CONDITION

Cushing syndrome due to adrenal tumor

Cushing syndrome due to an adrenal tumor occurs when a tumor makes too much of the hormone cortisol.

WHAT IT IS
Excess cortisol produced by an adrenal tumor

BODY SYSTEM
Hormone system and adrenal glands

MAIN SYMPTOMS
Easy bruising, muscle weakness, weight gain, purple stretch marks

WHAT CAUSES IT
Cortisol-producing adrenal adenoma or, less often, adrenal cancer

HOW IT IS DIAGNOSED
Cortisol tests, ACTH blood test, and adrenal CT or MRI

MAIN TREATMENT
Surgical tumor removal, with cortisol-lowering medicines when needed

CAN IT BE CURED?
Sometimes - complete tumor removal can cure it

IS IT AN EMERGENCY?
Sometimes - adrenal crisis causes vomiting, fainting, or confusion

LONG-TERM OUTLOOK
Often improves after treatment, but recovery may take years

Overview

Cushing syndrome happens when the body is exposed to too much cortisol for a prolonged time. Cortisol helps regulate blood pressure, blood sugar, inflammation, and the response to physical stress.

The adrenal glands sit above the kidneys. In this form of Cushing syndrome, a tumor in one adrenal gland makes cortisol without responding normally to the body's control signals. This is called ACTH-independent Cushing syndrome . ACTH is a pituitary hormone that usually tells the adrenal glands how much cortisol to make.

Most cortisol-producing adrenal tumors are noncancerous adenomas. A smaller number are adrenocortical carcinomas, or adrenal cancers. Tests can indicate which is more likely, although examining the removed tumor may be needed for a final diagnosis.

Excess cortisol can weaken muscles and bones, raise blood pressure and blood sugar, affect mood and sleep, and increase infection and blood-clot risk. Symptoms often develop gradually.

Symptoms

The pattern of symptoms matters more than any single change. Possible features include:

Children may gain weight while growing more slowly than expected.

Adrenal cancer may make other hormones as well as cortisol, causing rapid hair growth, a deeper voice, acne, or other sex-hormone changes. A large tumor may cause persistent abdominal or back discomfort.

- Weight gain around the abdomen, chest, neck, or face
- Thinner arms and legs due to muscle loss
- Weakness, especially when climbing stairs or rising from a chair
- Easy bruising or slow wound healing
- Wide red or purple stretch marks
- A rounded face or increased fat at the back of the neck
- New or worsening high blood pressure
- High blood sugar or diabetes
- Bone loss, back pain, or fractures after a minor injury
- Irregular or absent menstrual periods
- Increased facial or body hair
- Reduced sex drive or erection problems
- Anxiety, depression, irritability, poor concentration, or sleep problems
- Frequent or severe infections

Causes and risk factors

The tumor develops in the adrenal cortex, the gland's outer part, and releases cortisol even when the body signals that less is needed. As cortisol rises, the pituitary gland usually lowers ACTH production.

Most cortisol-producing adenomas affect one adrenal gland. Their cause is usually unknown,

and they are not caused by diet, stress, or anything you did.

Adrenocortical carcinoma is less common. Cancer may be suspected if a tumor is large, grows, has concerning scan features, or produces several hormones. Imaging cannot always determine whether a tumor is cancerous.

Rare inherited conditions, including multiple endocrine neoplasia type 1, Li-Fraumeni syndrome, and Lynch syndrome, can increase adrenal tumor risk. Genetic assessment may be considered for adrenal cancer at a young age or with a relevant personal or family history.

Long-term corticosteroid use can also cause Cushing syndrome, but this is a different form. Examples include prednisolone, dexamethasone, and hydrocortisone.

Diagnosis

Diagnosis involves confirming excess cortisol and then finding its source. Your clinician will review symptoms, physical changes, medical history, and exposure to corticosteroids, including tablets, injections, inhalers, creams, nasal sprays, and supplements.

Tests may include:

Tests may be repeated because cortisol varies from day to day. Pregnancy, shift work, heavy alcohol use, severe illness, depression, and some medicines can affect results.

After excess cortisol is confirmed, an ACTH blood test helps identify the source. Low ACTH suggests that an adrenal gland is producing cortisol independently. CT or MRI then shows the tumor's size, location, appearance, and possible effect on nearby structures. More imaging may be needed if cancer is suspected.

Adrenal biopsy is generally not used to distinguish a benign cortisol-producing tumor from cancer. It may not provide a reliable answer and carries risks with some adrenal tumors.

- Late-night salivary cortisol: Checks whether cortisol falls at night as it normally should.
- 24-hour urinary free cortisol: Measures cortisol in all urine collected over 24 hours.
- Dexamethasone suppression test: Dexamethasone is taken at a set time, followed by a blood cortisol test. Normal cortisol production should decrease.

Treatment and management

The main treatment for a tumor in one adrenal gland is surgical removal of that gland, called an adrenalectomy . Many small tumors that appear noncancerous can be removed through small incisions. Open surgery may be needed for a large tumor, suspected cancer, or invasion into

nearby tissue.

