CONDITION

Myasthenia gravis

Myasthenia gravis is an autoimmune condition that causes muscle weakness that worsens with activity.

WHAT IT IS
Autoimmune condition causing fluctuating voluntary muscle weakness

BODY SYSTEM
Nerves and muscles

MAIN SYMPTOMS
Drooping eyelids, double vision, swallowing difficulty, limb weakness

WHAT CAUSES IT
Immune antibodies disrupt nerve-to-muscle signals

HOW IT IS DIAGNOSED
Antibody blood tests and electrical nerve-muscle testing

MAIN TREATMENT
Symptom medicines, immune treatments, and sometimes thymus surgery

CAN IT BE CURED?
No - treatment can control symptoms

IS IT AN EMERGENCY?
Sometimes - new breathing or severe swallowing weakness

LONG-TERM OUTLOOK
Most people improve, but relapses can occur

Overview

Myasthenia gravis is a long-term autoimmune condition that causes certain muscles to become weak. Autoimmune means the immune system mistakenly attacks part of the body.

The condition affects communication between nerves and muscles. Nerves normally release a chemical called acetylcholine, which attaches to receptors on muscle cells and tells the muscles to contract. In myasthenia gravis, immune proteins called antibodies interfere with this signal.

Weakness usually becomes more noticeable when a muscle is used repeatedly and improves after rest. It may affect the eyes, face, throat, neck, arms, legs, or breathing muscles. It does not usually affect sensation, bladder control, or the ability to think.

Some people only have eye symptoms. Others develop weakness in several parts of the body, known as generalized myasthenia gravis. Treatment can often control symptoms and support an active life, although ongoing monitoring is usually needed.

Symptoms

Symptoms can change during the day. They may be mild after sleep and more noticeable after activity, later in the day, during illness, or when you are tired.

Eye symptoms are common and may be the first sign. These include one or both eyelids drooping and double vision. The drooping may switch sides or become more obvious after reading, driving, or looking upward.

Weakness in the face and throat can cause:

Weak neck muscles may make it hard to hold your head upright. Arm or leg weakness can make activities such as washing your hair, climbing stairs, rising from a chair, or carrying shopping more difficult.

Breathing muscle weakness can cause shortness of breath, a weak cough, or difficulty speaking in full sentences. This needs urgent assessment, particularly if it is new or getting worse.

Symptoms differ from ordinary tiredness. Myasthenia gravis causes loss of muscle strength rather than sleepiness or a general lack of energy. Pain, numbness, and tingling are not typical features, although someone may have these for another reason.

- A quieter, nasal, or slurred voice after prolonged speaking
- Trouble chewing, especially near the end of a meal
- Coughing or choking while eating or drinking
- Difficulty swallowing
- Reduced facial expression or difficulty smiling

Causes and risk factors

Most cases are caused by antibodies that interfere with the place where a nerve meets a muscle, called the neuromuscular junction. Many people have antibodies against the acetylcholine receptor. Others have antibodies against proteins such as muscle-specific kinase, known as MuSK, or LRP4. Standard antibody tests are negative in some people.

The thymus may be involved. This small immune-system organ lies behind the breastbone. It is normally more active during childhood and becomes smaller in adulthood. Some people with myasthenia gravis have an enlarged or unusually active thymus. A smaller number have a thymoma, which is a tumour of the thymus. Most thymomas do not spread, but they need specialist assessment.

Myasthenia gravis is not usually inherited directly. Rare inherited conditions called congenital myasthenic syndromes can cause similar weakness, but they have different causes and treatments.

The condition can begin at any age. Having another autoimmune condition, such as autoimmune thyroid problems, may be associated with a higher chance of developing it.

Infections, surgery, pregnancy, major physical stress, and certain medicines can uncover or worsen symptoms. These factors do not necessarily cause the underlying condition.

Diagnosis

No single symptom confirms myasthenia gravis. Diagnosis usually combines your symptom pattern, a neurological examination, blood tests, and tests of nerve-to-muscle signalling.

