CONDITION

Pituitary tumor

A pituitary tumor is a usually noncancerous growth that can affect hormone levels or press on nearby structures.

WHAT IT IS
Usually noncancerous growth in the pituitary gland

BODY SYSTEM
Hormone system and nervous system

MAIN SYMPTOMS
Headaches, vision changes, menstrual changes, sexual problems

WHAT CAUSES IT
Usually unknown; rarely inherited

HOW IT IS DIAGNOSED
Hormone tests, pituitary MRI, and vision testing

MAIN TREATMENT
Monitoring, medicines, surgery, radiation, or hormone replacement

CAN IT BE CURED?
Sometimes - treatment can remove or control it

IS IT AN EMERGENCY?
Sometimes - sudden severe headache with vision loss

LONG-TERM OUTLOOK
Often manageable with treatment and long-term monitoring

Overview

The pituitary is a small gland at the base of your brain. It releases hormones that help control growth, reproduction, stress responses, thyroid function, and the body's water balance. It also signals other glands, including the thyroid, adrenal glands, ovaries, and testicles.

A pituitary tumor is an abnormal growth of cells in this gland. Most are benign, meaning they are not cancer and do not spread to distant parts of the body. They are often called pituitary adenomas. Specialists may also use the newer term pituitary neuroendocrine tumor, or PitNET. Pituitary cancer is very rare.

A tumor can matter in two main ways. It may make too much of a hormone, or it may press on the normal pituitary and reduce hormone production. A larger tumor can also press on nearby structures, especially the nerves that carry visual information from the eyes.

Some pituitary tumors are found by chance during brain imaging for another reason. This is called a pituitary incidentaloma. A small tumor that is not producing hormones or causing pressure may never cause symptoms.

Tumors smaller than 10 millimetres are called microadenomas. Those measuring 10 millimetres or more are called macroadenomas. Size is important, but it does not tell the whole story. A small hormone-producing tumor can cause significant symptoms, while a larger nonfunctioning tumor may remain unnoticed for years.

Symptoms

Symptoms are shaped by the hormones involved, the tumor's size, and whether it is pressing on nearby tissue. Some people have no symptoms.

Pressure from a larger tumor may cause:

Symptoms from reduced hormone production may include tiredness, weakness, feeling cold, weight changes, low blood pressure, reduced sexual interest, erectile problems, or irregular or absent periods. Children may grow more slowly or enter puberty later than expected.

A functioning tumor releases too much of a particular hormone. Its effects differ by tumor type.

A prolactinoma makes too much prolactin. It may cause irregular or absent periods, milky breast discharge when not breastfeeding, infertility, low sexual interest, or erectile problems.

A growth hormone-producing tumor can cause acromegaly in adults. Possible changes include larger hands or feet, wider spacing between teeth, coarser facial features, increased sweating, joint pain, and sleep apnoea. In children whose bones are still growing, excess growth hormone can cause unusually rapid height gain.

An adrenocorticotropic hormone, or ACTH, tumor can cause Cushing disease. This raises cortisol levels and may lead to easy bruising, muscle weakness, weight gain around the trunk, a rounder face, purple stretch marks, high blood pressure, diabetes, or mood changes.

A thyroid-stimulating hormone tumor is uncommon. It can cause an overactive thyroid, with symptoms such as a fast heartbeat, tremor, sweating, anxiety, and unintended weight loss.

These symptoms can have many other causes. Symptoms alone cannot confirm a pituitary tumor.

- Headaches that are new or different from usual
- Loss of side vision, blurred vision, or double vision

- Reduced pituitary hormone production
- Less commonly, problems moving an eye or a drooping eyelid

Causes and risk factors

In most people, the cause is unknown. A pituitary cell develops changes that allow it to grow more than it should, but it is usually unclear why this happens.

A small minority of pituitary tumors occur as part of an inherited condition. These include multiple endocrine neoplasia type 1, familial isolated pituitary adenoma, Carney complex, and some other rare genetic syndromes.

A family history of pituitary tumors or certain endocrine tumors may increase risk. However, most people with a pituitary tumor do not have an affected relative and did not do anything to cause it.

Pituitary tumors are not caused by stress, diet, mobile phone use, or a minor head injury.

