CONDITION

Hereditary ovalocytosis

Hereditary ovalocytosis is an inherited condition that makes red blood cells oval and sometimes causes them to break down early.

WHAT IT IS
Inherited red blood cell membrane condition causing oval cells

BODY SYSTEM
Blood and circulation

MAIN SYMPTOMS
Often none, fatigue, jaundice, enlarged spleen

WHAT CAUSES IT
Inherited changes in red blood cell membrane proteins

HOW IT IS DIAGNOSED
Blood smear, hemolysis tests, sometimes genetic testing

MAIN TREATMENT
Monitoring, supportive care, sometimes spleen removal

CAN IT BE CURED?
No - inherited red cell change remains

IS IT AN EMERGENCY?
Sometimes, with severe anemia or newborn jaundice

LONG-TERM OUTLOOK
Most people have no symptoms or mild anemia

Overview

Hereditary ovalocytosis is an inherited condition that changes the shape of red blood cells. Instead of being round and flexible, many cells become oval or elongated.

The name is often used alongside hereditary elliptocytosis , which also describes inherited oval or elliptical red blood cells. A well-known form called Southeast Asian ovalocytosis causes especially rigid oval cells.

Red blood cells must bend as they travel through tiny blood vessels and the spleen. In hereditary ovalocytosis, changes in the cell's outer membrane can make this harder. Some affected cells are removed from the bloodstream earlier than usual. This early breakdown is called hemolysis .

Most people have no symptoms or only mild anemia. Anemia means there are not enough healthy red blood cells to carry oxygen. Less commonly, ongoing hemolysis causes jaundice, gallstones, or enlargement of the spleen. Some newborns and people with more severe inherited forms need prompt treatment.¹⁻³

Symptoms

Many people discover hereditary ovalocytosis by chance after a blood test. They may have a normal red blood cell count and no health problems.

When symptoms occur, they are usually related to anemia or hemolysis. They may include:

Symptoms can become more noticeable during an infection because the body may destroy more red blood cells or briefly make fewer new ones.

Newborns can develop jaundice as bilirubin builds up. Bilirubin is a yellow substance produced when red blood cells break down. Newborn jaundice has many possible causes, but it needs timely assessment because very high bilirubin can be harmful.

The number of oval cells does not always predict how someone will feel. A person can have many oval cells but few symptoms, while a less common, severe form may cause significant anemia from early life.

- Tiredness, weakness, or reduced stamina
- Pale skin or shortness of breath during activity
- Yellowing of the skin or eyes, called jaundice
- Dark urine during periods of increased hemolysis
- Discomfort or fullness under the left ribs from an enlarged spleen
- Upper abdominal pain from gallstones

Causes and risk factors

Red blood cells have a flexible membrane supported by a network of proteins. Hereditary ovalocytosis develops when an inherited genetic change affects one of these proteins.

Several genes can be involved. They provide instructions for proteins such as spectrin, protein 4.1, glycophorin C, and band 3. These proteins help red blood cells keep their shape and withstand repeated movement through the circulation.^{2,3}

Many forms are autosomal dominant . This means one altered copy of a gene can cause the

condition. If a parent has one of these forms, each child often has a 1 in 2 chance of inheriting the altered gene. The chance is separate for each pregnancy. Severity can differ between relatives who have the same genetic change.

Some severe forms result from inheriting changes from both parents or from having more than one membrane-related genetic change.

Southeast Asian ovalocytosis is linked to a specific change in the `SLC4A1` gene, which makes the band 3 protein. It is more common among people whose families come from parts of Southeast Asia and the western Pacific. However, inherited oval red cells can occur in people of any ancestry.

Having a relative with ovalocytosis, unexplained anemia, jaundice, gallstones at a young age, or an enlarged spleen increases the chance that an oval blood-cell finding is inherited.

Oval cells are not always hereditary. They can also appear with iron deficiency, vitamin B12 or folate deficiency, bone marrow conditions, and some other illnesses. A blood smear showing oval cells therefore does not confirm hereditary ovalocytosis by itself.

Diagnosis

Diagnosis begins with your symptoms, medical history, family history, and blood tests. The condition may first be noticed on a complete blood count , which measures red blood cells and hemoglobin, or on a blood smear examined under a microscope.

The smear may show many oval or elongated cells, also called ovalocytes or elliptocytes. Their number and appearance can help distinguish an inherited membrane condition from other causes.

If hemolysis is suspected, testing may include:

Specialist laboratories can test how red blood cells respond to stress or move through an instrument called an ektacytometer. These tests are not needed in every case.

Genetic testing may identify the affected gene. It can be helpful when the diagnosis is uncertain, symptoms are severe, a newborn is affected, or the result could guide family counselling. A negative genetic test does not always rule out the condition because not every relevant change is detected by every test.

- A reticulocyte count, measuring young red blood cells
- Bilirubin and lactate dehydrogenase, which may rise during hemolysis
- Haptoglobin, which may fall when red cells break down in circulation

- A direct antiglobulin test to look for immune-related red cell destruction
- Iron, vitamin B12, and folate tests when nutritional causes are possible

Treatment and management

People without anemia, hemolysis, or other complications usually do not need active treatment. Periodic blood tests may be enough.

If red blood cells are breaking down steadily, folic acid may be recommended. The body uses folate to make replacement blood cells. This should be taken according to professional advice rather than assumed to be necessary for everyone.

