

Robot Helps UVA Surgeons Perform Precision Procedures



Prostate surgeons have four hands apiece at the University of Virginia Health System.

With UVA's new da Vinci Surgical System, their second set of hands is able to reach inside the body laparoscopically and move in ways that human hands cannot, even rotating 360 degrees.

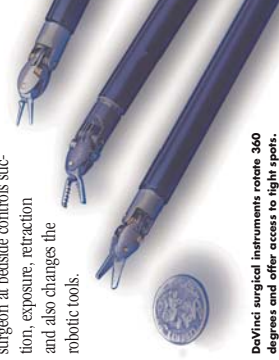
With this new technology, prostate surgeons are better able to avoid muscles and nerves that control sexual function and urination, potentially lowering a man's post-surgical risk of impotence and incontinence. In general, the precision offered with the da Vinci system means less pain and risk of complications, quicker recovery and shorter hospital stays.

ROBOTIC ADVANTAGES

Even in the world of surgical robotics, technology advances quickly. UVA's da Vinci system, the latest edition, offers surgeons the option of using 5 mm instruments as well as the previously available 8 mm instruments, giving them greater maneuverability and access to tight spots. Additionally, UVA's da Vinci robot is one of only a few in the country that has four arms instead of three. Two arms have instruments attached; the third has the camera. The fourth arm has a number of uses, including extra imaging, suction and organ retraction.

Another advantage of the robot is that the instruments give surgeons many more degrees of movement than they would have with their hands or with conventional laparoscopic tools. This includes 360-degree rotation, angulation and articulation as well, providing about four additional degrees of motion over that of a human wrist. With magnification, 3-D imaging and increased motion, this system greatly facilitates the ability of surgeons to apply and tie sutures laparoscopically.

Robotic surgery is "a two-surgeon, one-robot job," says Fulmer. The operative surgeon sits at a console a short distance from the patient, viewing the 3-D surgical site images and manipulating the laparoscopic tools with hand and foot controls. The surgeon at bedside controls suction, exposure, retraction and also changes the robotic tools.



da Vinci surgical instruments rotate 360 degrees and offer access to tight spots.

The surgical robot, made by Intuitive Surgical, Inc., was named after artist Leonardo da Vinci, who sketched a mechanical robot in the 15th century. UVA's robot, purchased by UVA's Paul Mellon Prostate Cancer Institute, was first used in August 2003 for a pyeloplasty but is now also being used for prostatectomy, cystectomy and other urologic surgeries at UVA.

BEYOND HUMAN HANDS

"Where the robot shines is anything that involves very meticulous dissection or fine but complex movements," says Brant Fulmer, M.D., UVA urologic surgeon. "The instruments that we use with the robot allow you to do things that human hands can't do using conventional laparoscopic techniques."

Laparoscopic surgery offers the advantage of magnification of the operational site. To this, the da Vinci system adds three-dimensional imaging. The endoscope contains two cameras and, with computers, can use this optical information to replicate human binocular vision. UVA uses a unique projection system that allows the entire surgical team to follow the operation—also in 3-D.



For Dr. Brant Fulmer and other surgeons, UVA's new da Vinci Surgical System brings dramatic laparoscopic advances.

DAVINCI PROSTATECTOMY

One of the most effective therapies for treating prostate cancer is surgically remove the prostate and surrounding tissue. This procedure, a radical prostatectomy, usually involves an open incision across the abdomen, but also can be done laparoscopically. The da Vinci system offers several advantages over both conventional alternatives.

One significant advantage of da Vinci compared to a conventional laparoscopic prostatectomy is timing. The conventional laparoscopic procedure usually lasts nine or 10 hours, while Fulmer reports that da Vinci procedures have been lasting around three hours. "Less operative time for the patient generally equals a shorter recovery," he says. "They get back to their normal activity much more quickly. Therefore, they leave the hospital earlier. That has obvious cost savings, as well."

Another potential advantage is that with da Vinci, surgeons perform the same nerve-sparing procedure done in standard laparoscopic prostatectomy, but with greater precision. The prostate, nearby lymph nodes, seminal vesicles and adjacent tissue can all be removed while sparing sensitive adjacent tissue. "It's much easier to see small bleeding

Benefits of da Vinci Prostate Surgery

The high degree of precision and control provided by the da Vinci Surgical System provides potential patient benefits compared to conventional surgery, including:

- ▶ LESS PAIN
- ▶ FEWER COMPLICATIONS
- ▶ SHORTER HOSPITAL STAYS
- ▶ FASTER RECOVERY
- ▶ EARLIER RETURN OF URINARY CONTROL
- ▶ IMPROVED SEXUAL FUNCTION
- ▶ LESS INTERNAL SCARRING

DAVINCI CYSTECTOMY

In November 2003, in a laparoscopic procedure using the da Vinci system, a male patient in his mid-50s with bladder cancer had his bladder and prostate gland removed by surgeons at the University of Virginia Health System. "We were very pleased with the procedure. It could not have gone better," says Dan Theodorescu, M.D., Ph.D., Paul Mellon Professor of Urology and Molecular Physiology and director of the Paul Mellon Prostate Cancer Institute. "Our patient is in good condition and was up and walking around the next day."

Doing the operation laparoscopically usually means that patients lose much less blood than when the body is opened surgically. Prior to the operation at UVA, robotic cystoprostatectomy with the da Vinci system had been performed at only two medical centers in the United States—in Detroit, Michigan, and Omaha, Nebraska.

Theodorescu and his colleagues perform about 70 cystectomies a year, mostly on bladder cancer patients. He plans to extend the da Vinci system's applications to allow him to perform a cystectomy and then construct a new bladder, also known as an orthotopic neobladder, from bowel, completely done within the patient's body. As done now, the surgeon has to remove a section of the bowel to build the neobladder, then replace the bowel and neobladder in the patient. "When we are able to do it this way, it truly will be a phenomenal operation," Theodorescu says.

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