The History of Cystoscopy in Urology

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Abstract

Cystoscopy is used to directly visualize the anterior urethra, posterior urethra, and the bladder. One of the most common indications for cystoscopy is the evaluation for bladder cancer in cases of gross hematuria. Examples of other indications for cystoscopy include evaluation of voiding symptoms, surveillance of bladder carcinoma, foreign body removal, and assisting in difficult placement of a catheter. Although its primary use is in the diagnosis and treatment of lower urinary tract disorders, it is also used to access the upper urinary tract for both diagnostic and therapeutic interventions.

INTRODUCTION

Cystoscopy is an important tool to identify abnormal findings in the lower urinary tract. This minimally invasive urologic procedure, often performed in the office, permits the endoscopic inspection the lower urinary tract. The instrument that is used to perform this procedure is called a cystoscope. This procedure allows direct visualization of important anatomic structures including: the urethra, bladder urothelium and the ureteral orifices. Cystoscopes can be either rigid or flexible. There are two major types of cystoscopes: flexible and rigid. [1, 2].

Both cystoscopes have their respective advantages and disadvantages. Table 1 provides a brief review of these salient features. Flexible cystoscopes have become the mainstay of male cystoscopy for several reasons including decreased patient discomfort and the ability to perform the procedure in the supine position. The flexible endoscope can be deflected to view the entire bladder including the trigone, ureteral orifices, lateral walls, floor, dome and anterior bladder neck. This latter location is much easier to view with the flexible cystoscope as compared with the rigid scope. Some disadvantages include the lack of a working sheath and the presence of only a small irrigating port. Finally, the sterilization time for the flexible endoscope is longer than that for the rigid endoscope, which can increase time between procedures. [2, 3].

Table 1

Comparison of Rigid and Flexible Cystoscopes

Rigid Endoscope		Flexible Endoscope	
ADVANTAGES	DISADVANTAGES	ADVANTAGES	DISADVANTAGES
-Greater variety of instruments	-Lithotomy position which can cause discomfort	-More patient position options	- No working sheath
-Better optics	-Generally have larger calibers	-Smaller calibers	-Small irrigating ports
-Increased durability	-Usually performed under general anesthesia	-Ability to move deflect	-Can't change lens, irrigation and aspiration not possible without removing scope.
-Working sheath	-Possibility of overnight stay at hospital	-Can be performed under local anesthesia thus permitting patient to witness procedure	-Complex sterilization and reprocessing between patients [4]
-Delicate but easy sterilization [4]	-More postop symptoms	-Less chance of overnight stay	-More complex structure which can result in more room for malfunction and broken parts
-Simple structure		-Virtually painless	-Less variety of instruments
-Easier learning curve		-Less postop symptoms	-Optics are suboptimal
-Lenses can be changed			- Needs both hands
-Can assess residual urine			-Harder learning curve
-Only needs one hand to operate			

References [1-7]

Rigid cystoscopes, on the other hand, remain the mainstay of female cystoscopy because of the short length of the female urethra allowing for a straight entry from the urethral meatus. For these reasons, the procedure tends to be relatively painless. The rigid cystoscope does require assembly prior to use. The cystoscope bridge must be connected to the optical telescopic lens which is connected to the cystoscope sheath. The sheath size ranges from 17 French to 22 French. The larger size sheaths allows for the use of working ports for the passage of instruments such as wires, stents and grasping forceps. In addition, an obturator can be inserted into the sheath to provide for easy passage of the rigid endoscope in female patients. In male patients, direct visualization of the urethra is recommended during endoscope passage. [2].

A classic attachment to the rigid cystoscope is the Albarran Bridge. This allows the physician to deflect a difficult to place wire into the ureteral orifice. It is typically used in male patients with a high median prostatic lobe which obscures the locations of the ureteral orifices. It may also be used in females who have a large cystocele that displaces the ureteral orifices from their normal location.

The rigid cystoscope uses a rod-lens system. There is a metal shaft within the cystoscope which is comprised of cylindrical lenses with air interfaces. This system allows transmission of light to the object viewed as well as be visualized by the clinician when looking into the eyepiece. [2]. On the other hand, the flexible cystoscope is comprised of fiberoptic bundles in a flexible shaft. This leads to illumination of the viewing area and transmission of the images to the eyepiece.

