

# Prostate Enlargement: Benign Prostatic Hyperplasia

*National Kidney and Urologic Diseases Information Clearinghouse*



National Institute of  
Diabetes and Digestive  
and Kidney Diseases

**ADULT  
PEDIATRIC** UROLOGY &  
UROGYNECOLOGY

## What is benign prostatic hyperplasia?

Benign prostatic hyperplasia—also called BPH—is a condition in men in which the prostate gland is enlarged and not cancerous. Benign prostatic hyperplasia is also called benign prostatic hypertrophy or benign prostatic obstruction.

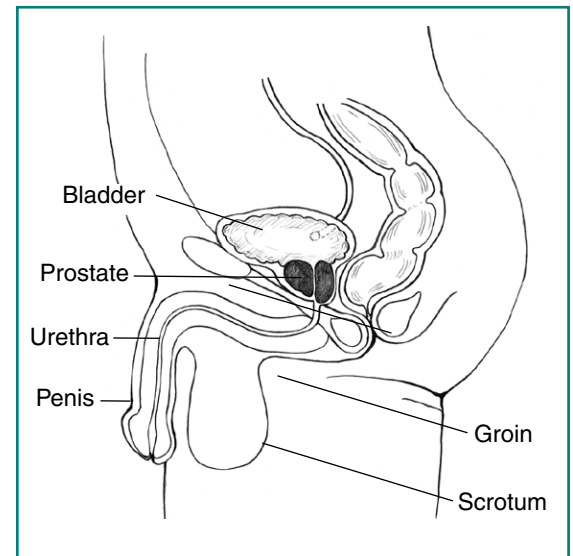
The prostate goes through two main growth periods as a man ages. The first occurs early in puberty, when the prostate doubles in size. The second phase of growth begins around age 25 and continues during most of a man's life. Benign prostatic hyperplasia often occurs with the second growth phase.

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. The narrowing of the urethra and urinary retention—the inability to empty the bladder completely—cause many of the problems associated with benign prostatic hyperplasia.

## What is the prostate?

The prostate is a walnut-shaped gland that is part of the male reproductive system. The main function of the prostate is to make a fluid that goes into semen. Prostate fluid is essential for a man's fertility. The

gland surrounds the urethra at the neck of the bladder. The bladder neck is the area where the urethra joins the bladder. The bladder and urethra are parts of the lower urinary tract. The prostate has two or more lobes, or sections, enclosed by an outer layer of tissue, and it is in front of the rectum, just below the bladder. The urethra is the tube that carries urine from the bladder to the outside of the body. In men, the urethra also carries semen out through the penis.



The prostate is a walnut-shaped gland that is part of the male reproductive system.

## What causes benign prostatic hyperplasia?

The cause of benign prostatic hyperplasia is not well understood; however, it occurs mainly in older men. Benign prostatic hyperplasia does not develop in men whose testicles were removed before puberty. For this reason, some researchers believe factors related to aging and the testicles may cause benign prostatic hyperplasia.

Throughout their lives, men produce testosterone, a male hormone, and small amounts of estrogen, a female hormone. As men age, the amount of active testosterone in their blood decreases, which leaves a higher proportion of estrogen. Scientific studies have suggested that benign prostatic hyperplasia may occur because the higher proportion of estrogen within the prostate increases the activity of substances that promote prostate cell growth.

Another theory focuses on dihydrotestosterone (DHT), a male hormone that plays a role in prostate development and growth. Some research has indicated that even with a drop in blood testosterone levels, older men continue to produce and accumulate high levels of DHT in the prostate. This accumulation of DHT may encourage prostate cells to continue to grow. Scientists have noted that men who do not produce DHT do not develop benign prostatic hyperplasia.

