Computed Tomography

Computed Tomography (CT) is a medical imaging technique employing tomography created by computer processing. In CT scanning, digital geometry processing is used to generate a three-dimensional image of the inside of a body part from a large series of two-dimensional X-ray images taken around a single axis of rotation.

The word "tomography" is derived from two Greek words "Tomos" which means slice and "Graphein "to Write. Computed tomography was originally known as the "EMI scan" as it was developed at a research branch of EMI, a company best known today for its music and recording business. It was later known as Computed Axial Tomography or CAT and body section Rontgenography.
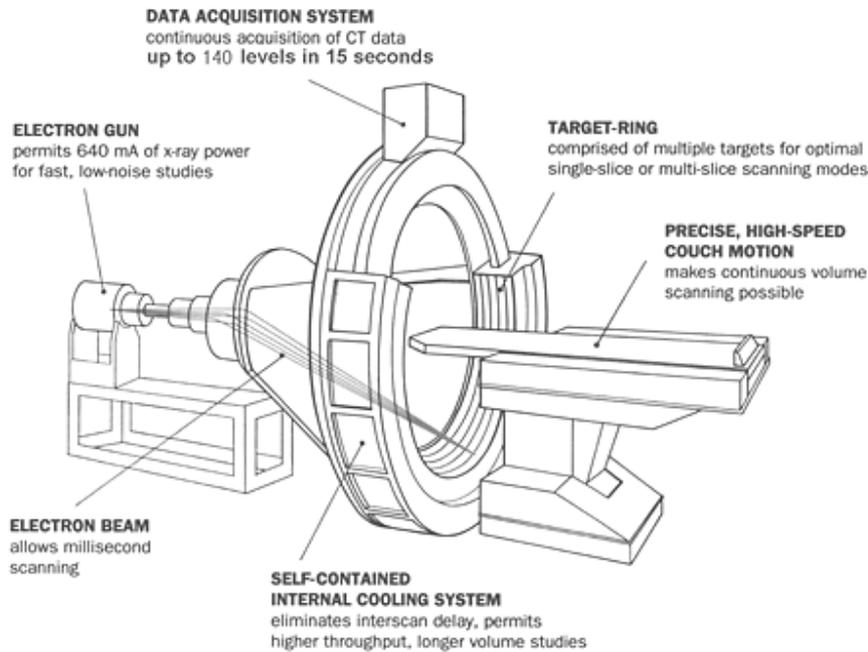

CT Scanner

Since its introduction in the 1970s, CT has become an important tool in medical imaging to supplement X-rays and medical Ultrasonography. It has more recently been used for preventive medicine or screening for disease, for example CT colonography for patients with a high risk of colon cancer, or full-motion heart scans for patients with high risk of heart disease.

How it works?

 CT uses X rays to scan the body parts. CT produces a volume of data which can be manipulated, through a process known as "windowing", in order to demonstrate various bodily structures based on their ability to block the X-ray beam. Formerly the images generated were in the axial or transverse plane, orthogonal to the long axis of the body, the new CT scanners allow this volume of data to be reformatted in various planes or even as volumetric (3D) representations of structures. X beam having 1.5 to 5.8 mSv effective dose is used in CT. The image of the

various sections of the body parts such as brain can be observed in the computer monitor or can be photographed.

CT scanner system

CT Scanning

CT can be used for detecting both acute and chronic changes in the lung parenchyma of the lungs. It is particularly relevant because normal two dimensional x-rays do not show such defects.

CT Image

CT Angiography

CT angiography of the chest is also becoming the primary method for detecting pulmonary embolism . CT is the standard method of evaluating abnormalities seen on chest X-ray and of following findings of uncertain acute significance. Cardiac CTA is now being used to diagnose coronary artery disease. CT pulmonary angiogram (CTPA) is the test used to diagnose pulmonary embolism. Images are usually taken on a 0.625 mm slice thickness, although 2 mm is sufficient. 50–100 mls of contrast is given to the patient at a rate of 4 ml/s.

ECG Grating

In ECG gating, each portion of the heart is imaged more than once while an ECG trace is recorded. The ECG is then used to correlate the CT data with their corresponding phases of cardiac contraction. Once this correlation is complete, all data that were recorded while the heart was in motion (systole) can be ignored and images can be made from the remaining data that happened to be acquired while the heart was at rest (diastole). In this way, individual frames in a cardiac CT investigation have a better temporal resolution than the shortest tube rotation time.

Abdominal Scanning

CT is a sensitive method for diagnosis of abdominal diseases. It is used frequently to determine stage of cancer and to follow progress. It is also a useful test to investigate acute abdominal pain,Renalstones,appendicitis, pancreatitis, diverticulitis etc. CT is also the first line for detecting solid organ injury after trauma.

Advantages of CT Scanning

There are advantages over the Radiography

1. CT completely eliminates the superimposition of images of structures outside the area of interest.

2. Because of the inherent high-contrast resolution of CT, differences between tissues that differ in physical density by less than 1% can be distinguished.

3. The data from a single CT imaging procedure consisting of either multiple contiguous or one helical scan can be viewed as images in the axial, coronal, or sagittal planes, depending on the diagnostic task. This is referred to as multiplanar reformatted imaging.

D.Mohankumar