# Open Radical Retropubic Prostatectomy and Pelvic Lymph Node Dissection

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Joseph C. Klink and Eric A. Klein

## Preoperative Preparation

All patients meet with the surgical team (surgeon and midlevel provider), preferably including partners, for discussion of the general nature of the procedure, potential complications-anticipated course and recovery of continence and potency, and the postoperative routine. Specific emphasis is placed on the use of epidural anesthesia, whether or not lymphadenectomy is to be performed, whether or not a nerve-sparing procedure is contemplated, planned hospital length of stay (typically 24 h), and time to return to normal activity (typically 2 and half weeks). A preoperative urinalysis should demonstrate no active infection. No preoperative dietary restrictions and no bowel preparation are used. Patients are admitted to the operating room (OR) on the day of surgery. A second-generation cephalosporin, or vancomycin and gentamycin if allergic to penicillin or cepahalosporins, is given intravenously just prior to incision and for two doses postoperatively. Intermittent compression stockings are used for prophylaxis against deep venous thrombosis. Subcutaneous heparin is not used.

## Anesthetic Considerations

Epidural anesthesia alone is the preferred technique for all patients. The epidural catheter is placed in low thoracic position preoperatively and dosed with 0.1 % bupivacaine and morphine sulfate 0.05 mg/mL upon arrival in the OR. This combination of position and drugs has been demonstrated to promote early return of intestinal function by sympathetic blockade and results in less postoperative pain by induction of preemptive analgesia [1]. Analgesia is maintained intra- and postoperatively with morphine sulfate or fentanyl, and low doses of anxiolytics are given parenterally throughout the procedure as needed. Epidural anesthesia avoids the need for ventilatory support and eliminates pulmonary and laryngeal complications, causes less sedation, results in less narcotic use, requires fewer transfusions, and is less expensive than general anesthesia [2].

## Patient Positioning

The patient is placed in the supine position with the table in mild reverse Trendelenburg position to facilitate exposure of the apex. Once the apical dissection is completed, the table is placed in mild

J.C. Klink, M.D. (✉)
Glickman Urological and Kidney Institute, Center for Urologic Oncology, Cleveland Clinic Foundation, Cleveland, OH, USA
e-mail: klinkj@ccf.org

E.A. Klein, M.D.
Glickman Urological and Kidney Institute, Cleveland Clinic Foundation, Cleveland, OH, USA

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Trendelenburg position to facilitate visualization and dissection of the bladder neck. Hyperextension of the table is not used as the exposure of the apex is usually adequate with reverse Trendelenburg alone. This also avoids nerve and soft tissue injury that may result from hyperextension of the spine for a prolonged period.

## Incision, Exposure, and Retractor Placement

An 18-French Foley catheter is placed transurethrally, and the balloon is inflated with 10 $cm^3$ of water prior to incision. A midline incision is made from below the umbilicus to the top of the pubis (Fig. 4.1), typically 8 cm in length. The space of Retzius is developed bluntly, and the bladder is mobilized off the pelvic sidewall bilaterally. The peritoneum is also mobilized superiorly, exposing the psoas muscles bilaterally. The vas deferens is not routinely divided. A Bookwalter retractor with blades specifically modified for the performance of radical prostatectomy is placed (Fig. 4.2) [3]. Two body wall retractor blades on both sides of the incision are usually adequate. A midline suprapubic blade is not routinely used. When pelvic lymphadenectomy is performed, a malleable blade is secured to the ring for lateral retraction of the bladder, permitting full visualization of the obturator fossa (Fig. 4.3).

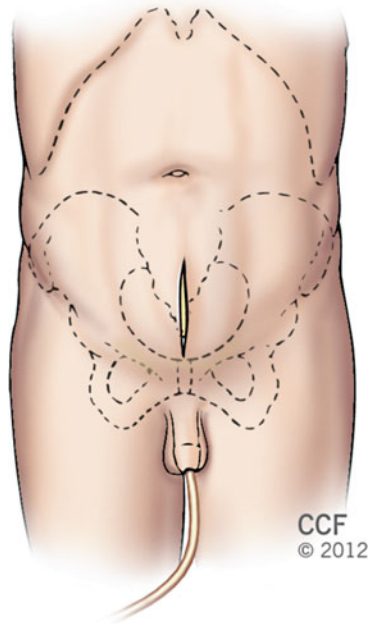


**Fig. 4.1** An 18-French Foley catheter is placed transurethrally, and an extraperitoneal incision is made in the lower midline, approximately 8 cm in length. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

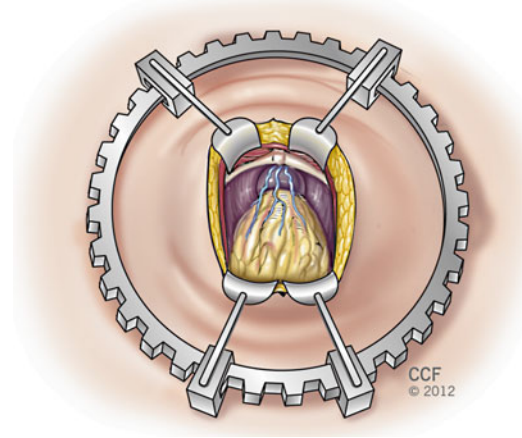


**Fig. 4.2** A self-retaining, table-fixed ring retractor is placed. The prostatic apex is to the top. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

