

LESSON ASSIGNMENT

LESSON 3

Procedures in Genitourinary Surgery

TEXT ASSIGNMENT

Paragraphs 3-1 through 3-44

LESSON OBJECTIVES

After completing this lesson, you should be able:

- 3-1. Identify terms and definitions that are related to genitourinary surgery.
- 3-2. Identify the anatomy and physiology of the genitourinary organs.
- 3-3. Identify general considerations in genitourinary surgery.
- 3-4. Identify operations on the kidney, ureter, and adrenal glands.
- 3-5. Identify operations on the bladder and prostate.
- 3-6. Identify operations on the scrotum, penis, and urethra.

SUGGESTION

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 3

PROCEDURES IN GENITOURINARY SURGERY

Section I. ANATOMY AND PHYSIOLOGY OF THE GENITOURINARY ORGANS

3-1. INTRODUCTION

The urinary organs in the male or female include two kidneys that excrete urine, two ureters that convey urine from the kidneys to the bladder, which in turn serves as a reservoir for the reception of urine, and a urethra through which the urine is discharged from the body. In the male, the reproductive system consists of the testes, vas deferens, seminal vesicles, penis, urethra, prostate, and bulbourethral glands. These organs have a direct or indirect function in the process of procreation. The reproductive system in the female has been discussed in lesson 2.

3-2. THE KIDNEYS

a. The kidneys are situated in the retroperitoneal space on the muscles of the posterior abdominal wall, one on each side of the vertebral column at the level of the twelfth thoracic to third lumbar vertebrae. Their position may vary slightly, but usually the right kidney lies lower than the left because of the space occupied by the liver. The placement of the kidneys is shown, in figure 3-1.

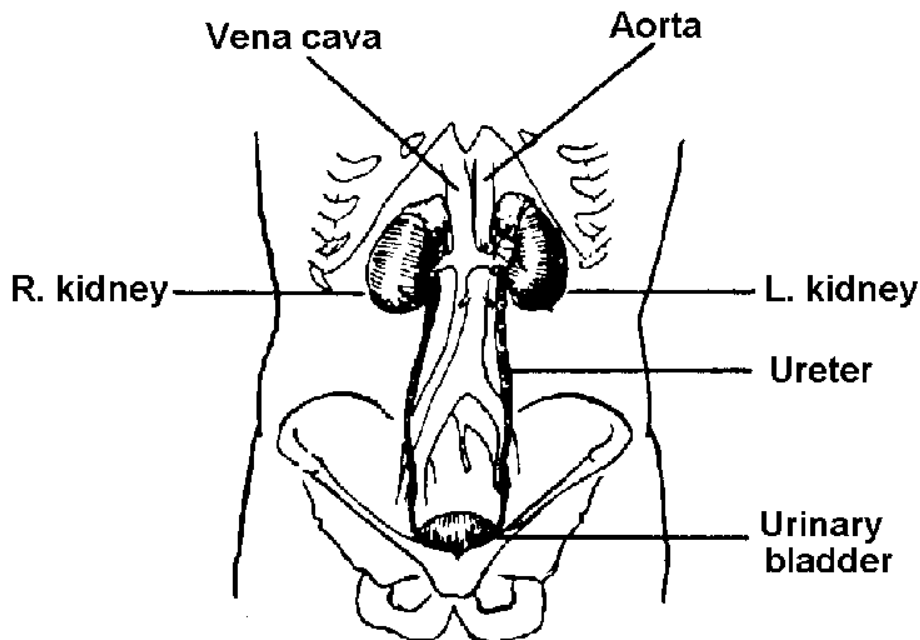


Figure 3-1. Male urinary organs in relation to other structures.

b. Each kidney is surrounded by a mass of fatty and loose areolar tissue, known as perirenal fat. Each kidney and fat capsule is surrounded by a sheath of fibrous tissue called Gerota's capsule, or renal fascia, which is connected to the fibrous tunic of the kidney by trabeculae. The kidneys are held in place by the renal fascia, which connects with the fascia of the quadratus lumborum muscle of the loins, the psoas major muscles, and the diaphragm.

c. On the medial side of each kidney there is a concave notch (called the hilum) through which the ureter, arteries, and veins enter and leave and where the renal pelvis is found.

d. The substance of the kidney (see figures 3-2 and 3-3) consists of an outer portion called the cortex, and an inner portion, called the medulla. The cortex contains the glomeruli (see figures 3-3 and 3-4) and the functioning tubules. The medulla contains many collecting tubules and papillary ducts. Each of the latter empties on a papilla within a minor calyx. Several of these join to form a major calyx. These unite to form--and therefore in turn empty into--the renal pelvis, consisting of smooth muscles lined with epithelium. The funnel-shaped renal pelvis of each kidney is continuous with the ureter below.

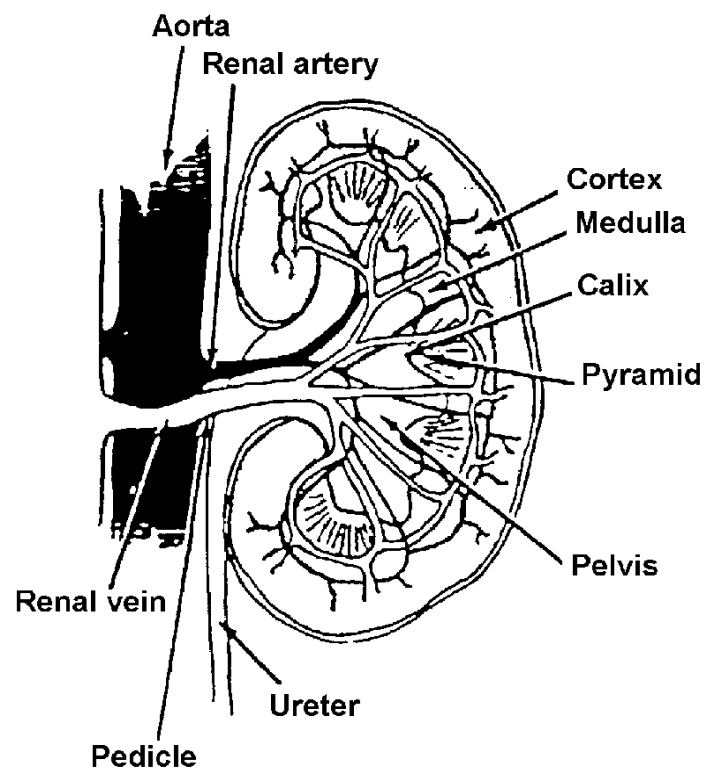


Figure 3-2. The kidney.

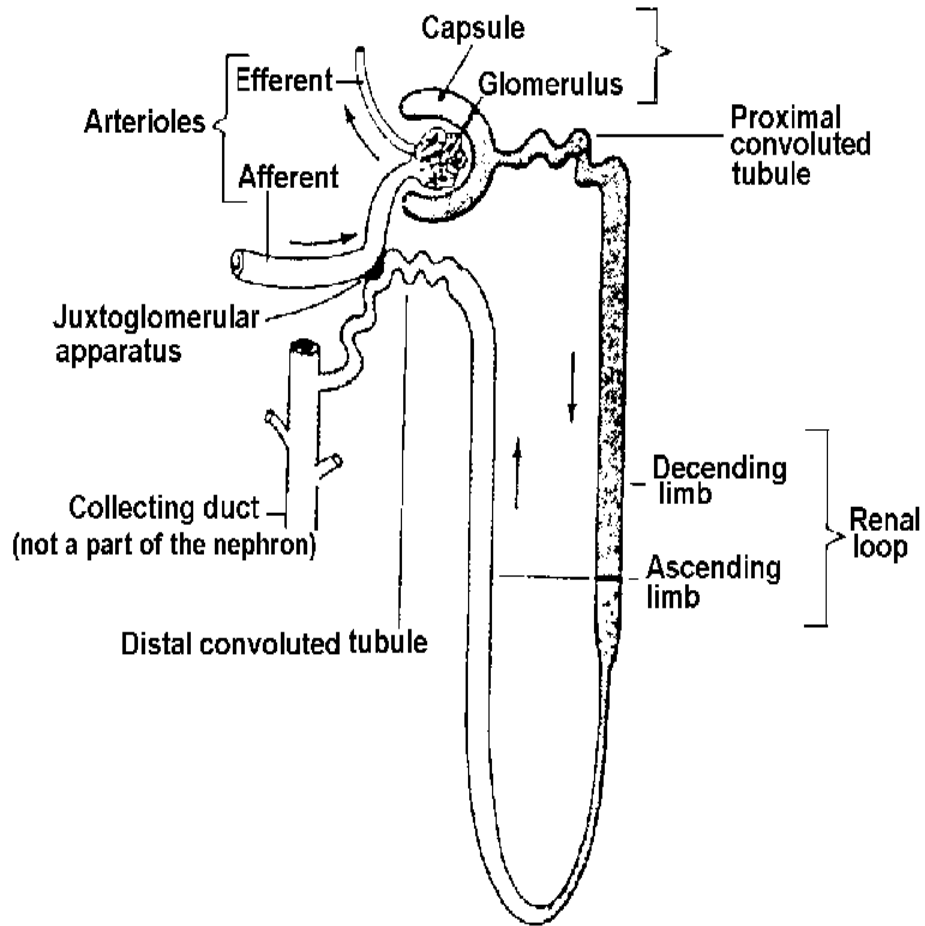


Figure 3-3. A "typical" nephron.

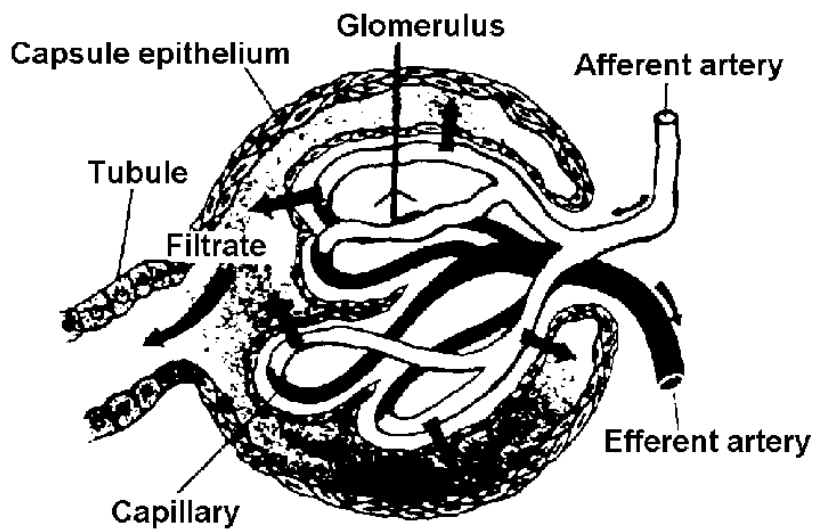


Figure 3-4. Renal corpuscle.

e. The kidneys are very vascular because one-fourth of the entire volume of blood passes through them at any one time. They receive their blood supply through the renal arteries that originate from the aorta. Each renal artery divides into several branches called afferent vessels.

f. The lymphatic supply for the most part drains into the lymph nodes that are located between the renal vessels and the aorta, and it accompanies the venous drainage.

g. The nerves of the autonomic (involuntary nervous) system carry pain sensations from the urinary organs. The nerve supply to the kidney comes from the lumbar sympathetic trunk and from the vagus nerves. Removal of the nervous pathways disrupts the ability to feel pain without impairing kidney function.

3-3. THE URETERS

Each ureter is a continuation of the cuplike calyces and renal pelvis. The ureter extends from the renal pelvis to the base of the bladder as a cylindrical tube. Each tube is about 25 to 30 cm long (10 to 12 inches) and 4 to 5 mm (1/5 inch) in diameter. Each consists of three layers: an outer adventitial layer, a muscular layer, and an inner epithelial lining. See figure 3-5.

