Interview with Dr. Heather Ross

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Dr. Heather Ross

Heather Ross, MD, MHSc, FRCP(C), FACC is a cardiologist at the Peter Munk Cardiac Centre, Professor of Medicine at the University of Toronto, and Director of the Cardiac Transplant Program at Toronto General Hospital. She is the Ted Rogers and Family Chair in Heart Function. She is also the Head of the Ted Rogers Centre of Excellence in Heart Function. She received her medical degree from the University of British Columbia, her cardiology training at Dalhousie University, and a postdoctoral fellowship in Cardiac Transplantation at Stanford University. She earned her Master's Degree in Bioethics from the University of Toronto.

Dr. Ross served as President of the Canadian Society of Transplantation in 2005, on the executive of the International Society for Heart & Lung Transplantation (ISHLT) from 2002 through 2005, and as Secretary Treasurer from 2007-2010. She is an Associate Editor for the Journal of Heart and Lung Transplantation. She served 5 years on the Canadian Cardiovascular Society Council, 3 years on the Canadian Cardiovascular Society Executive, and on the Board of the Canadian Cardiovascular Society Academy. She served 4 years on the executive of the Heart Failure Society of America. She is currently the Past President of the Canadian Cardiovascular Society. She has published over 250 articles and won numerous teaching awards. In 2015, she was named by Canadian Geographic as one of the top 100 modern day explorers.

UTMJ: Can you tell us a little about yourself?

HR: I was Born in Montreal, and I am a diehard Habs (Montreal Canadiens) fan, sorry! For reasons that remain unclear, at the age of 11, I said I wanted to be a doctor. I had a traditional middle class upbringing. My dad was in sales and my mom was a music teacher. My parents had university degrees, so school was a big priority in the family. We moved to Ontario in 1977, with the changes in English-French relations, even though my father was perfectly bilingual. We lived for a short time in Orangeville and then in Port Credit, but basically I got to university as soon as possible. I went to Queen's University for undergrad and then on a whim, as I didn't expect to get in, I applied to UBC for medical school. I got in! That was awesome. I did a rotating internship at St. Michael's Hospital. Then, I went back out to UBC because the skiing was better, but really for the internal medicine program. I then went to Dalhousie for cardiology, Stanford for transplant studies, and shockingly got a job here. I was expecting to stay here for three years and I've now stayed in Toronto for twenty-one years! I fell in love with the city, which I wasn't expecting, and the program. It has been an awesome experience.

UTMJ: Why did you pick cardiology out of all the internal medicine subspecialties?

HR: When I started medical school, I sort of knew that I wanted to specialize. I liked the idea of knowing an area with a real depth of knowledge. I have the ultimate respect for family doctors because they need a breadth of knowledge. However, I wanted to know everything about one area. The experience that tipped things was when I was an intern, and my grandmother died of a massive infarct. I was the only one there, as my parents were out of town. A few pieces of it made it a moving experience. First, you see things from the patient's perspective, and to see her in the span of a few hours, so vibrant, to having a massive infarct, full pulmonary edema, and then to watch her die was an overwhelming experience; I'm still quite emotional about that.

The second reason came from the doctor who was treating my grandmother and who wanted to intubate her, even though she had a wish to not be resuscitated. It was in the ER setting, and it was chaos in there. The whole idea of understanding goals of care, which is a consistent theme of my research, was very heavy at the time.

Then I did CCU as a resident. I am an adrenaline junky, so the idea of critical care, I loved it. The pace I loved. I flirted with hematology through a Terry Fox scholarship, which I really enjoyed. And when I did my CCU rotation as a resident, there was a heart transplant patient that walked into the CCU. He walked in and was dead by the next morning due to overwhelming rejection. Seeing the impact and immediacy of transplant was quite interesting to me. This interest in cardiology was there from very early on, even before residency, and clearly solidified from these experiences. I had an incredible mentor, Dr. Victor Huckell, a cardiologist in Vancouver. I had a real interest, and then you meet somebody like this, and it makes you go, "Wow!" Those two things happening together made cardiology the field for me.

I then had a running joke that transplant made car-

diology interesting, which isn't fair because cardiology is intrinsically interesting. But transplant is what makes me truly love cardiology. While in Halifax, Dr. Catherine Kells, who went to Stanford, talked a lot about it. The history of heart transplant is vast at Stanford, and that university has played a huge role in the science of transplant. Dr. Sharon Hunt, who was also there, is a real force in heart transplant, vibrant and academically strong. I did my science with Dr. Hannah Valentine there and the mentorship by both of these women was amazing.

