Robot-Assisted Radical Prostatectomy: The Extraperitoneal Approach and the Future with Single Port

24

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Introduction

The wide adoption of robot-assisted radical prostatectomy (RARP) has made surgical prostatectomies safe and effective with short hospital stays [1]. Furthermore, RARP has been associated with decreased complications when compared to other surgical approaches [2]. This has led to RARP becoming the standard of care in the surgical management of localized prostate cancer at a number of centers. To date, hundreds of thousands of radical prostatectomies have been performed since the approval of the first-generation robot in 2000. There have been several generations of robots used to perform radical prostatectomies aimed at improving outcomes, while decreasing the associated invasiveness of open radical prostatectomies.

While open radical prostatectomy, the previously accepted standard surgical approach, was performed using an extraperitoneal (EP) approach, RARP is most often performed using a transperitoneal approach. The learning curve associated with the creation of the EP space laparoscopically and port placement difficulty have been cited as reasons for its decreased popularity [3]. Multiport EP surgery requires lateral dissection of the EP space to allow lateral robotic and assistant ports placement. The Single-Port (SP) robot however, only requires placement of a midline port in the space of Retzius. Several centers including our own have embarked on SP RARP with encouraging results [4].

In this chapter we review the EP approach to the RARP, which has been our preferred route, in the surgical management of organ confined prostate cancer. Our institution has been performing EP RARP with every robot generation available. The latest da Vinci SP system lends itself to the EP technique, and will potentially lead to increased adoption of the EP approach. Herein, we describe our experience at the University of Rochester Medical Center (URMC) with the EP approach to RARP on the multiport, and the alterations required to perform the procedure using the SP platform. We also review key differences between the multiport and SP RARP experience.

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The URMC EP Approach to the RARP

Preoperative and Perioperative Considerations

All patients undergo pre-surgical screening by our anesthesia colleagues to ensure that anesthesia can be administered safely.

We do not have patients undergo bowel prep prior to RARP, except in patients undergoing salvage procedures. Just prior to being brought to the operating room 5000 U of low molecular weight heparin is injected subcutaneously. If the patient has a positive urine culture prior to surgery, culture specific antibiotic therapy is started several days prior to surgery, which is continued throughout the perioperative period. For routine antibiotic surgical prophylaxis, we prefer to give a cephalosporin antibiotic if there is not an allergy to prohibit administration. We ask our anesthesia colleagues to give less than 1.5–2 L of intravenous fluids until the vesicourethral anastomosis (VUA) is completed to avoid saturating the surgical field with urine. With the bladder neck transected, the field can be flooded with urine, which can slow down the procedure, particularly the anastomosis.

Operative Procedure

The following section outlines our technique of the EP RARP with caveats noted when the technique is altered to accommodate the SP platform. We currently use the da Vinci Xi and da Vinci SP surgical systems.

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Patient Positioning and Set Up

Patient positioning is critical as improper positioning may contribute to postoperative morbidity. Patients are placed in the supine position over a bean bag. Sequential compression devices (SCDs) are placed on the patient's calves upon arrival to the operating room. General anesthesia is administered and placement of additional intravenous access is performed as necessary. Egg crate protective foam is placed under bony prominences in contact with the surgical bed to prevent pressure injuries. The patient's arms are tucked. A rectal examination is performed to ensure adequate clinical staging, and proper surgical planning with respect to extent of nerve sparing. The abdomen is shaved. Using a vacuum, the beanbag is activated while wrapping the beanbag over the patient's shoulders to prevent sliding when the patient is placed in the Trendelenburg position. We clean and prep the patient with a chlorhexidine scrub from just below the patient's ribs down to the upper thighs with the genitals prepped in the operative field. We drape the patient with the penis in the operative field. A 16 F Foley catheter is placed, the bladder is emptied, and 10 cc of water is placed in the Foley balloon. The patient is placed in a mild (10–15°) Trendelenburg position.

EP Access and Trocar Placement

A Hasson "cut-down" technique is used to gain access to the EP space. Just inferior to the umbilicus, an approximately 3 cm vertical incision is made. We use a combination of blunt dissection and electrocautery until we reach the anterior rectus sheath (Fig. 24.1). The anterior rectus sheath is incised sharply (Fig. 24.2) by making a 1 cm incision and then placing a stay suture. The stay suture is used for retraction to aid in identifying the posterior rectus sheath. Bluntly, the rectus muscle is partially freed from the posterior rectus sheath to facilitate passage of a balloon dilator trocar (Fig. 24.3). This trocar is passed under direct visualization using a 0° laparoscope (a laparoscope is used at this time as the robotic camera can be difficult to manipulate due to the length and weight of the scope). The balloon is inflated under direct vision to create the EP space. Placing a fist over the left lower quadrant during inflation of the balloon can help ensure creation of a symmetric space by varying pressure on the left lower quadrant as the balloon expands. Over inflation should be avoided to lessen the risk of bleeding from the iliac or epigastric vessels, or creating a compromising peritoneal rent. After creating the EP space the external iliacs, the pubic bone and the epigastric arteries should be easily visible.

