INTUITIVE

Da Vinci SP Surgical System

How adding da Vinci single-port robotic-assisted surgery can transform your urologic practice

Hospitals
Baylor St. Luke's Medical Center and Houston Methodist Hospital

Location
Houston, Texas

Number of beds
850 at Baylor St. Luke's Medical Center and more than 900 at Houston Methodist Hospital.

Integrated delivery network
CHI St. Luke's Health System and Houston Methodist

Surgeon featured
Dr. Richard E. Link, Professor of Urology, Director of the Division of Endourology and Minimally Invasive Surgery and Carlton-Smith Endowed Chair in Urologic Education at the Baylor College of Medicine. He is a 20-year practitioner of da Vinci multiport robotic-assisted surgery and single-incision laparoscopic surgery.

Case summary

Experienced minimally invasive surgeon finds surprising value in embracing single site robotics to transform his mature minimally invasive urologic practice

After pursuing access to an Intuitive da Vinci SP® surgical system for several years, Dr. Richard E. Link began using the system when it became available at the Houston Methodist Hospital in July of 2022. At the beginning, he was somewhat skeptical how single port robotics would fit into a practice that already utilized multiport robotics and single site laparoscopy. Like many other urologic surgeons, he thought the da Vinci SP might help in a certain subset of clinical situations. As it turns out, single port robotics rapidly transformed his diverse practice of kidney, ureter and prostate surgery within only a few months.

Challenges

Da Vinci SP's unique features offer great versatility but also require thoughtful application alongside multiport robotics for complex urologic surgery

Intuitive designed the da Vinci SP to complement rather than replace its multiport da Vinci X® and Xi® systems. Both platforms have their individual strengths and weaknesses and together represent a "system" that can handle almost any urologic procedure suitable for a minimally invasive approach. Single port robotics is ideally suited to procedures within small working spaces outside the peritoneal cavity and presents a range of possibilities so far not easily accomplished with multiport robotics (such as transvesical surgery). Link, who uses both multiport and single-port systems, applies each robot to each individual clinical situation to maximize operating room efficiency and patient outcomes.

Solutions

Case volume and alternative access expedite learning curve and accelerate improvements in patient morbidity

Early in his learning curve, Link focused on replicating transperitoneal surgery that he had been performing for many years using da Vinci multiport robotics and laparoscopy. In January 2023, when his primary practice site at Baylor St. Luke's Medical Center acquired a da Vinci SP system, he had a revelation. With available access to the da Vinci SP, Link rapidly pushed through the learning curve and achieved greater insight into its value and applicability to his patients. The key to unlocking the system's full potential came when Link left traditional transperitoneal procedures behind and expanded into retroperitoneal and transvesical surgery.

Outcomes

Da Vinci single-port procedures yield impressive improvements in postoperative pain and hospital length of stay

After 20 years of performing multiport robotic surgery, just a few months of extensive single-port use convinced Link of the da Vinci SP's unique versatility. Pure retroperitoneal partial nephrectomy procedures resulted in faster operative times, less postoperative pain and much shorter hospital stays for his patients. The da Vinci SP also allowed him to address tumors almost anywhere in the kidney without entering the abdomen and without awkward patient positioning. Likewise, shifting his busy simple prostatectomy practice out of the abdomen and into transvesical simple prostatectomy resulted in same day discharge, no bladder irrigation or drains and minimal discomfort for most of his patients. It was hard to ignore the impressive benefits that patient's experienced from

"In a remarkably short period of time, the da Vinci SP has completely changed my thought process and approach for a lot of the surgeries I do. It has energized me and my operative team to push the envelope and maximize patient benefit in new and exciting ways. Da Vinci SP® and Xi® are complementary and powerful technologies that both have a valuable role to play in a minimally invasive urologic practice today."

Richard E. Link, MD, PhD, Urology

the alternative access advantages made possible by da Vinci SP's single-port robotic surgery.

Link has created an evolving multisystem practice centered around truly customized surgery with the "right platform for the right patient." This experience was transformative and left him with shareable and practical strategies to ease single-port robotic surgery adoption for other surgeons.

