Difficulties in Laparoscopic Radical Prostatectomy

15

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Necessary Equipment and Instruments

Equipment

- Olympus laparoscopic video tower (21-in. monitor, EXERA II image processor with light source) (Olympus Medical Systems, Tokyo, Japan)
- High-definition laparoscopic EndoEye 30° "chip-on-a-stick" laparoscope (Olympus Medical Systems, Tokyo, Japan)
- High flux UHI-3 CO_2 insufflator (up to 35 L/min) (Olympus Medical Systems, Tokyo, Japan)
- SonoSurg ultrasonic generator (Olympus Medical Systems, Tokyo, Japan)
- Electrosurgery unit (monopolar/bipolar)
- SurgiPump suction/irrigation pump (Olympus Medical Systems, Tokyo, Japan)

Instruments

- Trocars: Three 5-mm TroQ trocars (Olympus Medical Systems, Tokyo, Japan) and two disposables, 10 and 12 mm

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- 5-mm graspers: Two fenestrated alligator clips, one with and the other without a locking handle; one alligator grasper
- 5-mm suction-irrigation cannula
- Two Olympus straight laparoscopic needle-holders (Olympus Medical Systems, Tokyo, Japan)
- Olympus reusable Metzenbaum scissors (Olympus Medical Systems, Tokyo, Japan)
- 5-mm high-frequency L-hook-type monopolar electrode
- 5-mm SonoSurg cutting and coagulation shears (Olympus Medical Systems, Tokyo, Japan)
- 5-mm and 10-mm Weck Hem-o-lok® clip appliers (Teleflex Medical, Research Triangle Park, NC, USA)
- 5-mm Olympus titanium clip applier (Olympus Medical Systems, Tokyo, Japan)
- 24 F Urethral bougie (Beniqué)
- 10-cm Ethicon Endopouch laparoscopic extraction pouch (Ethicon Endo-Surgery, Cincinnati, OH)
- 20 F Foley silicone-coated catheter
- Metallic urethral catheter guide
- Sutures:
  - Dorsal vein complex ligation: 0-Vicryl™ on CT-1 needle (Ethicon, Inc., Somerville, NJ, USA)
  - Urethrovesical anastomosis: 2-0 Monocryl™ on UR-6 needle, or alternative 2-0 Biosyn™ on GU-46 needle (Covidien, Dublin, Ireland)
- Olympus fascia seal needle (to seal orifices or bleeding epigastric vessels) (Olympus Medical Systems, Tokyo, Japan)
- Storz 10-mm right angle dissector (Karl Storz, Tuttlingen, Germany)
- 10 F Blake drain with collection chamber.

Patient Preparation

- Routine preoperative studies (urine culture), respiratory exercises with incentive inspirometer
- Bowel preparation with magnesium citrate
- Preoperative antibiotics
- Detailed review of the preoperative ultrasound regarding the estimated volume, expected anatomy of the median lobe, and type of apex
- Consider performing cystoscopy in patients with symptoms of urinary obstructions and/or history of hematuria
- Digital rectal examination under anesthesia.

Patient Positioning

Antiembolic stockings or intermittent compression devices are placed on both legs. The patient is placed supine with the upper extremities in adduction and with the shoulder supported to prevent sliding. A 20 F silicone-coated Foley catheter is inserted without filling the balloon to evacuate the bladder. After application of the first trocar, the patient is placed in a steep Trendelenburg position.

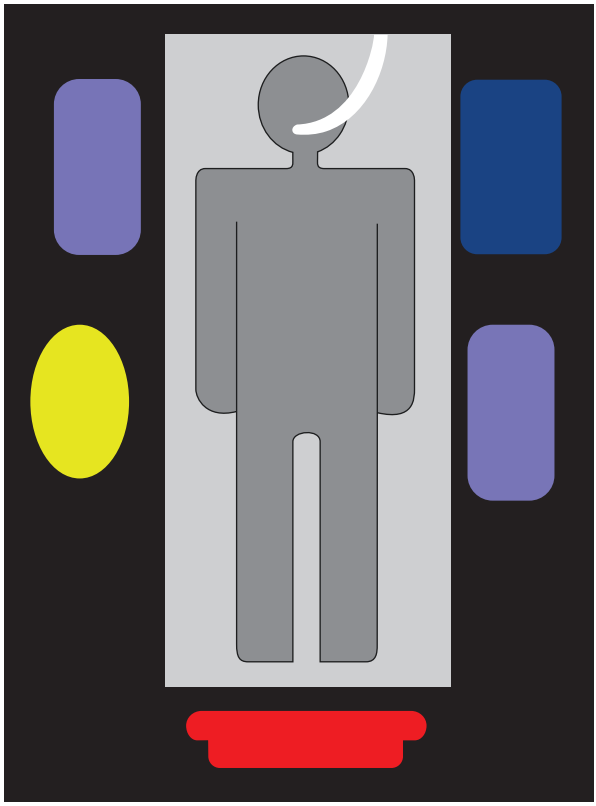


Fig. 15.1 Surgical setup. Surgeon (*blue*), first and second assistant (*sky blue*)

When performing antegrade dissection and encountering difficulty in delineating the plane between the bladder and prostate, one may inflate the balloon with 10 cc and slide it distally, thus the junction between the two structures will be demonstrated.

Surgical Setup

The laparoscope tower is placed at the patient's feet at a height whereby the monitor and insufflation equipment are clearly visible. The main surgeon is positioned on the patient's left, the first assistant to the right and the second assistant to the left of the main surgeon. The surgical orderly is positioned diagonal to the second assistant (Fig. 15.1).

Approaches

Extraperitoneal

Advantages

- In theory, surgery duration is shorter, considering that the dissection of the pre-peritoneal space is done digitally or with a balloon.
- Decreased risk of bowel injury.

- Decreased likelihood of developing postoperative ileus in the event of urine leak.
- A shallower Trendelenburg position is required since the bowel is naturally retracted by the veil of the peritoneum.

Disadvantages

- Small working space.
- Potentially increased tension on the urethrovesical anastomosis.
- Occasional bloody dissection of the preperitoneal space, decreasing visibility.

Transperitoneal

Advantages

- The space created with direct-vision through an avascular plane allows for a "clean" work field, taking greater advantage of light, thus obtaining better image and color.
- Wider working space, with reduced incidence of collapse of the operating field during suction and less interruption of visibility by fluids like blood or saline solution when irrigating, since they escape into the upper abdomen due to gravity.
- Wide bladder mobilization allows it to be brought down to the anastomosis with less tension.
- Storage of the specimen away from the work area, especially when it is large, does not hinder the execution of the anastomosis.
- Proximal extended lymph node dissection is more readily achieved.

Disadvantages

- Greater risk of bowel injury.
- Increased likelihood of developing postoperatory intestinal obstructions due to manipulation of the wall, and mainly because of leaked urine.

Transperitoneal with Two Windows

The authors have carried out an intermediate situation, in which after the transperitoneal approach, two lateral peritoneal windows are created to gain access to the prevesical space. This technique obtains some of the advantages of the extraperitoneal approach (bowel retraction) as well as the wider space of the transperitoneal approach.

Trocar Placement

Extraperitoneal

Placement of the trocars in a "W" tends to be the most correct and comfortable technique. In the extraperitoneal approach, the first trocar (10 mm) is placed immediately below the navel. A vertical or horizontal incision in the skin is performed

with a scalpel, followed by dissection of the subcutaneous cellular tissue, and a horizontal incision into the anterior rectus abdominus sheath.

The authors will describe two ways of gaining access to the work space: the first method requires the surgeon to section the entire middle raphe of the rectus sheath with scissors and dissect the prevesical space digitally or with the balloon. The second method requires the surgeon to vertically section the posterior of the rectus sheath and gain access to the space between the posterior sheath of the rectus and peritoneal. The surgeon then dissects with a lubricated finger, heading first toward the pubis, the Retzius space and then moving laterally, taking care not to accidentally open the peritoneal or section the perforable vessels located mainly in the epigastric zone.

Problem: It is important that the dissection of the peritoneum cavity generates no perforations. If perforated, CO_2 will enter the peritoneal cavity and push the bladder towards the created space, making surgery difficult.

Solution: Should a perforation occur, the peritoneal continuity solution should be broadened and another should be created contralaterally so that the CO_2can freely circulate between both cavities.

In order to cut costs, a Hasson trocar is not used. To maintain an airtight seal, a pulley stitch is placed using a retention needle through the entire width of the wall from the skin to the posterior aponeurosis of the rectus. The suture is loosened and the trocar is introduced without the obdurator. The surgeon then makes a half-knot and adjusts it with the Kelly forceps to avoid gas leakage.