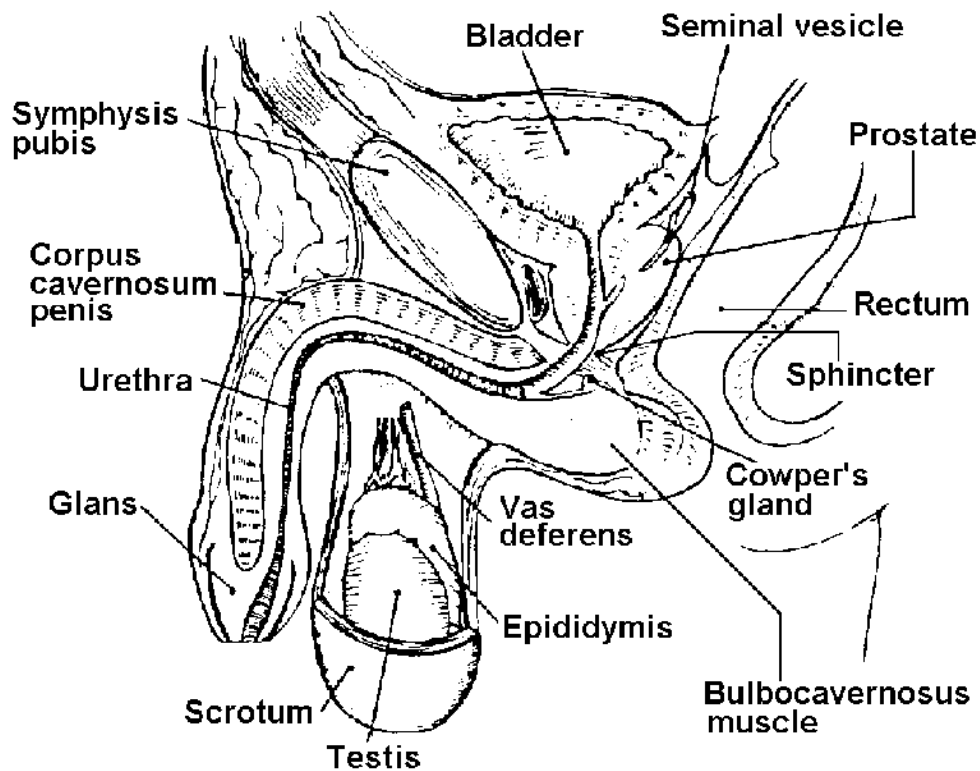


Figure 3-5. Genitourinary system (male).

3-4. URINARY BLADDER

a. The urinary bladder (see figure 3-5) is a musculomembranous sac situated in the pelvic cavity behind and below the symphysis pubis, in front of the rectum, and above the prostate gland in the male. The bladder lies in front of the neck of the uterus and the anterior wall of the vagina in the female. When the bladder becomes full and distended, it begins to ascend above the symphysis pubis, pushes its peritoneal covering ahead of it, and partially becomes an abdominal structure.

b. The bladder is connected to the pelvic wall by fascial attachments that extend from the back of the pubic bones to the front of the bladder. Other muscular fibers also pass from the base of the bladder to the sides of the rectum.

c. The bladder consists of a thick muscular wall with outer adventitial and inner mucosal layers. In addition, a peritoneal layer partially covers and is attached to the bladder dome. The blood supply of the bladder is derived from branches of the anterior trunk of the hypogastric artery.

d. As a result of the peristaltic muscular contraction of the renal pelvis and ureter, the urine is actively propelled from the kidney to the bladder and expressed from the ureteral orifice.

e. The size, position, and relation of the bladder to the intestines, rectum, and reproductive organs vary according to the amount of fluid it contains. The process of emptying the bladder appears to be initiated by nerve cells from the sacral divisions of the autonomic nervous system. These sacral reflex centers are controlled by higher voluntary centers in the brain. Stimulation from the sacral centers results in contraction of the bladder muscle and relaxation of the bladder outlet sphincters. Muscle tone maintains closure of the sphincters when the bladder is at rest.

3-5. MALE URETHRA

The male urethra (see figure 3-5) is a tube about 20 cm (8 inches) in length that forms an S curve. It is the terminal portion of both the urinary and reproductive tracts. The male urethra has three divisions: the prostatic urethra, which passes through the prostate gland, the membranous urethra, which contains the external sphincter of the bladder, and the remainder, called the bulbous urethra. The male urethra is composed of mucous membrane that is continuous with that of the bladder and merges with the submucous tissue, which in turn connects the urethra with other structures that it traverses.

3-6. FEMALE URETHRA

The female urethra (see figure 2-2 of Lesson 2) is a narrow membranous hollow tube about 4 cm (1/2 inches) in length and 6 mm (1/4 inch) in diameter. When it is not in use, however, its walls collapse. This structure lies behind and beneath the

symphysis pubis and anterior of the vagina. The external urethral orifice (urinary meatus) lies anterior to the vaginal opening and posterior to the clitoris.

3-7. MALE REPRODUCTIVE ORGANS

a. The male reproductive organs (see figure 3-5) include the two testes, epididymides, seminal ducts (vas deferens), seminal vesicles, Cowper's glands, and ejaculatory ducts, as well as the single reproductive organs of the prostate, penis, and urethra. The scrotum is located behind the base of the penis and in front of the anus. This loose sac contains and supports the testes, the epididymides, and some of the spermatic cord. The two sides of the scrotum are separated from each other by a median raphe. Within the scrotum there are two cavities or sacs that are lined with smooth and glistening tissue, known as the tunica vaginalis. Normally, a small amount of clear fluid is contained in the tunica vaginalis. The condition known as hydrocele denotes an abnormal accumulation of this fluid.

b. The testes manufacture the spermatozoa and also contain a specialized cell (Leydig) that produces the male hormone. Each testis consists of many tubules, in which the sperm are formed, surrounded by a dense capsule of connective tissue. The tubules coalesce and continue into the adjacent epididymis where the sperm mature and are stored.

c. The epididymis is a long narrow organ that lies along the posterior border of each testis. It connects the testis with the seminal duct. The vas deferens (ductus deferens, or seminal duct) is a distal continuation of the epididymis. Each is the excretory duct of the testis and conveys the sperm from the epididymis to the seminal vesicle.

d. The vas deferens lies within the spermatic cord in the inguinal region. The spermatic cord also contains the veins, arteries, lymphatics, nerves, and surrounding connective tissue (cremaster muscle) that give support to the testes.

e. The seminal vesicles are structures that unite with the vas deferens on either side. The terminal portion of each vas deferens is called the ejaculatory duct, which passes between the lobes of the prostate gland and opens into the prostatic urethra.

f. The prostate gland is an accessory sex organ. It lies just below the bladder in front of the rectum and surrounds the prostatic portion of the urethra. The entire prostate gland, which consists of five lobes, is surrounded by a fibrous capsule, through which the ejaculatory ducts enter to pass through the gland. Behind the prostatic capsule, there is a fibrous sheath that separates the prostate gland and the seminal vesicles from the rectum. The lobes of the gland secrete a highly alkaline fluid that dilutes the testicular secretion as it comes from the ejaculatory ducts. The prostate gland receives its blood supply from the internal pudendal, inferior vesical, and hemorrhoidal arteries.

g. Two small bodies called Cowper's glands are situated on either side of the membranous portion of the urethra inferior to the prostate. Each gland via its duct empties mucous secretions into the urethra.

h. The penis is a pendulous organ suspended by the fascial attachments of the pubis arch and supported by the suspensory ligaments. The penis contains three distinct vascular sponge-like bodies: the two upper bodies are called the right and left corpus cavernosum and the lower body, the corpus spongiosum urethras. The tissue contains a network of vascular channels that fill with blood on erection. At the distal end of the penis, the skin is doubly folded to form the so-called prepuce, or foreskin, which serves as a covering for the glans penis. The glans penis contains the urethral orifice.

3-8. ADRENAL GLANDS

The adrenal glands lie retroperitoneally beneath the diaphragm at the medial aspect of the superior pole of each kidney. On the right side, the gland is adjacent to the inferior vena cava; on the left side, the gland is posterior to the stomach and pancreas. Each adrenal gland has a medulla, which secretes adrenaline, and a cortex which secretes steroids and other hormones. The glands are freely supplied with arterial branches from the phrenic and renal arteries and from the aorta. The venous drainage is accomplished on the right by the inferior vena cava; on the left, by the left renal vein.

Section II. GENERAL CONSIDERATIONS IN GENITOURINARY SURGERY

3-9. INTRODUCTION

a. Operating room personnel must have a good understanding of the procedure that is planned in order to properly prepare the patient, room, equipment, and supplies. Safety is the prime consideration since the patient is positioned in a lateral, prone, or lithotomy position. These positions are frequently exaggerated to give better access to the organs involved, as for a radical operation on the prostate and bladder. Care must be taken to avoid displacement of the joints in lithotomy as the anesthetized patient is positioned. This is especially true in aged or debilitated patients.

b. In positioning a patient laterally for kidney surgery, the spine is extended to give more access to the retroperitoneal space. This patient should have padding and stabilizing support from rubber-covered pillows, sandbags, and straps. If the electrocautery unit is to be used, care must also be taken to see that no part of the patient touches metal equipment other than the indifferent electrode plate attached to the cautery unit.

c. In some procedures involving stones of the kidneys or ureters, it may be necessary to make X-ray examinations during the procedure. A cassette holder must be placed under the patient who is in the supine, prone, or lithotomy position. The patient positioned laterally will be X-rayed by a cassette held in a sterile wrap.

3-10. ASEPTIC TECHNIQUES AND SAFETY MEASURES

- a. Aseptic techniques in skin preparation and draping must be carefully maintained. Difficulty may be encountered in cleansing and preparing the perineal area. Spray apparatus may be preferred to gauze sponges on forceps for application of antiseptic in perineal skin preparations.
- b. Draping procedures for laparotomy are described and illustrated in Subcourse MD0927.
- c. The disposable O'Connor perineal drape with finger cot may be used.
- d. Transurethral passage of instruments and catheters requires meticulous aseptic technique to prevent retrograde infections of the urinary system. The use of transurethral instruments is facilitated by darkening the room. There should be provision for proper adjustments in lighting.
- e. Electrosurgical units and battery cords are frequent adjuncts in urological surgery. The staff must be familiar with their use and with the precautions necessary to prevent fire, explosion, or burns.

3-11. DISTENTION OF THE BLADDER

When the bladder is to be opened or manipulated, it is frequently distended with irrigating fluid prior to surgery. Provision must be made in positioning and draping of the patient and in instrument selection for filling and draining the bladder prior to or during the course of the operation.

3-12. DRAINAGE TUBES AND CATHETERS

- a. Ureteral catheterization may also precede radical operations. Preoperative preparations of the patient and cystoscopy instruments with catheterizing telescopes are needed.
- b. Whenever the urinary tract is opened, there is the danger of leakage of urine. All such wounds require careful drainage. Drainage tubes in the urinary tract must be kept open at all times and the surgeon should be notified immediately if there is no drainage. The tube or catheter used to drain the bladder suprapubically must be stiff enough to prevent collapse. An angulated tube or catheter may be useful in preventing kinking if bulky dressings are used. The catheters or tubes should be tested for patency, flushed and suctioned prior to use. Modern vacuum drainage collectors (of the Hemovac type) have been successful in maintaining drainage and keeping wounds dry.
- c. Ureterostomy and nephrostomy tubes must be carefully identified, fixed in position, and guarded to prevent dislodgment or obstruction. There are various types of catheters available for specific situations. Catheters are used for diagnostic purposes

and to explore the urethra for stenosis, discover residual urine in the bladder, and introduce contrast medium into the bladder.

d. Filiform tips and followers are used to dilate narrow strictures. Graduated woven ureteral catheters are used to introduce radiopaque material or obtain a sterile urine specimen from the renal pelvis and to help determine renal function.

e. The olive-tipped bougies are used to calibrate the urethra. The silk woven catheter may be used to manipulate past enlarged prostatic lobes. In some cases, a catheter stylet is used to insert a catheter. The catheter should be lubricated before the stylet is inserted. The catheter is drawn taut over the stylet so that its tip cannot become dislodged. Catheters with inflatable balloons are used for drainage and for pressure to help control bleeding.

Section III. OPERATIONS ON THE KIDNEY, URETER, AND ADRENAL GLANDS

3-13. GENERAL CONSIDERATIONS

a. Stones, infections, and tumors are the most common causes of urinary tract obstruction necessitating operations to prevent renal destruction or failure. Obstruction may also be due to malformations of the urinary tract.

b. Although the causes of kidney stones are obscure, certain conditions such as obstruction, stasis, or body chemistry predispose to their formation. Stones may form from various elements: calcium oxalate, calcium phosphate, magnesium ammonium phosphate, uric acid, and calcium carbonate, or combinations of these substances may be found. All stones removed at operation are usually subjected to chemical analysis. Stones obtained as surgical specimens are best submitted in a dry jar. Fixative agents such as Formalin^R can obscure the results of the analysis.

c. Stones in the renal pelvis may drop down into the opening of the ureter (the uretero-pelvic junction) and occlude it, or they may pass into the ureter and lodge at the ureterovesical junction or where the ureter passes into the bony pelvis at the level of the iliac crest. A stone may lodge in a renal calyx and continue to enlarge, eventually filling the entire calyx or renal pelvis (staghorn stone).

d. Hydroureter, hydronephrosis, and fibrosis with destruction of the renal parenchyma can result from unrelieved obstruction.

3-14. NEPHRECTOMY

a. **General.** This operation involves the removal of the kidney. It is done to treat some congenital unilateral abnormalities causing renal obstruction or severe hydronephrosis, tumor of the kidney, a severely injured kidney, renal tuberculosis, calculous pyelonephrosis, and sometimes cortical abscess.

b. **Patient Preparation.** The position of the patient on the operating table will depend on the type of lesion, the position of the kidney, and the surgical approach selected. The most common position for kidney operations is the lateral when a lumbar, transpleural, or extra-pleural transthoracic approach is to be used. A supine or a modified Trendelenburg position is employed when an abdominal approach is to be used.

c. **Approaches to the Kidney.**

(1) Lumbar or simple flank incision. This incision begins at the costovertebral angle and parallels the twelfth rib. It extends, forward and downward between the iliac crest and the thorax.

