

Urinary Retention

National Kidney and Urologic Diseases Information Clearinghouse



National Institute of
Diabetes and Digestive
and Kidney Diseases

**ADULT
PEDIATRIC
UROLOGY &
UROGYNECOLOGY**

What is urinary retention?

Urinary retention is the inability to empty the bladder completely. Urinary retention can be acute or chronic. Acute urinary retention happens suddenly and lasts only a short time. People with acute urinary retention cannot urinate at all, even though they have a full bladder. Acute urinary retention, a potentially life-threatening medical condition, requires immediate emergency treatment. Acute urinary retention can cause great discomfort or pain.

Chronic urinary retention can be a long-lasting medical condition. People with chronic urinary retention can urinate. However, they do not completely empty all of the urine from their bladders. Often people are not even aware they have this condition until they develop another problem, such as urinary incontinence—loss of bladder control, resulting in the accidental loss of urine—or a urinary tract infection (UTI), an illness caused by harmful bacteria growing in the urinary tract.

What is the urinary tract and how does it work?

The urinary tract is the body's drainage system for removing urine, which is composed of wastes and extra fluid. In order for normal urination to occur, all body parts in the urinary tract need to work together in the correct order.

Kidneys. The kidneys are two bean-shaped organs, each about the size of a fist. They are located just below the rib cage, one on each side of the spine. Every day, the kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine. The kidneys work around the clock; a person does not control what they do.

Ureters. Ureters are the thin tubes of muscle—one on each side of the bladder—that carry urine from each of the kidneys to the bladder.

Bladder. The bladder, located in the pelvis between the pelvic bones, is a hollow, muscular, balloon-shaped organ that expands as it fills with urine. Although a person does not control kidney function, a person does control when the bladder empties. Bladder emptying is known as urination. The bladder stores urine until the person finds an appropriate time and place to urinate. A normal bladder acts

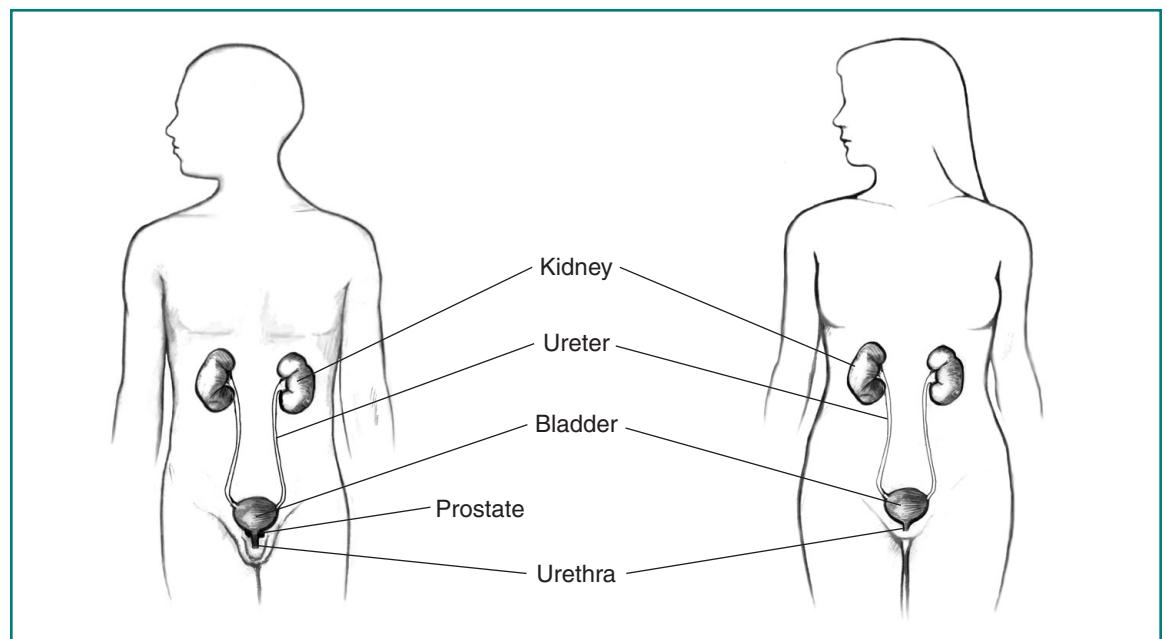
like a reservoir and can hold 1.5 to 2 cups of urine. How often a person needs to urinate depends on how quickly the kidneys produce the urine that fills the bladder. The muscles of the bladder wall remain relaxed while the bladder fills with urine. As the bladder fills to capacity, signals sent to the brain tell a person to find a toilet soon. During urination, the bladder empties through the urethra, located at the bottom of the bladder.

