



Rethinking Radiation Worldwide

From the United States to South Korea, radiation safety remains a shared priority and responsibility.

By Alyssa Martino

Although medical imaging is a global practice, it is used in countries with varying resources, diseases, and disorders. Despite these differences, radiologists assume a common responsibility: administering appropriate levels of radiation dose. Defining these standards is not always a simple task.

That's not to say that efforts aren't already in place or under way to create international standards of quality and safety in radiology. From a national coalition for pediatric imaging to a worldwide initiative to harmonize referral guidelines, radiologists everywhere hope to guarantee the safety of their patients. "We're all in this together," explains James A. Brink, M.D., FACR, from the Yale University School of Medicine in New Haven, Conn., who co-chairs the Image Wisely™ campaign. "[Radiation dose] is a global problem, and I think countries tend to benefit from the creative thinking of the international radiology community."

While general agreement exists that a variety of players should pitch in, several questions remain about how to approach the issue. For example, how can we define appropriate dose levels? Which organizations and agencies should oversee radiation safety and patient and employee protections? And, is it possible to standardize guidelines across country borders? From different corners of the globe, radiologists are recognizing the need for an unprecedented level of teamwork.

Reaching Out

For the ARRS, international outreach has always been a priority, and recently, the importance of international perspective has only increased within the society. ARRS leadership and members have tried to “think globally instead of nationally,” explains Kimberly E. Applegate, M.D., M.S., FACR, from Emory University School of Medicine in Atlanta.

One key undertaking to help facilitate this collaboration has been inviting an international radiology society to the ARRS Annual Meeting. In 2010, members from the Korean Society of Radiology (KSR), which is headquartered in Seoul, South Korea, attended the San Diego conference. “[This] brings added flavor and valuable insight to the meeting,” says Applegate. The 2011 ARRS Annual Meeting will feature speakers and presentations from the Spanish Society of Radiology, and for 2012, attendees can expect to hear from members of the Japan Radiological Society.

The 2010 annual meeting allowed selected ARRS and KSR members to participate in a focus group about the importance of radiation safety. “I was pleased to learn that this topic was perceived as a global issue and was being addressed in South Korea as seriously as it is in the U.S.,” says Brink.



James A. Brink, M.D., FACR, has been heavily involved in protecting patients from radiation.

Applegate was also impressed, especially given the lack of media coverage for radiation issues in South Korea. Although the level of awareness of radiation dose in the United States and Europe has been increasing, South Korea has not yet experienced such a degree of media attention over this issue. “While patients aren’t asking as many questions of their doctors, South Korean radiologists and medical physicists are proactively addressing radiation safety issues and dose reduction techniques,” Applegate says. “The South Korean press has not been as active in publicizing the kind of concerns raised in the American press regarding medical radiation.”

This lower level of reporting on the issue contrasts directly with that found in the United States, where media attention to radiation has risen dramatically, especially in the past 18 months. The shortage of coverage in South Korea about radiation risks and safety may have negatively affected patient education. Due to insufficient awareness, patients are less inquisitive about the potential risks and benefits of diagnostic-imaging procedures. They are given very little information, or worse, inaccurate data, said one KSR member during a presentation at the ARRS Annual Meeting.

“KSR is trying to educate the public with an online service portal,” explains In-One Kim, M.D., from Seoul National University College of Medicine, chair of the KSR’s International Liaison Committee. “We need to educate them not only on the hazards of radiation exposure but also the usefulness of radiological exams,” he says. “KSR and other medical societies also prepare and render guidelines, informative manuals, and recommendations to help minimize exposure and include radiation-protection techniques or devices.” For more information on the KSR’s activities, visit <http://bit.ly/a6uTes>.



Kimberly E. Applegate, M.D., M.S., FACR, hopes to develop one referral guideline for simple illnesses like pneumonia.

Efforts in South Korea

Several population differences affect the way South Korean officials approach radiation safety. “One big distinction is the demographics of the population,” says Brink. “I recently saw a statistic that approximately one-quarter of Americans are obese and two-thirds are overweight, and as a result, we tend to increase radiation dose in this country.”

In 2008, the “National Survey of Radiation Dose of Computed Tomography in Korea,” (not yet published in English) completed by the Korean Food and Drug Administration (KFDA), was used to determine diagnostic reference levels (DRL) for CT. The Korean survey data suggested a DRL of 60 mGy for a head CT scan.¹ In contrast, the DRL for an adult head CT in the U.S. is 75 mGy, based on data from the ACR CT Accreditation program. “I think this highlights that there may be more room for aggressive dose reduction in the United States,” notes Brink.

