TEST

RBC nuclear scan

An RBC nuclear scan tracks labelled red blood cells to find active internal bleeding.

WHAT IT MEASURES
Movement of labelled red blood cells outside blood vessels

SAMPLE
None for imaging; a blood sample is labelled and reinjected

FASTING NEEDED?
No, unless your imaging centre gives fasting instructions

HOW LONG IT TAKES
Usually one to two hours; delayed images may take longer

RESULTS IN
Usually same day; timing varies by imaging service

USED FOR
Diagnosing and locating active internal bleeding

MAIN LIMITATION
Bleeding must occur during imaging to be detected

Overview

RBC stands for red blood cell. An RBC nuclear scan uses a small amount of radioactive material to label some of your own red blood cells. A special camera then tracks those cells as they move through your bloodstream.

The scan is most often used to look for active bleeding in the digestive tract. If labelled blood leaves a blood vessel and collects in the bowel, it may appear on the images. This can help estimate where the bleeding started.

The radioactive material is usually technetium-99m. The camera detects radiation from the labelled cells; it does not produce radiation itself.

The term RBC nuclear scan can also describe blood-pool imaging of the heart, liver, or spleen. Those studies have different purposes and may follow different protocols. This article focuses on an RBC scan for internal bleeding.

Why the test is ordered

Your care team may order the scan when there are signs of bleeding in the stomach or bowel but the source is uncertain. Examples include passing red or dark blood, unexplained blood loss, or a fall in red blood cell levels.

The scan may be useful when bleeding comes and goes. Imaging can continue for longer than some other tests, increasing the chance of recording an intermittent bleed.

It may also be ordered when an endoscopy has not found the source or cannot be performed immediately. An endoscopy uses a flexible camera to examine the digestive tract and can sometimes treat bleeding during the same procedure.

This scan is not generally used to screen people without evidence of bleeding.

Who should have the test

An RBC nuclear scan may be considered if your healthcare team suspects active digestive tract bleeding and needs help locating it. The choice also depends on how stable you are, how quickly you are bleeding, previous test results, and which treatments are available.

Other tests may be preferred in some situations. CT angiography can produce faster and more detailed pictures of blood vessels when bleeding is active. Endoscopy may be better when the likely area can be reached because it can find causes such as ulcers and may allow treatment.

Tell the nuclear medicine team if you are pregnant, could be pregnant, or are breastfeeding. The scan may still be appropriate, but the benefits, timing, and radiation precautions need individual review.

How to prepare

Most RBC bleeding scans do not require fasting. Follow the instructions from your imaging centre, because you may be asked not to eat if another procedure could be needed.

Tell the team about:

Do not stop anticoagulants like warfarin or apixaban , antiplatelet medicines, or other prescribed treatments unless the clinician responsible for your care tells you to. These medicines may be important to why you are bleeding, but stopping them without guidance can be unsafe.

Wear comfortable clothing. You may need to remove metal objects near the area being scanned.

- Pregnancy or possible pregnancy
- Breastfeeding
- Recent nuclear medicine tests
- Recent blood transfusions or major bleeding
- All medicines and supplements you take
- Previous reactions during injections or blood collection

What happens during the test

A healthcare professional places a small needle or intravenous line into a vein. A sample of blood is taken and mixed with a substance that helps technetium-99m attach to your red blood cells. The labelled cells are then returned through the intravenous line.

Some centres use a slightly different labelling method in which part of the process occurs inside your bloodstream. The aim is the same: to make your red blood cells visible to the camera.

You lie on a scanning table while a gamma camera takes a series of images, usually over your abdomen. You need to remain as still as possible. The camera may be close to your body, but it does not enclose you like some MRI scanners.

Initial imaging commonly lasts one to two hours. If bleeding is intermittent, the team may take delayed images later. The exact schedule depends on what the early images show and the centre's protocol.

The injection should not make you feel the movement of the labelled cells. You can usually breathe normally throughout the scan.

Understanding your results

There is no universal numerical reference range for this test. A nuclear medicine specialist reviews how the labelled blood moves over time and compares the images with your anatomy and other test results.

A positive scan shows labelled blood appearing outside the expected blood vessels and then moving through the bowel. The first place it appears may suggest the likely bleeding site.

A negative scan means no active bleeding was seen during the imaging period. It does not prove that bleeding has never occurred. Bleeding may have stopped temporarily, may be too

slow to detect, or may be outside the area examined.

An indeterminate result means an area could not be confidently classified as bleeding. Additional imaging, endoscopy, or observation may be needed.

Interpretation varies with the imaging protocol, your age, anatomy, pregnancy status, medicines, kidney function, previous surgery, and the wider clinical situation. Unlike many blood tests, sex-specific laboratory ranges are not normally used.

What affects the results

The most important factor is timing. The test is more likely to find bleeding that is happening while images are being taken. Intermittent bleeding can produce a negative scan even when there is a genuine problem.