The importance of this type of suture is to enable the operation to progress smoothly, as it is easy to quickly reestablish the pneumoperitoneum hermetically after removing the operatory piece to review the borders of the section or simply to create a greater work space.

Insufflation then proceeds at a pressure of 15–17 mmHg and the blunt dissection is completed under direct vision with the scope moving forward in a fanning motion.

Tip: The scope should be 1 cm within the trocar to prevent it from getting dirty and wasting time cleaning it. Alternatively, a bariatric trocar (which is much longer) may be employed.

The second trocar (5 mm) is placed at the left pararectal level, a little below the line that unites the navel and the anterior superior iliac spine; the third trocar (5 mm) is placed 2 cm above and within the left anterior superior iliac spine. The fourth trocar (12 mm) is placed contralaterally to the left pararectal and the fifth trocar (5 mm) is placed 3 cm above and within the right anterior superior iliac spine.

Tip: It is worth remembering that one should perform the dissection of the bladder and prevesical space adequately, so that the trocars may be placed in the appropriate position.

Transperitoneal

For the initial approach, the authors use a modified Veress needle entry with abdominal wall retraction. A vertical skin incision is made in the umbilicus with an 11 blade. The anterior rectus sheath is cleared off, and a 2–3 mm incision is made until preperitoneal fat is seen. Two holding sutures of 2/0 Vicryl™ (passed inside out on

the fascia) are lifted for anterior traction on the abdominal wall. This serves to increase the distance between the abdominal wall and underlying structures and provides countertraction to the resistance of the peritoneum encountered by the Veress needle.

Once pneumoperitoneum is created, the first trocar is placed blindly using a safety trocar that has a retractible blade. After introduction of the optical scope and exploration of the cavity, the other trocars are placed under direct vision. The order is similar to that of the extraperitoneal approach, or in accordance with what is discovered during exploration (Fig. 15.2).

Tips: It is important that the depth and rigging of the trocars be in such a way that they do not move, to prevent them from entering or exiting accidentally.

The first assistant employs the transumbilical trocar to introduce the 30° optical scope (which is manipulated with the left hand), and the fifth trocar to introduce the suction-irrigation cannula and other instruments (which are manipulated using the right hand). The second assistant uses the right hand to retract the bladder or bowel

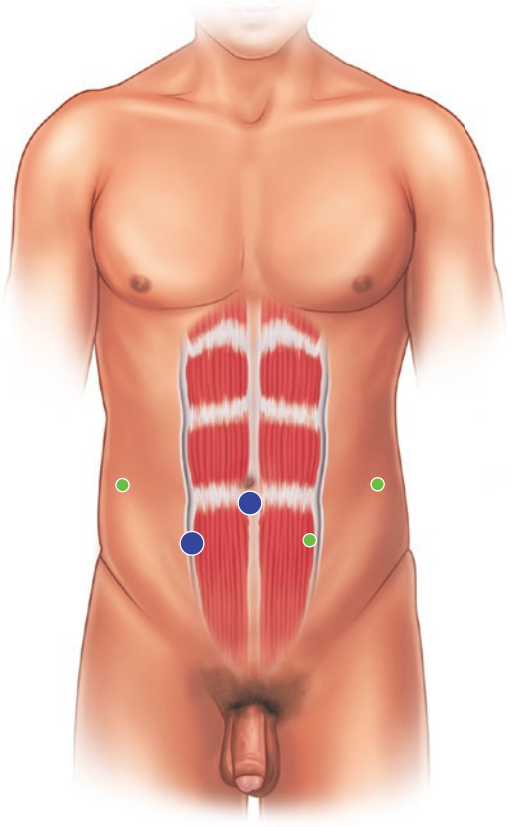


Fig. 15.2 Trocar placement. 10–12 mm (*square*), 5 mm (*circle*)

with a grasper through the third trocar, and the left hand to manipulate the metallic intraurethral bougie.

The authors use a high-definition 30° EndoEye laparoscopic video because of its multiple advantages. It allows the first assistant to manipulate it with one hand, and the 30° scope allows for lateral vision and a sense of depth not possible at with a 0° scope.

During dissection of the anterior wall of the prostate, bladder, and urethra, the bevel is pointed downwards and to the sides. In the lateral pedicles, the bevel is positioned upwards and to the middle. In the posterior wall of the prostate and the Denonvillier's fascia upwards, in the initial points of the anastomosis to the level of the urethra upwards, and in the rest it is downwards and to the side.

Transperitoneal Creation of Lateral Windows

With the 30° scope introduced in the peritoneal cavity through the first trocar (with the extreme distal located in the lower right quadrant and with the bevel pointed to the middle), the surgeon, with a grasper introduced by the left pararectal trocar, pulls on the urachus and presents the right umbilical ligament. Then using the 5-mm monopolar L-hook electrode introduced by the right pararectal trocar, the surgeon dissects the parietal peritoneum, creating a lateral window in the cephalo-caudal direction that proceeds laterally to the umbilical ligament down to the right vas deferens.

The surgeon proceeds in a similar manner on the left side until both dissection planes are united. The surgeon works using the two left 5-mm trocars and the first assistant performs counter-traction using the suction through the fourth trocar. Then, the second assistant introduces a grasper through the third trocar for cephalad retraction and posteriorly the peritoneal band made up of the urachus and the umbilical ligaments. In this manner, the surgeon completes dissection of the Retzius space reaching the pubis (Fig. 15.3).

Direction of Dissection

The laparoscopic dissection of the prostate was initially described in the antegrade direction, proceeding from base to apex. Other authors later presented the technique using retrograde dissection, similar to conventional open surgery [1, 3]. Nevertheless, both dissections have been combined with transperitoneal or extraperitoneal approaches. Technically, antegrade dissection is probably the most natural, in terms of the continuity of the prostate axis and taking into account the angle of the 0° scope. However, dissection of the lateral prostatic pedicle is difficult since the surgeon cannot spatially know the location of the distal point that he or she is heading towards.

Despite the use of the 30°scope and the ability to see the lateral border of the prostate, it is possible to lose the dissection plane of the lateral pedicle and head tangentially, sectioning the neurovascular bundles with consequent functional damage to the patient.

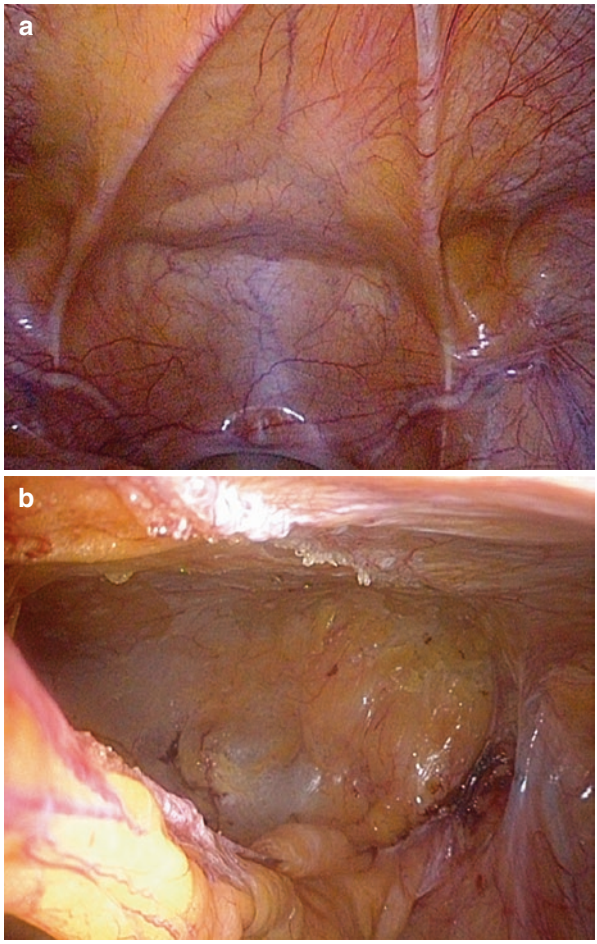


Fig. 15.3 (**a**, **b**) Umbilical ligaments and right lateral window

If difficulty is encountered in identifying the section's lateral line, the initial stitch (proximal) and the final one (distal), the authors first perform the retrograde dissection, which is possible due to the visibility obtained with the 30° scope. A proximal retraction stitch in the prostate allows for it to be lifted, retracted, and for the apex to be turned, which makes dissection of the lateral bundles in a retrograde direction feasible. This approach makes the dissection safer as the stitch reached in the antegrade approach can be simply connected to the stitch where the retrograde approach ends.

