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Computed Tomography and Patient Risk

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Computed tomography (CT) is one among the foremost important diagnostic tools in medicine, with a good scope for clinical use. Computed tomography (CT) has had a profound effect on the practice of drugs. Both the spectrum of clinical applications and therefore the role that CT has played in enhancing the depth of our understanding of disease are profound. CTs have increased their diagnostic capability while reducing examination times and radiation doses. At present, the state-of-the-art equipment performs real-time image acquisition with 320 "slices" (cross-sections used for reconstructing an anatomical image) or 640 slices interpolated, allowing detailed visualization of moving organs.

Since its introduction within the 1970s, computed tomography (CT) has revolutionized diagnostic decision-making. CT scanning has revolutionized medicine, but the utilization of such powerful technology demands that the radiologist consider the importance of patient safety additionally to image quality and diagnostic effectiveness. When used appropriately, the advantages of a CT scan far exceed the risks. CT scans can provide detailed information to diagnose, plan treatment for, and evaluate many conditions in adults and youngsters. Additionally, the detailed images provided by CT scans may eliminate the necessity for exploratory surgery.

Concerns about CT scans include the risks from exposure to ionizing radiation and possible reactions to the intravenous contrast agent, or dye, which can be used to improve visualization. The exposure to ionizing radiation may cause a little increase during a person's lifetime risk of developing cancer. Exposure to radiation is of particular concern in pediatric patients because the cancer risk per unit dose of ionizing radiation is higher for younger patients than adults, and younger patients have an extended lifetime for the consequences of radiation exposure to manifest as cancer. However, in children and adults, the danger from a medically necessary imaging exam is sort of small in comparison to the advantage of accurate diagnosis or intervention. It is especially important to form sure that CT scans in children are performed with appropriate exposure factors, as use of exposure settings designed for adults may result during a larger radiation dose than necessary to supply a useful image for a pediatric patient.

The link between ionizing radiation and therefore the subsequent development of neoplasia has been largely supported extrapolating data from studies of survivors of the atomic bombs dropped in Japan in 1945 and on assessments of the increased relative risk of neoplasia in those occupationally exposed to radiation within the nuclear industry. However, the association between exposure to low-dose radiation from diagnostic imaging examinations and oncogenesis remains unclear. With improved technology, significant advances have already been achieved with regards to radiation dose reduction. There are several dose optimization strategies available which will be readily employed including omitting unnecessary images at the ends of acquired series, minimizing the amount of phases acquired, and therefore the use of automated exposure control as against fixed tube current techniques. Additionally, new image reconstruction techniques that reduce radiation dose are developed in recent years with promising results. These techniques use iterative reconstruction algorithms to achieve diagnostic quality images with reduced image noise at lower radiation doses.