CONDITION

Hypokalemic periodic paralysis

Hypokalemic periodic paralysis causes sudden episodes of muscle weakness linked to low blood potassium.

WHAT IT IS
Episodic muscle weakness linked to low blood potassium

BODY SYSTEM
Muscles and nervous system

MAIN SYMPTOMS
Sudden weakness, limp limbs, difficulty moving, reduced reflexes

WHAT CAUSES IT
Inherited or thyroid-related potassium shifts

HOW IT IS DIAGNOSED
Low potassium during attacks, supported by genetic testing

MAIN TREATMENT
Trigger control, potassium replacement, preventive medicines

CAN IT BE CURED?
No, but attacks can often be reduced

IS IT AN EMERGENCY?
Sometimes, with breathing, swallowing, or heart symptoms

LONG-TERM OUTLOOK
Attacks often lessen, but some develop lasting weakness

Overview

Hypokalemic periodic paralysis is a rare condition that causes temporary attacks of muscle weakness or paralysis. During an attack, the amount of potassium measured in the blood is lower than normal.

Potassium helps muscle and nerve cells produce electrical signals. In this condition, potassium moves from the bloodstream into cells. This prevents muscles from working normally. It does not always mean that the body has lost a large amount of potassium.

The most common form is inherited. It is usually caused by a change in a gene that controls ion channels, which are tiny pathways carrying electrically charged particles in and out of muscle cells. Some people have no known family history.

A similar pattern can occur with an overactive thyroid. This is called thyrotoxic periodic paralysis. It needs thyroid treatment as well as management of the immediate weakness.

Attacks are usually reversible. However, severe episodes can affect breathing, swallowing, or heart rhythm. Some people also develop lasting muscle weakness over many years.

Symptoms

An attack may begin within minutes or develop over several hours. Weakness often affects both sides of the body and is usually strongest in the shoulders, hips, arms, and legs. The legs are commonly affected more than the arms.

During an attack, you may have:

Sensation is usually normal. Numbness, tingling, confusion, or loss of consciousness are not typical and may point to another cause.

Attacks often happen after waking or after resting following strenuous exercise. They may last for several hours and occasionally longer. Strength generally returns as the blood potassium level returns to normal.

Breathing, swallowing, speaking, and eye movements are usually spared, but they can be affected in a severe attack. A fast, slow, or irregular heartbeat can occur when potassium is very low.

Symptoms often begin in childhood or the teenage years in the inherited form. Thyroid-related attacks commonly begin in adulthood. The timing and severity can differ even among relatives with the same genetic change.

- Difficulty standing, walking, climbing stairs, or lifting your arms
- Muscles that feel heavy, floppy, or unable to move
- Reduced muscle reflexes
- Mild muscle aching before, during, or after an episode

Causes and risk factors

Inherited hypokalemic periodic paralysis is most often linked to changes in the CACNA1S or SCN4A gene. These genes help muscle cells respond to electrical signals. A change can make the cells behave abnormally when blood potassium falls.

The condition is usually inherited in an autosomal dominant pattern. This means that a person

with the genetic change has a 1 in 2 chance of passing it on with each pregnancy. Not everyone who inherits a change develops the same symptoms, and some may have few or no attacks.

Some people have the typical condition but no identifiable gene change. Others are the first known person in their family to be affected.

Thyrotoxic periodic paralysis occurs when excess thyroid hormone changes how potassium moves into cells. It is seen more often in men and in people of Asian, Hispanic, or Indigenous American ancestry, although it can affect anyone.

Common attack triggers include:

Triggers are not identical for everyone. An episode may also happen without an obvious cause.

Low potassium from vomiting, diarrhoea, kidney conditions, or certain medicines can cause weakness, but this is not usually periodic paralysis. These causes involve a real loss of potassium from the body and require different investigation and management.

- Rest after strenuous or unfamiliar exercise
- A large meal high in carbohydrates
- A high-salt meal
- Alcohol
- Emotional stress, illness, or lack of sleep
- Cold temperatures
- Long periods without food followed by a large meal

Diagnosis

Diagnosis begins with the pattern of weakness and a blood test taken during an attack. The potassium level is usually low while weakness is present and returns to normal between episodes. Thyroid, magnesium, blood sugar, kidney function, and acid-base balance may also be checked.

An electrocardiogram, or ECG, records the heart's electrical activity. It can show changes caused by low potassium and help identify a dangerous heart rhythm.

Genetic testing may confirm inherited hypokalemic periodic paralysis. A negative result does not completely rule it out because not every responsible genetic change is known or detected.

Electromyography, often called EMG, measures electrical activity in muscles. A specialised long exercise test may support the diagnosis when genetic testing is inconclusive. It does not require provoking a full paralysis attack.

Testing may also be used to rule out thyroid conditions, adrenal disorders, kidney problems, and other causes of low potassium or muscle weakness. Deliberately triggering an attack with insulin, glucose, or exercise can be dangerous and is generally avoided.

Because sudden weakness has many possible causes, a first episode should not be assumed to be periodic paralysis without medical assessment.

Treatment and management

Treatment has two aims: restoring muscle function safely during an attack and reducing future episodes.

Potassium may be given during an attack. The route and amount depend on the severity, the blood potassium level, heart findings, and whether swallowing is safe. Severe episodes may require treatment in hospital with repeated blood tests and heart monitoring.

Potassium must be used carefully. In inherited periodic paralysis, potassium has usually shifted into cells rather than left the body. It may move back into the bloodstream during recovery, creating a risk of an excessively high level if too much replacement has been given.

