“This is the largest study conducted by a single centre using the high-resolution 64-slice CT.

- Dr. Ben Chow, Co-Director of Cardiac Radiology, UOHI
(from Confirmed: Cardiac CT Can Help Predict and Prevent Heart Attack, page 1)

“Our new Diabetes Management Clinic is an important step in establishing a disease management infrastructure.”

- Dr. Richard Davies, Cardiologist, UOHI
(from The Very Best Practice in Diabetes Management, page 3)

This is the first Canadian study to examine a systematic approach to diagnosing potential diabetes among hospital patients and ensuring they are connected to appropriate community-based resources.

(from The Next Frontier: Identifying Diabetes by the Ottawa Model, page 3-4)

“Even some patients who have coronary disease, who’ve been through treatment, don’t understand that their symptoms are cardiac related.”

- Dr. Kathy Ascah, Director of the Stress Laboratory, UOHI
(from In Conversation, page 4)

Confirmed: Cardiac CT Can Help Predict and Prevent Heart Attack

Newly published research shows that cardiac computed tomography (CT) can identify and predict patients at risk for heart attack and death. The study, conducted at the University of Ottawa Heart Institute, is one of the largest to date to look at the clinical value of the high-speed imaging technology. The Heart Institute is a North American leader in diagnostic imaging, including research into new CT technology as a faster, effective alternative to invasive tests, such as cardiac catheterization. A cardiac CT scan, which takes seven to 10 seconds, images the entire heart and the arteries in three dimensions. The high-resolution images visualize plaque deposits, which can build up to clog vessels, block blood flow to the heart and cause a heart attack.

“We are pleased with the results of this study, which confirm the potential of CT to detect and predict heart attacks,” said Dr. Ben Chow, Co-Director of Cardiac Radiology. Details of the study were published electronically in March in the Journal of the American College of Cardiology (J Am Coll Cardiol 2010; 55: 1017-1028).

The Heart Institute employs an advanced 64-slice CT installed in 2006 as the first such unit in Canada dedicated to cardiac care. Each year, there are some 6,000 cardiac CT scans performed at the Heart Institute. High volumes provided Dr. Chow’s research team with a substantial database of patients to follow up cause of death and other post-CT cardiac events, such as heart attack. More than 2,000 patients were followed by Dr. Chow’s team over a period of two years for this research project.

In many cardiac centres, patients are normally tested using catheterization. This involves threading a tiny catheter through the blood vessel to produce an image that can highlight arterial blockages that reduce blood flow to the heart. The procedure takes up to 40 minutes and patients often stay in hospital as long as six hours. There is also some risk associated with the invasive procedure.

(from The Very Best Practice in Diabetes Management, page 3)

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The Beat is published by the University of Ottawa Heart Institute (UOHI). Comments or questions about The Beat should be directed to Jacques Guérette, Vice-President, Communications, at 613-741-4850 or jguerette@ottawaheart.ca. For more information about UOHI, please visit www.ottawaheart.ca.

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"Our main goal is to provide our patients with the latest technology and reduce wait lists to the shortest possible time while being able to pinpoint strong indicators of coronary artery disease. If we can identify patients earlier and get them proper medical therapy, we expect this will reduce the likelihood of a heart attack or death. Our research demonstrates the importance of cardiac CT as a diagnostic tool," said Dr. Chow.

CT is still regarded as a novel technique for cardiac medicine. Traditionally used to image the brain and other organs, cardiac CT provides exquisite detail of the interior workings of the heart, including views of calcified plaque as well as other types of mixed plaque collected inside the lining of the vessels. Until the 64-slice CT became available, the technology was not applicable to a beating heart.

"For individuals who suffer heart attack or sudden cardiac death, the cause is often due to nondescript plaques that rupture, block blood flow and cause a heart attack. The more plaque you have, the more likely you will suffer a cardiac event. CT allows us to see the plaque buildup and take appropriate action," said Dr. Chow.

