CONDITION

Gaucher disease

Gaucher disease is an inherited condition that causes fatty material to build up in organs, blood-forming tissues, and sometimes the nervous system.

WHAT IT IS
Inherited lysosomal condition causing fatty material buildup

BODY SYSTEM
Blood, bones, liver, spleen, and sometimes nervous system

MAIN SYMPTOMS
Enlarged spleen, fatigue, easy bruising, bone pain

WHAT CAUSES IT
Inherited GBA1 gene changes

HOW IT IS DIAGNOSED
Low enzyme activity blood test and genetic testing

MAIN TREATMENT
Enzyme replacement or substrate reduction therapy

CAN IT BE CURED?
No - treatments do not remove the inherited cause

IS IT AN EMERGENCY?
Sometimes - severe bleeding or breathing trouble

LONG-TERM OUTLOOK
Often manageable; neurological forms can shorten life

Overview

Gaucher disease is a rare, lifelong inherited condition. It happens when the body does not make enough working acid beta-glucosidase, also called glucocerebrosidase. This enzyme normally breaks down a fatty substance called glucosylceramide.

Without enough working enzyme, glucosylceramide collects inside cells, mainly in immune cells called macrophages. These enlarged Gaucher cells can build up in the spleen, liver, bone marrow, and bones.

Effects vary widely. Some people have few symptoms and are diagnosed as adults, while others develop blood, bone, or organ problems during childhood. Certain forms also affect the brain and nerves.

Gaucher disease is usually grouped into three types. Type 1 does not cause primary damage to the brain and spinal cord. Type 2 causes severe neurological problems beginning in infancy. Type 3 also affects the nervous system, but usually progresses more slowly. These categories can overlap.

Treatment can reduce many blood, organ, and bone problems. Current treatments are less effective against symptoms involving the brain.

Symptoms

Symptoms can begin at any age. Even relatives with the same genetic changes may be affected differently.

Common effects include:

Anaemia means there are too few healthy red blood cells to carry oxygen. Platelets help stop bleeding. Both can become low when Gaucher cells crowd the bone marrow or an enlarged spleen removes blood cells too quickly.

Bone pain may be persistent or occur as a sudden, intense bone crisis. Reduced blood flow can damage part of a bone or nearby joint.

Type 1 ranges from almost no symptoms to significant organ, blood, and bone problems. It does not cause the primary neurological decline seen in types 2 and 3.

Type 2 begins in infancy. Signs may include swallowing or feeding difficulty, unusual eye movements, stiff muscles, seizures, and problems controlling breathing. It is severe and life-limiting.

Type 3 usually begins in childhood or adolescence. Neurological changes may include difficulty moving the eyes from side to side, poor coordination, seizures, or learning difficulties. Blood, bone, liver, and spleen symptoms may also occur.

- An enlarged spleen or liver, sometimes causing a full or swollen abdomen
- Tiredness, weakness, or shortness of breath from anaemia
- Easy bruising, nosebleeds, or prolonged bleeding from low platelets
- Bone pain, reduced bone strength, fractures, or joint damage

Causes and risk factors

Gaucher disease is caused by harmful changes in the GBA1 gene, which contains instructions

for making acid beta-glucosidase.

It has an autosomal recessive inheritance pattern. A person usually has a harmful change in both copies of GBA1 , inheriting one from each biological parent.

Someone with one altered copy is a carrier and usually does not develop Gaucher disease. When both biological parents are carriers, each pregnancy has a chance of producing a child with the condition. The outcome of one pregnancy does not affect the next.

Gaucher disease can occur in any ethnic group. Some GBA1 variants are more common in people with Ashkenazi Jewish ancestry or particular regional backgrounds, but ancestry cannot diagnose or rule out the condition.

Gaucher disease and certain GBA1 variants are linked to a higher risk of Parkinson's disease. Most carriers and many people with Gaucher disease do not develop Parkinson's.

Diagnosis

An enlarged spleen, low blood counts, or unexplained bone problems may lead to testing. These findings have many possible causes and do not confirm Gaucher disease by themselves.

The main diagnostic test measures acid beta-glucosidase activity in white blood cells or other suitable cells. Very low activity supports the diagnosis. A dried blood spot may be used initially, but an abnormal result generally needs confirmation with a more specific sample.

Genetic testing can identify harmful changes in both copies of GBA1 . It can confirm the diagnosis, support family testing, and provide some information about the likely type. It cannot predict the exact severity or course.

A bone marrow biopsy is not usually needed. Gaucher-like cells can occur in other conditions, so finding them alone does not confirm the diagnosis.

Further assessments may include blood counts, liver tests, scans of the liver and spleen, and bone imaging. Heart, lung, eye movement, developmental, or neurological tests may be needed depending on symptoms.

Treatment and management

Care is usually coordinated by a specialist team experienced in inherited metabolic conditions. Treatment depends on the type, symptoms, organ and bone findings, age, and overall health.

Enzyme replacement therapy supplies a manufactured version of the missing enzyme through regular intravenous infusions. It can reduce liver and spleen enlargement, improve blood

counts, and lower the risk of some bone complications. Blood and organ changes may improve within months, while bones can take longer.