Three sets of muscles work together like a dam, keeping urine in the bladder.

The first set is the muscles of the urethra itself. The area where the urethra joins the

bladder is the bladder neck. The bladder neck, composed of the second set of muscles known as the internal sphincter, helps urine stay in the bladder. The third set of muscles is the pelvic floor muscles, also referred to as the external sphincter, which surround and support the urethra.

To urinate, the brain signals the muscular bladder wall to tighten, squeezing urine out of the bladder. At the same time, the brain signals the sphincters to relax. As the sphincters relax, urine exits the bladder through the urethra.



Male and female urinary tracts

What causes urinary retention?

Urinary retention can result from

- obstruction of the urethra
- nerve problems
- medications
- weakened bladder muscles

Obstruction of the Urethra

Obstruction of the urethra causes urinary retention by blocking the normal urine flow out of the body. Conditions such as benign prostatic hyperplasia—also called BPH—urethral stricture, urinary tract stones, cystocele, rectocele, constipation, and certain tumors and cancers can cause an obstruction.

Benign prostatic hyperplasia. For men in their 50s and 60s, urinary retention is often caused by prostate enlargement due to benign prostatic hyperplasia. Benign prostatic hyperplasia is a medical condition in which the prostate gland is enlarged and not cancerous. The prostate is a walnut-shaped gland that is part of the male reproductive system. The gland surrounds the urethra at the neck of the bladder. The bladder neck is the area where the urethra joins the bladder. The prostate goes through two main periods of growth. The first occurs early in puberty, when the prostate doubles in size. The second

phase of growth begins around age 25 and continues during most of a man's life. Benign prostatic hyperplasia often occurs with the second phase of growth.

As the prostate enlarges, the gland presses against and pinches the urethra. The bladder wall becomes thicker. Eventually, the bladder may weaken and lose the ability to empty completely, leaving some urine in the bladder.

Read more in *Prostate Enlargement: Benign Prostatic Hyperplasia* at www.urologic.niddk.nih.gov.

Urethral stricture. A urethral stricture is a narrowing or closure of the urethra. Causes of urethral stricture include inflammation and scar tissue from surgery, disease, recurring UTIs, or injury. In men, a urethral stricture may result from prostatitis, scarring after an injury to the penis or perineum, or surgery for benign prostatic hyperplasia and prostate cancer. Prostatitis is a frequently painful condition that involves inflammation of the prostate and sometimes the areas around the prostate. The perineum is the area between the anus and the sex organs. Since men have a longer urethra than women, urethral stricture is more common in men than women.¹

Read more in *Prostatitis: Inflammation of the Prostate* at www.urologic.niddk.nih.gov.

¹Urethral stricture. Mayo Clinic website. www.mayoclinic.org/urethral-stricture/about.html. Updated November 20, 2012. Accessed April 1, 2014.

Surgery to correct pelvic organ prolapse, such as cystocele and rectocele, and urinary incontinence can also cause urethral stricture. The urethral stricture often gets better a few weeks after surgery.

Urethral stricture and acute or chronic urinary retention may occur when the muscles surrounding the urethra do not relax. This condition happens mostly in women.

Urinary tract stones. Urinary tract stones develop from crystals that form in the urine and build up on the inner surfaces of the kidneys, ureters, or bladder. The stones formed or lodged in the bladder may block the opening to the urethra.

Cystocele. A cystocele is a bulging of the bladder into the vagina. A cystocele occurs when the muscles and supportive tissues between a woman's bladder and vagina weaken and stretch, letting the bladder sag from its normal position and bulge into the vagina. The abnormal position of the bladder may cause it to press against and pinch the urethra.

Read more in *Cystocele* at www.urologic.niddk.nih.gov.

Rectocele. A rectocele is a bulging of the rectum into the vagina. A rectocele occurs when the muscles and supportive tissues between a woman's rectum and vagina weaken and stretch, letting the rectum sag from its normal position and bulge into the vagina. The abnormal position of the rectum may cause it to press against and pinch the urethra.

Constipation. Constipation is a condition in which a person has fewer than three bowel movements a week or has bowel movements with stools that are hard, dry, and small, making them painful or difficult to pass. A person with constipation may feel bloated or have pain in the abdomen—the area between the chest and hips. Some people with constipation often have to strain to have a bowel movement. Hard stools in the rectum may push against the bladder and urethra, causing the urethra to be pinched, especially if a rectocele is present.