(2) Nagamatsu incision. This is a modification of the simple flank incision and is made over the eleventh and twelfth ribs, removing a section of each.

(3) Thoracoabdominal incision. The tenth and eleventh ribs are removed, and the chest cavity is opened, collapsing the lung. Rib spreaders and approximators and chest drainage are required. When the lumbar, Nagamatsu, or thoracoabdominal approach is used, the patient is placed in a lateral position.

(4) Transperitoneal and retroperitoneal incisions. The patient is placed in a supine position. A vertical incision is made in the epigastric and umbilical region on the affected side. This approach is used for a large kidney tumor or when the kidney and ureter are extensively involved in the surgery.

d. **Operative Approach (Lumbar Approach).**

(1) The incision is carried through the skin, fat, and fascia. Bleeding vessels are clamped with hemostats and ligated.

(2) The external oblique, the latissimus dorsi, and the internal oblique muscles are exposed. The required portions of the dorsi, external oblique, posterior inferior serratus, and internal oblique muscles are split or divided and retracted with a dull rake or Richardson right-angled retractors. Bleeding is controlled. The transversalis fascia is cut with scissors. Then the iliohypogastric and ilioinguinal nerves are identified and retracted. The sacrospinal muscle is retracted. The deep lumbar fascia is separated. The quadratus lumborum muscle may be divided.

(3) The pleura, peritoneum, and twelfth thoracic artery and nerve are identified and retracted. Laparotomy pads and Deaver retractors are placed to protect the adjacent structure and afford exposure.

(4) If necessary, a rib or ribs (twelfth, eleventh, or tenth) may be resected to give access to the kidney. The periosteum is stripped with an Alexander costal periosteotome and Doyen rib raspatory.

(5) A scalpel and heavy scissors may be used to cut through the lumbocostal ligaments. The rib is grasped with an ochsner clamp and cut with rib shears, removing the portion necessary to expose the kidney.

(6) Retractors and pads are placed. Gerota's fascia, the perirenal capsule, is grasped with long tissue forceps and incised with a scalpel. The incision is extended, using dissecting scissors, and the kidney and perirenal fat are exposed. The kidney is dissected free, using sharp and blunt dissection with long tissue forceps, scissors, and sponges on forceps. Crile hemostats are used on bleeding vessels.

(7) The ureter is identified, separated from its adjacent structures, and retracted. Holding forceps such as long Babcock or long Allis clamps may be used, or a length of Penrose tubing may be passed around the ureter to retain and retract it. The ureter is occluded by double clamping and then divided and ligated (see figures 3-6 **A** and **B**).

(8) The kidney pedicle containing the major blood vessels is isolated and doubly clamped by using long kidney clamps of a size suitable to the structures. The vessels are securely ligated with heavy chromic gut and transfixed with heavy sutures on Atraumatic needles. The pedicle is severed and the kidney removed (see figures 3-6 **C** and **D**).

(9) The wound is explored for bleeding, hemostasis secured, and the cavity cleansed by irrigating, sponging, and suctioning as necessary. A drain of Penrose tubing, which may be wicked with gauze, or a drain made of heavy rubber or plastic tubing is placed if leakage of urine is likely to occur.

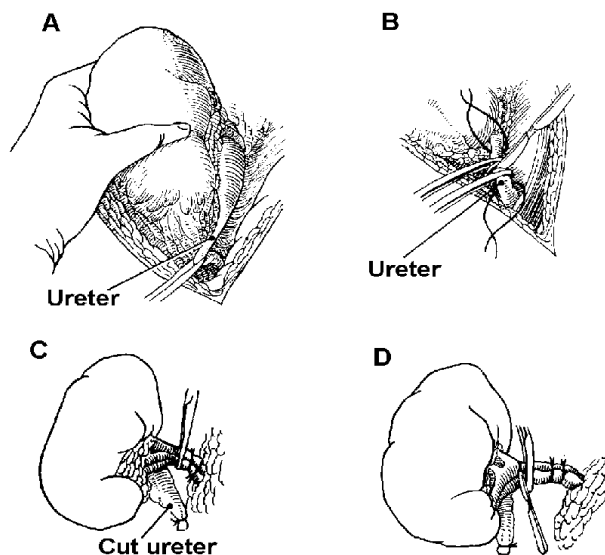


Figure 3-6. Nephrectomy.

A and **B**-Upper portion of ureter is freed, cut, and ligated. **C**-Chromic gut ligatures are placed; kidney clamps are applied between proximal ligature and kidney itself. **D**-Renal vascular pedicle is doubly ligated with suture ligatures, and the kidney is removed.

(10) The fascia and muscles are closed in layers with interrupted chromic sutures. If necessary, retension sutures may be used. The skin edges are approximated with interrupted sutures of silk or wire or with skin clips.

(11) The drain is secured and the wound dressed with gauze sponges, abdominal pads, and adhesive strips.

3-15. HEMINEPHRECTOMY

a. **General.** This procedure involves the partial excision of the kidney, and is otherwise similar to nephrectomy.

b. **Operative Procedure.** This procedure is usually indicated when one pole of the kidney has been destroyed by localized disease, such as an obstructive calculus. The rest of the kidney is healthy. This condition may be the result of a kidney being formed with two collecting systems. The capsule is pushed back, and a wedge of kidney tissue is resected, which includes the diseased or damaged cortex, pelvis, and vessels. The healthy kidney tissue is sutured with gut, the capsule is replaced and a pad of fat is sutured over the line of closure. A nephropexy will probably be done also to ensure good position and drainage.

3-16. PROCEDURES FOR OPENING THE KIDNEY

a. **Definitions.**

(1) Nephrotomy is an incision into the kidney. A simple incision and drainage may be required for hydronephrosis, cyst, or perinephritic abscess.

(2) Pyelotomy is an incision into the renal pelvis.

(3) Pyelostomy is an incision into the renal pelvis to establish drainage or to permit irrigation of the renal pelvis.

(4) Pyelolithotomy is the removal of a stone or stones through the opening made in the renal pelvis.

(5) Nephrostomy is an opening into the kidney to maintain temporary or permanent drainage. A nephrostomy is used to correct an obstruction of the urinary tract, conserve and permit physiological restoration of renal tissue that has been impaired by disease, provide permanent drainage when a ureter is unable to function, treat anuria as an emergency measure, or drain a kidney during the postoperative period following a plastic repair on the kidney or renal pelvis.

(6) Nephrolithotomy and pyelonephrolithotomy are essentially the same, since one is simply an extension of the incision. This is done in order to remove a large

stone intact or to explore a calyx where a small stone or fragment has slipped. The presence of a staghorn calculus is an indication for this procedure.

b. Operative Procedure.

(1) For opening. The kidney is approached as described for nephrectomy, using the desired incision. The renal pedicle is identified; the ureter is identified and retracted as necessary. The kidney is mobilized to permit approach to the aspect desired.

(2) For pyelotomy or pyelostomy. The pelvis of the kidney is incised with a small blade. Traction sutures of number 3-0 black silk on French eye or swaged-on needles may be placed at the edges of the incision to hold it open while the pelvis and calyces are explored. In pyelostomy, the catheter is placed through the incision directly into the renal pelvis.

(3) For nephrostomy. A curved clamp or stone forceps is passed through a pyelostomy incision into the renal pelvis and then out through the substance of the renal parenchyma via a lower pole minor calyx. The tip of a Malecot or Pezzer catheter is then drawn into the renal pelvis, and the pyelotomy incision is closed. The distal end of the tube is brought out through the flank incision. Penrose drains are placed, and the incision is closed in the regular manner.

(4) For pyelolithotomy. The renal pelvis is opened, and the ureter may be probed for stones or strictures by passing a ureteral catheter and irrigating. Stones are removed. A multieyed catheter-- Pezzer, Malecot, or Foley type--is placed. The catheter is secured with sutures. A purse-string suture may be placed around the nephrostomy tube. After removal of a staghorn calculus, mattress sutures are usually tied over a pad of renal fat to support the long parenchymal incision.

(5) For closure. An incision in the renal pelvis may be closed with fine chromic-gut swaged on needles or left unclosed. The wound is drained and closed, as for nephrectomy. Reinforced absorbent dressings or special wound decompression apparatus is required for draining wounds.

3-17. NEPHROURETERECTOMY

a. **General.** This operation involves the removal of a kidney and the entire ureter that drains it. It is indicated for the presence of hydronephrosis, a hydroureter too damaged to repair, or carcinoma of the renal pelvis or ureter. This procedure usually requires two separate incisions, one in the flank and one in abdomen. Two separate instrument sets are not required, but a second skin preparation setup and set of sterile drapes are required.

b. Operative Procedure.

(1) The patient is placed in a lateral position. The kidney and upper ureter are exposed, as described for nephrectomy, freed from their supporting structures, and brought out of the wound, taking as much ureter as possible. The ureter is not cut at this time. The wound is drained and closed in layers, leaving the kidney and ureter outside the wound, and lightly dressed.

(2) Care must be taken not to contaminate the kidney, exposed ureter, and incision as the patient is repositioned in a supine manner.

(3) The abdomen is prepped, sterile drapes are applied, and an abdominal incision is made to expose the lower ureter and bladder. These structures are freed. The ureter and a small cuff from the bladder are removed.

(4) At this time, the kidney and entire ureter are gently pulled free through the flank incision.

(5) A Penrose-type drain or catheter is placed in the bladder, and it is closed with chromic suture number 2-0. The abdomen is closed in layers and both wounds are dressed with gauze sponges and abdominal pads.

3-18. RECONSTRUCTIVE OPERATIONS ON THE KIDNEY

a. General.

(1) Pyeloplasty is a revision or reconstruction of the renal pelvis. It is done to create a better anatomical relationship between the pelvis of the kidney and the ureter and to relieve pain and obstruction to the flow of urine from the kidney. It may be necessary to ligate aberrant vessels, divide fibrous bands, resect stenotic areas, or reconstruct a redundant kidney pelvis to accomplish this and prevent or relieve hydronephrosis and hydroureter.

(2) Ureteroplasty is a reconstruction of the ureter, usually at the ureteropelvic junction.

(3) A Foley-Y pyelouretero-plasty may combine correction of a redundant kidney pelvis with resection of a stenotic area of the ureter.

b. Operative Procedure.

(1) The kidney and upper ureter are exposed, as for nephrectomy (refer to paragraph 3-14), using the desired approach.

(2) The kidney pelvis and ureter are incised, trimmed, and shaped to the desired contour, using fine forceps and scissors. A caliper and a ruler may be used for

establishing more precise relationships to improve urinary drainage. Anchoring sutures or soft rubber drains may be used for traction during handling and repair. The repair is completed using fine sutures and needles, as specified by the surgeon. The technique used is designed to provide a direct funnel-shaped enlarged outlet. The Foley Y-V plasty technique may be used for this purpose. It converts a Y-shaped incision into a V-shaped one by resecting the redundant tissue between the arm and the stem of the Y. Fine, interrupted stitches are placed to make the repair. Stenotic areas of the ureter are excised as necessary and the ureter anastomosed with fine, everting stitches (ureteroureterostomy).

(3) A nephrostomy tube may be placed through a stab wound in the renal parenchyma. A splinting latex catheter 8 or 10 Fr may be placed to extend along the nephrostomy drain through the kidney pelvis and into the ureter beyond the site of the plastic repair.

(4) The incision is closed in layers and the wound dressed.

3-19. KIDNEY TRANSPLANT

a. General.

(1) This procedure involves the removal of a donor kidney by means of a nephrectomy and ureterectomy with transplant of the donor's kidney in the recipient's iliac fossa. This is done in an effort to restore kidney function and thus maintain life in a patient who is succumbing to renal failure.

(2) The patient selected for kidney transplant is usually young, well advanced in irreversible uremia, free of other significant disease or infection, and free of obstruction in the lower urinary tract.

(3) A kidney replacement may be chosen from a living donor or from a cadaver that is without disease and of the same blood group as the recipient. The ideal living donor is an identical twin, although family members or other volunteers may be selected.

(4) It is important that the time lapse between donor nephrectomy and transplantation of the organ to the recipient be kept to a minimum. In living donors, hypothermia may be used to reduce the oxygen requirements of the kidney.

b. Preparation. Two adjacent operating rooms are prepared for the surgery, and the operations on donor and recipient proceed simultaneously. On a cadaver donor, the supine position is used, and a disposable drape with a large fenestration is used to provide adequate exposure for bilateral nephrectomies. For a living donor, either the lateral or supine position may be used. The recipient lies in the supine position.

c. Donor Operation.

(1) In living donors, angiography assists in selection of the preferred donor kidney.

(2) The donor nephrectomy is done much as the procedure already described in paragraph 3-14, but the surgeon will do a delicate dissection to prevent trauma to the renal vessels and ureter.

