

Radiation Exposure from Imaging Studies – Is there a risk?

Charlotte Radiology is a private radiology practice comprised of nearly 70 sub-specialized radiologists who have been serving the Charlotte and surrounding area for more than 40 years. The largest radiology group in the Southeast, Charlotte Radiology is committed to quality, accurate reads and participates in the American College of Radiology's (ACR) quality initiative programs. As a result we are actively involved in understanding and weighing the benefits and risk of our imaging procedures.

We want our referring physicians and patients to be informed about the recent questions surrounding the benefits vs. the risk of imaging studies. This handout provides both a summary of the risks of radiation exposure, the steps taken by our practice to ensure the risks are limited and the steps you as a patient or physician can take to limit the risks as well.

Radiation Exposure Risks in Black & White:

Generally, radiation doses from imaging exams are relatively small and the clinical benefit of an exam far outweighs the risks. According to the Environmental Protection Agency, most people in the United States receive an annual radiation dose of about 360 millirem (used to measure radiation); 80% of that is from natural sources such as elevation, soil, rocks, radon gas, human bodies, or plane trips. Imaging procedures typically account for the remaining 20%. The typical chest x-ray is comparable to taking a flight from Charlotte to Los Angeles.

The descriptions below outline some common imaging procedures and the radiation risks associated with them; while we provide examples of comparable risks, each modality's radiation dosage varies by study (imaging the head vs. the chest, etc.).

- MRI – Magnetic Resonance Imaging does NOT use radiation to image patients. There is no radiation risk involved in this study.
- Ultrasound (US) – US does NOT use radiation to image patients. There is no radiation risk involved in this study.
- X-ray – A mild dose of radiation is used to perform this study; chest x-ray is comparable to a cross country plane trip.
- Mammogram – A mild dose of radiation is used to perform this study. The radiation risk is similar to the annual radioactivity naturally produced by the average person's body.
- CT – A Computed Tomography scan requires more radiation than an x-ray, however it also provides a more detailed picture. The clinical benefit for diagnosis may outweigh the radiation risk; patients and their referring physician should consider the risks and benefits before proceeding with a CT study (i.e. what is the risk of not having the CT; is there alternate way to diagnosis, etc). Total radiation exposure varies greatly by procedure; a typical Chest CT is comparable to the radiation exposure from radon gas annually emitted in the average home.
- PET – Positron Emission Tomography uses small amounts of radioactive materials which are injected and target the area of the body being pictured. The radiation risk varies by procedure.
- Nuclear Medicine Scans – Nuclear medicine scans use small amounts of radioactive materials which are either injected, swallowed or inhaled to help target the area of the body being pictured and diagnosed. The radiation risks are similar to that of an x-ray.



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Questions for Patients & Referring Physicians to Ask:

A common concern among healthcare providers in regards to radiation exposure today is the overutilization of imaging studies. Physicians and patients have to balance the risk and benefit of imaging services that use radiation. Patients should keep a medical imaging history including dates, locations and types of imaging exams they have undergone; this can be important in assessing future imaging needs. Additionally, physicians should reference the ACR Appropriateness Criteria (www.acr.org/ac) to aid them in their decision planning for a patient and his/her imaging needs. This criterion provides an imaging necessities guideline for more than 210 clinical conditions and takes into consideration the radiation dose.

Both Charlotte Radiology and the ACR urge patients and physicians to review the following questions, taken from the "Radiology Safety" section of the ACR web site:

- Why do I need this imaging exam?
- How will having this imaging exam improve my health care?
- Are there alternatives that do not use radiation which are equally as good?
- Is the facility where I am scheduled for the exam accredited by an official organization (i.e. ACR)?
- Does the physician ordering the scan have a financial interest in the facility providing the exam (i.e. do they directly profit from ordering the scan)?
- Are the technologists at the facility certified?
- Are the physicians reading my exam sub-specialized radiologists?
- If the exam is for a pediatric patient, is the radiation dose "kid-sized?"

Charlotte Radiology's Efforts to Limit Radiation Exposure:

Charlotte Radiology participates in rigorous programs and has taken several steps to ensure our patients receive only the necessary amounts of radiation needed to achieve a quality image to properly diagnosis a patient. These steps include:

- All of our radiologists are board certified and have extensive training on techniques that minimize radiation exposure for patients.
- Our imaging units at all of our facilities are accredited by the ACR, meaning the equipment is calibrated and monitored to ensure radiation exposure is limited.
- Our imaging technologists are certified and trained to monitor radiation exposure on their equipment.
- We adjust the radiation exposure for each CT based on the size of the patient – this allows us to minimize radiation doses for children.
- Our radiologists use the ACR Appropriateness Criteria so that the most appropriate imaging exam is prescribed in order to avoid unnecessary exposure to scans that use radiation when other procedures that don't use radiation are better for a specific condition.
- Our radiologists participate in the ACR's "Image Gently" campaign, an initiative of the Alliance of Radiation Safety in Pediatric Imaging whose goal is to increase awareness of the opportunities to lower radiation doses in the imaging of children.
- Our radiologists are actively involved in the ACR and the American Board of Radiology so that they can monitor new trends for radiation dosing and implement new standards and guidelines quickly when needed.

Contact Us:

For updates on this topic, follow Charlotte Radiology on Twitter or Facebook. For additional information we suggest the following web sites:

- www.charlotteradiology.com
- www.acr.org
- www.epa.gov/rpdweb00/docs/402-k-07-006.pdf
- www.acr.org/HomePageCategories/News/ACRNewsCenter/ACRRebuttoNEJMArticle.aspx

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