Read more in *Constipation* at www.digestive.niddk.nih.gov.

Tumors and cancers. Tumors and cancerous tissues in the bladder or urethra can gradually expand and obstruct urine flow by pressing against and pinching the urethra or by blocking the bladder outlet. Tumors may be cancerous or noncancerous.

Nerve Problems

Urinary retention can result from problems with the nerves that control the bladder and sphincters. Many events or conditions can interfere with nerve signals between the brain and the bladder and sphincters. If the nerves are damaged, the brain may not get the signal that the bladder is full. Even when a person has a full bladder, the bladder muscles that squeeze urine out may not get the signal to push, or the sphincters may not get the signal to relax. People of all ages can have nerve problems that interfere with bladder function. Some of the most common causes of nerve problems include

- vaginal childbirth
- brain or spinal cord infections or injuries
- diabetes
- stroke
- multiple sclerosis
- pelvic injury or trauma
- heavy metal poisoning

In addition, some children are born with defects that affect the coordination of nerve signals among the bladder, spinal cord, and brain. Spina bifida and other birth defects that affect the spinal cord can lead to urinary retention in newborns.

Read more in *Nerve Disease and Bladder Control* and *Urine Blockage in Newborns* at www.urologic.niddk.nih.gov.

Many patients have urinary retention right after surgery. During surgery, anesthesia is often used to block pain signals in the nerves, and fluid is given intravenously to compensate for possible blood loss. The combination of anesthesia and intravenous (IV) fluid may result in a full bladder with impaired nerve function, causing urinary retention. Normal bladder nerve function usually returns once anesthesia wears off. The patient will then be able to empty the bladder completely.

Medications

Various classes of medications can cause urinary retention by interfering with nerve signals to the bladder and prostate. These medications include

- antihistamines to treat allergies
 - cetirizine (Zyrtec)
 - chlorpheniramine (Chlor-Trimeton)
 - diphenhydramine (Benadryl)
 - fexofenadine (Allegra)
- anticholinergics/antispasmodics to treat stomach cramps, muscle spasms, and urinary incontinence
 - hyoscyamine (Levbid)
 - oxybutynin (Ditropan)
 - propantheline (Pro-Banthine)
 - tolterodine (Detrol)

- tricyclic antidepressants to treat anxiety and depression
 - amitriptyline (Elavil)
 - doxepin (Adapin)
 - imipramine (Tofranil)
 - nortriptyline (Pamelor)

Other medications associated with urinary retention include

- decongestants
 - ephedrine
 - phenylephrine
 - pseudoephedrine
- nifedipine (Procardia), a medication to treat high blood pressure and chest pain
- carbamazepine (Tegretol), a medication to control seizures in people with epilepsy
- cyclobenzaprine (Flexeril), a muscle relaxant medication
- diazepam (Valium), a medication used to relieve anxiety, muscle spasms, and seizures
- nonsteroidal anti-inflammatory drugs
- amphetamines
- opioid analgesics

Over-the-counter cold and allergy medications that contain decongestants, such as pseudoephedrine, and antihistamines, such as diphenhydramine, can increase symptoms of urinary retention in men with prostate enlargement.

Weakened Bladder Muscles

Aging is a common cause of weakened bladder muscles. Weakened bladder muscles may not contract strongly enough or long enough to empty the bladder completely, resulting in urinary retention.

How common is urinary retention?

Urinary retention in men becomes more common with age.

- In men 40 to 83 years old, the overall incidence of urinary retention is 4.5 to 6.8 per 1,000 men.²
- For men in their 70s, the overall incidence increases to 100 per 1,000 men.²
- For men in their 80s, the incidence of acute urinary retention is 300 per 1,000 men.²

²Selius BA, Subedi R. Urinary retention in adults: diagnosis and initial management. *American Family Physician*. 2008;77(5):643–650.

Urinary retention in women is less common, though not rare.³ The incidence of urinary retention in women has not been well studied because researchers have primarily thought of urinary retention as a man's problem related to the prostate.⁴

What are the symptoms of urinary retention?

The symptoms of **acute** urinary retention may include the following and require immediate medical attention:

- inability to urinate
- painful, urgent need to urinate
- pain or discomfort in the lower abdomen
- bloating of the lower abdomen

The symptoms of **chronic** urinary retention may include

- urinary frequency—urination eight or more times a day
- trouble beginning a urine stream
- a weak or an interrupted urine stream
- an urgent need to urinate with little success when trying to urinate

- feeling the need to urinate after finishing urination
- mild and constant discomfort in the lower abdomen and urinary tract

Some people with chronic urinary retention may not have symptoms that lead them to seek medical care. People who are unaware they have chronic urinary retention may have a higher chance of developing complications.

