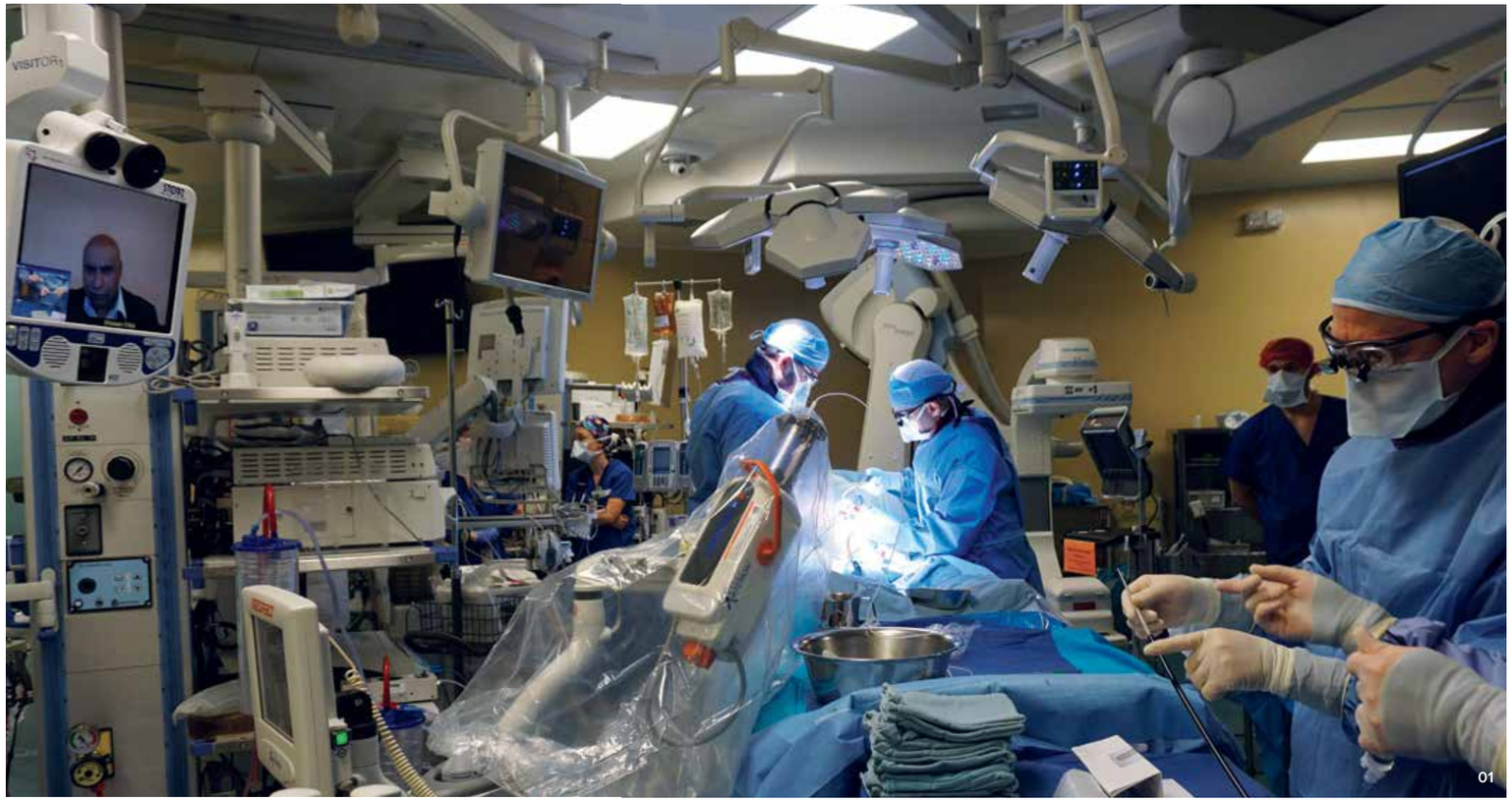
Bringing world-class cardiovascular care to Ontario's northwest

With an innovative 'one program, two sites' model, the PMCC is helping patients in the Thunder Bay area stay closer to home for the life- and limb-saving procedures they need

By **Shelley White**



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THUNDER BAY RESIDENT PEARL SLYFORD went for a routine doctor's appointment 15 years ago and received a surprise diagnosis.

