CONDITION

Empty sella syndrome

Empty sella syndrome is a condition in which the pituitary gland looks flattened within its bony space on a brain scan.

WHAT IT IS
Flattened pituitary gland within a fluid-filled bony space

BODY SYSTEM
Hormone and nervous systems

MAIN SYMPTOMS
Often none, headache, vision changes, hormone-related symptoms

WHAT CAUSES IT
Spinal fluid pressure or previous pituitary damage

HOW IT IS DIAGNOSED
Brain MRI and pituitary hormone tests

MAIN TREATMENT
Monitoring and treatment of hormone or pressure problems

CAN IT BE CURED?
No - anatomy usually remains, related problems are treatable

IS IT AN EMERGENCY?
Sometimes - sudden vision loss or adrenal crisis symptoms

LONG-TERM OUTLOOK
Usually stable when hormone and pressure problems are managed

Overview

The sella turcica is a small, cup-shaped space in the skull that holds the pituitary gland. The pituitary is a pea-sized gland that helps control thyroid function, stress hormones, growth, reproduction, and the body's water balance.

In empty sella syndrome, spinal fluid enters the sella and presses the pituitary against its walls. On a brain scan, the space may look partly or completely empty. It is not truly empty, and the pituitary gland has not necessarily disappeared.

An empty sella is often found by chance during an MRI or CT scan done for another reason. Many people have no symptoms and normal hormone levels. The term empty sella syndrome is generally used when the scan finding is associated with symptoms, abnormal pituitary function, or raised pressure around the brain.

The condition matters because a flattened pituitary may sometimes produce too little or, less often, too much of a hormone. It can also be linked to increased pressure inside the skull, called intracranial hypertension.

Symptoms

Many people with an empty sella have no symptoms. The amount of flattening seen on a scan does not always predict how well the pituitary works.

When symptoms occur, they may include:

Other symptoms depend on which pituitary hormones are affected. Low thyroid-stimulating hormone can contribute to feeling cold, constipation, dry skin, and low energy. Low cortisol can cause weakness, nausea, dizziness, and low blood pressure. Reduced growth hormone in children may slow growth.

Some people have a mildly raised prolactin level. Prolactin is a hormone involved in breast milk production. A raised level may cause unexpected milk leakage, menstrual changes, reduced sex drive, or fertility problems.

Symptoms such as headache and fatigue have many possible causes. Their presence does not show by itself that an empty sella is responsible.

- Persistent or recurring headaches
- Blurred vision, brief dimming of vision, or double vision
- Tiredness, weakness, or reduced ability to cope with illness
- Irregular or absent periods, infertility, low sex drive, or erection problems

Causes and risk factors

Primary empty sella develops without a previous injury or treatment involving the pituitary. A thin or incomplete layer of tissue normally covering the sella may allow spinal fluid to enter. Pressure from that fluid can gradually flatten the gland.

Primary empty sella is associated with raised pressure around the brain, including idiopathic intracranial hypertension. "Idiopathic" means that no single cause has been found. It has also been described more often in people with obesity, high blood pressure, or a history of several pregnancies. These associations do not mean that everyone with those factors will develop the condition.

Secondary empty sella occurs after the pituitary has lost volume because of another event. Possible causes include:

Rarely, a pituitary condition linked to pregnancy can damage the gland and later produce an empty-sella appearance.

Empty sella syndrome is not usually inherited. It is also not contagious.

- Pituitary surgery or radiation treatment
- A pituitary tumour that has shrunk after treatment
- Bleeding into or loss of blood supply to the pituitary
- Head injury
- Inflammation or infection affecting the pituitary

Diagnosis

An MRI of the brain and pituitary is the main imaging test. It can show spinal fluid within the sella and the pituitary flattened along its floor or walls. A CT scan may also detect the finding, but MRI usually gives more detail.

The scan may describe a partial empty sella , where spinal fluid fills part of the space, or a complete empty sella , where most of it is filled. These terms describe appearance rather than the severity of symptoms.

Blood tests assess whether the pituitary is working normally. Testing may include hormones related to:

The exact tests are selected according to age, symptoms, medical history, and whether the finding is primary or secondary. Some results need to be interpreted according to the time of day. If initial results are unclear, specialised stimulation tests may be used to check how a hormone system responds.

An eye examination may be needed if you have visual symptoms or possible intracranial hypertension. This may include a visual-field test and examination of the optic nerves for swelling.

A lumbar puncture, sometimes called a spinal tap, is not routinely needed just because an empty sella appears on a scan. It may be used when intracranial hypertension is suspected, after imaging has ruled out reasons that the procedure would be unsafe.

- Cortisol production by the adrenal glands

- Thyroid function
- Prolactin
- Reproductive function
- Growth hormone activity

Treatment and management

If you have no symptoms and your pituitary tests are normal, you may not need active treatment. The empty space itself does not usually need to be repaired or filled. Follow-up may include a review of new symptoms and repeat hormone tests when clinically appropriate.