Exploring da Vinci SP for robotic assisted surgery

Around the country, urologic surgeons face similar challenges—and opportunities—as Link does.

Prior to da Vinci SP, a small subset of robotic surgeons had managed to adapt multiport systems for single-port surgery, but instrument limitations and arm conflicts presented frustrating obstacles to broad adoption. Other surgeons opted to focus on non-robotic single site laparoscopic approaches to avoid these limitations. However, the ergonomic realities of single-site laparoscopy with rigid instrumentation and general limitation to transperitoneal surgery handicapped its use, particularly for reconstructive procedures with complex suturing.

Da Vinci SP's arrival in 2018 heralded the chance to truly advance and realize the benefits of single-site surgery with good ergonomics and a small footprint. Da Vinci SP's purpose-built platform uses a similar surgeon console as da Vinci's multiport counterparts, but engineers designed the rest of the system to finally achieve the full potential of single-site surgery.

Surgeons have since used the da Vinci SP successfully for a broad range of increasingly sophisticated urologic procedures. By early 2023, the FDA had approved its use for simple and radical prostatectomy, partial and radical nephrectomy, pyeloplasty, and certain transoral robotic surgeries. Surgeons in the more than 100 U.S. hospitals equipped with da Vinci SP systems feel empowered to offer innovative new care options, perform a range of complex procedures, and drive innovation thanks to the system's unique features:

- True single-incision surgery allowing instruments, endoscope, sutures, and insufflation to be introduced through the same incision.
- Versatility and range of motion for working in small spaces.
- Convenient access to retroperitoneal, extraperitoneal and transvesical surgery.
- Extended number of uses for endoscope and select instruments.

Incorporating single-port surgery into an established robotics practice

Even with the emergence of a dedicated single-port platform, Link still uses the da Vinci Xi for select cases in his practice. He favors its dissection speed, strength, instrument selection, and range of motion when those features are most advantageous. By adding the da Vinci SP, he has created a "total practice" featuring multiple platform choices that are tailored to each individual patient scenario. At a high level, this expansion also gives Link greater flexibility in surgical scheduling and robotic access. This total practice model enables him to harness the strengths of each system for maximal patient benefit. In select procedures, emerging clinical evidence supports improvements in complication rates, and minimization of length of stay and postoperative opioid use[1-4].

For Link, the advantages go well beyond the fact that this is single incision surgery. Cosmetic advantages are significant but not the most compelling reason to embrace da Vinci SP technology. His enthusiasm for single-port surgery lies in regionalizing access to organs in the retroperitoneum and bladder, avoiding intra-abdominal organs and accelerating operating room efficiency and patient outcomes. These minimally invasive but regionalized approaches to the kidney, ureter and prostate, in Link's opinion, represent the future of urologic surgery. Avoiding transperitoneal access and intra-abdominal adhesions protects abdominal organs such as bowel from injury. These approaches also allow patients with extensive prior abdominal surgery to more safely undergo procedures and avoid complications. The da Vinci SP platform is accelerating this "regionalization revolution" today and making these approaches more accessible for a greater number of robotic surgeons.

"If you use it and apply it thoughtfully, you will rapidly be convinced that single-site is unquestionably the future of surgical robotics," he says.

Improving minimally invasive partial nephrectomy through regionalization

For most surgeons, robotic partial nephrectomy is primarily a transperitoneal procedure requiring abdominal access, 5 – 6 incisions and colon reflection to access the kidney. This approach also may require complete kidney mobilization and reflection to access posterior tumors. Approaching the kidney through a low anterior approach and accessing the retroperitoneum directly is far more efficient and eliminates the complexity and risk of transperitoneal access. In some cases, the renal vessels and the tumor can be accessed in minutes using this approach. Although multiport robotic platforms can be used to perform retroperitoneoscopic partial nephrectomy, patients generally have to be positioned in full flank and surgeons need to:

- Provide sufficient port separation to avoid collisions among robotic arms (more challenging in smaller patients).
- Place a large dilating balloon to create operating space in the retroperitoneum.
- Position the patient on their side, introducing anesthesia management challenges, particularly for patients with a high BMI.