## How common is benign prostatic hyperplasia?

Benign prostatic hyperplasia is the most common prostate problem for men older than age 50. In 2010, as many as 14 million men in the United States had lower urinary tract symptoms suggestive of benign prostatic hyperplasia.<sup>1</sup> Although benign prostatic hyperplasia rarely causes symptoms before age 40, the occurrence and symptoms increase with age. Benign prostatic hyperplasia affects about 50 percent of men between the ages of 51 and 60 and up to 90 percent of men older than 80.<sup>2</sup>

## Who is more likely to develop benign prostatic hyperplasia?

Men with the following factors are more likely to develop benign prostatic hyperplasia:

- age 40 years and older
- family history of benign prostatic hyperplasia
- medical conditions such as obesity, heart and circulatory disease, and type 2 diabetes
- lack of physical exercise
- erectile dysfunction

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<sup>1</sup>Deters LA. Benign prostatic hypertrophy. Emedicine website. <http://emedicine.medscape.com/article/437359-overview>. Updated March 28, 2014. Accessed July 29, 2014.

<sup>2</sup>BPH: surgical management. Urology Care Foundation website. [www.urologyhealth.org/urology/index.cfm?article=31](http://www.urologyhealth.org/urology/index.cfm?article=31). Updated July 2013. Accessed July 29, 2014.

## What are the symptoms of benign prostatic hyperplasia?

Lower urinary tract symptoms suggestive of benign prostatic hyperplasia may include

- urinary frequency—urination eight or more times a day
- urinary urgency—the inability to delay urination
- trouble starting a urine stream
- a weak or an interrupted urine stream
- dribbling at the end of urination
- nocturia—frequent urination during periods of sleep
- urinary retention
- urinary incontinence—the accidental loss of urine
- pain after ejaculation or during urination
- urine that has an unusual color or smell

Symptoms of benign prostatic hyperplasia most often come from

- a blocked urethra
- a bladder that is overworked from trying to pass urine through the blockage

The size of the prostate does not always determine the severity of the blockage or symptoms. Some men with greatly enlarged prostates have little blockage and few symptoms, while other men who have minimally enlarged prostates have greater blockage and more symptoms. Less than half of all men with benign prostatic hyperplasia have lower urinary tract symptoms.<sup>3</sup>

<sup>3</sup>Enlarged prostate. MedlinePlus website. [www.nlm.nih.gov/medlineplus/ency/article/000381.htm](http://www.nlm.nih.gov/medlineplus/ency/article/000381.htm). Updated October 2, 2013. Accessed July 29, 2014.

Sometimes men may not know they have a blockage until they cannot urinate. This condition, called acute urinary retention, can result from taking over-the-counter cold or allergy medications that contain decongestants, such as pseudoephedrine and oxymetazoline. A potential side effect of these medications may prevent the bladder neck from relaxing and releasing urine. Medications that contain antihistamines, such as diphenhydramine, can weaken the contraction of bladder muscles and cause urinary retention, difficulty urinating, and painful urination. When men have partial urethra blockage, urinary retention also can occur as a result of alcohol consumption, cold temperatures, or a long period of inactivity.

## What are the complications of benign prostatic hyperplasia?

The complications of benign prostatic hyperplasia may include

- acute urinary retention
- chronic, or long lasting, urinary retention
- blood in the urine
- urinary tract infections (UTIs)
- bladder damage
- kidney damage
- bladder stones

Most men with benign prostatic hyperplasia do not develop these complications. However, kidney damage in particular can be a serious health threat when it occurs.

## When to Seek Medical Care

A person may have urinary symptoms unrelated to benign prostatic hyperplasia that are caused by bladder problems, UTIs, or prostatitis—inflammation of the prostate. Symptoms of benign prostatic hyperplasia also can signal more serious conditions, including prostate cancer.

Men with symptoms of benign prostatic hyperplasia should see a health care provider.

