



# Solving the complex puzzle of aortic disease

A team approach allows doctors to offer solutions, and quality care, to patients like Nazmoon Griffith

By **Judy Gerstel**

**NAZMOON GRIFFITH POINTS TO HER CHEST AND ABDOMEN TO ILLUSTRATE THE SURGERIES** at the Peter Munk Cardiac Centre (PMCC) that repaired her aorta, the main artery that carries blood throughout the body.

Perched on the seat of her walker in her Toronto, Ont., studio apartment, she traces lines vertically and diagonally across the front of her body.

“They cut here,” she says, as if unzipping a zipper, “and here. And here.”

Mrs. Griffith adds: “Then again here. And here.”

The 73-year-old native of Guyana, who came to Canada in 1968, says she doesn’t remember much these days. And she wasn’t

concerned about the details of the procedures, the months of days and nights in the Cardiovascular Intensive Care Unit (CVICU), the blood transfusions, the postop stroke, dialysis and time on the ventilator.

Her 31-year-old great-niece, Melissa Rahaman, a member of the Canadian military, talked with the doctors and explained the procedures and risks to her.

“My aunt doesn’t have the most education,” says Ms. Rahaman. “She didn’t really understand what was wrong with her. I had to keep track of everything. I did a lot of my own research.”

She also found the surgical team leader, Dr. Thomas Lindsay, Division Head of Vascular Surgery and the R. Fraser Elliot

Chair in Vascular Surgery, to be “super approachable. I didn’t feel nervous about asking him questions. He was very reassuring, and he was really involved, checking on her every day.”

Dr. Lindsay, in turn, appreciated Ms. Rahaman.

“Sometimes the patient is blissfully unaware,” he says. “Her niece was invaluable. When problems arose, we made sure to talk to the niece, as well.”

Even the fact that the case was one of the first of its kind in Canada and involved a large, highly skilled and creative team meeting and planning six months in advance of the first operation was of no great relevance to Mrs. Griffith.

What does impress her, though, is how she was cared for.

“They treated me so well,” she recalls. “Everybody knows me, almost like family.”

She’s also impressed with the result.

“I thank God I’m alive,” she says. “People who know me say, ‘You’re looking good.’”

Mrs. Griffith’s aorta was so enlarged and damaged from top to bottom that it required total reconstruction.

“They fabricated a whole new aorta for her,” explains Ms. Rahaman, summing up the complex and innovative treatment that saved her great-aunt’s life.

While Ms. Rahaman is impressed with the surgical achievement, she is in complete awe of the care and attention devoted to her great-aunt by the staff at the PMCC.

“They all looked out for my aunt,” she says. “I was worried that she was going to slip through the cracks. She’s one of my favourite people. She brought my father with her to Canada when he was 17,” recalls Ms. Rahaman.

“At [the] Peter Munk [Cardiac Centre], they treated her like she meant something, not like some low-income, old lady from Scarborough. She pulled through because of the care she received. She was treated like she was deserving of this.”

In addition to the conventional degenerative aneurysms – the bulging that can result in ruptures – Mrs. Griffith had a rare chronic dissection: a separation inside the aorta that left two channels instead of one

through which blood flowed, with the weaker one transporting the blood.

When aortic dissection occurs on an emergency basis, as a sudden tear followed by a rupture, death usually follows within hours or days. Acute aortic dissection was the cause of death for actors John Ritter and Alan Thicke.

With extensive aneurysms and chronic dissection, Mrs. Griffith required complex and innovative surgery to save her life.

“Only a handful of these operations are done to treat chronic dissection,” explains Dr. Kong Teng (KT) Tan, Division Head, Interventional Radiology. “She was the first case in Canada. Stents are not currently designed for this, so we had to think outside the box. Everything had to be perfectly planned from step one.”

He adds, “You think about it a lot. It makes a big difference where you cut. You get one shot to get it right. You get it wrong, it’s almost impossible to fix. Errors in the procedure cannot be resolved. In my mind, I went through a thousand steps for this. It was like planning a chess game, planning steps ahead.”