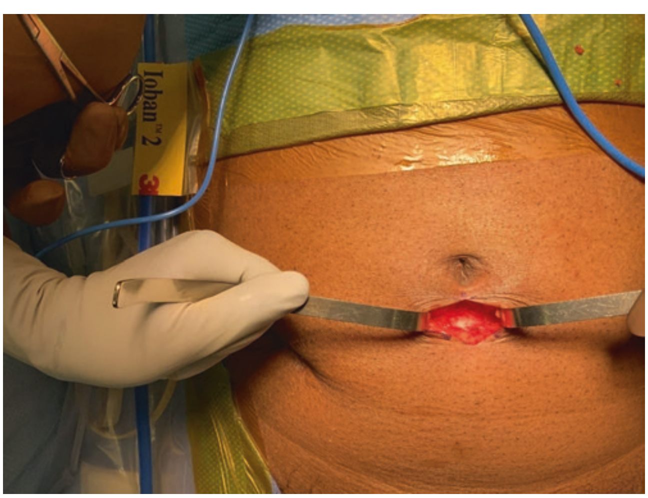

Fig. 24.1 An incision is made just inferior to the umbilicus and the dissection is carried to the anterior rectus sheath as visualized in this image (this patient is status post open appendectomy)

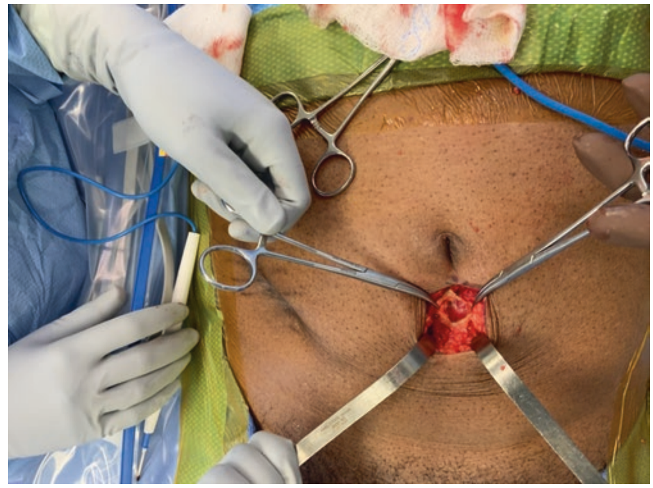

Fig. 24.2 The anterior rectus sheath is incised so a balloon dilator can be placed into the space of Retzius. It is critical to only incise the anterior rectus sheath as incising the posterior rectus sheath will result in entry into the peritoneal space

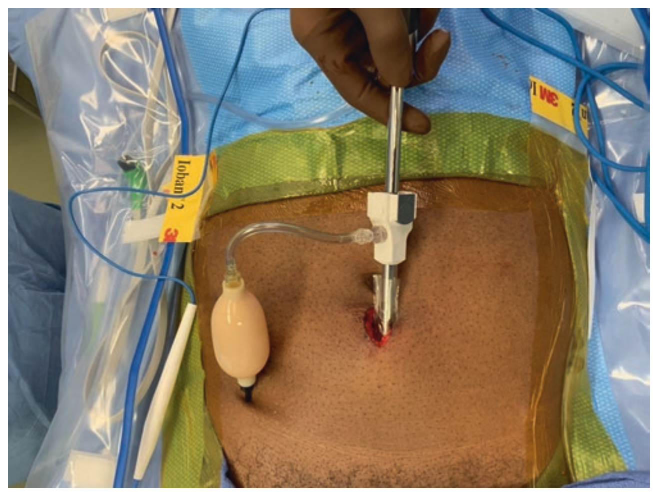

Fig. 24.3 The balloon dilator trocar is passed through the anterior rectus sheath incision into the space of Retzius. The laparoscope is being held by the surgeon's right hand. The balloon dilator is insufflated by hand using the pump connected to the balloon dilator trocar

