The new CT scanner constitutes a major leap forward in imaging technology, delivering high-quality images in high-definition with 50-per-cent clearer resolution as compared to those images produced by conventional CT scanners. In addition, the new scanner uses at least 50-per-cent less radiation – dramatically reducing exposure for patients. St. Paul’s was the first hospital in Canada to acquire the General Electric (GE) CT 750 HD 64-slice scanner. And only a few dozen of these cutting-edge devices are currently in use around the world, including at leading health centres such as the Mayo Clinic in the United States.

SCANNING FOR TROUBLE

Lab tests showed that Sandhu had high cholesterol levels, but he was poorly tolerant of the medications prescribed for this. He did not have any major cardiac symptoms. Nevertheless, he had just turned 50, and both his father and brother had died in their early 50s. “I was a little concerned,” says Sandhu.

A stress test to measure how well Sandhu’s heart functioned during exercise proved normal. However, his brother also had normal stress-test results – and that was just a few months before he died. “It [a normal stress test result] didn’t ease my mind.”

Sandhu wanted to be sure there were no other problems. His family physician sent him to a heart specialist who referred him to St. Paul’s Hospital’s Cardiology Department, part of the Providence Heart + Lung Institute. For cardiologist Dr. Brett Heilbron, Sandhu was a good candidate for imaging using the new scanner, as the test could clarify whether he needed aggressive medical therapy or not.

Just as he had hoped, the 15-minute test brought Sandhu some peace of mind, but showed that he had early buildup of plaque in his arteries. Sandhu had wondered whether he needed to stay on his cholesterol-reducing medication. “Now I know I have to stay with it,” says Sandhu, citing the scan results. “It’s a decision that’s made.”

ADVANCED CARDIAC IMAGING

The CT scanner will have a crucial role in a new program under development within the Providence Heart + Lung Institute at St. Paul’s Hospital. Led by Heilbron and radiologist Dr. Jonathon Leipsic, the Advanced Cardiac Imaging Program is a unique collaboration between radiology and cardiology. With highly specialized training in cardiac imaging, Drs. Leipsic and Heilbron are experts in this relatively new field.

“Until about five years ago, we couldn’t do coronary CT,” says Heilbron. “We weren’t able to scan fast enough to freeze the motion of the heart.” The new scanner has changed all that.

In selected patients, CT scanning is a valuable alternative to the traditional X-ray angiogram – a procedure during which a catheter is threaded from an artery (usually in the groin) to a coronary artery that is then visualized using X-rays. While the procedure is commonplace, it is not without attendant risks.

“There is a risk of bleeding because you have to go in through a large artery in the groin, and also a risk of stroke, heart attack and death,” says Heilbron. “The total likelihood of something bad happening is quite rare – less than two per cent – but it’s not zero.”

The advantage of a coronary CT scan is that it is less invasive, safer, less expensive and also faster.

“For those patients who have atypical chest pain, who may have inconclusive test results such as a stress test that is in the grey zone or a nuclear perfusion study that could be a false positive, the CT scan may be necessary,” says Heilbron.

“What we find is that we can pick up disease at an earlier stage and intervene earlier. Conversely, we can identify those patients who don’t have atherosclerosis [hardening of the arteries] and don’t need aggressive therapies or long-term cholesterol-lowering drugs or long-term aspirin. We can look at the coronary arteries using non-invasive technology that allows us to make a diagnosis in the majority of patients that we scan.”

Heilbron stresses that catheter angiograms will always have a place in cardiology-related diagnostics and therapy: “There will always be some patients who are best managed with them: if they are at high risk; if they’ve got unstable angina; if their history is very convincing for angina; or if they’re very likely to require an angioplasty [a mechanical method of widening the arteries] it’s better to go straight to an angiogram than to do another non-invasive test.” However, Heilbron anticipates...
Clockwise from top: St. Paul's cardiologist Dr. Brett Heilbron (right) and radiologist Dr. Jonathon Leipsic are using their specialized cardiac imaging training to diagnose and rule out heart problems with the new high-definition CT scanner; The scanner provides highly detailed images of organs and small structures throughout the body, including coronary arteries, stents (wire mesh tubes used to keep arteries open) and the chambers of the heart.

that the new scanner will gradually take on more and more patients.

In addition to delivering many benefits for heart patients, the new scanner will also be used to help diagnose health problems throughout the body, including early stroke detection and diseases of the lung, liver and kidney.

RESEARCH POSSIBILITIES
Leipsic is delighted with the research possibilities provided by the new scanner: “The fact that we were one of two beta sites selected in Canada is something to be excited about.

“My interest stems from the recognition that in order to do really advanced cardiac work we need to improve the technology. Coronary arteries are small structures but we have to see them to the smallest detail. The scanner that will afford you that will win out. On that basis, I feel that this new GE scanner is the answer. It will be better in evaluating the coronary arteries and in evaluating heavily calcified arteries, which is currently extremely challenging.”

St. Paul’s selection as a beta site (a site involved in multi-centred trials to validate research technologies for clinical use) didn’t happen by accident. Last June, when Leipsic heard that GE was considering St. Paul’s, he travelled to Milwaukee, Wisconsin, to persuade GE of the merits of his hospital.

“I described the merits of our hospital to the head of research,” says Leipsic. “I stressed the collaboration we have between radiology and cardiology. I made it really clear that I felt that St. Paul’s is optimally positioned for research and clinical applications. We don’t want to be late to the game. We wanted to be involved in some of the initial technology validation. In order to do that, we needed to get the scanner early.

“We are very grateful to St. Paul’s Hospital Foundation and its donors for recognizing the need to bring the scanner to St. Paul’s as soon as possible,” says Leipsic.

And now, research is already underway.

“We’re doing one multi-centre trial collaborating with Cornell,” says Leipsic. “We want to find out how good the scanner is at measuring the severity of the narrowing of the coronary arteries. We’re going to look at the radiation dose reduction, which is a unique feature of this scanner. We’re also going to look at stents [wire mesh tubes used to prop open arteries that have recently been cleared using angioplasty; previous CT scanning technology couldn’t see them very well]. The scanner is also a robust tool for whole-body imaging, which is extremely important given its role in the general medical imaging department. It will play a large role in acute stroke assessment and in the evaluation and characterization of abdominal masses.”

Leipsic is especially pleased with the fact that the new scanner operates using a significantly less radiation: “Radiation has been a real Achilles heel for CT scanning. It’s not good to get a nice image if the radiation dose is very high. We have to remember, ‘First, do no harm.’”

St. Paul’s Hospital Foundation committed $200,000 in crucial seed money from various donors to bring this powerful new CT scanner to the hospital, providing timely access to this leading-edge technology for both patient care and research. The Foundation continues to actively raise the additional $2 million needed from the community-at-large to complete the purchase. To find out how you can donate, please call 604-682-8206.

by claudia cornwall