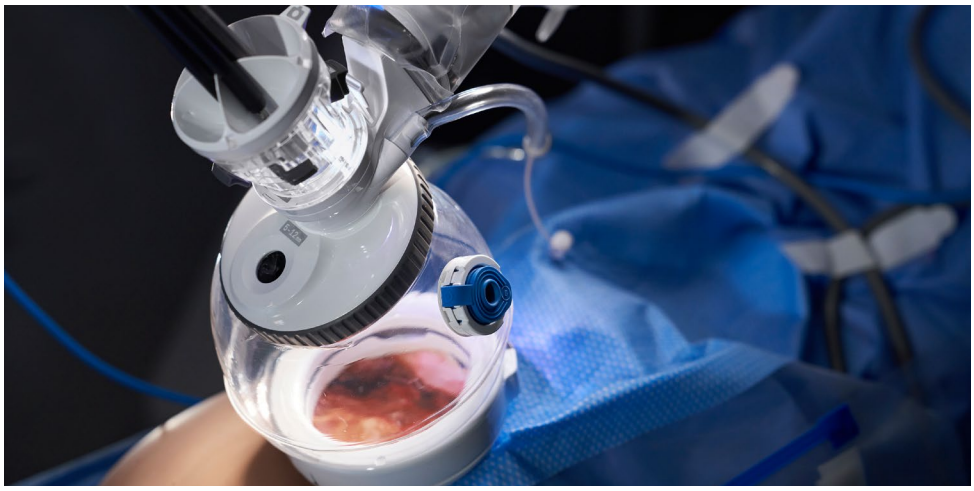
Those challenges meant that most surgeons performed multiport partial nephrectomies with a transperitoneal approach. With the emergence of the da Vinci SP, however, almost all tumors and patients can be approached using a supine position with a single incision outside the peritoneum.

70%

Within six months Link had transitioned about 70% of his partial nephrectomy practice toward the da Vinci SP retroperitoneoscopic approach.

Still, when Link began using the single-port platform, he had modest expectations. He thought he would use it only with a smaller subset of cases—patients with posterior tumors more accessible with a retroperitoneal approach. Plus, he had been doing transperitoneal robotic surgery for more than two decades, and he still felt it was "a good operation that works very well," typically with about 48 hours of hospital recovery. Despite these expectations, within six months he transitioned his partial nephrectomy practice about 70% toward the da Vinci SP retroperitoneoscopic approach.

"That was a pretty unexpected change in my practice," he says.



Potential benefits of single-port partial nephrectomy

Link found that the single-entry point—using a combined retroperitoneal and anterior approach—allowed optimized port placement and upper urinary tract access. It even facilitated a better path to most anterior kidney tumors and to the renal vein which are more difficult to access using multiport systems in the flank position.

With the retroperitoneal approach for partial nephrectomy:

- Link's surgeries are faster.
- People recover much more quickly with same-day discharge becoming a reasonable possibility.
- Link spends less time rounding on hospitalized patients.

For now, Link still performs partial nephrectomy with both the da Vinci SP and Xi systems depending on tumor and patient factors. He feels that very large specimens or tumors that may be best approached medially still warrant a transperitoneal multiport approach. However, as he accumulates more experience he anticipates a steadily increasing number of his partial nephrectomies will be done retroperitoneoscopically with the da Vinci SP.

"I now look at every partial nephrectomy as retroperitoneoscopic single port procedure except a small subset for which the Xi's advantages outweigh the benefits of SP. The da Vinci SP made it surprisingly easy to completely shift that mindset from my prior transperitoneal focused approaches."

Richard E. Link, MD, PhD, Urology

Enabling transvesical simple prostatectomy

Robotic-assisted surgeons have long been attracted to the potential advantages of performing simple prostatectomies with a percutaneous transvesical approach, thereby avoiding the abdomen. Accessing the bladder directly with multiport robotics can be very difficult due to the wide footprint of the system. For many years, Link and other like-minded surgeons treated benign prostatic hyperplasia for very large glands with a transabdominal approach, despite some drawbacks.