How I ended up here was a strange tale too. Imagine a perfect day in Palo Alto, California. Late May or beginning of June, 75 degrees. It was perfectly dry weather, so I biked to work. Every once in a while, I biked the long way home, an approximately 35 kilometer loop. There was a liver transplant doc giving a talk at 5:00 PM about cyclosporine. Again, it was a perfect day, and the Nurse Practitioner, Joan Miller, said that the speaker was from Toronto. She said, "You have to go to support him; he's from Toronto." The speaker was Dr. Gary Levy, a world-renowned immunologist and liver transplant doctor. He's actually an American, but was working in Toronto. I went to listen to his lecture and said, "Hi, I'm a Canadian studying transplant here." I then went on my bike ride. That weekend, I went camping in Yosemite. I found out when I got back that they were looking for someone in Toronto who's done training in both cardiology and transplant. They flew me out for a job interview, and a year later, I was accepted for the job. So the moral of the story was don't miss a perfect day! Don't miss the opportunity for a door opening. If it wasn't for Joan Miller, I wouldn't have gone to meet Dr. Gary Levy at the talk! I came to Toronto not expecting to fall in love with the program or city, but I did!

UTMJ: The cardiac transplant program at the University of Toronto is world-class. Can you talk about your involvement with the development of this program?

HR: For any program to hit the mark, a few things need to happen: you need a research platform, a successful clinical program, and an amazing education platform. For a clinical program, it's about volumes and outcomes. You need to have a critical mass of patients and maintain outcomes of patients. And then an effective administration program behind it to make it happen.

Toronto has a world class multi-organ transplant program. It is the 3rd or 4th largest worldwide, and far and away the largest in Canada. The heart transplant program was small in size for its patient volumes, so we needed to grow the program. For the first five years in Toronto, I did one in one call because that's the way it was at the time. And I don't regret a minute of it. Then, we recruited Dr. Diego Delgado, who trained in Argentina and Chicago.

Funding always was a bit of a challenge, including looking for different ways to get funding. There was no money for a fellowship program, so we started the "Test Your Limits" program, which developed amazing trips to raise awareness about organ donation and to fundraise in order to seed research and establish the fellowship program.

We have also been fortunate to have an incredible foundation, and a culture of philanthropy in Toronto. Specifically, the Rogers family created a center of excellence in heart function, which provided sustainable funding for the fellowship program. We recruited Dr. Michael McDonald, Phyllis Billia, Carolina Alba, Jeremy Kobulnik, and Mitesh Badiwala in the last five years. And the program has grown. Our heart failure program is huge, and it's on an exponential rise. It has been neat to see this growth happen. We had a Heart Links Christmas party in the TGH atrium on the 4th floor and many patients came together for the event. It really does feel crazy seeing the patients and their families. We even had our first thirty-year transplant survivor. What a journey it has been.

Heart failure is a terrible condition; when you have someone in the CCU on inotropes and waiting for a heart, and then they have a successful transplant (which it is in the vast majority of cases), seeing their families is an amazing thing. Every time we do a transplant, I think that is so amazing. Not every day is rosy, but there are more good days than there are bad ones.

I'm being honest when I say I want to come to work every day, because I really do. I feel sorry for people who haven't found that space. I feel very fortunate; when I applied to medical school I didn't have any publications. I hit the GPA you had to hit, and I played in a band and sports, but I had no papers, no first authorships. When I see the people applying now, I say, "Wow." I had one case report. I was passionate, but I feel that the competition level has changed. I personally think that it's unfortunate, because it may make people less rounded.

I still love what I do, more than 20 years in. But I respect the fact that it is very challenging for the new crop of students. I loved the rotating internship after medical school. You didn't worry about anything during that year, except getting experience and learning. There were lots of rotating internships at the time because it was popular. I lived in a house with 5 people interning at 3 different hospitals. You could breathe! There were no exams, no pressure, and you had a year of decompression. The current generation can't decompress. The other challenge is that we also had the opportunity to do electives in different places; it seems now that decisions about electives are more structured, and 'you better do the elective there because you want to go there'. I think it's tough for current students.