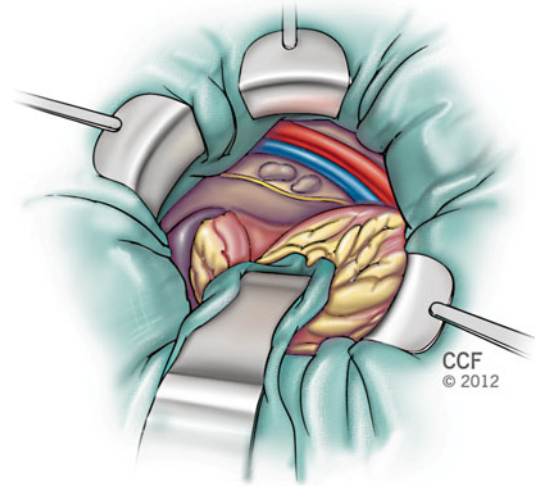


**Fig. 4.3** A malleable blade is used for exposure of the obturator fossa when pelvic lymphadenectomy is performed. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

## Pelvic Lymphadenectomy

Based on published nomograms and our own experience, pelvic lymphadenectomy is omitted in selected patients at low risk for lymph node metastases based on preoperative serum prostate-specific antigen (PSA), tumor grade, and palpable tumor extent. Generally, lymphadenectomy is omitted in patients with AUA or D'Amico low-risk criteria. Such patients have a minuscule risk of positive nodes and omission of lymphadenectomy in patients with these characteristics does not increase the likelihood of biochemical failure [4]. For prognostic and potential therapeutic purposes, an extended lymphadenectomy is performed in all patients not meeting the low risk criteria. The dissection includes the tissue medial to the external iliac artery, all tissue surrounding the external iliac, the internal iliac artery superiorally, the bifurcation of the external and internal iliac veins cephalad, the origin of the superficial circumflex iliac vein caudally, and the pelvic sidewall in the obturator fossa deeply. In addition, the nodes immediately medial to the common iliac artery are excised. The extent of the dissection is guided by the study by Mattei et al. showing that the nodes within these boundaries constitute 75 % of the primary lymphatic drainage of the prostate [5]. Frozen section analysis is not routinely performed unless the nodes are grossly suspicious, and only if a finding of positive nodes would result in aborting the prostatectomy.

## Endopelvic and Lateral Pelvic Fascia, Santorini's Plexus, and Dorsal Vein Complex

The apical dissection begins with vertical incisions of the endopelvic fascia at the apex bilaterally (Fig. 4.4). The attachments of the levator muscles to the lateral surface of the prostate are taken down sharply with scissors. Blunt dissection of these attachments should be avoided to prevent shearing of small blood vessels, which may be difficult to control. The puboprostatic ligaments are divided.

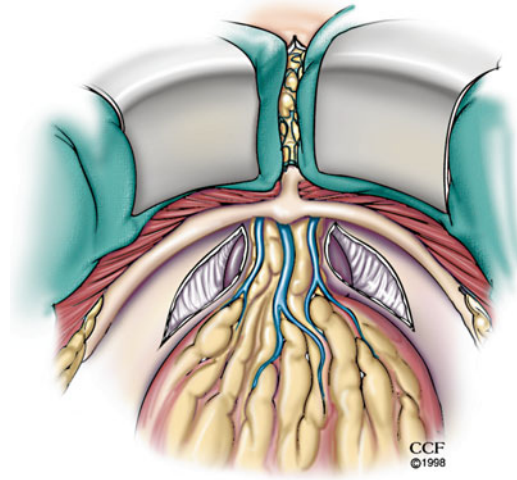


**Fig. 4.4** The endopelvic fascia is incised bilaterally just lateral to the prostatic apex. The attachments of the levator muscles to the lateral surface of the prostate are taken down sharply with scissors. The puboprostatic ligaments are left intact. The apex is to the top. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

Next, the lateral pelvic fascia (the visceral portion of the endopelvic fascia) covering the prostate is incised bilaterally beginning from the initial incision in the apical endopelvic fascia and extending to the base of the prostate (Fig. 4.5). The incision is performed high on the lateral surface of the prostate to avoid injuring the neurovascular bundles (NVBs). When completed, this maneuver allows clear visualization of the prostatourethral junction and location of the NVBs and facilitates bunching of the ramifications of the dorsal vein over the prostate. The cut edges of the lateral fascia are then grasped with Turner-Babcock clamps, incorporating the branches of the venous plexus on the dorsolateral surface of the prostate (Fig. 4.6a). The bunched tissue is suture-ligated with two individual figure-of-8 0-chromic ligatures (Fig. 4.6b, c). This technique is a modification of the dorsal venous plexus bunching technique originally described by Myers [6]. It prevents back-bleeding when the dorsal vein is divided and helps identify the plane between the dorsal vein and urethra. The prostate is next retracted superiorly with a sponge stick, and the fat between the puboprostatic ligaments

