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Surgery Illustrated – Surgical Atlas
Radical retropubic cystectomy

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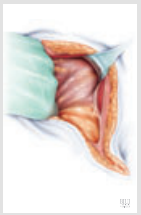
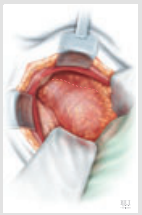
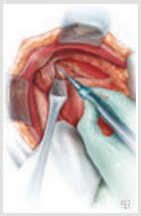
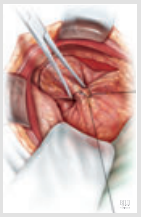
ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com

INTRODUCTION

Open radical cystectomy (RC) remains the treatment of choice for patients who present with invasive disease, those with progressive disease, or disease refractory to intravesical therapy [1]. Older age is not a contraindication to cystectomy, but it does make it critical to reduce the morbidity associated with this procedure. In the USA the incidence and death rates from bladder cancer have remained relatively stable over the last two decades. The mainstay for improving cancer-specific outcomes in patients with muscle-invasive disease is RC with extended lymph node dissection (LND). While robotic RC is beginning to gain favour for non-invasive disease [2,3], there are still concerns about this approach, and at present it is limited in application to only a few centres in the USA. Furthermore, the laparoscopic approach might require further analysis of the quality of the LND [2,4–6].

Given the importance of early RC and extended LND for improved cancer-specific survival it is of paramount importance that the techniques for this procedure are readily available to the practising urologist in all parts of the community. In this article we depict a technique that should be readily accessible to the urologist. The technique is centred on the open radical retropubic prostatectomy, with which most urologists have accrued excellent experience. The technique described, 'retropubic RC' is just a simple extension on this foundation which can be applied to men undergoing RC. This approach begins with extraperitoneal exposure similar to a radical retropubic prostatectomy. The bladder portion of the en bloc specimen is removed in an antegrade fashion, with LND to follow.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Extraperitoneal approaches are associated with less temperature change and fluid shifts, and we believe the exposure afforded helps to avoid rectal injuries. Positive microscopic nodes are not a contraindication to proceed with RC, and as grossly involved lymph nodes are readily seen on cross-sectional imaging, it is not mandatory to complete the LND before RC.

PLANNING AND PREPARATION

Comorbidities should be identified and optimized before the procedure. Special attention should be paid to any bowel pathology that would influence the selection or configuration of the bowel segment used for urinary diversion. Clinical staging with cross-sectional imaging should evaluate the abdomen, pelvis and retroperitoneum. Metastatic evaluation should also include a chest X-ray, serum alkaline phosphatase, and liver function tests. A bone scan should be obtained in the setting of bony pain or an elevated alkaline phosphatase level. Consultation with the enteral stoma nursing team is obtained. Mechanical bowel preparation includes a clear liquid diet and a preparation of GoLytely or Fleets Phospa soda 1 day before the procedure. Cefuroxime is given 'on call' and continued for 24 h after the procedure. An epidural catheter is placed while in the holding room for a patient-controlled epidural analgesia pump after surgery. Intermittent sequential compression devices are placed before inducing anaesthesia for the prophylaxis of deep venous thrombosis. The patient is placed supine, with the table extended slightly at the iliac crest to improve pelvic exposure. All pressure points are well padded. A nasogastric tube and an 18 F Foley catheter are placed.

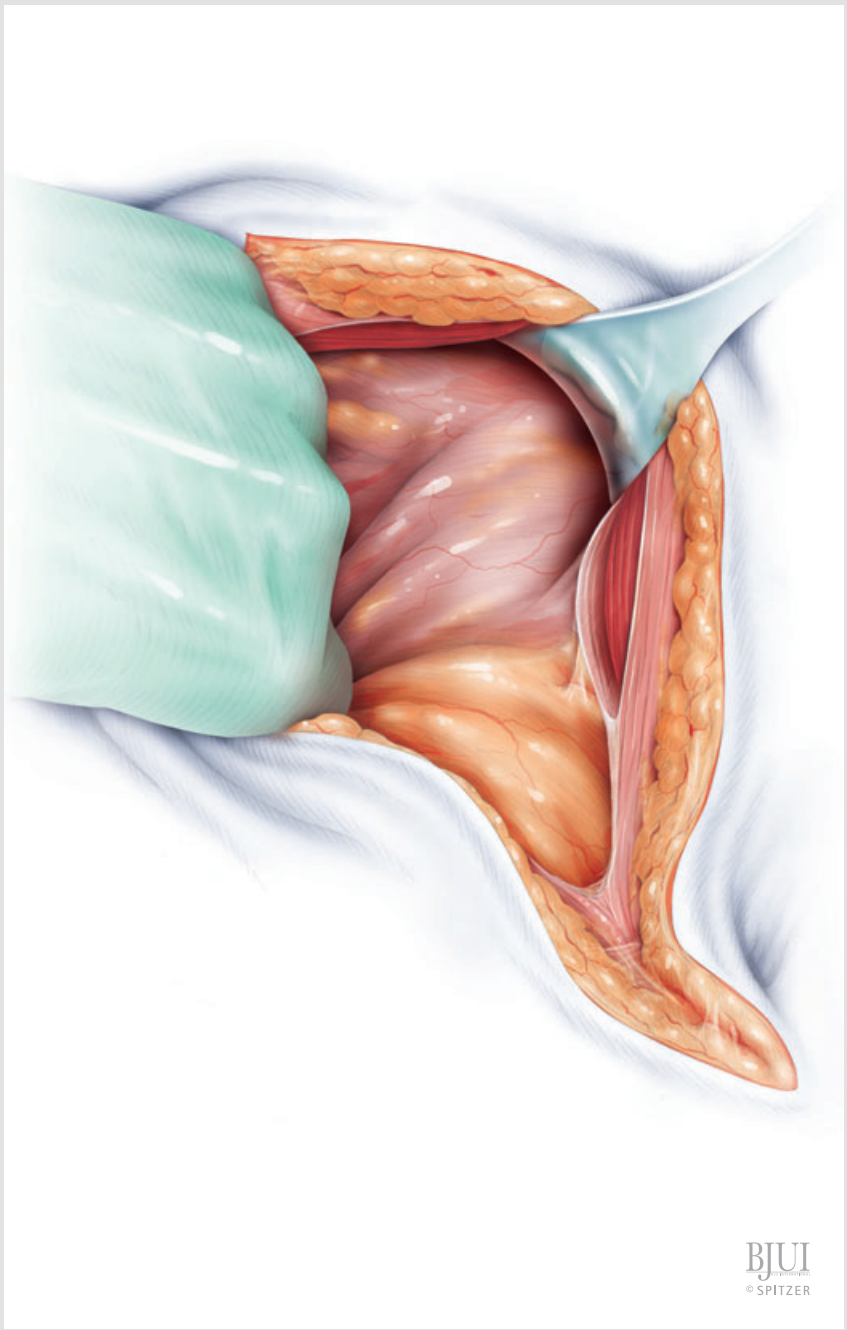
SURGICAL STEPS

Figures 1 and 2

A midline incision is made from 2 cm superior to the umbilicus to the pubic symphysis. The incision should be orientated lateral to the umbilicus on the contralateral side of any planned cutaneous stoma sites. The dissection is continued to expose the anterior rectus fascia.

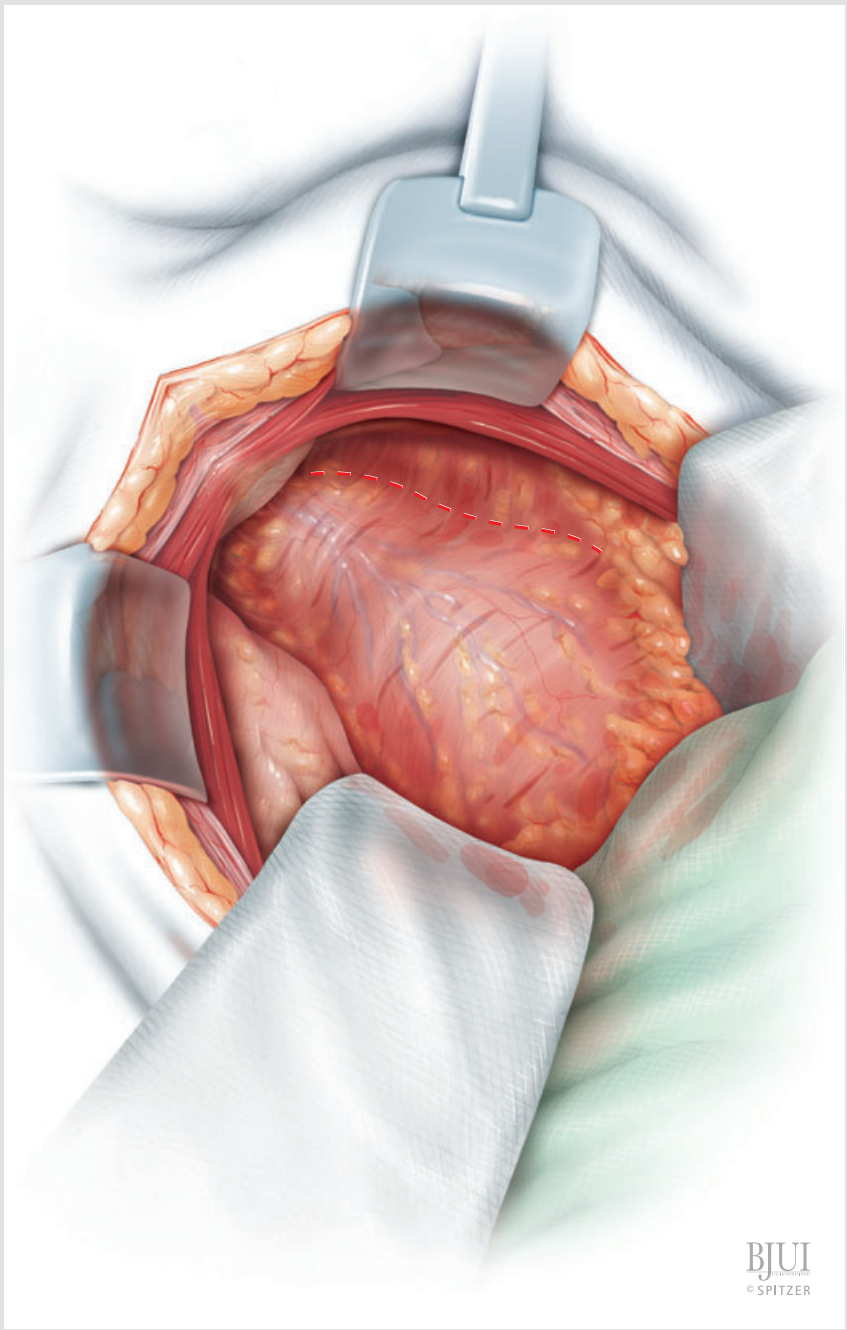
Incise the rectus fascia in midline along the lower 8–10 cm of incision and enter the transversalis fascia to develop the space of Retzius bilaterally. Take care not to enter the peritoneum at this point in the procedure. Identify the external iliac vein, endopelvic fascia, and obturator nerve, bilaterally.