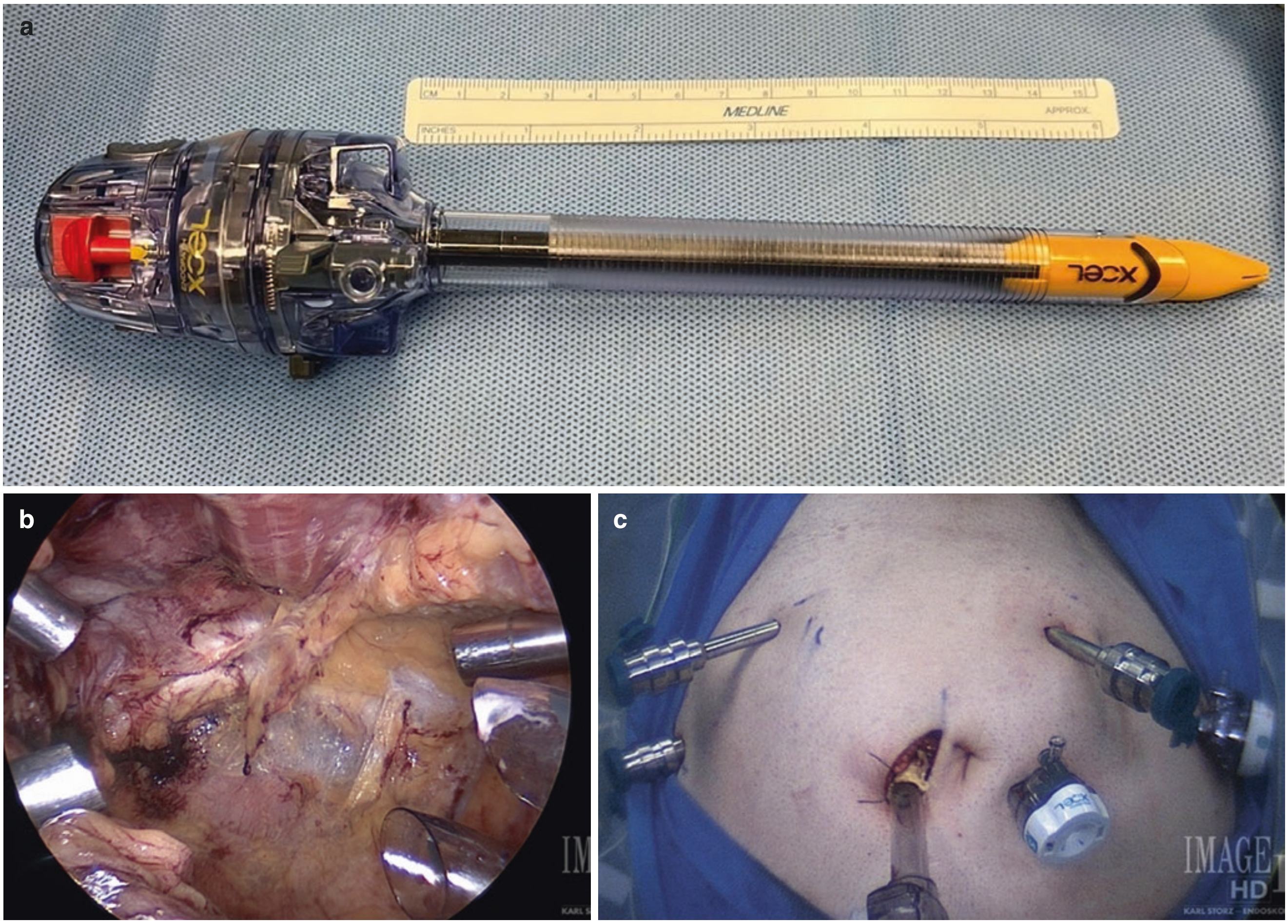

Fig. 24.4 When using multiport robotic platforms the EP space must be maximized for optimal placement of the robotic trocars and assistant ports to minimize collision of the robotic arms. The 10/12 mm 512 XD Ethicon trocar is used to dissect the extraperitoneal space laterally (**a**). Internal (**b**) and external (**c**) view of port placement configured for Si robot. (For Xi robot, the midline trocar is replaced by a 12 mm stapler cannula to accommodate robotic arm used for camera)

If performing surgery with the Xi system, a 10/12 long smooth trocar (Fig. 24.4a) with a bevel is placed in the EP space and insufflation with CO_2 is maintained at a pressure of 15 mmHg. With the multiport robot it is necessary to expand the extraperitoneal space laterally to accommodate the robotic and the assistant trocars (Fig. 24.4b, c). The smooth trocar is critical as it allows us to further develop the EP space by using the beveled edge of the smooth trocar to free the peritoneum cephalad from the transversalis fascia with care taken to avoid inadvertent entry into the peritoneal space. Developing the EP space further as described allows for trocar placement with appropriate distance between each robotic arm and assistant ports while only remaining in EP space. Creating this space is essential when using a multiport robot as appropriate spacing between the robotic ports prevents collision of the robotic arms while maintaining an adequate working space.

The first trocar is placed while the balloon dilator is still in place (Fig. 24.5).

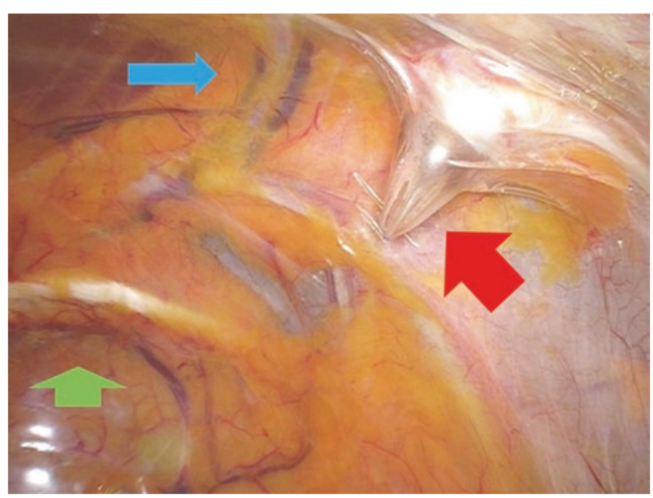

Fig. 24.5 The assistant trocar is being placed while the balloon dilator remains inflated in the EP space. The red arrow is pointing to the assistant trocar being placed, the blue arrow is highlighting the epigastric vessels, and the green arrow is pointing to the pubic bone

Each subsequent trocar is placed under direct vision. A 12 mm assistant trocar is inserted in the left or right lower quadrant approximately 2 cm anteromedial to the anterior superior iliac spine (ASIS). We use a hypodermic needle to identify the inferior epigastric vessels so that the left and right 8 mm robotic trocars can be inserted while avoiding injury to these vessels. We place these 8 mm ports 8–10 cm from the camera port on a line between the umbilicus and ASIS. The fourth 8 mm robotic trocar is placed approximately 2 cm anteromedial to the ASIS, opposite to the assistant. Lastly, a 5 mm trocar is placed between the camera port and the most medial port on the same side as the assistant port, to serve as an additional assistant port. To prevent CO_2 leakage at the midline trocar or camera entry site, and maintain insufflation, we use a 12 mm stapler cannula given the larger fascial opening. Additionally, a xeroform gauze is placed around the camera trocar. A suture is used to narrow the fascial opening around the trocar. In older robot generations, the same trocar used to dissect the extraperitoneal space is used for the camera as noted in the external view configuration below.

If performing surgery with the SP system, we enter the retropubic space in the midline approximately 5 cm from the umbilicus. The balloon dilator is used as described above to develop the EP space. However, the lateral dissection required when using the multiport robot is not needed as all the robotic arms are deployed from the single port site. The port is "air docked" to provide adequate working space and deploy the robotic arms with elbows. We use either the Gel Point mini, or the da Vinci SP Access Port. The associated wound protector is inserted in the space of Retzius after extending the fascial incision to 3–4 cm. When the GelPoint Mini is used, a 2.5 cm metal trocar is placed through the Gel Point along with other accessory ports. Instruments such as a suction cannula can be inserted directly through the gel without a trocar. We routinely "air dock" when using the Gel Point to facilitate internal triangulation of the robotic arms. When using the da Vinci SP Access Port, floating of the wound protector, or "air docking" is not necessary (Fig. 24.6). The Access Port is designed to float and allows for easy visualization of the robotic arms upon their entry through the instrument guide. Furthermore, the SP Access Port allows easy removal of the specimen from the working space without losing insufflation. If a "plus one" approach is used, an 8- or 12-mm port is placed medial to the epigastric vessels. We routinely insert this trocar directly into the inflated balloon as previously demonstrated.