Dissection of the Anterior Wall of the Prostate

The surgeon employs the grasper, SonoSurg and laparoscopic swab to remove the fat located in the anterior wall of the prostate. Dissection proceeds in a distal to the proximal direction; adipose tissue is removed as a continuous flap from the pubic bone back to the prostatovesical junction (Fig. 15.4).

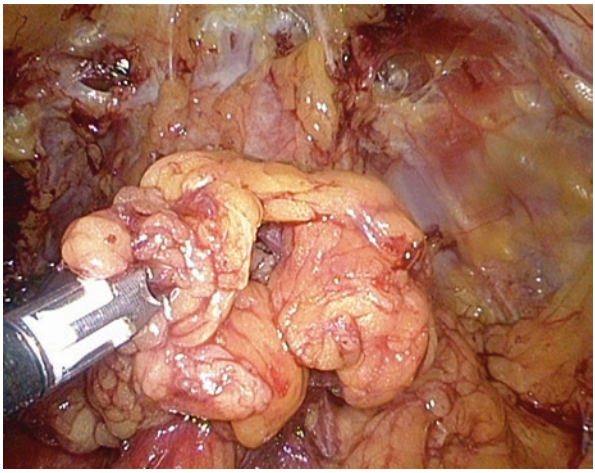


Fig. 15.4 Dissection of fat in the anterior wall of the prostate

It is important to take care when sectioning the fat in the median distal line, because easy-to-bleed, superficial veins flow through this fat.

The presence of lymphatic ganglions in this tissue has been reported in some works, which is a reason to send it to anatomopathologic study.

Opening Endopelvic Fascia and Dividing the Prostatic Component of the Puboprostatic Ligament

The surgeon opens the endopelvic fascia, lateral periprostatic fascia and partial separation of the neurovascular bundles (from apex to base) with the scissors and the swab, sectioning the prostatic component of the puboprostatic ligament while respecting the fibers leading to the urethra.

On the right side, with the 30° scope bevel aimed to the left, the surgeon retracts the prostate to the contralateral side with a left hand grasper, and sections the endopelvic fascia with the scissors in the right hand. Then, the surgeon deepens the dissection of the fascia with the grasper in the left hand, retracts the medial cut edge of endopelvic fascia, exposing the posterolateral zone of the periprostatic fascia. The surgeon sections with the scissors in the right hand and dissects with a swab, cleaning the apex with in a clockwise motion (Fig. 15.5). The procedure on the left side is similar, but dissection of the apex with the torund requires counterclockwise movements.

Ligation and Division of the Dorsal Venous Complex

Prior to ligature of the vein complex, a proximal stitch is placed at the apex to group and unite the entire area of the complex along the median line for better definition, thus allowing for improved ligature. Furthermore, the stitch allows the application

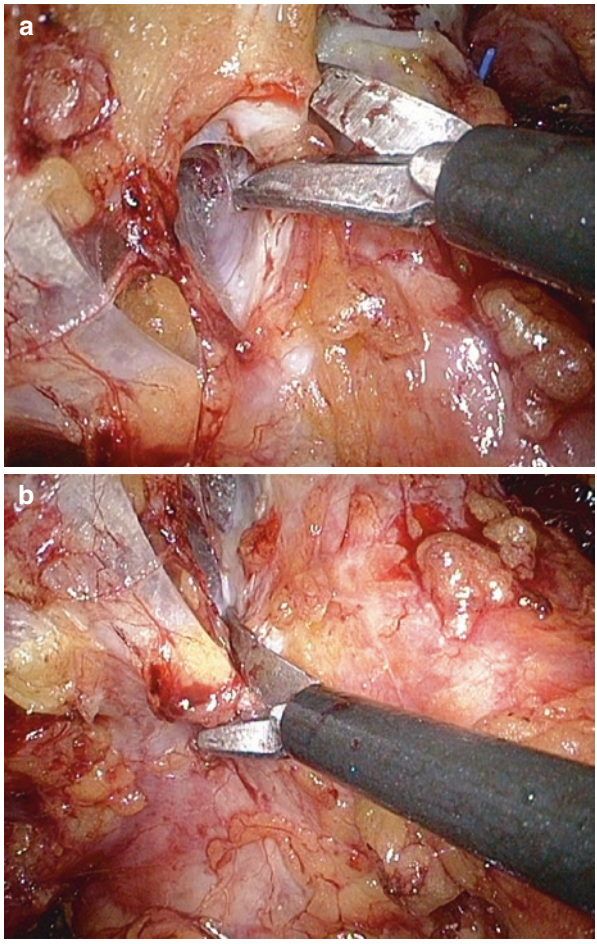


Fig. 15.5 (**a**, **b**) Opening of the endopelvic fascia

of traction and flection of the prostate to view the posterior component of the apex and thus facilitate retrograde dissection. Afterwards a second stitch is placed, which is the true distal stitch that encompasses the dorsal vein complex. Finally, with the Metzenbaum scissors, the dorsal vein complex is sectioned (Fig. 15.6).

Tip: To make proper placement of the needle used to ligate the vein complex easier, upon taking it with the needle-holder, press it against the anterior wall of the prostate and grasp it by its distal third. During its insertion it should be held straight; only after it has gone through nearly the entire complex should it be turned. If the needle is turned too quickly it may enter the complex.

Tip: When inserting the needle to ligate the vein complex, the first assistant should push the apex to the right with the suction device to see where the stitch exits. The second assistant should then go down with the Benique in the urethra, thus assuring that the needle enters between the area of the dorsal vein complex and the urethra.

Problem: The dorsal vein complex bleeds after being ligated and sectioned.

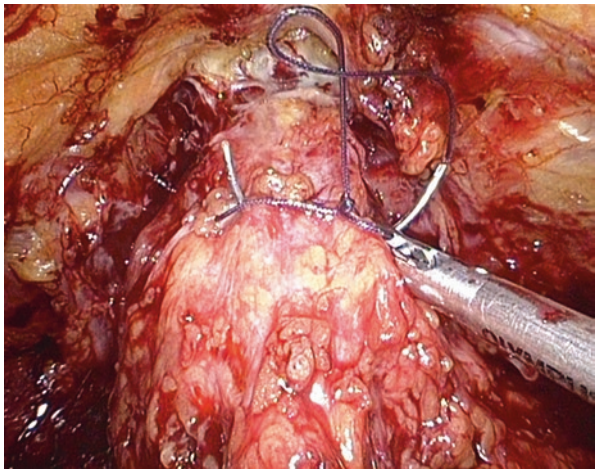


Fig. 15.6 Placement of the proximal point in the prostate

Solution: The bleeding can be controlled with the Benique; compression should be applied beforehand against the arc of the pubis.

The placement of a linear stapling device is an alternative way to ligate the dorsal vein complex; it should be 30 mm in width, vascular, and placed with a TYCO clip that articulates and roticulates.

Tip: The placement of the linear device should be done in three movements: (1) articulation, (2) reticulation, and (3) another articulation. Keep the stapler closed for approximately 1 min to compress the tissue, expel edema, and improve tissue coaptation.

Some surgeons perform the antegrade dissection before ligating the vein complex and opening the endopelvic fascia. This technique was described by Gaston, who does not ligate the complex or open the fascia, but goes directly to open the vesicle neck, then advances laterally interfascial or intrafascial and finally ligates the dorsal vein complex. In the authors' case, they first connect the dorsal vein complex and proceed to the dissection of the urethra, performing the retrograde dissection of the prostate and then the antegrade dissection to communicate both dissections. Their technique will be further described in the following sections (Fig. 15.7).

Apical Dissection, Division of the Urethra

The laparoscopic nondisposable scissors are used to dissect the urethra; with lateral movements, proper identification the structures is possible with 30° of vision and the neurovascular bundles can be dissected laterally. The Benique is gently removed and sectioning of the anterior circumference of the urethra is performed with a single cut, if possible.

Tip: The urethral stump should be kept as long as possible, requiring dissection very close to the prostate, but without risking margin safety.

