As seen in **Coronary Heart**

Radiation Protection: 'Best Practices' for High-Dose Procedures

By Amy Newell

Now more than ever, healthcare professionals must continually adhere to standards and policies set forth not only by the organizations in which they practice, but also by external monitoring agencies as well. Due to increasing patient volumes, acuity, and technology, there is a particular need to establish clear care standards in departments such as Radiology, Cardiology, and Nuclear Medicine. Indeed, as in many other specialties, successful Radiologic and Cardiovascular clinicians are challenged to maintain both clinical and regulatory expertise in their day to day practice, which can be difficult as industry advances and new techniques emerge.

Those organizations and departments that are best prepared to meet these challenges have done so through creating a model around Radiation Safety and Protection…a task that might not be so easy. So how can an organization or program develop a policy for radiation protection?

First, clinicians working in a Radiologic environment should ask themselves the following questions...*Am I practicing proper Radiation Safety Techniques, not just solely for myself, but for the patient? Do we have an active Radiation Safety Committee? Who is our acting Radiation Safety Officer (RSO)? How often should we be receiving continuing education relative to Radiation Safety and Protection? And, most importantly; what do I need to know and/or do as follow-up for high dose procedures?*

For example, in most settings, radiation exposure is reported through a designated Radiation Safety Officer (RSO) to the Radiation Safety Committee and potentially to a State and/or Local Department of Environmental Services. In addition, should a significant "high-dose" exposure resulting in cellular breakdown (such as visible radiation burns) occur, the program may choose to report the incident to the National Council of Radiation Protection and Measurements (NCRP).

This article is intended to raise awareness and provide insight to Radiation Safety practices that clinicians may take for granted, or those that they may not be aware of.

Nurses or Technologists who practice in a controlled environment providing simple X-Rays need adhere to Radiation safety policies and must be cognizant of exposures to the patient as well as to themselves. There are three fundamental radiologic principles: Time, Distance, and Shielding (see figure 1). In Corazon's experience, these fundamentals of radiation safety are often taken for granted during simple Radiologic procedures, which can be attributed to the latest technological advances such as digital technologies and the ability for the X-Ray beam to be more focused (inherent automatic collimation). Often, the hustle and bustle of departmental schedules results in neglect or even failure to consider these basic fundamental principles.

In "specialized" settings, such as with Cardiac Catheterizations or Peripheral Vascular Angiograms, the radiation exposure is significantly increased compared to simple X-rays, which is attributed to longer fluoroscopy and multiple cine runs. Consideration must be taken to protect not only those performing the procedures, but also the personnel that may enter this setting at any given time. Typically, the Radiologic Technologist or Physician is accountable to adhering to Radiation Safety and Protection guidelines, but organizations can designate another responsible party. It is vital that these professionals remain cognizant of unnecessary exposure, especially to those individuals of child-bearing age.

The person responsible for maintaining safe radiologic practices should ask the following questions:

- Is everyone in the room dawning appropriate lead apparel?
- Are extra precautions such as Thyroid collar, lead glasses, and portable lead barriers being utilized?
- Is there extra lead apparel for ancillary personnel or vendors who may need to enter the procedure?
- Is the operator of the flouro pedal providing a verbal notice so that personnel can move at least six feet from the X-ray tube?
- Are all personnel in the procedure wearing film badges for individual dosimetry monitoring, and is it being worn in the appropriate location? (On the outside of the Thyroid collar)

Neglect in wearing any of these protective devices is not only unsafe practice, but will not allow for accurate exposure monitoring.

Corazon recommends that organizations performing procedures using Ionizing Radiation have a Radiation Safety Committee. These organizations should also designate an individual to act as the Radiation Safety Officer (RSO). It is through this committee and/or individual that healthcare professionals are monitored, educated, and re-assigned should someone encounter an unexpected "high dose" exposure. Furthermore, this committee or the RSO should be charged with creating and revising policies regarding Radiation protection and safe practices. In many organizations, it is the goal of Radiation Safety Committee to adapt and implement the ALARA philosophy (see figure 2). Adherence to the ALARA philosophy should result in "low" to "no" incidence of radiation exposure.

The RSO should also be charged with providing or coordinating radiation safety education to all technical, nursing, and ancillary support personnel who may be involved in these procedures. We advocate that radiation safety and protection education be held annually through classes geared toward the ALARA philosophy and the fundamental principles of Time, Distance, and Shielding. The RSO should include as part of the education component any regulatory changes that are vital to personnel involved in Cardiac Catheterizations and Peripheral Vascular procedures.

In conclusion, Corazon challenges all professionals involved in these procedures to adhere to safe radiation practices, despite the challenges imposed by changing technology, new techniques and staffing shortages. It is also critical to know the reporting "chain of command" within the organization should any personnel fall victim to a "high dose" exposure. In our experience across the country, best practice programs consistently demonstrate the fundamental principles of Time, Distance, Shielding, as well as the ALARA philosophy. Indeed, the more programs that make significant strides in this area, the safer and more effective their Radiology Departments will become.

Figure 1: **Radiation Basics: Three Fundamental Principles**

Time	Reduce the amount of **time** spent near the radioactive material/source
Distance	Increase the **distance** from the radiation source
Shielding	Use appropriate protective **shielding** whenever possible

Figure 2: **The ALARA Philosophy**

A	**As**
L	**Low**
A	**As**
R	**Reasonably**
A	**Achievable**

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