The other adrenal gland often becomes less active while cortisol is high. After surgery, it may not immediately produce enough cortisol, so glucocorticoid replacement such as hydrocortisone is commonly needed. The dose is reduced only as the remaining gland recovers, which can take months or longer.

If surgery is delayed, is not possible, or does not fully control cortisol, medicines may reduce cortisol production or block its effects. Monitoring is essential because cortisol can become too low, and some medicines affect the liver, potassium, blood pressure, or other medicines.

Adrenocortical carcinoma treatment may include open surgery, mitotane, or other cancer therapies, usually coordinated by an experienced specialist team.

Treatment also addresses high blood pressure, diabetes, bone loss, infection, depression, and blood-clot risk. These problems may not resolve immediately when cortisol normalizes.

Complications

Prolonged high cortisol can contribute to:

After treatment, cortisol can fall too low, causing adrenal insufficiency. Symptoms include severe tiredness, nausea, poor appetite, dizziness, low blood pressure, and abdominal pain.

A sudden severe shortage is an adrenal crisis. It can cause repeated vomiting, profound weakness, fainting, confusion, or shock and requires emergency treatment.

Adrenocortical carcinoma may invade nearby structures or spread. Outlook depends strongly on whether it can be completely removed and whether it has spread at diagnosis.

- High blood pressure, heart disease, or stroke
- Diabetes and abnormal cholesterol
- Osteoporosis and fractures
- Loss of muscle strength and physical function
- Serious infections
- Blood clots in the legs or lungs
- Mental health or memory problems
- Reduced fertility and sexual function

Prevention

Most cortisol-producing adrenal tumors cannot be prevented. No diet, supplement, or lifestyle change is proven to stop them from forming.

If an inherited syndrome is suspected, genetic counseling can explain testing and possible implications for relatives.

Treatment and follow-up help limit complications. If you need glucocorticoid replacement after surgery, take it as directed and follow sick-day instructions. Do not stop it suddenly unless your specialist has provided a safe tapering plan.

Living with it and what to expect

Recovery often continues well beyond surgery. Blood pressure and blood sugar may improve within weeks or months, while muscle strength, bone health, body composition, menstrual cycles, and mood can take longer. Medicines for related conditions may still be needed.

Some people temporarily experience tiredness, aching, low mood, or reduced stamina after cortisol is corrected. Discuss these symptoms at follow-up because they can overlap with cortisol deficiency or other treatable problems.

Follow-up usually includes cortisol testing and review of glucocorticoid replacement. Blood pressure, blood sugar, bones, and mental health may also require monitoring. After adrenocortical carcinoma, regular scans and hormone tests check for recurrence.

Activities can usually be resumed gradually. Gentle, progressive exercise may help rebuild muscle, but recovery should not be rushed. Changes in appearance, strength, sleep, or mood can also affect work, relationships, and confidence.

A completely removed benign tumor usually does not regrow, but follow-up remains important until cortisol production and related health problems are stable. Adrenal cancer may require treatment and monitoring for years.

When to get medical help

Arrange a medical appointment for progressive changes such as easy bruising, wide purple stretch marks, worsening muscle weakness, unexplained fractures, or difficult-to-control blood pressure or diabetes.

After treatment, contact your care team promptly for increasing dizziness, nausea, unusual weakness, poor appetite, or possible signs that cortisol replacement is too low. Report new

hormone-related changes or persistent abdominal or back pain.

Seek urgent or emergency care for:

If you take replacement glucocorticoids, follow your personal sick-day and emergency injection plan. An adrenal crisis should not wait for a routine appointment.

- Repeated vomiting or diarrhea that prevents you keeping steroid medicine down
- Fainting, confusion, extreme weakness, or severe dizziness
- Severe abdominal pain with vomiting or very low blood pressure
- Sudden shortness of breath, chest pain, or coughing up blood
- One-sided leg swelling or pain
- Signs of a serious infection, especially while cortisol is uncontrolled

Common questions

Is a cortisol-producing adrenal tumor always cancer?

No. Most are benign adenomas. Scan findings, hormone tests, tumor behavior, and examination after surgery help determine whether cancer is present.

Will my weight return to normal after surgery?

Weight and fat distribution often improve gradually. Muscle rebuilding, sleep, mobility, other conditions, and medicines affect recovery, and surgery does not guarantee a particular weight.

Why might I need steroid medicine after the tumor is removed?

High cortisol suppresses the other adrenal gland. Replacement supplies the cortisol your body needs while that gland recovers.

How long does adrenal recovery take?

Recovery can take months and sometimes longer than a year. Testing guides the taper. Replacement medicine should be reduced only according to your treatment plan.

Can Cushing syndrome come back after adrenal surgery?

A completely removed benign tumor is unlikely to return, but follow-up is still needed. Recurrence is more concerning with adrenal cancer or incomplete tumor removal.

Can Cushing syndrome from an adrenal tumor be mild?

Yes. Mild cortisol excess may cause few obvious physical signs but can still contribute to high blood pressure, diabetes, or bone loss.

Sources

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