"The doctor had a young intern working with him at the time, and he was examining my stomach and the intern said, 'What is this?' " says Ms. Slyford, now 83. "The doctor said, 'It's an aneurysm.' "

The intern had detected a bulge or "ball" in Ms. Slyford's abdomen, caused by an abdominal aortic aneurysm (AAA), or a ballooning of a portion of the aorta. The aorta carries blood away from the heart and to the rest of the body. Aneurysms of the aorta can be life-threatening if the swelling causes the aortic walls to weaken and rupture.

Because the aneurysm was still small in size, Ms. Slyford's doctor didn't prescribe any treatment. But she continued to get ultrasounds every six months to monitor the aneurysm, and year by year, "it was getting bigger and bigger," she says.

Jacqueline Boileau, Ms. Slyford's daughter, says the diagnosis was of particular concern for her mother because she had witnessed a family member go through open heart surgery to correct a similar condition, but in a different location.

"Her brother had this happen to him, and they had to open up his chest cavity. He was in a lot of pain for a very long time after they operated," says Ms. Boileau. "She was horrified thinking she would need the surgery he had."

However, it wasn't open heart surgery that Ms. Slyford needed. It was EVAR, or endovascular aneurysm repair. In this minimally-invasive surgery, a modular stent graft – a cloth-covered stent – is inserted into the femoral artery in the groin and passed up into the weakened part of the aorta. The stent graft relines the diseased aortic wall to ensure the blood pressure against the wall is reduced to prevent aneurysm rupture.

It's a procedure that, until last year, wasn't readily available to patients in the Thunder Bay area (or anywhere in Ontario's northwest, for that matter), unless they sought treatment outside Thunder Bay. The local hospital, Thunder Bay Regional Health Sciences Centre (TBRHSC), didn't have the equipment to do an EVAR or a vascular surgeon on staff, and so patients traditionally had to travel to Hamilton, Toronto or Winnipeg to get EVARs done, performed by surgeons they'd never met before.

But that's all changing because of a pioneering program between the TBRHSC and the Peter Munk Cardiac Centre (PMCC) at University Health Network.

Ms. Slyford was able to get the EVAR she needed at the PMCC in Toronto, performed by someone closer to home. The TBRHSC's first dedicated vascular surgeon, Dr. Yaasin Abdulrehman, travelled to the PMCC from Thunder Bay, along with Ms. Slyford, to perform her life-saving surgery with the PMCC team.

It's the first stage of the "one program, two sites" model between the TBRHSC and the PMCC that will see the population of Ontario's northwest get access to the same world-class cardiovascular care as the residents of Toronto, says Dr. Barry Rubin, Medical Director of the PMCC. And soon, they won't have to travel for it.

Dr. Rubin says the genesis of the program happened about five years ago.

"I was invited to go to the [TBRHSC] by Gordon Porter, the Chief of Staff there, and he said, 'We really don't have good access to cardiovascular care here.' So I went for a visit, and I was struck immediately by two things. First, what a gorgeous hospital! And second, you walk in, and there are so many patients in wheelchairs [who are] missing a leg," says Dr. Rubin.

"I subsequently learned that if you live in Northwestern Ontario, you are three times more likely to have an amputation than if you live anywhere else in Ontario."

Amputations are frequently caused by peripheral arterial disease (PAD), a vascular disease that causes a buildup of plaque in the artery walls. Risk factors for PAD include diabetes, high blood pressure and high cholesterol, which affects Ontarians living in northern and rural areas disproportionately, particularly the province's indigenous population.

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> **Arlene Thompson,** Program Director for cardiovascular and stroke services at the TBRHSC

"We thought that there was a real need for vascular surgery in Thunder Bay, and it seemed unreasonable to me that patients should have to travel to get access to this care," says Dr. Rubin.

Arlene Thompson, Program Director for cardiovascular and stroke services at the TBRHSC, says that particularly for patients who live in rural areas, travelling long distances for major surgeries can be extremely stressful.

"For the patients who come [to the TBRHSC] from longer distances – anywhere from four to seven hours away in [Ontario] communities like Sioux Lookout, Kenora, Fort Frances – they're far more comfortable [in Thunder Bay] than they would be [if] displaced in more major Southern Ontario centres," she says.