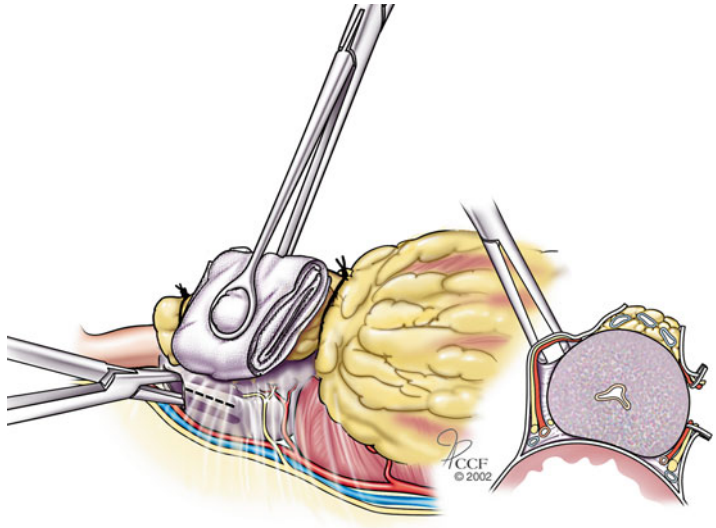


**Fig. 4.5** The lateral pelvic fascia (the visceral layer of the endopelvic fascia covering the prostate) is elevated with a right-angled clamp and incised sharply with a knife (along the *dotted line*) from the apex to base of the prostate. This maneuver exposes the anterior prostatourethral junction and the position of the neurovascular bundles and facilitates control of the ramifications of the dorsal vein over the prostate. The maneuver is then repeated on the opposite side (not shown). The apex is to the left. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

is gently removed to expose the superficial dorsal vein which is then divided between clips.

The dorsal vein and urethra are closely approximated and passage of an instrument between them carries the risk of damaging the anterior-striated sphincter. Therefore, the dorsal vein is next divided with scissors, exposing the anterior surface of the urethra (Fig. 4.7a). The distal portion of the incised dorsal vein is then oversewn with a figure-of-8 suture using a 3-0 absorbable monofilament suture on a 26 mm 5/8 circle needle (Fig. 4.7b). When correctly performed this technique does not compromise the anterior prostatic margin and results in excellent visualization of the urethra (Fig. 4.7c).

## Release of NVBs

For nerve-sparing procedures, the NVBs are next released from the prostate from the apex to the level of the vascular pedicle lateral to the seminal vesicles. The dissection is performed with tenotomy scissors and begins at the mid-prostate with identification of the most superior peri-prostatic vein, which marks the upper extent of the bundle. The dissection is carried sharply around the edge of the prostate bilaterally, entering the plane posterior to Denonvilliers' fascia and anterior to the rectum (Fig. 4.8). This plane is fully developed by sharp dissection, using a sponge stick for gentle rotation of the prostate (Fig. 4.8a); blunt dissection with an instrument or finger runs the risk of fracturing the neurovascular bundle and should be avoided. When this plane is fully developed, the prostate can be lifted off the rectal surface (Fig. 4.8b). This maneuver yields excellent visualization of the prostatourethral junction both anteriorly and posteriorly and allows precise transection of the urethra without risk of incision into the prostatic apex. For a non-nerve-sparing procedure, the incision in the lateral pelvic fascia is made lateral to the bundles to permit wide excision of all periprostatic tissue (Fig. 4.8c). The plane between the prostate and rectum is developed similarly.

There are several advantages to the described approach. Initial release of the lateral pelvic fascia allows superior visualization of the junction

