TEST

MIBG scintiscan

An MIBG scintiscan uses a radioactive tracer to locate certain nerve-related tumors.

WHAT IT MEASURES
Uptake of radioactive MIBG by nerve-related cells

SAMPLE
None; nuclear medicine imaging

FASTING NEEDED?
Usually no; some centres require short fasting

HOW LONG IT TAKES
Two visits; imaging usually one to two hours

RESULTS IN
Usually several days; timing varies by imaging service

USED FOR
Locating, staging, and monitoring certain neuroendocrine tumors

MAIN LIMITATION
Some target tumors do not take up MIBG

Overview

An MIBG scintiscan is a nuclear medicine imaging test. It is also called an MIBG scan.

MIBG stands for metaiodobenzylguanidine. It is a substance that behaves somewhat like noradrenaline, a chemical used by certain nerve cells. For the scan, MIBG is attached to a small amount of radioactive iodine, usually iodine-123. This is called a radioactive tracer.

After the tracer is injected into a vein, it can collect in some tumors that develop from nerve-related cells. A gamma camera detects radiation from the tracer and creates pictures showing where it has collected.

MIBG scanning is most often used for neuroblastoma, a cancer mainly affecting children, and for some pheochromocytomas and paragangliomas. These are uncommon tumors that can produce stress hormones. Its availability and exact uses differ between hospitals and countries.

Why the test is ordered

An MIBG scan can help show whether a suspected or known tumor takes up MIBG. It may be used to:

In specialist centres, MIBG may also be used to assess the nerves controlling the heart. This is a different application and may involve different preparation and interpretation.

The scan usually adds functional information: it shows how tissue handles the tracer. CT or MRI provides more detailed pictures of body structures, so these tests are often used together.

- Find the main tumor and possible areas of spread
- Help determine the extent, or stage, of disease
- Check the response to treatment
- Look for disease that remains or has returned
- Assess whether MIBG-targeted radioactive treatment may be suitable

Who should have the test

You may be offered an MIBG scan if your healthcare team is investigating or managing a tumor known to arise from certain nerve or adrenal cells.

Not every person with a neuroendocrine tumor needs this scan. The best imaging test depends on the suspected tumor type, its location, previous imaging, treatment history, and whether it is expected to take up MIBG.

Tell the nuclear medicine department before the appointment if you are pregnant, could be pregnant, or are breastfeeding. Radiation can affect a developing baby, and radioactive iodine can enter breast milk. The team may postpone the scan, choose another test, or give specific breastfeeding instructions.

Children may need extra support to remain still. Sedation is occasionally considered, but it is not routinely required and needs separate planning.

How to prepare

The radioactive iodine in MIBG can collect in the thyroid gland. You will usually receive a medicine containing non-radioactive iodine or another thyroid-blocking medicine. This protects the thyroid by reducing its uptake of radioactive iodine.

The medicine may begin before the injection and continue afterward. Follow the schedule provided by your imaging department because products and timing differ. Tell the team about

thyroid disease or previous reactions to iodine-containing medicines.

Some medicines can interfere with MIBG uptake. These include certain antidepressants like sertraline or fluoxetine , stimulants like methylphenidate or lisdexamfetamine , decongestants, blood pressure medicines, and medicines that affect the sympathetic nervous system. Give the department a complete list of prescription medicines, over-the-counter products, supplements, and recreational drugs.

Do not stop any medicine on your own. The nuclear medicine team will tell you whether anything needs to be paused and when it can be restarted.

Fasting is not usually required for a tumor MIBG scan, although local instructions may differ. Drinking fluids before and after the injection helps remove unused tracer in your urine.

Wear comfortable clothing and leave metal items at home if possible. You may be asked to remove jewellery or clothing containing metal before imaging.

What happens during the test

At the first visit, a small cannula is placed into a vein, usually in your arm or hand. The MIBG tracer is injected slowly. You can normally leave soon afterward unless your centre needs to observe you.

Images are usually taken about 24 hours later. Some centres also take earlier or later images, including images at 48 hours.

During imaging, you lie on a narrow bed while a gamma camera moves close to your body. It does not touch you. The camera may take whole-body pictures, focused pictures, or both.

You may also have SPECT/CT. SPECT creates three-dimensional tracer images, while the CT part helps show the exact body structure involved. The scanner can feel close, but it is not the same as being fully enclosed in an MRI machine.

Imaging commonly lasts one to two hours. Remaining still is important because movement can blur the pictures.

Understanding your results

A specialist in nuclear medicine reviews where the tracer has collected. Some uptake is normal, including in the salivary glands, liver, heart, bowel, bladder, and sometimes the adrenal glands.

An area described as MIBG-avid has taken up more tracer than expected. This may support the

presence of a tumor that handles MIBG, but the finding must be matched with CT, MRI, other scans, laboratory tests, and your medical history.

