CT Perfusion Imaging of the Head



Computed tomography (CT) perfusion of the head uses special x-ray equipment to show which areas of the brain are adequately supplied with blood (perfused) and provides detailed information about blood flow to the brain. CT perfusion is fast, painless, noninvasive and accurate. It's a useful technique for measuring blood flow to the brain, which may be important for treating stroke, brain blood vessel disease and brain tumors.

Tell your doctor if there's a possibility you are pregnant and discuss any recent illnesses, medical conditions, medications you're taking, and allergies. You will be instructed 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. These medications must be taken 12 hours prior to your exam. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.

What is CT Perfusion of the Head?

Computed tomography (CT) (http://www.radiologyinfo.org) perfusion imaging shows which areas of the brain are adequately supplied or perfused with blood and provides detailed information on delivery of blood or blood flow to the brain.

CT perfusion scanning is a noninvasive medical test that helps physicians diagnose and treat medical conditions.

CT scanning combines special x-ray equipment with sophisticated computers to produce multiple images or pictures of the inside of the body. These cross-sectional images of the area being studied can then be examined on a computer monitor, printed or transferred to a CD.

CT scans of internal organs, bones, soft tissue and blood vessels provide greater clarity and reveal more details than regular x-ray exams.

What are some common uses of the procedure?

CT perfusion is typically used to:

- evaluate acute stroke (http://www.radiologyinfo.org) .
- assist with selecting patients for thrombolytic therapy (http://www.radiologyinfo.org) following a stroke by identifying brain tissue at risk of infarction (http://www.radiologyinfo.org) or permanent injury by lack of an adequate blood supply.
- evaluate vasospasm (http://www.radiologyinfo.org) , a sudden blood vessel constriction that may arise from a subarachnoid hemorrhage (http://www.radiologyinfo.org) , in which bleeding occurs in the space between the two membranes surrounding the brain, known as the dura mater and arachnoid membrane.
- assess patients who are candidates for surgical or neuroendovascular treatments (http://www.radiologyinfo.org) . The technique employs special catheters (long, thin tubes), some containing special instruments, that can be manipulated into the area of vessel blockage to dissolve or dislodge a blood clot.
- diagnose and assess treatment response in patients with a variety of brain tumors.

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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.

What are the benefits vs. risks?

Benefits

- CT perfusion is a useful technique for measuring perfusion in the brain. Measuring perfusion may be important for treating stroke, other blood vessel diseases of the brain and brain tumors.
- 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 can be performed if you have an implanted medical device of any kind.
- 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 effective radiation dose for this procedure varies. *See the Radiation Dose (https://www.radiologyinfo.org/en/info/safety-xray) page for more information.*
- Every effort is made to use the lowest radiation dose possible, while not sacrificing the quality of the CT images necessary to effectively diagnose a disease process. Nearly all CT scanners now have special computer programs that help to increase image quality at lower radiation doses.
- Women should always tell their doctor and x-ray or CT technologist if there is any chance they are pregnant. *See the 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, as the x-ray beam is confined to the head, far away from the abdominal cavity where the baby lies.
- Nursing mothers should wait for 24 hours after contrast material injection before resuming breastfeeding.
- The risk of serious allergic reaction to contrast materials that contain iodine is extremely rare. Radiology departments are well-equipped to deal with any allergic reaction.

What are the limitations of CT Perfusion of the Head?

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.

External or implanted metallic objects of the head, such as earrings, aneurysm coils, surgical clips and other materials may cause

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image artifacts (inaccurate image information created by errors of CT image reconstruction). These image artifacts can degrade the quality of CT perfusion imaging.

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