungal infection, but it is not specific to Aspergillus . Test accuracy varies with immune status, recent medicines, and the type of sample.

Sputum may be examined under a microscope or sent for fungal culture. Finding Aspergillus in mucus does not always prove disease because the mold can sometimes live in the airways without damaging tissue. Conversely, a negative culture does not rule out aspergillosis.

Bronchoscopy may be needed. During this procedure, a clinician passes a thin camera into the airways and collects fluid or tissue. A biopsy can show fungal growth and whether it has invaded tissue. Doctors balance the value of these procedures against risks such as bleeding, especially in people who are very unwell.

ABPA is diagnosed from a combination of an underlying compatible condition, allergy testing, blood results, imaging, and symptoms. Chronic pulmonary aspergillosis generally requires compatible symptoms or progressive imaging abnormalities over time, evidence of an immune response or fungal infection, and evaluation for other causes. Suspected invasive aspergillosis often requires prompt testing and treatment at the same time.

- Aspergillus-specific IgE , an antibody linked to allergy
- Total IgE , which may rise in ABPA
- Aspergillus-specific IgG , which can support a diagnosis of chronic pulmonary aspergillosis
- Eosinophils , white blood cells that may increase with allergic inflammation
- Galactomannan , a component of the fungal cell wall that can support the diagnosis of invasive aspergillosis in selected patients

Treatment and management

Treatment depends on the form of aspergillosis, symptom severity, immune status, affected organs, and other medicines.

ABPA treatment aims to control allergic inflammation, reduce flare-ups, and protect the airways. Clinicians may use corticosteroids like prednisone or hydrocortisone , antifungal medicines, or both. Some people with repeated or treatment-dependent disease may be considered for biologic medicines that target specific parts of the allergic immune response. Asthma or cystic fibrosis care continues alongside ABPA treatment.

Chronic pulmonary aspergillosis is often treated with a prolonged course of an oral triazole antifungal medicine. Treatment length varies, and some people require long-term management. Doctors monitor symptoms, imaging, laboratory results, and medication levels when appropriate. Surgery may be considered for localized disease, especially when bleeding cannot be controlled by other methods, but it is not suitable for everyone.

An aspergilloma that causes no symptoms may sometimes be monitored rather than treated immediately. Repeated or significant coughing up of blood may lead to procedures that block the bleeding blood vessel or surgery to remove the affected area. The choice depends on lung function, the location of disease, and surgical risk.

Invasive aspergillosis requires prompt specialist treatment. Triazole antifungal medicines are commonly used, although another class of antifungal may be selected in certain circumstances. Treatment may start through a vein and later change to an oral medicine. Local resistance patterns, previous antifungal exposure, organ function, and the infection site influence the choice.

Antifungal medicines can interact with many drugs, including some transplant medicines, blood thinners like warfarin or apixaban , seizure medicines, and heart medicines. They may also affect the liver, kidneys, vision, skin, or heart rhythm, depending on the medicine. Clinicians may order blood tests, electrocardiograms, or antifungal drug-level testing. Patients should not stop or adjust prescribed medicines without discussing it with the treating team.

Management may also include reducing immune-suppressing treatment when medically possible, helping the immune system recover, controlling other lung conditions, and treating complications. Surgery can be useful in selected localized infections, such as disease near a major blood vessel or infection involving damaged bone, but antifungal treatment is usually still needed.

Complications

ABPA can lead to bronchiectasis, meaning permanent widening and scarring of the airways. This can make it harder to clear mucus and may contribute to repeated lung infections or reduced lung function.

Chronic pulmonary aspergillosis can cause enlarging lung cavities, scarring, worsening breathlessness, and weight loss. An aspergilloma or damaged cavity may bleed into the airways. Bleeding can range from streaks in mucus to a medical emergency.

Invasive aspergillosis may damage lung tissue and blood vessels. It can spread through the bloodstream to the brain, skin, kidneys, bones, or other organs. Early recognition is especially

important in people at high risk.

Treatment itself may cause complications through side effects or drug interactions. Regular monitoring helps clinicians identify these problems early.

Follow up

Follow-up is tailored to the type of aspergillosis. Routine visits may include a symptom review, lung-function testing, blood tests, medication review, and repeat chest imaging. ABPA monitoring may include total IgE levels, while chronic or invasive disease may require CT scans and fungal testing.

Keep follow-up appointments even when symptoms improve. Imaging and blood abnormalities may change more slowly than symptoms, and stopping treatment too early can allow disease to return. Tell the care team about missed doses, side effects, new medicines, or supplements because antifungal interactions are common.

Contact the treating clinician before the next routine visit if cough, wheezing, fatigue, fever, or breathlessness is worsening. Coughing up even a small amount of blood deserves prompt medical advice, particularly if it is new or recurring.

Emergency symptoms-including major bleeding, severe breathing difficulty, fainting, confusion, or seizures-should not wait for a routine appointment.

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