TEST

Head MRI

A head MRI uses magnets and radio waves to create detailed brain images.

WHAT IT MEASURES
Detailed images of the brain, blood vessels, and nearby structures

SAMPLE
None

FASTING NEEDED?
Sometimes, for sedation or facility instructions

HOW LONG IT TAKES
20 to 60 minutes, longer with contrast or sedation

RESULTS IN
Often 1-3 days; varies by imaging facility and laboratory

USED FOR
Diagnosis and monitoring

MAIN LIMITATION
Movement and metal can blur or distort important details

Overview

A head MRI, also called a brain MRI, creates detailed pictures of the brain and nearby structures. MRI stands for magnetic resonance imaging. It uses a powerful magnet, radio waves, and a computer. It does not use the ionizing radiation found in X-rays and CT scans.

The images can show the brain tissue, fluid-filled spaces, pituitary gland, eyes, inner ears, and other structures, depending on the reason for the scan. Special MRI methods can examine blood vessels, nerve pathways, blood flow, or how certain areas of the brain are working.

Some scans use a contrast agent containing gadolinium. It is injected into a vein to make selected tissues and blood vessels easier to see. Not every head MRI needs contrast.

Why the test is ordered

A head MRI may be ordered to investigate symptoms, clarify a finding from another test, or monitor a known condition. Reasons can include:

The exact MRI protocol matters. For example, a pituitary MRI uses different images from a

scan focused on the inner ears. An MRI angiogram, or MRA, is designed to examine arteries. An MRI venogram, or MRV, examines veins.

- New or changing headaches with concerning clinical features
- Seizures, fainting, confusion, or changes in memory
- Weakness, numbness, problems with balance, or changes in vision or hearing
- A possible stroke, tumour, infection, inflammation, or bleeding
- Conditions affecting the pituitary gland, nerves, eyes, or inner ears
- Monitoring after surgery or treatment
- Checking a previously found abnormality for change

Who should have the test

A head MRI is generally used when your symptoms, examination, medical history, or earlier test results suggest that detailed imaging may help. It is not usually a general screening test for people without symptoms or a specific risk.

MRI may not be suitable with some implanted or attached devices. Examples include certain pacemakers, defibrillators, cochlear implants, medicine pumps, aneurysm clips, or metal fragments. Many modern implants are safe only under specific scanning conditions.

Having an implant does not automatically mean you cannot have MRI. The imaging team needs the exact manufacturer, model, and implantation details to check whether scanning is safe.

Tell the team if you may be pregnant, have kidney disease, previously reacted to MRI contrast, or have severe claustrophobia. These factors can change how the scan is planned.

How to prepare

Complete the MRI safety questionnaire carefully. Report previous operations, implants, metal injuries, and any work involving metal grinding or welding. If a metal fragment could be in your eye, an X-ray may be needed before MRI.

Bring implant cards or device information if you have them. Remove jewellery, piercings, hearing aids, hair accessories, removable dental items, watches, and clothing containing metal. Some cosmetics, medication patches, and tattoos may contain metallic material, so follow the facility's instructions.

You can usually eat, drink, and take your regular medicines before a head MRI. You may need

to stop eating for several hours if sedation is planned or if your facility has specific instructions.

If contrast may be used, you may need a recent kidney function blood test. Severe kidney impairment can affect which gadolinium contrast agent is appropriate.

Tell the imaging team in advance if enclosed spaces cause distress. They may offer practical support or discuss medicine to help you relax. If you receive a sedative, arrange for someone to take you home and follow the instructions about driving and other activities.

What happens during the test

You will change into suitable clothing if needed and lie on a narrow padded table. A frame-like device called a head coil is placed around your head. It receives the signals used to make the images but does not produce radiation.

The table moves into the MRI scanner, which is shaped like a tunnel. The scanner makes loud tapping, knocking, or humming sounds. You will receive ear protection and can communicate with the radiographer throughout the scan.

You need to keep your head still while each set of images is taken. Some sets last several minutes. You can breathe normally unless told otherwise.

If contrast is required, a small plastic tube is placed in a vein, usually in your arm or hand. Images may be taken before and after the injection. The scan commonly takes 20 to 60 minutes, although specialised imaging or sedation can make the appointment longer.

Understanding your results

A radiologist, a doctor trained to interpret medical images, reviews the scan and writes a report. The report describes what was seen and how it relates to the reason for the MRI.

There is no universal "normal range" for a head MRI. Interpretation varies with age, sex, pregnancy status, medicines, previous treatment, symptoms, medical history, the scanner and protocol used, and the clinical context.

A report may describe a finding as incidental. This means it was discovered unexpectedly and may not explain your symptoms. Small white-matter spots, cysts, or anatomical differences can have several possible meanings. Their importance depends on their number, location, appearance, and your health history.

