

Urinary Retention in Adults: Evaluation and Initial Management

David C. Serlin, MD; Joel J. Heidelbaugh, MD; and John T. Stoffel, MD

University of Michigan Medical School, Ann Arbor, Michigan

Urinary retention is the acute or chronic inability to voluntarily pass an adequate amount of urine. The condition predominantly affects men. The most common causes are obstructive in nature, with benign prostatic hyperplasia accounting for 53% of cases. Infectious, inflammatory, iatrogenic, and neurologic causes can also affect urinary retention. Initial evaluation should involve a detailed history that includes information about current prescription medications and use of over-the-counter medications and herbal supplements. A focused physical examination with neurologic evaluation should be performed, and diagnostic testing should include measurement of postvoid residual (PVR) volume of urine. There is no consensus regarding a PVR-based definition for acute urinary retention; the American Urological Association recommends that chronic urinary retention be defined as PVR volume greater than 300 mL measured on two separate occasions and persisting for at least six months. Initial management of urinary retention involves assessment of urethral patency with prompt and complete bladder decompression by catheterization. Suprapubic catheters improve patient comfort and decrease bacteriuria and the need for recatheterization in the short term; silver alloy-coated and antibiotic-impregnated catheters offer clinically insignificant or no benefit. Further management is decided by determining the cause and chronicity of the urinary retention and can include initiation of alpha blockers with voiding trials. Patients with urinary retention related to an underlying neurologic cause should be monitored in conjunction with neurology and urology subspecialists. (*Am Fam Physician*. 2018;98(8):496-503. Copyright © 2018 American Academy of Family Physicians.)

Urinary retention is the inability to voluntarily pass an adequate amount of urine and can be attributable to acute and chronic etiologies. Acute urinary retention is a urologic emergency characterized by the sudden inability to urinate combined with suprapubic pain, bloating, urgency, distress, or, occasionally, mild incontinence.¹ Chronic urinary retention is usually associated with non-neurogenic causes, is often asymptomatic, and lacks consensus on defining criteria. The overall incidence of urinary retention is much higher in men than women and increases dramatically as men age. Estimates for men range from 4.5 to 6.8 per 1,000 person-years, increasing up to 300 per 1,000 person-years for men in their 80s, whereas the incidence in women is only seven per 100,000 per year.²⁻⁴

CME This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz on page 484.

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Causes of Urinary Retention

The main causes of urinary retention are obstructive, infectious/inflammatory, iatrogenic, and neurologic in nature; obstructive causes are the most common (*Table 1*).⁵

OBSTRUCTIVE

Benign prostatic hyperplasia is the most common obstructive cause of urinary retention, accounting for approximately 53% of cases⁶; a previous *American Family Physician (AFP)* article provides a detailed review of benign prostatic hyperplasia.⁷

Other obstructive causes in males include prostate cancer, phimosis, and paraphimosis; obstructive causes in females include pelvic organ prolapse of the bladder, rectum, or uterus. Both men and women can experience direct physical obstruction attributable to stones, urethral strictures, hematuria-related clot obstruction, and bladder cancer. Uncommonly, foreign bodies, either intraluminal or those causing extrinsic compression, can cause urinary retention. Additionally, fecal impaction, benign or malignant tumors, or other space-occupying pelvic masses can indirectly obstruct the urinary tract.⁵

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	References
Initial evaluation of the patient with suspected urinary retention should involve a detailed history, including current use of prescription and over-the-counter medications and herbal supplements.	C	5
A focused physical examination, including a neurologic evaluation, should be performed in patients with suspected urinary retention, and diagnostic testing should include measurement of postvoid residual urine volume.	C	5
Suprapubic catheters improve patient comfort and decrease bacteriuria and the need for recatheterization in patients requiring catheterization for up to 14 days.	A	29
Silver alloy-coated and antibiotic-impregnated urethral catheters are not recommended for use in patients with suspected urinary retention because neither produces significantly positive results.	A	31
In patients with urinary retention, initiation of alpha-blocker therapy at the time of catheter insertion or at least before removal is suggested because alpha blockers improve the likelihood of a successful voiding trial.	A	35-37

A = consistent, good-quality patient-oriented evidence; **B** = inconsistent or limited-quality patient-oriented evidence; **C** = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <https://www.aafp.org/afpsort>.