Next, we dock the da Vinci patient cart to the trocars. We use a da Vinci camera (0° if using the Xi system or EndoWrist SP camera with COBRA action if using the SP system). We also use monopolar scissors, a bipolar grasper, and the cardiere forceps.

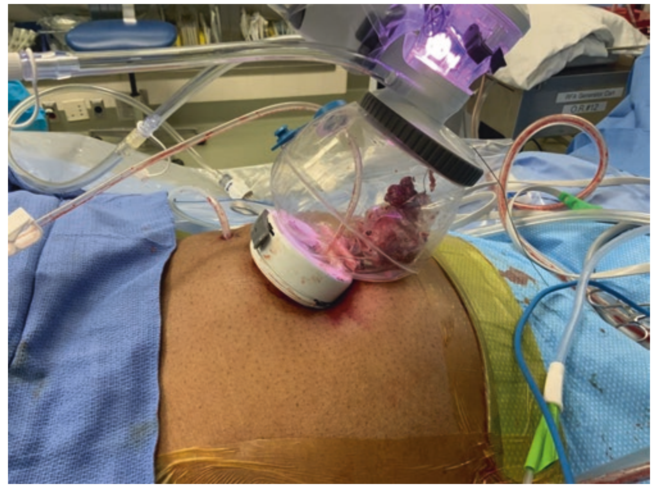

Fig. 24.6 The da Vinci SP Access Port with prostatectomy specimen. The drain in this photo was placed through the "plus one" port site

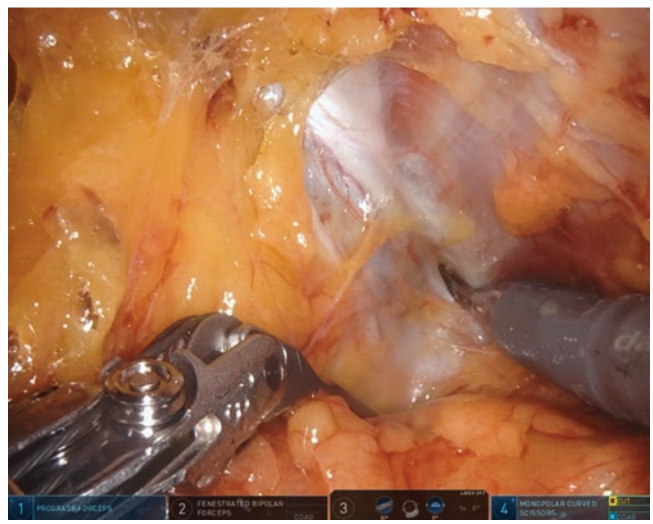

Fig. 24.7 The endopelvic fascia on the right side of the prostate is being incised just lateral to the prostate. The levator ani is seen lateral to the tips to the scissors

Subsequent operative steps of RARP are common to both the multiport and SP platforms. Of note, the EP RARP is performed via an anterior approach whereby the seminal vesicle dissection is performed after bladder neck dissection. The posterior approach to the seminal vesicles cannot be performed as the EP RARP is completed without entering the peritoneum.

Endopelvic Fascia Dissection

Lateral to the prostate, the endopelvic fascia should be easily visible. At times fatty connective tissue needs to be removed in order to visualize the fascia adequately. Just lateral to the prostate, the endopelvic fascia is incised (Fig. 24.7). A sweeping motion is used to push the levator ani muscle off the prostate. Occasionally, sharp dissection or electrocautery is needed to aid dissection as prostatic inflammation can cause the pelvic floor muscles to adhere to the prostatic capsule. Care should be taken to avoid violation of the prostate capsule laterally, or Santorini's plexus anteriorly (which can also be associated with bleeding). This dissection is brought caudally to a "notch" between the urethra and dorsal venous complex (DVC). The puboprostatic ligaments are cut close to the prostate to keep some of their pelvic floor support but facilitate suture ligation of the DVC.

Dorsal Vessel Complex Ligation

A barbed 2/0 V-Lok™ suture with a SH needle is passed through the "notch" between the DVC and urethra in a figure of eight fashion by suspending the stitch to the periosteum of the pubic bone. The DVC suture is secured with surgical clip (Fig. 24.8). Excess suture is left so the suture can be tightened if the suture slips. It is important to pass the figure of eight suture as distal to the apex as possible to ensure negative apical margins and to facilitate apical dissection.

Bladder Neck Dissection

Care with the bladder neck dissection is critical as too large of a bladder neck can be associated with postoperative incontinence, while following a bad plane can lead to positive margins on final pathology. We identify the initial dissection plane by tugging on the Foley and pressing on the bladder on each side of the prostate to identify the plane between prostate and bladder (Fig. 24.9). We then use a "burn and push" technique to develop the plane on either side carrying it to the midline. The "burn and push" technique allows us to follow a plane between the prostate and bladder and the visualization afforded by this technique gives us considerable control of the entire dissection. The anterior bladder neck is incised in the midline at which point the Foley catheter can be observed. The Foley can be retracted toward the pubic bone to facilitate further dissection. Once we transect the posterior bladder neck, the anterior layer of Denonvillier's fascia is now exposed. Incising Denonvillier's fascia should expose the vas deferens and the seminal vesicles.