A Bookwalter retractor is then placed (with a Richardson on the side of dissection and a malleable to hold the bladder to other side, and a small malleable to expose superior to external iliac vessels).



Figures 3 and 4

Enter the endopelvic fascia on the same side with electrocautery and sweep the levator fibres off the prostatic apex: divide the puboprostatic ligaments. Carefully expose the apex of the prostate, identifying the prostatic-urethral junction, the apical neurovascular bundles (NVBs) and the dorsal venous complex (DVC). Repeat the above steps on the contralateral side.



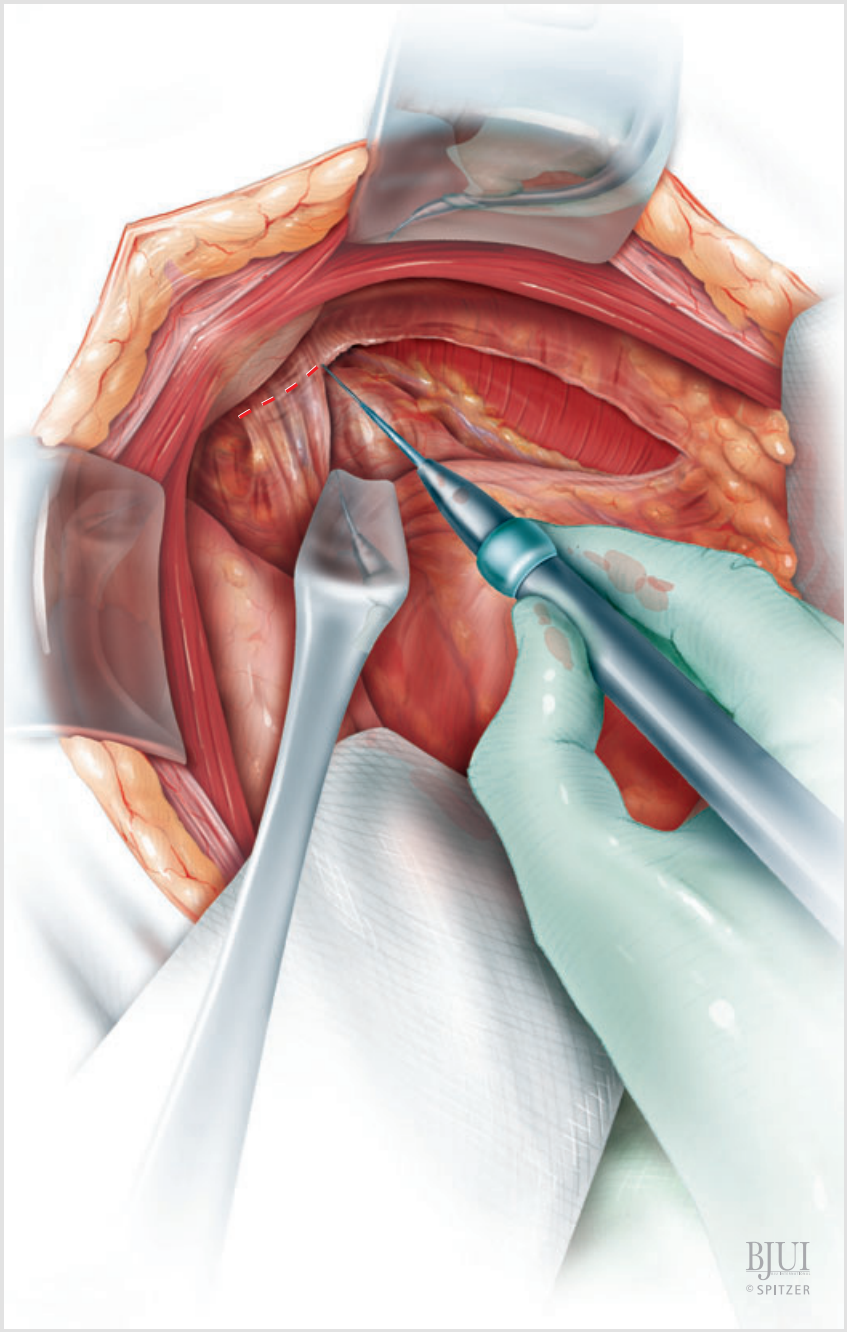


Figure 5

Use an Allis clamp to gather the plexus of Santorini, which lies over the bladder neck, and place a figure-of-eight 0-polyglactin suture to maintain haemostasis.

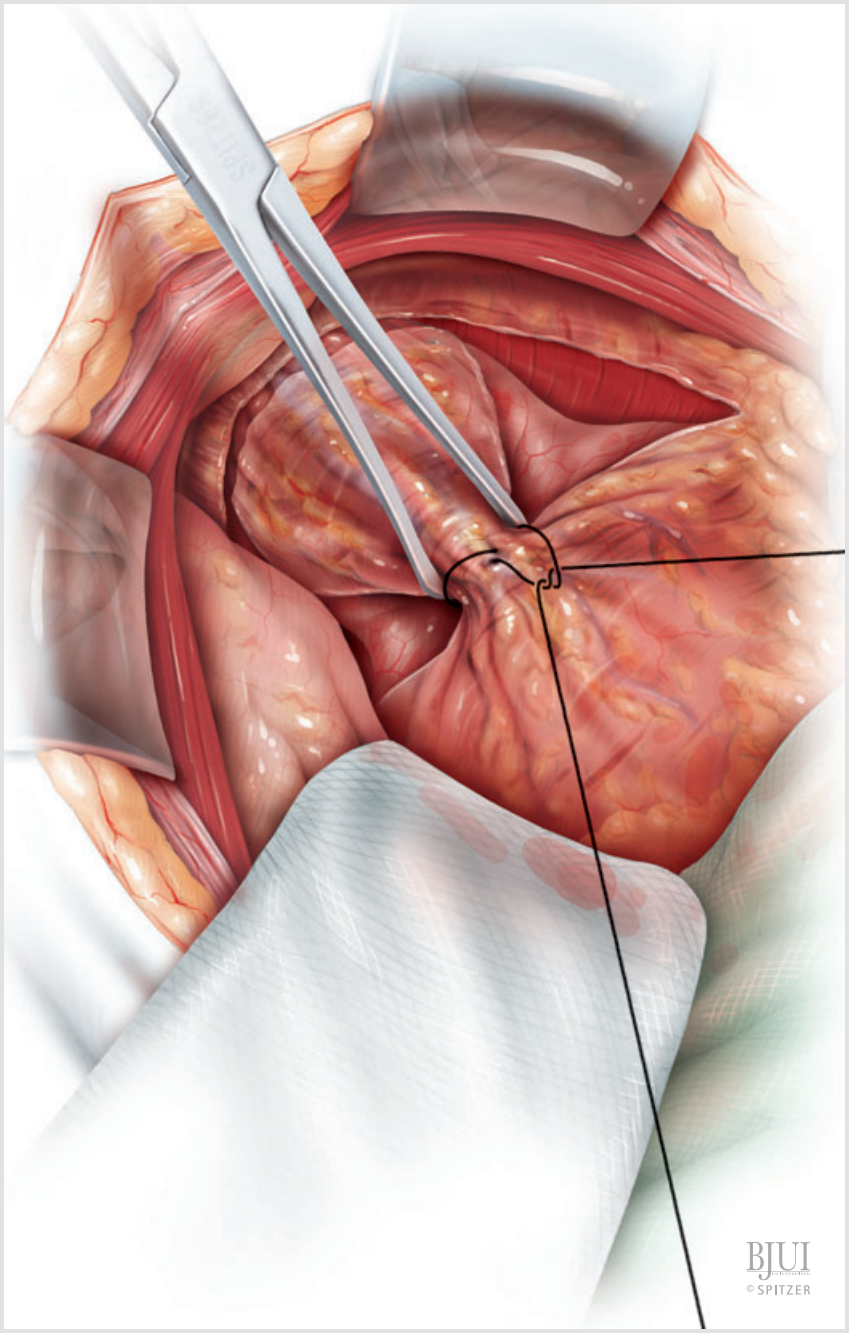


Figure 6

Next, apply an Allis clamp to grasp the leaves of the endopelvic fascia over the prostate and have the assistant grasp more laterally on each side with a second Allis clamp, and remove the first Allis clamp. A figure-of-eight 0-polyglactin stitch is then placed to control back bleeding.