The 64-slice CT at the Heart Institute works with sophisticated image processing tools so a physician can manipulate images for closer inspection at different vantage points. The higher resolution also allows for detailed threedimensional mapping of the vascular system and surrounding soft tissue. In addition, CT can simultaneously measure ejection fraction—a functional measure of the capacity at which the heart pumps blood out of a ventricle.

The question of whether high-resolution cardiac CT is an effective diagnostic tool has recently taken on heightened importance. This is, in part, because cardiac CT is such a new technology but also because of concerns about radiation exposure. In early February, the U.S. Food and Drug Administration announced it is issuing new requirements for makers of CT scanners and other imaging devices to safeguard patients from excess exposure to radiation.

"The medical community understands that before a new modality or test can come into play, it must meet certain criteria," said Dr. Chow. "Those criteria didn’t exist with older tests and we are being held to a much higher standard." The Heart Institute has one of the most comprehensive cardiac imaging programs in the world. Dr. Chow and the medical team look at a range of factors before recommending any diagnostic tests. These factors include the so-called “pre-test probability,” which is based on a number of risk factors that would determine whether a person is predisposed to heart disease and should be tested. Risk factors are based on age, gender and symptoms and then family history, smoking, diabetes, cholesterol and high blood pressure.

"Based on a person’s size, their heart rate and the pre-test probability, we will choose one modality, one test," explained Dr. Chow. "We are careful when making a decision to perform a diagnostic test to ensure they are not administered needlessly."

This study is one of a number of research projects by Dr. Chow and his team since the first 64-slice CT was installed at the Heart Institute. Results published in late 2009 examined the likelihood, with increased CT use, of discovering incidental findings in parts of the body beyond the heart. According to Dr. Chow, it is common for radiologists to detect these incidental findings, but it is more important that they be classified properly. Most findings are not clinically significant and would only be noted in the patient’s file.

Of the patients examined in the study, 1.2 per cent of the group had significant findings that required further action, and 7 per cent had indeterminate findings that required further diagnostic testing where illness, such as lung cancer, was discovered.

CT research at the Heart Institute has proved both important and useful, but further studies are needed to investigate patients at a number of different centres. CT, said Dr. Chow, represents technology on the frontier of cardiology. Research will show how quickly CT will become an indispensable tool.

More details about Dr. Chow’s research are available in an online interview on the American College of Cardiology site. See "JACC Journals" and "Prognosis of Cardiac CT" at the at the following link: http://cardiosource.org/cvn/index.asp

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**Managing the Dangerous Business of Diabetes**

Death from cardiovascular disease accounts for about 70 per cent of all diabetes-related deaths. As a group, individuals with diabetes have a significantly higher incidence of coronary artery disease. It’s not surprising, then, that diabetes is a common co-morbidity among hospitalized cardiac patients. Some 20 per cent of patients discharged from the University of Ottawa Heart Institute have diabetes.

Despite improvements in the prevention and treatment of heart disease, the management of cardiac patients with diabetes is challenging. Since diabetic patients with coronary artery disease—remains a challenge. In the coming years, this is serious situation has the potential to further deteriorate.

The Canadian Diabetes Association predicts by the end of this decade, the number of Canadians with diabetes will rise by 50 per cent. Research has shown that diabetes has increased in the general population and was present in the year 2000 in about 12 per cent of Canadians over the age of 50.

A leader in developing new approaches to cardiovascular medicine, the Heart Institute is launching two important programs to, firstly, identify diabetic patients and, secondly, to help patients manage their diabetes after leaving the hospital.

The goal, says Heather Sherrard, Vice-President, Clinical Services, is to create a continuum of care as a means of handling the growing diabetes epidemic. “One part of the program involves trying to identify patients early and repute them to the right treatment strategy. Another part lies in assisting, diabetic patients who are already admitted and ensuring their diabetes is being managed while they are dealing with heart disease.”