When to Seek Medical Care

A person who has any of the following symptoms should see a health care provider right away:

- complete inability to urinate
- great discomfort or pain in the lower abdomen and urinary tract

³Wein AJ, Kavoussi LR, Novick AC, et al. *Campbell-Walsh Urology*. 10th ed. Philadelphia: Saunders; 2011.

⁴Mevcha A, Drake MJ. Etiology and management of urinary retention in women. *Indian Journal of Urology*. 2010;26(2):230–235.

How is urinary retention diagnosed?

A health care provider diagnoses acute or chronic urinary retention with

- a physical exam
- postvoid residual measurement

A health care provider may use the following medical tests to help determine the cause of urinary retention:

- cystoscopy
- computerized tomography (CT) scans
- urodynamic tests
- electromyography

Physical Exam

A health care provider may suspect urinary retention because of a patient's symptoms and, therefore, perform a physical exam of the lower abdomen. The health care provider may be able to feel a distended bladder by lightly tapping on the lower belly.

Postvoid Residual Measurement

This test measures the amount of urine left in the bladder after urination. The remaining urine is called the postvoid residual. A specially trained technician performs an ultrasound, which uses harmless sound waves to create a picture of the bladder, to measure the postvoid residual. The technician performs the bladder ultrasound in a health care

provider's office, a radiology center, or a hospital, and a radiologist—a doctor who specializes in medical imaging—interprets the images. The patient does not need anesthesia.

A health care provider may use a catheter—a thin, flexible tube—to measure postvoid residual. The health care provider inserts the catheter through the urethra into the bladder, a procedure called catheterization, to drain and measure the amount of remaining urine. A postvoid residual of 100 mL or more indicates the bladder does not empty completely. A health care provider performs this test during an office visit. The patient often receives local anesthesia.

Medical Tests

Cystoscopy. Cystoscopy is a procedure that requires a tubelike instrument, called a cystoscope, to look inside the urethra and bladder. A health care provider performs cystoscopy during an office visit or in an outpatient center or a hospital. The patient will receive local anesthesia. However, in some cases, the patient may receive sedation and regional or general anesthesia. A health care provider may use cystoscopy to diagnose urethral stricture or look for a bladder stone blocking the opening of the urethra.

Read more in *Cystoscopy and Ureteroscopy* at www.urologic.niddk.nih.gov.

CT scans. CT scans use a combination of x rays and computer technology to create images. For a CT scan, a health care provider may give the patient a solution to drink and an injection of a special dye, called contrast medium. CT scans require the patient to lie on a table that slides into a tunnel-shaped device where a technician takes the x rays. An x-ray technician performs the procedure in an outpatient center or a hospital, and a radiologist interprets the images. The patient does not need anesthesia. A health care provider may give infants and children a sedative to help them fall asleep for the test. CT scans can show

- urinary tract stones
- UTIs
- tumors
- traumatic injuries
- abnormal, fluid-containing sacs called cysts

Urodynamic tests. Urodynamic tests include a variety of procedures that look at how well the bladder and urethra store and release urine. A health care provider may use one or more urodynamic tests to diagnose urinary retention. The health care

provider will perform these tests during an office visit. For tests that use a catheter, the patient often receives local anesthesia.

- **Uroflowmetry.** Uroflowmetry measures urine speed and volume. Special equipment automatically measures the amount of urine and the flow rate—how fast urine comes out. Uroflowmetry equipment includes a device for catching and measuring urine and a computer to record the data. The equipment creates a graph that shows changes in flow rate from second to second so the health care provider can see the highest flow rate and how many seconds it takes to get there. A weak bladder muscle or blocked urine flow will yield an abnormal test result.
- **Pressure flow study.** A pressure flow study measures the bladder pressure required to urinate and the flow rate a given pressure generates. A health care provider places a catheter with a manometer into the bladder. The manometer measures bladder pressure and flow rate as the bladder empties. A pressure flow study helps diagnose bladder outlet obstruction.

- **Video urodynamics.** This test uses x rays or ultrasound to create real-time images of the bladder and urethra during the filling or emptying of the bladder. For x rays, a health care provider passes a catheter through the urethra into the bladder. He or she fills the bladder with contrast medium, which is visible on the video images. Video urodynamic images can show the size and shape of the urinary tract, the flow of urine, and causes of urinary retention, such as bladder neck obstruction.