Men with the following symptoms should seek immediate medical care:

- complete inability to urinate
- painful, frequent, and urgent need to urinate, with fever and chills
- blood in the urine
- great discomfort or pain in the lower abdomen and urinary tract

## How is benign prostatic hyperplasia diagnosed?

A health care provider diagnoses benign prostatic hyperplasia based on

- a personal and family medical history
- a physical exam
- medical tests

## Personal and Family Medical History

Taking a personal and family medical history is one of the first things a health care provider may do to help diagnose benign prostatic hyperplasia. A health care provider may ask a man

- what symptoms are present
- when the symptoms began and how often they occur
- whether he has a history of recurrent UTIs
- what medications he takes, both prescription and over the counter
- how much liquid he typically drinks each day
- whether he consumes caffeine and alcohol
- about his general medical history, including any significant illnesses or surgeries

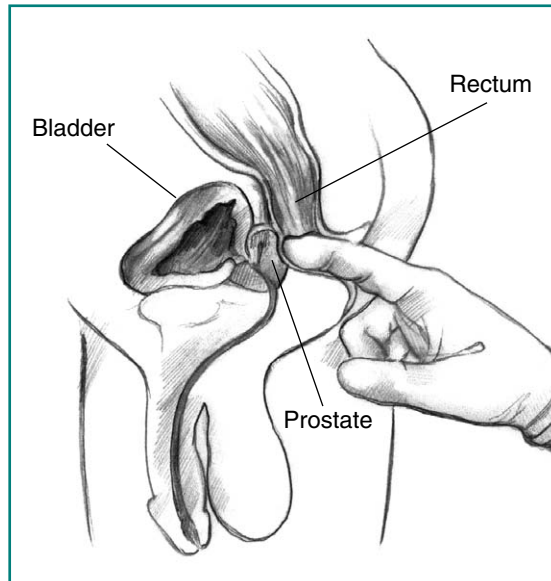
## Physical Exam

A physical exam may help diagnose benign prostatic hyperplasia. During a physical exam, a health care provider most often

- examines a patient's body, which can include checking for
  - discharge from the urethra
  - enlarged or tender lymph nodes in the groin
  - a swollen or tender scrotum
- taps on specific areas of the patient's body
- performs a digital rectal exam

A digital rectal exam, or rectal exam, is a physical exam of the prostate. To perform the exam, the health care provider asks the man to bend over a table or lie on his side while holding his knees close to his chest. The health care provider slides a gloved, lubricated finger into the rectum and feels the part of the prostate that lies next to the rectum. The man may feel slight, brief discomfort during the rectal exam. A health care provider most often performs a rectal exam during an office visit, and men do not require anesthesia. The exam helps the health care provider see if the prostate is enlarged or tender or has any abnormalities that require more testing.

Many health care providers perform a rectal exam as part of a routine physical exam for men age 40 or older, whether or not they have urinary problems.



Digital rectal exam

## Medical Tests

A health care provider may refer men to a urologist—a doctor who specializes in urinary problems and the male reproductive system—though the health care provider most often diagnoses benign prostatic hyperplasia on the basis of symptoms and a digital rectal exam. A urologist uses medical tests to help diagnose lower urinary tract problems related to benign prostatic hyperplasia and recommend treatment. Medical tests may include

- urinalysis
- a prostate-specific antigen (PSA) blood test
- urodynamic tests
- cystoscopy
- transrectal ultrasound
- biopsy

**Urinalysis.** Urinalysis involves testing a urine sample. The patient collects a urine sample in a special container in a health care provider's office or a commercial facility. A health care provider tests the sample during an office visit or sends it to a lab for analysis. For the test, a nurse or technician places a strip of chemically treated paper, called a dipstick, into the urine. Patches on the dipstick change color to indicate signs of infection in urine.

**PSA blood test.** A health care provider may draw blood for a PSA test during an office visit or in a commercial facility and send the sample to a lab for analysis. Prostate cells create a protein called PSA. Men who have prostate cancer may have a higher amount of PSA in their blood. However, a high PSA level does not necessarily indicate prostate cancer. In fact, benign prostatic hyperplasia, prostate infections, inflammation, aging, and normal fluctuations often cause high PSA levels. Much remains unknown about how to interpret a PSA blood test, the test's ability to discriminate between cancer and prostate conditions such as benign prostatic hyperplasia, and the best course of action to take if the PSA level is high.