Mrs. Griffith may not have been aware of all the risks – the greater risk of doing nothing versus the risk of surgery, or she may not remember the conversation about risk with her great-niece. She does recall going to see her family doctor a few years ago and being referred to the PMCC.

“She came to hospital in reasonable shape, but she had a very extensive problem with her aorta,” recalls Dr. Maral Ouzounian, a cardiac and an aortic surgeon.

“Most people who have an aneurysm have it in one section of the aorta, either close to the heart or in the arch or in the abdomen,” she says.

“The aorta leaves the heart, curves around as the aortic arch, then travels down through the chest and abdomen,” explains Dr. Ouzounian.

“Her aorta was very large and [the enlargement] went all the way from very close to her heart, through the arch and down the thorax (chest) and abdomen to her legs.”

She adds: “She’s a small, petite woman, but she was all aorta inside.”



A normal aorta is less than three centimetres. Mrs. Griffith’s was more than six centimetres.

Two different aortic surgical teams used two different approaches and techniques, with the first team, led by Dr. Ouzounian, leaving a set-up inside Mrs. Griffith for the second repair.

The surgical teams operated in stages, like relay race teams, albeit with time for the patient to recuperate in between.

“Many hospitals use one technique – either open surgery or endovascular [inserting a grafted stent through the artery],” explains Dr. Ouzounian.

“At our place, we’ve built a team where every single person who comes in with a complex aortic problem is the subject of team review meetings: ‘Should this patient have open or endo, or a combination of both?’” she says.

“Because we offer the whole spectrum of approaches, we can tailor for each patient what we

**01** Dr. Kong Teng Tan, Dr. Thomas Lindsay and Dr. Maral Ouzounian are part of the surgical team that selects and performs individualized procedures for patients with aortic problems.

**02** Nazmoon Griffith was impressed with both the results of her treatment and the level of personal care she received at the PMCC for a disease that caused the deaths of well-known actors Alan Thicke and John Ritter.

think is best.”

Dr. Ouzounian’s team used an open surgical technique to build a new aortic arch for Mrs. Griffith. The colourful name of the procedure is more Disney than scientific: frozen elephant trunk.

Dr. Ouzounian cut through Mrs. Griffith’s sternum and set about replacing her entire aortic arch with a customized synthetic tube



*“The only way to fix an enlarged aortic artery a few decades ago was to do a major open repair. But a way was invented to do it through inside the blood vessel, under X-ray control with a custom-made, flexible synthetic tube that can go around corners.”*

Dr. Thomas Lindsay, Division Head of Vascular Surgery

with an open branch “hanging in the breeze,” she says. That’s the “elephant trunk” to which the second surgical team would attach another tube, to replace the thoracic and abdominal aorta.

For the complex open chest procedure, “you need the heart lung machine, because the arch involves all the blood vessels to the brain, the upper body and the arms, so you need to turn off or reduce the blood flow to the brain for a certain amount of time,” clarifies Dr. Ouzounian.

“If I just turned the blood flow to the brain off at normal body temperature, I’d only have three or four minutes [to install the tube], but by dropping the body temperature to 20 degrees and providing blood flow to the brain, we have up to 30 to 40 minutes.”

And while the patient is cool, so is the surgeon.

“I don’t get fussed too much,” she says. “Obviously, some moments are stressful. The clock is ticking, and there’s minimal blood flow to the brain. It’s not the time to talk about dinner plans. We’re very focused.”

The entire operation takes about five or six hours, and Dr. Ouzounian says she now does about 15 total arch replacements a year.

“We’ve had other patients since Mrs. Griffith who have needed total arch elephant trunk and distal aortic repair, but it is unusual to replace someone’s entire aorta from the top to all the way down to the legs.”

While Mrs. Griffith was recovering from the arch replacement, Dr. Lindsay, Dr. Tan and their team were preparing for the second stage surgery, the endovascular aortic artery repair (EVAR), a relatively recent procedure.

“The only way to fix an enlarged aortic artery a few decades ago was to do a major open repair,”

explains Dr. Lindsay.