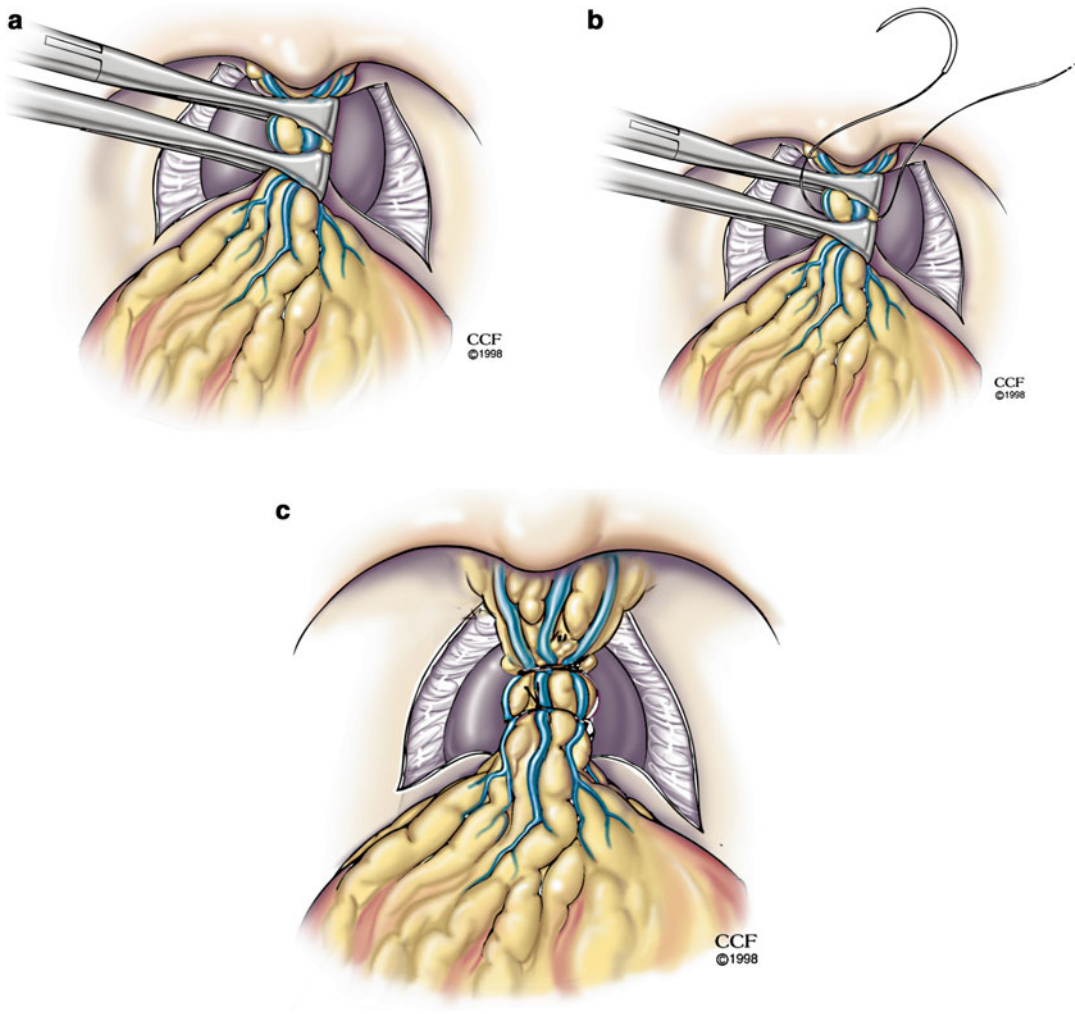


**Fig. 4.6** Bunching technique for control of the dorsal venous complex. (**a**) Turner-Babcock clamps are used to bunch together the branches of the dorsal vein covering the dorsal surface of the prostate. (**b**) Two figure-of-8 sutures are used to ligate these branches, incorporating the cut edges of the endopelvic fascia. (**c**) Appearance after both sutures have been placed. The apex is to the top. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

between the rectum and prostate, with precise definition of the plane of dissection between these organs leaving all layers of Denonvilliers' fascia on the prostate. This reduces the likelihood of a positive margin along the posterior aspect of this fascia. Lifting the prostate off the rectum early in the dissection also permits precise delineation of the anatomy of the prostatic apex, especially posterior to the urethra, and prevents leaving small amounts of prostatic tissue attached to the urethra. Improved visualization of the apex using this technique also incorporates one of the main advantages of the perineal approach while still permitting adequate visualization and resection of the bladder neck and seminal vesicles. This technique also fully preserves the posterior fascial attachments of the urethra. Finally, dissection of the neurovascular bundles away from the prostate prior to transection of the urethra lowers the risk of traction injury when the apex is elevated.

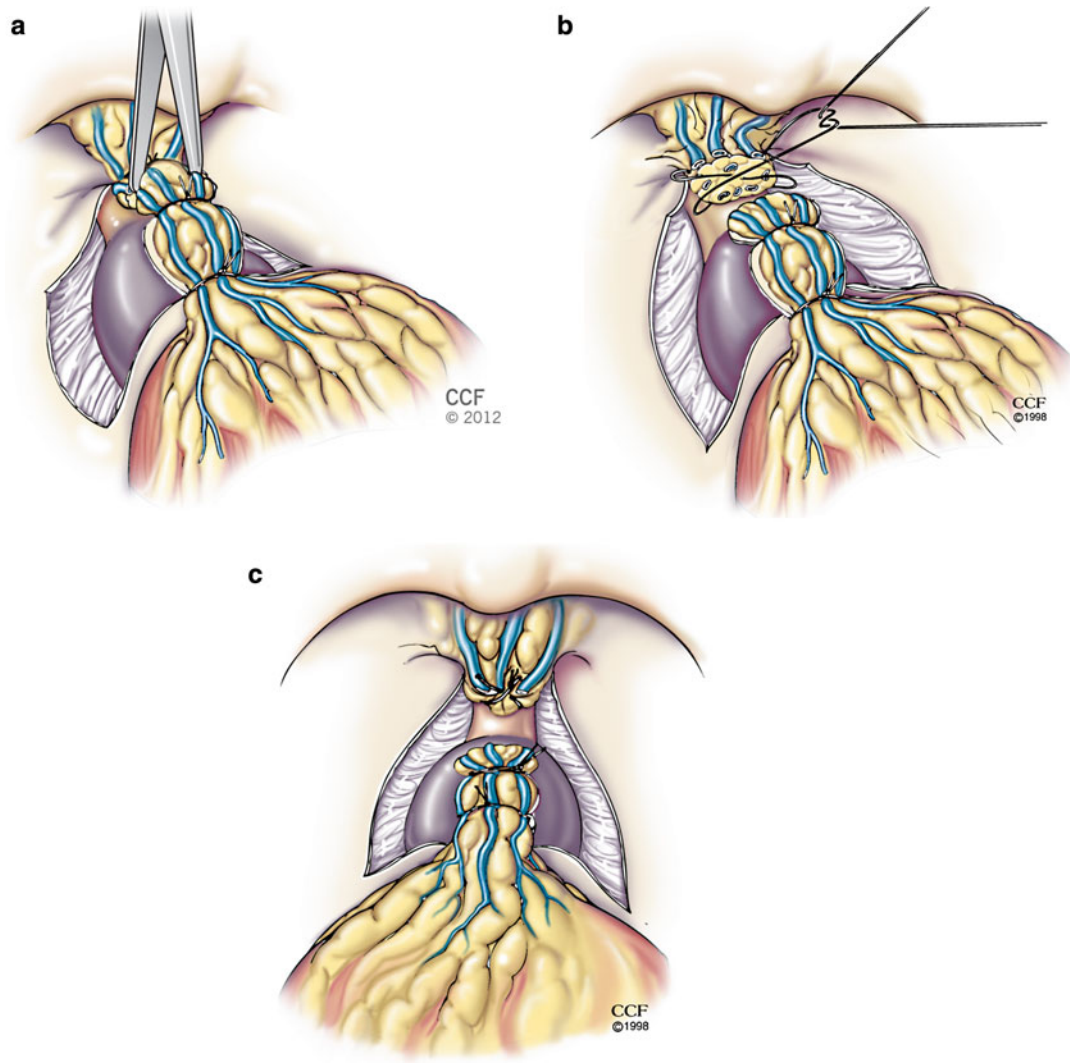


**Fig. 4.7** Division and control of the dorsal vein. The prostatic apex is to the left. (**a**) The dorsal vein is divided with scissors, exposing the anterior surface of the urethra. (**b**) The cut surface of the dorsal vein is suture-ligated for hemostasis. (**c**) Appearance of the urethra after division and ligation of the dorsal vein. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

