

Medical Physicists: CT Scans Safe

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Credit: NithinRao

Mayo Clinic professor of radiological physics Cynthia McCollough calls last fall's news from Cedars-Sinai Medical Center the straw that broke the camel's back for the CT scan community, at least when it comes to public perception.

In October 2009 Los Angeles-based Cedars-Sinai disclosed that over the course of 18 months 260 possible stroke victims had received up to eight times the normal radiation dose in a scan procedure to identify blood flow issues in the brain. Once patients began to come forward with symptoms of radiation sickness, hospital officials identified the problem and then acknowledged the errors. The hospital also notified appropriate state and federal agencies, including the [Food and Drug Administration](#).

While undeniably serious, the mistakes' immediate effects seemed mostly limited to temporary hair loss in less than half of patients. In November the hospital disclosed that one in five of the patients, who had a median age of 70, had exposure directly to the lens of their eyes, and thus faced an increased risk of developing cataracts. The patients were notified by the hospital, which offered to pay for any future treatment for health issues from the overexposure.

The announcement caused a media firestorm for Cedars-Sinai, the largest nonprofit hospital in the

western United States. An October 15 New York Times headline declared that "Radiation Overdoses Point Up Dangers of CT Scans." That article also detailed a botched CT scan of two-and-a-half-year-old boy at Mad River Community Hospital in Arcata, Calif. The boy, who was complaining of neck pain after falling out of his bed, was subject to an hour of CT scans when the procedure typically takes two or three minutes. Robert Schlag, head of California's division of Food, Drug and Radiation Safety, was quoted in Times story describing the boy's experience as "one of the more egregious, extreme cases that I have ever seen." And 15 patients of Huntsville Hospital are among the plaintiffs of a class action lawsuit filed in December in Alabama alleging that the patients may have received high doses of radiation during routine brain scans at the 630-physician hospital. The lawsuit accuses G.E. Healthcare, the manufacturer the CT scan machine, of lax safety features in the scanner's design.

Other hospitals have acknowledged committing errors during scans, overexposing patients. But what rankles McCollough and other organizers of last week's meeting is that the Cedars-Sinai story has been brought up repeatedly in subsequent media accounts of the dangers of excessive radiation, even though many such accounts have described problems in altogether different, higher-dose procedures, such as cancer therapies that irradiate tumors with particle beams produced by linear accelerators. CT scanners generally use a rotating X-ray device to create detailed, cross-sectional images of various parts of the body.

Half a year later McCollough was in Atlanta as one of the organizers of the two-day national "CT Dose Summit." Registration to the meeting, intended to begin the process of building a consensus on national guidelines for performing the common medical procedure, sold out in six days, McCollough said.

The more than 200 people in attendance included radiologists, state and federal regulators, CT scan

equipment manufactures, and officials from the National Institute of Health's National Institute of Biomedical Imaging and Bioengineering, one of the sponsors of the meeting. The attendees were "a very enthusiastic and positive crowd," said Dianna Cody, a professor of imaging physics at the University of Texas M.D. Anderson Cancer Center. Cody, also a conference organizer, added that the recent flurry of media attention has translated directly into unnecessary concerns for patients and their families.

"We get calls from parents in tears because their child is going in to have a scan," she said. "It's all wrong because the scientific evidence just doesn't justify the fear that's there."

The main issue, the two medical physicists said, is a fundamental misunderstanding about the nature of radiation. Basic facts—a typical chest CT scan is comparable to the radiation exposure from radon gas annually emitted in the average home, for example—rarely make it into news articles. Nor do explanations of the benefits of scanning technology, which include more effective surgeries, shorter hospital stays, elimination of exploratory surgery and better diagnosis and treatment of cancer. As a result, for too many people the mention of radiation connotes Chernobyl and the atom bomb, McCollough said.

None of this is likely to assuage patients who have been harmed by overexposure. Cody, whose employer M.D. Anderson does more than 500,000 diagnostic imaging procedures per year, said the medical physics community is deeply concerned about overexposures associated with CT scans, a sentiment echoed by Mahadevappa Mahesh, an associate professor of radiology and medicine at Johns Hopkins University School of Medicine.

"We in the profession have to do all we can to minimize errors and take responsibility for mistakes that do occur; in radiation therapy, even a single mistake or error can result in significant patient injury," said Mahesh. "And when someone is injured, the reply should be compassionate and not use statistics."

Mahesh was among the authors of two studies

published in December 2009 in the Archives of Internal Medicine that attempted to quantify the risks associated with overuse of CT scans and variations in doses. One paper found that each year of use of current CT scanning machines may ultimately be responsible for 14,500 deaths from cancer in the United States. Mahesh added that the number was based only current radiation risk models and that in fact is quite small in relation to the approximately 68 million CT procedures and 1 million cancer deaths annually in the United States. The second found as much as a 13-fold difference in [radiation dose](#) when the same scan was performed at different institutions.

In the wake of the Cedars-Sinai news, Dr. Richard Semelka, vice chair of quality and safety in the department of radiology at UNC Hospitals, told ABC News that "it is the wild west out there ... no one has solved the issue of keeping track of the global exposure of individuals to medical radiation."

Cedars-Sinai, a top 50 hospital for cancer treatment according to U.S. News & World Report, was not among the 4,000 accredited by American College of Radiology, which offers guidelines for protocols and standards. A new Medicare rule requiring such accreditation goes into effect January 1, 2012.

"We all know the medical benefits of CT scans far outweigh the risks," said Mahesh in a phone interview during a break on the first day of the conference. "However, there are still issues around how many CTs are appropriate. My opinion is that there are a number of CT exams that may not be necessary."

Medical physicist Thomas Ruckdeschel said the meeting was a good initial effort to compare notes about practices and procedures at various clinics around the country, but that his colleagues around the United States had more work to do.

"The Cedars-Sinai event was definitely a catalyst for many activities," said Ruckdeschel, president of Alliance Medical Physics, which consults with hospitals about use of CT imaging. "The next step...is to take responsibility for this issue and educate the medical CT imaging community."

As for educating the general public and dealing with perceptions that are so wildly off base, Cody said that her colleagues around the country who work daily with [CT scan](#) machines seems more energized than ever.

"Bad news sells," Cody said, when asked about Cedars-Sinai and other recent stories. "But we're motivated to fight harder to make sure people know CT scans are safe. And to make it safer in the few places that have made honest mistakes."

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