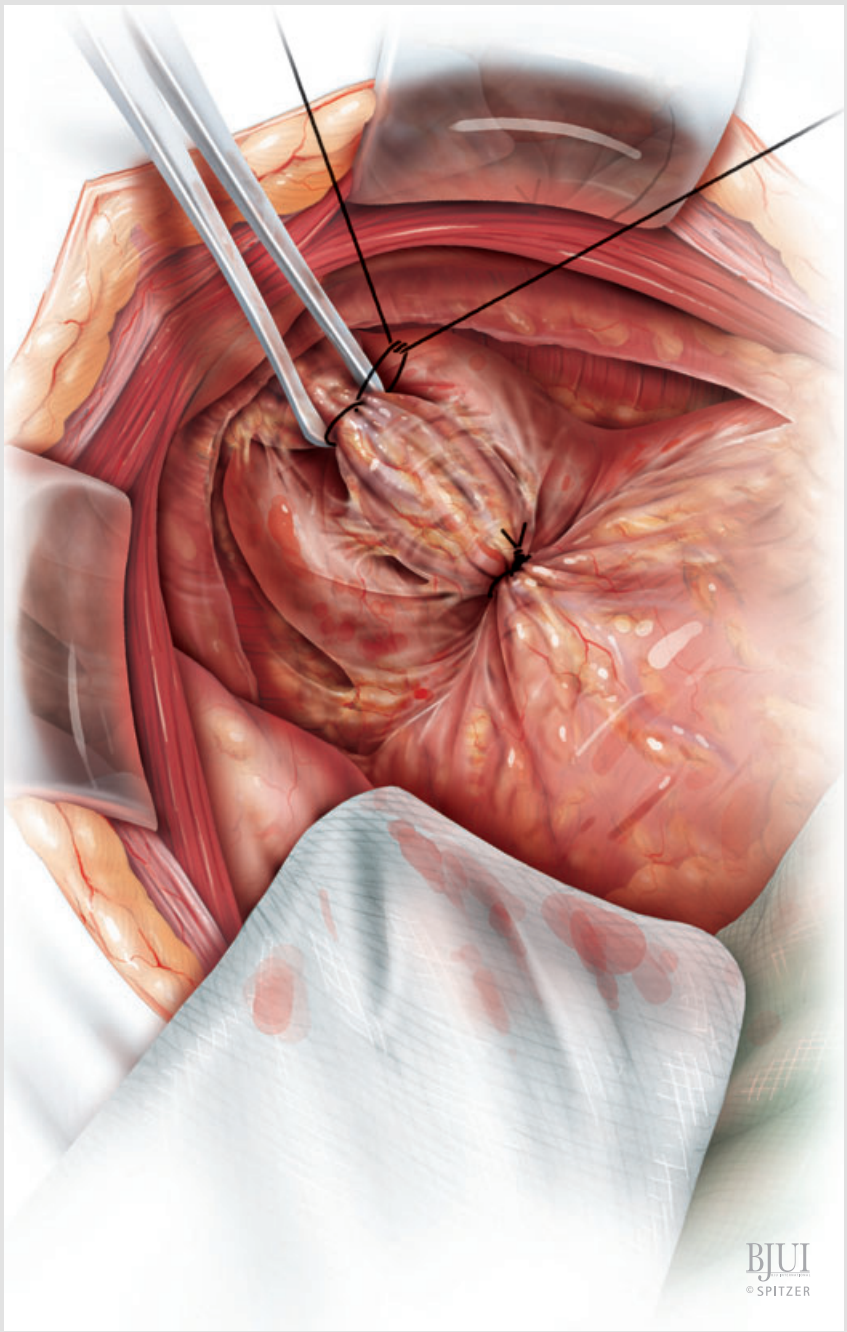


Figure 7

The space between urethra and dorsal vein is palpated bilaterally. A Hohenfellner clamp is placed beneath the dorsal venous complex, anterior to the urethra, just distal to the apex of the prostate. A 22-G wire is then delivered beneath the dorsal vein and used to elevate the complex [7]. Attached to the end of the wire is a 0-polyglactin free suture. The free end of a 0-polyglactin suture ligature is passed through this space and tied. The suture ligature end is then sutured just beyond the prostatic apex into the dorsal vein once, and secured. The needle is left on to allow the surgeon to place a second suture into the dorsal vein as needed

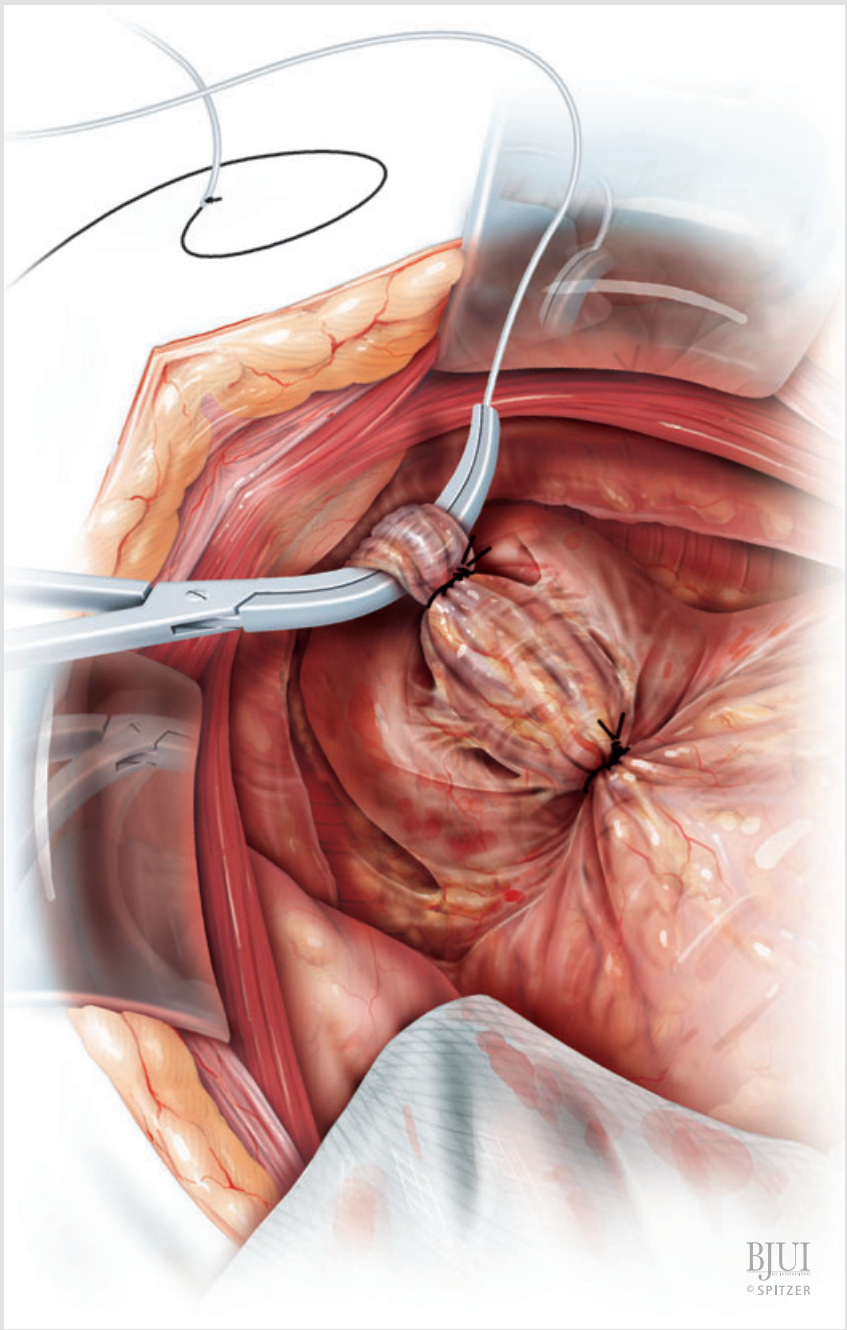


Figure 8

The previously placed 22-G wire is used to elevate the DVC and cautery is used to take down the dorsal vein distal to the prostate apex. Any residual bleeding from dorsal vein is controlled with the previously placed dorsal vein suture.

