

RADICAL RETROPUBIC PROSTATECTOMY: A Pictorial Guide

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(Adapted from PR Carroll et al, *Radical Retropubic Prostatectomy in Prostate Cancer: Atlas of Clinical Oncology*. BC Decker Inc, Hamilton, Ontario, p 164-183, 2002)

Patient positioning and incision

Patients may be positioned supine or in the very low lithotomy position to facilitate the use of perineal pressure for exposure. All pressure points are well padded. The technique is performed through a lower midline incision. A more limited incision of approximately 7 to 9 cm. is adequate in most patients and is associated with less morbidity opposed to longer incisions (**Figure 1**). The rectus abdominus muscles are separated in the midline and the retropubic space is entered.

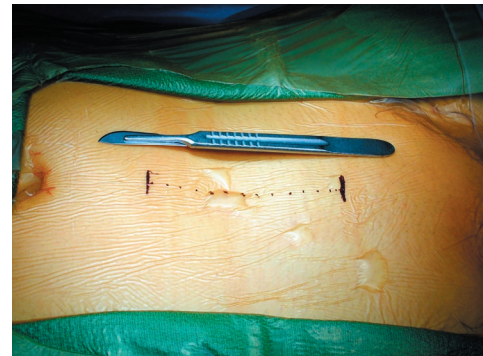


Figure 1

Prostate exposure

Exposure to the prostate is facilitated by use of a “forked” blade designed at UCSF, which is used to retract the previously placed Foley catheter superiorly thereby exposing clearly the endopelvic fascia and anterior surface of the prostate (**Figure 2a and 2b**). Fibroadipose tissue is removed from the anterior surface of the prostate using surgical forceps.

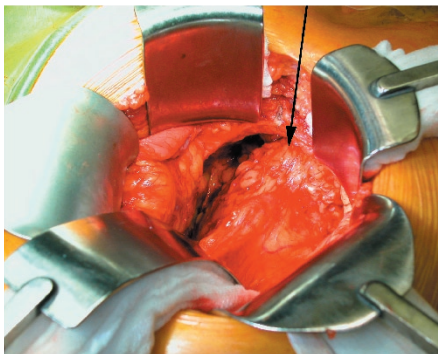


Figure 2a
Arrow depicts the fibroadipose tissue overlying the anterior surface of the prostate.



Figure 2b

Incision of the Endopelvic Fascia

Next, the endopelvic fascia is incised from just lateral to the puboprostatic ligaments along the lateral edge of the prostate (**Figure 3**). The incision is carried parallel to the neurovascular bundles along the lateral surface of the prostate. Fibers of the levator ani are separated from the apex of the prostate.

Figure 3a

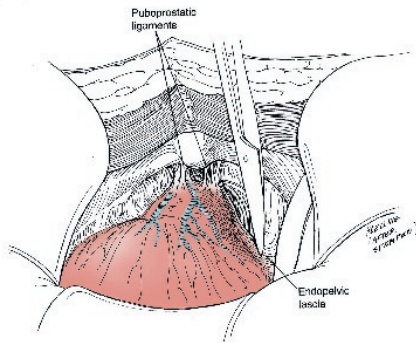
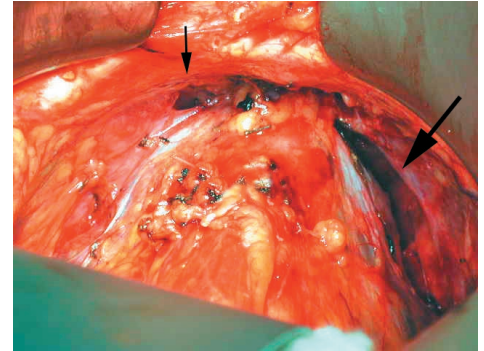


Figure 3b

Upper arrow depicts the natural fenestration on the side of the intact endopelvic fascia. **Right arrow** shows the lateral surface of the prostate after the endopelvic fascia has been incised.



Division of the puboprostatic ligaments and control of the dorsal venous complex

The puboprostatic ligaments, which provide anterior support of the urethra, are left intact over the urethra, but any attachments to the prostate are incised. Preservation of the puboprostatic (pubourethral) ligaments may facilitate earlier and more complete return of urinary continence compared to the use of previous techniques, which incised them over the urethra. The medial edge of the cut endopelvic fascia, and overlying dorsal vein complex is generally gathered with an alic instrument and suture ligated to facilitate exposure of the prostate, prevent bleeding from the complex once it is cut, and to allow clear access to the urethra (**Figure 4a and 4b**). If a distal suture is placed in the dorsal vein complex at this point, it should include only the overlying dorsal vein complex and not the distal sphincteric continence mechanism or the neurovascular bundles if they are to be spared.

