CONDITION

Hypochromia

Hypochromia means red blood cells contain less haemoglobin and look paler than usual.

WHAT IT IS
Red blood cells containing too little haemoglobin

BODY SYSTEM
Blood and circulation

MAIN SYMPTOMS
Often none, tiredness, breathlessness, paleness

WHAT CAUSES IT
Usually iron deficiency or inherited blood conditions

HOW IT IS DIAGNOSED
Complete blood count and blood smear

MAIN TREATMENT
Treatment of the underlying cause

CAN IT BE CURED?
Sometimes - correcting the cause may restore normal cells

IS IT AN EMERGENCY?
Sometimes - severe breathlessness, chest pain, or fainting

LONG-TERM OUTLOOK
Usually good when the cause is identified and managed

Overview

Hypochromia means that red blood cells look paler than usual under a microscope. The word means "reduced colour." Red blood cells get their colour from haemoglobin, the protein that carries oxygen around the body.

Hypochromia is a laboratory finding rather than a disease by itself. It may be reported after a complete blood count or an examination of a blood sample under a microscope, called a blood smear. It matters because it can be a sign that the red blood cells do not contain enough haemoglobin.

Hypochromic cells are often also smaller than normal. This is called microcytosis. However, the two findings do not always occur together, and neither one identifies the cause on its own.

Iron deficiency is the most common reason for hypochromic red blood cells. Other causes

include inherited haemoglobin conditions, long-term inflammation, and less common problems with how the body makes haemoglobin.

Some people with hypochromia have anaemia, meaning they do not have enough haemoglobin in their blood. Others have hypochromic cells but a haemoglobin level that is still within the laboratory's reference range. Your symptoms, test results, medical history, and the underlying cause all help determine what the finding means.

Symptoms

Hypochromia itself does not cause symptoms. Symptoms develop when the associated anaemia or underlying condition affects oxygen delivery or causes other health problems.

Mild anaemia may cause no noticeable symptoms. When symptoms occur, they can include:

Iron deficiency can also cause symptoms that are not explained only by the haemoglobin level. These may include restless legs, hair shedding, sore cracks at the corners of the mouth, or brittle and spoon-shaped nails.

Some people develop pica, which is a strong urge to eat non-food substances such as ice, soil, or paper. Craving and chewing ice is particularly associated with iron deficiency.

Children with significant or prolonged iron deficiency may have changes in attention, learning, growth, or behaviour. These symptoms have many possible causes, so testing is needed rather than assuming iron deficiency is responsible.

Symptoms may also come from the cause of the hypochromia. For example, heavy menstrual bleeding may cause frequent pad or tampon changes, while bleeding from the digestive tract may lead to black stools or visible blood.

- Tiredness or reduced stamina
- Shortness of breath during activity
- Dizziness, headaches, or difficulty concentrating
- A fast or noticeable heartbeat
- Pale skin, lips, or the inside of the lower eyelids

Causes and risk factors

Iron is needed to make haemoglobin. Hypochromia usually develops when the body lacks iron, cannot use iron effectively, or cannot make haemoglobin normally.

Iron deficiency can result from blood loss. Common examples include heavy menstrual periods and bleeding from the stomach or intestines. Digestive bleeding may be related to ulcers, bowel inflammation, polyps, cancer, or medicines that irritate the stomach or increase bleeding.

Iron deficiency can also occur when the body needs more iron, such as during pregnancy or periods of rapid growth. A diet low in available iron may contribute. Some digestive conditions, including coeliac disease, can reduce iron absorption. Surgery involving the stomach or small bowel may have a similar effect.

Inherited haemoglobin conditions can also cause hypochromia. Thalassaemia is an important example. In thalassaemia, genetic changes affect how haemoglobin is made. A person with thalassaemia trait may have small, pale red blood cells throughout life without having significant anaemia or symptoms.

Long-term inflammatory conditions can interfere with the body's ability to release stored iron and use it to make red blood cells. This is sometimes called anaemia of inflammation or anaemia of chronic disease. It can occur with persistent infections, autoimmune conditions, kidney disease, or cancer.