(3) The patient may be given intravenous mannitol before the kidney is excised, and the surgeon may inject 1percent lidocaine (Xylocaine®) about the renal pedicle before its dissection to prevent vasoconstriction. The scrubbed nursing team member should have sterile iced normal saline available to cool the kidney immediately after it is removed.

(4) If the donor kidney is cooled by intraarterial perfusion, cold (15°C), sterile, lactated Ringer's solution to which heparin and procaine have been added will be introduced into the vessels by means of small polyethylene catheters under strict aseptic conditions. The sterile basins and donor kidney should be covered with a sterile drape and taken to the recipient operation by the surgeon.

d. Recipient Operation.

(1) The incisional approach is carried out.

(2) The donor kidney is placed in the contralateral iliac fossa of the patient and rotated 180 degrees so that the posterior surface is anterior in the patient. Placing the organ extraperitoneally may prevent peritonitis if an infection develops.

(3) The renal artery is anastomosed to a branch of the hypogastric artery and the renal vein to the external iliac vein.

(4) The ureter, depending on its length, may be implanted into the bladder directly by a tunneling technique, or it may be anastomosed to the recipient ureter. A cystostomy tube may be inserted into the bladder.

NOTE: Bilateral nephrectomies and splenectomy may be performed on the recipient at the time of transplant or at another time, depending on the patient's general condition and the surgeon's program of management. This is done to prevent hypertension or urinary tract infection.

3-20. RECONSTRUCTIVE OPERATIONS ON THE URETER

a. **General.** Reconstructive operations may be indicated because of a pathological condition of the urinary bladder or lower ureter that interferes with normal drainage. Conditions requiring urinary diversion or reconstruction of the urinary tract

include malignancy, cystitis, stricture, trauma, or congenital malformations such as ureteral reflux. Pelvic malignancy or an anomaly requiring removal of the bladder necessitates urinary diversion.

b. Definitions and Purposes.

(1) Ureterostomy (ureterotomy). The opening of the ureter for continued drainage from it into another part.

(2) Cutaneou-ureterostomy (anastomosis or transplant). The diversion of the flow of urine from the kidney via the ureter away from the bladder onto the skin, usually on the abdomen.

(3) Ureterectomy. The complete removal of the ureter. This procedure includes nephrectomy, as well as the excision of a cuff of the bladder.

(4) Uretero-lithotomy. An incision into the ureter and removal of a stone.

(5) Ureterou-reterostomy. The division of the ureter and reconstruction in continuity with another ureteral segment (see figure 3-7).

(6) Ureteroileostomy (ileal conduit) or ureterosigmoidostomy (anastomosis). The diversion of the ureter into a segment of the ileum or into the sigmoid colon.

(7) Ureteroneocystostomy (ureterovesical anastomosis). The division of the ureter from the urinary bladder and reimplantation of the ureter into the bladder at another site.

c. Patient Preparation. The site of incision and position of the patient will depend on the indications for surgery and the nature of the proposed reconstruction or anastomosis. The patient may be placed in a supine position for an abdominal approach or in a modified Trendelenburg position for a low abdominal or pelvic incision. The patient may also be placed in a lateral position for high ureteral stones.

d. Operative Procedure for Ureteral Anastomosis.

(1) The ureter is exposed through the desired incision. A ureteral catheter, passed retrograde, may be used to facilitate identification and isolation of the ureter. The ureter is identified and dissected free, using long forceps and scissors.

(2) The ureter is picked up with fine traction sutures, freed from the surrounding tissues, and severed at the desired level.

(3) The distal end of the ureter is ligated, and the proximal stoma is transferred to the site of anastomosis. The anastomosis is accomplished with fine dissection instruments and fine swaged-on sutures.

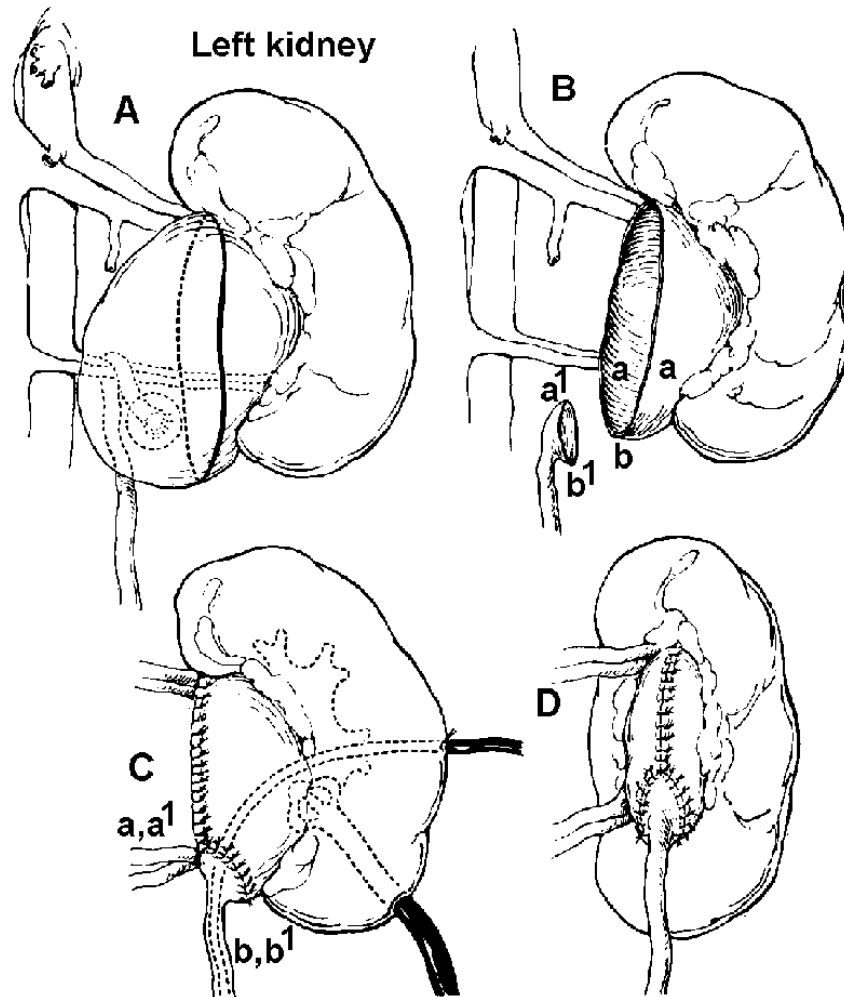


Figure 3-7. Technique of reimplantation of ureter at kidney pelvis. Correction of ureteral obstruction by aberrant vessels that cannot be divided without producing muscular renal damage.

A-Outline of proposed pelvic (ureteral) cuff and extent of redundant pelvic wall resection.

B-Ureter, with its funneled end, is brought approximated to dependent part of resected pelvic wall (a' to aa and b' to b).

C and **D**-Anastomosis completed. Nephrostomy drainage and ureteral splint may be inserted.

(4) A soft splinting catheter is usually left in place until healing has taken place and free drainage is assured.

(5) The wound is closed in layers and dressed in the routine manner.

e. Operative Procedure for Ureterolithotomy.

(1) The patient usually has a kidney, ureter, and bladder X-ray examination immediately before surgery to determine the exact location of the stone. The surgeon may also schedule a cystoscopic examination preoperatively and may attempt to manipulate the stone through the ureter.

(2) The position of the stone determines the surgical approach. A stone high in the ureter will require a flank incision, whereas one closer to the bladder will require an abdominal incision. Both of these have been described previously. The incision into the ureter is made with a small surgical blade above the stone. The Randall stone forceps will be used to locate and remove the stone. The ureter may be closed with fine chromic gut sutures number 4-0, or it may be left open and the site drained well. Either approach requires minimal routine closure.

(3) Ureterocutaneous transplant, ureterosigmoid anastomosis, and ileal segment are all urinary diversion procedures performed when the bladder no longer serves as a proper urine reservoir. The cause may be a congenital disorder (as in the neurogenic bladder), exstrophy, trauma, or tumor.

f. Operative Procedure for Ureterocutaneous Transplant (Anastomosis).

The surgical approach is the same as for a low ureterolithotomy, and the ureter is severed from the bladder. The severed ureter is passed through a stab wound in the flank and sewn to the skin with an everting suture-of number 4-0 chromic gut on an Atraumatic needle to form a stoma. The structures are handled with plastic instruments, fixation forceps, and iris scissors. A small catheter is passed into the ureter and irrigated for patency. The patient must have a urine collecting bag postoperatively.

g. Operative Procedure for Ureterosigmoid Anastomosis.

(1) The abdomen and peritoneal cavity are entered in the routine manner through a left rectus incision. A portion of the large bowel is protected with pads. Deep retractors are placed, and with long forceps and scissors the posterior peritoneum is incised.

(2) The ureters are severed close to the bladder. The ureter is brought through the posterior peritoneal incision to the sigmoid. Traction sutures and smooth tissue forceps are used to retain and handle the severed ureters.

(3) The sigmoid colon is immobilized to prevent traction and tension on the ureter by securing the former to the pelvic peritoneum at a point where the ureter falls

easily on the bowel, and a silk number 3-0 traction stitch is taken. Using a scalpel with blade number 15, an incision is made through the taenia of the sigmoid muscle layer separating it from the mucosal layer. A tunnel is created by blunt dissection.

(4) The ureter is laid on top of the mucosa, and a small-slit is made in the mucosa, using a scalpel with a number 11 blade.

(5) With fixation forceps and iris scissors, the ureter is slit to match the bowel incision. The ureter is anchored to the bowel with number 4-0 chromic ureteral sutures on Atraumatic needles. The other ureter is anastomosed in the same manner in a position slightly above the first.

(6) The posterior peritoneum is closed with fine silk sutures. Drainage is established. The abdominal wound is closed in layers.

h. Operative Procedure for Ileal Conduit.

(1) A urethral catheter is inserted to decompress the bladder, and a rectal tube is placed in the rectum. Before the incision is made, the stoma site is marked on the skin. Through a midline abdominal incision, the peritoneum is incised and the abdomen is entered in the routine manner; abdominal retractors are placed.

(2) The ureters are mobilized and brought through the retroperitoneum.

(3) The distal ileum and mesentery are inspected to identify the blood supply. A Penrose drain is passed through the mesentery midway between the two main arterial arcades adjacent to the ileum at the proximal and distal ends of the selected segment. This segment usually comprises 6 to 10 inches of the terminal ileum, a few inches from the ileocecal valve.

(4) The vessels of the mesentery are ligated. Care is exercised to preserve the ileocecal artery and adequate circulation to the isolated ileal segment. The peritoneum is incised over the proposed line of division of the mesentery. Allen or other intestinal clamps are placed across the ileum, and the bowel is divided flush with the clamps. Using gastrointestinal technique, the proximal end of the conduit is closed with a chromic layer of sutures followed by a second layer of interrupted silk sutures. The remaining ileum is reanastomosed end-to-end.

(5) The mesentery is closed with interrupted silk sutures.

(6) The closed proximal end of the conduit segment is fixed to the posterior peritoneum. The ureters are implanted in the ileal segment using plastic technique, with fine instruments and ureteral sutures of chromic number 4-0 catgut on Atraumatic needles. The peritoneum and muscle of the abdominal wall lateral to the original incision are separated by blunt dissection. The distal opening of the ileal conduit is

drawn through and sewn to the skin with fine chromic or silk sutures. The wound is drained, closed, and dressed. An ileostomy bag is placed over the stoma.

NOTE: The surgeon may do a cystectomy either before or after this procedure. In some cases, he may choose to leave the bladder rather than subject a debilitated patient to further surgery.

3-21. ADRENALECTOMY

a. **General.** This operation involves the partial or total excision of one or both adrenal glands. This procedure may be done to treat hyperfunction of the adrenals, remove tumors of the glands themselves, or treat tumors elsewhere in the body that are affected by adrenal hormonal secretions, such as carcinoma of the prostate or breast.

b. **Patient Preparation.** For unilateral adrenalectomy, the patient may be placed in the lateral kidney or supine position. More often, however, both glands are explored, and the supine position is selected.

c. Operative Procedure--Lateral Approach.

(1) An incision curving from the midline and extending from the rib cage to the iliac crest is made with the scalpel through the skin, fat, and muscle. The lumbodorsal fascia is cut to reveal the sacrospinal muscle. This muscle is detached from the ribs, using forceps and dissecting scissors.

(2) The rib is resected.

(3) An opening is made through the transverse fascia with scissors. The pleura and diaphragm are protected with wet pads, and Gerota's capsule is incised to expose the kidney and adrenal gland.

(4) The gland is dissected free, using scissors and Babcock forceps. The blood supply of the gland is identified, clamped or clipped, and divided. Bleeding vessels are ligated. To release the glands, the left adrenal vein, a branch of the left renal vein, is separated by clamping and cutting. The right adrenal vein, a tributary of the vena cava, is also divided. Fine vascular sutures may be required to repair inadvertent injury to the vena cava.

