PATIENT CARE

Stanford Hospital at forefront of providing robotic surgery for bladder cancer

By Diane Rogers

In a major advance for Stanford Hospital & Clinics, Mark Gonzalgo, MD, PhD, recently removed a cancerous bladder from a 75-year-old patient using a robotic surgical system that allows for more precision in executing minimally-invasive procedures but also demands a new level of technical expertise from surgeons.

Gonzalgo is one of the few surgeons doing this procedure in northern California and among a select group nationally to do so. While the robotic equipment is now routinely used for prostate and kidney operations, it has only recently been adopted for bladder-related cancer surgery.

"Robotically-assisted procedures are less invasive and have a much faster recovery time," said Gonzalgo, who is an associate professor of urology at the medical school. "I believe that we can achieve the same outcomes with less blood loss, less pain, faster recovery and smaller incisions—which benefit patients."

Gonzalgo was recruited from Johns Hopkins University in June to be director of Robotic-Assisted Urologic Cancer Surgery at Stanford, and he said that he would like to establish the expertise needed to offer patients at Stanford "a comprehensive program in robotic surgery for all urologic cancers." He has done research on how to train surgeons on the da Vinci surgical system used in these procedures and has been retained by the maker of the system, Intuitive Surgical Inc. of Sunnyvale, Calif., to be a proctor who instructs and serves as a mentor to other surgeons.

Currently, five Stanford faculty are performing robotically assisted surgery for prostate cancer, and three are using the surgical platform for kidney cancer. Gonzalgo is the first faculty member to use the new technology for those two cancers as well as bladder cancer.

At a time when some 68,000 cases of bladder cancer are being diagnosed every year in the United States—with some 14,000 deaths—Gonzalgo said the goal of the new program is "to do the same surgery as an open operation, but with fewer side effects." Instead of making a large incision across the abdomen to remove a cancerous bladder, for example, surgeons using robotic systems make shallow punctures, or "ports," through which instruments can be inserted and tissue can be withdrawn.

Gonzalgo explained that the development of robotic surgery followed the adoption of minimally invasive surgery in which doctors make tiny incisions and then use a laparoscope to thread miniature cameras and other instruments into the body. But some of these laparoscopic procedures are difficult to execute—and that's where robotics offers a big advance. "Robotic surgery has become more popular because we can do the same operations with less morbidity," he said.

Robotic systems were first used to remove prostate cancer, then adapted for kidney cancer and bladder cancer procedures, which are more complex because of the variation in surgical anatomy, size, and shape of tumors. "It was only after I developed tremendous experience with robotic prostate surgeries and was confident that we could safely offer this technology to more patients that I began to attempt robotic surgery for bladder cancer," Gonzalgo said.

He now is developing a program at Stanford that will be the first in northern California and one of the few in the nation to make robotically-assisted surgery routinely accessible for the entire spectrum of complex urologic cancer cases.

But for all the advances in robotic technology, Gonzalgo noted that the platform is "just another surgical instrument—in and of itself it doesn't build a program."

Gonzalgo likens his role in training the next generation of urologic surgeons to that of a conductor who "can play every instrument, but instead directs all the instruments to produce a masterpiece." Simulation training and hands-on learning experience are the keys to serving patients better, Gonzalgo said. "It all comes down to the most basic thing, which is expertise in understanding surgical anatomy," he said.

The benefits of robotic surgery are still being evaluated. A study published in the Oct. 14 issue of the *Journal of the American Medical Association* on its use in prostate surgery suggests that the technology is being over-used and may in certain respects produce worse outcomes than traditional prostate surgery. It used Medicare data to compare the experiences of 1,938 men who had minimally invasive prostate surgery with those of 6,899 men who had traditional, open surgery between 2003 and 2007.

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While the men who underwent minimally invasive surgery had shorter hospital stays and fewer respiratory complications, they reported more complications with erectile dysfunction and incontinence 18 months after surgery. There was no significant difference in the operations' effectiveness in ridding the patients of cancer.

Although the study could not quantify how many of the minimally invasive surgeries used a robotic system, robotic-assisted prostatectomies increased from 1 percent to 40 percent from 2001 to 2006.