“But a way was invented to do it through inside the blood vessel, under X-ray control, with a custom-made, flexible synthetic tube that can go around corners.”

A copy of Mrs. Griffith’s CT scan was sent to the manufacturer of the device, and a plan for construction of the made-to-measure Dacron mesh and metal tube was sent back to Dr. Lindsay and Dr. Tan.

“If we agree with the plan we sign it, and six to eight weeks later we receive the device, which we put in through the patient’s arteries in a high-tech operating room with radiology equipment,” says Dr. Lindsay.

Shortly after Mrs. Griffith’s new custom-made graft arrived by courier in a long cardboard tube, Dr. Lindsay, guided by Dr. Tan and his imaging equipment, attached it to the elephant trunk that was left hanging by Dr. Ouzounian and began the delicate work of reattaching blood vessels. “Everything’s about catheters and wires,” explains Dr. Tan. “The majority of the procedure requires fine catheter skills.”

Postoperatively, Mrs. Griffith experienced partial paralysis, requiring a leak to be created in order to improve blood flow to her spinal arteries. Several weeks later this leak was sealed without any paralysis, completing the aneurysm repair.

“We had to do some fancy rescue work,” recalls Dr. Lindsay. In the end, he says, “we have essentially replaced this woman’s aorta, from near her heart all the way down to below her belly button, where it divides into the legs.

“We did it with one major open operation and the rest through the groin. What is the innovation? That is the innovation,” he says.

“We’re constantly in a state of

innovating, figuring out how to do it better. And I work with colleagues who think the same way. That’s what’s so enjoyable about working at the PMCC.”

Dr. Lindsay explains: “The field is evolving, and we’re coming up with creative solutions to get these patients safely through everything they need. If you have all the tools at hand, you can offer a personalized approach to fixing the problem.”

He says that “the postop care from intensivists and ICU nurses is also critical. “These patients need very specialized nursing; they need spinal drains.”

As well, says Cindy Dickson, Registered Nurse, “vascular patients tend to heal slower than people who don’t have vascular disease.”

Ms. Rahaman recalls that her great-aunt’s postop condition was precarious. “She had a stroke and had to be on dialysis, and at one point was not doing well with her legs. Things could have gone either way.”

That she survived “is pretty much due to the dedication of the surgeons, the ICU staff and the nurses in [wards] 4A and 4B,” says Ms. Rahaman.

“All the nurses recognized her, [since] she’s been there so many times,” says Ms. Rahaman. “Even the nurses off her case came by to say, ‘Hi.’ And many times they told me they saw her in very bad shape. She was really, really sick. I would ask questions, and those nurses were extremely knowledgeable. They really know what they’re doing.”

She concludes: “The fact that she is living her life and continuing to be healthy is pretty good.”

Mrs. Griffith has her own summing up of the PMCC team that saved her life.

She points to her head and says, “There are very smart doctors there.”

#### DID YOU KNOW...

- Aortic disease is often hereditary. If someone has a thoracic aneurysm – a bulging of the aorta in the chest area (thorax) – there’s a 20 per cent chance that it is due to genetic factors and that other members of the family also have or are at risk of developing a similar aneurysm, explains Dr. Maral Ouzounian, a cardiac and aortic surgeon. Young patients with a thoracic aneurysm or those with a family history may be offered genetic testing. All first-degree relatives of patients with thoracic aneurysms should be checked for a similar aneurysm with imaging to identify aortic problems before rupture or dissection occurs. Other factors that may cause damage to the walls of the aorta include aging, hypertension and tobacco use.

- Ruptured aortic aneurysms and dissections are estimated to cause almost 3,000 deaths annually in Canada.

- People with aortic aneurysms rarely have symptoms. The bulging of the aorta and other arteries are typically found during screening or imaging for other health issues, such as those identified by ultrasound or CT scans done to investigate other diseases. Rarely, depending on the size and the location, aneurysms may cause pain in the upper body; shortness of breath, wheezing or chronic coughing; and difficulty swallowing or the coughing up of blood. Dissections are tears that occur in the aorta and generally cause severe chest or back pain and require emergency evaluation and treatment.