A recent development in cystoscopy is the digital cystoscope. With this technology, an imaging chip is located at the distal end of the cystoscope. This chip converts light energy into electrical energy and can be displayed on a viewing monitor. High definition optical resolution, color and contrast have been the major driving points to further this technological advance. While these advances in optics are certainly appreciated, these endoscopes are less durable that either their rigid or flexible counterparts. [2].

Access to the upper urinary tract can be achieved with cystoscopy. Placement of ureteral catheters (cone tip, olive tip, straight tip, and whistle tip) via intubation of the ureteral orifice allow for retrograde access to the ureter, renal pelvis and collecting system. Ureteral catheters with brushes can be passed up the ureter to obtain cytologic specimens. Ureteral access wires and stents can also be placed. In nearly all cases involving ureteral access, radiographic assistance with fluoroscopy or plain films is recommended. [2].

HOW A CYSTOSCOPE WORKS

In order to achieve adequate visualization of the lower urinary tract and its structures, a cystoscope essentially requires three things: irrigation, illumination and an optic system. The type of irrigant used is important as some procedures cannot be performed if the improper irrigant is used. In general, there are two types of irrigants: conductive and nonconductive irrigants. Normal saline and lactated Ringer's solution are known as conductive irrigants. These solutions should be avoided when performing traditional electric surgeries such as that for a transurethral resection of the prostate (TURP) or bladder tumor resection (TURBT). On the other hand, nonconductive irrigants include water and glycine. Water is considered better than glycine because its grants better visibility and it has the potential ability to lyse tumor cells due to its hypotonic properties [1].

The fiberoptic cable contains either the halogen or xenon light source which administers cooling light to the cystoscope. The eyepiece of a cystoscope can be used for direct visualization without any optic system or it can be attached to a video camera system. The latter option protects the clinician while reducing the risk of fluid contact and risk of potential cervical neck disease exacerbated by abnormal neck posture. Mobile tower configurations allows for efficient space for cystoscopic procedures. The video endoscopic unit, light source, camera, image processor and recorder can be placed in an efficient mobile unit. These can be set up in the office or operating room setting. The video display allows both the surgeon and the patient to visualize the findings during the procedure.

There is no eyepiece for digital endoscopes. Images are sent to the image processor. Screen shots and video sequences can be recorded for inclusion in the medical records. This is especially important for post procedure review, patient education and follow up. Narrow band imaging is a light source modification which may enhance detection of bladder cancer. The process involves filtering light into two separate bands (415 nm and 540 nm) which are absorbed by hemoglobin. The detection of vascular hyperemia seen with urothelial cancers is now possible. [2].

In the case of rigid cystoscopes, the endoscope can be adjusted to adopt 0°, 30°, 70°, and 120° lenses. This allows the cystoscope to provide different angles of visibility and therefore permit a complete examination of the lower urinary tract. In general, evaluation of the urethra is best accomplished with a 0-degree or 12-degree lens. This provides a straight-ahead view. In the bladder, a 30-degree lens allows visualization of the entire bladder including: lateral and posterior walls, trigone, dome and ureteral orifices. Cystoscopes with a 70-degree lens allow for visualization of anatomic variations such as a high medial bar, and visualization of bladder tumors in hard to see locations such as the anterior bladder wall. [1].

Cystoscope size is determined using the French (Fr) scale. This refers to the outer sheath circumference in millimeters. Pediatric endoscopes are generally 8 to 12 Fr. Adult cystoscopes range from 17 Fr to 24 Fr. The size of the telescope depends on several factors including: (1) procedure being performed, the need for additional working instruments (in which case a larger sheath is used) and the volume of irrigant flow needed (hematuria will require increased fluid flow to be able to see the bladder walls). In general, the sheath with the smallest diameter to accomplish the goals of the procedure will be used (usually the 17 Fr sheath is utilized for routine cystoscopic procedures).

PREOPERATIVE PREPARATION

Prior to the procedure, urinalysis is obtained to ensure that there is no evidence of urinary tract infection. Performing cystoscopy in the setting of active UTI can result in sepsis. Informed consent is obtained from the patient prior to the procedure. A careful explanation of procedure, associated risks and benefits should be discussed in detail. Antibiotic prophylaxis is recommended prior to the procedure. In general, the antibiotics of choice include the fluoroquinolones or trimethoprim sulfamethoxizole (14).