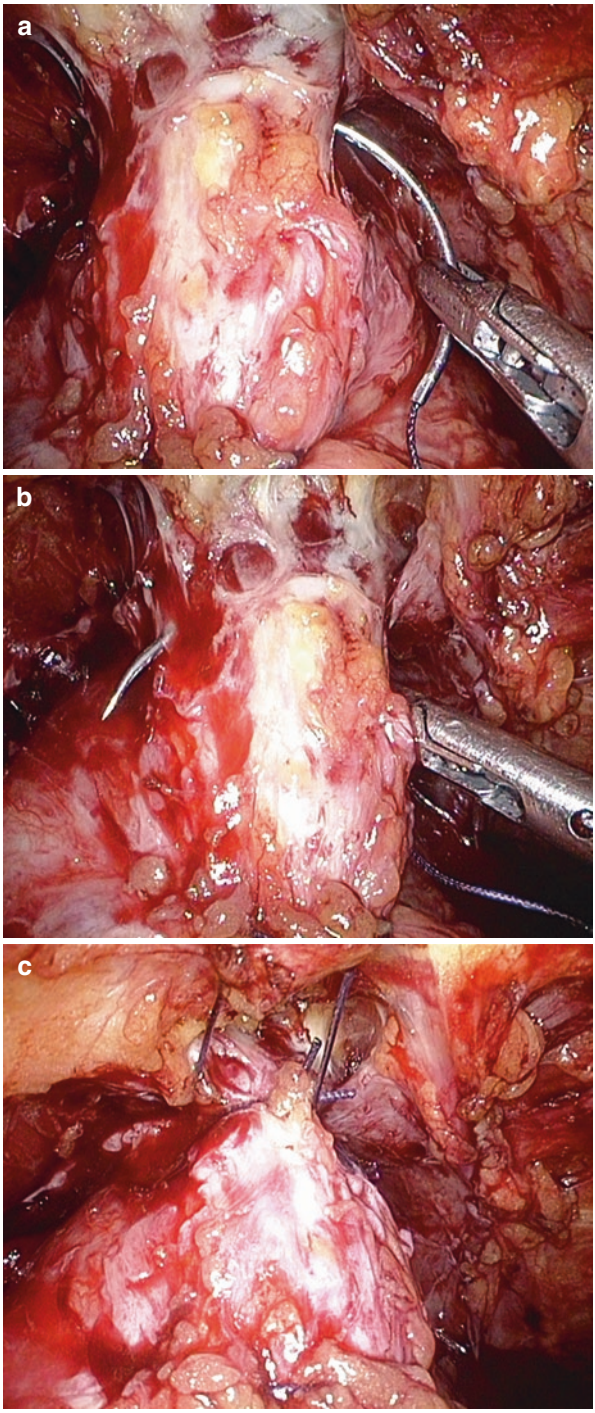
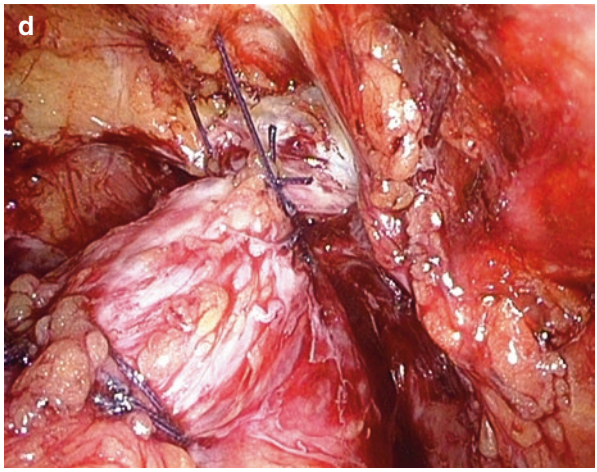


Fig. 15.7 (**a**–**d**) Ligation of the dorsal venous complex and point of suspension

Fig. 15.7 (continued)



Tip: The opening angle of nondisposable scissors are greater than disposable ones, so transection of the urethra with regular continuous edges can be performed with fewer cuts.

With the help of the 10-mm right-angle dissector, the posterior plane of the urethra and the posterior rhabdosphincter are dissected. Before sectioning the posterior lip of urethra, the anatomy of the posterior lip of the prostate's apex is identified laterally using the 30° scope. This identification guarantees a correct cutting plane, since the posterior prostatic apex may extend distally beneath the urethra (Fig. 15.8).

Retrograde Dissection of the Prostatic Apex

Once the dorsal vein complex and the urethra are sectioned, the surgeon proceeds with retrograde dissection of the prostatic apex, sectioning the posterior rhabdosphincter, laterally dissecting the bundles, and reaching as far as the Denonvilliere fascia. Positioning the bevel of the 30° scope with downward and applying traction with the proximal stitch will help facilitate this dissection (Fig. 15.9).

Tip: For a better view during the retrograde dissection, the second assistant pulls from the proximal stitch and the surgeon, with a grasper in the left hand, pulls and bends the posterior lip of the apex.

Anterior Bladder Neck Dissection

Once retrograde dissection of the apex has been completed, the surgeon takes the prostate from the point of proximal traction. While performing lateral movements and with the posterior traction of the bladder, the cleavage plane between both structures can be clearly identified by observing the differences in mobility between a hollow organ (bladder) and a solid one (prostate). After identifying the line where

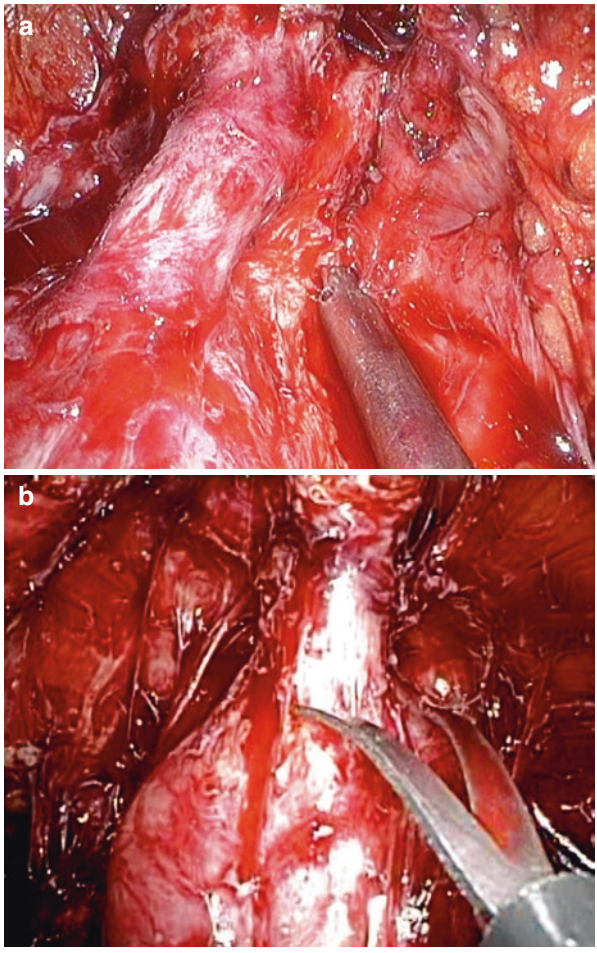


Fig. 15.8 (**a**, **b**) Dissection and division of the urethra

the bladder and prostate meet, a transverse incision is performed using a 5-mm L-hook monopolar electrode until the bladder is opened (Fig. 15.10).

Another way to recognize the boundaries of the prostatic-vesicle is to differentiate the fat on the prostatic surface (easily removable) and the bladder (denser and adheres to the organ). It also helps to laterally follow the curvature of the prostate. A combination of these maneuvers will aid in correctly identifying the limits for the cut.

A large median lobe may lead to confusion since the prostate and bladder may appear to meet farther back. This may result in the surgeon sectioning in the wrong place, so care should be taken in patients with large median lobes.

When cutting the anterior wall of the bladder, do not attempt to preserve the vesicle neck since there is no evidence of improvement in continence by doing so. Performing the anastomosis is difficult when the orifice is small, and at times it is impossible to determine precisely whether there is or is not a median lobe. There is

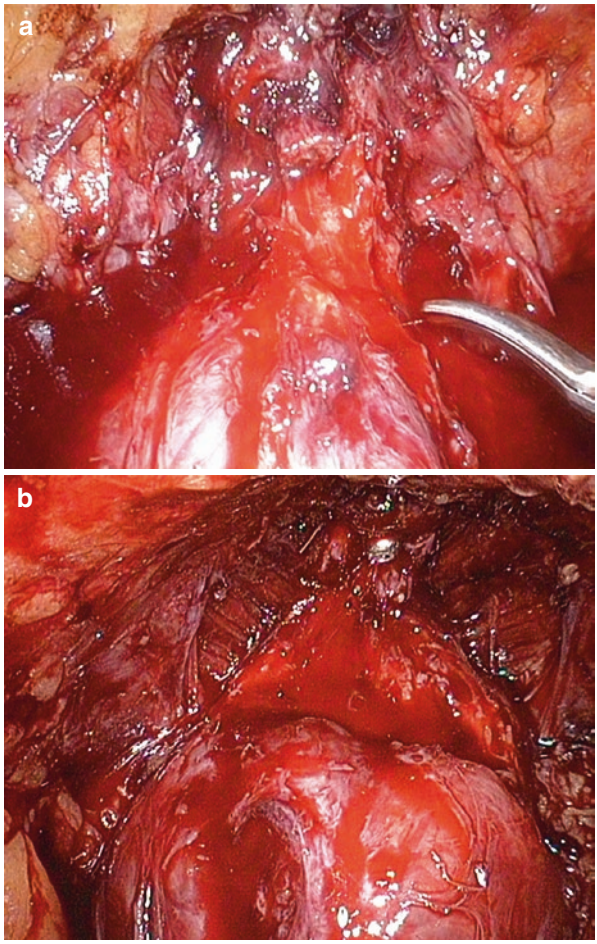


Fig. 15.9 (**a**, **b**) Retrograde dissection of the prostatic apex

also the risk of cutting the posterior wall and leaving the lobe semidetached from the bladder.