INFECTIOUS AND INFLAMMATORY

Various infections can lead to edema of the urethra or bladder, resulting in acute urinary retention. Acute bacterial prostatitis, previously reviewed in an *AFP* article,⁸ and balanitis/posthitis⁵ are common infectious causes in men;

in the detrusor muscle, leading to impaired detrusor contractility. Alpha-adrenergic agonists, such as decongestants, increase tone in the prostate and bladder neck, whereas calcium channel blockers reduce smooth muscle contractility in the bladder.¹² Nonsteroidal anti-inflammatory drugs

vulvovaginal candidiasis and Behçet syndrome are infectious and inflammatory causes in women. In both sexes, urinary tract and other infections, including herpes zoster affecting the lumbosacral dermatome, can be triggers for urinary retention.⁵

IATROGENIC

The two main causes of iatrogenic urinary retention include postoperative side effects or are pharmacologic in nature. An estimated 2% of acute urinary retention cases admitted to a teaching hospital over a two-year period were attributed to medication side effects⁹; in another study, medications were determined to be the most likely cause of 12% of cases of chronic urinary retention.¹⁰ The most common medications that cause acute or chronic urinary retention have anticholinergic side effects (*Table 2*¹¹) that block the parasympathetic muscarinic receptors

TABLE 1

Selected Causes of Urinary Retention

Cause	Men	Women	Both
Obstructive	Benign prostatic hyperplasia; meatal stenosis; paraphimosis; phimosis; prostate cancer	Organ prolapse (cystocele, rectocele, uterine prolapse); pelvic mass (gynecologic malignancy, uterine fibroid, ovarian cyst); retroverted impacted gravid uterus	Bladder calculi; bladder neoplasm; fecal impaction; gastrointestinal or retroperitoneal malignancy/mass; urethral strictures, foreign bodies, and stones
Infectious and inflammatory	Balanitis; prostatic abscess; prostatitis; posthitis	Acute vulvovaginitis; Behçet syndrome; vaginal lichen planus; vaginal lichen sclerosus; vaginal pemphigus	Aneurysmal dilation; bilharziasis (schistosomiasis); cystitis; echinococcosis; edema; Guillain-Barré syndrome; herpes simplex virus; Lyme disease; periurethral abscess; transverse myelitis; tubercular cystitis; urethritis; varicella-zoster virus
Iatrogenic/other	Fracture; laceration; penile constricting bands; penile trauma	Postpartum complication; urethral sphincter dysfunction (Fowler syndrome)	Disruption of posterior urethra and bladder neck in pelvic trauma; pharmacologic; postoperative complication; psychogenic

Note: For specific pharmacologic and neurologic causes of urinary retention, see Tables 2 and 3, respectively.

Adapted with permission from Selius BA, Subedi R. Urinary retention in adults: diagnosis and initial management. *Am Fam Physician*. 2008;77(5):644.

TABLE 2

Selected Pharmacologic Agents Associated with Urinary Retention

Class	Drugs
Antiarrhythmics	Disopyramide (Norpace), procainamide, quinidine
Anticholinergics (selected)	Atropine, belladonna alkaloids, dicyclomine, flavoxate, glycopyrrolate (Robinul), hyoscyamine (Levsin), oxybutynin, propantheline, scopolamine
Antidepressants	Amitriptyline, amoxapine, doxepin, imipramine, maprotiline, nortriptyline (Pamelor)
Antihistamines (selected)	Brompheniramine, chlorpheniramine, cyproheptadine, diphenhydramine (Benadryl), hydroxyzine
Antihypertensives	Hydralazine, nifedipine
Antiparkinsonian agents	Amantadine, benzotropine, bromocriptine (Parlodel), levodopa,* trihexyphenidyl
Antipsychotics	Chlorpromazine, fluphenazine, haloperidol, prochlorperazine, thioridazine, thiothixene
Hormonal agents	Estrogen, progesterone, testosterone
Muscle relaxants	Baclofen (Lioresal), cyclobenzaprine (Flexeril), diazepam (Valium)
Sympathomimetics (alpha-adrenergic agents)	Ephedrine, phenylephrine, pseudoephedrine
Sympathomimetics (beta-adrenergic agents)	Isoproterenol, metaproterenol, terbutaline
Miscellaneous	Amphetamines, carbamazepine (Tegretol), dopamine, mercurial diuretics, nonsteroidal anti-inflammatory drugs (e.g., indomethacin), opioid analgesics (e.g., morphine), vincristine

*—Levodopa is available only in combination drug products (e.g., carbidopa/levodopa [Sinemet]).

