

CT scan

Introduction

A computerised tomography (CT) scan uses X-rays and a computer to create detailed images of the inside of the body.

CT scans are also sometimes known as CAT scans, which stands for computerised axial tomography.

During a CT scan, you'll usually lie on your back on a flat bed. The CT scanner consists of an X-ray tube that rotates around your body. You'll usually be moved continuously through this rotating beam.

The X-rays will be received by a detector on the opposite side of your body and an image of the scan will be produced by a computer.

Unlike an MRI scan, where you're placed inside a tunnel, you shouldn't feel claustrophobic.

The images produced by a CT scan are called tomograms and are more detailed than standard X-rays. A CT scan can produce images of structures inside the body, including the internal organs, blood vessels, bones and tumours.

The scan is painless and will usually take between five and 10 minutes depending on the part of your body being scanned.

When CT scans are used

CT scans can be used to diagnose and monitor a variety of different health conditions, including brain tumours, certain bone conditions, and injuries to internal organs such as the kidneys, liver or spleen. They're also now being used to look at the heart.

They're also often used to look inside the body before another procedure takes place, such as radiotherapy treatment or a biopsy (where a small sample of tissue is taken so that it can be examined under a microscope).

Your results

CT scans are usually carried out on an outpatient basis, which means you'll be able to go home on the same day as the procedure.

Your scan results won't be available immediately. A computer will need to process the information from your scan, which will then be analysed by a radiologist (a specialist in interpreting images of the body).

After analysing the images, the radiologist will write a report and send it to your doctor. This usually takes a few weeks.

Safety

CT scans are only used when the doctor responsible for your care decides there's a clear medical benefit.

Although CT scans are generally safe, they do expose you to slightly more radiation than other types of imaging tests. The amount of radiation you're exposed to can vary depending on the type of scan you have.

In most cases, the benefits outweigh any potential risks because a CT scan can provide your doctor with much clearer images than those produced by a normal X-ray.

However, CT scans aren't routinely recommended for pregnant women because there's a risk that the X-rays could harm the unborn baby.

Children are also more at risk of developing a build-up of radiation than adults. A CT scan will therefore only be recommended if a child has a serious condition that puts them at greater risk.

When CT scans are used

Computerised tomography (CT) scans provide information that doctors can use to help diagnose medical conditions.

CT scan results can confirm or rule out a suspected diagnosis. They can also sometimes help identify conditions that were not suspected.

Unlike other imaging techniques, such as X-rays, CT scans can provide detailed images of many types of tissue, including bone, lung tissue, soft tissue and blood vessels.

Types of CT scan that can be used to investigate particular areas of the body include:

head scans – these can be used to check for suspected brain tumours and bleeding or swelling of the arteries; they can also be used to investigate the brain after a stroke

abdominal scans – these can be used to detect tumours and diagnose conditions that cause internal organs, such as the liver, kidneys, pancreas, intestines or lungs, to become enlarged or inflamed

vascular scans – these can be used to assess conditions that affect the blood flow to different parts of the body

bone scans – these can be used to assess bone injuries and disease, particularly in the spine

CT scans are often used after serious accidents to look for internal injuries, such as tears in the spleen, kidneys or liver.

They're also sometimes used to prepare for further tests and treatments. For example, as CT scans can identify both normal and abnormal tissue, they can be useful when planning radiotherapy treatment.

CT scanning can also act as a guide during a needle biopsy (where a sample of tissue is taken so it can be examined more closely).

CT scan screening

In recent years there have been concerns that in some cases CT scans have been used unnecessarily. Some private medical companies offer CT screening as a way of detecting conditions in people who don't have any symptoms or significant risk factors for a disease. This type of screening can be expensive and put you at unnecessary risk.

CT scans shouldn't be used to give you peace of mind if you don't have any symptoms. A scan may be recommended if you have symptoms caused by an

injury or illness that needs to be investigated. However, you should only have a CT scan following a medical referral.