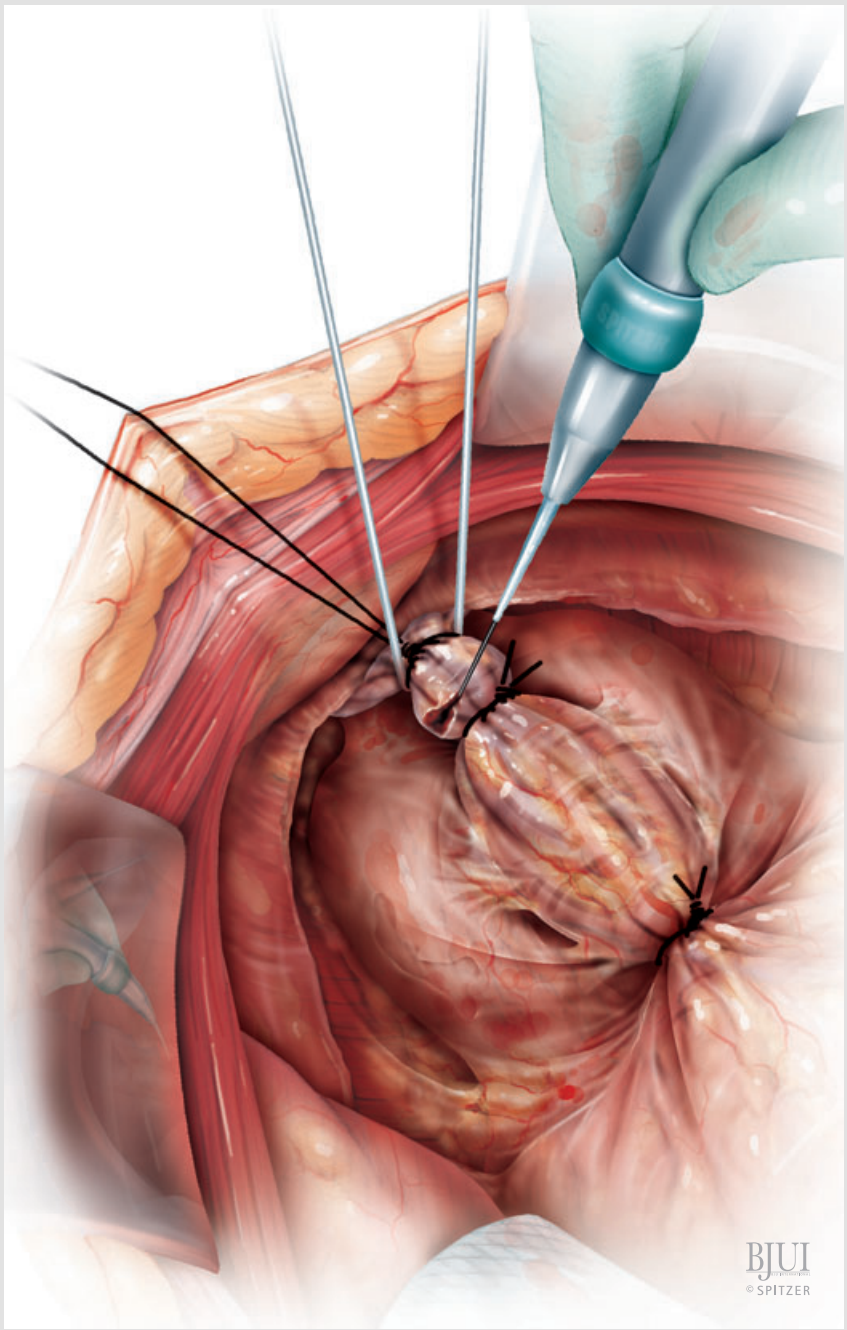


Figure 9

If a nerve-sparing procedure is desired, incise the lateral prostatic fascia at the middle portion of the prostate with cold scissors. Use sharp and gentle blunt dissection to free the NVB from the prostatic capsule and the apex of the gland. It is important to ensure that the NVB is dissected well away from the urethra at the apex to avoid later injury. The posterior apical projection of the prostate, which often lies further distal than the anterior portion, is gently pushed back from urethra to gain extra space on urethral stump. Carefully place a right angle clamp between the rectum and urethra (do not spread the clamp) and incise the urethra 270° with scissors or knife on a long handle. Clamp the Foley catheter and cut distally, bringing the catheter into the wound and exposing the posterior urethra, then replace the right angle clamp between the urethra and rectum. If a neobladder is to be created as a urinary diversion, seven sutures are place at this juncture in the urethral stump, which is well exposed. Divide the posterior urethra and rectourethralis sharply.

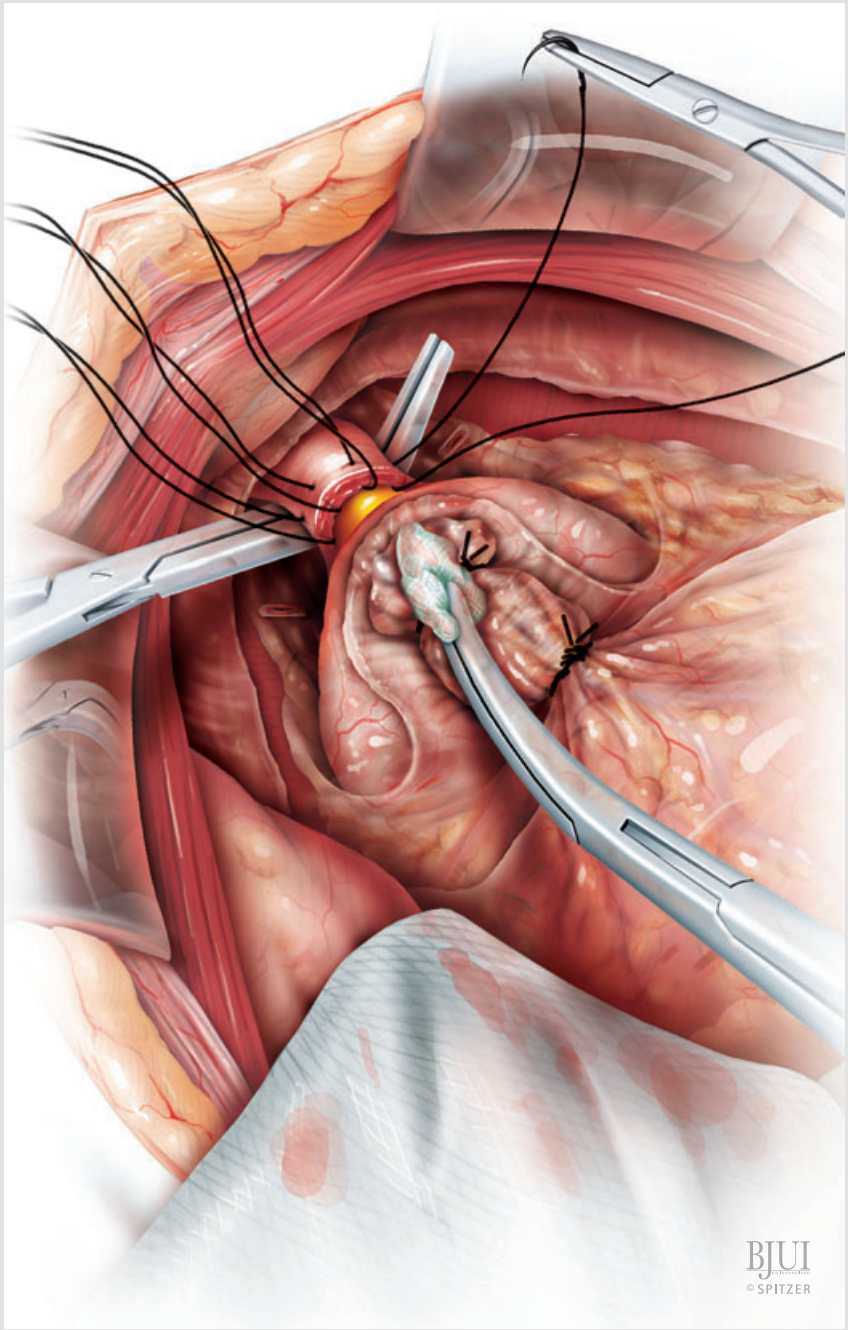


Figure 10

Under direct vision develop the plane between the anterior rectal fascia and Denonvilliers' fascia sharply as necessary, with care to prevent inadvertent rectal injury. In a nerve-sparing procedure care is taken to avoid traction injury to the nerves. In a non-nerve-sparing procedure, angle more laterally to take pedicle tissues widely. Vascular pedicles are controlled with medium metal clips.

