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NEWS

RSNA Press Release

New Technique Lowers CT Radiation Dose for Children

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OAK BROOK, Ill. - A new technique allows radiologists to lower the radiation dose that computed tomography (CT) delivers by tailoring the dose based on a child's size, according to a study appearing in the August issue of the journal *Radiology*.

"The purpose of our research was to provide the technologists who run CT scanners with a precise recipe for lowering the radiation dose levels for pediatric patients by matching radiation to body size, while still delivering a high-quality CT scan," said the study's lead author, John M. Boone, Ph.D. "There is a well-established need for this type of formula for dose reduction in pediatric CT," said Dr. Boone, professor of radiology and bioengineering at the University of California Davis in Sacramento.

The researchers studied CT images acquired using simulated pediatric patients of varying sizes to determine the lowest radiation doses achievable without loss of image quality. The resulting technique charts provide guidance for both head and body CT for pediatric patients from infancy to adolescence.

The researchers found that abdominal CT radiation doses can be reduced by 94 percent (from the standard adult level) for children with a five-inch abdominal diameter and by 36 percent for those with a 10-inch abdominal diameter. To measure the patient size, the technologist may either wrap a measuring tape around the body part to be scanned or use software measurement tools available on the CT computer.

Recently, the CT radiation dose delivered to pediatric patients has come under scrutiny, as the increasing number of beneficial medical applications for pediatric CT result in more pediatric exposure to radiation.

While several studies have reported qualitative techniques for estimating what dose reductions could be made while still maintaining good CT image quality, the new study offers a more exacting measure, according to Dr. Boone. "Our research leveraged the physics of CT along with experimental measurements performed on a CT scanner of tissue-like cylinders of different diameters," he said. "Our study therefore relies upon quantitative data for determining dose reduction, which should provide a more objective set of instructions for dose reduction in pediatric CT."

The researchers report that using the dose reduction factors outlined in the study would result in a population dose reduction of 77 percent in an evenly distributed population between 0 and 14 years of age. "If the radiology community used the techniques that are recommended in this article, there would be a substantial reduction in pediatric CT dose nationwide," Dr. Boone said.

Dr. Boone recommended that parents of small children ask the personnel operating the CT scanner if measures are being taken to reduce the radiation dose. If the child is an adolescent or is near the stature of an adult, then little or no dose reduction may be possible.

"There is widespread recognition in the pediatric radiology community of the need to reduce CT dosage for smaller patients. The scanner manufacturers have virtually all responded to this, and the newer scanners being delivered today generally have automatic procedures for reducing dose in smaller patients," he said. "As older CT scanners that do not have automatic dose reduction capabilities are replaced with newer models that do, dose reduction for smaller patients will become normal practice. In the meantime, the technique factors that we reported in our article will be useful towards this goal of lowering radiation dosage," Dr. Boone said.

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"A Rational Approach to Dose Reduction in Pediatric CT." Collaborating with Dr. Boone on this study were Estella M. Geraghty, M.D., M.S., J. Anthony Seibert, Ph.D., and Sandra Wootton-Gorges, M.D.