

34 Bladder

Biopsies

Biopsy specimens of the urinary bladder are generally removed through the cystoscope. They vary from single and minute to numerous, large, and papillary. Orientation of these specimens is generally impossible, even for the larger papillary fragments. Biopsies of neoplasms potentially hold important information regarding tumor type, tumor grade, and extent of tumor invasion into the various layers of the bladder wall. By following two simple rules, you can avoid missing this crucial information. First, be sure to submit all of the pieces of tissue for processing and multiple sectioning. Second, avoid the common mistake of overfilling specimen cassettes with tissue fragments. Keep in mind that portions of the specimen will not be sampled if they are “buried” within a crowded cassette. In addition, we strongly recommend that the urologist submit superficial and deep tumor biopsies as separate specimens to facilitate the detection of deep muscle invasion.

Total Cystectomies

The processing of resected urinary bladders can be accomplished in three steps: (1) orientation of the specimen and identification of relevant structures (e.g., ureters); (2) fixation of the specimen; and (3) dissection of the specimen. Given the almost spherical shape of the bladder, this first step, orientation, is not necessarily an easy one. The peritoneum covering the surface of the bladder can be used as a reliable, though subtle, anatomic landmark. As illustrated, the peritoneum

descends further along the posterior wall of the bladder than it does along the anterior wall. If they are present, other pelvic organs can also be used to orient the specimen. For example, the seminal vesicles and uterus mark the posterior aspect of the bladder. Once the specimen is oriented, locate both ureters and, when present, the vasa deferentia. The best place to look for the ureters is in the lateral perivesicular fatty connective tissues. The ureters are much easier to locate and dissect in the fresh state than they are once the specimen is fixed. Tag the end of each ureter with a safety pin so that you can locate them later.

The next step is to fix the specimen. Some prefer to fix bladders in distention, either through the urethra via a catheter or through the bladder wall using a large-gauge needle. The method we prefer and describe below is to open the bladder and pin it out before submerging it in formalin. The advantage of this latter method is that by exposing the tumor before fixation samples can be collected for ancillary studies requiring fresh tissue. Begin by inking the surface of the perivesicular soft tissues, and then open the anterior bladder wall from the urethra to the bladder dome using scissors. Avoid disrupting the posterior wall, because the ureteral orifices are located in this region, and they will serve as important anatomic landmarks later in the dissection. Examine the mucosa for ulcerations, exophytic tumors, or more subtle mucosal alterations. Note the size, gross morphology (flat, papillary, or ulcerated), and location (e.g., dome, trigone, free walls) of any lesions in the bladder. Photograph the opened specimen. Collect fresh tissue for special studies if warranted. Pin the specimen to a wax block such that the bladder cavity is opened and the

luminal surface is fully exposed, and submerge the entire specimen in formalin.

After the specimen is well fixed, resume the dissection by shaving the margins from each of the ureters and (when present) the vasa deferentia. These already should have been located and tagged in the fresh specimen. The urethral margin should also be taken as a thin shave section. When the specimen includes the prostate (see En Bloc Resections, next page), amputate the distal 1 cm of the prostate at its apex; then section this apical cone at right angles to the cut edge in thin, parallel sections. These sections will include the distal portion of the prostatic urethra, and will permit you to determine precisely the status of the distal margin at the prostatic apex. Next, using a small pair of scissors, open the ureters on both sides, beginning at their trigone orifices. Look for ureteral strictures and dilatations, and examine the mucosa for ulcerations or exophytic lesions. Document these findings in the gross dictation. Submit transverse sections of the ureters at regular intervals along their entire length.

If a tumor is identified in the bladder, try to determine its depth of invasion. To do this, make a full-thickness cut through the tumor and bladder wall. See whether the tumor appears to infiltrate the muscularis propria of the bladder and, if so, whether it extends into the surrounding soft tissues. Take sections of the tumor to demonstrate its relationship to the adjacent urothelium and, importantly, its maximal depth of invasion. Keep in mind that for large exophytic tumors sections will be more informative when they are taken from the base of the tumor than when they are taken from its surface.