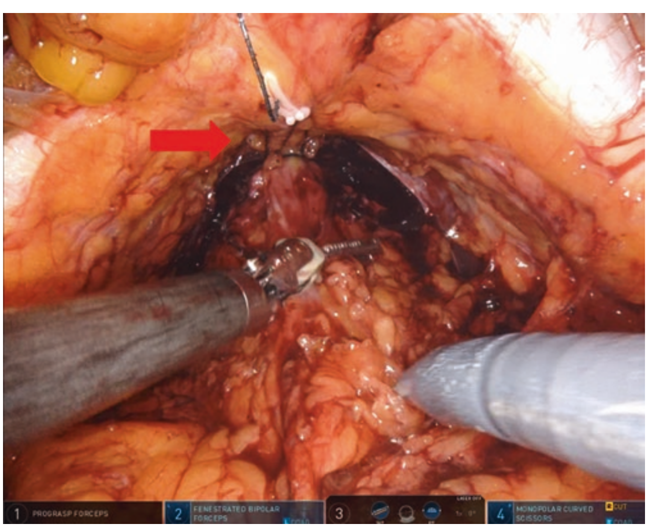

Fig. 24.8 Red arrow pointing towards figure of eight DVC suture suspended to the pubic bone

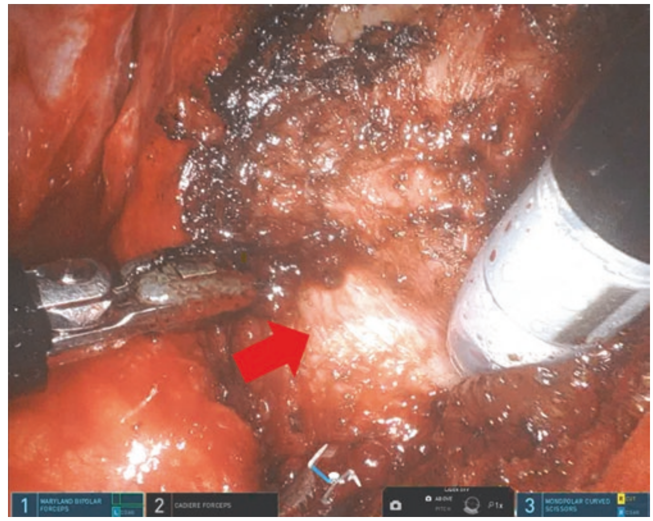

Fig. 24.9 The "burn and push" technique is being utilized to facilitate the bladder neck dissection. The red arrow is showing the bladder neck dissection plane

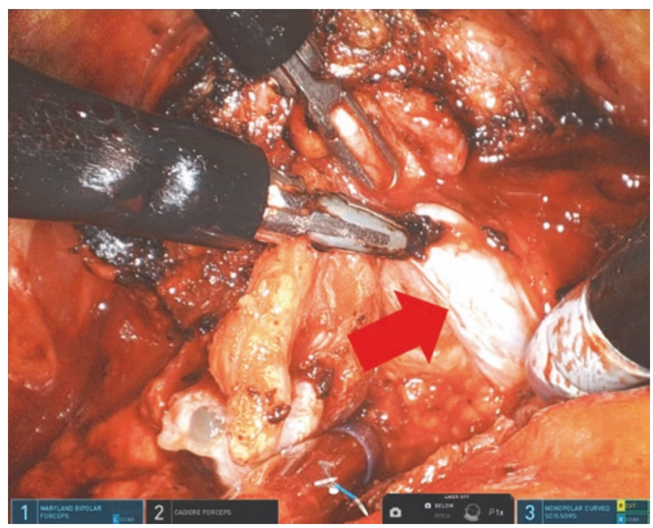

Fig. 24.10 The red arrow in this photo is the medial portion of a partially skeletonized seminal vesicle. The vas and seminal vesicle are being retracted anterior and cranially while the scissors dissect laterally to create a vascular pedicle that will be clipped

Vas Deferens and Seminal Vesicle Dissection

This is a challenging part of the dissection as it occurs essentially in a hole and electrocautery should be avoided to prevent damage to the laterally coursing neurovascular bundles, thus retraction is essential. First the vas deferens is dissected distal to the ampulla. The vas deferens are divided between Hem-o-Lok clips. Next, we skeletonize the seminal vesicles, freeing it from the overlying blood vessels (Fig. 24.10).

The grasping forceps are used to retract the seminal vesicle towards the contralateral shoulder (anterior and cranially). For example, the left seminal vesicle should be retracted toward the right shoulder. The dissection starts from the medial aspect of the seminal vesicle and carried laterally as the medial portion of the seminal vesicles is avascular which allows for creation of vascular pedicles. The vascular pedicles that are created can then be easily clipped laterally with Hem-o-lok clips and then sharply divided. Done well, each seminal vesicle will require about three clips for vascular control.

Incision of Denonvillier's Fascia and Posterior Dissection

Once the seminal vesicles are dissected free, the grasping forceps are used to retract the vas deferens and seminal vesicles anteriorly to facilitate dissection (Fig. 24.11). We incise the posterior layer of Denonvillier's fascia starting in the midline close to the prostate to avoid rectal injuries. A plane is then developed between the prostate anteriorly and the rectum posteriorly. We develop this plane mostly bluntly while pushing the rectum down and minimizing electrocautery to avoid rectal injuries. The dissection is carried distally toward the apex.

Securing the Prostatic Pedicle

We control the prostate pedicles with Hem-o-lok clips. To avoid inadvertent damage to the neurovascular bundles we avoid using electrocautery in this area.

Neurovascular Bundle Dissection

The ultimate goal of the procedure is cancer eradication. When the cancer parameters, and the prostate exam under

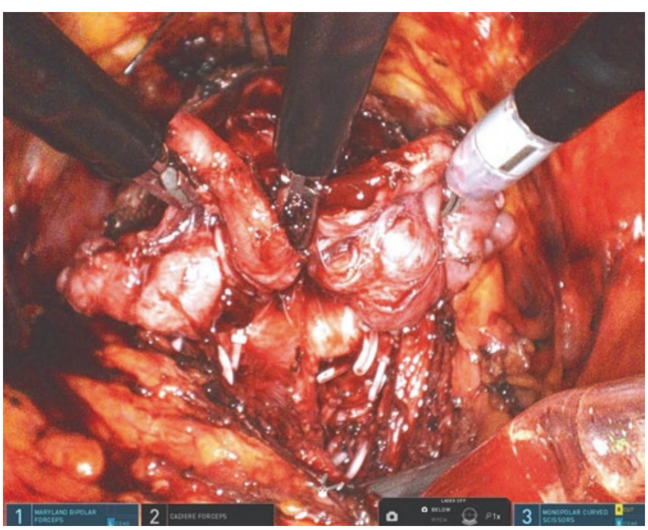

Fig. 24.11 Retraction of the vas deferens and seminal vesicles anteriorly which will help with visualization and facilitate the posterior dissection