The stories on page 1 offer background to physicians and patients on diabetes and its relation to heart disease, as well as information on new care and research programs at the Heart Institute.

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**By the Numbers: Diabetes and Cardiovascular Disease**

- Diabetes deaths due to cardiovascular disease
- People with diabetes who are undiagnosed and unaware of their condition
- Newly diagnosed and possible diabetes cases in previously undiagnosed hospital patients (Preliminary data from the Ottawa Model study)
The Very Best Practice in Diabetes Management

Diabetes is a major cause of heart disease. It is well recognized that more than 20 per cent of patients with heart disease also have diabetes. Caring for both conditions simultaneously is medically complex. It also poses special burdens on patients who have to play a major role in managing both of their conditions if they are to do well.

For their diabetes, patients must learn to monitor blood sugars, control the carbohydrates in their diet and manage the medications related to glucose control. For their heart disease, self-management can include cardiac rehabilitation, a well-structured exercise program, smoking cessation and the management of other medications specific to their cardiac disease.

It sounds good on paper. But things don’t always work as planned. A “care gap” exists whenever patient care does not meet best practice guidelines. Several recent published studies have shown evidence of such a care gap in cardiac patients with diabetes. This research indicates that many are not receiving the treatments proven to help them feel better and live longer.

It has been repeatedly shown that physician education alone is not sufficient to address these care gaps. Systems and procedures need to be put in place to identify patterns of care across within entire communities, to establish and implement treatment programs, and to measure and monitor their effectiveness, said cardiologist Dr. Richard Davies of the University of Ottawa Heart Institute.

“For we made it our goal to improve the delivery of care our to patients by working with specialists in other areas, such as endocrinology, to establish coordinated disease management programs. We are paying particular attension to providing a smooth transition and continuity of care to those patients with complex medical disease who are being discharged from hospital after an acute episode of heart disease,” said Dr. Davies.

The first such initiative is a Diabetes Management Clinic—a collaboration between the cardiology care team at the Heart Institute and the diabetes care team of the Division of Endocrinology & Metabolism at The Ottawa Hospital. “Our long-term objective is to improve the process of care so that all Heart Institute patients are treated according to best practice guidelines by default,” said Dr. Davies, who is establishing the clinic.

“Our new Diabetes Management Clinic is an important step in establishing a disease management infrastructure. The principle of the clinic and program is a collaborative approach involving a health care team working together to ensure continued, comprehensive care. This is most critical in the first three months after a heart patient is discharged from hospital.”

Besides the usual process of care for heart patients—diagnostic testing, treatment, medication monitoring and dose modification—there is a significant amount of education needed for both patients and their family physicians.

The Next Frontier: Identifying Diabetes Using the Ottawa Model

The phrase “diabetes epidemic” rings with increasing frequency from those in care institutions. Research shows that in North America, 50 per cent of individuals with diabetes are undiagnosed and unaware of their disease. More alarming, however, is that diabetes is a highly potent risk factor for developing heart disease.

The University of Ottawa Heart Institute has embarked on a research project to routinely screen and test newly admitted patients to identify those who have slipped through the net and may have undiagnosed diabetes. This is the first Canadian study to examine a systematic approach to diagnosing potential diabetes among hospital patients and ensuring they are connected to appropriate community resources, said Rob Reid, PhD., Associate Director of the Minto Prevention and Rehabilitation Centre at the Heart Institute.

“The average person with diabetes actually has the condition for about 10 years before they are diagnosed with it. The delay in diagnosis often results in complications, including cardiovascular disease and other damage such as kidney disease,” said Reid.

Reid’s approach is to apply the principles of the Heart Institute’s exceptional Ottawa Model for Smoking Cessation—perhaps the most successful smoking cessation programs in Canada. The same tools are being re-engineered to create a systematic approach to identify, manage and follow patients with undiagnosed diabetes.

