**computerized tomography (CT) is a noninvasive medical examination that combines a series of X-ray images taken from different angles and uses computer processing to create cross-sectional images. many pictures of the same area are taken from many angles and then placed together to produce a 3D image. very small differences in x-ray absorption values can be visualized. CT scan images provide more detailed information than plain X-rays do .**

**In CT scanning , the patient is passed through a rotating gantry that has an x ray tube on one side & a set of detector on the other. The usual thickness of section is between 1-10mm.By moving the patient through the gantry , multiple adjacent sections can be imaged ,Information from the detectors is analyzed by computer &displayed as a grey scale image. A much greater array of densities can be displayed than on conventional x ray films. White & light grey objects are said to be high attenuation, dark grey &black object low attenuation**

The relative density of an area of interest may be measured electronically . The attenuation value expressed in Hounsfield Unit. In CT , water is 0HF ,Substances less dense than water (fat, air) has negative value, substances of greater densities has positive value. **. By altering the grey scale setting , the image information can be manipulated to display the various tissue of the body e.g chest ct.**

**A CT scan can be used to visualize nearly all parts of the body and is used to diagnose disease or injury as well as to plan medical, surgical or radiation treatment.**

## Advantage of ct scan over the x ray

**0n standard X-ray image it appears as if they are looking through the body. CT produce cross-section. CT is better to evaluate soft tissues such as the brain,**

**liver, and abdominal organs, as well as to visualize subtle abnormalities that may not be apparent on regular X-ray tests.**

## Indication of use of ct scan

- **Diagnose muscle and bone disorders, such as bone tumors and fractures**
- **Pinpoint the location of a tumor, infection or blood clot**
- **Guide procedures such as surgery, biopsy and radiation therapy**

**Detect and monitor diseases and conditions such as cancer, heart disease, lung nodules**

**Detect internal injuries and internal bleeding and liver masses**

- **Monitor the effectiveness of certain treatments, such as cancer treatment**

## CONTAST material in ct

**I.V.contrast**

**1.differentiation of normal bl. Vessels from abnormal masses e.g hilar vessels from l.n.**

**2.to make an abnormality more apparent e.g. liver masses.**

**3.to demonstrate the vascular nature of a mass**

**4. CT angiography.**

## Advantage of ct

**CT scanning is painless, noninvasive and accurate.**

**CT examinations are fast and simple; in emergency cases.**

**Can examine any part of the body, particularly excellent for lung & mediastinum, bone pathology & for hemorrhage & calcification .**

**Useful for examination of the bowel**

**CT is less sensitive to patient movement than MRI.**

**CT can be performed if you have an implanted medical device of any kind, unlike MRI.**

**It a good tool for guiding minimally invasive procedures such as needle biopsies and aspirations .**

***Spiral computed tomography is a computed tomography[1] technology involving movement in a helical pattern for the purpose of increasing resolution. These CT scanners have a gantry that rotates continuously in the same direction. During scanning, data acquisition is combined with continuous movement of the patient through the gantry. This is advantageous for a number of reasons: 1fast often the patient can hold their breath for the entire study, reducing motion artifacts, particularly useful in irritable& confused patient 2) ) the study is quicker allowing for higher resolution in the same study time.3) it allows for more optimal use of intravenous contrast enhancement.*4)MPR&3D image**

## Limitation &disadvantage of ct:

**1.Use of ionizing radiation**

**2. Hazards of I.V contrast material**

**3. High cost**

**4.Availability & lack of probability of the equipment.**

**5. limited to axial section**

**6.certain areas poorly visualized by ct e.g. post. Fossa &spinal cord**

**7.frequently need contrast study unlike mri**

**8.contra indicated in pregnant female.**

**The differences between CT and MRI scans are as follows:**

**A CT scan uses X-rays. An MRI does not use X-rays; it uses magnets and radio waves.**

**A CT scan does not show tendons and ligaments, an MRI does.**

**MRI is better for looking at the spinal cord.**

**A CT scan is better for looking at cancer, pneumonia, abnormal chest x-rays, bleeding in the brain (especially from injury).**

**A brain tumor is better seen on MRI.**

**A CT scan shows organ tear and organ injury more quickly - so it may be the best choice for accident victims.**

**Broken bones and vertebrae are better seen on CT scan.**

**CT scans are better at visualizing the lungs and organs in the chest cavity**

**CT is less sensitive to patient movement than MRI.**

**CT can be performed if you have an implanted medical device of any kind, unlike MRI**