CSTAR, robotics, and minimally invasive surgery

An interview with Dr Christopher Schlachta

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INTRODUCTION

Dr Schlachta received his undergraduate and medical degrees from McGill University. With a keen interest in various types of surgery, he then completed a surgical internship at Toronto General Hospital before choosing to pursue residency in general surgery here at Western University. Subsequently, he returned to Toronto for a fellowship in advanced minimally invasive surgery and remained as staff surgeon at the Wellesley Hospital and St Michael's Hospital, where he was the head of the division. Finally, Dr Schlachta was recruited back to London to serve as the medical director of Canadian Surgical Technologies & Advanced Robotics (CSTAR) in 2005. He presently holds this position, as well as cross-appointments as Professor in the Departments of Surgery and Oncology. He has been involved in numerous Canadian and world firsts in robotic gastrointestinal surgery. We had the opportunity to speak with Dr Schlachta to discuss his surgical practice, current research, and the technology at CSTAR.

UWOMJ: When did you realize that you wanted to pursue surgery?

It was when I was in the hospitals in third year medical school, where I gained my first exposure to surgery and its patients. One of the main appeals to me was the near-immediate results: somebody is sick; you operate [on] them; and they get better. However, what type of surgery I wanted to pursue was really in flux for many years after that. It was during my internship in 1990 that I settled on general surgery, when I witnessed a laparoscopic gallbladder operation, which was revolutionary at the time. There were upwards of twenty people crowded in the OR; the lights were off; and they were trying to take out a patient's gallbladder without having to make a big incision. When I saw that, I realized it was what I had to do for a career.

How did you become interested in the use of minimally invasive and robotic surgery?

We are all touched by unique events that influence our whole life, and for me it was that gallbladder room. I was always "techy" as a kid, and that type of surgery just seemed like the epitome of technology. At that time, laparoscopy was really just used for gallbladder surgery, but there were rumours that other people were starting to do other things, and I wanted to be involved. So, at a time while everyone else was doing gallbladders, I became the first minimally invasive surgery fellow in Toronto and became part of a group that was doing colon cancer surgery, stomach cancer surgery, and donor nephrectomies laparoscopically. It was while I was in Toronto that robotics started to come onto the radar. I wanted to

be on that next wave, and it happened that shortly after that I was contacted by London for this position at CSTAR. When I arrived, robotic surgery was mainly the purview of cardiac surgeons and urologists. There weren't many people doing gastrointestinal surgery robotically and there were no fellowships or training programs; we really had to invent our own game. So, we started where we did with laparoscopic surgery: gallbladders. Once I got comfortable with what I could do with the robot on someone's gallbladder, I was able to try it on other things, and since then, we've applied it to pretty much any belly operation that you can think of.

What benefits does robotic surgery have for both the patient and physician?

For the patient, any laparoscopic-type method, whether it is traditional or robotic, will have a fantastic impact on their experience. Without having to make a big incision, the patient has significantly reduced post-operative recovery time, less pain, and fewer complications. I remember my mother having her gallbladder out when I was a teenager and her having to stay in hospital for ten days and on bedrest for two weeks afterwards. Today, 80% of gallbladder surgery in Ontario is an out-patient procedure. For the surgeon, first and foremost, robotic surgery is extremely comfortable. Instead of standing at the operating table with your arms up and getting fatigued, you're seated in an ergonomically designed workspace, and that lack of physical strain on your body everyday has value. Additionally, the instruments that the robot uses are far more dextrous than the ones that we hold with our hands, so they manipulate the tissues with far more precision. Finally, the robot allows for three-dimensional vision. When you look at a monitor during a traditional laparoscopic surgery, it's two-dimensional, but the robot provides one image for each eye which produces full depth perception, and that's something that you normally couldn't get without putting your head right inside the patient's belly!

Are there limitations or problems with robotic surgery?

The biggest one of course is cost. The cost of buying a robot and paying for its operations for five years ranks up there with the costs of buying an MRI machine; they are really expensive. With the da Vinci system, which we use here, there are also disposables involved in each case, which makes it very expensive compared to ordinary surgery from the OR's perspective. However, there is the argument that if we are able to do something in a minimally invasive fashion that we were not able to do without the robot then the overall cost will be less because of the reduction in complications and hospital stay. Another problem is the lengthy setup required

for the robot. The current iteration serves as a perfect system for a complex simple-quadrant operation, but if we want to move it around and operate across a wider area, it doesn't lend itself quite as well to that. However, there are new robotic systems coming to market that are more adaptable, so I think we'll see continual improvements in this area.

