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From Medscape Medical News

Cancer Risk Overestimated With Radiation From CT Scans

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December 2, 2010 (Chicago, Illinois) — Although it has risen slightly in recent years, the risk of developing cancer from a computed tomography (CT) scan is still lower than was previously thought, according to new research presented here at the Radiological Society of North America (RSNA) 96th Scientific Assembly and Annual Meeting.



Dr. Pat Basu

"We did this study because there has been a lot of attention and concern about radiation from medical imaging tests, especially CT scans, and we wanted to get a better picture of actual CT use in a large population," Pat A. Basu, MD, from Stanford University in Palo Alto, California, told Medscape Medical News.

Dr. Basu, a White House Fellow who is currently on a 1-year sabbatical from Stanford, and his colleagues did a retrospective study of Medicare claims data in patients 65 years and older from 2 periods — 1998 to 2001 and 2002 to 2005. The cohort from the first period comprised 5,267,230 individuals, and from the second comprised 5,555,345 individuals.

They analyzed the number and types of CT scans that each patient received to determine the percentage of patients exposed to threshold radiation doses of 50 to 100 mSv (defined as low) and to doses greater than 100 mSv (defined as high). They then used the Biologic Effects of Ionizing Radiation (BEIR) VII model to estimate the number of cancers that would have been caused by these examinations.

The analysis revealed that 42% of the first cohort received at least 1 CT scan, as did 49% of the second cohort.

CT scans of the head were most common (25% of the first cohort and 30% of the second cohort). Abdominal CT scans, although performed less frequently, accounted for about 40% of the total radiation in each cohort, followed by CT scans of the pelvis and chest.

Of patients receiving CT scans in the first cohort, 2.2% received radiation doses in the low range and 0.5% received doses in the high range. In the second cohort, 4.2% received doses in the low range and 1.2% received doses in the high range.

"Unfortunately we have no way of tracking the data of the patients, so we would like to assume that in a population over the age of 65, some of these patients probably had other medical illness for which CT is a useful adjunct," Dr. Basu said. "There's simply no way for us to correlate which patients were getting those scans. We just have the numbers."

According to the BEIR VII model, the incidence of cancer related to ionizing radiation from CT was 0.02% for the first cohort and 0.04% for the second cohort.

"We were surprised. We expected the number to be higher, especially in the last 5 years or so, because there have been suggestions that maybe 2% of cancers are CT-caused," Dr. Basu said.

Still, he pointed out, "the percentage of patients receiving significant doses of radiation from CT scans did rise between the 2 time periods. So while the risk of secondary cancers appears to be lower than we thought, we still have to monitor our use of such imaging and keep track of the consequences."

Dr. Basu said he would tell clinicians to advise their patients not to be afraid of getting a CT scan if there is a medically appropriate reason.

He admitted that there are times when CT scans are performed for less than medically appropriate reasons.

"There's the good, the bad, and the ugly of medical imaging. The ugly is when somebody sends a patient for financial gain. The bad are CT scans that are done for defensive medical liability reasons or when a doctor doesn't know what is going on and decides to do a scan. The good are the very well-documented reasons or clinical judgment for ordering a scan," he told Medscape Medical News.

The trouble is, it is very difficult for the patient to sort through these things, but asking the right questions about the need for a CT scan can help, he said.

"Asking what will be gained from getting the scan, what are the answers that we expect, is there a financial interest involved — these are some examples of questions patients might ask their provider," Dr. Basu said.

Commenting on this study for Medscape Medical News, Max Wintermark, MD, chief of neuroradiology at the University of Virginia in Charlottesville, said he was reassured by the results.

"I think this is a very useful study because there have been a number of studies recently reporting the increase in the utilization of CT scans, but to my knowledge, this is one of the first studies to look not only at the increase in the number of CT scans, but also at the impact of these scans in terms of cancer risk," he said. "As a radiologist, that's a question that I ask myself every day. I know we use more CT scans, and in a number of cases it's good that we do, but I am always worried that it will be harmful to my patients."

Dr. Wintermark, who moderated the session, said he was happy to see that the cancer risk was "not that bad," adding that radiologists are working to reduce that risk further.

"I've been struck by all the efforts by imaging companies to inform radiologists better about the risk of radiation for each individual patient, to also track more easily the amount of radiation delivered to the patient, in an effort to reduce radiation dose," he said.

Dr. Wintermark predicted that very soon — within a year or 2 — the amount of radiation delivered by a CT scan will decrease 10- to 100-fold. "If you look at the new machines that they have available, a regular CT scan is 3 or 4 mSv, now you get to 0.3 or 0.4 mSv, or even lower, depending on the application you are looking at. We are making a lot of progress in that direction."

He added that in some ways it was good to get such a "wake-up call" about the potential harm from CT scans. "Hopefully, we have addressed it before it really became a big problem."

Dr. Basu and Dr. Wintermark have disclosed no relevant financial relationships.

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