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Radiation Overdoses Point Up Dangers of CT Scans

By WALT BOGDANICH Published: October 15, 2009

At a time when Americans receive far more diagnostic radiation than ever before, two cases under scrutiny in California — one involving a large, well-known Los Angeles hospital, the other a tiny hospital in the northern part of the state — underscore the risks that powerful CT scans pose when used incorrectly.

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Roth family

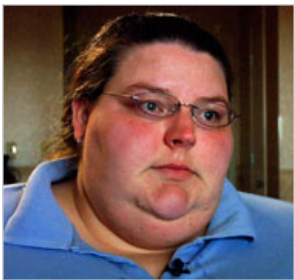
"The problem with this case is that the parents are subjected to worry for the rest of their lives. They're always going to have to worry for years — forever — because every time the child snuffles they instantly start thinking maybe this is the start of something really bad." DON L. STOCKETT, a lawyer representing the family of the child, Jacoby Roth.

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Rob Harris/The New York Times

Mad River Community Hospital in Arcata, Calif.



Rob Harris/The New York Times

Raven Knickerbocker, then an X-ray technologist at Mad River Community Hospital in Arcata, Calif., activated a CT scan 151 times on the same area of the head of 2 1/2-year-old Jacoby Roth, investigators concluded.

A week ago, Cedars-Sinai Medical Center in Los Angeles disclosed that it had mistakenly administered up to eight times the normal radiation dose to 206 possible stroke victims over an 18-month period during a procedure intended to get clearer images of the brain. State and federal health officials are investigating the cause.

Hundreds of miles north at Mad River Community Hospital in Arcata, the other case — involving a 2 1/2-year-old boy complaining of neck pain after falling off his bed — has led to the revocation of an X-ray technician's state license for subjecting the child to more than an hour of CT scans. The procedure normally takes two or three minutes.

The hospital's radiology manager at the time, Bruce Fleck, called the overdose a "rogue act of insanity." Robert Schlag, chief of the state's division of Food, Drug and Radiation Safety, said it was "one of the more egregious, extreme cases that I have ever seen."

The Arcata case is considered particularly disturbing because children are more vulnerable to the long-term effects of radiation, including cancer.

For reasons not yet fully understood, the X-ray technologist, Raven Knickerbocker, activated the CT scan 151 times on the same area, state investigators concluded. A normal test involves some 25 images, Mr. Schlag said. The test was terminated only after the victim's father, who had been holding his son still, began to worry that it was taking too long.

Ms. Knickerbocker, who was fired, is contesting the state's revocation of her license. An administrative hearing was recently adjourned until February, said Don L. Stockett, a lawyer representing the family of the child, Jacoby Roth.

The overdoses at Cedars-Sinai involved CT brain perfusion scans, a type of imaging "used in certain urgent situations — such as a suspected stroke — to identify the extent of possible blood flow problems in the

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brain,” the hospital said in a statement. The median age of the overdose victims was 70.

The hospital blamed its own flawed procedures for the overdoses. But on Thursday its chief executive, Thomas M. Priselac, said the manufacturer could help to prevent future errors by improving its internal settings and by installing more safeguards.

Cedars-Sinai began investigating the procedure in August after a patient noted a “temporary patchy [hair loss](#).” In a statement issued this week, the hospital added: “We have also received calls this week from other advanced [hospitals](#) who conduct this specialized type of CT brain perfusion scan, asking us about this issue, as they are looking into their own equipment and protocols.”

The hospital said that upon discovering the overdoses, it immediately informed appropriate government agencies. The federal [Food and Drug Administration](#) has alerted medical facilities that use CT imaging and asked them to review their procedures.

“While this event involved a single kind of diagnostic event at one facility, the magnitude of these overdoses and the impact on the affected patients were significant,” the agency said in a statement. “This situation may reflect more widespread problems with CT quality assurance programs and may not be isolated to this particular facility or this imaging procedure.”

The much smaller Mad River hospital, with 78 beds, did not report Jacoby Roth’s overdose to the state health department, as it was required to do. Had Jacoby’s parents not become suspicious and reported the incident, health officials might not have known about it.

“Absolutely, it concerns us,” Mr. Schlag, the state health official, said of the hospital’s failure to report the overdose.

After the incident, pictures of the child showed “a clear line” on his face “consistent with the anatomical region that received the excessive radiation,” state investigators said.

Since then, Jacoby has not shown any ill effects, said Mr. Stockett, who represents the Roth family in a pending lawsuit against the hospital and Ms. Knickerbocker. Since the effects of radiation can take years to develop, the prognosis is uncertain. The lawyer said his radiation expert predicts that the child will develop [cataracts](#) in three to five years.

Assessing the probability that Jacoby will develop radiation-induced cancer is difficult, Mr. Stockett said, because medical literature looks only at full body exposures for children at Nagasaki and Hiroshima. The Mad River overdose affected only a specific area.

“The problem with this case is that the parents are subjected to worry for the rest of their lives,” Mr. Stockett said. “They’re always going to have to worry for years — forever — because every time the child snuffles they instantly start thinking maybe this is the start of something really bad.”

Mike Morrison, the hospital’s lawyer, said that while it was possible Jacoby received more radiation than intended, “we don’t know that yet.”

“How serious of an injury, if any, is something else we don’t know yet,” Mr. Morrison added.

Ms. Knickerbocker said in an interview that she did not remember pushing the scan button 151 times. “I pushed the button like four to six times,” she said. “It’s frustrating because I don’t know what happened. I never intended it to happen.”

She said the machine must have malfunctioned. “I’ve been a technologist for more than 10 years,” she said. “Never had any kind of problems, never been written up.”

As the mother of a young daughter, Ms. Knickerbocker said she could understand what the Roth family was going through. “I’m human and if I did make an error, I’d be the first to admit it,” she said. “And I’m not afraid to ask for help when I need it. And unfortunately, that day, the help wasn’t there.”

According to state records, Ms. Knickerbocker told investigators that after suspecting the machine was malfunctioning, she summoned help but none came.

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A state investigator concluded that even if the machine had malfunctioned, she should have stopped the test.

Jacoby was taken to the Mad River hospital's emergency room on Jan. 23, 2008, after falling off his bed the night before. The emergency room doctor ordered a CT scan.

Ms. Knickerbocker administered the scan for 65 minutes before the parents stopped it, records show. The images were not clear, so another X-ray technician redid the procedure in under two minutes using the same equipment.

Simon Akam contributed reporting.

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