CONDITION

Cushing disease

Cushing disease is a pituitary condition that causes the body to make too much cortisol.

WHAT IT IS
Excess cortisol caused by a pituitary tumor

BODY SYSTEM
Hormone system

MAIN SYMPTOMS
Weight gain, easy bruising, muscle weakness, mood changes

WHAT CAUSES IT
Usually a noncancerous pituitary tumor

HOW IT IS DIAGNOSED
Cortisol tests, ACTH level, pituitary MRI, sometimes venous sampling

MAIN TREATMENT
Pituitary surgery, with medicines or radiation when needed

CAN IT BE CURED?
Sometimes - surgery produces lasting remission

IS IT AN EMERGENCY?
Sometimes - fainting, confusion, or severe vomiting after treatment

LONG-TERM OUTLOOK
Often manageable, but lifelong monitoring is needed

Overview

Cushing disease is a condition in which the body makes too much cortisol because of a tumor in the pituitary gland, a small gland at the base of the brain.

The tumor releases too much adrenocorticotropic hormone, or ACTH. ACTH tells the adrenal glands above the kidneys to produce cortisol. Most pituitary tumors causing Cushing disease are benign, meaning they are not cancer.

Cortisol helps control blood pressure, blood sugar, inflammation, and the response to physical stress. When it stays too high, it can affect almost every part of the body.

Cushing disease is one cause of Cushing syndrome , the general term for the effects of excess cortisol. Other causes include long-term corticosteroid use or ACTH production by a tumor elsewhere. Identifying the cause is important because treatments differ.

Symptoms

Symptoms usually develop gradually and may resemble more common conditions.

Possible symptoms and physical changes include:

Mental and emotional effects can include low mood, anxiety, irritability, poor sleep, or difficulty concentrating. Severe depression or other psychiatric symptoms can occur.

High cortisol may also cause high blood pressure, high blood sugar or diabetes, high cholesterol, bone loss, fractures, and more frequent or persistent infections.

Periods may become irregular or stop. Fertility and interest in sex may decrease, and some men develop erection problems. In children, an important pattern is weight gain combined with slower growth in height.

No single symptom confirms Cushing disease. Clinicians consider the overall pattern, examination findings, medicine history, and hormone test results.

- Weight gain, especially around the abdomen, chest, neck, or face
- Thinner arms and legs from muscle loss
- Muscle weakness, often when climbing stairs or standing up
- Easy bruising or slow wound healing
- Wide purple or reddish stretch marks, often on the abdomen
- A fuller, rounder face
- Increased fat at the back of the neck or above the collarbones
- Acne or increased facial and body hair
- Tiredness and reduced stamina

Causes and risk factors

Cushing disease is usually caused by a small ACTH-producing pituitary tumor. Why these tumors develop is often unknown.

Most cases are not inherited. Rare genetic conditions can increase the chance of tumors in hormone-producing glands. Genetic assessment may be considered for people with a strong family history, several hormone-related tumors, or disease at an unusually young age.

Corticosteroid medicines do not cause Cushing disease, but they can cause another form of Cushing syndrome. These medicines include prednisone and may be given as tablets,

injections, inhalers, nasal sprays, or creams.

Do not stop a prescribed corticosteroid like prednisone or hydrocortisone suddenly. After regular use, the body may not immediately make enough cortisol, so the dose may need to be reduced gradually under medical supervision.

Diagnosis

Diagnosis usually happens in stages. Initial testing checks whether cortisol is consistently too high. Further tests identify the source.

Before testing, your clinician will review all medicines and supplements, including steroid tablets, injections, inhalers, nasal sprays, creams, and products that may not appear to contain a steroid.

Initial testing may include:

Repeated or different tests are often needed because cortisol can vary from day to day. Shift work, severe illness, alcohol use, depression, pregnancy, and some medicines may affect results.

If excess cortisol is confirmed, a blood ACTH test helps identify the cause. ACTH that is not appropriately low suggests a pituitary tumor or another ACTH-producing tumor.

A pituitary MRI creates detailed images of the gland, but some ACTH-producing tumors are too small to see. Scans may also show small abnormalities unrelated to the condition.

If tests and imaging do not clearly identify the source, inferior petrosal sinus sampling may be recommended at a specialist center. Blood from veins draining the pituitary is compared with blood from elsewhere in the body. This can distinguish a pituitary source from ACTH production outside the pituitary.

- Late-night salivary cortisol: saliva collected when cortisol should normally be low
- 24-hour urinary free cortisol: urine collected for a full day to measure cortisol production
- Dexamethasone suppression testing: dexamethasone is taken at a set time, followed by a blood test to see whether cortisol falls normally

Treatment and management

The main treatment is surgery to remove the pituitary tumor. This is usually performed through the nose and sphenoid sinus, an air space behind the nose, and is called transsphenoidal surgery. Outcomes are generally better with a team experienced in pituitary conditions.

After successful surgery, cortisol may become very low because normal hormone production has been suppressed. Temporary cortisol replacement is often needed while the pituitary and adrenal glands recover, which may take months or longer. Some people need longer-term replacement.

Follow-up blood or urine tests assess cortisol and other pituitary hormones. A low cortisol level soon after surgery may support remission, but it does not guarantee that the disease will not return.