Adapted with permission from Curtis LA, Dolan TS, Cespedes RD. Acute urinary retention and urinary incontinence. *Emerg Med Clin North Am.* 2001;19(3):600.

TABLE 3

Neurologic Causes of Urinary Retention and Voiding Dysfunction

Lesion type	Causes
Autonomic or peripheral nerve	Autonomic neuropathy, diabetes mellitus, Guillain-Barré syndrome, herpes zoster virus, Lyme disease, pelvic fracture, pernicious anemia, poliomyelitis, radical pelvic surgery, sacral agenesis, spinal cord trauma, tabes dorsalis
Brain	Cerebrovascular disease, concussion, multiple sclerosis, neoplasm or tumor, normal pressure hydrocephalus, Parkinson disease, Shy-Drager syndrome
Spinal cord	Dysraphic lesions, intervertebral disk disease, meningomyelocele, multiple sclerosis, spina bifida occulta, spinal cord hematoma or abscess, spinal cord trauma, spinal stenosis, spinovascular disease, transverse myelitis, tumors or masses of conus medullaris or cauda equina

Adapted with permission from Ellerkmann RM, McBride A. Management of obstructive voiding dysfunction. *Drugs Today (Barc).* 2003;39(7):515.

NEUROLOGIC

Normal urinary function depends on storage of urine in the bladder at low intravesicular pressure without leakage and the ability to intermittently voluntarily and effectively empty the bladder. These processes depend on dynamic interactions between the central and peripheral autonomic and somatic nervous systems.¹⁶ Although miscommunication or interruption in these pathways more often results in urinary incontinence, comorbid or independent urinary retention can occur.¹⁷

Urinary retention can result from many neurologic conditions (Table 3¹⁸). Over time, 25% to 60% of men and women with diabetes mellitus will develop diabetic cystopathy, which can lead to detrusor underactivity and urinary retention.¹⁹ In a 2010 cross-sectional study, approximately 25% of patients with multiple sclerosis reported needing intermittent catheterization.²⁰ Patients with a new spinal cord injury experience spinal shock for one to 12 months post-injury, which can result in complete urinary retention. The majority of patients who have spinal cord injury with spinal shock–induced urinary retention will require management for incomplete bladder emptying, such as intermittent catheterization or a suprapubic tube, during this time frame.²¹ Many patients with spina bifida require anticholinergic medications to reduce bladder pressure. These medications can cause urinary retention, which requires intermittent catheterization to facilitate bladder emptying.²²

Cerebrovascular accidents more commonly lead to urinary incontinence; however, a subset of patients experience urinary retention because of detrusor hyporeflexia or

inhibit prostaglandin synthesis, which, in theory, could lead to decreased detrusor muscle contraction.¹³

Postoperative urinary retention occurs in 2% to 14% of inpatient surgeries and significantly varies based on the type of anesthetic used in the procedure, but also on patient age, sex, and comorbidities. In two large analyses, the strongest risk factors for postoperative urinary retention included older age and the presence of lower urinary tract symptoms; use of a preoperative alpha blocker decreased this risk.^{14,15}

areflexia, and retention is more likely to occur when lesions are found in the brainstem. The incidence of urinary retention can range from 19% to 47% in the early recovery period; a study of 80 consecutive adults undergoing inpatient rehabilitation after a first ischemic stroke found that 23 had evidence of urinary retention on admission, but only four still did by the time of discharge.²³

OTHER CAUSES

The risk of acute urinary retention increases during pregnancy and after the postpartum period. The incidence of acute urinary retention in pregnant women is about one in 200, and it is most common during weeks 9 through 16 of gestation. A significantly higher risk of developing acute urinary retention occurs in pregnant women who are 35 years or older, who have a retroverted uterus, or who experience preterm delivery during that pregnancy.²⁴ In the postpartum period, the incidence of acute urinary retention rose to one in 10 women; risk factors included instrumental deliveries, labors lasting longer than 700 minutes, and applied fundal pressure during the second stage of labor. The correlation of acute urinary retention with epidural anesthesia, episiotomy, macrosomia, and primiparity is supported by conflicting data.²⁴⁻²⁶

Self-inflicted causes of acute urinary retention include the use of external penile constricting devices used to maintain erections, as well as various other genitourinary traumas.⁵