Pre-operatively, the patient is ideally placed in an adequate examination gown which permits examination of the external genitalia of the patient while at the same time providing enough gown to protect the patient's privacy and limit genital exposure.

Just prior to the procedure, a topical water soluoble anesthetic is given in an effort to provide patient comfort during the procedure. In male patients, either a urethral clamp or manual pressure under the glans is held so that the anesthetic agent is retained for several minutes. In general, these maneuvers can reduce procedure related discomfort in male patients. However, in female patients, minimal improvement in procedure related pain is noted when either topical anesthetic versus topical lubricant gel is used. [2]. Regardless, there are ways to improve patient comfort and safety during the procedure. Careful explanation of the procedure both before and during the procedure is helpful to allay patient fears. In addition, positioning the video monitor so that both the physician and patient can view the findings can further decrease patient anxiety and discomfort. Specifically for males, when rigid cystoscopy is used, discomfort is noted when the cystoscope passes through the membranous and prostatic urethra. Informing patients to take slow deep breaths and relax their pelvic muscles aids greatly in cystoscope passage. Given the widespread availability of flexible cystoscopy in most cystoscopy suites, this typically painful aspect of the procedure for males can be avoided completely. Finally, in some cases a general anesthetic may be given prior to a cystoscopy, particularly if a rigid cystoscope must be used. In other cases, a lumbar epidural anesthetic is given which would numb the lower half of the body [1].

SURGICAL PROCEDURE

After there has been and adequate pre-operative preparation, the patient is brought into the cystoscopy suite and is carefully placed on the examination table. The patient must adopt a lithotomy position in the case of rigid cystoscopy. Flexible cystoscopy permits the patient to either adopt a supine or lithotomy position depending on the patient's comfort level. Afterwards, the patient's external genitalia is cleaned and prepared, preferably using antiseptic solution with derivatives based on Iodine or Chlorhexidine [1]. Before the procedure begins, the urethral meatus should be examined. If the urethra appears to be stenotic or narrowed, dilation with Van Buren sounds should be considered. Dilation to a point large enough to permit scope passage may be required (sometimes up to 22 Fr). In males, the penis is held on stretch to allow visualization of the important penile urethral structures including the fossa navicularis, penile urethra and bulbar urethra. [2].

For flexible cystoscopy, the male penis is still held on stretch but the endoscope tends to glide with ease through the urethra. Similar to rigid cystoscopy, important male urethral structures including the fossa navicularis, penile urethra and bulbar urethra should be well visualized. Periurethral glands of Littre can be visualized as they enter the urethra dorsally. During cystoscopy, strictures may be visualized. These may require either dilation or visual internal urethrotomy. Next, the membranous urethra is traversed. It is able to be identified by its striated mucosa. Sometimes one can see this visibly contract. Next, the distal prostatic urethra is entered. At this location, the prostatic length can be assessed as well as the occlusivity of the lateral lobes and the presence of a median lobe can be assessed. [2].

In females, cystoscopy is a bit easier as the penile urethra does not need to be traversed. As such, either rigid or flexible cystoscopy can be undertaken with relative ease.

With rigid cystoscopy, the female urethra can be cannulated with the visual obturator within the sheath. A 30 degree telescope can be used to visualize the urethra and bladder initially. Once the bladder is entered with the 30 degree telescope, it can be changed to the 70 degree telescope to better visualize the ureteral orifices, trigone, lateral walls, dome and anterior bladder neck. While these structures can also be seen with the 30 degree telescope, it is the authors preference to use the 70 degree telescope as it provides better overall visualization of the entire bladder. [2].

COMPLICATIONS

Most cystoscopies have no significant post-operative complications. Occasionally, the patient may experience dysuria or an increase in urinary frequency for the first 24 hours after the procedure. The patient may also visualize a change in urine color which can become darker, pink or red due to mild bleeding. This is particularly common if a biopsy was taken. Patients may also experience a mild to moderate transient fever which usually is self-limited and subsides spontaneously. If these symptoms worsen or persist for more than 48 hours, the patient may need an urgent reevaluation by the physician. Rarely, the patient may suffer a urinary tract infection after a cystoscopy. Fortunately, this complication occurs in less than 1% of all patients that undergo cystoscopy [1]. In almost all cases, these patients improve after a short course of oral antibiotics. Another extremely rare complication is bladder perforation which may require emergent surgical repair [7].