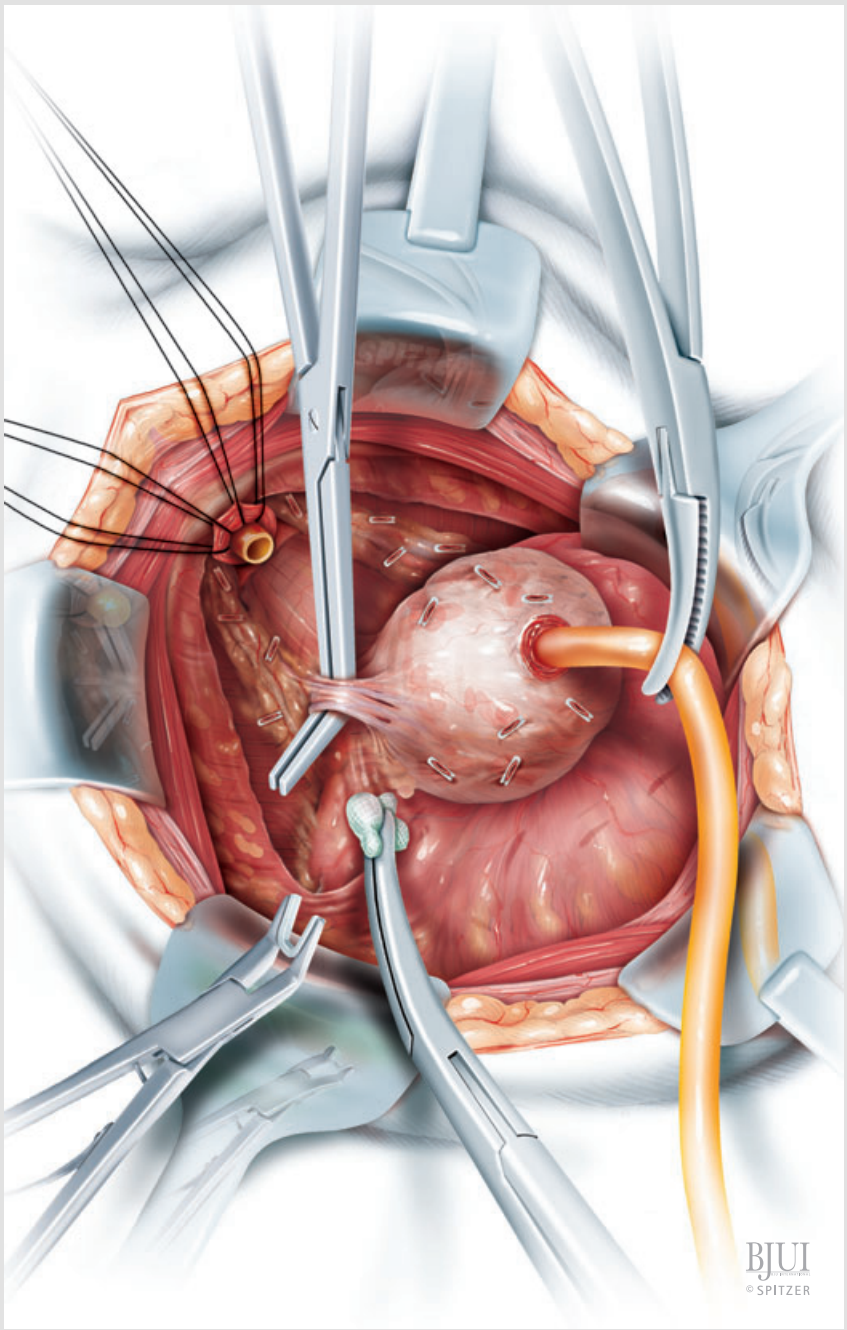


Figure 11

Use a Kittner sponge to push the rectum off Denonvilliers' fascia. Incise Denonvilliers' fascia and dissect the ampulla of the vas deferens, and divide as proximal as possible (this makes seminal vesicle dissection easier). Dissect the seminal vesicles (use tonsils laterally to separate the lateral border and a right angle clamp to gain counter-traction.) Care is again taken in a nerve-sparing procedure to maintain the continuity of the NVB during the seminal vesical dissection. For later identification of the posterior peritoneal incision, a 4 × 4 gauze is placed caudal to the pouch of Douglas.

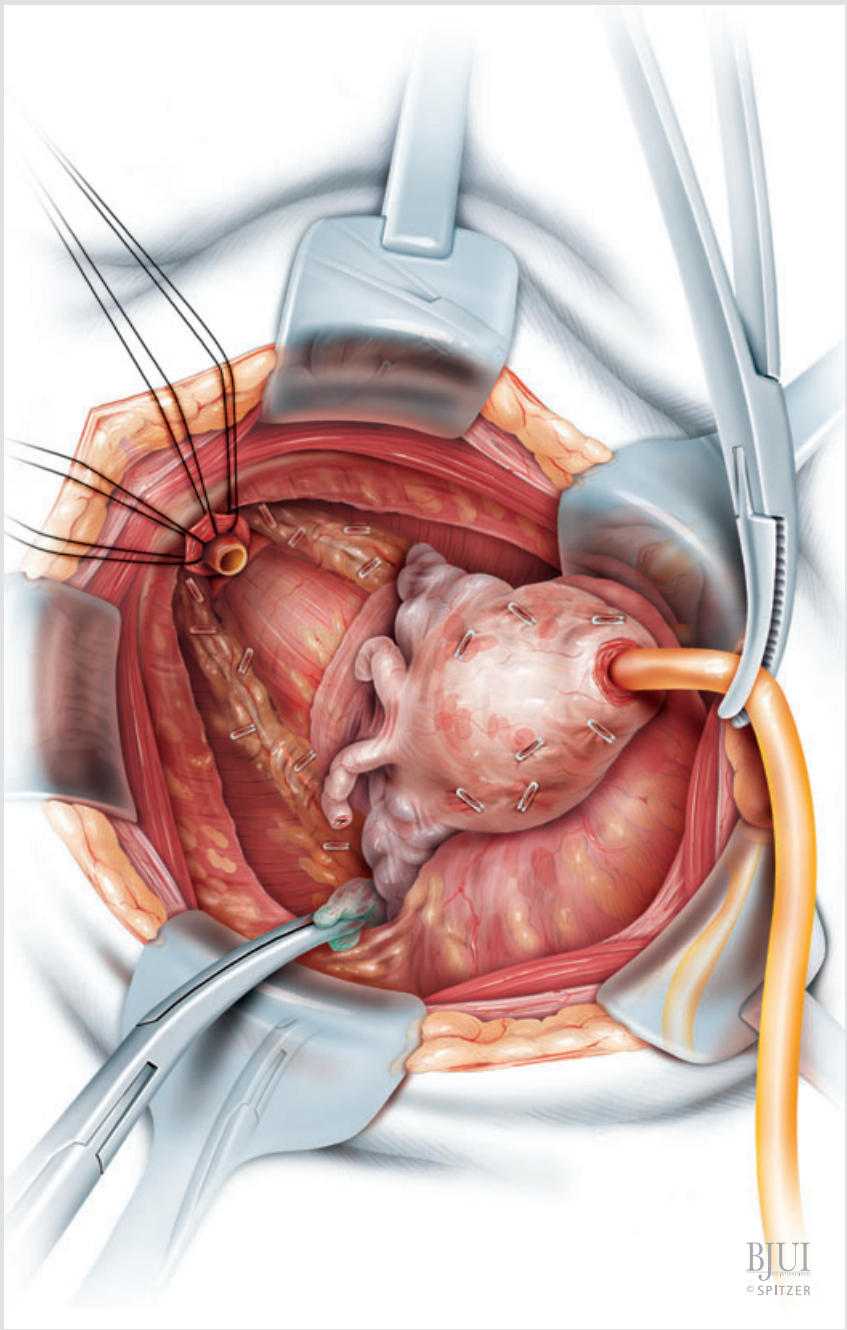


Figure 12

The posterior fascia is opened, the peritoneal cavity is entered, and the urachal remnants are identified and divided just below the umbilicus. The urachus is elevated, thus elevating the bladder. The urachal remnant is removed en bloc with the specimen. The small bowel is packed out of the pelvis and the Bookwalter retractor is reset. The peritoneal incision is extended inferiorly on either side of the urachus. Identify and divide the vas deferens.

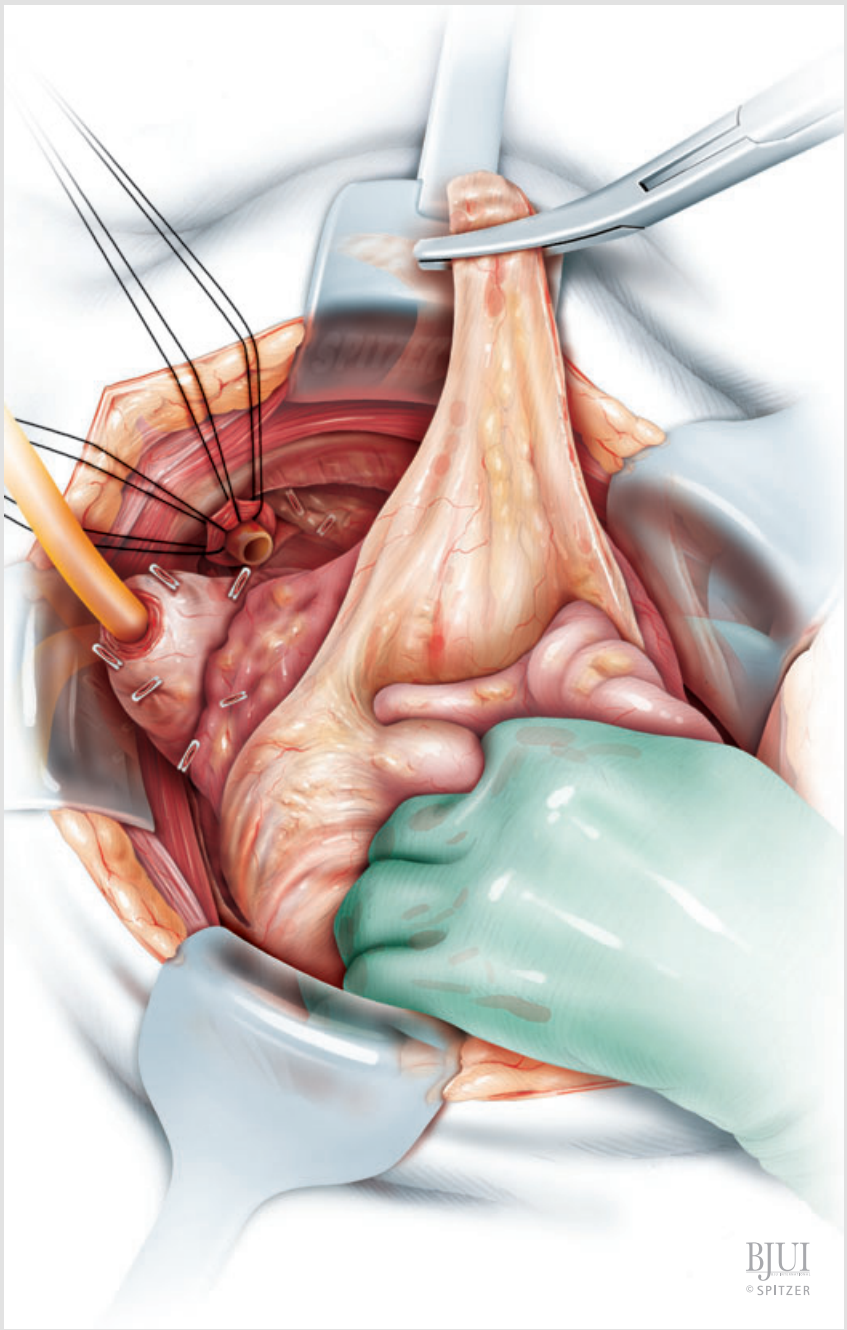


Figure 13

The white line of Toldt is incised on each side allowing mobilization of the caecum and sigmoid colon.