And then there's the cost. I did a Terry Fox scholarship, but lots of my friends in medical school took the summer off to go do electives in Africa, do rural practice, especially in UBC in the inner city of Vancouver

with a family physician. For your generation, how can you afford not to work in the summer?

UTMJ: We often discuss the difficulty of getting access to organs and the challenges that this comes with from a transplant perspective. Could you touch on how some of this is addressed here, and perhaps globally?

HR: I think you know that we have an opt in vs. an opt out system in Canada. There has been a lot of discussion over the years about changing this, as there are countries that have presumed consent, or opt out, and they have higher organ donor rates. The GTA (Greater Toronto Area) had one of the lowest organ donor rates per million. A lot of people thought that this was related to the multicultural nature of the city, and that organ donation was perhaps more frowned upon in certain cultures or religions. But virtually every major religious group has come forward and said that organ donation is actually a good thing and have supported it. I think that there has been a lot of work as a transplant community on national guidelines, the organ procurement organizations (OPO's) have put a lot of investment into organ donation, and the numbers are in fact climbing. Currently, one of the tragic reasons we are seeing an increase in organ donors is the crisis in opioid addiction, which is also happening in the US. We are now seeing this as one of the increasing causes of organ donor death, compared to ten years ago. In the past, subarachnoid hemorrhage or intracranial bleed was the most common cause of donor death. In even earlier days, it was MVA accidents/bike accidents, but thankfully the helmet and seatbelt laws and tighter speed limits have lowered this.

It's really a paradox. On one hand, I want to do transplants, but we also recognize that someone has to die for that to be possible. We must do everything we can to enhance the safety of the general population, but we recognize that tragedies do exist. When such a tragedy happens, we want to maximize organ donor potential, while at the same time recognizing that it's an unusual business.

UTMJ: So far, we have talked a lot about how the transplant program has grown and come to be. Can you talk about where you think the future of the field of transplant medicine is going?

HR: For a long time, we have been thinking that stem cells were going to be able to regenerate and replace, that that was going to be the thing. So far, I think that promise has not been as much as we had hoped, though research continues and hope remains.

The field of mechanical circulatory support, or ventricular assist device (VAD), has been a huge growth area. When you look at the volume of VADS implanted, we have seen an incredible uptick. In that field, we have had challenges, such as that of clotting/bleeding. Trying to find the fine line between clotting the device versus the risk of GI bleed. Another example is that a driveline is still required to charge the batteries, even though there has been a lot of work regarding transcutaneous charging of the devices. So there is still a risk of infection and challenges with managing device power. What we need, which almost always happens, is a technology leap.

Real-world life expectancy with a VAD is four years (not in clinical trials). This is a huge advantage to the patient, but transplant life expectancy is eleven years, and it's fourteen years if you survive the first year. So there is still an incremental advantage to transplant, despite the complications and challenges. I think that the hope is that the VAD piece will continue to develop, as there are no concerns about 'shortages', though they are costly.

In truth, the best option is prevention. So the real question is how we deal with a society that is driven by 'thumbs', where people are not exercising. Canada is an obese country, globally we're becoming more obese, and we've urbanized so we are seeing massive upticks in cardiovascular disease in low-middle income countries. Cardiovascular disease is the number one killer on the planet. The WHO (World Health Organization) recognizes that cardiovascular disease and non-communicable disease are the biggest issue we have. We have a global epidemic. We transplant and use VADS in about 5% of the people who could actually benefit. There are so many more patients with advanced heart failure. It has been said that using transplant to treat heart failure is like using the lottery to cure poverty. When you do the math, we know we need to treat people before they develop advanced heart failure. I spend a lot of time talking about how my life is worth one hour a day. But it's really something we must figure out, how to get people outside, doing things, eating better, that's the way forward. I think yes, I am hopeful for VADS and stem cells, but at the end of the day, we need to get at the problem a lot earlier.

UTMJ: There is certainly a role for physicians in providing this type of preventative health information to patients, but in terms of a more global or nationwide strategy, what are some ways that you think governments can be involved with this?