During an examination, a clinician may ask you to repeat movements, look upward, speak for a period, or hold your arms out. This can show weakness that appears or increases with repeated use.

Blood tests look for antibodies linked to myasthenia gravis, including acetylcholine receptor and MuSK antibodies. A positive result can support the diagnosis. A negative result does not always rule it out.

Electrical tests may include repetitive nerve stimulation or single-fibre electromyography. These measure how reliably nerves activate muscles. Single-fibre electromyography is particularly sensitive, but its findings must be considered alongside the rest of the assessment.

If eye symptoms are present, an ice-pack test may sometimes be used. Cooling a drooping eyelid for a short time can temporarily improve weakness, although this test is not enough by itself to confirm the condition.

A CT or MRI scan of the chest is usually used to examine the thymus and check for a thymoma. Breathing tests may be needed if respiratory muscles seem affected.

Other conditions can cause similar symptoms, including thyroid problems, stroke, motor neurone conditions, medication effects, and other disorders of nerves or muscles. The timing and pattern of weakness help distinguish them.

Treatment and management

Treatment is based on which muscles are affected, symptom severity, antibody type, other health conditions, and how symptoms respond over time.

Pyridostigmine improves communication between nerves and muscles. It can ease weakness for several hours but does not change the immune process causing the condition. Possible effects include stomach cramps, diarrhoea, sweating, and increased saliva.

Medicines that reduce immune activity may be used when symptoms are more than mild or are not controlled by symptom treatment. These include corticosteroids and other immunosuppressive medicines. Their benefits may take time to develop, and regular monitoring may be needed for side effects.

Targeted immune treatments are available for some adults with generalized myasthenia gravis. These include treatments that block part of the complement immune system and treatments that lower harmful antibodies through the neonatal Fc receptor pathway. Eligibility often depends on antibody type, previous treatment, and local approval.

Intravenous immunoglobulin, often called IVIG, and plasma exchange can improve weakness more quickly. Plasma exchange removes antibodies from the blood, while IVIG changes immune activity. These treatments may be used for severe worsening, before some operations, or during a myasthenic crisis. Their benefit is usually temporary.

Surgery to remove the thymus is called thymectomy. It is generally recommended when a thymoma is present. It may also improve long-term control in selected people with generalized, acetylcholine-receptor-antibody-positive myasthenia gravis, even without a thymoma. Improvement can take months or years and is not guaranteed.

Some medicines can worsen weakness. These include certain antibiotics like amoxicillin or doxycycline , heart medicines, magnesium-containing products, and drugs used during anaesthesia. This does not mean they are always forbidden. Make sure anyone prescribing or administering medicine knows that you have myasthenia gravis, and do not stop an essential medicine without advice.

Complications

A myasthenic crisis is severe weakness affecting breathing or the ability to protect the airway. It may be triggered by an infection, surgery, a medication, or worsening of the condition without a clear trigger. It requires emergency hospital treatment and may require breathing support.

Swallowing weakness can allow food, drink, or saliva to enter the airway. This can cause choking, dehydration, weight loss, or aspiration pneumonia, which is a lung infection caused by material entering the lungs.

Falls may occur if leg or neck weakness becomes significant. Double vision can affect driving and other tasks that require accurate vision.

Long-term immune treatment may increase the risk of infections or cause other side effects. Monitoring is used to balance these risks against the benefits of controlling weakness.

A thymoma can cause additional health concerns and usually needs assessment by a team experienced in thymus conditions.

Prevention

There is no established way to prevent autoimmune myasthenia gravis. It is not caused by something you did, and lifestyle changes cannot remove the antibodies responsible for it.

If you have the condition, reducing avoidable triggers may help prevent some worsening episodes. Take treatment as agreed, attend monitoring appointments, and tell your care team about new medicines or supplements.

Prompt treatment of infections may reduce the chance of a major flare. Recommended vaccinations can help prevent some infections, but the type and timing may need planning if you take immune-suppressing treatment.

