

Snapshots

Surgery by remote

If a surgeon possessed four arms, the ability to see through skin and tissue, tireless endurance, and the precision and control of a finely tuned machine, it's easy to imagine how patients might benefit. Now, a high-tech robotic surgery system is bringing just these advantages to surgeons affiliated with the medical school.

The da Vinci® Surgical System consists of a platform with four robotic arms and a high-definition endoscopic camera, which a surgeon controls from a sophisticated, ergonomic console located several feet away. By attaching a variety of specialized surgical tools to the arms and looking through a fully immersive, three-dimensional viewer, surgeons can use the system to perform even complex minimally invasive procedures with greater precision and lower risk of complications.

Minia Hellan, M.D., assistant professor of surgery in the Division of Surgical Oncology, trained on the system with some of the most experienced and innovative surgeons using it anywhere in the world. Following residencies in family medicine, obstetrics and gynecology, and general surgery, Hellan completed a surgical oncology fellowship at City of Hope National Medical Center in Duarte, California, where she developed her skill with the da Vinci system.

In essence, she said, the robotic surgery system represents an evolution in laparoscopic surgery.

“The goal of minimally invasive surgery is fewer and smaller incisions, faster recovery, less post-operative pain, shorter hospital stays, and a faster return to work and daily function,” Hellan said.

The da Vinci system provides all of these benefits and offers several advantages over standard laparoscopic procedures, which require the use of long, stick-like instruments that have limited maneuverability and can be awkward to handle.

In contrast, Hellan said, the robotic surgical instruments “have a 360-degree range of motion, and every motion of my hand is translated into a motion of the tip of the instrument. You can suture as if you were suturing [in] open [surgery].”

The robotic surgery system can also correct for accidental tremors in the surgeon's hands and can scale movements down to 25 percent, translating a gesture covering 4 millimeters into 1 millimeter of motion for the surgical instrument. This allows the surgeon to be exceptionally precise and careful.

Pushing the envelope

Robotic surgery is most common in the field of urology, where it has become the standard of care for prostatectomies. This kind of procedure is ideal for the system, because it involves delicate work in a very confined space. For similar reasons, robotic gynecologic surgery is also common, while cardiothoracic and thoracic surgery and procedures of the neck, liver, pancreas, and kidney using

Hellan (seated) and Marianne Keaton, R.N., prepare to perform surgery using the da Vinci system. The ergonomic console gives Hellan a three-dimensional view of the surgical field and allows her to manipulate tiny surgical instruments very precisely.





the system are evolving fields. The system hasn't been as widely applied in general surgery, which often requires the ability to move more freely throughout a larger area of the body.

Hellan is among a small group of physicians pioneering the use of the system in surgical oncology. In particular, she is one of just a handful of surgeons worldwide using the system to perform surgery for rectal cancer and is the co-author of several journal articles and a book chapter on the subject.

Due to her fellowship training, Hellan said, "I can offer this, but there are not too many places in the United States doing it."

Initial studies, many of them conducted in Europe, have shown that the surgery yields similar or better results when compared to traditional laparoscopic procedures. A large, randomized, domestic study has yet to be conducted, however, largely because the surgery is available in fewer than a dozen locations in the United States. Hellan is pleased to have added the Dayton area to that exclusive list.

"I really, really believe in the advantages of the robot," she said. "I believe in the minimally invasive approach. I think with the robot you can stretch the envelope more and probably do more sphincter-preserving [procedures]."

Giving residents newer and better tools

Michael Galloway, D.O., assistant professor of obstetrics and gynecology, director of gynecologic surgery, and associate director of the Obstetrics and Gynecology Residency Program, is also a big fan of the da Vinci system. He has used the system extensively for more than a year and considers it a wonderful resource, particularly for hysterectomies.

"Patients used to have to stay in the hospital for two to three days, have large incisions, have complications with healing, and face six to eight weeks of recovery," Galloway said. With robotic surgery, "they have a couple small incisions, and they're in the hospital overnight. Within two to three weeks, most are doing 95 percent of what they normally do."

The three systems in place in local hospitals are used so frequently by faculty and other physicians that the Miami Valley has become one of the top 10 locations in the country for robotic gynecologic surgery.

Building on this distinction and his own experience with the system, Galloway is working to make robotic surgery a formal part of the department's residency program.

The surgical instruments are small enough to fit through tiny incisions and allow surgeons to operate with exceptional precision.

"We'll be one of the first—if not the first—to have a resident robotic training program," Galloway said. "Residents will be able to leave and be among the leaders at their facility, because they will know how to do robotic surgical procedures."

David Dhanraj, M.D., assistant professor of obstetrics and gynecology and director of minimally invasive gynecological surgery, trained on the system before joining the department in 2008. He is working with Galloway to integrate robotic surgery into the residency program.

"Da Vinci surgery training will be a significant element of our residency program," Dhanraj said. "As patients are becoming more aware of the option of having major surgery through very small incisions, it is critical to be able to train more physicians effectively in these advanced laparoscopic techniques. Our goal is for our residency program to become a leader in this area." **VS**