Less common causes include sideroblastic anaemia, in which developing red blood cells cannot use iron normally, and lead exposure, which interferes with haemoglobin production. Certain medicines, alcohol-related bone marrow problems, and rare inherited disorders may also be involved.

Risk factors do not prove that you have any one cause. More than one factor can also be present at the same time.

Diagnosis

Hypochromia may first appear on a complete blood count. This test measures haemoglobin and several features of the red blood cells.

The mean corpuscular haemoglobin, or MCH, estimates how much haemoglobin is present in an average red blood cell. The mean corpuscular haemoglobin concentration, or MCHC, estimates how concentrated that haemoglobin is. Low results can support a finding of hypochromia.

A blood smear allows the cells to be examined under a microscope. Hypochromic cells have a larger pale area in the centre than normal red blood cells. The smear may also show differences in cell size and shape that help guide further testing.

Finding hypochromia is only the first step. Tests used to investigate the cause may include:

A low ferritin level strongly supports iron deficiency. However, ferritin can rise during inflammation or infection. A result within the reference range therefore does not always rule out iron deficiency, especially when a long-term inflammatory condition is present.

Your history may help identify possible blood loss, pregnancy-related needs, dietary limits, digestive symptoms, family blood conditions, medicines, or workplace and household lead exposure.

If iron deficiency is confirmed, finding out why it developed is important. Depending on age, symptoms, menstrual history, and other risk factors, the investigation may include testing for coeliac disease or examining the stomach and bowel. Bone marrow testing is rarely needed and is usually reserved for unclear or complex cases.

- Ferritin, which reflects the body's stored iron
- Transferrin saturation and other iron measurements
- A reticulocyte count, which shows how many new red blood cells are being made
- Tests for inflammation, kidney function, or vitamin deficiencies
- Haemoglobin analysis or genetic testing for inherited conditions

Treatment and management

Treatment is aimed at the cause rather than the pale appearance of the cells.

When iron deficiency is responsible, treatment usually includes replacing iron and addressing the reason it was lost or poorly absorbed. Iron may be given by mouth. Iron given into a vein may be considered when oral treatment is not tolerated, is not absorbed adequately, or is unlikely to meet the person's needs.

Iron tablets can cause nausea, stomach discomfort, constipation, diarrhoea, or dark stools. The choice of product, schedule, and route should be based on the individual situation. Taking iron without confirming a need can delay the correct diagnosis and may be harmful in some iron-loading conditions.

Blood loss also needs attention. Management might involve treatment for heavy periods, a digestive condition, or another source of bleeding. Replacing iron without investigating unexplained or continuing blood loss may provide only temporary improvement.

Thalassaemia trait usually does not require treatment. Iron should not be used simply because the red cells are small or pale; a person with thalassaemia can have normal iron stores. More severe inherited haemoglobin disorders need specialist care and may require transfusions or other treatments.

For anaemia linked to inflammation, kidney disease, or another long-term illness, treating or controlling that condition may improve red blood cell production. Some people need additional treatment directed at the anaemia.

A blood transfusion is not a routine treatment for hypochromia. It may be used for severe or symptomatic anaemia in selected situations, based on the haemoglobin level, symptoms, rate of blood loss, and overall health.

Follow-up blood tests can show whether haemoglobin production and iron stores are recovering. The cells already in circulation live for about four months, so changes in cell size and colour may take time to disappear completely.

Complications

Hypochromia does not usually cause complications on its own. The concern is untreated anaemia or an underlying condition that continues to cause abnormal red blood cells.

Significant anaemia makes the heart work harder to deliver oxygen. It can worsen shortness of breath, chest symptoms, or exercise tolerance, especially in someone who already has heart or lung disease. Severe anaemia can place substantial strain on the circulation.

Ongoing iron deficiency may affect energy, concentration, work, school, and physical activity. During pregnancy, untreated iron-deficiency anaemia is associated with health risks for both the pregnant person and the baby. In children, prolonged deficiency can affect development.

An important possible complication is delayed recognition of continuing blood loss or another medical condition. This is why unexplained iron deficiency should be investigated rather than treated indefinitely without checking the cause.