How CT scans are performed

Before having a computerised tomography (CT) scan, you'll be asked about any existing health conditions, whether you are taking any medication, and if you have any allergies.

This is to make sure that there's no risk of an adverse reaction during the scan.

Women of childbearing age will also be asked if they're pregnant. CT scans aren't recommended for pregnant women unless there's an urgent medical reason, as there's a small chance that the X-rays could harm the unborn child.

Tell the radiographer if you feel anxious or claustrophobic about having a CT scan. A radiographer is a healthcare professional trained to carry out X-rays and other types of scans. They'll be able to give you advice to help you feel calm and, if necessary, arrange for you to have a sedative (medication to help you relax).

The scan

Before the scan, you may be asked to remove your clothing and put on a gown. You'll also be asked to remove any jewellery, as metal interferes with the scanning equipment. If you're having a head scan, you may also be asked to remove dentures, hair clips and hearing aids.

The CT scanner is a large circular machine. You'll be asked to lie on your back on a motorised bed that can be moved in and out of the scanner. The radiographer will position the bed so that the part of your body being investigated is lined up with the scanner.

The radiographer will operate the scanner from an adjoining room. While the scan is taking place, you'll be able to hear and speak to them through an intercom.

While each scan is being taken, you'll need to lie very still and breathe normally. This ensures that the scan images aren't blurred. You may be asked to breathe in, breathe out, or hold your breath at certain points.

The X-ray unit inside the ring will rotate around you. Each time it goes round it creates a new X-ray scan. The bed will move forward slightly after each scan is completed.

Depending on the area of your body being investigated, a CT scan may last up to 10 minutes. You should be able to go home soon after the scan has been completed.

Contrast medium

For some CT scans, such as those investigating the brain or abdomen, you may be given contrast medium beforehand. This is a liquid that contains a dye that shows up clearly on the images of certain tissues or blood vessels. It helps distinguish blood vessels from other structures in your body.

Contrast medium can be given in different ways, depending on the part of your body being scanned. It can be swallowed in the form of a drink, given as an enema in your back passage, or can be injected into your bloodstream (intravenously).

If your kidney function is poor, contrast medium isn't usually given intravenously as it can depress kidney function further.

In rare cases, contrast medium can cause an allergic reaction. Tell the radiologist if you have had an allergic reaction to iodine or contrast medium in the past, or if you have any other allergies.

Contrast medium is harmless and will pass out of your body in your urine.

Your results

The results of your CT scan won't be available immediately. A computer will be used to process all the information, which will then be analysed by a radiologist (a doctor who specialises in interpreting images of the body).

The radiologist will write a report and send it to your doctor. Before leaving hospital, check when you should expect your results.

Risks of a CT scan

If you have a computerised tomography (CT) scan, you'll be exposed to radiation in the form of X-rays. The amount of radiation used can vary.

Radiation is measured in units called millisieverts (mSv). Different types of CT scan use different amounts of radiation:

CT scan of the head – 1.4 mSv, which corresponds to seven-and-a-half months' worth of background radiation

CT scan of the chest – 6.6 mSv, or three years' worth of background radiation

CT scan of the whole body – 10 mSv, which corresponds to four-and-a-half years' worth of background radiation

Benefits versus risks

The benefits of having a CT scan to help diagnose a medical condition, or to check the symptoms of an existing condition, will usually greatly outweigh any potential risk. CT scans are quick and accurate, and often eliminate the need for invasive surgery.

However, if you don't have any symptoms, the benefits of having a CT scan may not outweigh the risks, particularly if it leads to further unnecessary testing and added anxiety.

The benefits and risks should therefore always be weighed up before deciding to have a CT scan. It's recommended that you only have one following a medical referral.

Pregnant women and children

CT scans aren't usually recommended for pregnant women because there's a small risk that the X-rays may harm the unborn child. Before having a scan, tell your doctor if there's a chance you may be pregnant.

Children are at greater risk from a build-up of radiation than adults. They should only have a CT scan if it's justified by a serious condition that risks their health.