Urothelial neoplasms often arise in a background of widespread epithelial alterations. Furthermore, many urothelial neoplasms are treated before surgical resection, and residual tumors may not be grossly apparent. For these reasons, it is important that bladders resected for urothelial neoplasia be extensively sampled for histology, even at sites that appear distant from the tumor. As a guide for sampling, treat the bladder as though it were a box with six walls including the floor (trigone), roof (dome), right and left lateral walls, anterior wall, and posterior wall. Submit two sections from each of these, as well as longitudinal sections through the ureteral orifices on both sides. Selectively sample areas where the mucosa appears abnormal. Carefully inspect

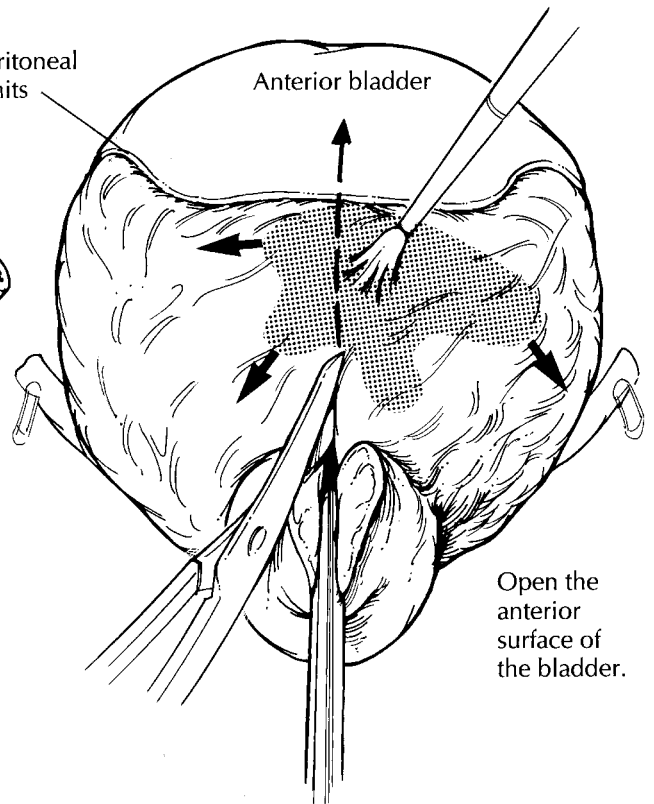
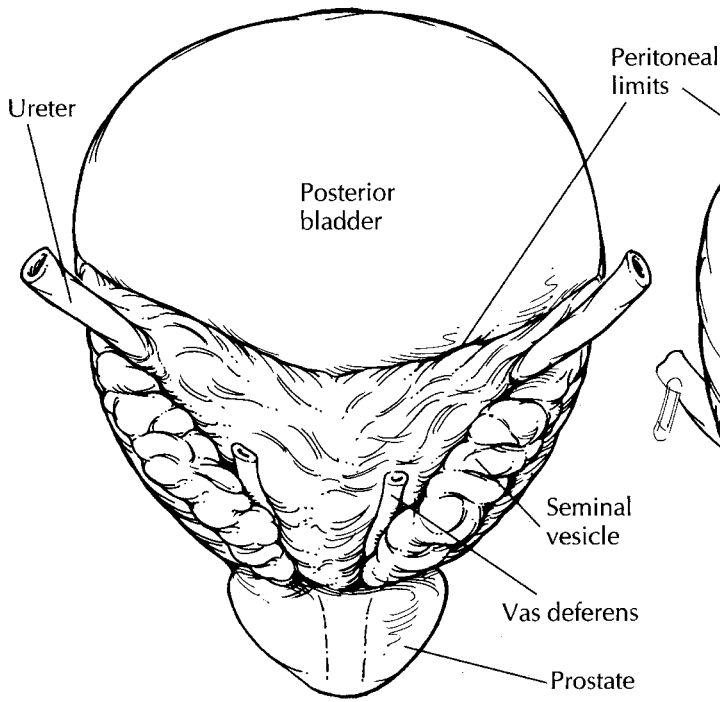
the bladder mucosa because many *in situ* neoplasms of the bladder are flat and are characterized by a subtle red velvety appearance, in contrast to the tan, smooth appearance of normal mucosa.

Section through the perivesicular soft tissues, and look for tumor extension beyond the bladder wall. Submit perpendicular sections from the soft tissue margins. Be sure to search for lymph nodes, which are sometimes present in the perivesicular soft tissues. If any are found, measure them individually, and submit each for histologic evaluation.