Iron supplements do not treat hereditary ovalocytosis itself. They are appropriate only if testing confirms iron deficiency. Repeated transfusions can instead cause too much iron to collect in the body.

A blood transfusion may be needed for severe or rapidly worsening anemia. This is uncommon in typical mild hereditary ovalocytosis but may be necessary during serious infections, in severe inherited forms, or during the newborn period.

Newborn jaundice may be treated with phototherapy, which uses special light to help remove bilirubin. Severe cases may require more intensive hospital treatment.

Removal of the spleen, called splenectomy , can reduce hemolysis because the spleen is responsible for removing many abnormal red blood cells. It does not correct their inherited shape. Because spleen removal creates a lifelong risk of serious infection and blood clots, it is generally reserved for people with clinically significant anemia or complications rather than an abnormal blood smear alone.⁴

Vaccination and an infection-prevention plan are important before and after splenectomy. Gallbladder surgery may be considered separately if pigment gallstones cause repeated symptoms.

Complications

Most people do not develop serious complications. When hemolysis is ongoing, possible problems include chronic anemia, jaundice, and an enlarged spleen.

The breakdown of red blood cells can increase bilirubin and lead to pigment gallstones . These may cause pain in the upper right abdomen, especially after eating, and can occasionally block a bile duct.

An infection with parvovirus B19 can briefly stop red blood cell production. In someone whose cells already have a shortened lifespan, this can cause a sudden, marked drop in hemoglobin. This is called an aplastic crisis.

Severe newborn hemolysis can cause significant anemia or high bilirubin. Close monitoring during the first days of life is particularly important when a parent has a severe form or a previously affected baby.

Repeated transfusions can lead to iron overload over time. Splenectomy carries separate long-term risks, including severe bacterial infection and an increased tendency to form blood clots.

Prevention

Hereditary ovalocytosis cannot be prevented because it results from an inherited genetic change. Lifestyle choices during pregnancy do not cause it.

Genetic counselling can explain the likely inheritance pattern, the chance of passing the genetic change to a child, and why severity may differ within a family. This provides information for family planning but does not prevent the condition itself.

Complications can sometimes be reduced through appropriate follow-up. This may include monitoring anemia, assessing new jaundice or abdominal pain, and following vaccination and infection precautions after spleen removal.

Living with it and what to expect

For many people, hereditary ovalocytosis remains a lifelong laboratory finding rather than an illness that limits daily life. The oval red blood cell shape remains, but symptoms may never develop.

Mild anemia, when present, is often stable over years. Hemolysis can temporarily increase during infections, so tiredness, jaundice, or dark urine may become more noticeable. Recovery usually follows treatment of the infection and restoration of normal blood-cell production, although individual experiences differ.

Children with a mild form can usually take part in school, play, and sports according to how they feel. Adults can generally work, exercise, travel, and become pregnant. Pregnancy increases the body's need for red blood cells, so someone with anemia may need closer blood-test monitoring.

Routine follow-up depends on the severity of hemolysis and any previous complications. It may include a complete blood count, hemolysis tests, and review for gallbladder or spleen symptoms. People who have had transfusions or splenectomy need additional long-term monitoring.

Family members can have different symptoms despite sharing the condition. A person with no symptoms should not assume that a newborn or relative with jaundice has the same mild course. Each person needs their own assessment.

When to get medical help

Arrange a routine appointment if a blood test repeatedly shows oval cells, particularly if you also have anemia or a family history of similar findings. Routine review is also appropriate for persistent tiredness, mild jaundice, or fullness under the left ribs.

Seek prompt medical advice for:

Call emergency services for difficulty breathing at rest, fainting, confusion, severe weakness, chest pain, or signs of shock such as cold, clammy skin. These can occur with severe anemia or another urgent condition and should not be assessed at home.

- A noticeable increase in jaundice or dark urine
- New upper abdominal pain, especially with vomiting or fever
- Sudden worsening of tiredness, paleness, or shortness of breath
- Fever after spleen removal, following your emergency infection plan
- Jaundice or poor feeding in a newborn

Common questions

Is hereditary ovalocytosis the same as hereditary elliptocytosis?

The terms overlap and are sometimes used interchangeably. Both describe inherited red blood cells that are oval or elongated because of membrane protein changes. Southeast Asian ovalocytosis is a specific form with particularly rigid cells.

Can hereditary ovalocytosis go away?

The inherited change and oval cell shape do not go away. However, many people never need treatment. Splenectomy can reduce red cell destruction in selected severe cases, but it does not remove the genetic change or make every cell normally shaped.

Will my child inherit it?

Many common forms are autosomal dominant. If you carry one altered gene, each child may have a 1 in 2 chance of inheriting it. Other inheritance patterns are possible, so the exact chance depends on the gene changes present in your family.

Does having oval blood cells mean I have this condition?

No. Oval cells can occur with iron, vitamin B12, or folate deficiency and with some bone marrow conditions. The proportion and appearance of the cells, other blood results, symptoms, and family history help determine the cause.

Is hereditary ovalocytosis a type of cancer?

No. It is an inherited red blood cell membrane condition and does not turn into leukemia or another cancer. However, newly identified oval cells may need evaluation because they can have causes other than an inherited condition.

Can I donate blood?

Blood donation rules differ by country and service. Anemia, active hemolysis, or a history of transfusion may prevent donation. A local blood donation service can assess eligibility based on your diagnosis, hemoglobin level, and treatment history.

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