TEST

Fetal-maternal erythrocyte distribution blood test

This blood test measures fetal red blood cells that have entered the pregnant person's bloodstream.

WHAT IT MEASURES
Percentage of fetal red blood cells in maternal blood

SAMPLE
Blood

FASTING NEEDED?
No

HOW LONG IT TAKES
About 5 to 10 minutes

RESULTS IN
Same day to several days, depending on the laboratory

USED FOR
Diagnosing and quantifying fetomaternal bleeding; guiding Rh immune globulin

MAIN LIMITATION
Maternal fetal-haemoglobin cells can mimic fetal red cells

Overview

The fetal-maternal erythrocyte distribution blood test looks for fetal red blood cells in the pregnant person's bloodstream. Small numbers may cross the placenta during pregnancy or birth. A larger transfer is called a fetomaternal haemorrhage, which does not necessarily cause visible bleeding.

The test usually reports the percentage of red blood cells that appear fetal. The laboratory may use this to estimate how much fetal blood entered the maternal circulation.

Flow cytometry uses fluorescent markers to count cells containing fetal haemoglobin. Some laboratories use the Kleihauer-Betke test, which stains fetal cells differently from most adult cells. Flow cytometry is generally more precise when only a small proportion of fetal cells is present.

This is not a genetic screening test and does not assess chromosomes or inherited conditions.

Why the test is ordered

The test may be ordered to investigate or measure a possible fetomaternal haemorrhage, including:

RhD is a protein found on some red blood cells. If you are RhD negative and the fetus is RhD positive, exposure to fetal cells can cause your immune system to make antibodies that may affect a future RhD-positive pregnancy.

Rh immune globulin reduces this risk. The estimated size of the haemorrhage helps determine whether additional medicine is needed beyond routine prophylaxis.

- After childbirth, particularly when the pregnant person is RhD negative
- Following significant abdominal injury during pregnancy
- After certain pregnancy procedures
- When placental separation or another cause of bleeding is suspected
- When there are concerns about fetal anaemia or an unexpected fetal loss
- After a screening test detects fetal cells

Who should have the test

This is not a routine test for every pregnancy. It is usually ordered when the result could affect pregnancy assessment or the amount of Rh immune globulin given.

You may be offered it after delivery if you are RhD negative and the baby is, or may be, RhD positive. It may also be requested after trauma, bleeding, a procedure involving the uterus or placenta, or signs of fetal anaemia.

Whether the test is appropriate depends on pregnancy stage, blood group, symptoms, ultrasound findings and the time since the possible event. Local maternity protocols differ.

How to prepare

You do not need to fast. You can usually eat, drink coffee and take your regular medicines unless you have separate instructions for another test or procedure.

Tell the healthcare professional if you have:

If the test follows an injury, delivery or procedure, tell them when the event occurred. No special clothing or recovery arrangements are needed.

- Received a recent blood transfusion
- Been given Rh immune globulin
- A blood condition that increases fetal haemoglobin
- Had a stem-cell or bone-marrow transplant

What happens during the test

A healthcare professional inserts a small needle into a vein, usually in your arm. Blood is collected into a tube and sent to the laboratory. The draw generally takes a few minutes.

The laboratory distinguishes fetal and maternal red cells by their reactions to stains or antibodies. The result is often reported as a percentage of fetal cells and may include an estimated volume of fetal blood.

Testing may be repeated when the result is near a treatment threshold or does not fit the clinical situation.

Understanding your results

The report may say that fetal cells were not detected, were below the reporting limit or made up a stated percentage of examined red cells.

A negative result does not prove that no transfer occurred. A very small amount may be below the method's detection limit, and fetal cells can clear from the bloodstream over time.

When fetal cells are found, the laboratory may estimate the volume of fetal blood transferred. This calculation relies on assumptions about maternal blood volume and fetal red-cell concentration, so it is not exact.

There is no universal reference range. Interpretation depends on the laboratory method, timing, pregnancy details and reason for testing. Your result may be considered with your RhD type, the baby's blood type, ultrasound findings and other pregnancy assessments.

What affects the results

Maternal red cells sometimes contain fetal haemoglobin, particularly during pregnancy or with inherited conditions such as hereditary persistence of fetal haemoglobin and some haemoglobin disorders. Certain methods may mistake these cells for fetal cells and produce a

result that is too high. Flow cytometry using more than one marker can help distinguish them.

A recent transfusion can change the mixture of circulating red cells. Tell the laboratory about any transfusion, even if it was given for another reason.

Timing also matters. A sample taken too early may not reflect the full transfer, while a delayed sample may underestimate it as fetal cells are cleared. Record the timing of delivery, injury, bleeding, procedures and Rh immune globulin.

Other influences include:

Meals, coffee, time of day and ordinary exercise are not expected to meaningfully affect the result.

- The number of cells counted
- Differences between laboratory methods
- Assumptions about maternal blood volume
- Sampling after substantial blood loss or fluid replacement
- Uneven mixing or settling of the sample

Accuracy and limitations

Flow cytometry usually counts small proportions of fetal cells more consistently than manual staining, but no method identifies every fetal cell or haemorrhage.

The test may miss a very small transfer, especially if few cells are examined or the sample is collected after cells have begun to clear. It may also produce a falsely high result when maternal cells contain increased fetal haemoglobin. Some laboratories use a second cell marker to reduce this problem.

Methods based on RhD work only with suitable blood-group combinations, such as an RhD-negative pregnant person carrying an RhD-positive fetus. Fetal-haemoglobin methods do not have this restriction.

The test estimates the amount of transferred blood. It cannot show where or when bleeding occurred or determine whether the fetus is currently anaemic. Fetal monitoring, ultrasound blood-flow measurements or, in selected cases, direct fetal blood testing may provide more information.

Risks and complications

The risks are those of a routine blood draw. You may have brief discomfort, bruising or light-headedness. Serious complications are uncommon.

What happens next

If no important fetomaternal haemorrhage is found and there are no other concerns, you may only need usual pregnancy or postnatal follow-up.

If you are RhD negative, the result may help determine the amount of Rh immune globulin required. Dose and timing depend on local protocols, the estimated bleed and your clinical circumstances.

A larger or unexpected result may be checked with another sample or method. During pregnancy, further assessment may include fetal monitoring or ultrasound measurements for signs of anaemia.

Contact your maternity service urgently for reduced or absent fetal movement, vaginal bleeding, significant abdominal pain, fainting, or after a serious abdominal injury. Heavy bleeding, severe pain, difficulty breathing, collapse or rapidly worsening symptoms require emergency care rather than waiting for the test result.

Common questions

Can I drink coffee before the test?

Yes. Coffee does not usually affect the result. Follow separate fasting instructions if other tests are being collected.

Does the time of day matter?

No. The time since delivery, injury, bleeding or a pregnancy procedure is more important.

Can I exercise beforehand?

Ordinary activity is unlikely to affect the result. If the test follows an injury or pregnancy symptoms, follow your maternity team's advice.

How soon after an injury or delivery should the sample be taken?

Timing depends on the event and local procedure. Tell the healthcare professional exactly when the injury, procedure, bleeding or delivery occurred.

Is this the same as the Kleihauer-Betke test?

They have the same general purpose but use different methods. Kleihauer-Betke examines a

stained blood smear under a microscope. Fetal-maternal erythrocyte distribution is often measured by flow cytometry, which can provide a more consistent count.

Does a positive result mean my baby is unwell?

Not by itself. It means fetal-type red cells were detected. The amount, timing, pregnancy stage and other assessments determine its importance.

Sources

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