## Division of the Urethra and Placement of Urethrovesical Sutures

Following division of the dorsal vein complex and release of the lateral fascia and NVBs, the prostate remains attached at the apex only by the urethra. Division of the urethra begins with an incision of the anterior surface between 3- and 9-o'clock (Fig. 4.9a), exposing the Foley catheter. The catheter is next removed to allow placement of the vesicourethral anastomotic sutures. Placement of these sutures is facilitated by leaving the posterior urethra attached to the prostate in order to prevent urethral retraction (Fig. 4.9b). Five sutures of absorbable material are used for the anastomosis, placed at the 12-, 3-, 5-, 7-, and 9-o'clock positions, taking care to avoid the NVBs lying posterolaterally. With experience placement of these

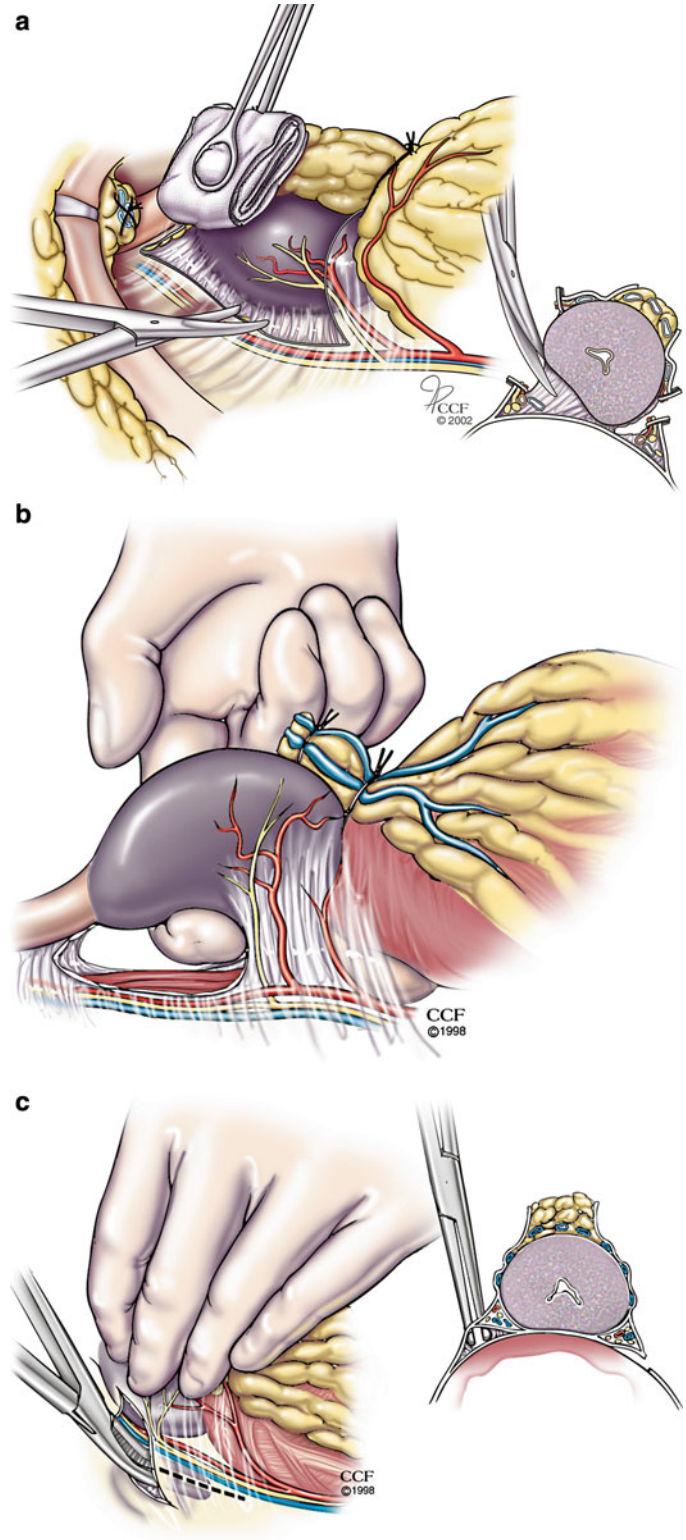


**Fig. 4.8** Release of the neurovascular bundles. The prostatic apex is to the left. (**a**) The left neurovascular bundle is exposed by rotating the prostate medially with a sponge stick and released from the prostate by sharp dissection from the apex to the posterior vascular pedicle. The *inset* shows the plane of dissection medial to the bundle and posterior to Denonvilliers fascia. A similar dissection is performed on the other side. (**b**) The finger in the figure illustrates that when the dissection is complete, the prostate can be lifted off the anterior surface of the rectum. The dissection is not done bluntly with a finger. The urethra remains intact at this point of the dissection. (**c**) The dissection is similar for non-nerve-sparing procedures, except that the lateral fascia is incised lateral to the neurovascular bundles. The plane between the prostate and rectum is developed similarly to the nerve-sparing technique. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