SUBTYPES OF CYSTOSCOPY

1. Fluorescent Cystoscopy

Fluorescent cystoscopy is currently used as an additional test to diagnosis bladder cancer. During a conventional cystoscopy procedure, porphyrin derivatives (5-aminolevulinic acid or hexaminolevulinate) can be infused into the bladder and subsequently accumulate on cancer cells. These cells are later detected by a red glow in blue fluorescent light. The use of fluorescent cystoscopy with blue light can enhance the ability to detect lesions by as much as 20% [1]. If a tumor is visualized, the lesion can be biopsied. On the other hand, the patient can be scheduled for cystoscopy under anesthesia and transurethral resection of bladder tumor (TURBT) [8].

2. Air inflation cystoscopy

In the late 19th century, air cystoscopy was developed. Because the initial endoscopes did not utilize irrigation tubes, urologists had to use air as a medium to distend the bladder to allow visualization. Over time, endoscopic technology evolved and the use of fluid to distend the bladder became more common-place. Thus, air cystoscopy became outdated [5].

If there is significant hemorrhage or reason to believe there will be during procedure, it may be best to resort to air-insufflation. Air cystoscopy facilitates the examination of the bladder in extreme hemorrhagic conditions. Irrigant solutions can be easily clouded by major bleeding and thus impede adequate visibility. But even in cases of extreme hemorrhage, free irrigation through the irrigating cystoscope is practically sufficient. Air insufflation cystoscopy may also be used for urethral procedures such as urethral strictures and foreign bodies [11, 12].

Air cystoscopy holds many differences to modern irrigation system cystoscopes. A patient is placed Trendelenburg position instead of lithotomy position in order to prevent escape of air and permit adequate drainage of patient urine. Also, instead of using irrigant solution, the cystoscope uses normal air, preferably heated. The cystoscopic field is decreased in comparison to a modern water-distention cystoscope system. Also, it is impossible to observe the anterior wall or the region around the ureteral orifice under air inflation. The caliber of the cystoscope is decidedly larger than in water-distention cystoscopes [12, 16].

This procedure essentially holds the same risks as a conventional irrigant cystoscopy. There is reduced risk of fluid contact between patient and physician. However, while there is a theoretical risk of air embolus, we are not aware of any documented evidence of this ever having occurred.

3. Fetal Cystoscopy

In fetal cystoscopy, a flexible cystoscope can be inserted into the fetal bladder to possibly identify the cause of obstruction (such as posterior urethral valves) and to treat the condition (vesicoamnionic shunt). The rationale for fetal intervention is to prevent lung and kidney maldevelopment by improving available amnionic fluid volume. [2].

4. CT virtual Cystoscopy

This technique creates a three dimensional rendering of the bladder based on helical CT data. With applications to the colon, stomach and bronchus in existence, it logical to consider a possible role in the evaluation of the urinary tract. This technique has been successfully utilized to visualize transitional cell carcinoma of the bladder. [10]. CT virtual cystoscopy can be a useful alternative to conventional cystoscopy in patients that are extremely poor procedural candidates. Conventional cystoscopy has its disadvantages in comparison to CT virtual cystoscopy. A conventional cystoscopy can be considered to be invasive, time-consuming and carries a significant expense. Further, it may require either topical anesthesia or sedation in some cases. Of course, there is risk of iatrogenic injury to the urethra or bladder. It may be difficult to visualize disorders of the bladder neck, urethral and small bladder diverticulum. Post-operative infection is a rare but possible risk. It is also difficult to use a conventional cystoscope in urethral stenosis and in the presence of significant hematuria [13].

CT virtual cystoscopy is non-invasive and routinely does not require any form anesthesia. Patients that suffer from claustrophobia may need a sedative prior to the procedure. After initial intravenous injection with contrast, the bladder is distended with 200 to 600 cc of room air. For the most optimal evaluation, the bladder must be distended and then imaged in both supine and prone positions. Subsequently, the patient is examined with a helical CT scanner usually with a single detector. The CT data is later transferred to a workstation in order to recreate a surface rendering for interpretation of the transverse and virtual imaging [10, 13, 14].