Fig. 24.12 The red arrow is pointing to the left neurovascular bundle that has been dissected free of the prostatic capsule. The blue arrow shows the dissection place between the neurovascular bundle and periprostatic fascia. Note the prostate being retracted anteriorly and slightly to the right to facilitate dissection

anesthesia suggest a low likelihood of extraprostatic disease, we routinely perform a nerve sparing approach. When aggressive cancer is present, we avoid sparing the neurovascular bundle. We often send frozen sections from the periprostatic tissues near the neurovascular bundles to ensure a cancer free dissection plane. When the bundles are spared, the prostate pedicles are selectively clipped while avoiding injury to the adjacent bundles. The prograsp is used to retract the prostate anteriorly, and opposite to the side being dissected (Fig. 24.12). We prefer a combination of antegrade and retrograde dissection. The latter is used to facilitate appropriate visualization and dissection of the bundles coursings posterolaterally. We use scissors to incise the lateral prostatic fascia. The neurovascular bundle is gently dissected from the prostatic capsule. Clips are used to control large vessels entering the prostate prior to their transection. This dissection is carried to the apex. If bleeding is encountered over the dissected bundles, it can be controlled by placing Interrupted 4-0 Vicryl sutures. We avoid using electrocautery close to the neurovascular bundles to prevent electrical and thermal injuries.

Apical Dissection

The previously secured DVC is incised using electrocautery. A plane between the prostatic apex and urethra is created. We then expose and sharply incise the anterior urethra a few millimeters from the prostatic apex. Care should be taken to avoid injuring the neurovascular bundle near the prostatic apex as the neurovascular bundles course anterolaterally to the apex. Once the posterior urethral wall and rectourethralis muscle are dissected, the specimen is completely freed. We then examine the specimen with careful attention to the resection margins. Additional frozen sections may be sent from the specimen if there are concerning areas.

Lymph Node Dissection (LND)

It is possible to perform a LND with the EP approach using either the da Vinci multiport or SP platforms. The difficulty of the dissection is due to the shorter working distance of the robotic arms limiting the range of motion of the robotic arms and ability to obtain optimal angles when performing the LND. Furthermore, compared to transperitoneal approaches, the assistant port is slightly more inferior and medial which also limits the ability of the assistant to place clips and retract. Despite the difficulty in performing LND with the EP approach, there does not seem to be increased rates of symptomatic lymphoceles [5]. Our dissection starts at the node of Cloquet and is carried proximally to the bifurcation of the common iliac vein. The lateral margin is over the external iliac vein and medially to the node packet below the obturator nerve and vessels. Clips and bipolar energy are used to prevent lymphatic leakage. We clip the left lymphatic packet so we can identify which side each lymphatic packet came from for pathologic analysis.

Once the LND is complete, the lymph node packets and prostate specimen are placed in a specimen retrieval bag.

Posterior Reconstruction

The posterior reconstruction is performed as there is some evidence that performing a posterior reconstruction can improve early continence after RARP [6]. Furthermore, performing the posterior reconstruction is helpful as it makes the VUA somewhat simpler as the posterior reconstruction approximates the bladder neck and urethra. This approximation also likely takes tension off the anastomosis. The posterior reconstruction is performed with two separate 3/0 9-in. V-Loc™ sutures. The first suture throw is a good bite through the posterior rhabdosphincter. The suture is then used to pull the rhabdosphincter into the pelvic cavity so that a second suture throw can be made through the posterior rhabdosphincter slightly lateral without incorporating mucosa. The suture from the first throw is then completely removed. Next, the suture is passed through Denonvillier's fascia and the posterior bladder. The suture is then placed through the loop at the end of the V-Loc™ suture. A second throw of the suture is then made more lateral to the first stitch and again incorporates the posterior rhabdosphincter, Denonvillier's fascia and the posterior bladder (Fig. 24.13). We repeat these steps with the second V-Loc™ suture starting on the opposite side of the posterior rhabdosphincter. We then cinch these sutures to approximate the bladder neck to urethra. We eventually suspend these sutures Cooper's ligament after cinching the aforementioned sutures (Fig. 24.14). Suspending these sutures to Cooper's ligament is a technical modification which helps to restore the intrapelvic position of the membranous urethra. This also may be associated with improved early return of urinary continence as the suspension provides a sling-like effect on the bladder neck which prevents the anastomosis from descending through the pelvic diaphragm.

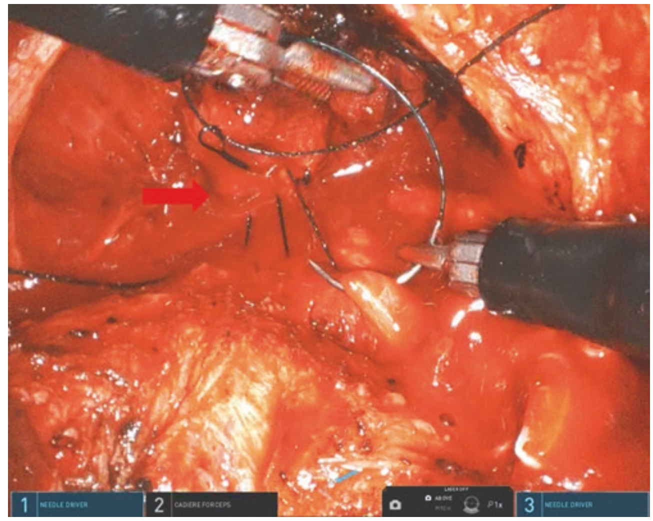

Fig. 24.13 The posterior reconstruction with the posterior rhabdosphincter being highlighted with the red arrow. The needle is currently being driven through Denonvillier's fascia prior to being incorporated into the posterior bladder