The da Vinci SP makes robotic transvesical surgery efficient and feasible by overcoming those earlier multiport challenges. Using only a 2 – 3 cm suprapubic incision, the da Vinci SP can be docked directly to the bladder and the surgery performed. Using this approach, surgeons can perform a complete 360-degree urethrovesical anastomosis so that no raw tissue is exposed, resulting in quicker recovery and less postoperative irritative symptoms. By avoiding the abdomen, this procedure can be performed in men who have had prior abdominal surgery and the risk of urine leak into the abdomen is avoided.

90%

After working with the da Vinci SP for a few months, Link switched 90% of his simple prostatectomies to single-port surgeries with a percutaneous transvesical approach.

Potential benefits of single-port simple prostatectomy

Robotic simple prostatectomy patients always had excellent mid and long term functional outcomes but their immediate postoperative recovery was hampered by the transabdominal approach. After working with the da Vinci SP for a few months, Link switched 90% of his simple prostatectomies to single-port surgeries with a percutaneous transvesical approach.

"It's a great use of the platform, and lets the patients benefit from the mid/long term outcomes of robotic simple prostatectomy but enjoy shorter hospital recovery or immediate discharge postoperatively" he says. For him, many patients go home the same day and don't need drains or continuous bladder irrigation which are uncomfortable and drains on hospital nursing resources. Emerging clinical evidence supports Link's experience of the benefits for the transvesical approach and demonstrate excellent voiding outcomes and significantly improved continence rates compared to HoLEP or ThuLEP [3-6].

Faster patient recoveries with the transvesical approach have also gained the notice of referring physicians, Link says, prompting a significant increase in referrals for this procedure.

"If you need a robotic simple prostatectomy, I don't see why you'd do it any other way than transvesically for most patients."

Richard E. Link, MD, PhD, Urology

Overcoming the single-port learning curve to build a total practice

The da Vinci SP offers compelling and innovative ways to perform surgery, overcome challenges, and benefit patients. It also diversifies and strengthens your practice by allowing customization of approach to specific patient and pathology scenarios. Although there is a learning curve, surgeons familiar with multiport robotics should be able to adapt to the system with ease. Most importantly, an early transition to regionalized surgery outside the peritoneum will accelerate how quickly the system benefits your patients.

The da Vinci SP's clinical benefits make it well worth working through the learning curve. Fortunately, Link says, experienced single-port users are increasingly developing best practices, making onboarding for new surgeons much easier. Further, Intuitive offers educational opportunities to help surgeons learn basic and advanced techniques with the da Vinci SP. With the right encouragement and support, newcomers can make the manageable climb and find a very rewarding view at the top.

Take the next step in your total practice journey

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Dr. Link has received compensation from Intuitive for consulting and/or educational services.

Important safety information
For important safety information, please refer to www.intuitive.com/safety. For a product's intended use and/or indications for use, risks, full cautions, and warnings, please refer to the associated User Manual(s).

Surgeon disclosure
The material presented represents the views, experiences, and opinions of independent surgeons based on their practice and personal experience performing surgery with the da Vinci surgical systems. Their experience may or may not be reproducible and is not generalizable.

Da Vinci Xi/X system precaution statement
The demonstration of safety and effectiveness for the representative specific procedures did not include evaluation of outcomes related to the treatment of cancer (overall survival, disease-free survival, local recurrence) or treatment of the patient's underlying disease/condition. Device usage in all surgical procedures should be guided by the clinical judgment of an adequately trained surgeon.

Da Vinci SP system (TORS and URO)
The safety and effectiveness of this device for use in the performance of general laparoscopic surgery procedures have not been established. This device is only intended to be used for single port urological procedures and for transoral otolaryngology surgical procedures in the oropharynx for benign tumors and malignant tumors classified as T1 and T2 with the da Vinci EndoWrist SP Instruments and the da Vinci SP surgical system TSP1098X.

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