**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 performs urodynamic tests during an office visit or in an outpatient center or a hospital. Some urodynamic tests do not require anesthesia; others may require local anesthesia. Most urodynamic tests focus on the bladder's ability to hold urine and empty steadily and completely and may include the following:

- uroflowmetry, which measures how rapidly the bladder releases urine
- postvoid residual measurement, which evaluates how much urine remains in the bladder after urination
- reduced urine flow or residual urine in the bladder, which often suggests urine blockage due to benign prostatic hyperplasia

Read more in *Urodynamic Testing* at [www.urologic.niddk.nih.gov](http://www.urologic.niddk.nih.gov).

**Cystoscopy.** Cystoscopy is a procedure that uses a tubelike instrument, called a cystoscope, to look inside the urethra and bladder. A urologist inserts the cystoscope through the opening at the tip of the penis and into the lower urinary tract. A urologist performs cystoscopy during an office visit or in an outpatient center or a hospital. The urologist will give the patient local anesthesia; however, in some cases, the patient may require sedation and regional or general anesthesia. A urologist may use cystoscopy to look for blockage or stones in the urinary tract.

Read more in *Cystoscopy and Ureteroscopy* at [www.urologic.niddk.nih.gov](http://www.urologic.niddk.nih.gov).

**Transrectal ultrasound.** Transrectal ultrasound uses a device, called a transducer, that bounces safe, painless sound waves off organs to create an image of their structure. The health care provider can move the transducer to different angles to make it possible to examine different organs. A specially trained technician performs the procedure in a health care provider's office, an outpatient center, or a hospital, and a radiologist—a doctor who specializes in medical imaging—interprets the images; the patient does not require anesthesia. Urologists most often use transrectal ultrasound to examine the prostate. In a transrectal ultrasound, the technician inserts a transducer slightly larger than a pen into the man's rectum, next to the prostate. The ultrasound image shows the size of the prostate and any abnormalities, such as tumors. Transrectal ultrasound cannot reliably diagnose prostate cancer.

**Biopsy.** Biopsy is a procedure that involves taking a small piece of prostate tissue for examination with a microscope. A urologist performs the biopsy in an outpatient center or a hospital. The urologist will give the patient light sedation and local anesthetic; however, in some cases, the patient will require general anesthesia. The urologist uses imaging techniques such as ultrasound, a computerized tomography scan, or magnetic resonance imaging to guide the biopsy needle into the prostate. A pathologist—a doctor who specializes in examining tissues to diagnose diseases—examines the prostate tissue in a lab. The test can show whether prostate cancer is present.

Read more in *Medical Tests for Prostate Problems* at [www.urologic.niddk.nih.gov](http://www.urologic.niddk.nih.gov).

## How is benign prostatic hyperplasia treated?

Treatment options for benign prostatic hyperplasia may include

- lifestyle changes
- medications
- minimally invasive procedures
- surgery

A health care provider treats benign prostatic hyperplasia based on the severity of symptoms, how much the symptoms affect a man's daily life, and a man's preferences.

Men may not need treatment for a mildly enlarged prostate unless their symptoms are bothersome and affecting their quality of life. In these cases, instead of treatment, a urologist may recommend regular checkups. If benign prostatic hyperplasia symptoms become bothersome or present a health risk, a urologist most often recommends treatment.

## Lifestyle Changes

A health care provider may recommend lifestyle changes for men whose symptoms are mild or slightly bothersome. Lifestyle changes can include

- reducing intake of liquids, particularly before going out in public or before periods of sleep
- avoiding or reducing intake of caffeinated beverages and alcohol
- avoiding or monitoring the use of medications such as decongestants, antihistamines, antidepressants, and diuretics
- training the bladder to hold more urine for longer periods
- exercising pelvic floor muscles
- preventing or treating constipation

## Medications

A health care provider or urologist may prescribe medications that stop the growth of or shrink the prostate or reduce symptoms associated with benign prostatic hyperplasia:

- alpha blockers
- phosphodiesterase-5 inhibitors
- 5-alpha reductase inhibitors
- combination medications

**Alpha blockers.** These medications relax the smooth muscles of the prostate and bladder neck to improve urine flow and reduce bladder blockage:

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

**Phosphodiesterase-5 inhibitors.** Urologists prescribe these medications mainly for erectile dysfunction. Tadalafil (Cialis) belongs to this class of medications and can reduce lower urinary tract symptoms by relaxing smooth muscles in the lower urinary tract. Researchers are working to determine the role of erectile dysfunction drugs in the long-term treatment of benign prostatic hyperplasia.