Mild attacks may improve with rest and a treatment plan previously agreed with a healthcare professional. Vigorous exercise during an attack may increase the risk of a fall and should be avoided.

Long-term management can include:

Carbonic anhydrase inhibitors, such as dichlorphenamide or acetazolamide, may reduce attack frequency in some people. They do not work for everyone, and response may be influenced by the responsible gene. Other medicines, including potassium-sparing medicines, are sometimes considered by specialists.

Thyrotoxic periodic paralysis is managed by correcting the overactive thyroid. Attacks usually stop once thyroid hormone levels remain within the normal range, although immediate episodes still need careful potassium and heart monitoring.

- Learning and limiting personal triggers
- Eating regular, balanced meals rather than very large carbohydrate-heavy meals
- Using prescribed potassium supplements when appropriate
- Taking preventive medicines that alter ion movement in muscle cells
- Monitoring blood electrolytes and kidney function during treatment

Complications

Most attacks resolve, but weakness can lead to falls, injuries, or being unable to get out of bed without help.

Very low potassium can disturb the heart's electrical system. This may cause palpitations or, less commonly, a serious abnormal heart rhythm. Severe weakness can also interfere with breathing or swallowing.

Taking more potassium than the body needs can lead to high blood potassium during recovery. High potassium can also affect the heart, which is why severe attacks should be monitored rather than managed by repeatedly taking unplanned doses.

Some people with inherited hypokalemic periodic paralysis gradually develop fixed weakness, especially in the hip and shoulder muscles. This weakness remains between attacks and may become more noticeable later in adulthood. It does not happen to everyone and does not always match how frequent earlier attacks were.

Prevention

The inherited tendency cannot currently be prevented. Genetic testing and genetic counselling can help families understand inheritance and reproductive options, but they cannot predict exactly how severely someone will be affected.

Many attacks can be reduced by identifying personal triggers and following an agreed management plan. A symptom diary may help you record meals, exercise, sleep, illness, alcohol, stress, and the timing of weakness.

Avoiding all physical activity is not recommended. Regular, moderate activity may support general health and muscle function. Sudden strenuous exertion followed by complete rest is more likely to trigger an attack in some people.

Thyrotoxic periodic paralysis may be prevented from recurring by treating the underlying overactive thyroid and keeping thyroid hormone levels controlled.

Living with it and what to expect

The pattern often changes over time. Some people have occasional mild episodes, while others have repeated attacks that interfere with school, work, travel, or independent movement. Attacks may become less frequent with age, but this cannot be predicted for one

person.

Between episodes, many people have normal strength and can take part in everyday activities. Some develop persistent weakness over months or years and may need physiotherapy, mobility support, or changes to their activities.

It can help to keep an accessible written plan explaining the diagnosis, usual symptoms, current medicines, and what should happen during an attack. Family members, housemates, school staff, or colleagues may also need to know how to help without forcing you to stand or walk.

Regular follow-up may include reviewing attack frequency, checking muscle strength, monitoring treatment effects, and repeating blood tests. New symptoms between attacks deserve review because not every episode of weakness will necessarily be caused by periodic paralysis.

If pregnancy, surgery, or fasting for a procedure is planned, tell the relevant healthcare team about the condition in advance. Changes in eating, stress hormones, medicines, and activity can affect potassium movement.

When to get medical help

Seek emergency medical help if weakness is accompanied by:

These symptoms need prompt assessment because they may reflect a severe potassium disturbance or another urgent condition, such as a stroke.

Contact your regular healthcare professional soon if attacks are becoming more frequent, lasting longer, or occurring despite treatment. Arrange routine review if you notice weakness between attacks, have medicine side effects, become pregnant, or need help identifying triggers.

- Trouble breathing, swallowing, or speaking
- Chest pain, marked palpitations, fainting, or near-fainting
- Inability to sit, stand, or move safely
- Confusion, loss of consciousness, one-sided weakness, or facial drooping
- A first sudden episode of severe weakness or paralysis

Common questions

Is hypokalemic periodic paralysis the same as simply having low potassium?

No. In the inherited condition, potassium usually shifts from the blood into muscle cells during an attack. In ordinary potassium deficiency, potassium has often been lost through the kidneys or digestive system. Blood tests and other investigations help separate these causes.

Can I have an attack when my potassium test is normal?

The potassium level may have returned to normal if blood is taken after strength starts to recover. Some attacks of weakness also have another cause. Recording the timing of symptoms and testing can help with interpretation.

Does eating a banana stop an attack?

Food is not a reliable treatment for significant paralysis. A banana contains potassium, but it may not work quickly enough and also contains carbohydrates, which can worsen potassium movement in some circumstances. Follow the attack plan given to you rather than relying on a particular food.

Can I exercise if I have this condition?

Many people can exercise, but sudden strenuous activity and the period of rest afterwards can trigger symptoms. Gradual, moderate activity and a planned cool-down may be easier to tolerate. Your approach may need adjustment if you have persistent weakness.

Will I eventually become permanently paralysed?

Temporary attacks usually resolve. Some people develop lasting muscle weakness later in life, but complete permanent paralysis is not the expected course. Regular review can track changes in strength and mobility.

Can I pass hypokalemic periodic paralysis to my children?

The common inherited form is usually autosomal dominant. A person with the genetic change generally has a 1 in 2 chance of passing it on in each pregnancy. Genetic counselling can explain testing options and the limits of predicting symptoms.

Sources

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