Diagnosis

Evaluation usually starts with your symptoms, medical history, medicines, and a physical examination. Because several medicines and health conditions can alter hormone levels, this context matters when interpreting test results.

Blood tests measure pituitary hormones and hormones made by the glands it controls. The exact tests are chosen according to the suspected tumor and symptoms. Some conditions require timed blood tests, urine collection, saliva testing, or a test that measures how hormones respond to a specific stimulus.

Magnetic resonance imaging, or MRI, provides detailed pictures of the pituitary and nearby structures. It can show the tumor's size, location, and relationship to the nerves for vision. A CT scan may be used when MRI is not suitable, although it usually gives less detail of the pituitary.

Formal visual field testing checks side vision. It is especially important when a tumor is close to or touching the optic chiasm, where the visual pathways cross above the pituitary.

If surgery is performed, a pathologist examines the removed tissue to identify the tumor type. A biopsy is not usually needed before treatment because imaging and hormone tests often provide enough information to plan care.

Treatment and management

Treatment is based on the tumor type, hormone activity, size, growth, symptoms, and proximity to the visual pathways. Care may involve an endocrinologist, neurosurgeon, eye specialist, radiation specialist, and other professionals.

A small, nonfunctioning tumor that is not affecting vision or hormone levels may be monitored rather than treated immediately. Follow-up can include repeat MRI scans, hormone tests, and vision testing. The interval is based on the tumor's features and whether it changes over time.

Medicines are the usual first treatment for many prolactinomas. They lower prolactin and often shrink the tumor. Other hormone-producing tumors may also be treated with medicines to reduce hormone production or block its effects, although surgery is often considered first for tumors producing ACTH, growth hormone, or thyroid-stimulating hormone.

Surgery may be recommended when a tumor presses on the visual pathways, causes certain hormone excess syndromes, grows over time, or cannot be controlled with medicine. Most pituitary operations are performed through the nose and sphenoid sinus, an air space behind the nose. This is called transsphenoidal surgery. Some large or unusually positioned tumors require a different approach.

Radiation treatment may be considered when part of a tumor remains after surgery, returns, continues to grow, or produces hormones that other treatments have not controlled. Its effects develop gradually, sometimes over several years. Radiation can also reduce normal pituitary function, so long-term hormone testing is needed.

If the pituitary does not make enough hormones, replacement hormones may be required. These replace what the body is missing rather than directly treating the tumor. Some people need replacement temporarily after surgery; others need it long term.

Complications

Untreated pressure on the visual pathways can cause lasting sight problems. Early assessment is important when vision changes develop.

Too much or too little of a pituitary hormone can affect bones, fertility, sexual function, blood pressure, blood sugar, muscles, mood, and heart health. The risks depend on which hormone is involved and how long the imbalance has been present.

Pituitary apoplexy is an uncommon but serious complication caused by sudden bleeding into a tumor or loss of its blood supply. It may cause an abrupt, severe headache, vomiting, vision loss, double vision, eye movement problems, drowsiness, or collapse. It can also cause a dangerous fall in cortisol.

Treatment itself can have complications. Surgery may cause a leak of the fluid surrounding the brain, infection, bleeding, changes in water balance, or reduced hormone production. Radiation can slowly damage normal pituitary function. Your care team should explain the expected benefits and risks of any proposed treatment.

A tumor can remain or return after treatment, even when symptoms and hormone levels improve. This is why follow-up often continues for years.

Prevention

Most pituitary tumors cannot be prevented. There is no proven lifestyle change, food, or screening test that prevents a sporadic pituitary tumor from developing.

If you have a known inherited syndrome linked to pituitary tumors, planned screening may find a tumor or hormone change earlier. Genetic counselling can help explain testing and what a result may mean for you and your relatives. Screening detects problems early; it does not prevent the genetic condition.

Managing blood pressure, blood sugar, bone health, and other effects of hormone imbalance can reduce complications, but it does not prevent the tumor itself.

Living with it and what to expect

Many pituitary tumors grow slowly, and some do not grow at all during follow-up. Others need active treatment because they affect hormones, vision, or nearby structures. Your outlook is influenced more by tumor type, hormone effects, and treatment response than by size alone.

