

*Thirty years ago, the invention of computed tomography (CT) allowed physicians to evaluate internal organs without doing surgery. In those early days, the scan itself took several hours. Producing images from the data took even longer.*

## A Sharper Image

*A three-dimensional reconstruction image from a CT angiogram shows the carotid arteries, the major arteries that carry blood to the head. This image shows a blockage of the left internal carotid artery.*



Today, a scan of the entire body can be done in minutes, and the data can be quickly converted into three-dimensional images. At Lahey Clinic Medical

Center, Burlington, the Department of Diagnostic Radiology recently installed a 64-slice, multidetector CT scanner, the latest advance in CT technology.

“We can achieve better resolution of a smaller piece of tissue or image a greater amount of tissue at a higher rate of speed,” says radiologist William F. Arndt, MD. “Better resolution and quicker acquisition even allow us to see things that are moving—such as the heart.”

### Speeding Up the Process

CT has always been a two-step process. The basic principle involves an X-ray beam passing through an axis in the patient’s body while an X-ray detector records data corre-

sponding to a cross-sectional “slice.” As the patient passes through the scanner, the beam moves around the patient, yielding a series of slices from different angles. Computer software then translates the data into visual images that doctors can analyze.

“With CT, slice thickness is controlled by the thickness of the detectors,” explains Arndt. “Other scanners in use today have thicker detectors and fewer of them. The new CT has very thin detectors and there are 64 in all. Thinner slices mean better resolution, and more detectors mean faster scanning of the patient.”

Sharp resolution is especially important when looking at structures that are very small, such as blood vessels. With 64 detectors, physicians can get a better look at the arteries of the brain, heart and extremities than they could with previous CT scans. In some cases, Arndt says, it may spare patients from having a more complicated procedure.

The current gold standard tool for evaluating arteries is angiography. Doctors use angiography to diagnose and treat coronary artery disease, peripheral vascular disease, and brain aneurysms. In this procedure, a physician threads a thin catheter into an artery and injects a contrast dye to highlight a suspected blockage or aneurysm in the branch arteries.

“We have always had the ability to do traditional angiograms,” says Arndt. “But those procedures are more invasive, requiring an arterial puncture. While there are many patients who, for various reasons, must still undergo conventional angiography, the new CT allows us to get similar images in some cases, with just an IV injection. It is much quicker and easier on the patients.”

Anna K. Chacko, MD, chair of Diagnostic Radiology, expects the new technology to have widespread applications, from evaluating bone fractures to diagnosing aneurysms. “This technology will allow additional screening of patients so that they can avoid having an invasive procedure unnecessarily,” Chacko says.

*For more information on diagnostic imaging at Lahey, visit our Web site at [www.lahey.org](http://www.lahey.org).*