CONDITION

Gigantism

Gigantism is excessive growth caused by too much growth hormone before a child's growth plates close.

WHAT IT IS
Growth hormone excess before growth plates close

BODY SYSTEM
Hormone system, bones, heart, metabolism, and vision

MAIN SYMPTOMS
Rapid height gain, enlarged hands and feet, headaches, sweating

WHAT CAUSES IT
Usually a growth-hormone-producing pituitary tumor

HOW IT IS DIAGNOSED
IGF-1 and glucose suppression testing, plus pituitary MRI

MAIN TREATMENT
Pituitary surgery, hormone-targeting medicines, sometimes radiotherapy

CAN IT BE CURED?
Sometimes - surgery can normalize growth hormone

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

LONG-TERM OUTLOOK
Often manageable, but height and bone changes remain

Overview

Gigantism is a condition caused by too much growth hormone during childhood or adolescence. It develops while the growth plates-the areas near the ends of bones where growth occurs-are still open.

Extra growth hormone makes the long bones grow faster than expected. A child or teenager may become unusually tall and have rapid changes in hand, foot, jaw, and facial size. The hormone can also affect the heart, joints, metabolism, sleep, and other hormone systems.

Growth hormone is made by the pituitary gland, a small gland beneath the brain. In most cases, the excess comes from a noncancerous pituitary tumor called an adenoma.

Gigantism and acromegaly are related but not identical. Gigantism begins before the growth

plates close, so height increases greatly. Growth hormone excess after the plates have closed is called acromegaly. A young person can have features of both if hormone excess continues into adulthood.

Early recognition matters because treatment can slow excessive growth, protect vision, and reduce long-term effects on the heart and metabolism. Treatment cannot reverse height already gained or fully undo established bone changes.

Symptoms

The clearest sign is growth that is much faster than expected for the child's age and family pattern. This may show on a growth chart as a sharp increase in height over time.

Possible features include:

These changes usually develop over time. Because children normally grow and their appearance changes during puberty, early signs can be overlooked.

Not every tall child has gigantism. Height is often inherited, and some healthy children grow faster or mature earlier than their peers. In gigantism, rapid growth is usually accompanied by other physical changes or symptoms of hormone excess.

- Rapid height gain and unusually long arms or legs
- Increasing shoe, glove, hat, or ring size
- Enlarged hands and feet
- A prominent forehead, wider nose, or larger jaw
- Wider spacing between the teeth
- Headaches or changes in side vision
- Heavy sweating and oily skin
- Joint pain, back pain, or muscle weakness
- Snoring, disturbed sleep, or daytime tiredness
- Delayed puberty or irregular menstrual periods
- Increased thirst and urination if blood sugar is high

Causes and risk factors

Most cases are caused by a pituitary adenoma that releases too much growth hormone. These

tumors are usually benign, meaning they are not cancer. However, a large tumor can press on nearby structures, including the nerves that carry visual information from the eyes.

Growth hormone tells the liver and other tissues to produce insulin-like growth factor 1, usually shortened to IGF-1. IGF-1 drives much of the excessive bone and tissue growth.

Some cases are linked to inherited or genetic conditions that increase the chance of pituitary tumors or hormone overproduction. These include changes involving the AIP or GPR101 genes and conditions such as multiple endocrine neoplasia type 1, McCune-Albright syndrome, and Carney complex.

A genetic cause is more likely when gigantism begins very early, the pituitary tumor is unusually large, or other family members have pituitary tumors. Many people with gigantism have no known family history.

This condition is not caused by eating too much, playing certain sports, or taking ordinary nutritional supplements. Affected children and families did not cause it through anything they did.

Diagnosis

Evaluation usually begins with a review of growth records, symptoms, puberty, medicines, and family height. Measurements of height, weight, arm span, and head size may be compared with age-based growth charts.

Blood tests measure IGF-1. Results must be interpreted using normal ranges for the child's age, sex, and stage of puberty because hormone levels naturally change during development.

If IGF-1 is high, a glucose suppression test may be used. The child drinks a glucose solution, and growth hormone is measured over the following hours. In someone without growth hormone excess, glucose normally lowers growth hormone. Failure to suppress supports the diagnosis.

Magnetic resonance imaging, or MRI, is then used to look for a pituitary tumor. MRI uses a strong magnet rather than radiation to create detailed pictures.

Further assessment may include:

Diagnosis is usually coordinated by a pediatric endocrinologist, a specialist in children's hormones and growth.

- Tests of thyroid, adrenal, reproductive, and other pituitary hormones
- A formal visual-field test to check side vision

- Blood pressure and blood sugar checks
- Sleep or heart testing when symptoms suggest related complications
- Genetic testing when age, family history, or other findings suggest it

Treatment and management

The goals are to lower growth hormone and IGF-1, control the pituitary tumor, preserve normal pituitary function, and reduce complications.

Surgery is commonly the first treatment for a pituitary tumor that can be removed. It is usually performed through the nose and sphenoid sinus, an air space behind the nose. This is called transsphenoidal surgery. A surgeon with experience treating pituitary tumors is important, particularly because tumors associated with gigantism can be large.

Surgery may produce remission, meaning hormone levels return to the target range without ongoing tumor-directed treatment. Complete removal is not always possible, especially if the tumor has grown into nearby tissue.