Other factors include:

Coffee, meals, ordinary daily activity, age, and kidney function usually do not directly change the labelled cells in the way they can affect some blood tests. Kidney and bladder activity may still complicate interpretation if free tracer is present.

- Poor cell labelling: If less technetium attaches to the red cells, free radioactive material can collect in the stomach, thyroid, kidneys, or bladder and resemble or hide bleeding.
- Movement within the bowel: Blood can travel forward or backward after entering the bowel. The final location may not be where the bleeding began.
- Body movement: Changing position during an image can make small areas difficult to compare.
- Previous surgery or unusual anatomy: Altered bowel position can make the source harder to localise.
- Medicines: Some medicines can affect red-cell labelling or the clinical pattern of bleeding. Do not stop them yourself; give the team a complete list.
- Recent nuclear imaging: Radioactive material left from another test may interfere with the pictures.
- Recent transfusion: This does not automatically prevent the scan, but the timing and reason for transfusion help the specialist interpret it.

Accuracy and limitations

An RBC nuclear scan can record bleeding over an extended period and may detect slower bleeding than catheter angiography. It is less precise at showing the exact anatomy than CT angiography or endoscopy.

The scan can miss a real bleed when bleeding has stopped, is extremely slow, or occurs outside the camera's field. This is a false-negative result.

It can also suggest bleeding when the activity comes from a blood vessel, urinary activity, free technetium, or another normal structure. Blood that moves through the bowel can make the source appear to be in the wrong segment. These are false-positive or misleading findings.

No single accuracy figure applies to everyone. Performance changes with bleeding activity, imaging duration, labelling quality, equipment, and the reader's experience.

CT angiography may be better when rapid, detailed localisation is needed. Endoscopy is often better for examining the bowel lining and treating a reachable source. Catheter angiography may be chosen when a blood vessel needs to be treated directly.

Risks and complications

The blood draw and injection can cause brief discomfort, a small bruise, or light-headedness. Infection or significant bleeding at the needle site is uncommon.

The test exposes you to a small amount of ionising radiation. The radioactive material loses activity over time and leaves the body naturally. Your imaging centre may advise drinking fluids and urinating regularly afterward.

Reactions to the labelled cells are rare because the scan uses your own blood. Careful handling and identity checks are important to ensure that you receive your own labelled cells.

Pregnancy and breastfeeding require individual advice. If you are breastfeeding, the nuclear medicine team will tell you whether a temporary interruption is needed and for how long.

What happens next

Your results are considered alongside your symptoms, blood counts, blood pressure, previous imaging, and endoscopy findings. A positive result may lead to CT angiography, endoscopy, catheter angiography, surgery, or monitoring, depending on the location and severity of bleeding.

A negative result may lead to routine observation or another test if bleeding continues. It does not always require immediate further investigation if you are stable and the bleeding has

stopped.

Follow the discharge and follow-up instructions given by your care team. Seek urgent medical help if you develop heavy ongoing bleeding, fainting, severe weakness, chest pain, difficulty breathing, confusion, or signs of shock such as cold, clammy skin. Smaller amounts of bleeding without these symptoms still need timely medical advice, but are not always an emergency.

Common questions

Can I drink coffee before an RBC nuclear scan?

Usually yes, because fasting is not normally needed for the scan itself. Follow your centre's instructions if another procedure is being considered.

Does the time of day matter?

There is no standard best time. The chance of finding the source is higher when bleeding is active, so urgent scans may be performed whenever needed.

Can I exercise beforehand?

Ordinary activity does not usually affect the result. Avoid exercise if you feel weak, dizzy, or are actively bleeding, and follow any instructions from your care team.

Can I take my medicines?

Usually, but do not assume. Tell the team about every medicine and supplement, especially medicines that affect blood clotting. Do not stop prescribed medicine without specific advice.

Will I be radioactive afterward?

A small amount of radioactive material remains temporarily. Most people can resume normal activities, although the imaging centre may provide short-term precautions based on the dose and your circumstances.

Can the scan treat the bleeding?

No. It is an imaging test used to look for the source. Endoscopy, catheter angiography, medicines, or surgery may be used for treatment.

Sources

- Grady E, et al. SNMMI Procedure Standard/EANM Practice Guideline for Gastrointestinal Bleeding Scintigraphy 2.0 . Journal of Nuclear Medicine Technology . 2014;42(4):308-317.

- American College of Radiology. ACR Appropriateness Criteria: Radiologic Management of Lower Gastrointestinal Tract Bleeding .
- American College of Radiology and Radiological Society of North America. Gastrointestinal Bleeding Scan . RadiologyInfo.org.
- US National Library of Medicine. UltraTag RBC: technetium Tc 99m-labelled red blood cell preparation kit . DailyMed prescribing information.
- Oakland K, et al. Diagnosis and management of acute lower gastrointestinal bleeding: guidelines from the British Society of Gastroenterology . Gut . 2019;68(5):776-789.