“The [South Koreans] have high rates of CT use,” says Applegate. “But not as high as we do — nowhere is it as high as in the United States.” Applegate was inspired by several presentations at the annual meeting that showed the ways in which South Korea optimizes CT and conducts imaging audits, which are rare in the United States. “It’s clear to me that they do a very careful job looking at audits and how they use imaging,” she adds. “Those activities are not really part of our typical American practice.”

In a more expansive look at South Korea’s health-care system, all radiation exposure is controlled by two government organizations: the Ministry of Science and Technology (MOST) and the Ministry of Health and Welfare. The first organization controls radiation therapy, and the latter group deals with diagnostic radiology. Kim notes that South Korean radiologists apply techniques that are similar to those used by U.S. radiologists to

control and minimize radiation exposure. MOST also works with the KFDA to closely control radiation levels.

KSR works with these government agencies as well, through its Safety Control Committee, which “educates and advises on radiation-safety control or training of specialists, and pursues activities as a member of research-service cohorts for the KFDA,” explains Kim. Much like the ACR’s Commission on Quality and Safety, this committee works with a variety of individuals: medical physicists, radiological technologists, and other specialists in radiation exposure.

As in the United States, South Korea uses accreditation as one way of ensuring safety in radiation technology. In 2004, the KSR proposed the creation of the Korean Institute for Accreditation of Medical Image (KIAMI). KIAMI is now responsible for the annual accreditation of CT, mammography, and MRI machines. KSR and KIAMI work together “intimately,” says Kim, “to maintain the proper quality of images for special equipment.”

KIAMI accredits imaging machines just as the ACR does; however, disparities such as those between South Korean and U.S. levels of radiation dose have led radiologists to contemplate the possibility of working together to create standardized guidelines for patient radiation safety. “Radiology in Korea: What Is Happening,” published in the *AJR* in March 2008, expands on this topic. (Visit <http://bit.ly/djJz6m>.)



In-One Kim, M.D., chairs the KSR’s International Liaison Committee.

“Collaboration Is Strength”

With the acknowledgement that teamwork is key, Lawrence S. Lau, M.B., FRANZCR, FRCR, with the help of like-minded colleagues and organizations, organized the International Radiology Quality Network (IRQN) in 2002 (www.irqn.org). Now, as founding chair of the network, Lau remains committed to the IRQN’s mission. “Our focus is quality and safety in radiology,” he explains.

In fact, the group has adopted “collaboration is strength” as its motto. “There’s no point in reinventing the wheel,” Lau says. “There’s synergy between countries and stakeholders, and a number of these actions [e.g., in radiology quality and radiation safety] require resources and a range of expertise, which may be beyond the means of a single organization or agency.”

IRQN members hold in-person meetings and conferences and communicate through e-mail. The current focus for the organization is to adapt and harmonize international referral guidelines. In March of 2010, the World Health Organization (WHO), under

Web Exclusive



Want to listen in on the focus group with the Korean Society of Radiology? Please visit the digital version of *InPractice* and click “play” to hear audio clips from Applegate (1) and Ella A. Kazerooni, M.D., FACR, (2) at the ARRS focus group during the annual meeting.

its December 2008-launched Global Initiative on Radiation Safety in Health Care Settings, invited IRQN members, radiology experts, regional and international agencies, and professional organizations to a meeting in Geneva on “Referral Guidelines for Appropriate Use of Radiation Imaging.” There, the attendees put forth an action plan for creating, trialing, and implementing a set of harmonized guidelines, which are consistent with the current national referral guidelines, including the ACR’s Appropriateness Criteria®. To learn more about the meeting in Geneva, read the IRQN’s news release, “Stakeholders to Collaborate on Referral Guidelines,” available at <http://bit.ly/caTtTN>.



Lawrence S. Lau, M.B., FRANZCR, FRCR, founded an organization that focuses on international quality in radiology.

“Referral guidelines are currently available in Argentina, Australia, Austria, Canada, France, Germany, Hong Kong, New Zealand, the U.K., and the U.S.,” explains Lau. “The team is working together to harmonize that material into a single set of global guidelines that can be used by a larger number of stakeholders in developing and developed countries.”

Applegate was among the radiologists invited to the Geneva meeting. She says she’s been interested in the IRQN’s efforts to develop simple guidelines for imaging common conditions, such as pneumonia. Applegate says, “Ultimately, even if all we can do is agree on one way to do literature search and critical review, as well as share information, while different countries develop their guidelines, it would still be a huge step forward.” She adds that the IRQN hopes to create a set of core guidelines initially, with progressive updates by adding topics and making them available online for free.

