


Back to Basics: Radiation Safety 1.1 www.aornjournal.org/content/cme

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Purpose/Goal

To provide the learner with knowledge of best practices related to radiation safety.

Objectives

1. Discuss common areas of concern that relate to perioperative best practices.
2. Discuss best practices that could enhance safety in the perioperative area.
3. Describe implementation of evidence-based practice in relation to perioperative nursing care.

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Lisa Spruce, DNP, RN, CNS-CP, CNOR, ACNS, ACNP, FAAN, has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.

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ABSTRACT

Perioperative team members and patients are frequently exposed to radiation during operative and other invasive procedures. The use of equipment that emits radiation (eg, a fluoroscopy unit) is beneficial for diagnosing and treating patients but carries the risk of harm if team members do not follow radiation safety guidelines. Perioperative team members should implement safety precautions for themselves and their patients when radiation is used. This Back to Basics article addresses the basics of radiation safety and the precautions that perioperative team members should implement in the perioperative setting. *AORN J* 106 (July 2017) 42-49. © AORN, Inc, 2017. <http://dx.doi.org/10.1016/j.aorn.2017.05.001>

Key words: radiation safety, fluoroscopy, x-ray, shielding, ionizing radiation.

Patients and perioperative team members can be exposed to ionizing radiation during procedures performed in almost every surgical specialty. Perioperative personnel must implement special precautions to protect themselves, their team members, and their patients from excess ionizing radiation. Wilhelm Conrad Röntgen coined the word *x-ray* when he discovered the technology in 1895.¹ X-rays are electromagnetic energy waves that act similarly to light rays but at wavelengths approximately 1,000 times shorter than those of light, allowing practitioners to see inside the human body. Scientists quickly adopted x-ray technology into practice but did not initially realize that radiation from x-rays could cause damage and even death to those who were excessively exposed.¹

Excessive exposure to ionizing radiation can cause hair loss, skin redness, cataracts, infertility, and circulatory disease.² Some effects can occur as soon as 24 to 48 hours after exposure. Long-term effects from exposure to radiation can also develop; for example, cancer and genetic effects can appear several years after exposure.² The severity of symptoms depends on the length of time a person is exposed to radiation. Perioperative team members can implement safety measures to

decrease patient and health care worker exposure to radiation. AORN updated its “Guideline for radiation safety”² in 2016, which offers strategies to decrease exposure to radiation in the perioperative setting for patients and health care providers. This Back to Basics article addresses basic radiation precautions but does not address the handling of therapeutic radionuclides. For comprehensive guidance on radiation safety, refer to the complete guideline.

HOW-TO GUIDE

Perioperative personnel should follow several safety precautions to protect their patients and themselves from radiation. Patients’ body parts that are not being x-rayed should be out of the path of the radiation beam to avoid injuries. Perioperative team members should determine which areas of the patient’s body should be shielded (eg, the thyroid, ovaries, testes, breasts) when the patient is close to the radiation beam.³ The shielding (eg, lead apron, eyewear) must be positioned between the patient and the source of radiation (Figure 1). Perioperative team members should not place the shielding in the path of the beam that originates from the x-ray tube, because this will block the x-ray image.²

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