The smoking cessation model involves the routine screening of all patients admitted to the Heart Institute. A physician and nurse team monitor smoking status, provide counselling, use smoking cessation medications if needed and provide long-term follow up after hospital discharge.

The Ottawa Model has up to a 50 per cent quit rate and has reached 20,000 patients across the country in centres that have adopted the program.

In applying the model to diabetes, all patients are systematically tested for hyperglycemia (high blood sugar levels) and necessary monitoring and treatment is initiated while in hospital. Additionally, patients who are discharged from the hospital are monitored and counselled with a reference to their family physician.

The Ottawa Model for Undiagnosed Diabetes is a 26-week project, funded by the Ontario Ministry of Health Promotion in collaboration with Division of Endocrinology & Metabolism at The Ottawa Hospital. The study will test 250 heart patients, whose results will then be assessed. The goal of the project is to establish whether the model is valid for diabetes and more firmly establish the prevalence of undiagnosed diabetes in certain hospital settings.

Other important details will be gleaned to provide a comprehensive database on the characteristics of patients, their progress after discharge from hospital and how the health care system is capable of providing help to patients whose diabetes was previously undetected.

“We’re essentially setting up an alert system to get patients onto the right pathway and to ensure everything is done to help deal with a growing epidemic in diabetes. This is a team project with The Ottawa Hospital but we at the Heart Institute are driving it,” said Heather Sherrard, Vice-President, Clinical Services, at the Heart Institute. “Let’s improve the care and get them into a better transition so they can be managed in a team setting, in cooperation with their family physician.”

“Managing these patients is complex. Our goal is to provide the best care available anywhere, and we can only accomplish this by taking a team approach to disease management,” added Dr. Davies.

Diet and nutrition, exercise and overall lifestyle adjustments are important aspects of disease management that a family physician simply cannot achieve alone.

“Our goal in this program is to focus on diabetic patients that are here and being treated for heart disease, and improve all aspects of the care provided to them,” said Heather Sherrard, Vice-President of Clinical Services at the Heart Institute. “Let’s improve the care and get them into a better transition so they can be managed in a team setting, in cooperation with their family physician.”

The screening project works as follows:

• Patients admitted to the hospital for heart disease are administered a glucose level check on admission, along with a second blood test. This is considered the standard in diabetes screening as established in the Canadian Diabetes Association guidelines. The Hemoglobin A1-C provides an average measure of glucose control over the preceding month. Glucose levels can fluctuate in some people under stress. Sometimes blood sugar levels will become artificially high, pointing to a possible problem.
You still tend to see more men than barriers to getting a diagnosis. "Well, I'm 75 or 80, everyone my age feels some aches who will notice that they're slowing down and showing their partners. Husbands usually still have their wives, to downplay their symptoms, and they often outlive. Another set of barriers to diagnosis is that women tend from immigrant backgrounds in particular.

In September of this year, the journal Circulation: Cardiovascular Quality and Outcomes published a look back at 12 years of surveys conducted by the American Heart Association to track awareness and knowledge of heart disease among women. That study found that nearly half of women are still unaware that heart disease is the No. 1 cause of death for women and that only about half of women would call 911 if they were experiencing symptoms of a heart attack.

The Beat sat down with Dr. Kathy Ascah to talk about the issue of women and heart disease. Dr. Ascah has been a cardiologist at the University of Ottawa Heart Institute since 1986 and is Director of the Stress Laboratory.

In Conversation

Dr. Kathy Ascah: Women and Heart Disease

Heart disease is the leading cause of death in women, yet it remains under-diagnosed and symptoms often go unrecognized or ignored. In March of this year, the journal Circulation: Cardiovascular Quality and Outcomes published a look back at 12 years of surveys conducted by the American Heart Association to track awareness and knowledge of heart disease among women. That study found that nearly half of women are still unaware that heart disease is the No. 1 cause of death for women and that only about half of women would call 911 if they were experiencing symptoms of a heart attack.