With the anterior surface of the bladder sectioned, the authors release the traction of the prostate's proximal stitch and take the rim of the bladder that drops off, grabbing the prostate with a locking alligator grasper. The prostate is raised and bent, and the vesicle neck is laterally sectioned until the trigone is visible, which exposes the posterior mucous ending. (Fig. 15.11).

Posterior Bladder Neck Dissection

After sectioning the bladder's anterior wall and exposing the trigone, the authors section the lateral walls of the bladder, allowing the prostate to bend completely, separating it from the bladder. The authors then make a transversal incision with the

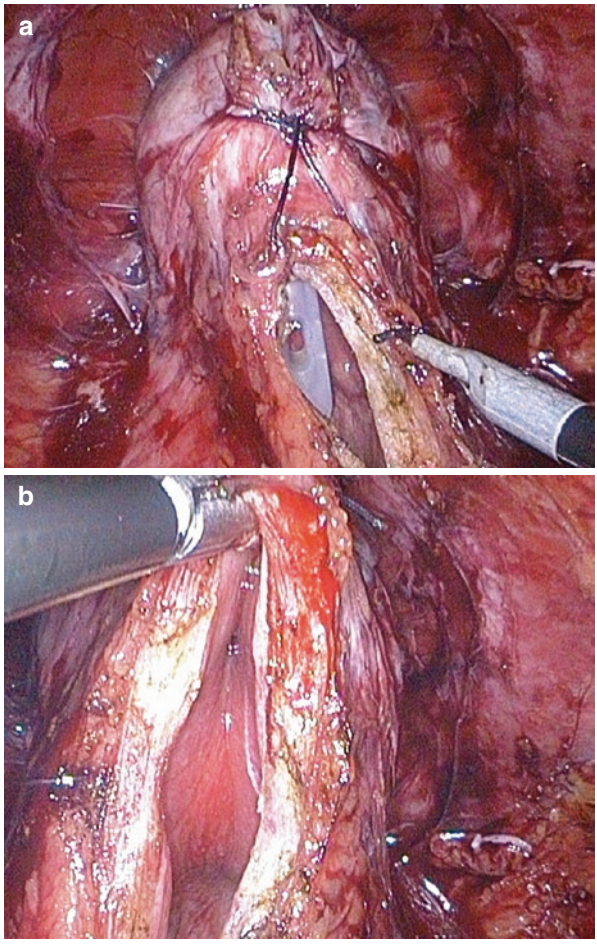


Fig. 15.10 (**a**, b) Anterior bladder neck dissection

electrocautery shears, starting at the medial line and moving towards the entire depth of 4–5 mm along the shears (which is the thickness of the wall), and then moving to the sides.

Tip: If the median lobe appears, it can be retracted with suture. The posterior mucous vesicle should be cut where the median lobe ends; generally it has hypervascularized, beefy red mucosa that defines the border of the lobe and helps delineate the line of incision.

Once the posterior wall of the bladder has been sectioned, the surgeon should pay careful attention to anatomic detail and identify the vertical vesicle fibers. This continues until the areolar fat tissue is encountered and the deferential ducts appear.

Tip: During dissection of the posterior wall of the bladder, once the vesicle fibers have been visualized, the direction of dissection should change from frontal to

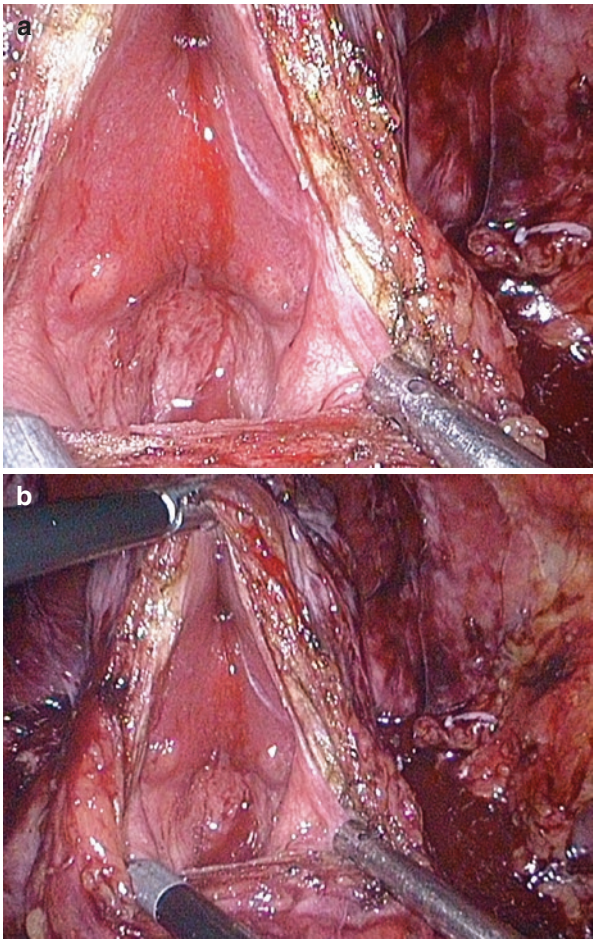


Fig. 15.11 (**a**, **b**) Bladder trigone

posterior to finish sectioning the posterior vesicle wall and reach the deferential plane and seminal vesicles.

Once the adipose areolar tissue has been exposed, the second assistant changes the grasper and takes the vesicle neck tissue stuck to the prostate, lifting it upwards and distal to expose and bring the deferential ducts to the surface (Fig. 15.12).

As the surgeon completes dissection of the posterior vesicle wall, the window is widened laterally before proceeding with the seminal vesicle to avoid working in a small cavity. As the prostate is freed from the lateral pedicles, the surgeon should finish releasing the bladder neck as it bends back and exhibits the deferential ducts and seminal vesicles.

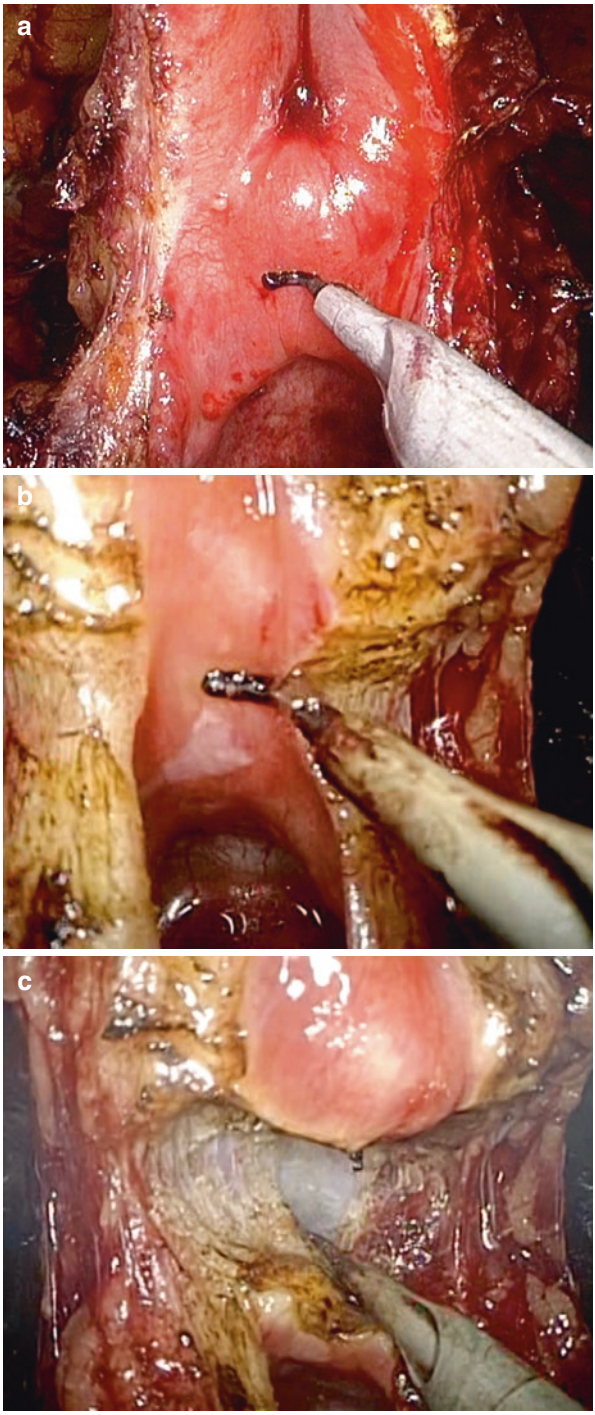


Fig. 15.12 (**a**–**c**) Trigone and posterior bladder neck dissection with electrocautery