Gonzalgo said the study raised important questions, but that it was inconclusive as the results did not specifically look at robotic-assisted procedures. More importantly, it did not show how surgeons who had extensive training and experience with this equipment compared with those who did not. "I would recommend going to an experienced surgeon who has a track record of excellent patient outcomes, regardless of surgical technique," Gonzalgo said. "It is that level of expertise that we're providing at Stanford."

On a recent afternoon, Gonzalgo was preparing to perform a robotically-assisted procedure to remove a patient's prostate cancer, using the robotic system. The da Vinci platform comes in two parts—the surgeon's console and a 7-foot by 5-foot patient side cart with four interactive robotic arms that allow the surgeon to control the laparoscopic equipment and other instruments.

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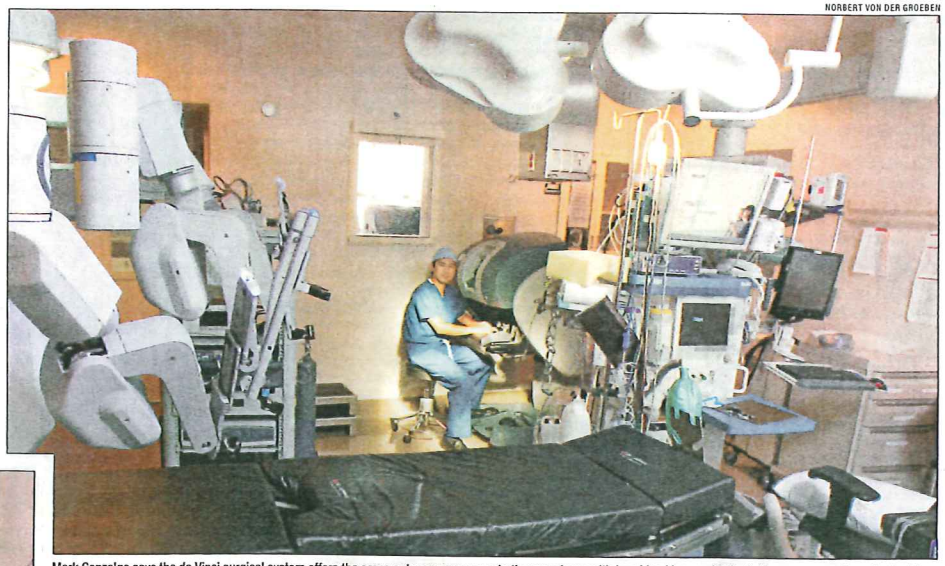

Mark Gonzalgo says the da Vinci surgical system offers the same outcomes as non-robotic procedures with less blood loss and pain, faster recovery and smaller incisions.

Gonzalgo switched on the da Vinci in Operating Room 1 and maneuvered the praying-mantis-like machine, swathed in plastic and light-blue surgical sheeting, close to the anesthetized patient for "docking" with the instruments that had been inserted through small incisions in the patient's abdomen. He then took 10 steps away from the patient, sat down at the console and wrapped his thumb and forefinger around the mechanisms that would translate his hand movements into the twists and turns of the robotic instruments. He peered through a deep scope for a 3-D view of the operative site provided by an endoscope attached to one of the robotic arms.

When the overhead lights were turned off in the OR, an image of the patient's bowels came into view on the high-definition plasma monitors that surrounded the surgical team. Gonzalgo snipped away at the layers of fascia that protected the prostate, cauterizing some small blood vessels and asking the bedside assistant to clip off others.

"We push and pull and then clip to avoid any thermal injury to the nerves responsible for sexual function," he explained, keeping his eyes on the pathway he was clearing to the prostate. "We stay superficial and are very careful about the neurovascular bundles."

Gonzalgo also was intent on giving urologic oncology fellow Steven Chang, MD, a turn on the console. As the procedure progressed, they traded positions—one surgeon at the console, and the other standing at a nearby flat screen, using his finger to trace a route around a critical structure, which appeared simultaneously in the 3-D viewfinder. Gonzalgo kept up a steady commentary during the surgery, which ended with a flurry of deftly executed sutures.

"Suction at 6 o'clock," Gonzalgo said. "Clip. Close. Done." ISM

INSIDE STANFORD MEDICINE

An exhibit on mummies and medicine at the Legion of Honor features nifty scanning done at the med school.

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