In Need of Synergy

If one set of referral global radiation-safety guidelines can exist, who should create them, and who will be responsible for overseeing their appropriate use? Several international organizations and agencies will coordinate on these issues, explains Lau. “United Nations’ agencies, such as WHO and the International

In Your Own Backyard

The ARRS and the ACR are heavily involved in a variety of radiation-dose safety projects — from patient education to accreditation and practice guidelines. Here's a roundup of various ways in which these organizations have been contributing and how you can take advantage of their efforts to better your own practice:

Accreditation

With the new MIPPA requirements, all MRI, CT, PET, and nuclear medicine equipment must be accredited by one of three bodies: the ACR, the Joint Commission, or the Intersocietal Accreditation Commission. Accrediting machines is important to guarantee that they are safe and adhere to standards. Choosing ACR, the gold standard for accreditation, will show your patients you've taken the necessary steps to provide quality and safety at your practice. To learn more, visit www.acr.org/accred.

Practice Guidelines and Appropriateness Criteria[®]

The ACR has developed a plethora of practice guidelines and technical standards, which include imaging of pregnant women, diagnostic reference levels in X-ray imaging, fluoroscopic procedures, and radiopharmaceuticals, among many others. Visit www.acr.org/ac for more information.

Image Gently[™] and Image Wisely[™]

The Image Gently[™] and Image Wisely[™] coalitions strive to raise awareness and generate patient-education initiatives surrounding radiation dose in children and adults, respectively. For more information on Image Gently, visit www.imagegently.org.

PQI Chest Template

The ARRS's PQI Chest Template focuses on reducing CT radiation exposure in female patients who are 18 and older. The template is designed to help members meet Part IV of the ABR's Maintenance of Certification (MOC) requirements and increase the effectiveness of their quality improvement skills. This activity offers *AMA PRA Category 20 Credit(s)[™]* following completion of an online test. For more information, visit <http://bit.ly/bTlam5>.

Registries

The ACR's Dose Index Registry is currently piloting a program for CT — arguably the most concerning of all ionizing-radiation-emitting tests. The program will allow participants to collect and compare radiation dose data across the United States, helping to better assess and evaluate radiation dose from CT scans. For more information on ACR registries, visit <http://bit.ly/aRm90a>.

Atomic Energy Agency (IAEA), are facilitators," he emphasizes. Each of these groups also works with a whole slew of regional and national organizations.

"Neither the IAEA nor the WHO can tell their member states what to do," says Lau. "But their advice, which is viewed as an unbiased, trustworthy source, carries weight and will guide the direction of national policy development," he continues. "Their job is to facilitate the strengthening of national infrastructure by building capacity and providing support and resources," Lau states. Additionally, these agencies have good relationships with competent authorities, such as those in health, transportation, and radiation protection.

Still, the WHO and the IAEA are not necessarily staffed by radiologists with expertise in all areas. As a result, the organizations rely on professional groups, such as the IRQN, the International Society of Radiology, and the International Society of Radiographer and Radiological Technologists, for input, says Lau. Because of the number of entities involved, synergy is a necessity.

Sharing Responsibility

Radiation safety-related efforts require not only immense coordination between international and local groups but also among equipment manufacturers and vendors, referring physicians, radiologists, radiologic technologists, and medical physicists. Brink calls this phenomenon a "three-legged stool." He explains, "The vendors have to provide the tools that allow us to use their equipment effectively. Radiologists, radiologic technologists, and physicists have to know how best to use these tools for the benefit of their patients, and the referring physicians have to be aware of the radiation issues and guide utilization appropriately."

Aplegate acknowledges this sense of teamwork and says, "The FDA is now working with the medical community and the vendors, especially CT equipment vendors, to collaborate and find ways to make imaging safer. For example, a standard set of federal guidelines could be quite helpful for technologists. When the technologists use the equipment, they could have pop-up reminders to check what they're doing so that they do not over radiate a patient." Communicating with referring physicians about radiation dose is equally important, and clearly, some guidelines as well as general education will be important to advance this issue. In the ARRS focus group, one individual wondered whether the United States should institute a specific threshold for the number of CT scans a patient can receive, or else, the focus participant asked, "How do clinicians know when to be alarmed?"

Critical questions like these show the dedication of the ARRS and KSR, as well as groups like the IRQN, in advocating and developing radiation-safety initiatives, both in the United States and abroad. However, much work remains — locally and internationally. These efforts, above all, will require a commitment to further research, teamwork, and a sense of shared responsibility. ■

ENDNOTE

1. KFSA Survey, "National Survey of Radiation Dose of Computed Tomography in Korea," 2008. Available only in Korean.