A normal MRI can be reassuring, but it cannot rule out every cause of neurological symptoms. Some problems are too small, too early, intermittent, chemical rather than structural, or

outside the area examined.

What affects the results

Movement is one of the main causes of unclear head MRI images. Even small movements from discomfort, coughing, tremor, or difficulty staying still can blur detail. The team may repeat part of the scan if this happens.

Metal can create an artefact, meaning a false or distorted area on the image. Dental work, surgical clips, implants, or metal fragments may hide nearby tissue even when the item itself is safe in the scanner.

The chosen MRI protocol also matters. A routine brain MRI may not include the thin image slices or special sequences needed to assess the pituitary gland, inner ears, veins, or a specific cranial nerve. Contrast can reveal findings that are less visible without it, but it is not helpful for every question.

Recent surgery, radiation therapy, or other treatment can cause inflammation and tissue changes that resemble active disease. Comparing the scan with earlier images often improves interpretation.

Age-related changes, migraine, blood-vessel risk factors, and previous minor injuries can produce findings that are real but may not explain current symptoms. Kidney function mainly affects whether and how gadolinium contrast is used rather than the quality of a non-contrast MRI.

Most foods, coffee, routine medicines, and recent exercise do not alter a standard structural head MRI. Pregnancy does not usually make the images inaccurate, but it affects decisions about contrast and whether the timing of a non-urgent scan is appropriate. A recent blood transfusion generally does not affect the result.

Accuracy and limitations

MRI gives excellent detail of soft tissues and can detect many abnormalities that are difficult to see on CT. However, its accuracy depends on what is being looked for, the MRI technique, image quality, and the stage of the condition.

A small, early, or subtle abnormality may be missed. Movement or metal distortion can also hide a finding. On the other hand, MRI can identify harmless or nonspecific changes that look abnormal but are not the cause of your symptoms. Follow-up imaging or another test may be needed to tell the difference.

MRI cannot always determine exactly what a mass or abnormal area represents. Blood tests, spinal fluid testing, electrical tests, repeat imaging, or a biopsy may sometimes provide the answer.

CT is often faster and may be preferred for an immediate assessment after serious head injury or when rapid evaluation for bleeding is needed. Blood-vessel imaging, PET scanning, ultrasound, or dedicated eye and ear tests may be better for particular questions.

Risks and complications

MRI itself does not use ionizing radiation. The strong magnetic field can move unsafe metal objects or interfere with certain devices, which is why screening before the scan is essential. Hearing protection reduces exposure to scanner noise.

Some people feel anxious or confined. You can speak to the radiographer, and the scan can be paused if necessary.

An IV can cause brief discomfort, bruising, or light-headedness. Reactions to gadolinium contrast are uncommon but can occur. A rare serious condition called nephrogenic systemic fibrosis has been linked mainly to certain gadolinium agents in people with severe kidney dysfunction.

Small amounts of gadolinium can remain in the body after contrast MRI. Health authorities have not established harmful effects from retention in people with normal kidney function, but contrast should be used only when it is expected to add useful information.

Sedation has separate risks, including slowed breathing and impaired coordination. The team will explain these if sedation is being considered.

What happens next

Your referring clinician will review the report alongside your symptoms, examination, and other test results. Routine next steps may include reassurance, a follow-up appointment, comparison with older scans, another type of test, or a repeat MRI after a set interval.

An unexpected finding does not automatically mean something serious. Some findings only need observation, while others require more focused imaging or specialist review.

Do not wait for a routine MRI result if you develop sudden facial drooping, new one-sided weakness, severe difficulty speaking, a seizure lasting several minutes, loss of consciousness, or a sudden severe headache unlike your usual headaches. Seek emergency medical help. MRI

reporting systems are not designed to replace urgent assessment of new symptoms.

Common questions

Can I drink coffee before a head MRI?

Usually, yes. Coffee does not change a standard structural head MRI. Follow different instructions if you are having sedation or a specialised scan that restricts caffeine.

Does the time of day matter?

Usually not. Choose a time when you are most likely to remain comfortable and still. Timing may matter for sedation, certain research scans, or appointments linked to other tests.

Can I exercise beforehand?

Normal exercise usually does not affect a routine head MRI. Avoid arriving overheated or uncomfortable if that could make it difficult to lie still.

Can I wear makeup?

Some cosmetics contain metallic particles that can affect images or cause warming. You may be asked to remove eye makeup, false eyelashes, or hair products before the scan.

Can I drive home afterward?

You can usually drive after an MRI without sedation. Do not drive if you received a sedative; arrange transport and follow the facility's instructions.

Will my whole body be inside the scanner?

Your head and much of your upper body will usually be inside the scanner. Tell the team beforehand if you are worried about enclosed spaces so they can discuss available options.

Sources

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- National Health Service. MRI scan

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