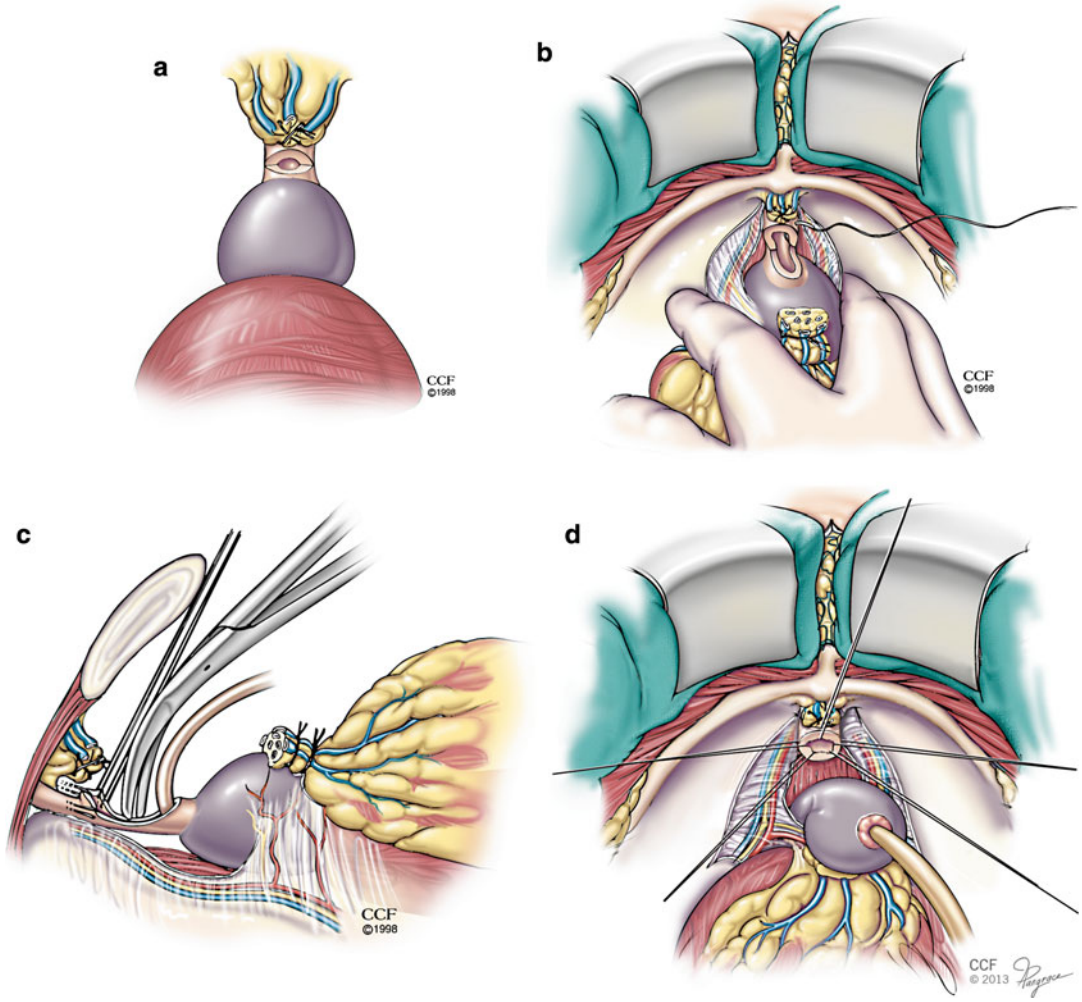


**Fig. 4.9** Urethral division and placement of urethral sutures. (**a**) The anterior urethra is incised sharply from the 3- to 9-o'clock position, exposing the Foley catheter. (**b**) The Foley catheter is removed, and two anterior and three posterior anastomotic sutures are placed at the 12-, 3-, 5-, 7, and 9-o'clock positions, respectively. Leaving the posterior urethra attached facilitates suture placement by preventing urethral retraction. (**c**) The posterior urethra is divided sharply under direct vision, using gentle traction on the apex of the prostate for exposure. (**d**) Final appearance of the divided urethra with anastomotic sutures in place. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

sutures can usually be easily accomplished from outside to inside without the need for double-armed sutures or a urethral sound. The sutures with needles still attached are held with hemostats labeled with the corresponding clock face position to avoid entanglement until the anastomosis is completed. Urethral transection, including the underlying layers of Denonvilliers' fascia, is next completed under direct vision using scissors and gentle traction on the prostatic apex for exposure (Fig. 4.9c, d). To minimize traction injury, the Foley catheter is not replaced into the prostate until the NVBs are fully released by division of the posterolateral pedicles.

## Posterior Vascular Pedicles, Bladder Neck, and Seminal Vesicles

Dissection of the posterior vascular pedicles is easily accomplished after completion of the apical dissection. Placing the table in mild Trendelenburg position and gentle traction on the prostate facilitates visualization for this portion of the procedure. It has generally been our approach to perform the bladder neck dissection prior to dissection of the seminal vesicles to permit leaving as much fascia as possible on both sides of these glands, although the "posterior peel" technique of seminal vesicle dissection prior to bladder neck dissection is occasionally helpful for glands with large median lobes. Dissection of the prostate base begins with opening of the plane between the caudad surface of the seminal vesicles (still covered by Denonvillier's fascia) and the rectum to fully expose the medial surface of the posterior vascular pedicles. Lateral to the pedicles, the NVBs are typically tethered to the prostate by several 1 mm arterial branches, which are divided between small hemostatic clips to fully release them from the prostate. The pedicles are similarly divided between clips, exposing the lateral surface of the seminal vesicles (Fig. 4.10). A small window is made sharply in Denonvillier's fascia over the seminal vesicle bilaterally, and the fascia and vessel-containing tissue lateral to the SVs is divided between clips. Next, a right-angled clamp is passed between the posterior bladder neck and cephalad surface of the seminal vesicles (Fig. 4.11a). The bladder neck is then incised sharply in a direction that preserves its anatomical integrity as much as possible and avoids cutting into the trigone near the ureteral orifices (Fig. 4.11b). In cases of high-grade or large volume tumor at the prostate base, a larger cuff of bladder neck is removed to ensure an adequate margin of normal tissue. Release of the prostate from the bladder neck exposes the posterior surface of the vas deferens and seminal vesicles (Fig. 4.11c). The vas are individually ligated with clips and divided; the remaining attachments of the seminal vesicles are then dissected sharply (Fig. 4.11d), ligating the small arterial branch at the tips of the glands, and the specimen is removed. In patients with low-risk disease, it is not necessary to excise the entirety of the seminal vesicles.