A negative scan means no convincing abnormal MIBG uptake was seen. It does not always rule out a tumor. Some tumors do not take up MIBG, and very small areas may be below the scan's ability to detect them.

For neuroblastoma, the report may include a score describing how much of the skeleton shows uptake. Scoring systems and their interpretation differ by treatment programme.

There is no universal normal numerical range for this scan. Interpretation varies by imaging equipment, tracer timing, age, sex, pregnancy status, medicines, kidney function, tumor type, and clinical context.

What affects the results

Several factors can make the scan misleading even when the equipment and tracer are working correctly.

Medicines are an important cause. Some antidepressants, sympathomimetic medicines such as certain decongestants, stimulants, labetalol, and other drugs affecting noradrenaline transport can reduce or alter tracer uptake.

Tumor biology also matters. A tumor may lose the cell machinery needed to absorb MIBG, particularly after it changes over time. Dead or damaged tumor tissue may not take up tracer.

Other influences include:

Pregnancy changes whether the test is appropriate rather than simply changing a number. Age can affect normal tracer distribution and how images are interpreted, especially in children.

Recent exercise, iron deficiency, and blood transfusion generally do not directly alter MIBG uptake in the way they affect some blood tests.

- Very small tumors that the camera cannot separate from nearby tissue
- Movement during imaging
- Recent surgery, chemotherapy, radiotherapy, or MIBG treatment
- Reduced kidney function, which can slow tracer clearance
- Normal uptake close to a suspected abnormality
- Residual radioactivity from another recent nuclear medicine test

Accuracy and limitations

MIBG scanning is most useful when the tumor actively takes up MIBG. Its ability to find disease differs between tumor types, tumor locations, genetic subtypes, previous treatments, and imaging methods. For this reason, there is no single meaningful rate for how often it is correct.

The scan can miss small tumors or tumors with little MIBG uptake. This is a false-negative result: the scan looks negative even though disease is present.

It can also show uptake that is not cancer. Normal adrenal tissue, bowel activity, urine, inflammation, or another MIBG-absorbing growth may sometimes resemble disease. SPECT/CT and comparison with other scans help reduce these false-positive results.

CT or MRI is usually better for showing detailed anatomy. PET scans using tracers such as fluorodeoxyglucose or specialized neuroendocrine tracers may be better for tumors that do not absorb MIBG. The most suitable alternative depends on the tumor being investigated.

Risks and complications

The injection may cause a small bruise or brief discomfort. Some people feel faint during needle procedures.

The scan exposes you to a controlled amount of ionizing radiation. The expected medical benefit is weighed against this exposure, with particular care during pregnancy and childhood.

Allergic or blood pressure reactions to the tracer are uncommon, but staff are equipped to manage them. Seek immediate help for trouble breathing, facial or throat swelling, or severe dizziness after leaving the department.

Thyroid-blocking medicine can also cause side effects or reactions. Contact the imaging team promptly if you develop a concerning rash, swelling, or persistent vomiting.

You may receive short-term instructions about fluids, toilet hygiene, or close contact with pregnant people and young children. Follow the specific advice from your department because precautions depend on the tracer and dose used.

What happens next

A nuclear medicine specialist sends a report to the clinician who requested the test. Results are usually discussed alongside CT, MRI, laboratory results, symptoms, and previous treatment.

Routine follow-up may involve another appointment, additional imaging, or continued

monitoring. A result showing MIBG uptake does not by itself determine the diagnosis or treatment.

Contact the nuclear medicine department if you missed thyroid-protection medicine, vomited soon after taking it, or accidentally continued a medicine that you had been told to pause. These issues are usually handled through routine advice rather than emergency care.

Seek urgent medical help for severe breathing difficulty, collapse, or rapidly increasing swelling after the injection.

Common questions

Can I drink coffee before an MIBG scan?

Usually, yes. Most tumor MIBG scans do not require fasting or caffeine avoidance. Follow your appointment instructions because cardiac protocols or local practices may differ.

Does the time of day matter?

The exact clock time is less important than the interval between the tracer injection and imaging. Attend each visit at the scheduled time.

Can I exercise beforehand?

Normal activity usually does not affect the scan. Avoiding strenuous exercise may make it easier to remain comfortable and still during a long imaging session.

Can I take my regular medicines?

Many medicines can be continued, but some interfere with MIBG uptake. Send the department your medication list in advance and stop something only when specifically instructed.

Will I feel radioactive?

No. You cannot feel the radiation, and you do not become dangerous to people around you. You may need brief contact precautions to keep other people's exposure as low as reasonably possible.

Can I drive home afterward?

Most people can drive after the injection and imaging. If you receive sedation, you will need someone else to take you home and follow the sedation unit's restrictions.

Sources



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