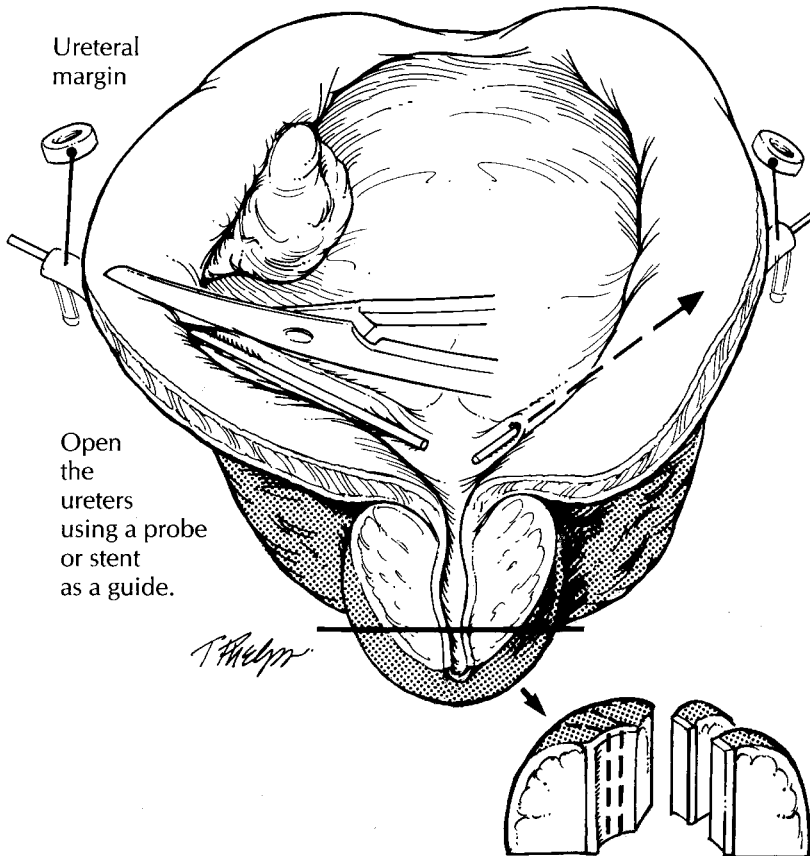
Partial Cystectomies

Less frequently, only a portion of the bladder is removed as a sheet-like piece of tissue. In general, these partial cystectomies should be fixed and dissected according to the guidelines given for complete bladder specimens, keeping in mind that orientation of these specimens may not always be possible. Rather than a three-dimensional box, the partial cystectomy can be thought of as a rectangular sheet with four edges. These edges are important, because they represent the surgical margins of the bladder wall. Ink the edges and assess these margins for tumor involvement by taking perpendicular sections from all edges of the rectangle at regular intervals. Remember to include mucosa as well as the wall of the bladder in these sections. Sections should also be taken to demonstrate the maximum depth of invasion of the tumor.

