

How Safe is Your Computed Tomography (CT) Service?

In October 2009, the FDA released an initial notification that 206 patients at a prestigious West Coast medical center suffered hair loss and erythema after undergoing brain perfusion CT scans for assessment of stroke. It was revealed that these patients received 8 times the amount of radiation to the skin than is normal for such scans. Several other cases of harm from CT scans were subsequently discovered at other sites. In November 2010, the FDA released the findings of its investigation. It exonerated the manufacturers and their respective CT scanners. It put the cause of the adverse events squarely in the hands of the users.

ECRI Institute has listed CT radiation dose among its Top 10 Hazards every year from 2007 - 2011. Safety science reveals that adverse events rarely occur because of a single failure. In light of this knowledge, CT safety is best ensured when we optimize the entirety of the CT service, among which one would include:

- ▶ Support of an overall safety culture within the department
- ▶ Quality assurance and quality control of the CT scanning technology
- ▶ Appropriate certification and training of staff
- ▶ Establishment and adherence to up-to-date safety policy and procedures

It is when healthcare facilities fail to implement measures for delivering appropriate radiation dose that they risk exposing patients to unnecessarily high doses, which may result in hair loss, skin burns, and long-term increased risk of cancer. The risk in pediatric patients is especially high. The three key recommendations we make for healthcare facilities to ensure appropriate radiation dose are:

1. Ensure that CT orders meet appropriateness criteria, as required by the facility or as established by the American College of Radiology. Such criteria reduce unnecessary CT studies by suggesting alternative imaging tests with lower or no radiation risks, such as plain radiography or ultrasound or MRI.
2. Measure and monitor CT dose so that staff is aware of actual doses being delivered for specific types of exams, such as pediatric or adult abdomen. Flag patients receiving high dose from multiple CT studies over a short time.
3. Control CT dose for specific high-dose studies, such as CT brain perfusion scans and multiphase abdominal CT scans, by optimizing the CT scanning protocols so required clinical image quality is achieved using radiation doses that are As Low As Reasonably Achievable (ALARA). ALARA is a fundamental radiation safety principle that CT staff should live and breathe by.

ECRI Institute and the Healthcare Improvement Foundation have launched a Partnership for Patient Care regional collaborative focused on improving CT radiation safety at hospitals in the Southeastern Pennsylvania region. The partnership, funded by Philadelphia-area hospitals and Independence Blue Cross, is aimed at helping healthcare facilities to monitor and compare their CT radiation dose levels and to work toward improving operational safety of their CT service. Facilities in other regions can access useful guidance in ECRI Institute's CT Radiation Dose Safety Resource Center. https://www.ecri.org/Forms/Pages/CT_Radiation_Dose_Safety_Resources.aspx