The replacement enzyme does not cross the blood-brain barrier in useful amounts. It therefore does not prevent or reverse the main neurological features of types 2 and 3.

Substrate reduction therapy is an oral treatment for some people, mainly selected adults with type 1. It reduces how much fatty material the body makes. Suitability depends on the medicine, genetic results, other medicines, heart rhythm, liver or kidney health, and pregnancy plans.

Supportive care may include pain treatment, physical therapy, mobility support, and management of seizures, swallowing problems, or breathing difficulties. Blood transfusions are occasionally needed for severe anaemia or bleeding.

Removing the spleen is now generally avoided when possible because it does not treat the underlying condition and can increase infection and other health risks.

Stem cell transplantation can provide cells that make the working enzyme, but it carries substantial risks and is rarely used now.

Regular monitoring remains important even when treatment works. Tests can track blood counts, liver and spleen size, bone health, growth in children, and neurological changes.

Complications

Untreated or severe Gaucher disease can cause fractures, loss of blood supply to bone, joint damage, and reduced mobility.

A very enlarged spleen can worsen anaemia and low platelet counts. Severe liver disease and lung involvement are less common but can occur. People without a spleen have a higher risk of serious infection.

Some blood cancers, including multiple myeloma, occur more often in people with Gaucher disease than in the general population. Individual risk also depends on age and other factors. Routine follow-up helps clinicians investigate persistent or unexplained changes.

Neurological forms can cause increasing problems with movement, swallowing, seizures, breathing, and development.

Prevention

Gaucher disease cannot be prevented through diet, exercise, vaccination, or lifestyle changes.

It is present from conception because of inherited gene changes.

Genetic counselling can explain inheritance and testing options. Adult relatives may choose carrier or diagnostic testing when a family's GBA1 variants are known.

People planning a pregnancy may wish to discuss carrier screening, testing during pregnancy, or testing embryos created through in vitro fertilisation. These are personal choices, and counselling should provide information and support rather than direct a decision.

Early diagnosis cannot prevent the condition, but it may allow treatment before some complications become severe.

Living with it and what to expect

The long-term course depends mainly on the type of Gaucher disease and the organs involved.

Many people with type 1 attend school, work, have families, and remain active. Treatment can control many blood and organ problems, although fatigue, pain, infusions, appointments, and uncertainty may affect daily life.

Blood counts and organ enlargement often improve after treatment begins. Bone symptoms may improve more slowly, and existing joint or bone damage may not fully reverse. Treatment generally needs to continue to maintain its benefits.

Type 3 usually progresses over years. Treatment may help blood, bone, liver, and spleen problems, but neurological symptoms can continue to change. Support at school or work, seizure care, mobility services, and swallowing assessments may become important.

Type 2 progresses rapidly and is life-limiting. Care focuses on comfort, nutrition, breathing, seizure control, and support for the child and family.

A care plan can help with travel, missed infusions, pregnancy, surgery, dental procedures, or changing symptoms. Emotional support and contact with other affected families may also help.

When to get medical help

Attend routine follow-up as recommended, even if you feel well. Contact your specialist team sooner about increasing fatigue, more frequent bruising, new abdominal fullness, worsening bone pain, reduced mobility, or changes in balance, eye movement, swallowing, or development.

Seek urgent medical advice for severe bone pain, a possible fracture, rapidly increasing

bruising, persistent bleeding, or fever if you have had your spleen removed. Follow any infection plan provided after spleen surgery.

Seek emergency care for:

These symptoms can have causes other than Gaucher disease, but they need prompt assessment.

- Difficulty breathing, blue or grey lips, or choking
- Bleeding that is heavy or will not stop
- A first seizure or a seizure lasting longer than your emergency plan allows
- Sudden severe abdominal pain, especially after an injury
- Collapse, loss of consciousness, or inability to wake normally

Common questions

Is Gaucher disease cancer?

No. It is an inherited metabolic condition. Gaucher cells can collect in bone marrow and may resemble cells from another disorder. People with Gaucher disease have an increased risk of certain blood cancers, but most do not develop them.

Is Gaucher disease contagious?

No. You cannot catch or spread it through contact, blood, food, sex, or shared air. It is caused by inherited GBA1 gene changes.

Can someone with Gaucher disease live a normal life?

Many people with type 1 have a lifespan and daily life close to those of people without the condition, particularly with effective treatment and monitoring. Significant bone, liver, lung, or blood complications can affect health. Types 2 and 3 have more serious neurological effects, and type 2 is usually life-limiting in early childhood.

How do I know which type I have?

The type is based mainly on symptoms, age at onset, neurological findings, and genetic results. The boundaries are not always clear, so specialist assessment is needed.

Do Gaucher carriers have symptoms?

Carriers usually do not have Gaucher disease because they have one working copy of GBA1 . Some have a higher risk of Parkinson's disease, but carrying a variant does not mean Parkinson's will develop.

Can people with Gaucher disease have children?

Many can. Pregnancy may affect blood counts, bone symptoms, and treatment planning, so discuss it in advance with metabolic and pregnancy specialists. A genetic counsellor can explain inheritance and testing options.

Sources

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