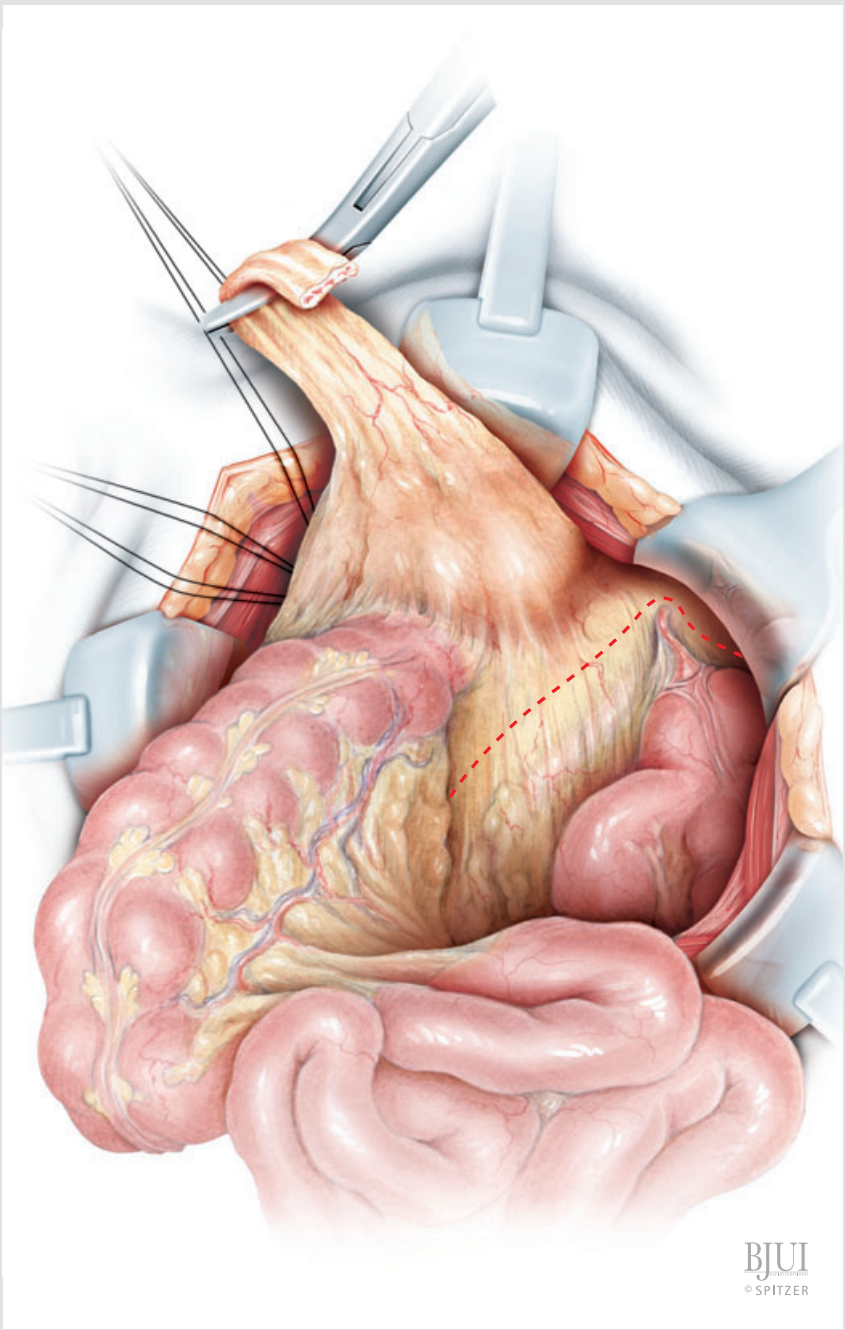


Figure 14

The ureters are then identified where they cross the common iliac bifurcation and dissected free for 3–4 cm inferior to superior vesicle artery, clamped with a Rummel clamp distally, ligated and divided. Distal ureteric segments are sent for frozen-section analysis and the distal end is folded in a warm 4 × 4 gauze and placed in the retroperitoneum superiorly. The left ureter is brought under the sigmoid mesentery with care not to twist the ureter. The lateral pedicles are then controlled in large part by identifying, ligating, and dividing the superior vesicle artery.

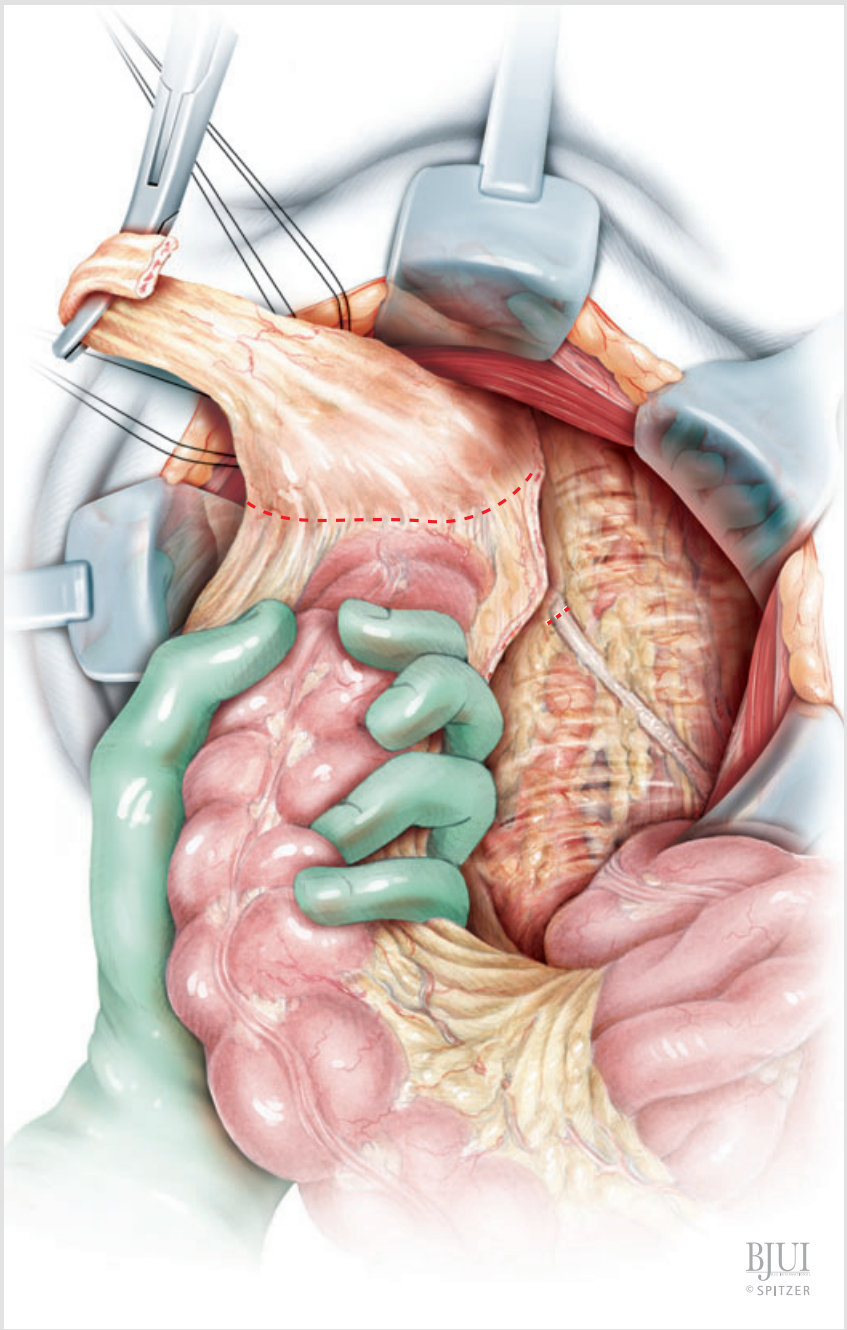


Figure 15

Next, incise the peritoneum transversely just anterior to the rectum/sigmoid. The 4 × 4 gauze placed previously is identified in the pouch of Douglas. Umbilical tape is placed in the plane between the prostate and bladder; this allows anterior traction of the specimen and isolation of the posterior pedicles. Traction is then used to put tension on the urachal remnant, and the posterior portion of the superior bladder is dissected bluntly as the specimen is lifted ventrally. With the prostatic pedicles controlled earlier in the procedure, the only remaining attachments are the remaining portions of the lateral pedicles, as well as the posterior pedicles, which are ligated and divided with an endoGIA stapling device.