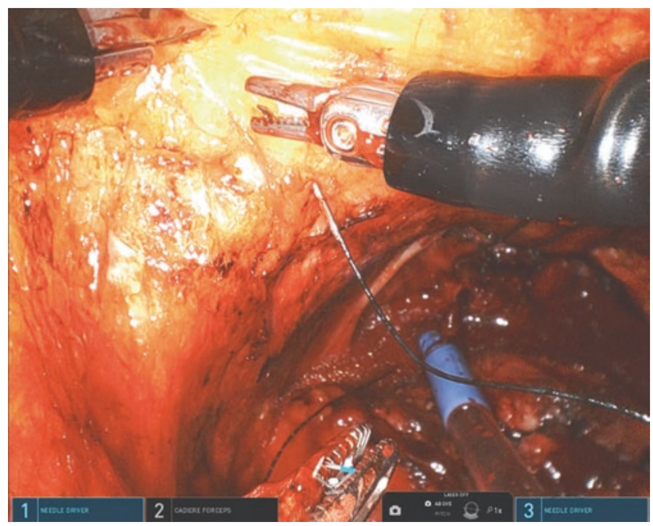

Fig. 24.14 The posterior reconstruction suture being thrown through Cooper's ligament. In this image one can appreciate the placement of the suture in relation to the endopelvic fascia and DVC suture. Note the posterior reconstruction sutures have been cinched as well to approximate the bladder to the rhabdosphincter

Vesicourethral Anastomosis

A watertight anastomosis with good approximation of the urethral and bladder mucosa is important as these measures likely help reduce the risk of bladder neck contractures [7].

Furthermore, urine leaks are a source of post-operative morbidity for patients as a urine leak may lead to prolonged need for a Foley catheter and drain. The urethra and bladder neck are approximated by running two separate 2-0 9-in. Vicryl sutures on RB-1 needles. The first throw is placed at the 5 o'clock position starting on the inside of the urethra and then placed through the bladder ending through the bladder mucosa (Fig. 24.15). The suture is then tied. We then run the suture clockwise from the 5 to 11 o'clock position. Next, we run the second suture anticlockwise from the 4 to 10 o'clock position. The suture is cinched as each suture is placed and careful attention is given to ensure there is good mucosa-to-mucosa apposition. Each suture is tied separately which provides two suture lines and avoids reliance on a single knot. If there is a large bladder neck we close some of the bladder neck by suturing bladder mucosa to bladder mucosa in the anterior midline prior to completing the VUA creating a tennis racket closure. A new 20 F 2-way Foley catheter is placed. The integrity of the anastomosis is evaluated by observing the anastomosis for leaks while the bladder is filled with 180 cc of saline. If a leak is demonstrated, additional sutures are placed to ensure its resolution. Once we are satisfied with the VUA, 15 cc of water is placed in the Foley balloon.

Drain Placement

A 19 F Blake drain is inserted through the most lateral 8 mm trocar site when performing surgery with the multiport robot. During SP "plus one" cases the 8 or 12 mm assistant port is used to place the drain. No fascial closure is absolutely necessary at the assistant port site, given its EP nature of the procedure. The drain is positioned so it is not directly over the anastomosis which may result in a urine leak.

At this point the robot is undocked after removal of instruments.

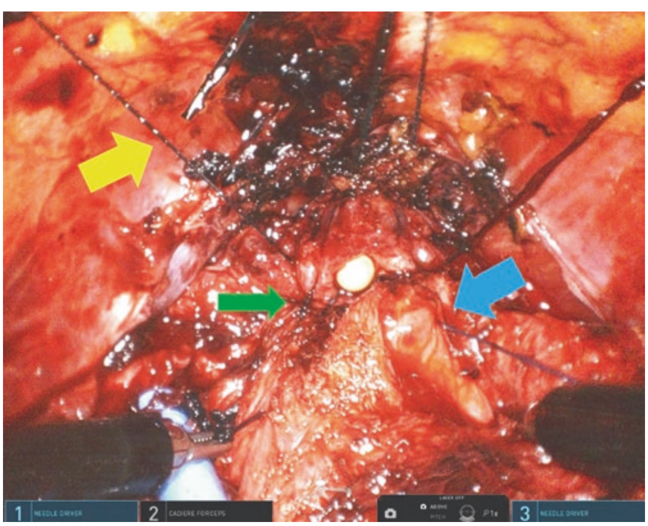

Fig. 24.15 Start of the VUA. The yellow arrow highlights the left posterior reconstruction suspension suture, the green arrow highlights the posterior reconstruction sutures, and the blue arrow is displaying placement of the first suture for the VUA. Note the approximation of the rhabdosphincter to the bladder neck with the posterior reconstruction

Specimen Extraction and Wound Closure

The patient is taken out of Trendelenburg position. With the multiport setup, the specimen bag string is transferred from the assistant's 12 mm port to the robotic 8 mm camera port. The umbilical incision is extended as needed and the specimen is extracted. With the SP setup, the specimen can often be easily removed through the robotic port site as it is approximately 3–4 cm in length. Occasionally the fascial incision needs to be extended to remove the specimen. All additional ports are taken out under direct vision to ensure there is not any significant bleeding.

Once the specimen is removed, we close the fascia with 3–4 interrupted figure of 8's using 0-polyglactin suture.

Skin incisions are closed with 4/0 Monocryl sutures (Fig. 24.16). A 3-0 silk tie is used to secure the drain to the skin. Steri strips and dressings are applied over the incision and local anesthetic is infiltrated prior to the reversal of anesthesia.