If surgery cannot be performed, does not produce remission, or the condition returns, options may include:

Medicines require monitoring because cortisol may fall too low. Some can also affect the liver, blood pressure, potassium, blood sugar, or other hormones.

Radiation may take months or years to work fully and can eventually reduce other pituitary hormones, requiring long-term testing.

Removing both adrenal glands stops cortisol production but causes permanent adrenal insufficiency. Lifelong replacement hormones are required, and the pituitary tumor must still be monitored because ACTH may rise after surgery.

Treatment also addresses related problems such as high blood pressure, diabetes, infections, bone loss, depression, and increased blood-clot risk.

- Another pituitary operation in selected cases
- Medicines that reduce adrenal cortisol production
- Medicines that act on the pituitary tumor to lower ACTH
- A medicine that blocks some effects of cortisol
- Radiation directed at the pituitary tumor
- Removal of both adrenal glands in selected situations

Complications

Prolonged excess cortisol can damage blood vessels, bones, muscles, and the immune system.

Possible complications include:

Some effects do not disappear immediately after treatment. Blood pressure, blood sugar, bone health, and cardiovascular risk may need ongoing care.

Surgical risks include bleeding, infection, leakage of fluid surrounding the brain, and damage to normal pituitary tissue. The surgical team will explain individual risks before treatment.

- High blood pressure, heart disease, stroke, or blood clots
- Diabetes or difficulty controlling blood sugar
- Osteoporosis and fractures
- Frequent or serious infections
- Loss of muscle strength and physical function
- Depression, anxiety, memory problems, or other mood changes
- Menstrual, sexual, or fertility problems

Prevention

Cushing disease generally cannot be prevented because the pituitary tumors usually develop without a known avoidable cause.

Early recognition and treatment can help limit complications. People with a rare inherited tumor syndrome may be offered specialist monitoring, although this does not prevent a tumor from forming.

Corticosteroid-related Cushing syndrome is different from Cushing disease. Take prescribed steroids as directed and discuss unwanted effects rather than reducing or stopping treatment yourself.

Living with it and what to expect

Recovery is often gradual. Weight, blood pressure, blood sugar, skin changes, and bruising may improve over time, while muscle strength, bone health, sleep, and concentration can take longer.

Some people initially feel worse after successful surgery. A sudden fall from very high cortisol can cause tiredness, weakness, nausea, joint or muscle pain, and low mood. This is sometimes called glucocorticoid withdrawal. It does not necessarily mean treatment failed, but symptoms should be discussed with the treating team.

Take cortisol replacement exactly as instructed. You may need to increase the dose during illness, carry medical identification, and keep an emergency steroid injection available. These precautions are important because severe cortisol deficiency can become an emergency.

Many people return to work, education, exercise, and usual activities, although recovery times differ. Gradual activity, physical therapy, mental health support, and treatment for bone or

metabolic problems may help.

Cushing disease can return years after apparent remission. Lifelong follow-up usually includes symptom reviews, periodic cortisol testing, and monitoring of other pituitary hormones, especially after surgery or radiation.

When to get medical help

Arrange a routine appointment if you develop a combination of progressive features such as easy bruising, wide purple stretch marks, increasing weakness, unexplained weight gain around the abdomen and face, irregular periods, or newly difficult-to-control blood pressure or blood sugar.

After treatment, contact your care team for possible signs of high cortisol, worsening headaches, vision changes, or symptoms of low cortisol such as persistent nausea, unusual weakness, dizziness, or loss of appetite. These need timely assessment but are not always emergencies.

Seek urgent or emergency help for:

These symptoms may indicate adrenal crisis, a blood clot, stroke, severe infection, or another serious complication.

- Fainting, confusion, severe weakness, or inability to stay awake
- Repeated vomiting or severe diarrhea when you rely on cortisol replacement
- Severe dehydration or symptoms of very low blood pressure
- Chest pain, sudden shortness of breath, or coughing up blood
- Sudden one-sided weakness, facial drooping, or difficulty speaking
- A severe infection with rapid worsening
- Thoughts of suicide or immediate risk of self-harm

Common questions

Is Cushing disease the same as Cushing syndrome?

No. Cushing syndrome means the body is exposed to too much cortisol from any cause. Cushing disease is the specific form caused by an ACTH-producing pituitary tumor.

Is a Cushing disease pituitary tumor cancer?

Almost always, it is benign rather than cancerous. Even a small benign tumor can cause serious effects because it releases too much ACTH.

Can Cushing disease be cured with surgery?

Surgery can produce lasting remission, especially when the tumor is identified and completely removed. It does not work permanently for everyone, and the condition can return. Lifelong monitoring remains important.

Will I lose weight after treatment?

Some people lose weight as cortisol normalizes, but the amount and timing vary. Muscle recovery, sleep, medicines, blood sugar, diet, and activity can affect weight.

Why do I need steroid medicine after removing a cortisol-producing tumor?

High cortisol suppresses the body's normal ACTH and cortisol system. After successful surgery, the adrenal glands may need time to produce enough cortisol again. Replacement prevents cortisol deficiency during recovery.

Can stress alone cause Cushing disease?

No. Stress can temporarily raise cortisol, but it does not create an ACTH-producing pituitary tumor. Physical and mental health conditions can affect cortisol test results, so repeated, carefully selected tests may be needed.

Sources

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