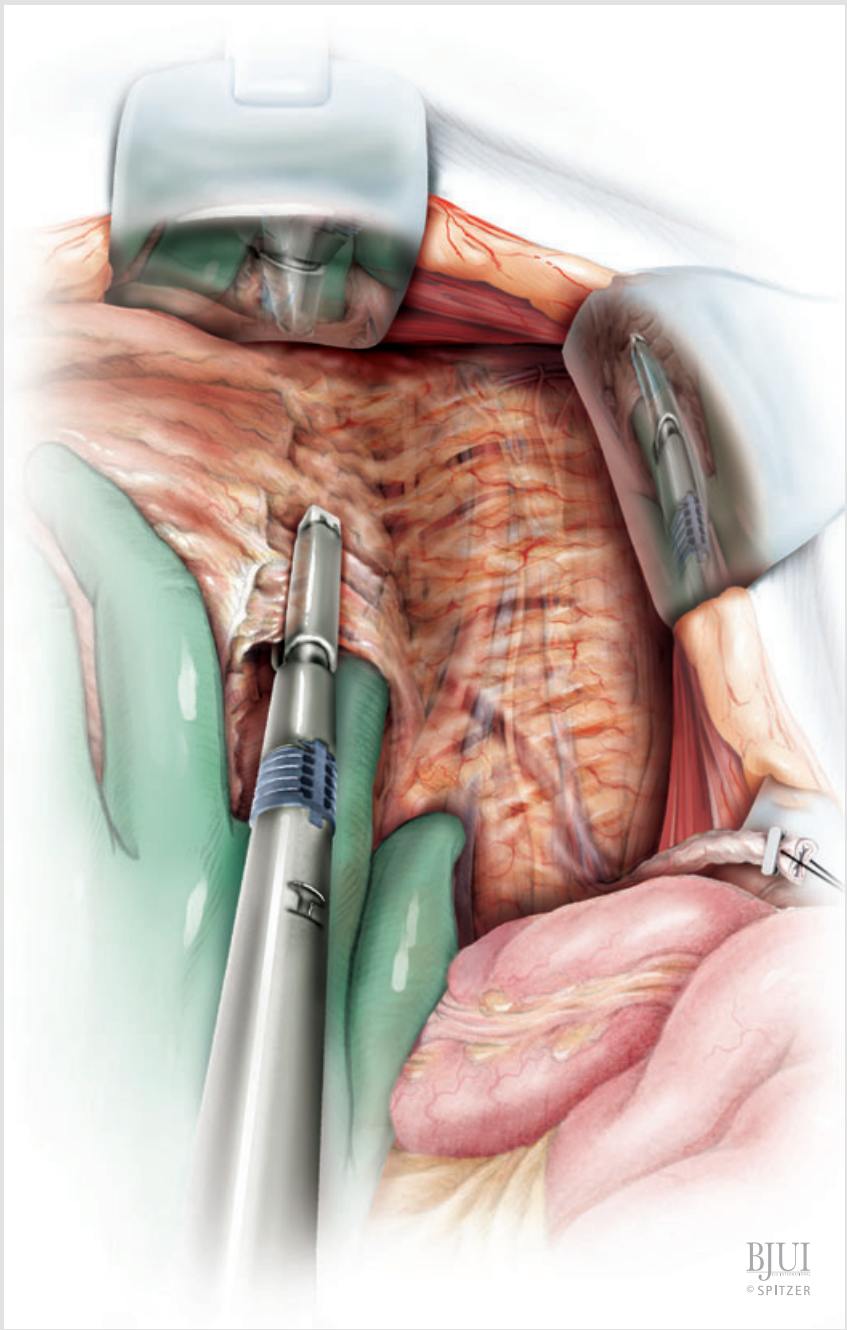
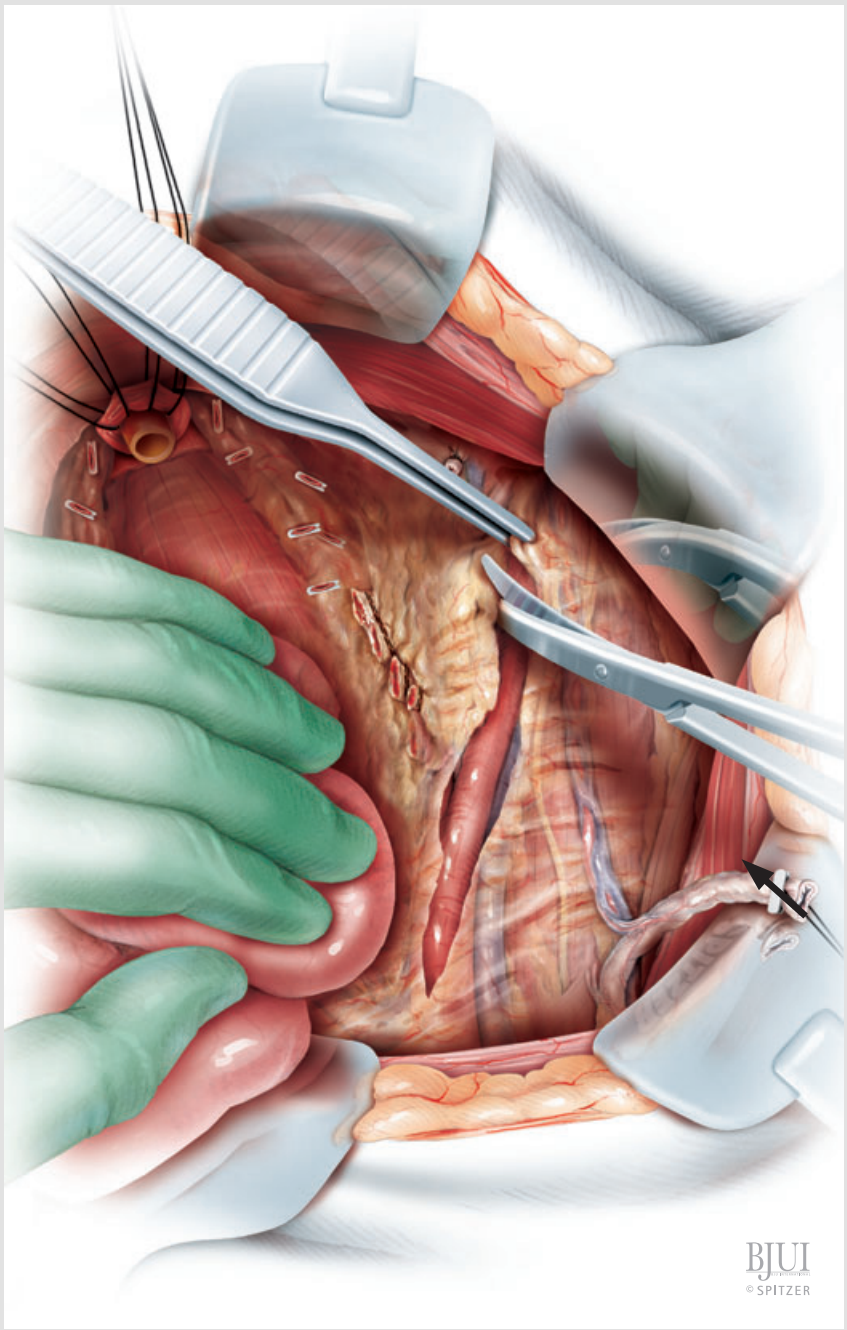


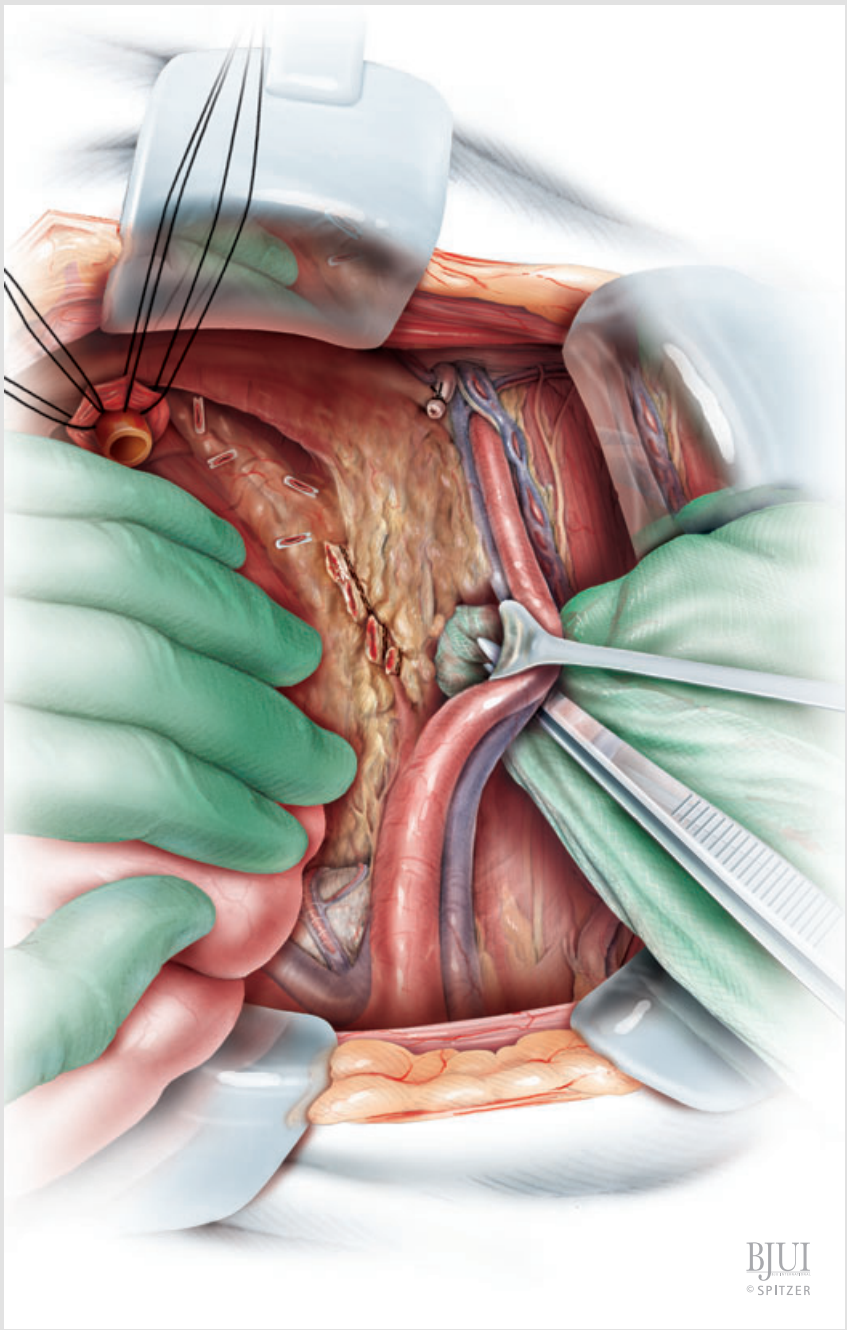
Figure 16

To begin the lymphadenectomy, the peritoneal incision is extended posterolaterally along the lateral border of the external iliac and common iliac vessels up to the aortic bifurcation. Previous mobilization of the bladder and ureters allows excellent exposure of the common, external, and internal iliac vessels.