Read more in *Urodynamic Testing* at www.urologic.niddk.nih.gov.

Electromyography. Electromyography uses special sensors to measure the electrical activity of the muscles and nerves in and around the bladder and sphincters. A specially trained technician places sensors on the skin near the urethra and rectum or on a urethral or rectal catheter. The sensors record, on a machine, muscle and nerve activity. The patterns of the nerve impulses show whether the messages sent to the bladder and sphincters coordinate correctly. A technician performs electromyography in a health care provider's office, an outpatient center, or a hospital. The patient does not need anesthesia if the technician uses sensors placed on the skin. The patient will receive local anesthesia if the technician uses sensors placed on a urethral or rectal catheter.

How is urinary retention treated?

A health care provider treats urinary retention with

- bladder drainage
- urethral dilation
- urethral stents
- prostate medications
- surgery

The type and length of treatment depend on the type and cause of urinary retention.

Bladder Drainage

Bladder drainage involves catheterization to drain urine. Treatment of acute urinary retention begins with catheterization to relieve the immediate distress of a full bladder and prevent bladder damage. A health care provider performs catheterization during an office visit or in an outpatient center or a hospital. The patient often receives local anesthesia. The health care provider can pass a catheter through the urethra into the bladder. In cases of a blocked urethra, he or she can pass a catheter directly through the lower abdomen, just above the pubic bone, directly into the bladder. In these cases, the health care provider will use anesthesia.

For chronic urinary retention, the patient may require intermittent—occasional, or not continuous—or long-term catheterization if other treatments do not work. Patients who need to continue intermittent catheterization will receive instruction regarding how to self-catheterize to drain urine as necessary.

Urethral Dilation

Urethral dilation treats urethral stricture by inserting increasingly wider tubes into the urethra to widen the stricture. An alternative dilation method involves inflating a small balloon at the end of a catheter inside the urethra. A health care provider performs a urethral dilation during an office visit or in an outpatient center or a hospital. The patient will receive local anesthesia. In some cases, the patient will receive sedation and regional anesthesia.

Urethral Stents

Another treatment for urethral stricture involves inserting an artificial tube, called a stent, into the urethra to the area of the stricture. Once in place, the stent expands like a spring and pushes back the surrounding tissue, widening the urethra. Stents may be temporary or permanent. A health care provider performs stent placement during an office visit or in an outpatient center or a hospital. The patient will receive local anesthesia. In some cases, the patient will receive sedation and regional anesthesia.

Prostate Medications

Medications that stop the growth of or shrink the prostate or relieve urinary retention symptoms associated with benign prostatic hyperplasia include

- dutasteride (Avodart)
- finasteride (Proscar)

The following medications relax the muscles of the bladder outlet and prostate to help relieve blockage:

- alfuzosin (Uroxatral)
- doxazosin (Cardura)
- silodosin (Rapaflo)
- tadalafil (Cialis)
- tamsulosin (Flomax)
- terazosin (Hytrin)

Surgery

Prostate surgery. To treat urinary retention caused by benign prostatic hyperplasia, a urologist—a doctor who specializes in the urinary tract—may surgically destroy or remove enlarged prostate tissue by using the transurethral method. For transurethral surgery, the urologist inserts a catheter or surgical instruments through the urethra to reach the prostate. Removal of the enlarged tissue usually relieves the blockage and urinary retention caused by benign prostatic hyperplasia. A urologist performs some procedures on an outpatient basis. Some men may require a hospital stay. In

some cases, the urologist will remove the entire prostate using open surgery. Men will receive general anesthesia and have a longer hospital stay than for other surgical procedures. Men will also have a longer rehabilitation period for open surgery.

Read more in *Prostate Enlargement: Benign Prostatic Hyperplasia* at www.urologic.niddk.nih.gov.

Internal urethrotomy. A urologist can repair a urethral stricture by performing an internal urethrotomy. For this procedure, the urologist inserts a special catheter into the urethra until it reaches the stricture. The urologist then uses a knife or laser to make an incision that opens the stricture. The urologist performs an internal urethrotomy in an outpatient center or a hospital. The patient will receive general anesthesia.

