TEST

Head CT scan

A head CT scan uses X-rays to create detailed pictures of the brain, skull, and nearby tissues.

WHAT IT MEASURES
X-ray pictures of the brain, skull, and nearby tissues

SAMPLE
None

FASTING NEEDED?
Sometimes, if contrast or sedation is planned

HOW LONG IT TAKES
Usually 10 to 20 minutes

RESULTS IN
Often within hours; timing varies by imaging service

USED FOR
Diagnosis and monitoring

MAIN LIMITATION
MRI shows some brain abnormalities more clearly

Overview

A head CT scan, also called a computed tomography scan, uses X-rays and computer processing to create cross-sectional pictures of your head. These pictures can show the brain, skull, blood, fluid spaces, sinuses, and some blood vessels.

CT is fast, widely available, and particularly useful in emergencies. It can help find bleeding, skull fractures, swelling, or pressure on the brain.

Some scans use an injection of iodine-based contrast dye. Contrast makes blood vessels and certain tissues easier to see. Many urgent head CT scans, including initial scans for suspected bleeding or head injury, are done without contrast.

A head CT does not answer every question about the brain. MRI uses a different technology and can show some small or subtle abnormalities more clearly.

Why the test is ordered

A head CT may be ordered to look for a physical cause of symptoms or to assess an injury. Reasons include:

The reason for the scan affects whether contrast is used and whether another test, such as CT angiography or MRI, is needed.

- A significant head injury
- Sudden weakness, speech difficulty, or other possible stroke symptoms
- A sudden, severe headache
- New confusion, reduced alertness, or loss of consciousness
- A first seizure or an important change in seizures
- Possible bleeding, swelling, infection, or a brain mass
- A suspected skull fracture
- Monitoring after surgery or a previously identified abnormality

Who should have the test

A head CT is appropriate when the information it may provide is likely to affect your care. Not everyone with a headache, minor bump to the head, dizziness, or long-standing symptoms needs one.

For a head injury, the decision may be based on your symptoms, examination, age, medicines, and how the injury happened. Blood-thinning medicines can increase concern about bleeding after an injury.

Children are assessed carefully because they are more sensitive to radiation. When CT is needed, the imaging team can adjust the radiation amount for the child's size.

Tell the healthcare team if you could be pregnant. A necessary head CT can still be performed during pregnancy because the uterus is outside the scanned area, but the team should consider the benefits and radiation exposure.

How to prepare

A head CT without contrast usually needs no special preparation. You can normally eat, drink, and take your usual medicines.

Instructions may differ if contrast or sedation is planned. You may be asked not to eat for a

period beforehand, particularly if sedation will be used. Follow the instructions from your imaging service rather than fasting automatically.

Before a contrast scan, tell the team if you have:

Do not stop prescribed medicines unless the team responsible for the scan tells you to. Remove hair clips, hearing aids, dentures, glasses, or other metal objects when asked because they can interfere with the pictures.

- Had a previous reaction to CT contrast
- Kidney disease or a recent change in kidney function
- Diabetes, especially if you take metformin
- Asthma or significant allergies
- Possible pregnancy

What happens during the test

You lie on a narrow table, usually on your back. Your head may be supported with cushions or a soft strap to help you remain still.

The table moves through a short, ring-shaped scanner. A CT scanner is not a long enclosed tunnel. The technologist can see and speak with you throughout the scan.

You may hear humming or clicking. You need to keep still and may briefly be asked not to swallow. The scan itself often takes only a few minutes, although positioning and preparation make the appointment longer.

If contrast is needed, a small intravenous line is placed into a vein. The injection may cause temporary warmth, flushing, or a metallic taste. These sensations usually pass quickly.

Young children or people who cannot remain still may need sedation. This requires extra preparation, monitoring, and recovery time.

Understanding your results

A radiologist, a doctor trained to interpret medical images, reviews the pictures and writes a report. The report is sent to the healthcare professional who requested the scan.

A report may describe bleeding, swelling, a skull fracture, enlarged fluid spaces, pressure on the brain, or an abnormal area that needs further assessment. It may also mention sinus disease, age-related changes, or an old injury that is unrelated to the current problem.

There is no single normal range for a head CT. Interpretation varies with age, symptoms, medical history, medicines, pregnancy status, previous imaging, and the type of scan performed.

