CONDITION

Classic galactosemia

Learn how classic galactosemia affects the body's ability to process galactose, including newborn symptoms, diagnosis, lifelong dietary management, and follow-up care.

WHAT IT IS
Rare inherited sugar-processing disorder

BODY SYSTEM
Metabolism

MAIN SYMPTOMS
Poor feeding, vomiting, jaundice, unusual sleepiness

WHAT CAUSES IT
Inherited GALT gene changes

HOW IT IS DIAGNOSED
GALT enzyme, galactose-1-phosphate, and genetic testing

MAIN TREATMENT
Lifelong dietary galactose and lactose restriction

CAN IT BE CURED?
No, lifelong dietary management required

IS IT AN EMERGENCY?
Sometimes, seizure, breathing difficulty, or unresponsiveness

LONG-TERM OUTLOOK
Early treatment helps, but long-term complications may occur

Overview

Classic galactosemia is a rare inherited condition that affects how the body processes galactose , a type of sugar. Galactose is part of lactose, the natural sugar in breast milk, cow's milk, and many dairy products.

People with classic galactosemia have very little or no working galactose-1-phosphate uridylyltransferase , commonly called GALT. This enzyme helps convert galactose into substances the body can use. Without enough GALT, galactose and related chemicals, especially galactose-1-phosphate, build up in cells and tissues.

In newborns, this buildup can quickly damage the liver and other organs. It can also increase the risk of a serious bloodstream infection. Symptoms often begin after a baby starts drinking breast milk or a standard milk-based formula. Because early treatment is important, classic

galactosemia is included in newborn screening programs in many countries and all U.S. states.

Treatment centers on removing major sources of galactose and lactose from the diet. This can prevent or reverse many of the life-threatening problems seen in newborns. However, some people develop speech, learning, movement, bone, or reproductive problems even when the diet is followed carefully. These outcomes are not necessarily caused by dietary mistakes. The body also produces a small amount of galactose on its own, and researchers are still studying why long-term complications occur.

Classic galactosemia is different from milder GALT gene variants, such as Duarte galactosemia. A metabolic specialist can explain what a particular test result means and whether dietary treatment is needed.

Symptoms

Babies with classic galactosemia usually appear healthy at birth. Symptoms may develop within the first days of life as milk intake increases. Possible symptoms include:

A newborn who is feeding poorly, becoming increasingly sleepy, vomiting repeatedly, developing jaundice, or appearing seriously ill needs urgent medical assessment. Fever or an unusually low temperature can also signal infection. Call emergency services for trouble breathing, a seizure, severe difficulty waking, or loss of responsiveness. Do not wait for newborn screening results if a baby is becoming ill.

After dietary treatment begins, liver problems, feeding difficulties, and cataracts may improve. Long-term concerns vary widely. Some children and adults may have delayed speech, unclear speech, learning difficulties, problems with coordination, tremor, or emotional health concerns. Girls and women may have delayed puberty, irregular or absent menstrual periods, or reduced fertility.

Having one of these symptoms does not establish that a person has classic galactosemia. Many other conditions can cause similar problems.

- Poor feeding or difficulty gaining weight
- Vomiting or diarrhea
- Yellow skin or eyes, called jaundice
- An enlarged liver or abnormal liver test results
- Unusual sleepiness, weakness, or irritability
- Low blood sugar

- Bleeding or easy bruising
- Clouding of the eye's lens, called a cataract
- Signs of a serious infection, especially infection caused by Escherichia coli bacteria

Causes and risk factors

Classic galactosemia is caused by disease-causing changes in the GALT gene. This gene provides instructions for making the GALT enzyme.

The condition follows an autosomal recessive inheritance pattern. This means a child must inherit one disease-causing GALT variant from each biological parent. Parents who carry one variant usually do not have symptoms because their other copy of the gene produces enough enzyme.

When both parents are carriers, each pregnancy has:

These chances are the same for each pregnancy. They do not change based on the sex of the child or the outcomes of earlier pregnancies.

The main risk factor is having two carrier parents. A family history may provide a clue, but many affected babies are born into families with no known history of the condition. Classic galactosemia is genetic. It is not caused by anything a parent ate, did, or was exposed to during pregnancy.

- A 25% chance that the child will have classic galactosemia
- A 50% chance that the child will be an unaffected carrier
- A 25% chance that the child will inherit neither familial variant

Diagnosis

Newborn screening is often the first indication of classic galactosemia. Depending on the screening program, the dried blood spot may be tested for low GALT enzyme activity, elevated total galactose, or both. Screening identifies babies who need prompt evaluation, but it does not by itself confirm a diagnosis.

An abnormal screen requires immediate contact with a clinician and usually a metabolic specialist. Because a baby can become ill before confirmatory results are available, clinicians may recommend temporarily stopping breast milk and standard milk-based formula and using an appropriate alternative while testing is completed. This should be directed by the baby's

medical team.

