CONDITION

Addison disease

Learn how Addison disease affects adrenal hormones, including its symptoms, causes, diagnosis, treatment, emergency warning signs, and follow-up care.

WHAT IT IS
Primary adrenal insufficiency from low adrenal hormones

BODY SYSTEM
Hormone system

MAIN SYMPTOMS
Tiredness, weight loss, dizziness, skin darkening

WHAT CAUSES IT
Usually immune attack

HOW IT IS DIAGNOSED
Corticotropin stimulation test

MAIN TREATMENT
Lifelong hormone replacement

CAN IT BE CURED?
No, lifelong hormone replacement required

IS IT AN EMERGENCY?
Sometimes, repeated vomiting or collapse

LONG-TERM OUTLOOK
Most people remain active with lifelong treatment

Overview

Addison disease is a form of primary adrenal insufficiency . It happens when the adrenal glands cannot make enough of certain hormones.

The adrenal glands are small organs located above the kidneys. Their outer layer, called the adrenal cortex, normally produces cortisol and aldosterone. It also makes small amounts of hormones called adrenal androgens.

Cortisol helps the body respond to physical stress, maintain blood pressure, regulate blood sugar, and control inflammation. Aldosterone helps the kidneys balance sodium, potassium, and water. When these hormones are too low, problems can develop throughout the body.

Addison disease is different from secondary or tertiary adrenal insufficiency. In those

conditions, the adrenal glands may be able to work, but they do not receive enough signaling from the pituitary gland or hypothalamus in the brain. Aldosterone is usually less affected in those forms.

Symptoms of Addison disease often develop gradually and can resemble other conditions. However, a serious illness, injury, or interruption in treatment can cause an adrenal crisis . This is a medical emergency involving dangerously low blood pressure and other severe symptoms.

With lifelong hormone replacement, preparation for illness, and regular medical care, most people with Addison disease can remain active.

Symptoms

Symptoms may appear slowly over months or years. They can become more noticeable during an infection or another period of physical stress.

Possible symptoms include:

Many people develop hyperpigmentation , meaning areas of skin become darker. It may be most visible in skin creases, scars, pressure points, around the nipples, or inside the mouth. This happens because the pituitary gland produces more adrenocorticotropic hormone, or ACTH, while trying to stimulate damaged adrenal glands. ACTH is related to a hormone that affects skin pigment.

Skin darkening is more typical of primary adrenal insufficiency than secondary adrenal insufficiency. Not everyone notices it, especially when changes are gradual or less visible against a person's natural skin tone.

Symptoms alone cannot confirm Addison disease. Fatigue, weight loss, nausea, and dizziness have many possible causes and should be assessed in their full medical context.

- Ongoing tiredness or muscle weakness
- Loss of appetite or unintended weight loss
- Nausea, vomiting, diarrhea, or abdominal discomfort
- Dizziness, especially when standing
- Low blood pressure
- Craving salty foods
- Muscle or joint pain
- Low mood, irritability, or difficulty concentrating

- Low blood sugar, particularly in children
- Irregular or absent menstrual periods
- Reduced underarm or pubic hair in some women

Causes and risk factors

In many higher-income countries, the most common cause is autoimmune adrenalitis . This occurs when the immune system mistakenly attacks the adrenal cortex. The damage usually develops over time.

Autoimmune Addison disease can occur by itself or with other autoimmune disorders. These may include autoimmune thyroid disease, type 1 diabetes, celiac disease, vitiligo, or premature ovarian insufficiency. Some inherited autoimmune syndromes can affect several hormone-producing glands.

Other causes of adrenal gland damage include:

Severe infection, major surgery, trauma, or treatment with blood-thinning medicine may raise the risk of adrenal bleeding in certain situations. However, this complication is uncommon and usually occurs in people who are already seriously ill or have other risk factors.

Long-term use of corticosteroid medicines can suppress the body's hormone signaling system, but stopping those medicines usually causes secondary or tertiary adrenal insufficiency rather than Addison disease. Corticosteroids like prednisone or hydrocortisone should not be stopped suddenly unless a clinician provides a safe plan.

- Infections such as tuberculosis, HIV-related infections, or certain fungal infections
- Bleeding into both adrenal glands
- Cancer that spreads to the adrenal glands
- Surgical removal of both adrenal glands
- Genetic disorders that affect adrenal development or hormone production
- Infiltrative diseases, in which abnormal cells or substances collect in an organ
- Certain medicines that block cortisol production or increase how quickly cortisol is broken down
- Immune checkpoint inhibitor medicines used to treat some cancers

Diagnosis

A clinician will review symptoms, medical history, medicines, blood pressure, and physical findings. Because Addison disease can resemble digestive, neurological, or other hormonal conditions, testing is needed.

Blood tests may measure cortisol and ACTH, often early in the morning when cortisol would normally be higher. Low cortisol together with a high ACTH level suggests that the adrenal glands are not responding normally. Results must be interpreted using the laboratory's testing method and the person's clinical situation.

A corticotropin stimulation test , also called an ACTH or cosyntropin stimulation test, is commonly used. A synthetic form of ACTH is given, and cortisol is measured before and afterward. If cortisol does not rise as expected, adrenal insufficiency is more likely.