(5) When hemostasis has been assured, the wound is closed in layers--muscle, fascia, subcutaneous tissue, and skin.

d. Operative Procedure--Abdominal Approach.

(1) The abdominal wall is incised, and the peritoneal cavity is opened and explored. Bleeding vessels are clamped and ligated.

- (2) The abdominal wound is retracted, and the surrounding organs protected with laparotomy pads, using instruments and sutures as for routine laparotomy.
- (3) The retroperitoneal area near the diaphragm is opened on the left side, exposing the renal fascia.
- (4) The renal fascia is opened to reveal the left kidney and adrenal gland.
- (5) The adrenal gland is freed from the kidney by sharp and blunt dissection, clamping and ligating all bleeding vessels with silk sutures number 3-0 or vascular clips.
- (6) After all bleeding is controlled, the kidney is gently replaced in the renal fascia, and closed with interrupted chromic sutures number 0.
- (7) The peritoneum is closed over the left kidney and renal fascia.
- (8) The abdominal retractors are rearranged to give access to the peritoneum over the right kidney and adrenal gland. Care must be taken here to avoid trauma to the liver.
- (9) The right retroperitoneal space is opened to reveal the renal fascia.
- (10) The renal fascia is opened, exposing the right kidney and adrenal gland.
- (11) The adrenal gland is freed in the same manner as the left one and excised.
- (12) The right kidney is replaced in the renal fascia, which is sutured closed.
- (13) The right retroperitoneal area is closed with chromic sutures #0.
- (14) The abdomen is inspected for bleeding vessels, which are ligated.
- (15) The wound is closed in the routine laparotomy fashion.

Section IV. OPERATIONS ON THE BLADDER AND PROSTATE

3-22. OPEN OPERATIONS ON THE BLADDER

a. **General.** The urinary bladder may be opened to remedy acute retention; relieve obstruction and distention; control hemorrhage; remove stones, tumors, or foreign bodies; or repair congenital or traumatic defects. Other radical procedures are performed to treat cancer. Total cystectomy requires permanent urinary diversion.

b. Definitions.

- (1) Cystotomy. A procedure in which the bladder is cut open.
- (2) Cystolithotomy. A procedure in which the bladder is opened to remove stones.
- (3) Cystostomy. A procedure in which an opening is made into the bladder for continuous drainage.
- (4) Cystectomy (total). A procedure in which the bladder and adjacent structures are excised.

c. Patient Preparation.

- (1) To facilitate identification and dissection, the bladder is usually drained of urine and filled with a sterile irrigating or antiseptic solution as a part of the preoperative preparation. Equipment and instruments for catheterization and irrigation should be prepared, in addition to the surgical setup. Irrigating solutions should be sterile, isotonic, and at body temperature.
- (2) The patient lies in the supine position for most open operations of the bladder. The Trendelenburg position may be desired, since it tilts the pelvis high and offers good visualization of the pelvic organs, including the bladder. The patient may be draped with a nonabsorbent disposable skin drape and a fenestrated laparotomy sheet.

d. Sterile System for Bladder Irrigation.

- (1) Each hospital has its own system for bladder irrigation. Suitable solutions should be specified by the surgeon.
- (2) The system may consist of prepackaged irrigating solutions and sterile sets of connecting tubing, or it may be a flask, rubber tubing, and connector set such as the Valentine irrigator, which is prepared and sterilized by the operating room personnel as part of the instrument setup. With the Cotter system, the irrigating fluids are usually mixed and poured by the operating room personnel. Sterile pitchers or other containers for mixing and pouring will then be needed.

e. Operative Procedure (Suprapubic Cystotomy and Cystostomy).

- (1) The bladder is distended preoperatively with the prescribed irrigating solution instilled via catheter. A vertical or transverse suprapubic incision is made through the skin and subcutaneous layers to the muscle using a scalpel, thumb forceps, and scissors. Bleeding vessels are controlled with hemostats and ligated. Wound

towels and retractors are placed. The rectus muscle is incised or split by blunt dissection and retracted. The prevesical fat and peritoneum are retracted upward with Deaver retractors.

(2) The top of the bladder is dissected free, using thumb forceps and Metzenbaum scissors. The wall of the bladder is grasped on either side of the midline with Allis forceps. Two traction sutures of number 0 chromic gut may be placed through the bladder wall and held with straight Halsted hemostats. The muscle of the bladder is spread by blunt dissection with the tip of a clamp or scissors until the mucosa is seen. Two Allis clamps are placed, and the bladder is incised with a sharp blade. At this point the distended bladder may be emptied via the urethral catheter, which is unclamped under the drapes by the circulating member of the team, or a suction tube may be introduced through the stab wound to remove the fluid as the bladder mucosa is incised.

(3) The bladder opening is extended with scissors. Bladder retractors are placed, and the bladder is explored for diverticula, calculi, or tumor. Removal of the pathological area or other corrective procedure is carried out and wound closure begun. A Malecot catheter may be used to drain the bladder suprapubically and a Foley retention catheter to drain through the urethra. The prevesical space may be drained with Penrose tubing.

(4) The bladder is sutured in two layers. A continuous suture of catgut is used on the mucosa and interrupted stitches of chromic catgut on the muscle layer. The abdominal muscle fascia and subcutaneous tissue are closed with catgut. Tension sutures of nylon or silver wire may be needed for some patients. A suture is placed around the cystostomy tube and affixed to the skin. The skin may be closed with silk or stainless steel wire.

(5) The wound is dressed with bulky dressings. The wound and cystostomy tube are held in place by adhesive tape strips.

3-23. TROCAR CYSTOSTOMY

a. **General.** This operation consists of opening the bladder, drainage by blind puncture using needles or trocar, and insertion of a catheter.

b. **Operative Procedure.** The skin at the site of the puncture is nicked with the scalpel, and the trocar is inserted into the bladder (see figure 3-8). The trocar obturator is withdrawn, and a catheter is passed into the bladder over the catheter guide. The cannula is withdrawn, and the catheter is sutured to the wound edges. The wound is dressed.

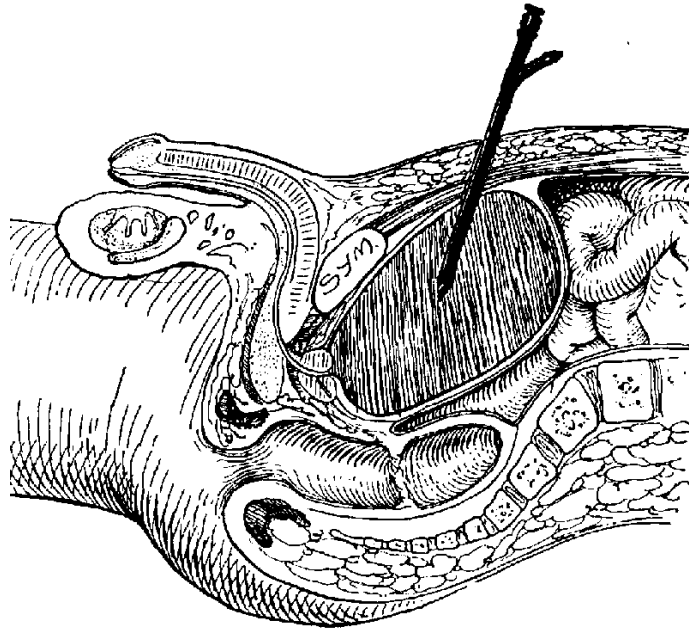


Figure 3-8. Trocar cystostomy.

3-24. PARTIAL CYSTECTOMY

a. **General.** This procedure involves the resection of a portion of the bladder having a lesion.

b. **Operative Procedure.**

(1) The bladder and lesion are exposed via suprapubic abdominal, perineal, or vaginal approach. Usually the bladder is opened suprapubically, as described in paragraph 3-22e.

(2) The ureteral orifices are identified and ureteral catheters passed.

(3) The diseased portion of the bladder is excised, using clamps and ligatures of the type required for the organs and tissues involved. Vessels are tied with number 2-0 plain gut.

(a) For vesicointestinal fistula, bowel resection with colostomy or ileostomy may be indicated. For vesicovaginal fistula, a vaginal plastic repair is done.

(b) For diverticulum, excision of the defect is done intravesically or extravesically.

(4) The incision in the bladder is sutured in two layers, as described in paragraph 3-22e(4).

(5) The bladder is drained suprapubically, as well as by an indwelling urethral catheter. Penrose drains may also be placed in the wounds.

3-25. CYSTECTOMY

a. **General.** This operation involves the total or radical excision of the urinary bladder. The extent and nature of the excision depends on the extent and nature of the pathological area. Total excision is usually carried out if the malignancy has not infiltrated the entire bladder or shown evidence of extension or distant metastasis and if the patient is in condition to withstand the procedure with hope of an appreciable period of relief. More conservative measures may be taken when the tumor is hopelessly advanced or when the pathological area is limited. If a radical procedure is to be done, combined abdominal and perineal approaches may be made.

b. Operative Procedure (Suprapubic Approach).

(1) The bladder is approached as for cystostomy.

(2) Deep retractors and laparotomy pads are used to retract the peritoneum. Long tissue forceps, stick sponges, and long scissors are used for dissection. Long hemostats or right-angled clamps are placed across the major vessels and ureters. Suture ligatures number 2-0 chromic gut are placed and the structures divided. Large pedicle or intestinal clamps are placed across the urachus and its vessels anterior to the bladder. The structures are ligated and divided by sharp dissection.

(3) In the male, the bladder is lifted up, using long Allis forceps. The peritoneum is dissected free from the bladder. The bladder is retracted to expose the vesicle neck. The bladder is dissected from the prostate and the vas deferens ligated. A large pedicle or intestinal clamp is placed across the urethra which is ligated with number 2-0 chromic sutures. The urethra is divided and the specimen removed.

(4) The seminal vesicles are removed with the bladder. Ureteral transplant is performed if not done previously.

(5) Penrose drains are placed in the suprapubic wound, which is closed in layers with #0 chromic interrupted sutures. Silver wire or nylon tension sutures may be placed. The skin is sutured with silk number 3-0 or steel wire gauge 35. The abdominal and perineal wounds are dressed.

NOTE: In the female, cystectomy will depend on the extent and nature of the pathological lesion. A vaginal approach may be used and then, via the abdominal approach, lymphadenectomy and pelvic exenteration completed.

3-26. BLADDER NECK OPERATION (Y-V-PLASTY)

a. **General.** This operation involves the plastic repair of the bladder neck. It is done to overcome contracture of the bladder neck due to primary or secondary stricture.

b. **Operative Procedure.**

(1) The bladder is approached as for cystostomy. The prevesical fat is removed, using long forceps and dissecting scissors. The vessels over the bladder neck are occluded with right-angled clamp, ligated with number 2-0 plain gut, and divided. The self-retaining bladder retractor is placed.

(2) Traction sutures of fine silk on small, fine, cutting-edge needles (cleft palate-type) are placed at the base and on either side of the urethra to start the pattern for the plastic dissection.

(3) With the aid of the traction sutures and an Allis forceps, the Y is incised through all layers as evenly as possible, using sharp-pointed scissors. Bleeding vessels in the wall of the bladder and bladder neck are ligated with plain number 2-0 gut on small Ferguson needles. The V flap is folded free, and the length of the Y arm is determined with a caliper and ruler.

(4) The apex of the V is brought to the neck of the bladder to overcome the stricture and broaden the outlet. A catheter is placed in the urethra to guide the needle and prevent the suture from penetrating the urethral mucosa. A stitch of chromic number 2-0 suture is taken through the apex of the V under the urethra to the base of the Y and tied. The closure of the plastic repair is completed with mattress suture of number 2-0 chromic on Atraumatic needles.

(5) A cystostomy tube is placed in the bladder, and the bladder and abdominal wall are closed in the usual manner for cystostomy.

3-27. VISICAL-URETHRAL SUSPENSION (MARSHALL-MARCHETTI OPERATION)

a. **General.** This operation involves the suspension of the bladder neck to the posterior surface of the pubis in the female patient for treatment of stress incontinence.

b. **Patient Preparation.** The patient is usually placed in a supine position with Trendelenburg modification, but the surgeon may prefer a frogleg modification and vaginal preparation with the insertion of a Foley catheter.

c. **Operative Procedure.**

(1) A suprapubic incision is made to expose the prevesical space of Retzius. The bladder and urethra are separated from the posterior surface of the rectus muscles and pubis by gentle, blunt dissection.

(2) Heavy chromic sutures are placed on each side of the urethra and sewn to the periosteum and cartilage on the posterior side of the pubis.

(3) The outside of the bladder wall is then sutured with chromic gut suture to the rectus muscle to further suspend the urethra and bladder.

(4) The area is drained, and the wound is closed in layers.