"[When you travel for surgery], you get high-quality care, but it's stressful," says Dr. Rubin. "You and your family have to leave your home environment. Your support network is not there. And then when your care is finished, you're not near the people who just did your operation."

With the support of Thunder Bay-area MPPs Bill Mauro and Michael Gravelle, teams from the TBRHSC and the PMCC, led by Dr. Mark Henderson and Dr. Rubin, respectively, worked to set up a pilot project between the two academic health science centres that will bring cardiac and vascular surgery care to the people of Thunder Bay.

But instead of simply telling the TBRHSC, "Send us your patients," Dr. Rubin and the team at the PMCC proposed something more novel: one program, two sites.

"If our name is going to be part of this, the quality of the care that gets delivered [at the TBRHSC] has to be the same as the quality of the care that gets delivered here," says Dr. Rubin.

In this model, Dr. Rubin and the team at the PMCC will be involved in every aspect of cardiovascular care at the TBRHSC, from training and recruiting to providing regular support and mentoring to staff. The PMCC will also assist with measuring and improving the quality of care using the same tools at both sites.

"We will collect data on the outcomes of patients in Thunder Bay. We will collect data on outcomes of patients at the UHN [University Health Network]. We'll compare our outcomes, not just in Ontario, which is important, but also across North America. And we're going to be the first centre in Canada to participate in a U.S. database called the National Cardiovascular Data Registry (NCDR), which has a thousand centres in the U.S.," says Dr. Rubin.

The program kicked off last year when the TBRHSC recruited vascular surgeon Dr. Abdulrehman, who's also credentialled at the PMCC. Because the TBRHSC has only recently acquired the equipment to perform EVARs locally, Dr. Adbulrehman began travelling back and forth to Toronto with his patients to do these operations.

Ms. Thompson says that having Dr. Abdulrehman at the TBRHSC for the past 1.5 years has already made a big difference in terms of patient care in the Thunder Bay area. In addition to the cases where he's travelled to Toronto with patients to do EVAR, he's performed 385 procedures in Thunder Bay, she says, and 200 of those cases were actual surgeries, while the other 185 were diagnostic or minimally-invasive procedures.

"So already, in our first year with only one surgeon, we've been able to serve almost 400 patients at home," she says. "And next year, that'll be closer to 500."

Ms. Thompson says the TBRHSC's cardiovascular program is only limited by surgeon resources ("we're actively recruiting," she says) and capital for specialized equipment, so they can do EVAR and other more complex operations in Thunder Bay. "For our patients, the most important thing is that patients and their families are able to stay within their own region and keep their family and cultural support systems intact."

Plans are in place to make that happen, says Dr. Rubin. "The end game is that the majority of heart and vascular surgery will happen in Thunder Bay, and only patients with complex problems or who require redo surgery will be sent to the PMCC," he says.

Dr. Abdulrehman says he's looking forward to that day. "We want to be able to tell the patients that we can offer the appropriate treatment for them here in Thunder Bay, and we're almost at that point."

Ms. Thompson notes that the relationship between the TBRHSC and the PMCC is more than "pen on paper" – it's a true partnership.

"Each week, we have multiple team meetings with the key members from the PMCC. They are helping train our staff. They're working with us on research projects around cardiac and vascular disease. So it's more than just actual services. We're truly becoming a partner, through many levels within the organization," she says.

In keeping with the partnership model of the program, Dr. Abdulrehman gets the benefit of regular interaction with the vascular team at the PMCC.

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"With any type of medical profession, it's good to have colleagues to bounce ideas off for difficult cases or difficult problems, and so they've been very instrumental for that," says Dr. Abdulrehman.

Dr. Thomas Lindsay, Chief of Vascular Surgery at the PMCC, says providing support through "telementoring" and phone calls is an essential part of the "one program, two sites" model.

"I talk to him on the phone regularly. He texts me questions. We have electronic rounds on Wednesday afternoon, when he joins our case conference every other week. We reserve some spots for him to present cases for discussion," says Dr. Lindsay. "We're not seeing the patient, but we can look at their X-rays and CT scans and say, 'Well, it sounds like this is the right thing to do, or we may have some additional suggestions on management and operative strategies.' "

Because of this digital interaction, it's like they are down the hall. "It's just a thousand miles down the hall," adds Dr. Lindsay.

