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Opinion Article

Computed Tomography Scan: its Types and Advantages

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DESCRIPTION

A computed tomography scan, often known as a computed axial tomography scan, is a medical imaging procedure that produces precise inside images of the body. The individuals who perform computed tomography scans are known as radiologists or radiography technologists.

To measure the attenuations of X-rays by various tissues inside the body, computed tomography scanners use a revolving X-ray tube and a row of detectors arranged in a gantry. Tomographic reconstruction procedures are then used to process the many X-ray data acquired from various angles on a computer to create tomographic (cross-sectional) images (virtual "slices") of a body. Those who need a computed tomography scan but cannot undergo an MRI do so because they have metallic implants or pacemakers.

Types

Spinning tube imaging, also known as spiral computed tomography or helical computed tomography, involves spinning the entire X-ray tube around the centre axis of the area being scanned. Because they have been produced for a longer period of time and have cheaper manufacturing and acquisition costs, these scanners currently account for the majority of the market. The main drawback of this kind of computed tomography is the equipment's weight and inertia (the X-ray tube assembly and detector array are on the other side of the circle), which restricts how quickly it can spin. To increase temporal resolution, some designs employ two X-ray sources and detector arrays that are angled at an angle.

Electron Beam Tomography (EBT) is a particular type of Computed Tomography (CT) in which a sufficiently large X-ray tube is built so that only the electrons' paths between the X-ray tube's cathode and anode are twisted by deflection coils. Since sweep speeds for this type can be significantly faster, it allows for less hazy imaging of moving components like the heart and arteries. When compared to spinning tube types, fewer scanners of this form have been made, mostly because of the higher cost of developing a considerably larger X-ray tube and detector array and the limited anatomical coverage. Contrary to traditional single tube scanners, dual source CT is a sophisticated scanner with a two X-ray tube detector system. These two detector systems are positioned 90 degrees apart in the same plane on a single gantry. A whole CT slice can be acquired using a dual source CT scanner in just half a rotation, allowing for quick scanning and improved temporal resolution. Rapid imaging lessens motion blurring at high heart rates and may shorten the time needed to hold patients breath. For sick patients who have trouble holding their breath or are unable to take heart-rate lowering medicine, this is very helpful.

Advantages

In comparison to conventional two-dimensional medical radiography, CT scanning has a number of benefits. The superimposition of photos of structures outside the area of interest is first removed using CT. The ability to examine finer details is made possible by the higher image resolution of CT scans. Tissues that differ in radiographic density by 1% or less can be distinguished by CT. Thirdly, multiplanar reformatted imaging is made possible by CT scanning. Depending on the diagnostic purpose, scan data can be seen in the transverse (or axial), coronal, or sagittal plane.

New investigations have been made possible by the enhanced CT resolution. For instance, CT angiography prevents the intrusive catheter implantation. Compared to a typical colonoscopy, a CT scan can perform a virtual colonoscopy more accurately and with less discomfort for the patient. Virtual colonography employs less radiation and is far more accurate at finding cancers than a barium enema.

CT uses radiation levels between mild and high for diagnosis. The volume scanned, patient build, the number and type of scan sequences, required resolution and picture quality, and the type of examination all affect the radiation dose. Tube current and pitch, two easily-adjustable helical CT scanning parameters, have a significant impact on radiation. For assessing anterior interbody fusion, CT scanning is more accurate than two-dimensional radiographs, however they may still overestimate the degree of fusion.

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