Approach to Patients with Urinary Retention

The evaluation of the patient with suspected urinary retention should begin with a detailed history to elucidate the precise etiology, as summarized in Table 4.⁵ Initial evaluation should also include a thorough medication history, including use of over-the-counter

TABLE 4

History and Physical Examination Findings That Suggest Etiologies of Urinary Retention

Potential etiology	History	Physical examination
Men		
Acute bacterial prostatitis	Fever, dysuria, rectal or perineal pain	Tender, boggy, warm prostate and possible penile discharge
Benign prostatic hyperplasia	Previous history of urinary retention	Enlarged, firm, nontender, non-nodular or normal prostate examination
Phimosis, paraphimosis, or edema from vacuum erection device	Pain, erythema, swelling of foreskin and/or penis	Edema of penis without retractable foreskin
Prostate cancer	Asymptomatic; weight loss; constitutional signs and symptoms	Normal or enlarged prostate with or without palpable nodules
Women		
Cystocele; rectocele; uterine prolapse	Pelvic pressure; palpation of pelvic organ from vagina	Prolapse of bladder, rectum, or uterus
Uterine fibroid, pelvic mass or malignancy	Pelvic or lower abdominal pain, dysmenorrhea, bloating	Palpable uterus, ovaries, or adnexa
Vulvovaginitis	Vaginal discharge, vaginal itching, dysuria	Inflamed or erythematous vulva or vagina, vaginal discharge
Both		
Advanced gastrointestinal tumor or malignancy	Constitutional symptoms; abdominal or pelvic pain or distention; rectal bleeding	Palpable abdominal or pelvic mass; positive fecal occult blood test; palpable rectal mass
Bladder tumor	Painless hematuria	Gross hematuria with or without clots
Cystitis, urethritis; urinary tract infection; sexually transmitted infection; herpes infection	Dysuria; hematuria; fever, back pain, constitutional symptoms; urethral discharge; genital rash or lesions; recent sexual activity	Suprapubic tenderness; costovertebral angle tenderness; urethral discharge; genital vesicles
Fecal impaction	Constipation	Abdominal or pelvic distention; dilated rectum; retained stool in vault
Neurogenic bladder	Existing or newly diagnosed neurologic disease; diabetic neuropathy; multiple sclerosis; Parkinson disease; stroke; overflow incontinence	Generalized or focal neurologic deficits relative to S1-S5 distribution

Adapted with permission from Selius BA, Subedi R. Urinary retention in adults: diagnosis and initial management. *Am Fam Physician*. 2008;77(5):647.

TABLE 5

Diagnostic Testing in Patients with Urinary Retention

Test type	Diagnostic test	Rationale
Laboratory	Prostate-specific antigen	May be elevated in prostate cancer, benign prostatic hyperplasia, prostatitis, and in the setting of acute urinary retention
	Serum blood glucose	Evaluate for undiagnosed or uncontrolled diabetes mellitus in neurogenic bladder
	Serum blood urea nitrogen, creatinine, electrolytes	Evaluate for renal failure from lower urinary tract obstruction
	Urinalysis	Evaluate for infection, hematuria, proteinuria, glucosuria
Imaging studies	Magnetic resonance imaging of the spine	Evaluate for lumbosacral disk herniation, cauda equina syndrome, spinal tumors, spinal cord compression, multiple sclerosis
	Magnetic resonance imaging or computed tomography of the brain	Evaluate for intracranial lesion, including tumor, stroke, multiple sclerosis (magnetic resonance imaging preferred in multiple sclerosis)
	Pelvic ultrasonography; computed tomography of the abdomen and pelvis	Evaluate for suspected pelvic, abdominal, or retroperitoneal mass or malignancy causing extrinsic bladder neck compression
	Renal and bladder ultrasonography	Measure postvoid residual urine; evaluate for bladder and urethral stones, hydronephrosis, and upper urinary tract disease
Other	Cystoscopy, retrograde cystourethrography	Evaluate for suspected bladder tumor and bladder or urethral stones or strictures
	Urodynamic studies (e.g., uroflowmetry, cystometry, electromyography, urethral pressure profile, video urodynamics, pressure flow studies of micturition)	Evaluate bladder function (detrusor muscle and sphincter) in patients with neurogenic bladder to help guide management

Note: Imaging studies and diagnostic procedures are guided by the clinical context and suspected diagnoses.