3-28. SUPRAPUBIC PROSTATECTOMY WITH CYSTOSTOMY

a. **General.** This procedure involves enucleation of the prostatic adenomas or hypertrophied masses via a suprapubic approach. It is required because as the male ages, the prostate gland enlarges and gradually obstructs the urethra, giving rise to symptoms of urinary obstruction. The enlargement may be benign or malignant. In benign hypertrophy, only the periurethral portion of the gland is removed. When malignancy is involved, however, total or radical prostatectomy is done. This may involve excision of the entire gland and its capsule, together with associated structures, a portion of the trigone of the bladder, and the seminal vesicles.

b. **Patient Preparation.** The patient is placed in the supine or modified Trendelenburg position, with the legs apart and the weight of the torso supported by shoulder braces. An O'Connor drape may be fanfolded at the pubis, with the penis exposed through the fenestration and the finger cot in the rectum. A towel folded lengthwise is placed over the fanfolded drape at the pubic level, and a fenestrated disposable drape is used at the site of the suprapubic incision.

c. Operative Procedure.

(1) The bladder is distended via catheter irrigation, as for cystostomy. Vasectomy is frequently done as a preliminary procedure to prevent postoperative epididymitis.

(2) The bladder is approached through the routine cystostomy incision, and the top of the bladder is dissected free, using long thumb forceps and Metzenbaum scissors.

(3) The wall of the bladder is grasped on each side of the midline with Allis forceps. Two traction sutures of chromic gut number 0 on Ferguson number 12 needles may be placed through the wall of the bladder at this point and retained on straight hemostats.

(4) The muscle layers of the bladder are spread by blunt dissection with a hemostat until the mucosa is exposed. Allis forceps are placed on either side, and the bladder is incised, using a scalpel with a number 10 blade. The opening is extended with scissors. Bladder retractors--either long-bladed loops or self-retaining type--are placed, and the bladder is explored.

(5) The surgeon places the forefinger of one hand into the rectum via the finger cot in the O'Connor drape and pushes the prostate gland forward. With the forefinger of the operating hand, the lobes of the gland are enucleated from the capsule (see figure 3-9). Bleeding is controlled with hemostats and ligatures, sutures, or electrocoagulation. Long forceps, half-length sutures, and long needle holders are required for placing sutures.

(6) Following removal of the prostate and control of bleeding, a hemostatic catheter with an inflatable bag--Foley 24 Fr with a 30-ml bag may be placed in the fossa; the balloon is adjusted under direct vision and inflated, using sterile water in a 30-ml syringe with an adapter. A hemostatic cone of Gelfoam may be used if preferred.

(7) The bladder is closed as for suprapubic cystostomy with a Malecot catheter in place. One or two wide Penrose drains may be placed in the prevesical space of Retzius. The wound is closed in layers and dressed.

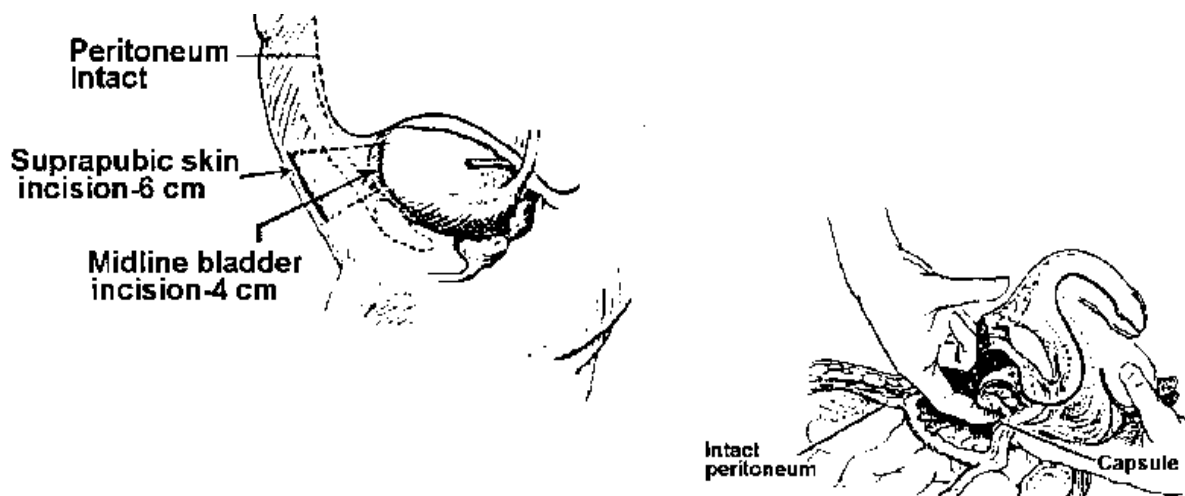


Figure 3-9. Enucleation of prostate by suprapubic approach.

3-29. RETROPUBIC PROSTATECTOMY.

a. **General.** This operation involves enucleation of the prostatic hypertrophied lobes directly through a capsular incision in the upper surface of the prostate rather than through the bladder.

b. **Operative Procedure.** See Figure 3-9.

(1) Through a vertical or transverse suprapubic incision, the abdominal wall is opened to expose the space of Retzius. The bladder is not directly opened. The precystic fat is extracted using long, smooth tissue forceps. Large vessels are ligated, using 18-inch transfixion sutures of chromic gut number 0 threaded on small Mayo needles.

(2) The prostatic capsule is incised transversely, using number 7 scalpel with a number 10 blade. The prostate is freed and enucleated, employing scissors and Allis forceps. Deep bleeding vessels are clamped with long hemostats and ligated with long plain gut number 2-0 or number 3-0 sutures with medium curved taper point Atraumatic needles.

(3) A wedge excision of the posterior bladder neck is made, using long Allis forceps, a long scalpel, and scissors. A wedge of tissue may be sutured over the defect in the bladder neck after removal of the prostate. In radical prostatectomy, a V-shaped portion of the bladder mucosa may be sutured over the defect in the bladder neck.

(4) A multieyed Robinson or Foley retention catheter is placed via the urethra. A Malecot cystostomy tube may be placed in the bladder if the surgeon desires.

(5) The incision in the prostatic capsule is closed with a continuous suture of chromic gut number 0. Penrose drains are placed in the retropubic space, the abdominal incision is closed in layers, and the wound is dressed.

3-30. PERINEAL PROSTATECTOMY

a. **General.** Either enucleation of adenomas or radical prostatectomy may be carried out through a perineal exposure.

b. **Patient Preparation.** The patient is placed on the operating table in an extreme lithotomy position. The buttocks are elevated on pads sufficient to tilt the pelvis and flatten the perineum on the vertical plane. The thighs are fully flexed with the knees to the chest and the feet are supported in stirrups. The arms are extended on armboards and shoulder braces applied with the usual precautions. Measures must be taken to reduce strain on the muscles and nerves of the back and legs and also prevent respiratory embarrassment from compression of the abdomen and chest. Draping is with an O'Connor drape and perineal sheet.

c. **Operative Procedure.**

(1) Through a curved incision made just above the anal margin, the skin, fat, and subcutaneous fascia are divided. Straight hemostats are used for bleeding vessels in the superficial tissues and curved hemostats for deeper tissues. The tissue on either side of the central tendon is dissected, using Metzenbaun scissors and forceps. McBurney retractors followed by Young bifurcated prostatectomy retractors are placed as dissection progresses. The levator ani muscles are exposed and retracted.

(2) The gland is exposed and enucleated. The surgeon manipulates the gland with a finger in the rectum via the O'Connor drape finger cot or with the hand protected by a second glove.

(3) Bleeding is controlled with sutures and electrocautery. A multieyed Robinson or Foley retention catheter is inserted into the urethra. In radical prostatectomy, the bladder neck is approximated to the urethra to cover the defect of the excision.

(4) A Penrose drain is placed in the wound. The wound is closed in layers with chromic number 0 gut sutures swaged on medium Ferguson number 14 needles. The skin edges are approximated with interrupted sutures on straight needles.

Section V. OPERATIONS ON THE SCROTUM, PENIS, AND URETHRA

3-31. HYDROCELECTOMY

a. **General.** This operation (see figure 3-10) involves the excision of the tunica vaginalis of the testis in order to remove a hydrocele. This is abnormal accumulation of fluid within the scrotum around the capsule of the testis and within the tunica vaginalism. Excessive secretion or accumulation may be due to infection or trauma.

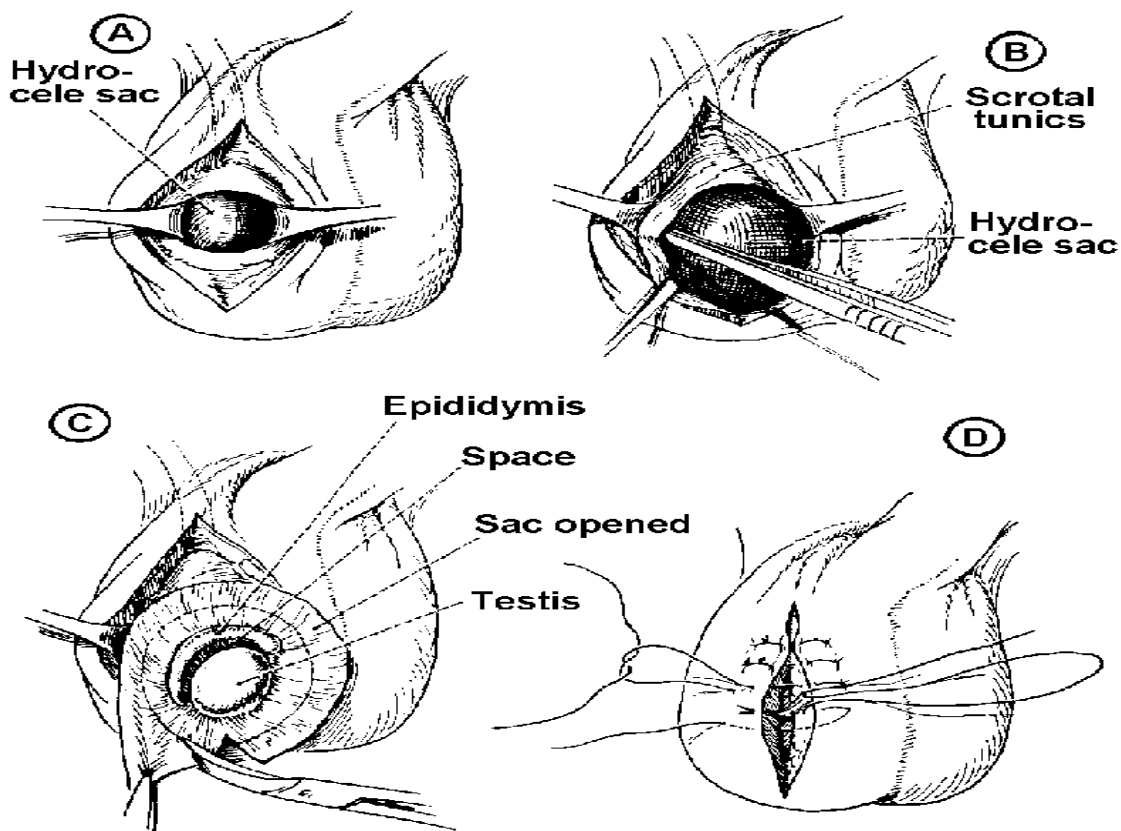


Figure 3-10. Hydrocelectomy.

A-Incision through anterior scrotum, exposing hydrocele sac. Characteristic dark blue shiny appearance of tunica vaginalis (which is sac wall) is due to deep shadow within sac.

B-Hydrocele sac enucleated and removed from scrotum. It is left attached to groin by spermatic cord.

MD0928 **C**-Sac opened and excised from testis.

D-Skin edges and subcuticular tissues approximated with single mattress sutures of no. 3-0 plain catgut.

b. **Patient Preparation.** The patient is placed in supine position and draped with fenestrated sheet.

c. **Operative Procedure.**

(1) An anterolateral incision is made in the skin of the scrotum over the hydrocele mass, using a scalpel with a number 2-0 blade. Bleeding is controlled with Crile hemostats and vessels ligated with number 2-0 plain gut ligatures.

(2) Small retractors may be placed (see figure 3-10 **A**), and then the fascial layers are incised to expose the testis and tunica vaginalis. With fine scissors and forceps, the sac is delivered and dissected free (see figures 3-10 **B** and **C**). The hydrocele may be aspirated. The adherent tunica vaginalis is separated from the internal fascia layers and the sac opened. When the tunica vaginalis has been trimmed as desired, the testis is returned to the scrotal sac.

(3) A Penrose drain is placed, and the wound is closed (see figure 3-10 **D**) in layers with Atraumatic sutures plain gut number 2-0 on curved cutting needles. The wound is dressed, and a supportive sling dressing or suspensory is usually applied.

3-32. VASECTOMY

a. **General.** This operation involves the excision of a section of the vas deferens. This is done electively as a permanent method of sterilization or birth control and also prior to prostatectomy to prevent spread of infection from the urethra to the epididymis.

b. **Patient Preparation.** The patient usually lies in the dorsal supine position, although the operation can be done in the lithotomy position prior to transurethral surgery. The procedure may be done with either local or general anesthesia.

c. **Operative Procedure.**

(1) The vas is located by palpation in the upper part of the scrotum. A small incision is made in the skin over the vas (see figure 3-11 **A**).