Plans are also underway to bring in additional vascular surgeons to join the vascular team on the ground in Thunder Bay. Dr. Rubin says the vision is to have three vascular surgeons and three cardiac surgeons available and working at the TBRHSC. He says the Government of Ontario has embraced the idea, and they are also working with the Cardiac Care Network of Ontario to operationalize the plan.

"Cardiac surgery is going to be a longer lead time because to do cardiac surgery, you need to have a specific type of operating room," he says. "You need to have a team. You need to have operating nurses specifically trained and to develop that infrastructure. That's going to take some time, so we expect to go live with that in 2019 or 2020."

The challenges, says Dr. Rubin, are both organizational and financial: A project of this magnitude involves many complexities and significant funding requirements. But the potential to create a game-changing new model that will provide service to the province's most vulnerable cardiovascular patients is enormous, he adds.

01 Dr. Thomas Lindsay, right foreground, vascular surgeon, PMCC, conducts a telementoring session to train vascular surgery teams in Thunder Bay.

02 A routine doctor's appointment revealed that Pearl Slyford, above, had an aneurysm.

"If this programs works out, you could use it as a model and address other areas of underserviced care across Ontario," he says.

As for Ms. Slyford, she says that since her EVAR surgery at the PMCC, she feels great. "I thought the care was wonderful," she says.

But although her experience was a positive one, it would be a real step forward to have those kinds of procedures available in Thunder Bay, says Ms. Boileau.

"I think people will recover faster without all of the inconveniences of travelling far, and it would be a tremendous contribution to Thunder Bay to be able to have procedures more accessible to other communities of the North."

Photograph by Chad Kirvan

The Heart Transplant Clinic is ground zero for complicated operations

Charlie Cook, the survivor of a horrific car crash and a transplant recipient, says there are no people he trusts more than the doctors of the PMCC

By **Bryan Borzykowski**

IT WAS JUST OVER A DECADE AGO that Charlie Cook nearly lost his life for the first time. He was driving on a highway in Georgia, coming home from work, when he suffered a massive stroke and passed out. Like out of a scene from *Dukes of Hazzard*, the car flipped over, landed back on its wheels and then continued to drive for several hundred yards before it somehow stopped on the side of the road. Luckily, no one was hit by the out-of-control car, but the wild crash did cause one passerby to rush over and pull Mr. Cook out of the vehicle. "If it wasn't so spectacular, no one would have noticed, and I would have just died there in the car," he says.

The stroke was related to a heart condition that was discovered when he was 17 but remained dormant until that fateful day. Mr. Cook had hypertrophic cardiomyopathy (HCM), a disease that causes the myocardium – the muscle of the heart – to thicken, which can restrict blood flow and impact the heart's rhythm. While nothing happened until the accident, the stroke set in motion years of heart-related complications and near-death experiences: collapsing in a restaurant; having his heart massaged back to life on an operating room table; and needing intravenous medication to keep his heart pumping and blood flowing.

Mr. Cook's decade-long ordeal culminated in a successful heart transplant in May 2016, performed by doctors at the Peter Munk Cardiac Centre (PMCC) and the Multi-Organ Transplant Program at UHN. If it weren't for the heart transplant team at the PMCC – he's American but moved to Waterloo, Ont., in 2005 and soon became a patient – and Mr. Cook's unwavering optimism, he knows he'd likely not be here today. "There are no people I trust more than my doctors there," he says. "They saved my life."

MEETING DR. ROSS

As Mr. Cook quickly learned, the PMCC's Heart Transplant Clinic is ground zero for most of the country's most complicated heart surgeries. It replaces about 40 hearts a year in patients from across Canada, and it installs nearly 30 left ventricular assist devices (LVAD), a battery-operated pump that helps the left ventricle deliver blood to the rest of the body. The transplant unit is home to more than just surgeries, though, with doctors and nurses also staying in close contact with patients for their entire lives, starting the moment they get admitted to the unit.

When a patient first comes to the PMCC, the patient will likely meet with Dr. Heather Ross, a world-renowned doctor, heart failure specialist and Managing Director of the PMCC's Heart Failure and Transplant Clinic. She'll put people through a number of tests, including a stress test that helps determine how hard one's heart is working. Not surprisingly, Mr. Cook failed his first stress test. "It was operating at about 30 per cent of where it should be," he says. "Dr. Ross said that was horrible. I liked that she was telling it to

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