Adapted with permission from Selius BA, Subedi R. Urinary retention in adults: diagnosis and initial management. *Am Fam Physician*. 2008;77(5):648.

medications and herbal supplements. The American Urological Association Symptom Index is a validated questionnaire that aims to quantify lower urinary tract symptoms in men relative to obstructive uropathy, often secondary to prostatic enlargement (<https://www.aafp.org/afp/2014/1201/p769.html#afp20141201p769-f1>).²⁷

Physical examination should include a complete abdominal assessment, including palpation and percussion of the bladder and abdominal/pelvic organs; evaluation for flank tenderness; a digital rectal examination in men to assess prostate size with or without nodularity and the presence or absence of rectal masses; a complete pelvic examination in women; and a neurologic evaluation to assess strength, sensation, muscle tone, and reflexes relative to lower thoracic, lumbar, and sacral spinal levels.⁵

Testing should include a postvoid residual (PVR) urine evaluation, which is a simple, noninvasive, and cost-effective volume measurement of urine within the bladder that can be performed with ultrasonography in the office. To date, there is no consensus on the cutoff volume to define acute urinary retention. Some studies posit that the bladder can be percussed when it contains 150 mL of urine and palpated with greater than 200 mL.⁵ No evidence supports a specific PVR threshold for patients with chronic urinary retention; however, the American Urological Association has recommended using a value greater than 300 mL that has persisted for at least six months and has been documented on two separate occasions.²⁸ Patients with chronic urinary retention should be referred to a urologist if they are bothered by related symptoms or have evidence of renal or infectious complications resulting from retained urine. If PVR evaluation cannot be obtained or if it is thought to be inaccurate, patients with suspected urinary retention should be catheterized for decompression of the bladder and accurate measurement of stored urine.

Table 5 reviews additional diagnostic testing that may be indicated in the evaluation of a patient with urinary retention.⁵

Management of Patients with Urinary Retention

ACUTE URINARY RETENTION

In patients with suggestive history or symptoms, physicians should first use physical examination and/or imaging to confirm that the patient is retaining urine (*Figure 1*). The physician should then assess for urethral access by asking patients

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whether they have a history of urethral stricture, urethral injury, bladder or urethral surgery, or pelvic/perineal trauma that may have altered their urethral anatomy. It may be advisable to urgently refer these patients for urologic evaluation rather than attempting catheterization, particularly if patients note a history of being difficult to catheterize. These patients may benefit from an alternative catheter, such as a coude tip, an endoscopic catheter placement via cystoscopy, or suprapubic catheter placement rather than the traditional 16 Fr catheter. Suprapubic catheters improve patient comfort and decrease bacteriuria and the need for recatheterization in those who require catheterization for up to 14 days.²⁹

Catheterization of patients with acute urinary retention should be attempted by experienced physicians because patients are usually experiencing significant discomfort; multiple unsuccessful attempts to place the catheter may increase the risk of urethral injury.³⁰ A Cochrane review found that catheters coated with silver alloy do not prevent catheter-acquired urinary tract infections, and antibiotic-impregnated catheters produce statistically significant but clinically unimportant reductions.³¹ After the catheter is placed, the bladder should be allowed to drain continuously for at least three days.

