Shielding in Computed Tomography: An Update

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The primary purpose of this report is to review the general principles of shielding during computed tomography (CT) and to summarize the latest published information on shielding efficacy. Currently, there are discordant opinions within the literature regarding the appropriateness of shielding, particularly with regard to in-plane bismuth. Understanding that the decision to implement use of a particular type of shielding is not always the purview of the CT technologist, this update will outline the literature-supported best practices for each method and will attempt to clarify common misconceptions about proper use of shielding during CT procedures.

Computed Tomography and Patient Radiation Dose

Ongoing concern exists regarding the potential adverse effects of radiation exposure from CT procedures.1,2 CT continues to be a highly utilized imaging modality, with more than 85 million studies performed in the United States in 2011.3 CT patient dose has begun to decline from peaks reached during a period of rapid technologic development that began with the advent of multidetector CT in the late 1990s.4 During this period, which is commonly referred to as the “slice wars,” patient dose skyrocketed as a byproduct of the singular goal of acquiring large volumes of scan data in the shortest time possible.4,5 In 2007, the National Council on Radiation Protection & Measurements published NCRP Report No. 160, Ionizing Radiation Exposure of the Population of the United States, which dramatically illustrated the effect on per capita radiation dose resulting from the proliferation of CT examinations.6 Following the widespread attention the report received in both the scientific literature and the mainstream media, far more attention has been paid to dose reduction, leading to the current period of CT development that may be characterized as a “dose war.”

Efforts to Reduce Computed Tomography Patient Dose

Over the past several years, the American Society of Radiologic Technologists, the American College of Radiology, the Radiological Society of North America, the Society for Pediatric Radiology, and the American Association of Physicists in Medicine have collaboratively implemented programs designed to educate physicians, technologists, and other health care providers about the potential risks associated with radiation exposure from CT. These programs have helped increase the focus on methods of dose reduction in CT. The Image Gently campaign, launched in 2007 through the Alliance for Radiation Safety in Pediatric Imaging, successfully highlighted the need to “child-size” CT protocols for optimal dose reduction.

In 2010, the Joint Task Force on Adult Radiation Protection initiated the Image Wisely campaign. This educational program expands the concept of consistent dose reduction to adults who undergo CT procedures.