Health problem addressed

These scanners are used for a wide variety of diagnostic procedures, including spine and head injuries, lesions, and abdominal and pelvic malignancies; to examine the cerebral ventricles, the chest wall, and the large blood vessels; and to assess musculoskeletal degeneration.

Product description

Devices that consist of an x-ray subsystem, a gantry, a patient table, and a controlling computer. A high-voltage x-ray generator supplies electric power to the x-ray tube, which usually has a rotating anode and is capable of withstanding the high heat loads generated during rapid multiple-slice acquisition. The gantry houses the x-ray tube, x-ray generator, detector system, collimators, and rotational frame.

Principles of operation

CT scanners use slip-ring technology, which was introduced in 1989. Slip-ring scanners can perform helical CT scanning, in which the x-ray tube and detector rotate around the patient’s body, continuously acquiring data while the patient moves through the gantry. The acquired volume of data can be reconstructed at any point during the scan. All modern CT scanners are multislice. Inside the gantry, an x-ray tube projects a fan-shaped x-ray beam through the patient to the detector array. As the x-ray tube and detector rotate, x-rays are detected continuously through the patient. The computer mathematically reconstructs data from each full rotation to produce an image of one slice.

Operating steps

During a CT scan, the table moves the patient into the gantry and the x-ray tube rotates around the patient. As x-rays pass through the patient to the detectors, the computer acquires and processes data to form an image.

Reported problems

Controlling the radiation dose is the most significant concern facing all CT users. Also, unnecessary testing could cause an overexposure to radiation. System problems and communication breakdowns can result in repeat CT scans, and so, facilities need to provide extensive training for these systems to eradicate confusion when using the equipment.