(2) An Allis forceps is inserted to grasp the vas and bring it to the surface of the wound (see figure 3-11 **B**). The vas is denuded of surrounding tissues of the cord, and straight clamps are placed on either side of the Allis to crush the vas.

(3) The vas is cut between the clamps and a section removed (see figure 3-11 **C**). The cut ends are doubled back and ligated with silk-or cotton number 3-0.

(4) The clamps are removed, and the skin incision is closed with plain gut #3-0 on a needle. A collodion dressing and scrotal suspensory may be applied.

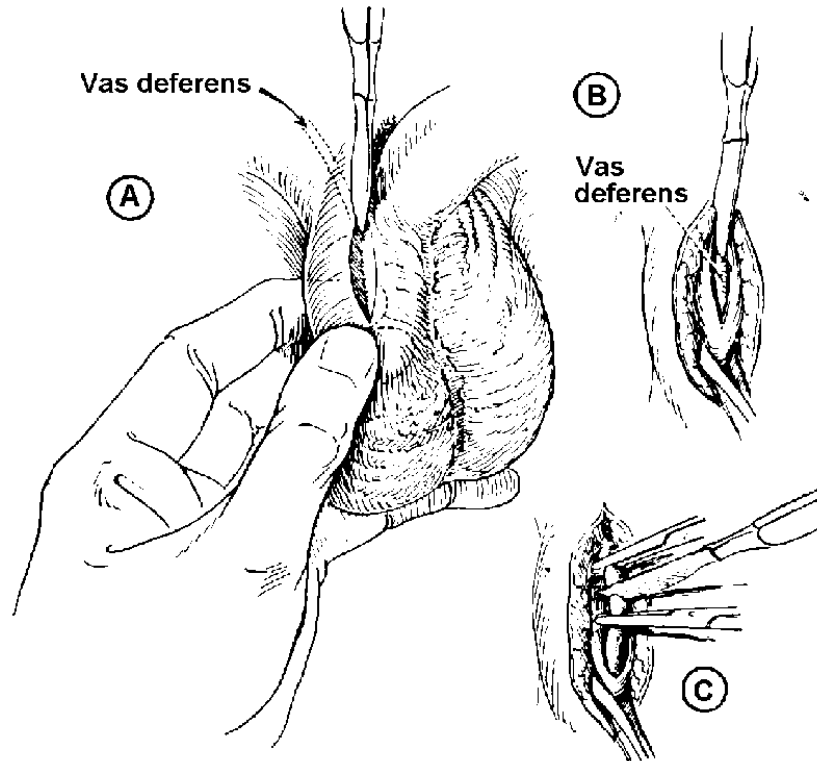


Figure 3-11. . Vasectomy (vas ligation)

A-Vas grasped between thumb in front and first and second fingers behind. Incision 2 cm long is made over vas.

B-Vas grasped with Allis clamp and incision deepened into it.

C-Vas clamped with two hemostats and incised between them.

3-33. EPIDIDYMECTOMY

a. **General.** This is the excision of the epididymis from the testis. It is rarely done but may be indicated in the treatment of persistent infection.

b. **Operative Procedure.** Incision is made over the testis in the scrotum to expose the tunica vaginalis. This is incised to expose the testis and overlying epididymis. An incision is made between the upper pole of the epididymis, which is then carefully freed from the testis. Bleeding is controlled and the wound closed with fine sutures and small drain.

3-34. SPERMATOCELECTOMY

a. **General.** This operation involves the removal of a spermatocele, which usually appears as a lobulated cystic mass within the scrotum attached to the upper

pole of the epididymis. This condition is usually caused by an obstruction of the tubular system that conveys the sperm. An epididymovasostomy may be attempted after excision of the mass to maintain the system.

b. Operative Procedure.

(1) The mass is approached through a scrotal incision as for hydrocelectomy or varicocelectomy.

(2) The structures of the testis and spermatic cord are identified, and the cyst is dissected free. Bleeding is controlled with clamps and ligatures in routine fashion.

(3) The wound is closed and dressed as for hydrocelectomy refer to paragraph 3-31c(3).

3-35. VARICOCELECTOMY

a. **General.** This procedure involves ligation and partial excision of dilated veins in the scrotum. It is done to reduce congestion of the testes and to improve spermatogenic function. The condition occurs more frequently on the left, since the vein of the left testis is connected to the renal vein and is under greater pressure. The veins of the pampiniform plexus of the spermatic cord become tortuous and engorged, causing a bag of redundant veins.

b. Operative Procedure.

(1) The incision may be made low in the inguinal canal or in the upper portion of the scrotum. The structures of the spermatic cord are identified and the vessels dissected free from the vas deferens.

(2) The abnormal vessels in the inguinal canal are clamped and ligated. The redundant portions are excised. The remaining structures are sutured to the external oblique fascia above the external inguinal ring to support the testicle.

(3) A Penrose drain may be placed. The incision is closed in layers.

3-36. ORCHIECTOMY

a. **General.** This operation involves the removal of the testis or testes. Removal of both testes is castration and renders the patient both sterile and deficient in male hormones. Because of the social implications, this operation, like vasectomy, requires particular attention to legal permission. Bilateral orchiectomy is usually performed to control carcinoma of the prostate. A unilateral orchiectomy may be

indicated because of cancer, trauma, or infection of the testis. In benign conditions, a prosthesis may be implanted for cosmetic or psychological reasons. Prostheses are usually made of silicone rubber.

b. Operative Procedure.

(1) The upper anterior surface of the scrotum is incised over the testicle. The incision is carried through the skin and fascial layers to expose the tunica vaginalis. Retractors are placed and bleeding vessels clamped and tied.

(2) The tunica vaginalis is grasped and mobilized. The spermatic cord is dissected free up to the external abdominal ring, clamped, and ligated. The testis is removed. Bleeding is controlled. A small Penrose drain may be placed in the wound. Fine sutures of plain gut number 3-0 or nylon number 4-0 are used to close the wound.

3-37. ORCHIOPEXY

a. **General.** This operation involves the suspension of the testis within the scrotum. An undescended (cryptorchid) testis is one that has failed to move properly into the normal intrascrotal position. A retractile testis is one that has descended through the inguinal canal but lies either within or superficial to the external ring. An ectopic testis is one that has descended through the canal and rests in an abnormal position (the perineal femoral area or lateral to the canal). When this operation is done on young boys, the primary goal is to obtain adequate length of the spermatic vessels and the vas to allow the testis to lie in the scrotum.

b. Operative Procedure (Transverse Inguinal Approach).

(1) An incision is made at the internal inguinal ring, the inguinal canal is opened, and the testis and cord freed. Another incision is made at the external inguinal ring and the testis is brought through the incision and into the scrotum to the proper side.

(2) The reconstruction of the muscle closure of both the internal ring and the external oblique is accomplished, using fine interrupted silk or chromic sutures.

(3) The subcutaneous tissue and skin are closed with fine sutures, as desired.

3-38. HYPOSPADIAS REPAIR

a. **General.** This surgery involves penile straightening and urethral reconstruction. Because the deformities are usually multiple, correction is usually accomplished in several stages, allowing several months to elapse between operations. The various techniques employed are for the purpose of providing a straight penis and establishing an effective urethral orifice.

b. Definitions.

(1) Hypospadias. A deformity of the penis and malformation of the urethral wall in which the urinary meatus is located on the underside of the penis, either short of its normal position at the tip of the glans or on the perineum or scrotum. This condition is often associated with chordee.

(2) Chordee. A downward bowing of the penis due to the congenital malformation of hypospadias with fibrous bands.

(3) Epispadias. A condition in which the urethral meatus is situated in an abnormal position on the upper side of the penis.

c. Operative Procedures.

(1) Chordee repair (Fraser or Nesbit technique).

(a) A transverse incision is made across the penis. Restricted fibrous tissue is dissected off the undersurface of the penis. Fine plastic scissors, a scalpel with blade number 10, and fine plastic tissue forceps are needed.

(b) With the penis held forward and the prepuce retracted, the skin is incised, and a dorsal quadrilateral flap is freed from the body of the penis.

(c) On each side, a narrow penile band of skin is divided.

(d) A transverse buttonhole is made to accommodate the head of the penis, which is threaded through it.

(e) The proximal edge of the buttonhole is sutured to the mucosa behind the corona. The preputial flap is trimmed and sutured to the raw area on the undersurface of the penis.

(f) An indwelling catheter is placed, and the wound is dressed.

(2) Urethral reconstruction.

(a) The urethra is dilated, and a Malecot catheter number 14 or number 16 Fr over a sound number 8 Fr is used to accomplish a perineal urethrostomy.

(b) On the ventral side of the penis, the Duplay flap is made to create the urethra. The edges of the flap are inverted and united over a catheter number 8 or number 10 Fr with interrupted chromic gut sutures number 5 - 0 or number 6-0 on Atraumatic needles.

(3) Penile reformation.

(a) The scrotal flaps are made prior to lifting the penis from the scrotum. A catheter is placed in the penile urethra. By dissection, the penis with its established new urethra is lifted off the scrotum.

(b) The flaps are sutured, providing the proper penoscrotal angle.

(c) The scrotal fascia of the flap may be sutured.

(d) A catheter may be placed. The wound is dressed.

3-39. CIRCUMCISION

a. General.

(1) This procedure is the excision of the foreskin (prepuce) of the glans penis. It is done prophylactically in infancy and is commonly performed in the newborn period. For Jewish patients, this may be a religious rite performed by a rabbi. Provision should be made in a hospital to observe the religious needs and preferences of parents in this regard.

(2) Circumcision is done for the relief of phimosis, a condition in which the orifice of the prepuce is too small to permit easy retraction behind the glans. Circumcision may be done to relieve paraphimosis, a condition in which the prepuce cannot be reduced from a retracted position.

b. Patient Preparation. Newborn infants are generally positioned on specially constructed boards that facilitate restraint by immobilizing the limbs and exposing the genitalia. No anesthesia is used for newborn infants. Older patients may be given a general or local anesthetic.

c. Operative Procedure.

(1) If the foreskin is adherent, a probe or hemostat may be used to break up adhesions. The foreskin is grasped with an Allis forceps and stretched taut over the glans. A superficial, circumferential incision is made in the skin at the level of the coronal sulcus at the base of the glans. A straight hemostat may be placed at the medial dorsal aspect and the foreskin cut from the meatus to the sulcus with a straight scissors or scalpel. The foreskin is then completely excised at the level of the sulcus. Bleeding vessels are clamped with mosquito hemostats and tied with fine number 2-0 plain gut ligatures.

(2) The raw edges of the skin incision are approximated along the corona with fine number 4-0 chromic sutures on Atraumatic needles. The wound may be dressed with petrolatum or hemostatic gauze, if desired.

(3) The plastibell method for infants is done in a somewhat different way. A dorsal slit is made, adhesions freed, and the bell placed over the glans inside the foreskin. A suture is tied lightly around the bell, compressing the foreskin into the groove. The free skin is trimmed and the bell handle is broken off.

3-40. URETHRAL MEATOTOMY

a. **General.** This involves incisional enlargement of the external urethral meatus. The procedure is done to relieve stenosis or stricture.

b. **Patient Preparation.** For the male, a supine position is generally used, and the penis is elevated on a small folded sheet. For the female, the lithotomy position is used. Either general or topical anesthesia may be used. Cocaine 5 percent is used for the meatus and 2 percent procaine with bulb syringe is used for instillation into the urethra.

c. **Operative Procedure.** A straight hemostat is applied to the ventral surface of the meatus. An incision is made along the frenulum to enlarge the opening and overcome the stricture. Bleeding vessels are clamped and ligated with fine plain surgical gut sutures. The mucosal layer is sutured up to the skin with fine plain gut sutures. A dressing of petrolatum gauze may be applied.

3-41. EXCISION OF URETHRAL CARUNCLE

a. **General.** This procedure involves the removal of papillary or sessile tumors of the urethra. It is done to rectify an inflammatory prolapse from the lower lip of the female urinary meatus.

b. **Operative Procedure for the Removal of Papillary Growth.** The growth is exposed, clamped at its base with curved hemostats, and excised. A urethral indwelling catheter is inserted into the bladder. The wound is closed.

c. **Operative Procedure for Removal of Sessile Growth.** A circular skin incision is made around the meatus and carried through the submucosal layer. The urethra is freed from the caruncle, the meatus is dissected back to the healthy tissue, and the diseased portion of the urethra is excised. The mucocutaneous junction is approximated with fine chromic gut sutures. An indwelling urethral catheter is introduced and is kept in the bladder for at least 5 days.