You've been involved in several "firsts" in your career – can you tell us about one of these that you have found particularly rewarding?

In 2013, we performed the first Canadian single-site gallbladder removal by using the da Vinci robot. With single-site surgery, instead of making multiple holes in the abdomen, we only make one. The problem with that was always that it was very awkward. All of the laparoscopic instruments would cross over each other; for instance, the instrument you are holding in your left hand becomes the right-handed one inside the patient. However, when we use the robot's technology for the operation, we were able to have the computer switch all of that over to make it look and feel like a standard gallbladder operation. What I really like about this is that it's a technology that everybody can use. Everyone always wants to be the only one who can do a certain surgery, but a true innovator is someone who comes up with technology that everyone could learn how to use, so it becomes available to every patient. The first patient that we did this single-site operation on was a young woman, and if you look at her belly now, you wouldn't even be able to tell she had surgery because there is no scar. That was really important to her, and she was thrilled with her operation. As a surgeon that's the best thing that can ever happen; you do an operation and see your patient afterwards and have them give you a big hug or shake your hand with a smile and tell you they feel great. That's the reason why you do it in the first place.

To many medical students, CSTAR is an exciting and renowned facility associated with the medical school, but one we really don't know much about it. As the medical director, can you tell us more about it and what goes on there?

I would argue that CSTAR is a true innovation center. The word innovation is massively overused these days and often used synonymously with invention, but the proper definition is invention plus translation into frontline care. That's what we have here at CSTAR. First, we have an extensive research program, which focuses on developing new technologies and therapies for patient care. Then, we have the training side, which involves teaching people to use the technology. And then when you combine those two interests, you have simulation, where the technology developed for care can be used for training. CSTAR is the place to come if you want to learn how to operate laparoscopically, intubate a patient, put in a Foley catheter, sew a bowel anastomosis, or any other skill you can name. It has a dramatic impact on training experience.

How do you see simulation-based training being incorporated into medical education in the future?

Simulation has enormous value in minimizing medical error. When patients come into a hospital that is a teaching center, it is expected that medical students, residents, and other learners will be caring for them. However, it is well-documented that errors happen because of this, and that patients come to harm accordingly. Part of learning is making mistakes, but simulation allows you to make those mistakes on a simulator instead of a real person. Another benefit of simulation is that it makes training more efficient. Historically, if you wanted to learn to run a cardiac arrest, for example, you would need to be on call all weekend and hope that one came in at the appropriate time. In other words, you would have to put significant time in waiting for a training opportunity to present itself. With simulation, there is much more control; we can book you an hour in the simulation lab for you to learn how to run a cardiac arrest instead. With the Royal College switching to competency-based programs, you can see how simulation fits naturally into demonstrating competency. I think that by the time current medical students get to residency, simulation will be a very large part of what they are doing.

You've done lots of research in simulation-based training. Could you tell us about some of your recent findings or current interests in that area?

One of the areas that I'm very interested in is serious games. We have these very expensive simulators in that lab that often times that sit empty; the only time that trainees rush to use them is if we say that it is mandatory. For example, if April 30th is the deadline, trainees are climbing over each other to get their time in that last week of April. We wanted to find out how we could motivate people to use the simulators outside of this period, and so we did a research project where we put up a "high scores" list for laparoscopic suturing every week. It was amazing how that shifted the curve. Instead of the rush in April, people were using the simulators in September because they wanted to compete to get their name in the top three. Ultimately, we have many projects underway to find ways to use serious games to motivate trainees to acquire the skills that they need to but make it enjoyable for them while doing so.

Do you have any final advice for students interested in surgery and what to expect?

You are forced to make a decision very early in your career when you're very young as to what you want to do with your life. You will graduate and do your residency training and then practice for thirty or more years, and that puts a lot of pressure on that early decision. Make the most of your early time really trying to understand what this specialty is all about. Ask questions; mentorship is very valuable. I can't emphasize enough that the more background work you do, the happier you're going to be with whatever specialty you choose. For surgery, it's important to remember the impact that you can have. There are long days and hard work, and it is a stressful job. But to see someone recovery quickly from surgery and realize what a dramatic effect you have had on their pain or suffering is extremely rewarding. It makes all the hours worth it.