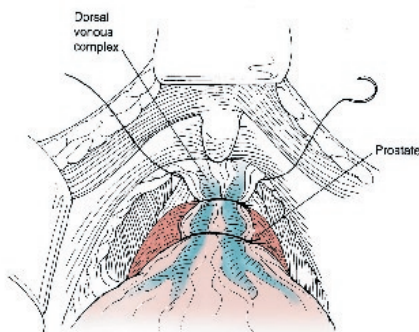


Figure 4a

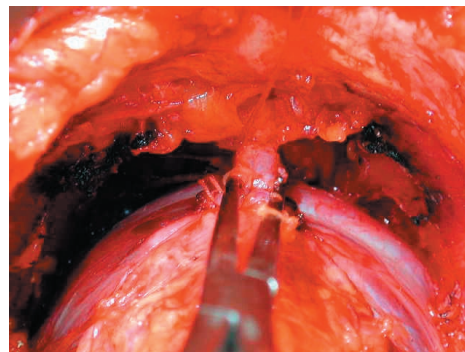


Figure 4b

Dividing and oversewing of the dorsal vein complex

A 2-0 or 3-0 absorbable suture may be placed distally at the most anterior portion of the dorsal vein complex and the needle left on the suture. As the dorsal vein is incised, the suture may be used to progressively close the cut end of the dorsal vein complex facilitating hemostasis allowing clear visualization of the urethra and proper plane of dissection. (Figure 5a and 5b). Care is taken during the apical dissection of the prostate to simultaneously preserve the urethra's distal continence mechanism and excise all prostate tissue. Once the dorsal vein complex has been incised and controlled, the anterior urethral surface is identified.

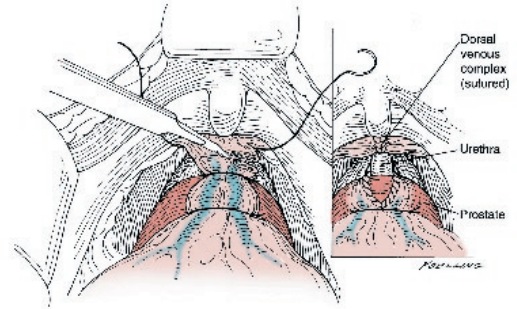


Figure 5 a and 5b

Nerve sparing approach (Dividing the lateral prostatic fascia)

The nerves and arterial blood supply (neurovascular bundles) crucial to potency run posterolaterally along either side of the prostate (Figure 6). These bundles may be spared during surgery in an effort to preserve potency. The neurovascular bundles run deep to the lateral prostatic fascia at approximately the 5 and 7 o'clock positions along the posterolateral surface of the prostate. During nerve-sparing radical prostatectomy, the lateral prostatic fascia should be incised anterior to the neurovascular bundles and the bundles should be separated from the prostatic capsule before the urethra is incised. The incision in the lateral prostatic fascia is best made not at the apex of the prostate, but more proximally near the mid-portion of the prostate (Figure 7) Small vascular branches to the prostate may be ligated using small clips or 4-0 or 5-0 absorbable sutures. The neurovascular bundles are at the most risk for damage at the time of urethral dissection and transection, ligation of the lateral pedicles and dissection of the seminal vesicles.



Figure 6
Endorectal MRI at the mid-portion of the prostate. Arrow notes the posterolateral course of the neurovascular bundles.

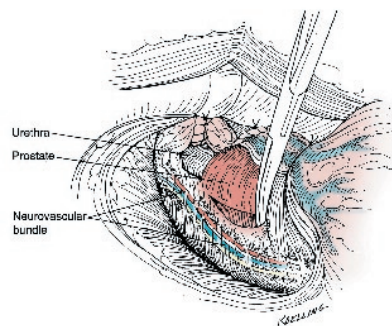


Figure 7

Dividing the urethra

Once the neurovascular bundles have been separated unilaterally or bilaterally from the prostatic capsule (in cases of nerve-sparing surgery), the urethral incision can be performed. An anterior incision using a scalpel (15-blade) is made and the Foley catheter is grasped and pulled into the wound before being cut distally (**Figure 8**). Avoid undue tension on the catheter or, the sphincter as either could shear the prostatic capsule or damage the continence mechanism. The posterior portion of the urethra is incised sharply under direct vision with care taken to either include or exclude the neurovascular bundles depending on the extent of surgery in individual cases (**Figure 9a and 9b**). The rectourethralis muscle can be cut sharply avoiding the neurovascular bundles. These posterior incisions should be carried distally and posteriorly enough to include all prostate tissue and Denonvilliers' fascia in the midline, respectively, to ensure complete cancer excision.