Other tests may include:

If an adrenal crisis is suspected, treatment should not be delayed while waiting for test results. Blood samples may be collected first when this can be done promptly, but stabilizing the person is the priority.

- Sodium, potassium, glucose, and kidney function tests
- Renin and aldosterone measurements to assess salt and water regulation
- Adrenal antibody testing for an autoimmune cause
- Thyroid, diabetes, or other autoimmune screening when appropriate
- A CT scan of the adrenal glands if infection, bleeding, cancer, or another structural cause is suspected
- Genetic or infectious-disease testing in selected cases

Treatment and management

Addison disease requires lifelong replacement of the hormones the adrenal glands can no longer make.

A glucocorticoid medicine replaces cortisol. Hydrocortisone is commonly used, while other corticosteroids may be considered depending on the person's needs and local practice. Treatment is planned to resemble the body's normal daily cortisol pattern as closely as practical.

People who do not make enough aldosterone usually receive fludrocortisone, a mineralocorticoid medicine. It helps maintain blood pressure and the correct balance of

sodium, potassium, and water. A clinician may adjust treatment based on symptoms, blood pressure, electrolyte results, and sometimes renin levels.

Some women continue to have reduced well-being or low sexual interest despite otherwise appropriate treatment. A specialist may occasionally consider a monitored trial of dehydroepiandrosterone, or DHEA. It is not routinely needed, and its possible benefits and adverse effects should be discussed carefully.

The body normally releases more cortisol during fever, infection, injury, surgery, or other major physical stress. People taking replacement medicine therefore need written sick-day rules explaining when and how to increase glucocorticoid treatment. The plan should cover vomiting, procedures, dental work, travel, and other likely situations.

Key safety measures include:

Vomiting and severe diarrhea are especially important because oral medicine may not be absorbed. An emergency injection may be needed according to the person's plan, followed by urgent medical care.

Some people need additional salt during hot weather, heavy exercise, or illnesses that cause fluid loss. This should be discussed with the treating clinician, particularly when the person has high blood pressure, heart disease, or kidney disease. Fludrocortisone should not be adjusted without medical guidance.

Pregnancy is possible with well-managed Addison disease, but care should involve clinicians experienced in adrenal insufficiency. Hormone needs and symptoms should be reviewed during pregnancy, and a plan is required for labor and delivery.

An adrenal crisis is treated in the hospital with prompt glucocorticoid medicine, usually given into a vein or muscle, along with intravenous fluids. Low blood sugar and the illness or injury that triggered the crisis are also treated.

- Keep an emergency hydrocortisone injection kit available if prescribed.
- Make sure the person and, when possible, a family member know how to use it.
- Carry a steroid emergency card or medical identification.
- Keep an adequate medicine supply, including extra medication when traveling.
- Never stop glucocorticoid replacement suddenly.
- Tell healthcare professionals about adrenal insufficiency before surgery or a medical procedure.
- Follow the individualized illness and emergency plan provided by the treating team.

Complications

The main immediate complication is adrenal crisis. It may be triggered by infection, vomiting, diarrhea, injury, surgery, childbirth, or missed medication. Sometimes it is the first sign of previously unrecognized adrenal insufficiency.

Emergency symptoms can include:

These symptoms require emergency medical help. If an emergency injection has been prescribed, it should be used according to the person's plan while emergency services are contacted. The injection is not a substitute for hospital assessment.

Long-term problems can also occur if replacement is too low or too high. Too little may cause fatigue, weight loss, dizziness, nausea, salt craving, or repeated episodes of illness. Too much glucocorticoid over time may contribute to weight gain, sleep problems, high blood pressure, high blood sugar, fragile skin, or reduced bone strength. Excess mineralocorticoid can cause high blood pressure or low potassium.

The goal is enough replacement to support normal function and protect against crisis without exposing the body to unnecessary excess.

- Severe weakness or sudden worsening of illness
- Repeated vomiting or inability to keep medicine down
- Severe abdominal, back, or leg pain
- Fainting, collapse, confusion, or unusual drowsiness
- Very low blood pressure
- Signs of shock, such as cold or clammy skin and rapid breathing

Follow up

Regular follow-up is usually coordinated by an endocrinology team. Visits may review energy levels, weight, blood pressure while sitting and standing, dizziness, salt craving, swelling, sleep, and signs of too much or too little replacement.

Blood tests may be used to monitor electrolytes and other health conditions. Treatment decisions are based on the overall clinical picture rather than a single cortisol measurement while taking replacement medicine.

Follow-up should also include a review of sick-day rules, injection technique, medicine supplies, medical identification, and plans for travel or procedures. Family members or caregivers may

benefit from emergency training.

Contact the treating team promptly for repeated dizziness, weight change, persistent fatigue, new swelling, rising blood pressure, or uncertainty about illness dosing. These concerns usually need timely review but are not necessarily emergencies when the person is otherwise stable.

Repeated vomiting, collapse, confusion, severe weakness, or inability to take replacement medicine requires emergency care.

Sources

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