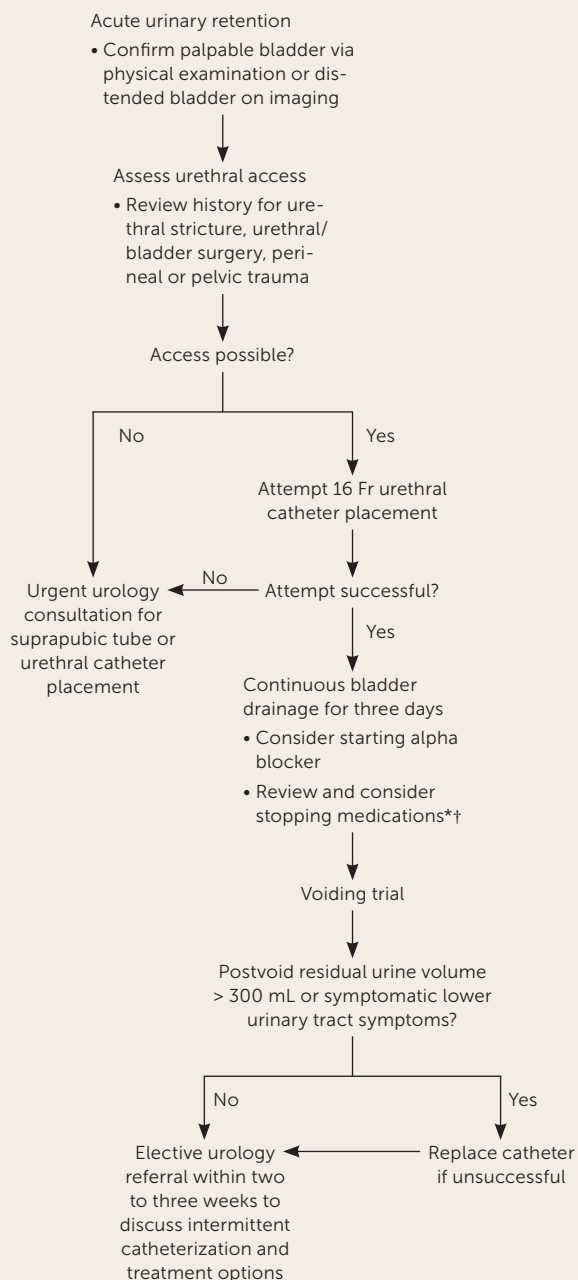
Physicians should be aware that high-volume urinary retention can sometimes cause ureteral obstruction and, consequently, acute renal injury. Therefore, rapid decompression of the bladder can occasionally lead to a postobstructive diuresis and hematuria. Physicians should be aware of this rare potential complication and should monitor patients closely for electrolyte abnormalities, dehydration, and hypotension.

Starting an alpha-blocker medication such as tamsulosin (Flomax) at the time of catheter insertion or certainly before removal increases the likelihood of a successful voiding trial, although it may not prevent recurrent urinary retention or the need for future surgical intervention. Most experts recommend a voiding trial after the catheter has been in place for three to seven days, which should be sufficient for resolution of an iatrogenic or temporary condition.³²⁻³⁷ Patients who fail a voiding trial after catheter removal, who have a PVR greater than 300 mL, or who reported bothersome urinary symptoms before the retention episode should be referred to a urologist within two to three weeks for evaluation.

CHRONIC URINARY RETENTION

Chronic urinary retention should be managed based on its underlying cause. For patients with non-neurologic chronic urinary retention, the American Urological Association has proposed a treatment algorithm that recommends classifying patients with chronic urinary retention first by risk