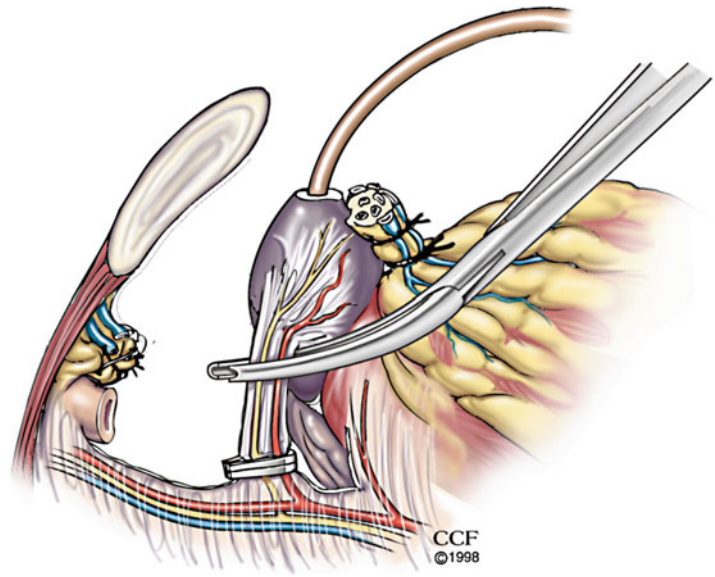


**Fig. 4.10** The posterior vascular pedicles are divided bilaterally between clips. This exposes the junction of the bladder and prostate. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography

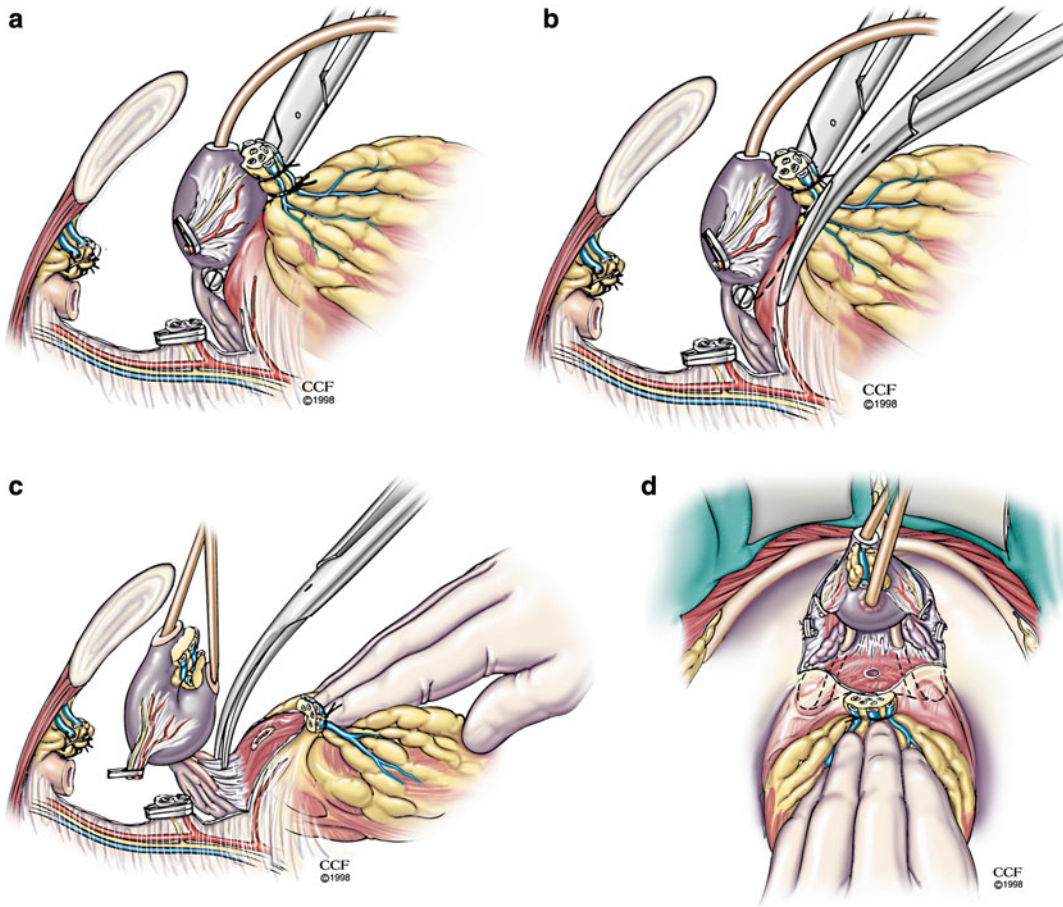


**Fig. 4.11** Bladder neck dissection. (**a**) A right-angled clamp is inserted in the plane between the posterior bladder neck and the seminal vesicles. This maneuver helps identify the correct plane for bladder neck dissection without injury to the trigone. (**b**) The bladder neck is incised sharply, leaving an adequate cuff of bladder neck on the prostate while preserving the anatomical integrity of the bladder neck muscle fibers. (**c**) Release of the prostate from the bladder neck exposes the posterior surface of the vas deferens and seminal vesicles. The vasa are ligated with clips and divided. (**d**) The attachments to the seminal vesicles are divided, and the specimen is removed. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

