

COMPUTED TOMOGRAPHY (CT SCAN)

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WHAT IS A CT SCAN?

CT scan stands for Computed Tomography. It is derived from the Greek words - *tomos* meaning "slice", and *graphein* meaning "write". It was formerly referred to as computerized axial tomography (CAT) scan. CT scan is an X-ray procedure that combines many X-ray images with the aid of a computer to generate cross-sectional views and 3-D images of the internal organs and structures of the body. The first commercial CT scanner was invented by Sir Godfrey Hounsfield in United Kingdom in 1971.

HOW DOES A CT SCAN WORK?

A CT SCANNER EMITS A SERIES OF NARROW X-RAY BEAMS THROUGH THE HUMAN BODY AS IT MOVES THROUGH AN ARC, UNLIKE AN X-RAY MACHINE WHICH SENDS JUST ONE RADIATION BEAM. THE FINAL PICTURE IS FAR MORE DETAILED THAN AN X-RAY ONE.

WHAT IS THE ROLE OF A CT SCAN? WHEN IS IT PERFORMED?

CT scan is one of the major radiological modality for diagnosing a wide range of diseases affecting from head to toe. It helps in diagnosing diseases of brain, lungs, heart, abdominal organs (liver, spleen, pancreas, kidneys) and bones for e.g. Brain haemorrhage, brain tumours, stroke, TB infection and cancer in lungs, stones in kidneys, intestinal cancer, appendicitis, sinusitis etc. It is very useful in road traffic accident cases for diagnosing brain injuries and bony fractures.

TYPES OF CT STUDY

1. Plain study (also called Non-contrast study)
2. Contrast study (intravenous contrast is given)

HOW DOES A PATIENT PREPARE FOR CT SCANNING?

The patient will be asked to undress and is provided with a gown to wear for the scan. In preparation for a scan, patients are often asked to avoid food, especially when contrast material is to be used. Contrast material may be injected through vein (intravenous) and/ or given by mouth in order to increase the distinction between various organs or areas of the body. Therefore, food may be restricted for several hours prior to the examination.

A blood examination for checking creatinine level is mandatory before any intravenous (i.v) contrast study. I.V Contrast CT study is generally avoided in patients with creatinine higher than normal range.

If the patient has a history of allergy to contrast material, the radiologist and the radiology technician should be notified. All metallic materials and certain clothing around the body are removed because they can interfere with the clarity of the images.

HOW IS IT PERFORMED?

Patients are placed on a movable table, and the table is slipped into the centre of a large donut-shaped machine which takes the X-ray images around the body. The actual scanning time takes just a few seconds in latest CT machines of 64 or 128 slices. CT machines with higher number of slices produce better image quality and takes lesser time. It is important during the CT scan procedure that the patient minimizes any body movement by remaining as still as possible to increase the clarity of the images. The CT scan technician tells the patient when to breathe or hold his/her breath during scans of the chest and abdomen.

WHO ANALYSES THE IMAGE?

A radiologist (doctor specialised in radio-diagnosis) will analyse the images and give his/her report.

ARE THERE RISKS IN OBTAINING A CT SCAN?

CT scan is a very low-risk procedure. Few risks that are associated with CT scan are:

1. ALLERGIC REACTION TO CONTRAST AGENT - The most common problem is an adverse reaction to intravenous contrast material which is an iodine-based liquid given in the vein, which makes many organs and abnormalities more visible on the CT scan. There may be resulting itching, a rash or a feeling of warmth throughout the body. These reactions usually go away rather quickly. If needed, medicines can be given to help relieve the symptoms.

A more serious allergic reaction to intravenous contrast is called an anaphylactic reaction. When this occurs, the patient may experience extreme difficulty in breathing. This reaction is quite rare but can be serious. Medications can reverse this adverse reaction if given timely.

2. RADIATION EXPOSURE –Though the amount of radiation a person receives during a CT scan is significantly higher than x-ray, still the radiation exposure is quite low to produce any adverse effects in a single scan. However, it is always advisable to keep all radiation exposure to a minimum and undergo CT scan only if indicated. If a woman is pregnant, there is a potential risk to the foetus, especially in the first trimester of the pregnancy, hence should be avoided.

PLAIN CT SCAN SHOULD BE AVOIDED IN –

Pregnancy - any woman who suspects she may be pregnant should tell her doctor before-hand because of the risk of radiation.

INTRAVENOUS CONTRAST INJECTION SHOULD BE AVOIDED IN –

1. **People with history of allergic reaction** to specific medicine/ iodine and patients with severe asthma.
2. **Kidney failure patients.**

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