THE USES OF A CYSTOSCOPY IN UROLOGY

1. Urinary obstruction

Inspection of the urethra, bladder, ureter, and renal pelvis by means of panendoscopy, cystoscopy, or ureteroscopy may reveal the primary obstructive cause. Some of the most common causes are urethral stricture, benign prostatic hyperplasia, urinary stones, vesical tumor at the bladder neck and congenital defects. Findings such as muscular hypertrophy with trabeculation, edema of mucosa, cellules and diverticula may be observed depending on the severity of obstruction. In addition, ureteral catheters can be placed into the ureters and upper urinary tract to obtain selective urine cytologies and/or urine cultures. Contrast can be instilled into the ureters to visualize anatomic defects (retrograde ureteropyelogram). [1].

2. Vesicoureteral reflux

Vesicoureteral reflux can be associated with several important findings such as: small or trabeculated bladders, duplication of the ureters, the presence of a ureterocele and bladder inflammation (cystitis). The ureteral orifices in patients with vesicoureteral reflux can be ectopic and found in locations such as the bladder neck or the urethra. Bladder diverticuli can be found on or lateral to the ureteral orifices. [1].

The normal ureteral orifice has the appearance of a small volcanic cone. The appearance is variable and can look like a horseshoe in some cases. When the orifice is completely incompetent, it may appear like a golf-hole orifice. In general, the more defective looking the ureteral orifice, the further away from the normal location in the trigone will the orifice lie. [1].

It is important to note that cystoscopy is not routinely performed in the diagnosis of vesicoureteral reflux. However, it may be performed prior to surgical correction to further delineate bladder anatomy and evaluate for the presence of other bladder and ureteral abnormalities. [2].

3. Lower Urinary Tract Infection

Cystoscopy is indicated in the diagnostic approach of cases of recurrent urinary tract infections. It is performed in order to establish possible structural abnormalities that may be causing the persistent reinfections.

4. Urinary Stone Disease

Cystoscopy may be performed in order to obtain direct visualization of stone that may be present within the lower urinary tract, yet it’s use is not routine and has been substituted by less invasive radiological techniques such as X-Ray, CT scan and/or intravenous pyelography. Cystoscopy may be used as a tool while performing other procedures like a retrograde pyelogram or ureteroscopic stone extraction [1].

Transurethral cystolitholapaxy is the procedure used to treat bladder stones. It utilizes a small simple mechanical crushing device (Lithotrite) in order to break up bladder stones into smaller pieces and remove them through a cystoscope. The lithotrite must be used with extreme caution as injury to the bladder and urethra are possible if the jaws are open during instrument passage. In order to prevent this possible complication, the examiner must ensure that there is unrestricted movement with adequate visualization and that the bladder is partially full [1].

5. Cystoscopy in Trauma

Cystoscopy and retrograde urography are important adjuncts in the trauma patient to detect potential lower urinary tract injury. However, due to the widespread acceptance and availability of CT scanning, these tests are rarely utilized today. It is quicker and easier to perform a CT with and without intravenous contrast along with a CT cystogram to evaluate the kidneys and bladder in the trauma setting. Not only will this study evaluate the urogenital system but can look for abnormalities in the gastrointestinal and musculoskeletal systems. [1].

6. Bladder Carcinoma

Cystoscopy is important in the initial diagnosis of bladder cancer. Usually cystoscopy is performed to evaluate gross or microscopic hematuria and in the patient with a significant history of cigarette smoking, bladder tumors can be found. Superficial, low-malignant potential bladder tumors usually appear as single or multiple papillary lesions. On the other hand, high-malignant potential lesions are larger and sessile. Carcinoma in situ (CIS) usually appears as flat areas of erythema. Use of fluorescent cystoscopy with blue light can enhance the ability to detect possible areas of CIS [1].

With transurethral resection, physicians achieve tumor diagnosis and the depth of bladder wall invasion for staging purposes. The American Urologic Associations' best practice guidelines for bladder cancer state that all patients should undergo a complete resection of all possible and visible tumors [1].

During the cystoscopy, suspicious areas may be biopsied. Bleeding areas may be subsequently cauterized to ensure adequate hemostasis. Fluorescent cystoscopy can be used as a tool during the follow up of a patient who has undergone a transurethral resection of a bladder tumor. The use of fluorescent cystoscopy allows physicians to assess to possibility of any remaining residual tumors that may be invisible to the naked eye [1, 2].