Dissection of the Vas Deferens and Seminal Vesicles

Approaching the precise plane to dissect the deferential ducts and seminal vesicles requires meticulousness and care to gain adequate access to the area. Once the deferential ducts are visible, the surgeon begins pulling the planes apart. The assistant uses the grasper to retract the bladder backwards and the surgeon uses a hand to retract the duct, dissecting it as wide as possible.

Tip: When performing the dissection of the deferential ducts (which form a rigid and easy-to-grab structure), do not be separate them from the vesicles. Instead, use the natural attachments of the vas to the seminal vesicles to deliver the seminal vesicles up.

Once dissection has progressed, the deferential ducts should be separated in order to dissect the seminal vesicles from within the duct. The surgeon begins with the internal wall of the seminal vesicles, which is under and within the duct, and ends with the outer wall. Generally, there is a vessel parallel to the deferential and seminal vesicle which is then directed to the external wall of the seminal vesicles (Fig. 15.13).

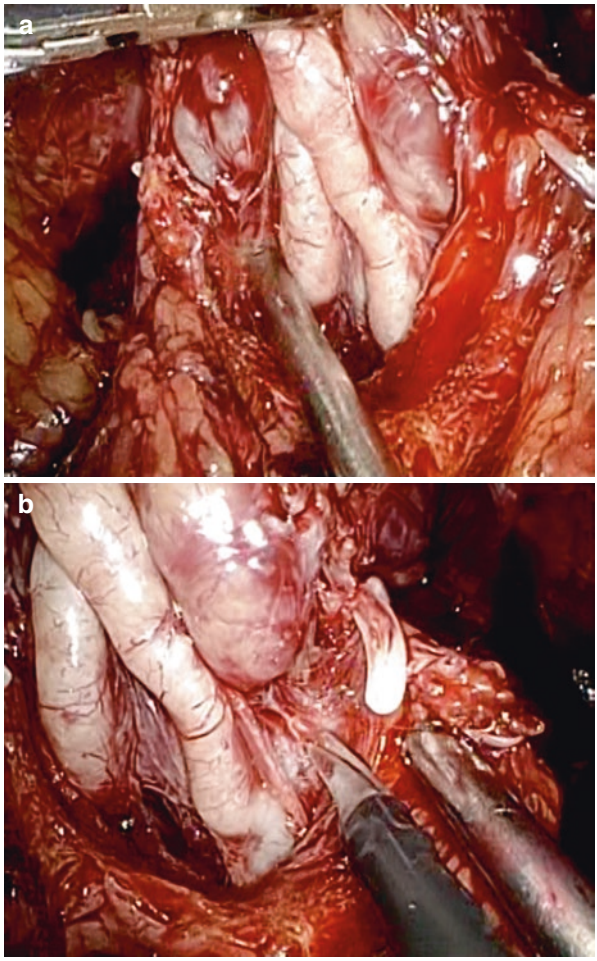


Fig. 15.13 (**a**, **b**) Dissection of the seminal vesicles

Dissection is performed with a swab or a swab-shaped piece of gauze to turn down the tissue that sticks to the seminal vesicles, only using clips and scissors to separate them. Once the seminal vesicles have been dissected, both should be lifted; it is recommended that the second assistant lift them, or the first assistant can lift one while the surgeon lifts the other. To dissect on the right side, the first assistant retracts the bladder and the surgeon takes the seminal vesicle. On the left side, the assistant should lift the vesicle while the surgeon retracts the bladder. It is also possible to insert a suprapubic 5-mm trocar to help to hold up the seminal vesicles.

Dissection of Denonvillier's Fascia

When the prostate is lifted upwards with a grasper applied over the seminal vesicles, Denonvillier's fascia is exposed. Downward retraction with the suction cannula over the rectum is applied. An incision is made using the scissors, with a cold transversal cut 2 mm below the prostate. A counter-traction maneuver is applied from the rectum downwards, exposing the yellowish tissue of the prerectal fat and separating it from the posterior wall of the prostate.

Tip: Once the transversal cut has been made, the 30° optical scope can be placed upwards to provide a better view of the posterior surface of the prostate during its dissection.

Tip: If there is a suspected injury to the rectum, fill the pelvic cavity with liquid and introduce a Foley catheter through the rectum to inject air. Air bubbles will indicate a rectal injury.

Ligation of Prostate Vascular Pedicles

Once Denonvillier's fascia and the rectum have been dissected, the surgeon and assistant should coordinate to dissect the lateral pedicle, keeping the prostate in upward traction. With the lateral walls of the prostate and the dissection line of the lateral periprostatic fascia in evidence, the surgeon proceeds to ligate the prostatic pedicles. This maneuver can be performed with 5- to 10-mm Hem-o-lok® clips, or alternatively, the SonoSurg can be employed during this step.

Once the prostate has been freed upon communicating the antegrade and retrograde dissection, the assistant should retract the bladder backwards and observe if there is any bleeding, particularly in the lateral pedicles. In case of bleeding, chromic cat gut figure-of-eight sutures can be placed (Fig. 15.14).

Tip: To perform ligature of the lateral pedicles, trace an imaginary line between the external lateral surface of the prostate and the medial surface. This will indicate which direction the surgeon should move. To ascertain depth, raise the prostate and search for the point of retrograde dissection that was previously reached.