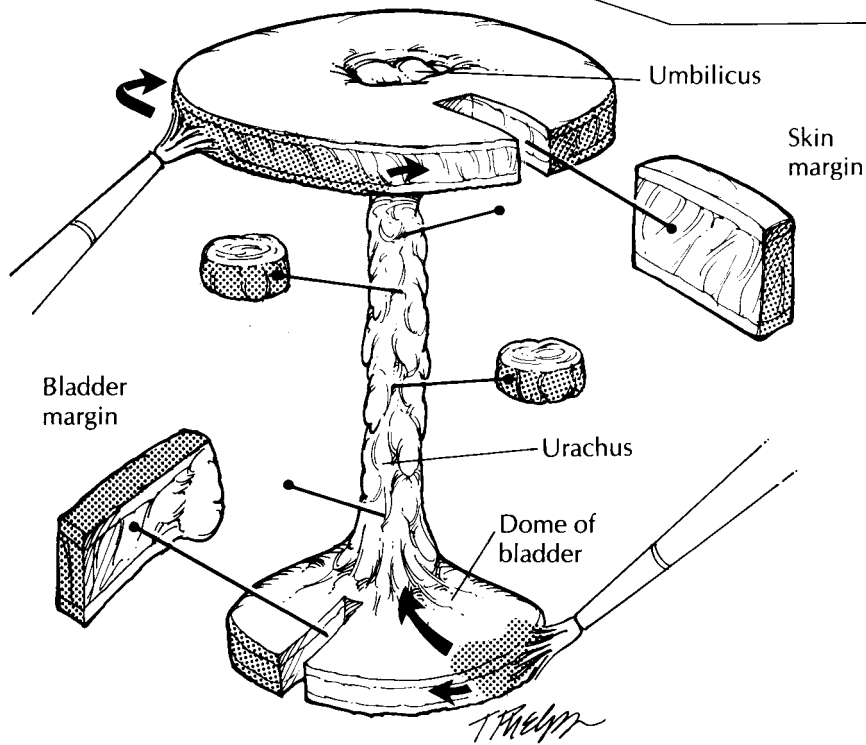
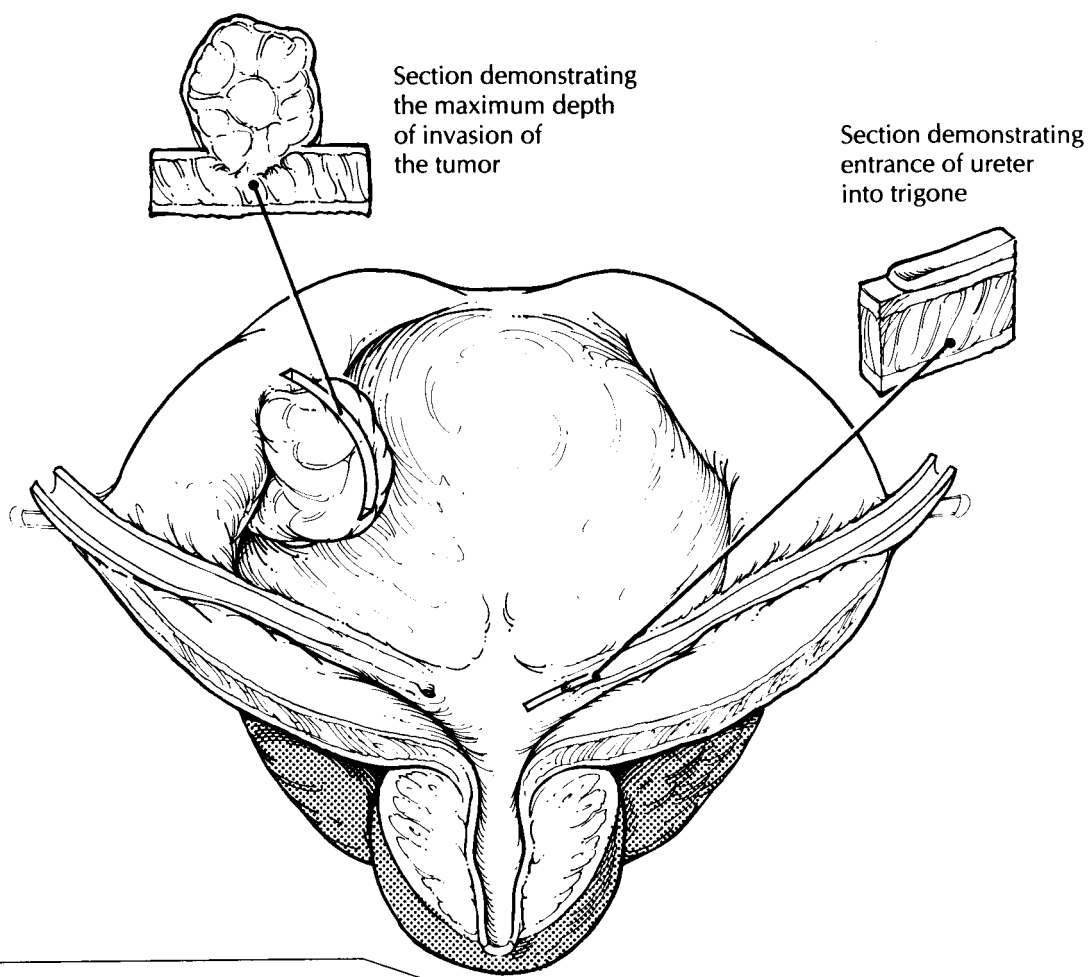
A peculiar variation of the partial cystectomy is seen in resections of neoplasms arising from the urachal tract. These specimens consist of the dome of the bladder in continuity with the urachal tract up to and including the umbilicus. As illustrated, the bladder portion of the specimen should be routinely processed as you would any ordinary partial cystectomy. As for the urachal tract, first ink the surrounding soft tissue margins, and then serially section through the tract from the bladder to the umbilicus. These sections should be taken at right angles to the long axis of the urachal tract. Submit a number of these cross sections from the urachal tract for histology as well as the standard bladder sections. Remember to sample the two additional margins introduced by this resection: the soft tissue margin