Medicines may be used before surgery, after surgery, when surgery is not possible, or when hormone levels remain high. Treatment categories include:

Radiotherapy may be considered if surgery and medicines do not adequately control the tumor or hormone levels. Its effect develops slowly. It can also reduce the pituitary gland's ability to make other hormones, so long-term testing is needed.

A young person may need replacement hormones if the tumor or its treatment causes pituitary hormone deficiencies. This can include hormones needed for thyroid function, stress responses, puberty, or normal fluid balance. Treatment is chosen and monitored by the specialist team rather than based on symptoms alone.

Follow-up normally includes growth measurements, IGF-1 and other blood tests, and periodic pituitary imaging. Vision is rechecked if the tumor was close to the visual nerves.

- Somatostatin receptor medicines, which reduce growth hormone release
- A growth hormone receptor blocker, which limits the hormone's effects
- Dopamine-acting medicines, which help in selected pituitary tumors

Complications

Ongoing growth hormone excess can affect several parts of the body. Possible complications

include:

The chance of complications is influenced by how long hormone levels remain high and how well treatment controls them. Monitoring can identify many problems before they become severe.

Treatment also has possible effects. Surgery can cause bleeding, infection, leakage of the fluid surrounding the brain, or new hormone deficiencies, although the individual risk differs. Medicines may cause side effects that are specific to the drug. Radiotherapy can lead to gradual loss of pituitary function and requires long-term follow-up.

- High blood pressure or enlargement of the heart
- High blood sugar or diabetes
- Sleep apnea, in which breathing repeatedly stops during sleep
- Joint pain, abnormal spinal curvature, or reduced mobility
- Persistent headaches or visual-field loss
- Delayed puberty or reduced fertility
- Deficiency of other pituitary hormones
- Emotional distress related to rapid growth or visible physical changes

Prevention

Most cases of gigantism cannot be prevented. Pituitary tumors generally do not result from lifestyle choices, and inherited genetic changes cannot be prevented through diet or exercise.

When a genetic condition is identified, relatives may be offered genetic counselling or testing. This does not prevent the genetic change, but it may allow earlier monitoring and treatment if hormone excess develops.

Keeping accurate childhood growth records can support earlier recognition. This is detection rather than prevention.

Living with it and what to expect

Treatment can often control growth hormone excess, but care usually continues for years. Even after successful surgery, regular blood tests are needed because hormone excess can persist or return. MRI scans may be repeated to monitor any remaining tumor.

Once growth hormone and IGF-1 are controlled, excessive height gain should slow toward an age-appropriate rate. Height already gained will not decrease. Enlarged bones, including changes in the jaw, hands, and feet, may remain, although swelling of soft tissues can improve.

Some health effects, such as headaches, sweating, or blood sugar changes, may improve after hormone control. Joint, spine, dental, or sleep problems may need separate care. If another pituitary hormone is low, replacement treatment may be long term.

School seating, clothing, transport, and everyday equipment may need practical adjustments. A young person may also face unwanted attention or comments about their height. Emotional support, age-appropriate information, and contact with others who have pituitary conditions can help.

Physical activity is often possible and beneficial, but joint, heart, or vision problems may affect which activities are suitable. The care team can advise on restrictions based on documented complications rather than height alone.

Many people continue education, work, relationships, and family life. The long-term course is not the same for everyone. It is generally better when hormone levels are controlled early and complications receive ongoing attention.

When to get medical help

Arrange a routine medical appointment if a child or teenager is growing much faster than expected, has rapidly increasing shoe or hand size, or develops several features such as headaches, heavy sweating, facial changes, or delayed puberty. Bring previous growth measurements if they are available.

Contact the pituitary or endocrine team promptly for new or worsening headaches, double vision, loss of side vision, repeated vomiting, or major changes in thirst and urination. These symptoms need timely assessment but are not always an emergency.

Seek emergency care for:

A sudden headache with visual or neurological symptoms can rarely mean bleeding into a pituitary tumor, called pituitary apoplexy. This requires urgent hospital assessment.

- A sudden, severe headache, especially with vomiting
- Sudden loss or marked worsening of vision
- Fainting, severe confusion, unusual drowsiness, or collapse
- Severe weakness with low blood pressure or repeated vomiting

Common questions

Is gigantism the same as being naturally very tall?

No. Natural height usually follows a steady growth pattern related to family height and puberty. Gigantism causes excessive growth hormone levels and often produces rapid height gain alongside enlarged hands, feet, or facial features.

Is gigantism the same as acromegaly?

Both result from growth hormone excess. Gigantism starts before the growth plates close and causes extreme height. Acromegaly develops after they close, so bones become thicker but height does not increase substantially.

Can gigantism be cured?

Sometimes. Complete removal of a pituitary tumor can normalize hormone levels. If surgery does not produce remission, medicines and sometimes radiotherapy can often control the condition. Long-term monitoring remains important.

Will treatment make someone shorter?

No. Treatment cannot reverse height already gained or shorten the long bones. Its purpose is to stop further excessive growth and reduce other effects of high growth hormone.

Is a pituitary tumor cancer?

The pituitary adenomas that usually cause gigantism are generally benign, not cancerous. They can still cause serious problems by producing hormones or pressing on nearby nerves and normal pituitary tissue.

Does gigantism run in families?

It can, but many cases are not inherited. Genetic assessment may be considered when symptoms begin at a very young age, a tumor is large, or relatives have pituitary or related endocrine tumors.

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