The Beat sat down with Dr. Kathy Ascah to talk about the issue of women and heart disease. Dr. Ascah has been a cardiologist at the University of Ottawa Heart Institute since 1986 and is Director of the Stress Laboratory.

The Beat: Heart disease is the leading cause of death in women, but it still goes under-diagnosed and under-recognized. Why do you think that's still the case?

Dr. Ascah: I think both women and men still have this preconceived notion that coronary disease or a heart attack involves severe pain, but in many cases, particularly in women, it's more of a feeling of discomfort—such as pressure or indigestion. And this discomfort can be in any atypical location. Another common symptom is shortness of breath. A lot of people just do not equate shortness of breath with cardiac disease; they think it's the lungs, or just that they're overweight. But for some people, particularly with diabetes, shortness of breath may be the only symptom of cardiac disease.

So I think there is still a lack of awareness of what the symptoms are. Even patients who have coronary disease, who've been through treatment, don't understand that their symptoms are cardiac related.

More education and increasing awareness are really important, and that's been one of the major pushes of the Heart and Stroke Foundation, the American Heart Association, and other organizations that deal with cardiac disease. When these groups started emphasizing awareness in the 90s, most women didn't know what to look for—but improvements seem to have hit a bit of a wall in particular, we have not really increased the knowledge of people who are medically underserved, from immigrant backgrounds in particular.

Another set of barriers to diagnosis is that women tend to downplay their symptoms, and they often outline their partners. Husbands usually still have their wives, who will notice that they're slowing down and giving symptoms and will get them to see a doctor. But older women are often alone, and no one notices that they're not quite capable of doing what they used to do.

And women often pass their symptoms off as normal—"Well, I'm 75 or 80, everyone my age feels some aches and pains now and then." These are psycho-social barriers to getting a diagnosis.

On discharge, a patient who is flagged as "potential diabetes," will receive a letter and a maximum of three automated telephone calls over a one-year period in order to track their progress in diabetes screening and management. The goal of the project is to adapt the Ottawa Model as a basis for identifying and managing other high-risk patients. Both diabetes and smoking are among the top risk factors for heart disease. Collaboration with The Ottawa Hospital Division of Endocrinology under Drs. Erin Keely, Division Chief, and Janine Malcolm, Program Director, has helped provide the test procedures, protocols and patient management advice.

"In the Ottawa Model, we learned lessons about the strength of applying routine protocols to telephone follow-up. These can significantly impact the management of patients discharged after short-stay cardiac surgery," said Dr. Andrew Pipe, Chief, MIasto Prevention and Rehabilitation Centre at the Heart Institute.

"We have helped transform approaches to patient care. We've influenced professional behaviour in health care institutions across our regional health district and, increasingly, across the entire country among the nearly 80 hospitals that have introduced the Ottawa Model for Smoking Cessation.”

Dr. Ascah: One thing is diabetes—that tends to be a stronger risk factor in women. While women tend not to be at risk of coronary disease until after menopause, if they're diabetic they have the same risk as a man of the same age. High triglycerides, which often go along with obesity and diabetes, tend to be a stronger risk factor in women than men. Smoking affects men and women pretty equally, but women are thought to have a more difficult time quitting.

Another thing, which ties into prevention, is that women tend to be the primary caretakers—of their kids, of their husband, of their aging parents—and they're often working full time as well. It's hard for them to find time to get out and exercise. Sometimes I'll actually write a woman a prescription for exercise to help them see how important it is—it's probably even more important than medication in some cases.

Because women are at lower risk prior to menopause, sometimes they don't get a push to make the lifestyle changes that are necessary to prevent cardiac disease. We may need to find a different way of getting them into the clinic, getting them to realize how important healthy lifestyle is, and do this soon enough so that they can make the necessary changes to avoid becoming a statistic.