Cystocele or rectocele repair. Women may need surgery to lift a fallen bladder or rectum into its normal position. The most common procedure for cystocele and rectocele repair involves a urologist, who also specializes in the female reproductive system, making an incision in the wall of the vagina. Through the incision, the urologist looks for a defect or hole in the tissue that normally separates the vagina from the

other pelvic organs. The urologist places stitches in the tissue to close up the defect and then closes the incision in the vaginal wall with more stitches, removing any extra tissue. These stitches tighten the layers of tissue that separate the organs, creating more support for the pelvic organs. A urologist or gynecologist—a doctor who specializes in the female reproductive system—performs the surgery to repair a cystocele or rectocele in a hospital. Women will receive anesthesia.

Tumor and cancer surgery. Removal of tumors and cancerous tissues in the bladder or urethra may reduce urethral obstruction and urinary retention.

What are the complications of urinary retention and its treatments?

Complications of urinary retention and its treatments may include

- UTIs
- bladder damage
- kidney damage
- urinary incontinence after prostate, tumor, or cancer surgery

UTIs. Urine is normally sterile, and the normal flow of urine usually prevents bacteria from infecting the urinary tract. With urinary retention, the abnormal urine flow gives bacteria at the opening of the urethra a chance to infect the urinary tract.

Bladder damage. If the bladder becomes stretched too far or for long periods, the muscles may be permanently damaged and lose their ability to contract.

Kidney damage. In some people, urinary retention causes urine to flow backward into the kidneys. This backward flow, called reflux, may damage or scar the kidneys.

Urinary incontinence after prostate, tumor, or cancer surgery. Transurethral surgery to treat benign prostatic hyperplasia may result in urinary incontinence in some men. This problem is often temporary. Most men recover their bladder control in a few weeks or months after surgery. Surgery to remove tumors or cancerous tissue in the bladder, prostate, or urethra may also result in urinary incontinence.

How can urinary retention be prevented?

People can prevent urinary retention before it occurs by treating some of the potential causes. For example, men with benign prostatic hyperplasia should take prostate medications as prescribed by their health care provider. Men with benign prostatic hyperplasia should avoid medications associated with urinary retention, such as over-the-counter cold and allergy medications that contain decongestants. Women with mild cystocele or rectocele may prevent urinary retention by doing exercises to strengthen the pelvic muscles. In most cases, dietary and lifestyle changes will help prevent urinary retention caused by constipation. People whose constipation continues should see a health care provider.

Read more about exercises to strengthen the pelvic muscles in *Kegel Exercise Tips* at www.urologic.niddk.nih.gov.

Eating, Diet, and Nutrition

Researchers have not found that eating, diet, and nutrition play a role in causing or preventing urinary retention.

Points to Remember

- Urinary retention is the inability to empty the bladder completely.
- Urinary retention can be acute or chronic.
- Urinary retention can result from
 - obstruction of the urethra
 - nerve problems
 - medications
 - weakened bladder muscles
- The symptoms of **acute** urinary retention may include the following and require immediate medical attention:
 - inability to urinate
 - painful, urgent need to urinate
 - pain or discomfort in the lower abdomen
 - bloating of the lower abdomen
- The symptoms of **chronic** urinary retention may include
 - urinary frequency—urination eight or more times a day
 - trouble beginning a urine stream
 - a weak or an interrupted urine stream
 - an urgent need to urinate with little success when trying to urinate
 - feeling the need to urinate after finishing urination
 - mild and constant discomfort in the lower abdomen and urinary tract
- A health care provider diagnoses acute or chronic urinary retention with
 - a physical exam
 - postvoid residual measurement
- A health care provider may use the following medical tests to help determine the cause of urinary retention:
 - cystoscopy
 - computerized tomography (CT) scans
 - urodynamic tests
 - electromyography
- A health care provider treats urinary retention with
 - bladder drainage
 - urethral dilation
 - urethral stents
 - prostate medications
 - surgery
- Complications of urinary retention and its treatments may include
 - urinary tract infections (UTIs)
 - bladder damage
 - kidney damage
 - urinary incontinence after prostate, tumor, or cancer surgery
- People can prevent urinary retention before it occurs by treating some of the potential causes.

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) conducts and supports research into many kinds of urinary tract disorders, including urinary retention. The knowledge gained from these studies is advancing scientific understanding of why urinary tract disorders develop, leading to improved methods of diagnosing, treating, and preventing them.

Clinical trials are research studies involving people. Clinical trials look at safe and effective new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. To learn more about clinical trials, why they matter, and how to participate, visit the NIH Clinical Research Trials and You website at www.nih.gov/health/clinicaltrials. For information about current studies, visit www.ClinicalTrials.gov.

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