Confirmatory testing may include:

A recent red blood cell transfusion can interfere with enzyme testing because the donated cells may have normal GALT activity. Clinicians and the laboratory should be told about any transfusions. Dietary changes can also affect some galactose measurements, although genetic testing is not changed by diet.

Genetic testing can help distinguish classic galactosemia from milder variants. Testing the biological parents may confirm inheritance and support counseling about future pregnancies. When familial GALT variants are known, prenatal testing and testing of embryos created through in vitro fertilization may be possible for families who want those options.

- Measuring GALT enzyme activity in red blood cells
- Measuring galactose-1-phosphate in red blood cells
- Testing the GALT gene for disease-causing variants
- Checking liver function, blood sugar, blood clotting, and other signs of illness
- Testing blood or urine for infection when a baby appears unwell

Treatment and management

Treatment should begin promptly when classic galactosemia is strongly suspected. The main treatment is lifelong restriction of major dietary sources of galactose and lactose.

For an infant, breast milk and standard cow's-milk formulas contain lactose and are not suitable during initial treatment. A metabolic specialist and pediatric dietitian can recommend an appropriate lactose-free formula, such as a suitable soy-based or elemental formula, based on the baby's needs. Caregivers should not change an infant's feeding plan without medical guidance.

As children begin solid foods, the diet generally excludes milk and dairy products that contain substantial lactose or galactose. Milk from goats and sheep also contains lactose. Food labels require careful review because milk ingredients can appear in baked goods, sauces, processed meats, snack foods, and other products.

The diet does not usually require avoiding every trace of galactose. International management guidance allows many fruits, vegetables, legumes, and unfermented soy foods because strict avoidance of these nutritious foods has not been shown to improve outcomes. Some mature cheeses may contain very little galactose, but whether a particular product is appropriate should be discussed with a metabolic dietitian. Food preparation and labeling vary.

A dietitian can also help families evaluate:

People who avoid dairy may not obtain enough calcium or vitamin D. Clinicians may recommend dietary changes or supplements after reviewing food intake, growth, laboratory results, and bone health. Supplement amounts should be individualized.

There is currently no routinely available medicine that replaces GALT or removes all internally produced galactose. Dietary treatment remains essential, particularly during infancy, but it may not prevent every long-term complication.

Families should have a written plan explaining the diagnosis, usual diet, specialist contacts, and what to do if the child becomes ill or cannot eat normally. Medical identification jewelry or a wallet card can help communicate the condition during emergency care.

- Infant formulas and age-appropriate milk alternatives
- Packaged foods and restaurant meals
- Medicines, vitamins, and supplements that may contain lactose
- Calcium, vitamin D, protein, and overall energy intake
- Safe planning for school, travel, sports, and social events

Complications

Without early treatment, classic galactosemia can cause liver failure, abnormal bleeding, cataracts, kidney-related problems, and life-threatening infection. These risks are greatest in untreated newborns. Prompt removal of dietary galactose often leads to major improvement.

Long-term complications can still occur despite early diagnosis and careful dietary management. Possible concerns include:

Primary ovarian insufficiency means the ovaries stop working normally earlier than expected. It may lead to delayed puberty, irregular or absent periods, low estrogen levels, and reduced fertility. Pregnancy can still occur in some women, so fertility should be discussed individually rather than assumed to be absent.

Boys and men generally have typical pubertal development and reproductive function, although personal assessment may be needed.

The type and severity of complications differ considerably. Regular developmental and medical assessment can identify concerns early and connect the person with useful therapy, school support, or specialist care.

- Speech and language disorders, including difficulty planning the movements used for speech
- Learning, attention, or executive-function difficulties
- Tremor, poor balance, or problems coordinating movement
- Anxiety, depression, or social difficulties
- Reduced bone mineral density
- Slower growth in some children
- Primary ovarian insufficiency in many affected girls and women

Follow up

Ongoing care is usually coordinated through a metabolic genetics clinic. Routine follow-up may review growth, nutrition, dietary galactose exposure, development, school progress, movement symptoms, emotional well-being, and bone health.

Children may benefit from formal speech, language, developmental, and learning assessments even when early milestones seem typical. Speech therapy, occupational therapy, physical therapy, and educational accommodations can be added according to the child's needs.

Adolescents should receive age-appropriate education about managing their own diet and medical care. Girls may need monitoring of puberty, menstrual cycles, and ovarian function. Adults may need continued support related to nutrition, bone health, mental health, fertility, education, or employment.

Contact the regular care team if there are new problems with growth, diet, speech, learning, balance, tremor, mood, puberty, or menstrual periods. These concerns usually need timely outpatient review rather than emergency care.

Seek urgent assessment if an infant has poor feeding, repeated vomiting, jaundice, marked sleepiness, fever, abnormal bleeding, or other signs of serious illness. Emergency services are appropriate for a seizure, breathing difficulty, unresponsiveness, or another immediately life-threatening symptom.

Sources

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