HR: I think that Jane Philpott and the government have made great strides with their plan for improved food labelling. People can't know what they are eating if they don't know what is in their food, and so requiring labelling on everything is critical. I had the opportunity to bear witness at the Senate on the issue of obesity in Canada. That was really an amazing experience to be in front of the Senate subcommittee and talk about this from a cardiovascular perspective and what some of the current issues are. We helped put forward a car-

diovascular health strategy on behalf of the Canadian Cardiovascular Society a number of years ago, and governments changed, but nothing came from it, and that is one of the challenges that we have in the country.

People often do things because they are convenient, easy, and unfortunately, much of the convenient food is not healthy. I am saying this as I have my diet Dr. Pepper, so I am not perfect by a longshot, but we do have to do a better job. I think that my parents' generation did a really good job. They came through the depression and the war and they have always eaten a meal that had protein and vegetables. I am at the tail end of the baby boomers, and I think we have done a poor job because we have been working long hours and have opted for fast. At least when my generation opts for fast, given our reasonable income, our meals look like Whole Foods. The current generation also opts for fast food, but without the same income. As a result, cost issues have made fast options unhealthy, as opposed to fast and healthy. In truth, the Big Mac problem doesn't catch up to you at a young age. However, once you establish that food pattern, the rest of life hits, the exercise doesn't happen, and the food patterns don't change, that's when the obesity happens. So, I think it is critical to support healthy eating at every age. It would be nice to have done a good job at making healthy foods easier; it's almost as if it's somehow inconvenient to eat healthy, and that's a problem.

UTMJ: You are one of the giants in cardiac health and research. What research are you currently pursuing and what are your research passions overall?

HR: The area that I am extremely interested in right now is big data, analytics, predictive modeling, and prevention. I believe that we are at a cusp. Are you are familiar with Moore's Law regarding technology? We are seeing this incredible growth of tech, which is enabling us to monitor things that people have never really appreciated. I think we are at the point where we can do a much better job through big data, and artificial intelligence, in terms of predictive analytics. So, my goal is leveraging tech to monitor patients, while collecting all the data and creating a data ecosystem or data lake, where we can start asking good questions. There is such a volume of data that you can do a better job of predicting when someone is going to get into trouble before something actually happens.

By having massive amounts of data, you can start to make links that people would never have realized before. I think that if you look at computational biomedicine, we are at the cusp in the next five to seven years of taking your genome, all the places that you touch the healthcare system, looking at all of the tech and wearables, all the apps that people use to monitor different things, monitoring food, bloodwork; if you actually put all of that info into one place, you can start asking the right questions. Imagine if I could tell you that, based on what you are doing right now, I know what is going to happen to you. Maybe I could make you change your ways?

UTMJ: As we look at some of the things around your room, you really appear to be quite the globetrotter. We wanted to get your take on how you balance life and medicine.

HR: So, I think the question of balance is an amusing one, because there are a lot of people who don't think I have adequate balance in my life. It's seeing opportunities when they appear, even if you don't actually realize you are in the middle of an opportunity. My version of balance works really well for me. I am divorced and I was not fortunate enough to have kids, and so that changed my life in a different direction and this is where it is. That was a big tragedy for me, but out of my control. When life goes this way, you make the most of where it goes. That is part of the path. You never quite know when it's there sometimes.

It's those moments of serendipity that you often don't realize you are in until after and you go, "Holy cow, that was the most amazing serendipitous moment." A friend of mine from Montreal climbed Mont Blanc with a heart transplant patient and I got really mad at him and said, "I don't understand why you didn't call me!" His next trip was to Bolivia. He's wonderfully French Canadian, and said "Do you want to go to Bolivia with 13 guys on Viagra?". I said, "That sounds really good!" So we went together to climb Mt. Sajama in Bolivia. When I came back from that trip, I met someone outside of medicine who has been an incredibly important mentor in my life. He's in business and he asked what I wanted to do, and I said I think that we can do something much bigger. I think we can take that type of trip, captivate people's imagination, fundraise and promote health, and that is when Test Your Limits was born (www.testyourlimits.ca). This year, we are on our seventh trip and we are going to cycle the roof of the world from Lhasa, Tibet to Everest Base Camp. TYL has allowed me to do the adventure part of my life that I love, while actually promoting what I believe passionately about, which is healthy living. Pure serendipity. We are now on the seventh trip and we have raised more than 2 million dollars from these trips. On the off years, I do trips that I think are fun. I did Machu Pichu, Mt. Blanc, Patagonia, and Annapurna Sanctuary in my off years, because why not?