X-RAY COMPUTED TOMOGRAPHY

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Computed Tomography Scan

- Computed tomography (CT) scan provides detailed, cross-sectional views of all types of tissues in the human body.

- CT scan may also be called Computer Axial Tomography (CAT) scan.

- CT scan is one of the best imaging methods for analyzing the chest, brain, and abdomen.

- This method is introduced by British physicist, Godfrey Hounsfield who got Nobel prize in the year 1979.

- It is often used for diagnosing various cancers like lung, liver and pancreatic cancers.

- The image reveals to a physician to confirm the presence of a tumour and to measure its size, location and the extent of damage to the nearby tissue.

- CT scans are often used to plan and administer radiation therapy.

- It is also used to plan surgery and to determine surgical resectability.

- CT scan clearly shows even very small bones as well as neighbouring tissues such as muscle and blood vessels.

- That is why its usefulness is invaluable in diagnosing and treating spinal cord problems and injuries of the feet, hand and skeletal structures.

- CT scan can also be used to measure bone density for the diagnosis of osteoporosis.

- In cases of trauma, CT scan can quickly identify injuries to the liver, spleen, kidneys or other internal organs

CT Scanning of the Body

- It uses special X-ray equipment to obtain a set of image data at different angles around the human body.

- The set of data is processed in a computer to show a cross-section of human body tissues and organs.

- CT scan can show several types of tissues like lung, bone, soft tissue and blood vessels with great clarity.

- It can be used to diagnose problems easily such as cancers cardiovascular disease, infectious disease, trauma and musculoskeletal disorders.

- CT scan can also play an important role in the detection, diagnosis and treatment of vascular diseases that can lead to stroke, kidney failure or even death.

Advantages and Disadvantages of CT Scan

▶ **Advantages**

▶ 1. CT scan offers detailed views of tissues like lungs, bones, soft tissues and blood vessels

2. CT scan is painless, noninvasive and accurate.

3. CT scan is quick and simple. In trauma cases, it can reveal internal injuries and bleeding quickly so as to save lives.

4. Diagnosis with the help of CT scan has the potential to eliminate the need for invasive exploratory surgery and surgical biopsy.

5. CT scan can distinguish between normal and abnormal structures.

▶ 6. CT scan is a cost-effective imaging tool for a wide range of clinical problems.

▶ Disadvantages

▶ 1. CT scan involves exposure to X-ray radiation. The radiation dose from this procedure is equal to a dose that the average person receives from background radiation in three years, but the benefit of an accurate diagnosis far outweighs the risk.

2. Pregnant women cannot undergo CT scan.

3 Lactating mothers cannot breast feed for 24 hours after contrast injection.

4. The contrast material injected may lead to allergic reaction.

5. This gives images of only transverse sections of the body.

Limitations of CT Scan

- Very fine soft-tissue details in areas such as the knee or shoulder may not be revealed using CT scan.

- It can be more readily and clearly seen with the magnetic resonance imaging (MRI).

- The CT scan is not generally suitable for pregnant women.

The following are
the major applications of the CT scan:

▶ 1. To investigate multiple organ injury due to trauma and accidents

2. To confirm the presence of cysts, solid tumours in various parts of the body

3. To know the size and extent of damage of organs as a result of the lesions

4. To investigate problems related to the spinal cord such as osteoporosis

5. To diagnose the sudden abdominal pain, blood in the urine, and renal infection

6. To ensure presence of tumour and to determine the stage of a tumour

7. To identify stones in the urinary bladder

8. To plan radiation treatments for tumours

9. To guide biopsy needle and to guide minimally invasive procedures

10. To detect small bone injuries

11. To locate the bleeding and damage in the brain