Hormone deficiencies are treated by replacing the hormones that the affected glands can no longer make in adequate amounts. Treatment may involve cortisol, thyroid, sex-hormone, growth-hormone, or water-balance medicines. The type and order of treatment are important, particularly when cortisol production is low, so replacement is planned and monitored by a specialist.

A raised prolactin level does not always need treatment. Management is based on the level, symptoms, fertility plans, and whether another cause is present.

If intracranial hypertension is contributing to headaches or vision problems, treatment focuses on lowering pressure and protecting sight. Depending on the situation, this may involve weight management when relevant, pressure-lowering medicine, regular eye monitoring, or surgery. These treatments address the pressure problem rather than the empty-sella appearance.

Surgery is uncommon for empty sella syndrome itself. It may be considered for a leak of spinal fluid through the nose or for a serious vision problem linked to pressure or movement of structures near the sella.

People with secondary empty sella may also need follow-up for the original pituitary condition, previous surgery, radiation treatment, or head injury.

Complications

Most people do not develop serious complications. Possible problems are mainly related to hormone deficiency or raised pressure around the brain.

Low cortisol can become dangerous during a severe illness, injury, or operation. This is called an adrenal crisis. People known to have cortisol deficiency may receive a written sick-day plan and emergency information.

Untreated intracranial hypertension can damage the optic nerves and reduce vision. Rarely, spinal fluid can leak through the nose. A leak creates a route through which infection may reach the tissues surrounding the brain.

Hormone deficiencies can also affect bone strength, fertility, sexual function, energy, and metabolism if they are not recognised and managed.

Prevention

There is no proven way to prevent primary empty sella. It is linked to the structure covering the pituitary and, in some people, pressure around the brain. These factors are not fully under a person's control.

Secondary empty sella may follow treatment or damage that was necessary or unavoidable. Managing an identified pituitary disorder or intracranial hypertension can reduce related risks, but it cannot guarantee that the scan appearance will be prevented.

Living with it and what to expect

For many people, empty sella remains an incidental scan finding and does not interfere with everyday life. The appearance often stays present on later scans, even when no treatment is needed.

Pituitary function may remain normal for years. Hormone changes can occasionally be found during follow-up, particularly when there is a complete empty sella or a previous pituitary injury. New symptoms such as menstrual changes, reduced sexual function, unusual thirst, or persistent weakness should be reviewed rather than assumed to be part of the condition.

If a hormone deficiency is confirmed, replacement treatment may be long term. Regular blood tests help check that treatment remains appropriate during changes such as pregnancy, menopause, major illness, or ageing.

The course is shaped more by hormone function and pressure around the brain than by how "empty" the sella looks. When these issues are identified and managed, many people continue their usual work, family life, exercise, and other activities.

Repeat brain scans are not always necessary. They are more likely to be considered if symptoms change, a previous pituitary disorder needs surveillance, or the original scan was uncertain.

When to get medical help

Arrange a routine medical appointment if you develop persistent headaches, unexplained fatigue, menstrual changes, sexual difficulties, fertility concerns, unusual thirst and urination, or symptoms of low thyroid function. These symptoms are usually not emergencies, but they may justify hormone testing or a review of existing results.

Seek urgent medical assessment for new or worsening vision changes, especially brief episodes of dimming, double vision, or loss of part of your visual field.

Call emergency services for:

A clear nasal discharge is often caused by allergies or infection. A persistent one-sided watery leak, particularly after pituitary surgery or a head injury, needs prompt assessment for a possible spinal-fluid leak.

- Sudden loss of vision or a sudden severe headache with weakness or confusion
- Fainting, severe weakness, repeated vomiting, or confusion if cortisol deficiency is known or suspected
- Clear, watery fluid leaking from one side of the nose with severe headache, fever, neck stiffness, or marked light sensitivity

Common questions

Does an empty sella mean my pituitary gland is gone?

No. The gland is usually flattened against the side or bottom of the sella, which makes it difficult to see on some scan images. It may still produce all the hormones your body needs.

Is empty sella syndrome a brain tumour?

No. Empty sella is not a tumour and does not turn into cancer. It can sometimes develop after treatment for a pituitary tumour, but the empty-sella appearance itself is different from a tumour.

Can empty sella cause headaches?

It may be associated with headaches, especially when pressure around the brain is raised. However, headaches are common and may have another cause. The scan finding alone cannot prove that empty sella is responsible.

Can empty sella cause weight gain?

Empty sella does not directly explain most weight gain. A pituitary-related thyroid or other

hormone deficiency can affect weight and energy, so testing may be appropriate when other symptoms are present. Obesity is also associated with primary empty sella and intracranial hypertension, but an association does not show which came first.

Can I become pregnant with empty sella syndrome?

Many people with an empty sella can become pregnant. Fertility may be affected if pituitary hormones controlling ovulation or reproductive function are abnormal. Pregnancy planning may require hormone assessment and closer monitoring when a deficiency is known.

Will I need treatment for the rest of my life?

Not everyone needs treatment. If your pituitary function is normal, observation may be enough. Confirmed hormone deficiencies are often long term, although the need for each medicine should be reviewed rather than assumed.

Sources

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