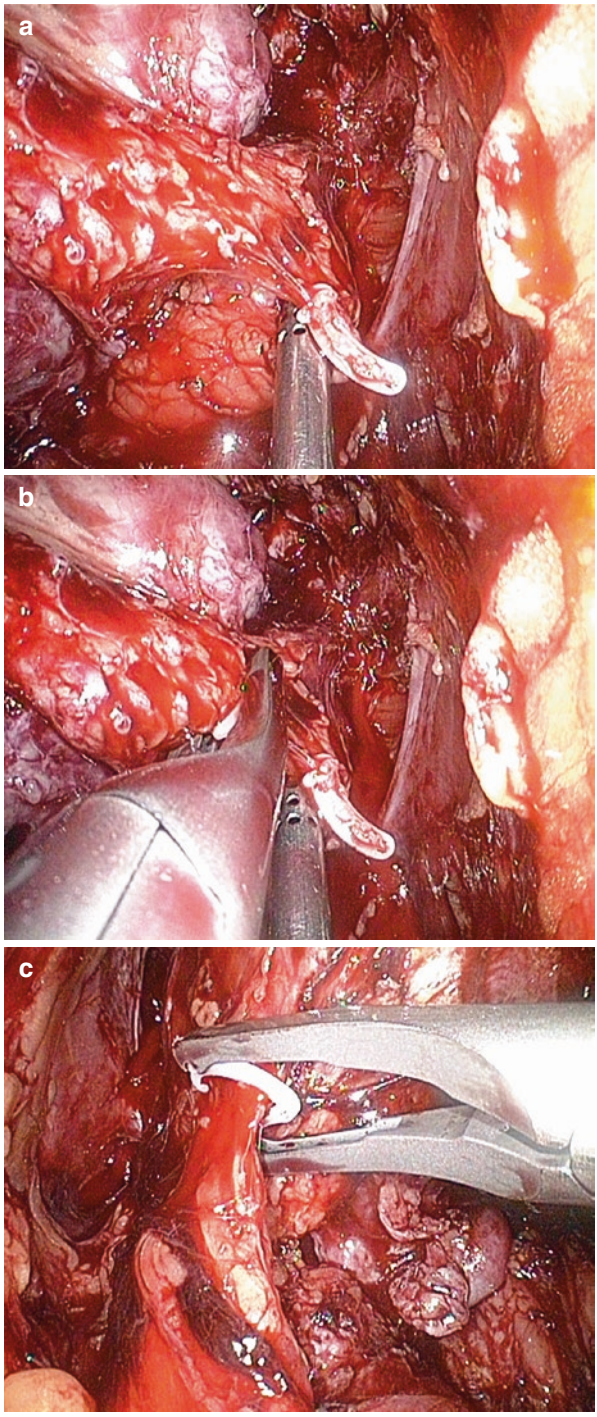


Fig. 15.14 (**a**–**c**) Dissection and ligature of the lateral pedicles

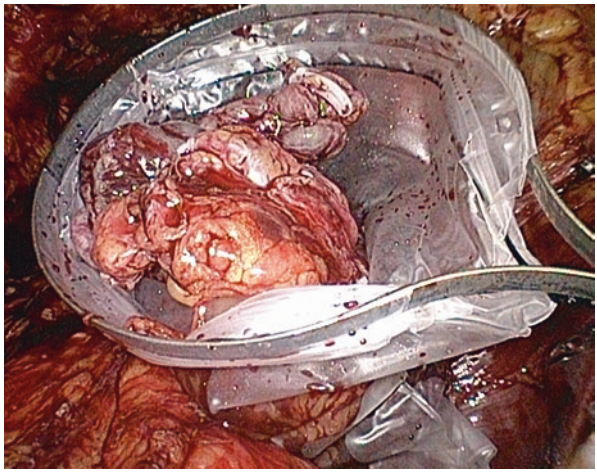


Fig. 15.15 Prostate and seminal vesicles in the extraction pouch

Specimen Extraction

The prostate and seminal vesicles are placed in an extraction pouch (Endopouch). To shorten operative time in a transperitoneal approach, the specimen is placed in the cavity to be extracted at the end of the surgery. The thread fastening the extraction pouch (with the specimen inside) is exteriorized with the umbilical trocar. This easily extracts the specimen once the surgery is complete (Fig. 15.15).

Urethrovesical Anastomosis

Generalities

Urethrovesical anastomosis is the reconstructive stage of this surgery, requiring experience and dedicated laparoscopic training. It represents a fundamental step in the results of a laparoscopic radical prostatectomy, and poor technique can have short- and long-term consequences, not just regarding morbidity (urine leak, duration of catheterization), but also functional outcomes (bladder neck contractures).

Instruments

There are some needle-holder models that automatically align or rectify the needle with the axis of the instrument to maintain a 90° angle. These types of needle-holders are not recommended for performing anastomosis as the needle needs to be at different angles to the needle holder axis during this part of the procedure.

Suturing Tips

1. *If possible, manipulate the target tissue into a favorable position for an easy forehand or backhand stitch.*

2. *If the target tissue is rigid or cannot be manipulated (e.g., the urethral stump), change the angle of the needle in the driver.*
3. *Simulate the movement of the needle (in the "air") before placing the stitch to ensure that the desired path will be accomplished.*
4. *If the previous suggestions do not achieve the optimal path, place the needle driver in a different trocar.*
5. *Try using the nondominant hand to achieve the best angle of approach.*

There are needle-holders made for the right hand and others for the left with curved points; the authors prefer the straight needle-holders that can be used in either hand. The Olympus brand is recommended as the distal extreme is slightly thicker, its jaws stronger and more robust, which prevents the needle from sliding and changing angles when held. Another benefit is that when the insert in the needle-holder wears out, only the insert needs to be changed and not the whole instrument.

The use of an absorbable monofilament such as Monocryl™ or Biosyn™ suture is recommended since it easily slides without tearing the tissues, mainly of the urethra. It is fundamental that there be a UR-6 type (Monocryl™) or GU-46 (Biosyn™) needle, as its curvature allows for optimal passage over the urethral stump.

For anastomosis, some use a Benique with a hole in the tip; the needle is inserted into the Benique orifice and when it is removed, the point of the needle falls into the urethra. Instead of this maneuver, the authors torque the sound to the side opposite the needle path. The needle tip passes in the space between the metal and the mucosa, rather than in the hollow bore of the sound itself. However, either technique is acceptable. Alternatively, an assistant can pass the Foley catheter tip in and out, coordinating with the needle movement to avoid incorporating the Foley catheter in the stitch.

Type of Anastomosis

Urethra-bladder anastomosis is described in several ways: with interrupted stitches, continuous stitches or a combination of the two. The advantage of anastomosis with continuous sutures is that it guarantees a superior water-tightness to results obtained using separate stitches. Anastomosis with continuous stitches may be performed in several ways; some surgeons perform it with a single suture, others with two sutures knotted together beforehand in their distal threads. These sutures go from outside to inside in the posterior wall of the bladder in such a way that the knot is in the outer wall (van Velthoven).[2]

In the authors' case, they employ individual sutures knotted separately in each initial stitch. The stitches advance circumferentially from the posterior plane to the anterior, the left going clockwise and the right counter-clockwise. The sutures meet around the back, one ending in the urethra and the other in the bladder and are finally tied together.

There are two reasosn to not use two prewoven sutures, the first being that there is a risk of stenosis of the anastomosis in a purse-string fashion, which can be avoided by using two separate sutures. The second reason is that when the stitches

pass through the posterior urethral wall, the maneuver becomes difficult as posterior gaps may occur when pulling the posterior plate together, particularly when there is tension. For these reasons, the authors prefer to use separate sutures that allows each closure of the posterior wall to be checked.[4] As an alternative, the van Velthoven approach can be used with care to ensure that the posterior plate comes together completely. With either approach, a monofilament suture should be used.

Anastomosis with Two Separate Sutures with Continuous Stitches

With the 30° scope guided upwards, the first stitch is placed into the urethra at the 5 o'clock position with the right needle-holder, with the needle introduced from the outside in. When the needle goes in from outside, it is more posterior and takes up a greater quantity of the rhabdosphincter and urethral muscle (external circle and internal longitudinal). Then, upon turning the hand, the point of the needle enters the urethral lumen, perforating the cylindric epithelium very near the edge. This maneuver guarantees a greater consistency and solidity of the anchoring tissue, keeping the urethra from coming loose when tying the knot, and assures approximation of the bladder and urethra.

Once the suture is through the urethra, the surgeon proceeds to the bladder stitch. With the help of the left needle-holder to grip and retract the bladder from its anterior wall, allowing a downward view with the 30° scope, the posterior wall of the bladder and the passage of the needle with the right needle-holder from inside out in radio five.

The knot is placed outside of the anastomosis, towards the right. The first semi-knot loops around three times to maintain the tension and prevent slippage, while the second and third knot loop around twice.

Problem: Tension when lowering the bladder when tying the first knot.

Solution: After verifying that the second assistant has removed the traction on the bladder, the first assistant applies suction at the level of the trigone, which helps lower the bladder and reduce tension so that the first semi-knot can be adjusted. If tension persists, it causes difficulty in approaching the vesicle neck, impeding coaptation of the anastomosis knot. This generally occurs because the bladder has not been well dissected laterally and is solved by completing the dissection. A few additional millimeters can be gained by reducing the pneumoperitoneum pressure to <5 mm by having the assistant apply suction.

Once the first stitch is in and the knot is on the outside and the needle is on the right, there are two ways to continue with anastomosis: (1) pass the entire suture with the needle behind the knot (in order to be on the left side) and continue with a ipsilateral semicircle, or (2) take it with the right needle-holder and pass it diagonally from outside in, moving right to left throughout the entire length of the bladder so that it comes out from within on the left side. The second maneuver saves time and is the authors' preferred method.

Tip: Before putting the first stitch in the urethra, the perineum can be compressed, allowing for better exposure and visualization of the urethral stump.

Tip: As much for placing the stitches in the bladder, as for those in the lateral and anterior urethra walls, the bevel of the 30° scope is pointed downward, allowing for optimum visualization of the place where the needle goes in and/or comes out.

Now with the needle within the bladder, the authors end by putting the second stitch in the urethra with the right hand, from the inside out, with the 30° scope positioned upwards (Fig. 15.16).

Tip: Before putting in the anastomosis stitch, make a separation with the Beniqué in the direction opposite to the needle's point of entry, leaving space between the Benique and the urethral wall. Once the point of the needle is in this space, remove the Benique to allow for the turn and exit of the needle outside the urethra.