**5-alpha reductase inhibitors.** These medications block the production of DHT, which accumulates in the prostate and may cause prostate growth:

- finasteride (Proscar)
- dutasteride (Avodart)

These medications can prevent progression of prostate growth or actually shrink the prostate in some men. Finasteride and dutasteride act more slowly than alpha blockers and are useful for only moderately enlarged prostates.

**Combination medications.** Several studies, such as the Medical Therapy of Prostatic Symptoms (MTOPS) study, have shown that combining two classes of medications, instead of using just one, can more effectively improve symptoms, urinary flow, and quality of life. The combinations include

- finasteride and doxazosin
- dutasteride and tamsulosin (Jalyn), a combination of both medications that is available in a single tablet
- alpha blockers and antimuscarinics

A urologist may prescribe a combination of alpha blockers and antimuscarinics for patients with overactive bladder symptoms. Overactive bladder is a condition in which the bladder muscles contract uncontrollably and cause urinary frequency, urinary urgency, and urinary incontinence. Antimuscarinics are a class of medications that relax the bladder muscles.



## Minimally Invasive Procedures

Researchers have developed a number of minimally invasive procedures that relieve benign prostatic hyperplasia symptoms when medications prove ineffective. These procedures include

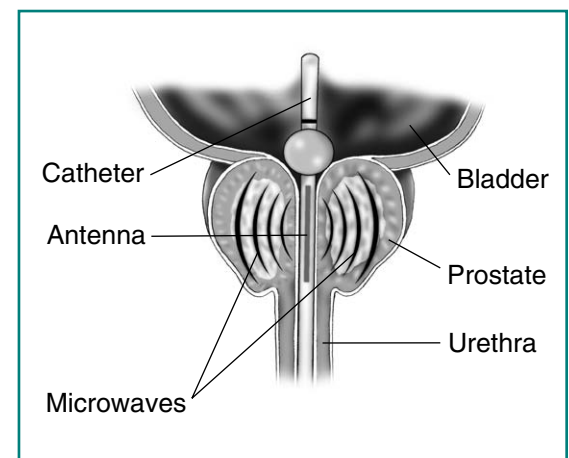
- transurethral needle ablation
- transurethral microwave thermotherapy
- high-intensity focused ultrasound
- transurethral electrovaporization
- water-induced thermotherapy
- prostatic stent insertion

Minimally invasive procedures can destroy enlarged prostate tissue or widen the urethra, which can help relieve blockage and urinary retention caused by benign prostatic hyperplasia.

Urologists perform minimally invasive procedures using the transurethral method, which involves inserting a catheter—a thin, flexible tube—or cystoscope through the urethra to reach the prostate. These procedures may require local, regional, or general anesthesia. Although destroying troublesome prostate tissue relieves many benign prostatic hyperplasia symptoms, tissue destruction does not cure benign prostatic hyperplasia. A urologist will decide which procedure to perform based on the man's symptoms and overall health.

**Transurethral needle ablation.** This procedure uses heat generated by radiofrequency energy to destroy prostate tissue. A urologist inserts a cystoscope through the urethra to the prostate. A urologist then inserts small needles through the end of the cystoscope into the prostate. The needles send radiofrequency energy that heats and destroys selected portions of prostate tissue. Shields protect the urethra from heat damage.

**Transurethral microwave thermotherapy.** This procedure uses microwaves to destroy prostate tissue. A urologist inserts a catheter through the urethra to the prostate, and a device called an antenna sends microwaves through the catheter to heat selected portions of the prostate. The temperature becomes high enough inside the prostate to destroy enlarged tissue. A cooling system protects the urinary tract from heat damage during the procedure.



