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Robotic Surgery in Urology

By: Moses M. Kim, M.D., Ph.D.

Introduction

Robot-assisted laparoscopic surgery has dramatically expanded the treatment options available to patients with urologic diseases. This minimally invasive approach can be used for cancer surgeries and reconstruction of the urinary tract.

Traditional open surgical procedures are performed through significant incisions, from 4 inches for prostatectomy, to more than 12 inches for kidney and bladder cancer surgeries. *In contrast, laparoscopy is performed through several half-inch incisions.* This translates into significant benefits for patients: decreased post-operative pain, shortened hospital stay, recovery, and return to work.

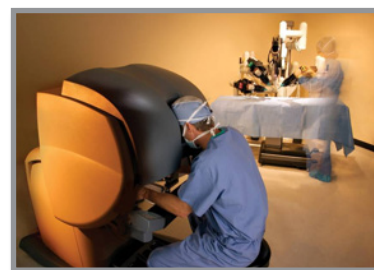
How “the Robot” Works

Traditional laparoscopy is generally limited to straightforward procedures. Using the robotic surgery platform, more complex surgeries can be performed laparoscopically. Mission Hospital uses Intuitive Surgical’s da Vinci System, the only robot currently approved in the U.S.

- › In the operating room, the robotic arms are mounted on a cart that is positioned at the patient’s bedside.
- › Instruments attached to these arms are placed inside the patient through small trocars.
- › One arm holds the 3-D laparoscopic camera, which can be zoomed in, providing greater magnification of the surgical field.
- › The other two or three arms hold instruments, which can cut, grasp, and cauterize.

The surgeon sits at the control console, where he or she controls the robot arms. Each movement of the robot instrument is modeled after the movement of the surgeon’s hands. The “endowrist” feature allows for movements like a human wrist, giving the surgeon incredible freedom of motion to tackle tasks such as delicate dissection and fine suturing. These

features, along with the enhanced visualization, make increasingly complex surgeries amenable to the robot-assisted laparoscopic approach.



Prostate Cancer

More than 200,000 men are diagnosed with prostate cancer annually in the U.S. About half of these men undergo prostatectomy, and more than 80% of these cases are performed robotically.

Patients choose robotic surgery over open prostatectomy because of:

- › Lower transfusion rates
- › Shorter convalescence
- › Quicker recovery of urine control
- › Better preservation of sexual function

Studies show that in experienced hands, cancer cure rates for robot prostatectomy are equal to open prostatectomy, *while recovery and functional return rates are superior.*

Kidney Cancer

Kidney cancer can be treated effectively with surgical removal of the tumor. Studies have shown that patients with renal cell carcinoma who undergo partial removal of the kidney have longer survival when compared

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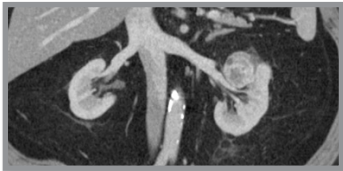
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to those who have total removal. Another nephron sparing modality, *cryoablation* (freezing), results in higher local recurrence rates compared to surgical excision.

› The 2009 American Urological Association (AUA) guidelines recommend partial nephrectomy for small renal tumors when anatomically feasible. Ablative techniques should be reserved for patients who are high-risk surgical candidates.

› Partial nephrectomy is usually performed through a large flank incision, sometimes requiring partial removal of a rib. This is a complex surgery that can be performed in only select cases with traditional laparoscopy.



54 year old man with a 3cm left renal mass, adjacent to the renal vein. He underwent robot assisted laparoscopic left partial nephrectomy and was back to full activity in 3 weeks. Final pathology was renal cell carcinoma with negative margins.

Robotic assistance allows many more patients to be candidates for a minimally invasive approach.

Bladder Cancer

Robotic bladder surgery is a recent advancement in urology. Complete removal of the bladder for bladder cancer (cystectomy) is a major operation, with long operative times and prolonged convalescence. *Studies have shown that robotic cystectomy has less blood loss and post-operative pain when compared to open surgery.*

Ureteral Obstruction

In addition to cancer surgeries, the da Vinci robot can be utilized for the treatment of ureteral obstruction. *Robotic pyeloplasty has become the gold standard for the treatment of congenital proximal ureteral obstruction.* Robotic ureteral reimplantation can be performed for distal and mid ureteral obstructions.

Expanding Applications

When possible, robotic surgery and therefore avoidance of laparotomy, is the preferred approach for the surgical treatment of urologic diseases. While not every patient is an appropriate candidate for robotic surgery, many

are, including those with obesity and previous surgery. Indeed, these are the very patients who may most benefit from a robotic approach. As surgeons become increasingly facile with the robot, they continue to adapt, apply, and improve this technology to other urologic problems.

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ABOUT THE AUTHOR

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Dr. Moses Kim is fellowship trained in robotic and minimally invasive surgery, specializing in performing complex surgeries for malignant and benign urologic conditions.

Dr. Kim grew up in San Francisco and graduated from University of California, Berkeley with a major in biochemistry. His interest in medicine and biomedical research led him to University of California, San Francisco, where he earned his combined M.D. and Ph.D. degrees through the highly selective Medical Scientist Training Program.

Dr. Kim completed his urology residency at the Scott Department of Urology at Baylor College of Medicine. While a resident, he was at the forefront of minimally invasive technologies and helped launch the robotics program at the Michael E. DeBakey Veterans Administration Medical Center. He performed the first robotic prostate and kidney surgeries there. Dr. Kim completed his fellowship in robotics and minimally invasive surgery at Baylor College of Medicine.

Maximizing on his fellowship training, Dr. Kim has performed several “firsts” at Mission Hospital: the first robotic partial nephrectomy, the first robotic radical cystectomy, and the first robotic ureteral reimplant.

Dr. Kim resides in Orange County with his wife, also a physician, and their two young sons.

For feedback or questions related to the content of this article, contact Susan Fox, Mission Hospital's Physician Relations Specialist, at (949) 364-4269 or susan.fox@stjoe.org.

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