Cystoprostatectomy



1. Orient the bladder. The peritoneum extends further down the posterior wall than it does anteriorly.
2. Open the prostate and bladder along the anterior surface, beginning at the distal urethra.
3. Think of the bladder as a box with sides made up of the trigone, dome, anterior wall, posterior wall, left lateral wall, and the right lateral wall.
4. Submit shave sections of distal urethral and ureteral margins and perpendicular sections from the closest soft tissue margin.
5. Submit sections of the tumor to demonstrate its maximal depth of invasion and the relationship of the tumor to the bladder mucosa. Submit two sections of the trigone, dome, anterior wall, posterior wall, left lateral wall, and right lateral wall. Submit transverse sections of the ureters and a longitudinal section through the ureteral orifices. Include standard prostate sections. Submit sections of any lymph nodes.



Urachal Resections

Resections for urachal cancers often include the dome of the bladder, the urachus, and a portion of the umbilicus.

surrounding the urachus and the skin margin rimming the umbilicus.

En Bloc Resections

Commonly, the bladder is removed in continuity with the prostate, uterus, or other pelvic organs. The added complexity of these specimens introduces only minor alterations to the guidelines given above. For cystoprostatectomies, you will again need to open the specimen anteriorly before fixing it; only now begin the incision at the distal prostatic urethra. Using a pair of scissors, open the prostate anteriorly by cutting along the prostatic urethra, and continue the incision through the anterior bladder wall all the way to the dome. Try not to disrupt the posterior aspect of the prostate with this first longitudinal cut. After the specimen has been opened, carefully examine the urethral mucosa for evidence of extension of tumor into the prostatic urethra. Once the specimen is fixed, serially section the prostate from apex to base at 2- to 3-mm intervals. These sections should be transverse sections through the posterior surface of the gland. Examine the cut surface of the prostate. If a tumor is identified, try to determine if it is arising centrally from the prostatic urethra or if it is more peripherally located, as is common for cancer of the prostate. This observation is important, because the prostate should be processed differently (see Chapter 31) if a primary prostate carcinoma is present. If no peripheral tumors are noted, then a more limited sampling of the prostate is in order. These prostate sections should include (1) shaved margins from the distal vasa deferentia; (2) perpendicular sections from the distal (apical) margin of the prostate including the prostatic urethra; (3) a posterior transverse section from the apical, mid, and basilar regions of the gland; (4) two cross sections of the prostatic urethra; and (5) a section of each seminal vesicle.

Because the other pelvic organs commonly removed with the bladder (e.g., uterus and rectum) are situated posteriorly, use the same anterior approach to open the bladder without altering its relationship to these other organs. Section these additional structures, keeping four objectives in mind: (1) document the presence of these structures; (2) demonstrate the relationship between

the tumor and each of these structures; (3) evaluate the resection margins for each organ; and (4) examine the attached pelvic organs for other diseases. For example, when a portion of rectum accompanies the bladder specimen, sections should be submitted (1) to document the presence of rectum and any incidental rectal pathologic findings; (2) to demonstrate the relationship between the rectum and the tumor; and (3) to assess the status of the proximal and distal rectal margins.

Important Issues to Address in Your Surgical Pathology Report on Cystectomies

- What procedure was performed, and what structures/organs are present?
- Is a neoplasm present?
- Where in the bladder is the tumor located (trigone, anterior wall, posterior wall, left lateral wall, right lateral wall, dome)?
- How large is the tumor?
- What is its pattern of growth? Is it papillary, flat, or ulcerated?
- Is the neoplasm *in situ* or infiltrating?
- What are the size, histologic type, and grade of the neoplasm?
- What is the maximal depth of invasion of the neoplasm? Does it extend into the lamina propria, the inner half of the muscularis propria, or the outer half of the muscularis propria?
- Does the tumor extend beyond the bladder into the perivesicular fat, prostate, uterus, vagina, pelvic wall, or abdominal wall?
- For bladder carcinomas involving the prostate, specify the nature of prostatic involvement. Specifically, does the carcinoma directly invade the prostate at the bladder neck? Does the carcinoma involve the prostatic urethra? Is there involvement of prostatic ducts with or without stromal invasion?
- What is the status of each of the margins (the ureters, urethra, soft tissue, etc.)?
- Is the tumor multifocal or unifocal?
- Does the tumor involve blood vessels, nerves, or regional lymph nodes? How many lymph nodes were examined, and how many harbor a metastasis?