Transurethral microwave thermotherapy

**High-intensity focused ultrasound.** For this procedure, a urologist inserts a special ultrasound probe into the rectum, near the prostate. Ultrasound waves from the probe heat and destroy enlarged prostate tissue.

**Transurethral electrovaporization.** For this procedure, a urologist inserts a tubelike instrument called a resectoscope through the urethra to reach the prostate. An electrode attached to the resectoscope moves across the surface of the prostate and transmits an electric current that vaporizes prostate tissue. The vaporizing effect penetrates below the surface area being treated and seals blood vessels, which reduces the risk of bleeding.

**Water-induced thermotherapy.** This procedure uses heated water to destroy prostate tissue. A urologist inserts a catheter into the urethra so that a treatment balloon rests in the middle of the prostate. Heated water flows through the catheter into the treatment balloon, which heats and destroys the surrounding prostate tissue. The treatment balloon can target a specific region of the prostate, while surrounding tissues in the urethra and bladder remain protected.

**Prostatic stent insertion.** This procedure involves a urologist inserting a small device called a prostatic stent through the urethra to the area narrowed by the enlarged prostate. Once in place, the stent expands like a spring, and it pushes back the prostate tissue, widening the urethra. Prostatic stents may be temporary

or permanent. Urologists generally use prostatic stents in men who may not tolerate or be suitable for other procedures.

## Surgery

For long-term treatment of benign prostatic hyperplasia, a urologist may recommend removing enlarged prostate tissue or making cuts in the prostate to widen the urethra. Urologists recommend surgery when

- medications and minimally invasive procedures are ineffective
- symptoms are particularly bothersome or severe
- complications arise

Although removing troublesome prostate tissue relieves many benign prostatic hyperplasia symptoms, tissue removal does not cure benign prostatic hyperplasia.

Surgery to remove enlarged prostate tissue includes

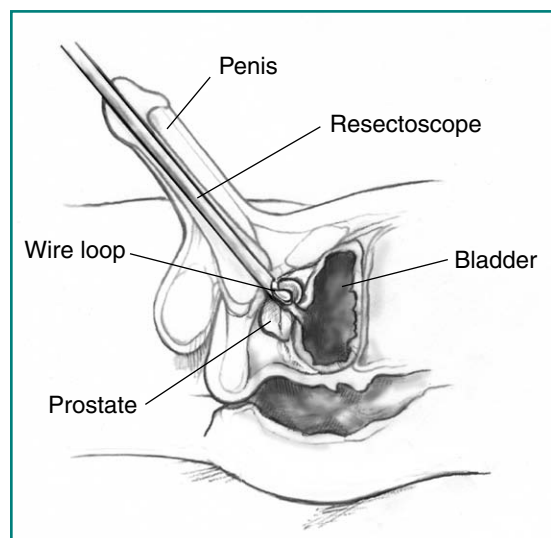
- transurethral resection of the prostate (TURP)
- laser surgery
- open prostatectomy
- transurethral incision of the prostate (TUIP)

A urologist performs these surgeries, except for open prostatectomy, using the transurethral method. Men who have these surgical procedures require local, regional, or general anesthesia and may need to stay in the hospital.

The urologist may prescribe antibiotics before or soon after surgery to prevent infection. Some urologists prescribe antibiotics only when an infection occurs.

Immediately after benign prostatic hyperplasia surgery, a urologist may insert a special catheter, called a Foley catheter, through the opening of the penis to drain urine from the bladder into a drainage pouch.

**TURP.** With TURP, a urologist inserts a resectoscope through the urethra to reach the prostate and cuts pieces of enlarged prostate tissue with a wire loop. Special fluid carries the tissue pieces into the bladder, and the urologist flushes them out at the end of the procedure. TURP is the most common surgery for benign prostatic hyperplasia and considered the gold standard for treating blockage of the urethra due to benign prostatic hyperplasia.