Figures 17 and 18

Extended lymphadenectomy is carried out in an attempt to maximize patient outcome [8–12], using the technique previously described by Stein and Skinner [13]. Pelvic LND is then carried out, dissecting all fibrofascial tissue in the area from bifurcation of common iliacs down to the femoral canal.



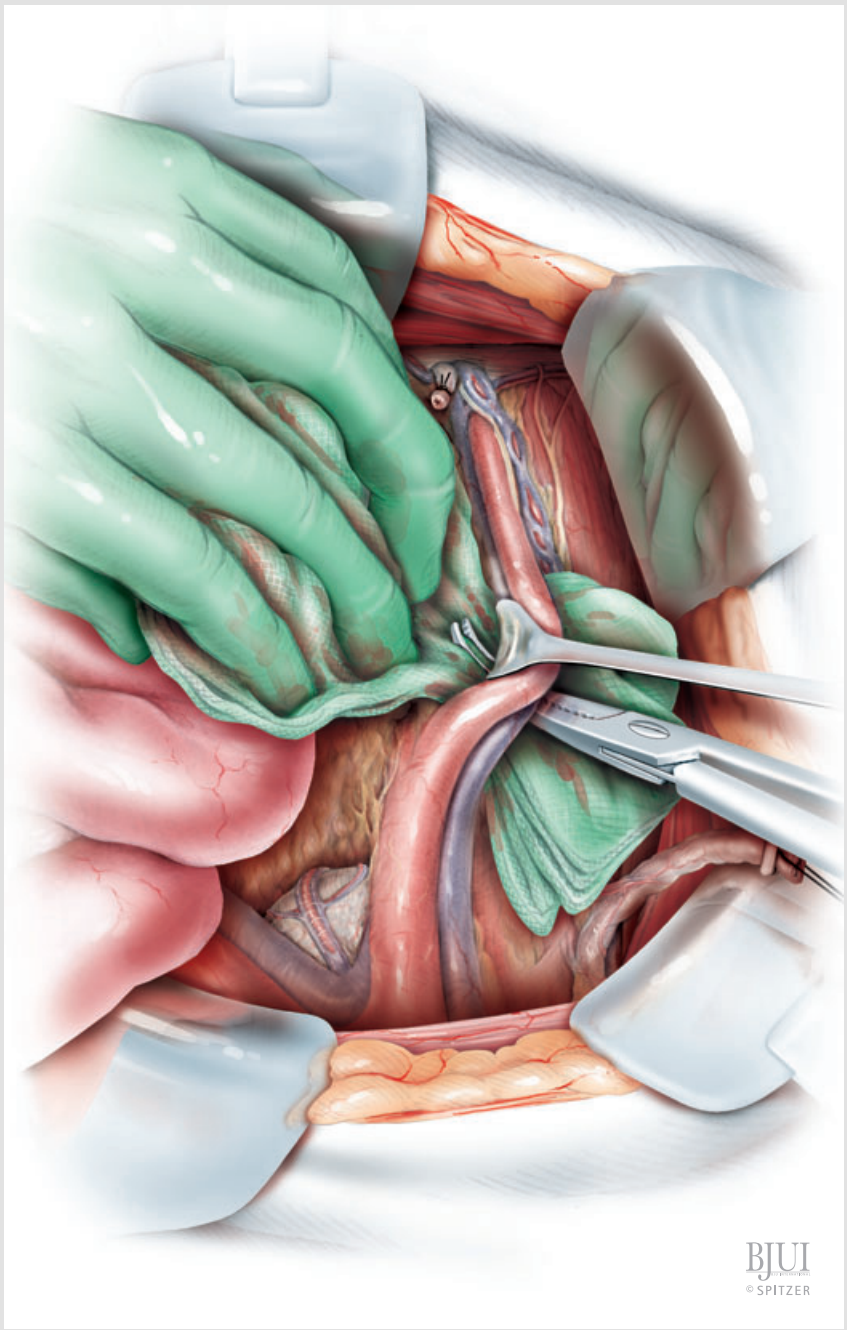
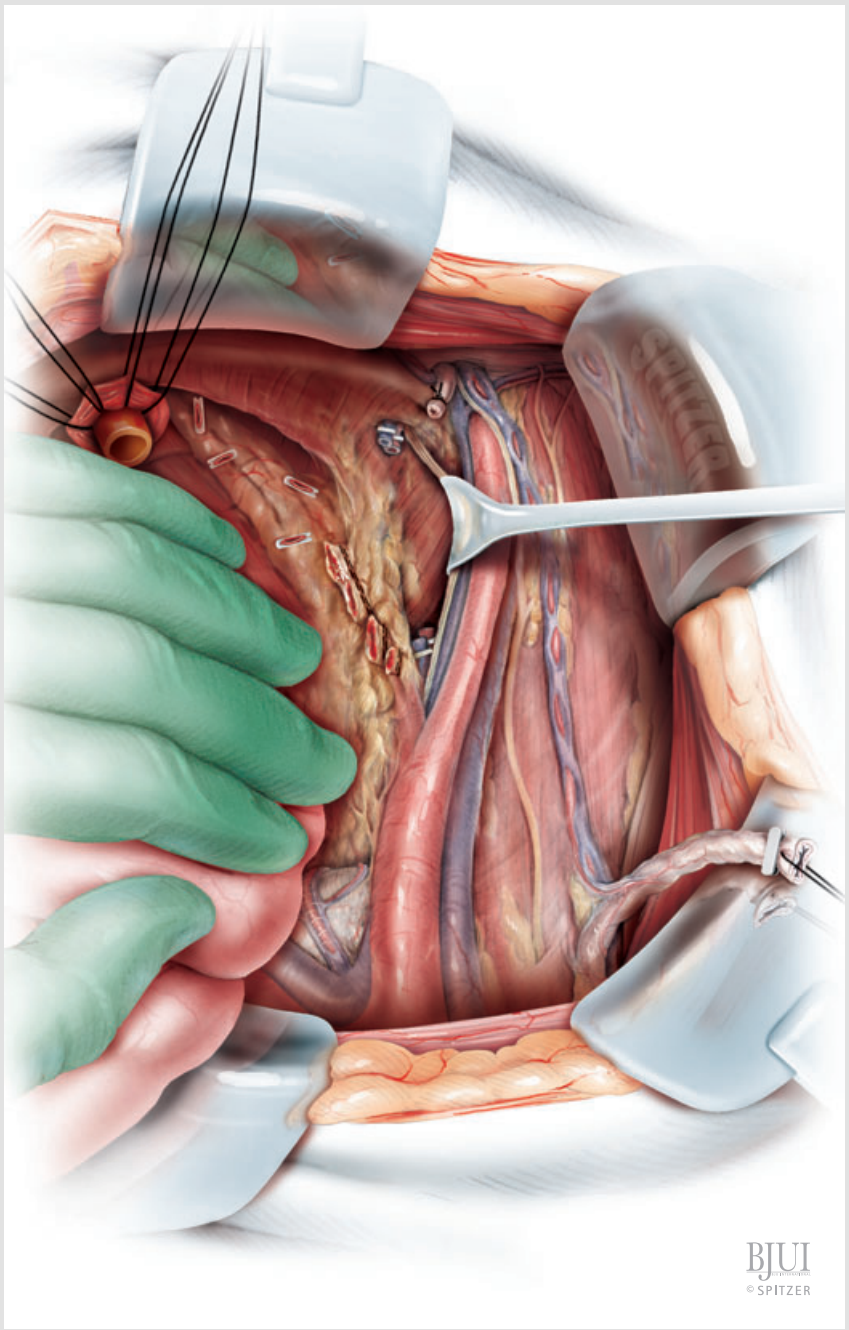


Figure 19

The limits of this dissection include the aortic bifurcation proximally, the inguinal ligament distally, the pelvic side wall and the genitofemoral nerve laterally. The proximal and distal limits of the lymph node packet are ligated to prevent lymphocele.

The urinary diversion is then created. A Jackson Pratt drain is placed through the left lower quadrant and secured to the skin with a nylon suture. The fascia is closed with 0-polydioxanone double-stranded suture from below and above. Subcutaneous tissue is re-approximated with 3–0 polyglactin and the skin is closed with staples or subcuticular 4–0 polyglactin.



POSTOPERATIVE CARE

The stent position is assessed by a plain abdominal film. Patients are observed in the surgical intensive-care unit for 24 h. Aggressive pulmonary toilet is begun. Patients are continued on antibiotics for 24 h. H2 blockers are used for prophylaxis of gastric ulcers. The nasogastric tube is removed on the first day after surgery. Intermittent sequential compression devices are continued throughout hospitalization. Ambulation is also begun on the first day, with diet begun after the bowel ileus resolves. Stents are sequentially removed at 4 and 5 days if the ileus has resolved, with the closed suction drain being removed 1 day later after checking the drain creatinine level. The patient returns for a wound check after 14 days and a MAG-3 renogram with frusemide at 28 days.

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Abbreviations: **RC**, radical cystectomy; **DVC**, dorsal venous complex; **LND**, lymph node dissection; **NVB**, neurovascular bundle.