Head CT

Computed tomography (CT) of the head uses special x-ray equipment to help assess head injuries, severe headaches, dizziness, and other symptoms of aneurysm, bleeding, stroke, and brain tumors. It also helps your doctor to evaluate your face, sinuses, and skull or to plan radiation therapy for brain cancer. In emergency cases, it can reveal internal injuries and bleeding quickly enough to help save lives.

Tell your doctor if there's a possibility you are pregnant. Discuss any recent illnesses, medical conditions, medications you're taking, and allergies. If your exam needs intravenous contrast, your doctor may tell you not to eat or drink anything for a few hours beforehand. If you have a known allergy to contrast material, your doctor may prescribe medications to reduce the risk of an allergic reaction. Leave jewelry at home and wear loose, comfortable clothing. You may need to change into a gown for the procedure.

What is a head CT?

Computed tomography, more commonly known as a CT or CAT scan, is a diagnostic medical imaging test. Like traditional x-rays, it produces multiple images or pictures of the inside of the body.

A CT scan generates images that can be reformatted in multiple planes. It can even generate three-dimensional images. Your doctor can review these images on a computer monitor, print them on film or via a 3D printer, or transfer them to a CD or DVD.

CT images of internal organs, bones, soft tissue, and blood vessels provide greater detail than traditional x-rays. This is especially true for soft tissues and blood vessels.

CT scanning provides more detailed information on head injuries, stroke (https://www.radiologyinfo.org/en/info/stroke) , brain tumors, and other brain diseases than regular x-rays.

What are some common uses of the procedure?

Doctors typically use head CT to detect:

- bleeding, brain injury and skull fractures in patients with head injuries.
- bleeding caused by a ruptured or leaking aneurysm (http://www.radiologyinfo.org) in a patient with a sudden severe headache.
- a blood clot (https://www.radiologyinfo.org/en/info/bloodclot) or bleeding within the brain in a patient with symptoms of a stroke.
- a stroke, especially with a technique called CT perfusion of the head (https://www.radiologyinfo.org/en/info/perfusionheadct) .
- brain tumors (https://www.radiologyinfo.org/en/info/braintumor) .
- enlarged brain cavities (ventricles) in patients with hydrocephalus (http://www.radiologyinfo.org) .
- diseases or malformations of the skull.

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Doctors also perform head CT to:

- evaluate the extent of bone and soft tissue damage in patients with facial trauma, and plan surgical reconstruction.
- diagnose diseases of the temporal bone on the side of the skull, which may be causing hearing problems.
- determine whether inflammation or other changes are present in the paranasal (http://www.radiologyinfo.org) sinuses.
- plan radiation therapy (http://www.radiologyinfo.org) for cancer of the brain or other tissues.
- guide the passage of a needle used to obtain a tissue sample (biopsy (http://www.radiologyinfo.org)) from the brain.
- assess aneurysms, arteriovenous malformations (http://www.radiologyinfo.org) , and blood vessels through a technique called CT angiography. *For more information, see the CT Angiography (https://www.radiologyinfo.org/en/info/angioct) page.*

Who interprets the results and how do I get them?

A radiologist (https://www.radiologyinfo.org/en/info/article-your-radiologist) , a doctor specially trained to supervise and interpret radiology exams, will analyze the images. The radiologist will send an official report to the doctor who ordered the exam.

You may need a follow-up exam. If so, your doctor will explain why. Sometimes a follow-up exam further evaluates a potential issue with more views or a special imaging technique. It may also see if there has been any change in an issue over time. Follow-up exams are often the best way to see if treatment is working or if a problem needs attention.

What are the benefits vs. risks?

Benefits

- CT scanning is painless, noninvasive, and accurate.
- A major advantage of CT is its ability to image bone, soft tissue, and blood vessels all at the same time.
- Unlike conventional x-rays, CT scanning provides very detailed images of many types of tissue as well as the lungs, bones, and blood vessels.
- CT exams are fast and simple. In emergency cases, they can reveal internal injuries and bleeding quickly enough to help save lives.
- CT has been shown to be a cost-effective imaging tool for a wide range of clinical problems.
- CT is less sensitive to patient movement than MRI.
- Unlike MRI, an implanted medical device of any kind will not prevent you from having a CT scan.
- A diagnosis determined by CT scanning may eliminate the need for exploratory surgery and surgical biopsy.
- No radiation remains in a patient's body after a CT exam.
- The x-rays used for CT scanning should have no immediate side effects.

Risks

- There is always a slight chance of cancer from excessive exposure to radiation. However, the benefit of an accurate diagnosis far outweighs the risk involved with CT scanning.
- The radiation dose for this procedure varies. *See the Radiation Dose (https://www.radiologyinfo.org/en/info/safety-xray) page for more information.*
- Women should always tell their doctor and x-ray or CT technologist if there is any chance they are pregnant. *See the (https://www.radiologyinfo.org/en/info/safety-radiation) Radiation Safety (https://www.radiologyinfo.org/en/info/safety-radiation) page for more information about pregnancy and x-rays.*
- CT scanning is, in general, not recommended for pregnant women unless medically necessary because of potential risk to the baby. This risk is, however, minimal with head CT scanning.

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- IV contrast manufacturers indicate mothers should not breastfeed their babies for 24-48 hours after contrast material is given. However, the most recent American College of Radiology (ACR) Manual on Contrast Media reports that studies show the amount of contrast absorbed by the infant during breastfeeding is extremely low. *For further information please consult the ACR Manual on Contrast Media (https://www.acr.org/Clinical-Resources/Contrast-Manual) and its references.*
- The risk of serious allergic reaction to contrast materials that contain iodine is extremely rare, and radiology departments are well-equipped to deal with them.
- Because children are more sensitive to radiation, they should have a CT exam only if it is essential for making a diagnosis. They should not have repeated CT exams unless necessary. CT scans in children should always be done with low-dose technique.

What are the limitations of a head CT scan?

A person who is very large may not fit into the opening of a conventional CT scanner. Or, they may be over the weight limit—usually 450 pounds—for the moving table.

Compared to MR (http://www.radiologyinfo.org) imaging, the precise details of soft tissue (particularly the brain, including the disease processes) are less visible on CT scans (http://www.radiologyinfo.org) . CT is not sensitive in detecting inflammation of the meninges (http://www.radiologyinfo.org) —the membranes covering the brain.

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