Transurethral resection of the prostate

**Laser surgery.** With this surgery, a urologist uses a high-energy laser to destroy prostate tissue. The urologist uses a cystoscope to pass a laser fiber through the urethra into the prostate. The laser destroys the enlarged tissue. The risk of bleeding is lower than in TURP and TUIP because the laser seals blood vessels as it cuts through the prostate tissue. However, laser surgery may not effectively treat greatly enlarged prostates.

**Open prostatectomy.** In an open prostatectomy, a urologist makes an incision, or cut, through the skin to reach the prostate. The urologist can remove all or part of the prostate through the incision. This surgery is used most often when the prostate is greatly enlarged, complications occur, or the bladder is damaged and needs repair. Open prostatectomy requires general anesthesia, a longer hospital stay than other surgical procedures for benign prostatic hyperplasia, and a longer rehabilitation period. The three open prostatectomy procedures are retropubic prostatectomy, suprapubic prostatectomy, and perineal prostatectomy. The recovery period for open prostatectomy is different for each man who undergoes the procedure. However, it typically takes anywhere from 3 to 6 weeks.<sup>4</sup>

<sup>4</sup>Prostate cancer: surgical management. Urology Care Foundation website. [www.urologyhealth.org/urology/index.cfm?article=30](http://www.urologyhealth.org/urology/index.cfm?article=30). Updated April 2014. Accessed July 29, 2014.

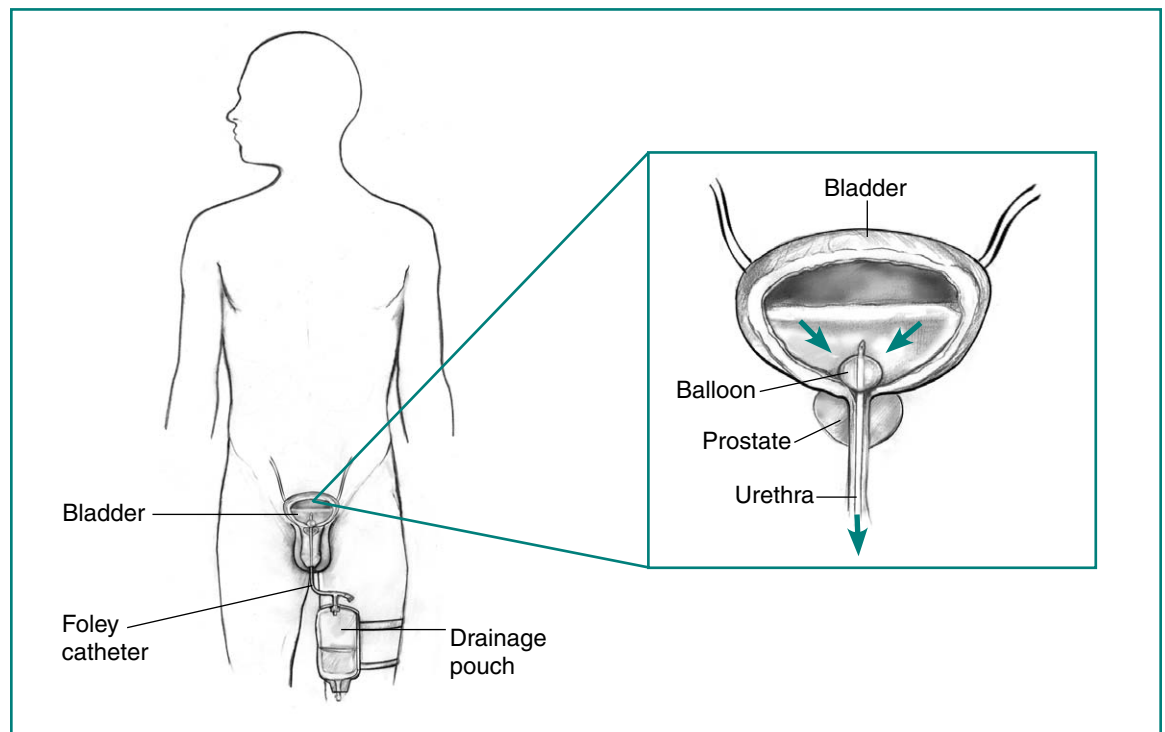
**TUIP.** A TUIP is a surgical procedure to widen the urethra. During a TUIP, the urologist inserts a cystoscope and an instrument that uses an electric current or a laser beam through the urethra to reach the prostate. The urologist widens the urethra by making a few small cuts in the prostate and in the bladder neck. Some urologists believe that TUIP gives the same relief as TURP except with less risk of side effects.

