

DEFINING THE LANDSCAPE OF PROSTATE CANCER TREATMENT

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Smilow Cancer Hospital is now offering a new surgical option for prostate cancer treatment unavailable elsewhere in Connecticut, and still rare throughout the United States. The beneficiaries are men in need of a prostatectomy, a procedure in which the prostate is partially or completely removed to eradicate localized cancer.

More than 95 percent of prostatectomies in the United States are performed by surgeons using robotic instruments. In the vast majority of these procedures, the robot has four arms that hold surgical instruments and a high-resolution camera. The surgeon manipulates the arms from a console and each arm enters the body through its own small abdominal incision, or 'port.' The surgeon also makes two additional incisions as 'assistance ports,' for a total of six.

Isaac Kim, MD, PhD, MBA



The new technology and expertise at Smilow Cancer Hospital reduces those incisions to two—one for the robot, the other for assistance. This is possible because the da Vinci SP (Single Port) merges all the instruments into one robotic arm.

“That allows us to work in a much tighter space,” said Isaac Kim, MD, PhD, MBA, Professor and Chair of Urology at Yale School of Medicine, and Chief of Urology at Yale New Haven Hospital. “The multiport robot has arms coming through four incisions, and you can’t have them too close together or they’ll start colliding with each other, so you don’t have the range of motion that you get with the single port.”

Operating through a single incision offers several other benefits. The prostate, normally about the size of a golf ball, envelops the urethra and sits between the bladder and the rectum. It is surrounded by muscles, nerves, and blood vessels necessary for erections and bladder function. The multiport typically goes through the peritoneal space, the abdominal cavity that contains the intestines, stomach, and liver.

“That’s important because that’s where the bowel sits,” explained Dr. Kim. “In single port surgery, the incision is made right under the navel, and we don’t have to violate the peritoneal space. That means the potential for complications are a lot less.”

Fewer incisions also mean less pain, and hence less need for pain medications. Instead of opiates, Dr. Kim typically prescribes a couple of days of acetaminophen with codeine. Another major advantage is faster recovery. “With this new technology,” he said, “we’ve basically made prostatectomies an outpatient procedure.” Patients come in in the morning, have their surgery, spend a few hours in recovery, and “are sleeping in their own bed that night.” One report found that hospital stays after the single port procedure averaged 4.3 hours compared to 26 hours for multiport surgery.

Despite these advantages, single port technology is still uncommon. One reason is price. The new instrument costs about \$2 million and doesn’t improve patient outcomes over conventional multiport surgery. That makes budget-conscious administrators leery, though the higher technology costs are likely offset by shorter hospital stays.

Single port robots also remain rare, said Dr. Kim, because of the steep learning curve for surgeons. He has done more than 2,000 multiport prostatectomies, but the new technology requires different skills.

“Not everyone is going to be good at using it,” he said. For instance, he continued, his son constantly crushes him at video games. “Does that mean the technology is worse for me? Of course not. It’s a matter of what the operator can achieve with it. This new technology allows us to push the boundaries of what’s possible, but whether we’re able to take advantage of that new capability is really up to the skills of the individual surgeon.”

Dr. Kim began using the single port instrument two years ago and has completed more than 100 prostatectomies with it. He came to Yale from Rutgers last year partly because Yale offered the state-of-the-art technology. He is also training residents to use the new instrument.

Patients referred to him for prostatectomies expect the multiport procedure and are pleasantly surprised by the single port option.

In his clinical research, Dr. Kim focuses on patients with prostate cancer that has metastasized to the bone, lung, liver, and lymph nodes. The current standard of care is hormonal therapy and chemotherapy, but the prognosis is difficult. “I’m interested in determining whether surgery has any role for these patients,” he said. He hopes to answer that question as co-principal investigator of a study that will eventually enroll 870 patients across 25 institutions worldwide. The study is analyzing whether cytoreductive

radical prostatectomy—complete removal of the prostate—impacts outcomes for patients with metastatic prostate cancer. The results from the Phase I data will soon be published and were more than encouraging.

Our early data show that, in a minority of patients, combining surgery with hormonal therapy and chemotherapy may produce a long-term durable response where there’s no evidence of cancer off hormonal therapy after more than four years of follow-up,” said Dr. Kim. “That is a significant finding. Men with metastatic prostate cancer must continue hormonal therapy for the rest of their lives. But now, by adding surgery, some men may discontinue hormonal therapy after a few years. Yale Cancer Center is now the leading center exploring this potential paradigm-changing concept.” He and his colleagues are currently enrolling 190 patients for the Phase II study.

Why does removing the primary tumor seem to affect metastatic prostate cancer? Dr. Kim answers by describing the movie *Independence Day*, in which alien spaceships invade Earth, and the world’s best pilots can’t touch them because they’re shielded by a force field. The lead character figures out that the shield is being projected by a mother ship hiding behind the moon.

“He destroys that mother ship, and the force field goes down, and then the alien ships are vulnerable,” explained Dr. Kim. “That is precisely the scientific premise of this. There is some sort of communication from the primary tumor, the mother ship, to these metastatic sites. By removing the primary tumor, you’re taking away the shield, which allows the hormonal therapy and chemotherapy to be much more effective against the metastatic cancer in the bone and lymph nodes.”

Dr. Kim was able to tell some of his patients on the Phase I trial that they have no evidence of disease after a metastatic prostate cancer diagnosis more than four years ago and hormonal therapy was stopped for more than two years.

“We’re talking about something that was considered absolutely incurable even just five years ago,” he said. “I’m really excited because the potential is huge, and what we’re doing will put Yale Cancer Center and Smilow Cancer Hospital in front of this changing landscape in how we treat prostate cancer.”

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—Dr. Isaac Kim