FIGURE 1

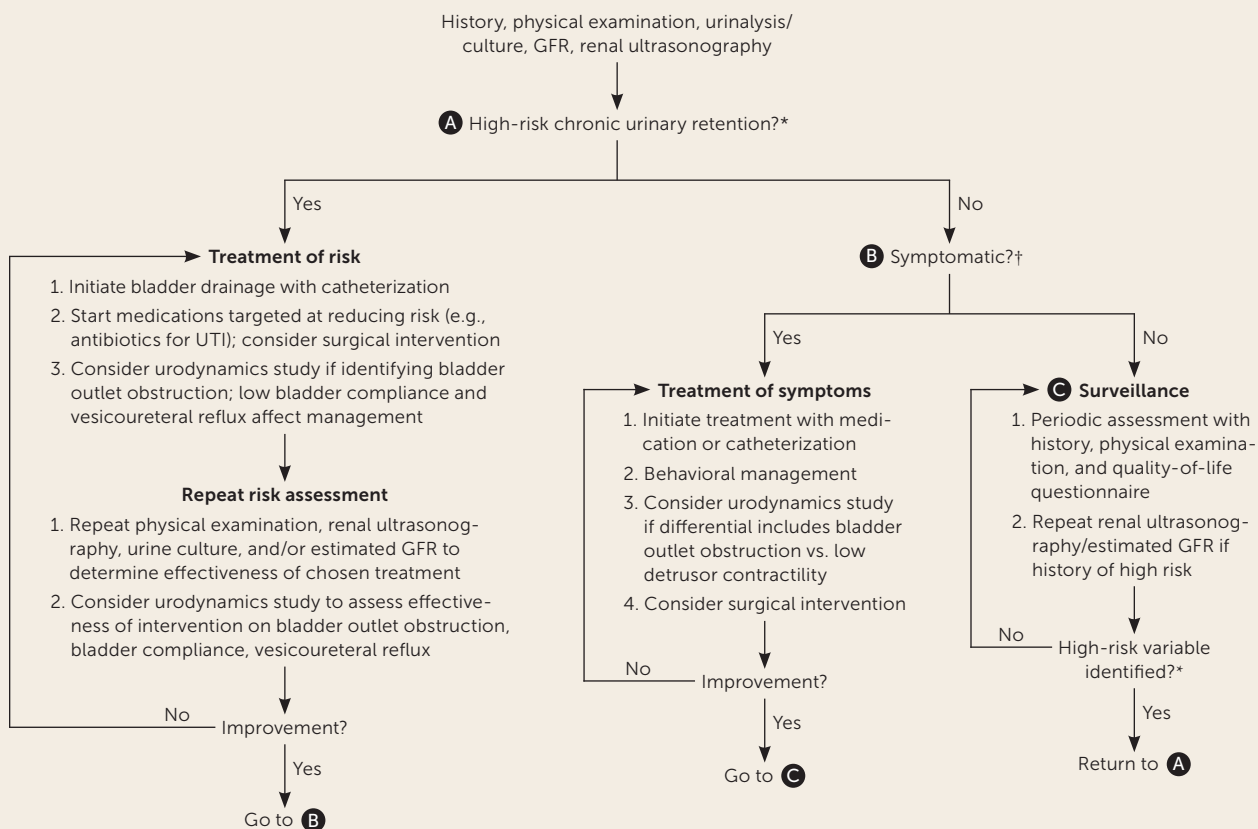


*—Inhibitors of bladder contractility: anticholinergics/antispasmodics, tricyclic antidepressants, beta-adrenergic agonists, calcium channel blockers, nonsteroidal anti-inflammatory drugs, opioids, benzodiazepines, and antipsychotics.

†—Bladder neck/urethral sphincter stimulators: antihistamines, alpha-adrenergic agonists, and antipsychotics.

Management of acute urinary retention.

FIGURE 2



*—High-risk variables include radiologic findings of hydronephrosis or hydroureter; laboratory findings of stage 3 chronic kidney disease or recurrent culture-proven UTI or urosepsis; or signs or symptoms of urinary incontinence associated with perineal skin changes or sacral decubitus ulcers.
†—Moderate to severe on a questionnaire such as the American Urological Association Symptom Index.

American Urological Association treatment algorithm for non-neurologic chronic urinary retention. (GFR = glomerular filtration rate; UTI = urinary tract infection)

Adapted with permission from Stoffel JT, Peterson AC, Sandhu JS, Suskind AM, Wei JT, Lightner DJ. AUA white paper on nonneurogenic chronic urinary retention: consensus definition, treatment algorithm, and outcome end points. *J Urol.* 2017;198(1):156.

and then by symptoms (Figure 2⁸). Patients with high-risk chronic urinary retention have associated findings of hydronephrosis on imaging, stage 3 chronic kidney disease, or recurrent culture-proven urinary tract infection or urosepsis. Patients with symptomatic chronic urinary retention will generally report moderate to severe urinary symptoms on the American Urological Association Symptom Index and/or have a recent history of catheterization for urinary retention. All of these patients should be reassessed periodically for changes in risk or symptoms.²⁸

Persons with urinary retention related to an underlying neurologic cause (“neurogenic bladder”), including those

with spinal cord injuries, have a significantly higher risk of infectious or renal morbidity from retained urine.³⁸ Given the additional risk of these and other neurologic conditions, such as multiple sclerosis and Parkinson disease, these patients should be followed in conjunction with a neurologist and urologist.

This article updates a previous article on this topic by Selius and Subedi.⁵

Data Sources: A PubMed search was completed using the key terms acute urinary retention and chronic urinary retention. The Cochrane Database of Systematic Reviews was searched using the key term urinary retention. Essential Evidence Plus, the

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U.S. Preventive Services Task Force, the Agency for Healthcare Research and Quality, and the National Guideline Clearinghouse were also searched. Search dates: April through July 2017.

The Authors

DAVID C. SERLIN, MD, is an assistant professor in the Department of Family Medicine at the University of Michigan Medical School, Ann Arbor.

JOEL J. HEIDELBAUGH, MD, is a clinical professor in the Departments of Family Medicine and Urology at the University of Michigan Medical School.

JOHN T. STOFFEL, MD, is a professor in the Department of Urology at the University of Michigan Medical School.

Address correspondence to David C. Serlin, MD, Department of Family Medicine, University of Michigan Medical School, 300 North Ingalls St., N14C06, Ann Arbor, MI 48109-5435. Reprints are not available from the authors.

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