Pacing demanding activities, taking breaks, avoiding overheating when it worsens your symptoms, and planning meals for times when swallowing and chewing are strongest can make daily symptoms more manageable.

Living with it and what to expect

The course of myasthenia gravis is not the same for everyone. Symptoms may remain limited to the eyes, spread to other muscles, improve with treatment, or fluctuate over months and years. Periods of good control can be interrupted by relapses.

Many people reach a point where symptoms have little effect on daily activities. Some need ongoing medicine, while others may eventually use less treatment under specialist supervision. Remission can occur, meaning there are few or no symptoms for a period, but this is not the same as a guaranteed permanent cure.

Regular follow-up usually includes reviewing muscle strength, swallowing, breathing, medicine

effects, and blood-test monitoring when needed. Report a gradual increase in drooping eyelids, double vision, chewing difficulty, limb weakness, or reduced stamina rather than waiting for the next routine visit.

Practical changes can help. Rest before demanding tasks, schedule important activities when you are strongest, and allow extra time for meals. If double vision persists, temporary measures such as an eye patch or specialist prisms may help, although alternating the covered eye can be important.

Pregnancy is possible for many people with myasthenia gravis, but symptoms and medicines need advance planning. Weakness may improve, worsen, or remain stable during pregnancy. A newborn can occasionally have temporary weakness from antibodies crossing the placenta, so the maternity and neurology teams should be aware of the condition.

When to get medical help

Call emergency services if you develop:

Do not drive yourself if breathing or swallowing is seriously affected. A fingertip oxygen reading can remain normal until late in respiratory muscle weakness, so a normal reading should not delay emergency help.

Seek prompt medical advice for new swallowing problems, a weak cough, shortness of breath when lying down, fever or infection with increasing weakness, or a clear decline in your usual strength.

Arrange routine follow-up if symptoms are gradually becoming harder to control, side effects are troubling you, or weakness regularly returns before the next dose of symptom medicine. Medication changes should be made with the prescribing team.

- New or rapidly worsening difficulty breathing
- Difficulty speaking because you cannot get enough breath
- Inability to swallow saliva or repeated choking
- Severe weakness that is worsening quickly
- Bluish or grey lips, confusion, or unusual drowsiness

Common questions

Is myasthenia gravis fatal?

Most people respond well to treatment and have a near-normal life expectancy. Severe breathing weakness can be life-threatening, but emergency recognition and modern intensive care have greatly improved outcomes.

Can myasthenia gravis go away?

Symptoms can become minimal or disappear for a period, sometimes called remission. This may happen with treatment or after thymectomy, but it cannot be promised, and symptoms can return.

Does myasthenia gravis always get worse?

No. It often fluctuates rather than steadily worsening. Some people remain stable for long periods, while others have relapses or need treatment changes.

Can I exercise with myasthenia gravis?

Many people can exercise safely when symptoms are controlled. Moderate, paced activity may support general fitness. Stop and rest if weakness affects safe movement, swallowing, or breathing, and discuss a suitable plan if symptoms are significant.

Can I drive if I have double vision or weak muscles?

Do not drive while double vision, eyelid closure, neck weakness, or limb weakness makes driving unsafe. Licensing and reporting rules differ by location. Treatment or visual aids may allow driving once symptoms are controlled.

Is myasthenia gravis inherited or contagious?

Autoimmune myasthenia gravis is not contagious and is not usually passed directly from parent to child. Rare congenital myasthenic syndromes are inherited but are separate conditions.

Sources

- National Institute of Neurological Disorders and Stroke. Myasthenia Gravis .
- NHS. Myasthenia gravis .
- Narayanaswami P, Sanders DB, Wolfe G, et al. International Consensus Guidance for Management of Myasthenia Gravis: 2020 Update . Neurology. 2021;96(3):114-122.
- Gilhus NE. Myasthenia Gravis . New England Journal of Medicine. 2016;375:2570-2581.
- Myasthenia Gravis Foundation of America. Cautionary Drugs .