3-42. URETHRAL DILATATION AND INTERNAL URETHROTOMY

a. **General.** This procedure involves the gradual dilatation and removal of a urethral stricture to provide for adequate urinary drainage of the kidney.

b. **Operative Procedure for Gradual Dilatation.** The urethra is lubricated and anesthetized. In the male patient, the penis is clamped and the urethra anesthetized. A

filiform bougie is passed through the urethral stricture into the bladder. Sounds or followers of desired type attached to filiform bougies are then passed into the bladder.

c. **Operative Procedure for Internal Urethrotomy.** The filiform bougie is passed into the bladder; the urethrotome is connected and inserted. The Otis urethrotome consists of a curved sound with a groove on its upper side, along which is a triangular knife. Its sides are sharp and its apex blunt. The urethrotome is inserted, and then the blade is released to cut the stricture. Electrosurgical cutting and coagulating electrodes may be used.

3-43. CYSTOSCOPY

a. **General.** This procedure is the visual inspection of the interior of the bladder and examination of adjacent structures by means of an instrument (cystoscope) introduced via the urethra into the bladder. The examination may be done as an end in itself, or may be the first step in a series of examinations or treatments that may be accomplished transurethrally.

b. **Patient Preparation.** The patient is placed in the lithotomy position perineal, preparation is carried out, and the patient is draped with a lithotomy fenestrated sheet and leggings. Surgical jelly is required to lubricate instruments passed into the urethra. A local or general anesthetic may be administered. The surgeon will require a circulator, but probably not a scrub assistant.

c. Operative Procedure.

(1) The surgeon assembles the cystoscope, fitting the obturator into the sheath. The light is tested, and the circulating team member adjusts the current to the proper brightness.

(2) The instrument is lubricated and inserted into the patient's urethra. The obturator is removed and the telescope inserted into the sheath. The surgeon puts his eye to the eyepiece and makes his examination. The bladder is distended with irrigating fluid. The surgeon adjust the flow and volume with the stopcock. Then the obturator or telescope is removed, the irrigating fluid flows out.

(3) Other procedures such as catheterization, biopsy, or stone removal are carried out by exchanging or supplementing the cystoscope lens with the appropriate accessory instrument.

(4) Kidney function studies, cystometry, and X-ray examinations may be performed and various specimens of urine collected. When the examination is concluded, the instrument is removed. A urethral catheter may be inserted as required.

3-44. TRANSURETHRAL SURGERY

a. **General.** By means of a resectoscope passed into the bladder via the urethra, piecemeal resection of the prostate gland and of tumors of the bladder and bladder neck may be carried out, and bleeding vessels and tumors may be fulgurated.

b. **Operative Procedure.** See Figure 3-12.

(1) The resectoscope is assembled. The sheath is fitted with its obturator. The electrode and telescope are attached to the working element. The irrigating system is connected to the sheath. The lamp cord or fiberoptic bundle is fitted to the telescope. The electrode is attached to the electro-surgical unit. The currents are adjusted as the surgeon directs.

(2) The surgeon lubricates the sheath containing the obturator and inserts it into the urethra and bladder. The obturator is removed, and the operating element is introduced through the sheath.

(3) Viewing the anatomy through the telescope, the surgeon begins the electro-dissection, alternately cutting and coagulating. The bladder is permitted to drain--washing out blood tissue and clots--and refill at intervals. The operating element may be removed and evacuating devices such as the Ellik applied, to flush out the bladder.

(4) When the stones are present, they are trapped or crushed with dislodgers or lithotrites, and copious irrigations are done.

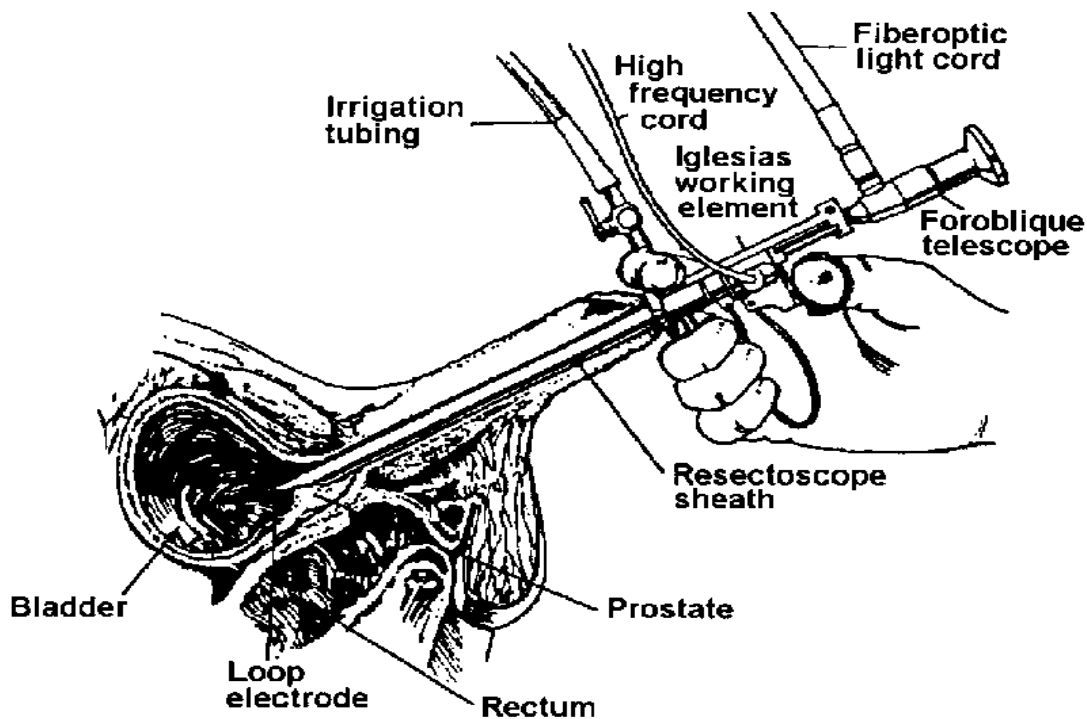


Figure 3-12. Transurethral resection of bladder tumor.

(5) When resection of the lesion is completed and bleeding controlled, the operating instrument is removed. A Foley catheter is introduced. A catheter stylet may be employed. The bag of the catheter is filled, using a 30-ml syringe and adapter. The catheter may be a self-inflating type or have a valve that requires no clamp to retain the fluid in the hemostatic bag. The catheter is flushed for patency, irrigating with an Asepto syringe. When the surgeon is satisfied that the patient's condition is good, the patient is transferred from the operating table.

[**Continue with Exercises**](#)

[**Return to Table of Contents**](#)

EXERCISES, LESSON 3

INSTRUCTIONS: The following exercises are to be answered by marking the lettered response that best answers the question or best completes the incomplete statement or by writing the correct word or phrase in the space provided.

After you have completed all the exercises turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. The urinary bladder is partly in the abdomen when it is:
 - a. Full.
 - b. Empty.
 - c. Healthy.
 - d. Infected.

2. A ureter extends from the _____ to the _____.
 - a. Renal pelvis, bladder.
 - b. Calyces, renal pelvis.
 - c. Bladder, outside.
 - d. Kidney, outside.

3. The renal pelvis is in the shape of a:
 - a. Butterfly.
 - b. Funnel.
 - c. Ball.
 - d. Hand.

4. Adrenalectomy may be done to:
 - a. Remove adrenal tumors.
 - b. Treat hyperfunction of adrenals.
 - c. Discourage cancers elsewhere in the body.
 - d. All of the above.

5. What organ serves as the passageway for urine from the bladder to be eliminated from the body?
 - a. Ureter.
 - b. Urethra.
 - c. Prostate.
 - d. Seminal vesicles.

6. The tubes in which sperm cells are actually formed are in the:
 - a. Spermatic cord.
 - b. Prostate gland.
 - c. Epididymides.
 - d. Testes.

7. Besides adrenalin (epinephrine), the adrenal glands secrete_____ and other hormones.
 - a. Insulin.
 - b. Steroids.
 - c. Thyroxin.
 - d. Testosterone.

8. Kidney stones should always be placed in Formalin solution®.
- a. True.
 - b. False.
9. Application of antiseptic in perineal skin preps is different from other areas because many surgeons prefer to apply antiseptic to this area with:
- a. Inhalation.
 - b. Cotton balls.
 - c. Gauze sponges.
 - d. Spray apparatus.
10. Heminephrectomy is an operation in which a:
- a. Kidney is removed.
 - b. Kidney is resected.
 - c. Donor kidney is placed.
 - d. Kidney stone is removed.
11. Nephroureterectomy usually requires _____ separate incisions.
- a. 0.
 - b. 1.
 - c. 2.
 - d. 3.

12. According to this subcourse, the kidneys are ordinarily positioned at approximately the twelfth thoracic vertebra to the _____ lumbar vertebra.
- First.
 - Second.
 - Third.
 - Fourth.
13. Tocar cystostomy involves draining the bladder by:
- Incision.
 - Resection.
 - Blind puncture.
 - Urethral catheter.
14. The Marshall-Marchetti operation is performed on:
- Males.
 - Females.
 - Newborns.
 - Males and females.
15. For vesical-urethral suspension, a _____ incision is used.
- Midline.
 - McBurney.
 - Suprapubic.
 - Midparamedian rectus.

16. An enlarged prostate is always benign.
- True.
 - False.
17. Suprapubic prostatectomy with cystostomy includes:
- Adrenalectomy.
 - Ureteral anastomosis.
 - Trocar blind puncture.
 - Incision of the bladder.
18. What shape excision is made in the neck of the bladder during retropubic prostatectomy?
- Semicircle.
 - Rectangle.
 - Square.
 - Wedge.
19. Pads are used under the buttocks for which kind of prostatectomy?
- Perineal.
 - Retropubic.
 - Suprapubic.
 - Transurethral.

20. Ligation and partial excision of dilated veins in the scrotum may be done to reduce venous congestion. This procedure is called:
- a. Vasectomy.
 - b. Orchiectomy.
 - c. Hydrocelectomy.
 - d. Varicocelectomy.
21. The operation to bring an undescended testicle into place is called:
- a. Hypospadias repair.
 - b. Varicocelectomy.
 - c. Orchiectomy.
 - d. Orchiopexy.
22. When the urethral meatus is on the upper side of the penis, this is called:
- a. Chordee.
 - b. Epispadias.
 - c. Hypospadias.
 - d. Cryptorchidism.
23. Stenosis of the external urethral meatus requires that the meatus be:
- a. Reduced in size.
 - b. Transposed.
 - c. Cauterized.
 - d. Enlarged.

24. A papillary tumor of the urethra is called a _____:
- a. Urethral caruncle.
 - b. Mitral annuls.
 - c. Carcinoma.
 - d. Empyema.

Special Instructions for Exercises 25 Through 34. Each numbered item in **Column A** can be matched best by one of the letter choices in **Column B**. Write the letter of the **best** answer to the left of the number in **Column A**.

Column A	Column B
_____ 25. Nephrotomy	a. Incision into renal pelvis.
_____ 26. Pyelotomy	b. Removal of small stone(s) from renal pelvis.
_____ 27. Pyelostomy	c. Removal of staghorn calculus.
_____ 28. Pyelolithotomy	d. Opening of a kidney for drainage.
_____ 29. Nephrostomy	e. Opening of the renal pelvis for drainage.
_____ 30. Nephrolithotomy	f. Simple kidney incision.
_____ 31. Cystotomy	g. Bladder is opened to removed stones.
_____ 32. Cystolithotomy	h. Bladder is excised.
_____ 33. Cystostomy	i. Bladder is cut open.
_____ 34. Cystectomy	j. Bladder is opened for continuous drainage.

Special Instructions for Exercise 35. Write the name in the correct column for the male reproductive organs that are found in pairs and those that appear singly.

Testis
Prostate
Ejaculatory duct

Seminal vesicle
Urethra

Seminal duct
Cowper's gland

35.

PAIRS	SINGLY

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 3

1. a (para 3-4a)
2. a (para 3-3)
3. b (para 3-2d)
4. d (para 3-21a)
5. b (para 3-1)
6. d (para 3-7b)
7. b (para 3-8)
8. b (para 3-13b)
9. d (para 3-10a)
10. b (para 3-15a, b)
11. c (para 3-17a)
12. c (para 3-2a)
13. c (para 3-23a)
14. b (para 3-27a)
15. c (para 3-27c(1))
16. b (para 3-28a)
17. d (para 3-28c(4))
18. d (para 3-29b(3))
19. a (para 3-30b)
20. d (para 3-35a)
21. d (para 3-37a)

- 22. b (para 3-38b(3))
- 23. d (para 3-40a)
- 24. a (para 3-41a)
- 25. f (para 3-16a(1))
- 26. a (para 3-16a(2))
- 27. e (para 3-16a(3))
- 28. b (para 3-16a(4))
- 29. d (para 3-16a(5))
- 30. c (para 3-16a(6))
- 31. i (para 3-22b(2))
- 32. g (para 3-22b(2))
- 33. j (para 3-22b(3))
- 34. h (para 3-22b(4))

35. **PAIRS**

Testis
 Ejaculatory duct
 Seminal Vesicle
 Seminal duct

SINGLY

Prostate
 Urethra

(para 3-7a)

[Return to Table of Contents](#)