Symptoms caused by hormone excess may improve over months after successful treatment. Some physical changes, such as sweating or soft-tissue swelling in acromegaly, may improve, while established bone or joint changes may not fully reverse. Periods, sexual function, and fertility may recover when hormone levels return to a healthier range, but this cannot be guaranteed.

Vision often improves when pressure on the visual pathways is relieved, particularly when treatment occurs before severe or prolonged damage. Long-standing loss may be permanent.

You may need regular blood tests, MRI scans, and eye assessments. Follow-up checks whether the tumor is stable and whether pituitary function has changed. Hormone deficiencies can appear after surgery or radiation, including years later.

Most people can continue work, exercise, relationships, and family life with suitable care. Some

need daily hormone replacement or ongoing medicine. Carrying medical identification can be important if you have cortisol deficiency, because missing steroid like prednisone or hydrocortisone replacement during serious illness can become dangerous.

Pregnancy may change the monitoring or treatment of some tumors, particularly prolactinomas. If pregnancy is possible or planned, discuss this before changing medication or trying to conceive.

When to get medical help

Arrange a routine medical appointment if you develop persistent headaches with gradual vision changes, unexplained menstrual or sexual changes, milky breast discharge, unusual growth-related changes, or symptoms suggesting a hormone imbalance. These symptoms often have other explanations, but they deserve assessment.

If you already have a pituitary tumor, contact your care team promptly for worsening headaches, new visual symptoms, major changes in thirst or urination, or a return of previous hormone-related symptoms. Keep planned follow-up appointments even when you feel well.

Seek emergency help for:

These symptoms may indicate pituitary apoplexy or a severe hormone deficiency and need immediate assessment.

- A sudden, extremely severe headache, especially with vomiting
- Sudden loss of vision, double vision, or difficulty moving an eye
- Fainting, severe weakness, marked confusion, or unusual drowsiness
- Severe vomiting or collapse if you have known cortisol deficiency

Common questions

Is a pituitary tumor cancer?

Almost all pituitary tumors are noncancerous. They do not usually spread elsewhere, but they can still cause important problems through hormone changes or pressure on the brain's visual pathways. True pituitary cancer is very rare.

Do all pituitary tumors need surgery?

No. Some small, nonfunctioning tumors can be monitored. Prolactinomas often respond well to medicine. Surgery is more likely when a tumor affects vision, produces certain hormones,

grows, or does not respond to medicine.

Can a pituitary tumor be cured?

Sometimes. Surgery may completely remove some tumors, and medicines can bring certain hormone-producing tumors under long-term control. Other tumors remain stable but require monitoring or ongoing treatment. Follow-up is needed because a tumor can persist or return.

Can a pituitary tumor cause weight gain?

It can, but not every pituitary tumor does. Weight gain may occur with excess cortisol, low thyroid hormone, low sex hormones, or reduced activity caused by symptoms. Weight change alone is not enough to identify a pituitary problem.

Can a pituitary tumor affect fertility or pregnancy?

Yes. High prolactin or low levels of reproductive hormones can interfere with ovulation, periods, sperm production, and sexual function. Treatment may improve fertility. Pregnancy planning is important because medicines and monitoring may need to change.

Will a pituitary tumor grow back after treatment?

It can. The chance is influenced by the tumor type, whether it was completely removed, and how it responds to treatment. Repeat hormone tests and imaging are used to look for regrowth or renewed hormone activity.

Sources

- National Institute of Diabetes and Digestive and Kidney Diseases: Pituitary Tumors
- Endocrine Society: Pituitary Incidentaloma Clinical Practice Guideline , Journal of Clinical Endocrinology & Metabolism , 2011
- Endocrine Society: Diagnosis and Treatment of Hyperprolactinemia , Journal of Clinical Endocrinology & Metabolism , 2011
- Pituitary Society: Diagnosis and Management of Prolactin-Secreting Pituitary Adenomas , international consensus statement, Nature Reviews Endocrinology , 2023
- Congress of Neurological Surgeons: Management of Patients with Nonfunctioning Pituitary Adenomas
- Society for Endocrinology: Emergency Management of Pituitary Apoplexy in Adult Patients , Endocrine Connections , 2016