A result described as normal means the CT did not show a significant visible abnormality. It does not exclude every possible cause of symptoms. Some conditions are too early, small, or subtle to appear clearly on CT.

What affects the results

Several factors can make a scan harder to interpret without anything being wrong with the scanner:

Kidney function does not change a non-contrast CT image. It can affect whether iodine-based contrast is advisable. Pregnancy also does not usually alter the image, but it affects how the need for radiation is considered.

Medicines rarely change the appearance of a head CT directly. However, blood thinners like warfarin or apixaban affect the clinical concern about bleeding, and sedating medicines may help reduce movement.

- Movement: Even small movements can blur the images
- Metal: Dental work, jewellery, or implanted devices can create streaks
- Scan timing: Very early stroke changes may not yet be visible
- Contrast timing: Poorly timed contrast can limit blood-vessel assessment
- Previous surgery or injury: Scar tissue and old changes may resemble current disease
- Body positioning: An unusual angle can make structures harder to compare

Accuracy and limitations

Head CT is very good at finding many types of recent bleeding, major swelling, and skull fractures. However, no scan finds every abnormality.

An early ischemic stroke, caused by a blocked blood vessel, may not be visible on the first non-contrast CT. Small abnormalities, inflammation, and problems near the base of the skull can also be missed. MRI may be the better test for these concerns.

A CT can sometimes suggest a problem that is not actually new or harmful. Movement, metal streaks, normal variations, calcification, and old injuries can resemble disease. Comparing the

scan with earlier images can reduce this uncertainty.

A standard head CT does not fully assess all blood vessels. CT angiography uses contrast to examine arteries, while CT venography examines veins. MRI, ultrasound, a lumbar puncture, or other tests may be more suitable depending on the question.

Because accuracy changes with the condition, timing, scan method, and patient group, there is no single reliable percentage for how often head CT misses or falsely identifies a problem.

Risks and complications

A head CT uses ionizing radiation. The exposure is limited to the area being scanned, but radiation can slightly increase lifetime cancer risk. This matters most with repeated scans and in children, so imaging teams use the lowest amount that provides useful pictures.

A scan without contrast does not require an injection. If contrast is used, the intravenous line may cause brief discomfort or bruising.

Iodine-based contrast can cause an allergic-like reaction. Most reactions are mild, but serious reactions can occur and imaging departments are equipped to manage them. Contrast can also leak into tissue around the vein, causing pain and swelling.

The risk of kidney injury from modern intravenous contrast is mainly a concern for people with acute kidney injury or severely reduced kidney function. The team may review recent kidney blood tests before giving contrast.

What happens next

Urgent scans are often reviewed quickly, sometimes before the formal report is completed. Routine results may take longer, depending on the imaging service and why the scan was requested.

The next step may be no further imaging, observation, treatment, comparison with an older scan, or another test such as MRI or CT angiography. An unexpected finding may need routine follow-up even if it is unrelated to your symptoms.

If you are sent home after a head injury, follow the discharge instructions you were given. Seek emergency help for worsening drowsiness, repeated vomiting, a seizure, new weakness, trouble speaking, severe worsening headache, unequal pupils, or loss of consciousness.

For non-urgent questions about the report or planned follow-up, contact the healthcare service that requested the scan.

Common questions

Can I drink coffee before a head CT?

Usually, yes, if the scan is without contrast or sedation. If you were given fasting instructions, coffee may not be allowed, especially with milk. Follow the instructions from your imaging service.

Does the time of day matter?

Usually not. In an emergency, the scan should be done when needed. Scheduled contrast or sedation appointments may have specific timing instructions.

Can I exercise beforehand?

Normal activity does not usually affect a head CT. Avoid exercise if it worsens your symptoms or if you have been told to rest after a head injury.

Will I need contrast dye?

Not always. Many scans for acute head injury or suspected bleeding begin without contrast. Contrast may be used to assess blood vessels, infection, inflammation, or certain masses.

Can I drive home afterward?

You can usually drive after a standard head CT. Do not drive if you received sedation or if your symptoms make driving unsafe.

Can I breastfeed after CT contrast?

Professional guidance generally does not require breastfeeding to be interrupted after iodine-based CT contrast. Tell the imaging team that you are breastfeeding if you have concerns.

Sources

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- American College of Radiology. Appropriateness Criteria: Cerebrovascular Diseases-Stroke and Stroke-Related Conditions