Close follow up of patients with superficial bladder cancer is mandatory. Disease recurrence will occur in 40-70% of patients, depending on cancer grade, tumor stage, and number of tumors [1]. Early recurrence of tumor after initial resection portends increased risk of future recurrences and progression. In general, follow up cystoscopies are performed every 3 months for the first two years, then every six months for the next two years and annually thereafter. [1, 2]. The risk of recurrence decreases as the tumor-free interval increases. If a patient can continue without recurrence for 5 years, their risk of further tumor recurrence decreases to about 20%. Further, the rate of recurrence after 10 years is 2% [1].

7. Neuropathic Bladder Disorders

Cystourethroscopy helps assess the integrity of the urethra and visualize possible sites of stricture. The bladder may show variable degrees of trabeculation with occasional diverticula. Assessment of bladder capacity, presence of kidney stones, competency of the ureteral orifices, changes secondary to chronic infection or indwelling catheters and the integrity of the bladder neck and external urethral sphincter can be done through cystoscopy. When indicated, ureteroscopy can also be used to inspect the ureter and the renal pelvis [1].

Cystoscopy and urethroscopy performed some months or weeks after the injury will confirm the laxity and arreflexia of the sphincter and pelvic floor. The bladder neck is usually funneled and open and the bladder can be large and smooth walled. The integrity of the ureteral orifices should be normal. Fine trabeculation may be evident. Bladder stones and urethral stricture or obstruction may be seen in long-term cases [1].

8. Interstitial Cystitis/Bladder Pain Syndrome (IC/PBS)

Diagnostic cystoscopy is commonly performed under anesthesia in order to adequately distend the bladder. Typical cystoscopic findings associated with IC/PBS are reduced capacity, scarring and cracking of the mucosa with distention known as Hunner's Ulcer, and appearance of diffuse petechial hemorrhages in the mucosa known as glomerulation after distension. However, classic Hunner's ulcer is rare. Glomerulation can also be seen with other conditions and is not specific to interstitial cystitis [9].

9. Foreign Body in the Bladder

Numerous objects have been found in the urethra and bladder of both men and women. Some of them find their way into the urethra in the course of inquisitive self-exploration. Some objects can migrate in the bladder through erosion. Commonly reported objects are intrauterine contraceptive devices, hernia repair mesh, surgical drains, vaginal sling material, and bone fragments after trauma. The presence of a foreign body causes cystitis. Hematuria is not uncommon. Embarrassment may cause the victim to delay medical consultation. A plain x-ray of the bladder area discloses metal objects. Non-opaque objects sometimes become coated with calcium. Cystoscopy visualizes them all [1].

Cystoscopic or suprapubic removal of the foreign body is indicated. If not removed, the foreign body will lead to infection of the bladder. If the infecting organisms are urea splitting, the alkaline urine contributes to rapid stone formation on the foreign object [2].

10. Vesical Fistulas

Cystoscopic examination shows a severe localized inflammatory reaction from which bowel contents may exude. Catheterization of the fistulous tract may be feasible; the instillation of radiopaque fluid often establishes the diagnosis [1].

11. Hemorrhagic Cystitis

Hemorrhagic cystitis may be caused by previous local pelvic radiation therapy, medications such as Danazol and certain Penicillins, chemotherapy treatment with Cyclophosphamide and infection by Schistosoma haematobium. Cystoscopy shows abnormal neovascularization that is easy to bleed with distention. Diffuse mucosal bleeding is common.

12. Benign Prostatic Hyperplasia

Cystoscopy can provide the clinician with visualization of the prostate urethra. One can see occlusion of the lateral lobes of the prostate and determine the presence of a prominent median prostatic lobe. The length of the prostate can be determined preoperatively which can allow the clinician to judge the time required to complete prostate resection. When marked obstructive symptoms exist in the setting of relatively minimal prostate enlargement, cystoscopy may be useful to identify a high bladder neck, urethral stricture, or other pathology. If BPH is associated with hematuria, then cystoscopy is mandatory to rule out other bladder pathologies [1].

CONCLUSION

Cystoscopy allows visualization of the important anatomic components of the urethra and bladder. One of the most common indications for cystoscopy is the evaluation of patients with gross or microscopic hematuria. Other indications for cystoscopy include evaluation of voiding symptoms, surveillance of bladder cancer, evaluation of the urinary tract for suspected foreign body (such as bladder stones or pieces of urinary catheters/stents), and for the assistance in placement of a urinary catheter. Cystoscopy can also be used to assess the upper urinary tract via the ureters to perform diagnostic and therapeutic interventions (such as retrograde ureteroscopy).

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