Post-operative Care

The patient is recovered in our PACU. Clear liquid diet is administered initially and diet is advanced as tolerated. Patients are ambulated the same day. If there is no significant concern for bleeding, prophylactic chemical thromboembolic prophylaxis is given with intermittent pneumatic compression with SCDs while the patient is in the hospital. We only obtain post-operative labs for clinical concerns. The morning after surgery the drain is removed if there is <100 cc of output in an 8-h shift. Almost all patients are discharged within 24 h of surgery. For straight forward cases, the Foley catheter is removed approximately 7–10 days after surgery. Patients with significant thromboembolic risks are discharged with a course of 10 days of anticoagulation.

Discussion

EP RARP remains an underutilized approach. This route avoids insufflation of the intraperitoneal space. Diaphragmatic splinting, which can cause respiratory compromise, is eliminated. Severe Trendelenburg which is often required with the transperitoneal approach is also avoided. The peritoneum serves as a natural barrier, keeping intraabdominal contents out of the operative field. Furthermore, no lysis of adhesions is necessary in patients with prior abdominal surgeries [8].

The potential advantages of the SP RARP are fewer incisions and possibly better postoperative pain control. We

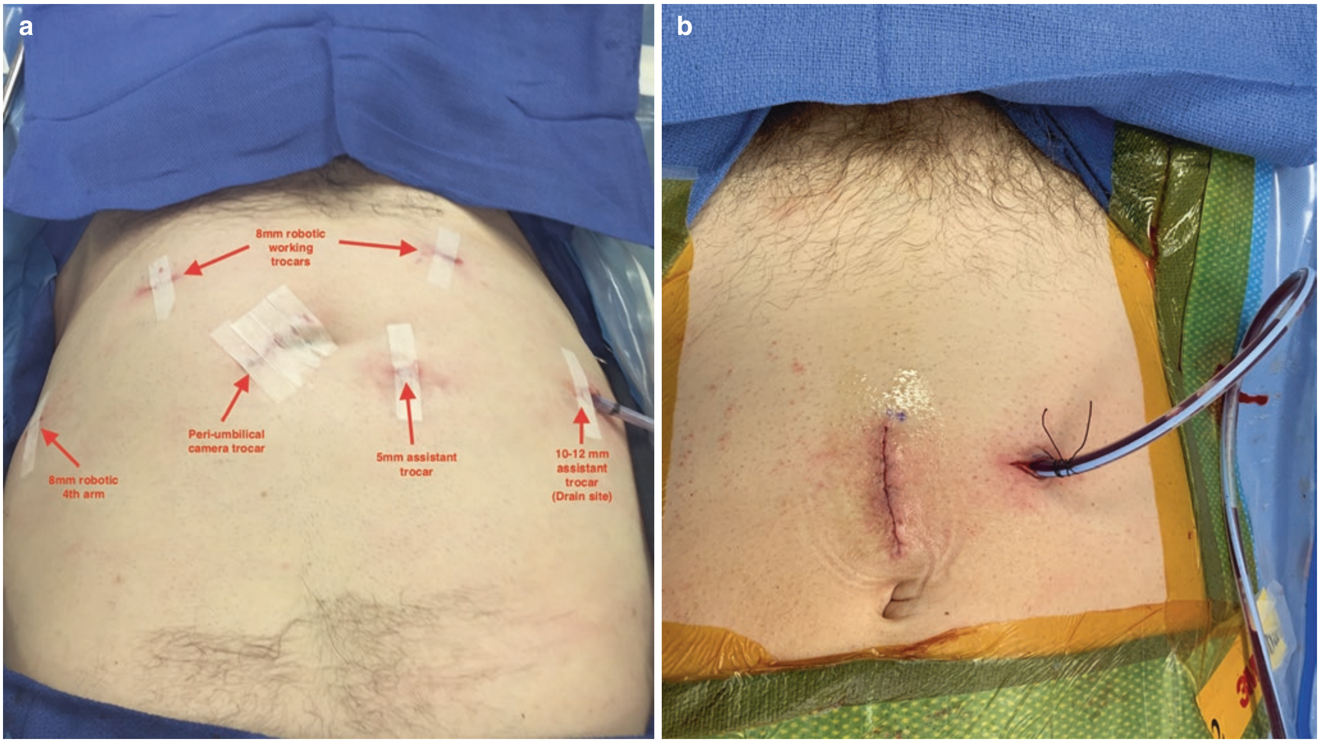

Fig. 24.16 Post-operative views post multiport (**a**) and SP "plus one" (**b**) EP RARP

expect improvement in operative times once the surgical techniques become established and there is better familiarity with the maneuverability of the SP robotic instruments. The camera does have a cobra head allowing better maneuverability, however using this capability to ease the operative procedure is not clearly evident. There are some that will use a 0° scope for the majority of a RARP and switch to a 30° down scope during the bladder neck and seminal vesicle dissections. Thus, for those who use two scopes during RARP the cobra head function of the camera could help save them time and money by providing optimal visualization without needing to change robotic scopes during the case. However, there are currently significant disadvantages of the SP system. Training is an issue for two reasons: currently training consoles are not widely available and the primary surgeon is often still working out the surgical technique and maneuverability of the robot for themselves. Furthermore, maneuverability of the robotic arms with the SP system is an issue. The instruments have an articulating elbow 2–3 cm from the wrists of the robotic instruments which allow the instruments to enter the surgical space and then move out of the view of the camera. Due to the articulating elbows, the range of motion of the instruments are reduced when compared to the multiport robot. Creation of new instruments for the SP robot may help with optimizing the surgical experience while minimizing postoperative complications.

We show in this chapter that the EP approach can be used to perform RARP using both a multiport and a SP robot. However, the EP RARP has not been widely adopted with the multiport robot. This is mainly due to the learning curve associated with the extraperitoneal space expansion laterally. This often challenging EP dissection is no longer necessary with the SP robotic system given the space created in the midline with a finger manually or with a balloon dilator is sufficient to deploy the SP. A lot of progress is on the way to further minimize invasiveness of our surgical approach to RARP. The SP access kit which has only become available in the last year is one such example. With further technological improvement, adoption of the SP robot to perform RARP will undoubtedly continue.

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