The following two or three stitches of the left posterior quadrant of the urethra are placed with the left hand, moving clockwise, from inside out. Then in the left anterior quadrant, the needle-holder is switched to the right hand. With the bevel of the 30° scope positioned downwards to show the zone where the needle will pass with the free hand, stitches are placed in the bladder from the outside in with the left

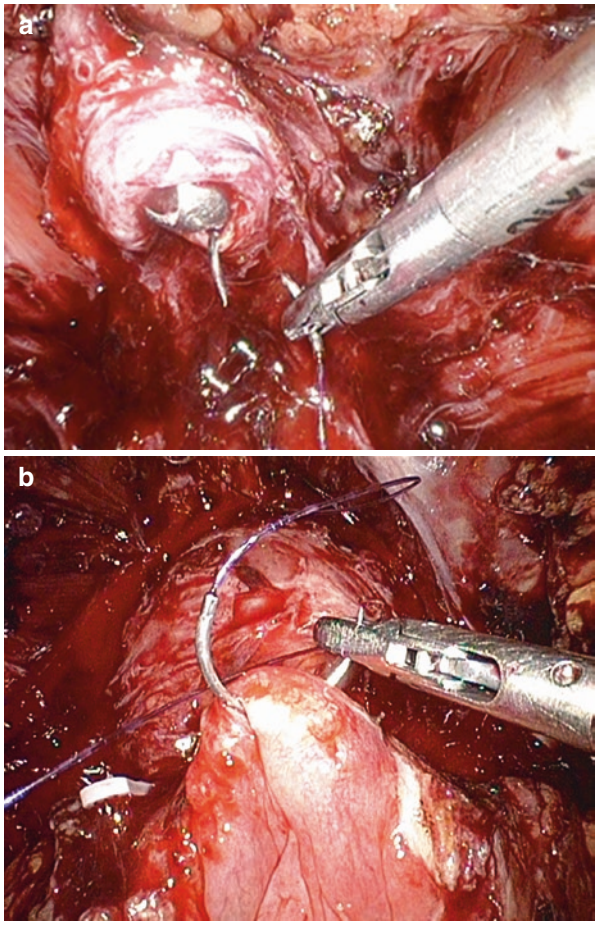


Fig. 15.16 (**a**–**b**) First stitch in the urethra and passage of the needle in the posterior wall of the bladder

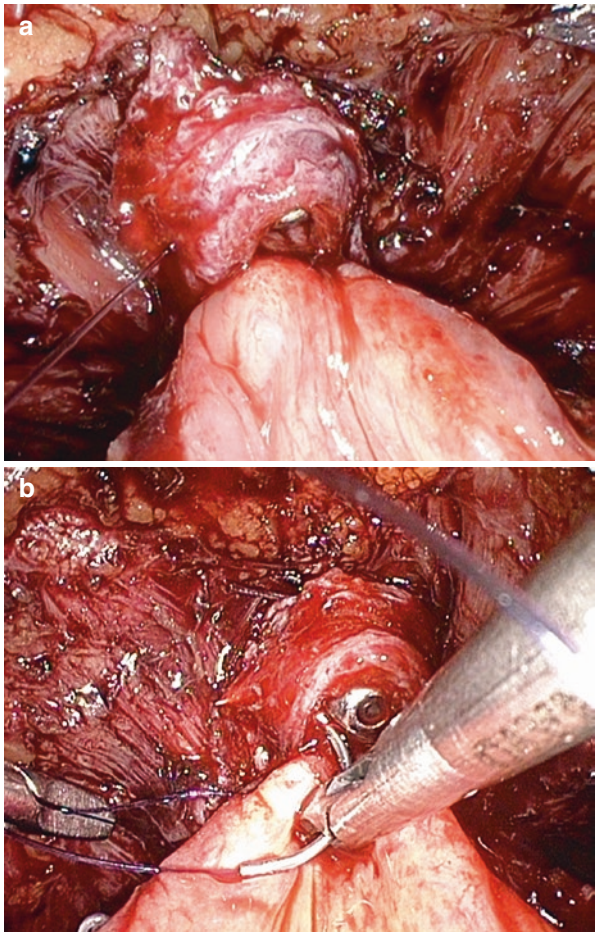


Fig. 15.17 (**a**, **b**) Stitches of the left semicircle

needle-holder in the posterior quadrant and with the right needle-holder in the anterior quadrant (Fig. 15.17).

To complete the urethrovesical anastomosis, the surgeon begins with a stitch at the 5 o'clock position in the right semicircle, using the right needle-holder. The stitch goes from inside out in the urethra and then, from outside in the bladder, and a double knot is tied on the outside. The stitches of the urethra are placed with the right hand in the posterior quadrant and with the left hand in the anterior quadrant; the stitches in the bladder are done with the right hand (Fig. 15.18).

Tip: Before passing the needle in the needle-holder through the tissue, simulate the movement externally. This ensures that the needle will go in the direction that is mentally expected, as the view is two-dimensional and without depth; potentially the point of the needle can pass closer or farther away than intended.

It is important to keep the ureteral orifices in sight during anastomosis. As this maneuver is complex, it is recommended that diuresis be forced to make the

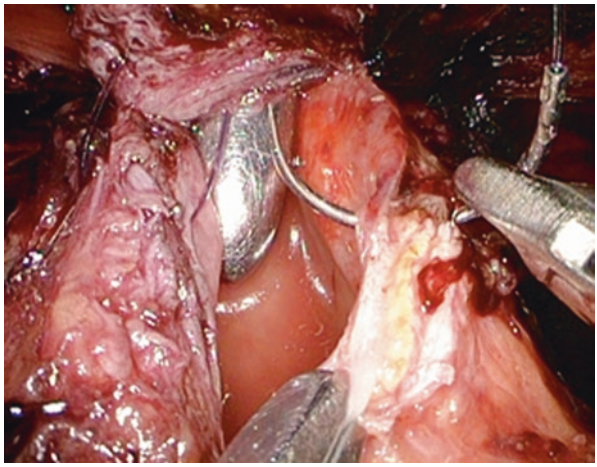


Fig. 15.18 Stitches of the right semicircle

ejaculated urethral evident or for intravenous carmine indigo be administered to mark the orifices. If the bladder neck has been preserved and the ureteral orifices are well away from harm, no additional attempt to expose them must be undertaken.

Upon finishing both semi-circles, the two suture threads are in the exterior of the urethra. The surgeon then passes into the bladder with the needle on the right side, first from outside in and finally from inside out. This positions the sutures one in front of the other before they are tied together.

Before tying the threads, the transurethral vesicle catheter should be introduced with a metal guide. It is fundamental to visualize clearly that the catheter is ahead of the mucous of the posterior vesicle wall to guarantee proper placement.

Tip: Once the catheter has been placed within the bladder using the guide, the curve will tent up the anterior bladder wall. Moving the guide from side to side will clearly indicate its position.

In cases where the size of the mouth of the bladder proportionally exceeds the dimensions of the diameter of the urethral stump, the anastomosis must be remodeled using the stitches in the urethra that are closest to each other and the stitches in the bladder that are farthest apart. Nevertheless, if there is one too many in the bladder, it should be closed off with another continuous suture after the threads are tied.

Drainage

It is important to put in drainage in the form of a Blake drain to help guide any leaked urine. It is recommended that one of the most lateral ports be employed for that purpose (Fig. 15.19). According to how it wears out it is maintained up to 24 h when it is less than 25 cc, this is on average between 2 and 5 days.

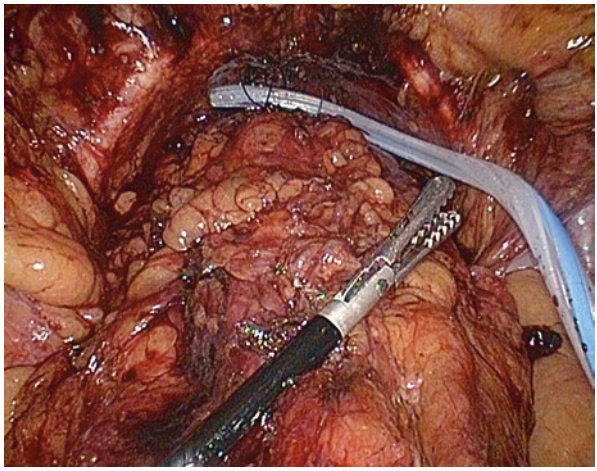


Fig. 15.19 Blake drain

Specimen Extraction

The specimen is finally extracted through the umbilical orifice which can be progressively extended to adapt to the size of the specimen. Care should be taken not to incorporate bowel into the fascial closure.

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