## Completion of the Anastomosis

The final step is completion of the vesicourethral anastomosis. When necessary, the bladder neck is reconstructed using 3-0 chromic suture. The anastomotic sutures previously placed in the urethra are placed in corresponding positions in the bladder neck (Fig. 4.12a), placing the 5- and 7 o'clock sutures close to the midline to ensure a watertight closure posteriorly. A 20-French Foley catheter is then placed per urethra and guided into the bladder; the ballon is inflated with 10 $cm^3$ of water. The cephalad two retractor blades (Fig. 4.2) are removed, releasing the bladder into the pelvis. The needles are removed from the sutures and the sutures are tied sequentially, beginning posteriorly (Fig. 4.12b). Use of a Foley with an overinflated balloon and traction on the bladder neck prior to tying the sutures is avoided, as the balloon simply fills up the already

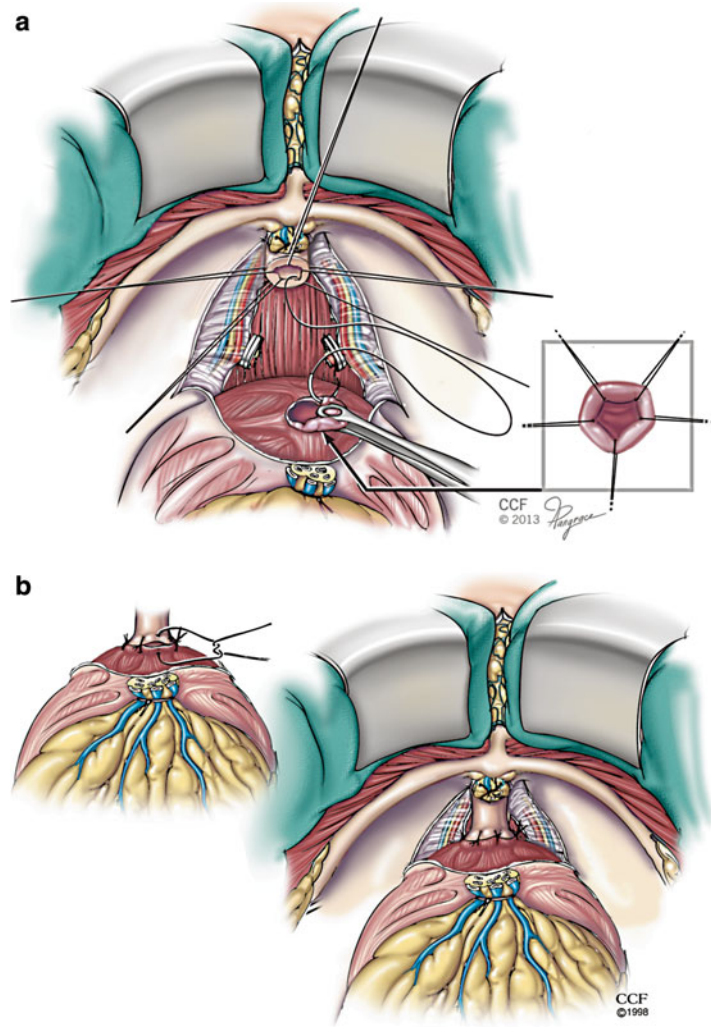


**Fig. 4.12** Vesicourethral anastomosis. (**a**) The five urethral sutures are placed into the bladder neck at the corresponding positions after eversion of the bladder neck mucosa. The *inset* shows detail of bladder neck suture placement after mucosal eversion. (**b**) The vesicourethral sutures are tied circumferentially over a 20-French Foley catheter (*left*). The final appearance of the completed anastomosis is illustrated (*right*). Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 1996–2013. All Rights Reserved

small space of the pelvis and may prevent good approximation of the bladder neck and urethra. An overinflated Foley balloon can also increase bladder spasms and obstruct the eye of the catheter. The anastomosis is checked for watertightness by irrigation via the Foley.

Closed suction drains are placed through separate incisions through the body of the rectus muscle and left in the obturator fossa. Only a single drain is used in patients in whom no pelvic lymphadenectomy is performed. The incision is closed in a single layer with running nonabsorbable suture, and the skin is approximated with clips.

## Post-op Routine

Patients are ambulated and begin a clear liquid diet on the evening of surgery. Patient-controlled analgesia is maintained with continuous and on-demand morphine sulfate plus bupivacaine via epidural catheter for 24 h, followed by iv/po ketorolac and ibuprofen as needed. No oral or systemic narcotics are used. The drains are removed before discharge unless there is clinical suspicion of a urine leak. Approximately 90 % of patients are discharged to home on the first postoperative day. Patients return seven days

after discharge for incisional staple and catheter removal. Cystograms are not routinely performed. In cases where the vesicourethral anastomosis is not tension-free and in cases of documented urine leak, the Foley is left in longer and a cystogram may be performed before catheter removal.

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