Prevention

Hypochromia cannot always be prevented. Inherited causes such as thalassaemia are present from birth, and hypochromia related to chronic illness may occur even with a balanced diet.

Some cases of iron deficiency may be reduced through adequate dietary iron and early treatment of ongoing blood loss. Iron is found in meat, fish, beans, lentils, fortified cereals, tofu, nuts, seeds, and dark green vegetables. Vitamin C-containing foods can help the body absorb iron from plant foods.

Routine iron supplements are not appropriate for everyone. They should not be used to prevent or treat hypochromia unless there is a clear reason, particularly when an inherited

haemoglobin condition or iron-loading disorder is possible.

If you have repeated heavy periods, digestive bleeding, or a condition that affects iron absorption, planned monitoring may identify deficiency before marked anaemia develops.

Living with it and what to expect

What happens over time is mainly determined by the cause.

When iron deficiency is found and both the deficiency and its cause are treated, haemoglobin often begins to improve over the following weeks. Rebuilding iron stores usually takes longer. Follow-up testing helps confirm that treatment has worked and that blood loss is not continuing.

If iron levels do not improve as expected, possible reasons include continued bleeding, difficulty absorbing iron, side effects that make treatment hard to take, or a different diagnosis. This calls for reassessment rather than simply continuing the same approach.

Hypochromia caused by thalassaemia trait is usually lifelong. The red cells may remain small and pale, but many people have few or no symptoms and lead typical lives. Knowing about the trait can prevent repeated iron treatment when iron stores are normal. It can also be relevant when planning a pregnancy because a child's risk depends on the genes carried by both biological parents.

Hypochromia associated with a long-term inflammatory or kidney condition may improve when that condition is controlled, but it can return during flare-ups or progression. Periodic blood tests may be part of routine care.

A laboratory value does not define how well you can function. Symptoms and treatment needs are influenced by how low the haemoglobin is, how quickly it changed, your general health, and the cause.

When to get medical help

Arrange a routine medical appointment if a blood test reports hypochromia, low MCH, low MCHC, microcytosis, or anaemia. This is especially important if the finding is new, unexplained, or persistent.

Seek prompt medical advice if you have worsening tiredness, shortness of breath with ordinary activity, frequent dizziness, a racing heartbeat, heavy periods, unexplained weight loss, persistent abdominal symptoms, or visible blood in your stool.

Get urgent or emergency help for:

A mildly abnormal result without severe symptoms is not usually an emergency, but it still deserves routine follow-up to identify the cause.

- Chest pain, fainting, confusion, or severe weakness
- Severe breathing difficulty or breathlessness at rest
- Vomiting blood or passing black, tar-like stools
- Heavy, uncontrolled bleeding
- A rapid decline in symptoms, especially with heart or lung disease

Common questions

Is hypochromia the same as anaemia?

No. Hypochromia describes how pale the red blood cells appear or how little haemoglobin they contain. Anaemia means the overall haemoglobin level is low. You can have hypochromic cells before clear anaemia develops.

Does hypochromia always mean iron deficiency?

No. Iron deficiency is a common cause, but thalassaemia, inflammation, lead exposure, and other conditions can produce a similar result. Iron studies are usually needed before assuming that iron is low.

Can I fix hypochromia by eating more iron?

Diet may help when intake is part of the problem, but it may not replace enough iron to correct an established deficiency. Diet also cannot stop continuing blood loss or treat an inherited condition. The cause should be confirmed first.

Is hypochromia cancer?

Hypochromia is not cancer. However, unexplained iron deficiency can occasionally result from bleeding caused by a digestive cancer, particularly in older adults and people who do not menstruate. Many non-cancerous conditions can also cause blood loss.

Why are my red blood cells pale if my haemoglobin is normal?

Early iron deficiency or an inherited trait can change the cells before the overall haemoglobin falls below the laboratory range. Results should be interpreted together with iron tests, cell size, symptoms, and medical history.

Will hypochromia go away?

It may go away when a reversible cause, such as iron deficiency, is corrected. It may remain lifelong with an inherited condition such as thalassaemia trait. Persistent hypochromia does not always mean that treatment is needed.

Sources

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