Figure 8

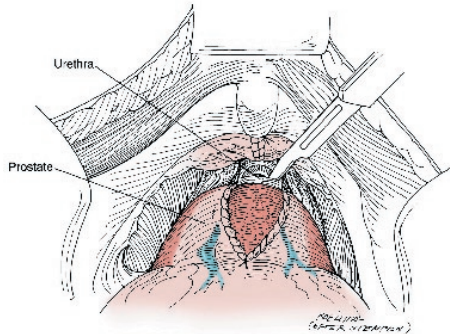
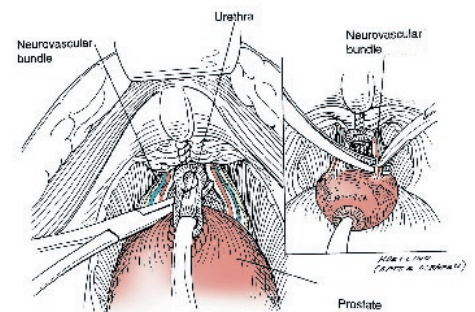


Figure 9a and 9b



Dividing the lateral pedicles and removing the seminal vesicles

The lateral pedicles (branches of the prostatic and rectal arteries) are ligated alongside the prostate, on the lateral surface of the seminal vesicles. In those cases where the neurovascular bundles are to be preserved, care should be taken to ligate the pedicles anterior to the bundles. Dissection proceeds superiorly or cranially exposing Denonvilliers' fascia over the seminal vesicles and ampullae of the vas deferens (**Figure 10a and 10b**). The fascia is incised, the ampullae are clipped or tied before being cut and each seminal vesicle is excised in its entirety. Dissection should proceed just alongside the seminal vesicle to avoid injury to the neurovascular bundles as the pelvic nerve plexus lies very close to the seminal vesicles.

Figure 10a

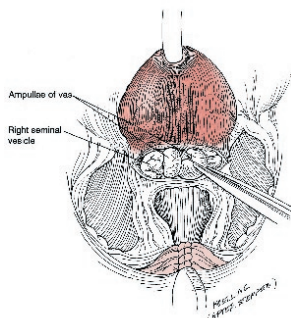


Figure 10b



Dividing and closing the bladder neck

The prostate is then separated from the bladder neck circumferentially. 3-0 or 4-0 absorbable suture material is used to evert the bladder mucosa anteriorly and laterally. The bladder neck can be narrowed in a “racket handle” fashion, if necessary, using a continuous 4-0 or 3-0 absorbable suture.

Anastomosis of the bladder to the urethra

The bladder neck is sutured to the urethra using interrupted 3-0 or 4-0 suture material over a 16 or 18 Fr. urethral catheter. Generally 6 to 8 interrupted sutures are placed (**Figure 11**). Care is taken when placing these sutures posterolaterally to avoid injury to the autonomic and somatic innervation of the external urinary sphincter and the neurovascular bundles. The sutures should include only the cut end of the urethra and not the levator musculature or nerve fibers.



Figure 11

Autologous fascial sling

Patients thought to be at an increased risk of post-operative urinary incontinence (i. e. advanced age, previous radiation, cancer at the apex requiring wide excision) may be candidates for autologous fascial sling placement at the time of radical prostatectomy. A strip of rectus fascia measuring approximately 1 by 8 centimeters is harvested. This piece of fascia is trimmed of all fat and the ends of the fascia are plicated with 2-0 absorbable or non-absorbable suture, the ends of which were left long. After the vesico-urethral anastomosis is completed, the sling is carefully placed underneath the anastomosis using a right-angled clamp (**Figure 12**). Care is taken to position the sling at the level of the anastomosis and external sphincter and not more proximally. The free suture ends are placed through the ipsilateral rectus fascia. The rectus fascia is closed inferiorly using interrupted

absorbable suture material and the sling sutures are tied loosely, without tension, on the rectus fascia. Closure is then completed.

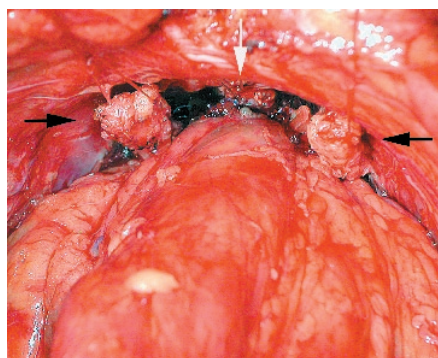


Figure 12

Black arrows point towards the ends of the rectus fascial sling. **White arrow** points toward the urethrovesical anastomosis.