



Pediatric Clips

*Child-size doses of radiation:
the Image Gently campaign* By Elizabeth Ey, MD

Pediatric Clips from The Children's Medical Center of Dayton are quick reviews of common pediatric conditions.

The Children's Medical Center of Dayton is the region's pediatric referral center for a 20-county area. As the only facility in the region with a full-time commitment to pediatrics, Dayton Children's offers a wide range of services in general pediatrics as well as in 35 subspecialty areas for infants, children and teens. We welcome your inquiries about services available – call 937-641-3666 or e-mail marketing@childrensdayton.org.



Experts you trust, caring for the children you love.

One of the joys of being a pediatric radiologist is working with children and their families. Families often experience anxiety from having a sick or injured child, and the procedures and tests ordered can add to that anxiety. In addition, recent media coverage of concerns regarding the radiation dose from computerized tomography (CT) scans may also heighten anxiety.¹ For pediatric health care providers, families inquire on what can be done to reduce the risks for their child from radiation exposure in medical imaging.

A NATIONAL INITIATIVE

There is good news and a good resource for providers and their pediatric patients. The Alliance for Radiation Safety in Pediatric Imaging consists of 23 organizations representing more than 500,000 health care professionals worldwide. The Alliance launched the *Image Gently* campaign in January 2008. The campaign is a national initiative to educate providers of pediatric imaging care about the importance of child-sizing radiation doses, especially in CT scans. Their website is a resource for physicians and families to learn more about the risk of radiation in children.²

The goal of the *Image Gently* campaign is to raise awareness of radiation risk in children and is especially targeted on the use of CT in children. CT is currently the single largest source of radiation exposure to the United States population. In 2006, about four million CT scans were performed in children in the United States; triple the number performed on children in 2001.

When a CT scan is performed on a child using adult scan techniques,

the child is exposed to significantly more radiation than required for body size. The smaller size of a child requires considerably less radiation dose to penetrate the body and to create a diagnostic image. The actively growing tissues in children are more sensitive to radiation than an adult. The life expectancy of a child is longer compared to an adult meaning the effects of radiation exposure last a longer time in a child.³ CT scan practices from 1990-2000 reported patient radiation exposure in the dose range experienced by long distance survivors of the nuclear bombings in Japan.⁴ Previous studies have estimated that CT use in the early to mid-1990s might be responsible for four out of 1000 cancers occurring today. CT use may result in 1.5 to 2.0% of the cancers that will occur 15 to 25 years from now.^{5,6}

Until recently, most health care providers and patients were unaware of the radiation risk from CT scans. A survey performed in 2004 asked patients, emergency department (ED) physicians and radiologists their perception of relative radiation dose from a chest radiograph versus a CT scan of the abdomen. The survey found that zero patients, 22% of ED physicians and 13% of radiologists answered correctly that on average the CT scan delivered between 100 to 250 times the radiation dose of a chest radiograph.⁷ The same survey asked if there is an increased cancer risk to the patient from a single abdominal CT scan. Approximately 47% of radiologists, 9% of ED physicians, and 3% of patients correctly answered yes.⁷

CT scans in children should only be performed when necessary. When it

is appropriate to perform a CT scan in a child, the scan parameters (kVp and mA) should be adjusted to the child's size and needs. The CT scan also needs to be limited to the indicated body region. Multiphase scanning (before, during and after IV contrast) should not be performed routinely when one phase will suffice. Alternative imaging to CT scan, such as ultrasound (US) and magnetic resonance (MR) should be considered whenever possible. Consultation with a pediatric radiologist is important in managing the imaging options and radiation exposure for children.

GOING ABOVE AND BEYOND TO MINIMIZE RADIATION

The medical imaging department in The Children's Medical Center of Dayton has consistently provided the appropriate doses of radiation for our pediatric patients. Radiation safety has always been a priority and the ALARA (As Low As Reasonably Achievable) has been the guiding principle for radiation exposure. The CT scanner is regularly calibrated for radiation output and a radiation physicist recently verified our CT protocols use less radiation than the guideline set by the *Image Gently* campaign for radiation dose.

The use of breast, thyroid and orbit shields in CT have been instituted to reduce radiation exposure to those more sensitive organs. A radiologist reviews each order for CT scans to be sure the exam is indicated as ordered and that the exam is completed properly the first time. Routinely, scans in multiple phases of IV contrast enhancement are not performed. Child life specialists

Continued from the front.

help prepare a child and family for lengthy and difficult tests in order to reduce anxiety, improve cooperation and limit the number of attempts needed to achieve diagnostic images. The department continues to look for ways to improve diagnoses of childhood illness in a safe and caring environment. We are pleased to partner with and promote the *Image Gently* campaign to help educate our pediatric patients, families and other health care professionals about the special needs of children in medical imaging.

REASONS TO CHILD-SIZE DOSES OF RADIATION²

- CT helps us save kids lives
- When we image, radiation matters
 - Children are more sensitive to radiation

- What we do now lasts for their lifetime
- When we choose to image a child, we need to image gently
 - More is usually not better
 - When CT is the right thing to do:
 - Child-size the kV and mA
 - One scan (single phase) is usually enough
 - Scan only the indicated body area

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FEATURED SPECIALIST



ELIZABETH EY, MD, is the medical director in the department of medical imaging at The Children's Medical Center of Dayton. Dr. Ey completed

a fellowship in pediatric radiology at Cincinnati Children's Hospital Medical Center. She is board certified in diagnostic radiology and has a certifi-

cate of added qualification in pediatric radiology. She performs angiography and interventional studies such as drainages, biopsies and intraoperative image guidance. Dr. Ey has special interest in neuroradiology, interventional radiology, cross-sectional imaging and 3D reconstructions available in CT and MRI.

MEDICAL IMAGING AT DAYTON CHILDREN'S

The department of medical imaging at Dayton Children's provides a full spectrum of diagnostic imaging for infants,

children and teens. Our board-certified pediatric radiologists are available 24 hours a day, seven days a week to read tests and our staff is specially trained in sedating infants and young children. In addition the department has state-of-the-art equipment designed to perform diagnostic examinations with a minimum of radiation exposure to patients. Dayton Children's also has five convenient off-site locations with medical imaging services. For more information, call 937-641-3811.



For further information about The Children's Medical Center of Dayton or its specialists contact us at 937-641-3666 or marketing@childrensdayton.org.



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