After surgery, the prostate, urethra, and surrounding tissues may be irritated and swollen, causing urinary retention. To prevent urinary retention, a urologist inserts a Foley catheter so urine can drain freely out of the bladder. A Foley catheter has a balloon on the end that the urologist inserts into the bladder. Once the balloon is inside the bladder, the urologist fills it with sterile water to keep the catheter in place. Men

who undergo minimally invasive procedures may not need a Foley catheter.

The Foley catheter most often remains in place for several days. Sometimes, the Foley catheter causes recurring, painful, difficult-to-control bladder spasms the day after surgery. However, these spasms will eventually stop. A urologist may prescribe medications to relax bladder muscles and prevent bladder spasms. These medications include

- oxybutynin chloride (Ditropan)
- solifenacin (VESIcare)
- darifenacin (Enablex)
- tolterodine (Detrol)
- hyoscyamine (Levsin)
- propantheline bromide (Pro-Banthine)



Foley catheter

## What are the complications of benign prostatic hyperplasia treatment?

The complications of benign prostatic hyperplasia treatment depend on the type of treatment.

### Medications

Medications used to treat benign prostatic hyperplasia may have side effects that sometimes can be serious. Men who are prescribed medications to treat benign prostatic hyperplasia should discuss possible side effects with a health care provider before taking the medications. Men who experience the following side effects should contact a health care provider right away or get emergency medical care:

- hives
- rash
- itching
- shortness of breath
- rapid, pounding, or irregular heartbeat
- painful erection of the penis that lasts for hours

- swelling of the eyes, face, tongue, lips, throat, arms, hands, feet, ankles, or lower legs
- difficulty breathing or swallowing
- chest pain
- dizziness or fainting when standing up suddenly
- sudden decrease or loss of vision
- blurred vision
- sudden decrease or loss of hearing
- chest pain, dizziness, or nausea during sexual activity

These side effects are mostly related to phosphodiesterase-5 inhibitors. Side effects related to alpha blockers include

- dizziness or fainting when standing up suddenly
- decreased sexual drive
- problems with ejaculation

## Minimally Invasive Procedures

Complications after minimally invasive procedures may include

- UTIs
- painful urination
- difficulty urinating
- an urgent or a frequent need to urinate
- urinary incontinence
- blood in the urine for several days after the procedure
- sexual dysfunction
- chronic prostatitis—long-lasting inflammation of the prostate
- recurring problems such as urinary retention and UTIs

Most of the complications of minimally invasive procedures go away within a few days or weeks. Minimally invasive procedures are less likely to have complications than surgery.

## Surgery

Complications after surgery may include

- problems urinating
- urinary incontinence
- bleeding and blood clots
- infection
- scar tissue
- sexual dysfunction
- recurring problems such as urinary retention and UTIs

**Problems urinating.** Men may initially have painful urination or difficulty urinating. They may experience urinary frequency, urgency, or retention. These problems will gradually lessen and, after a couple of months, urination will be easier and less frequent.

**Urinary incontinence.** As the bladder returns to normal, men may have some temporary problems controlling urination. However, long-term urinary incontinence rarely occurs. The longer urinary problems existed before surgery, the longer it takes for the bladder to regain its full function after surgery.

**Bleeding and blood clots.** After benign prostatic hyperplasia surgery, the prostate or tissues around it may bleed. Blood or blood clots may appear in urine. Some bleeding is normal and should clear up within several days. However, men should contact a health care provider right away if

- they experience pain or discomfort
- their urine contains large clots
- their urine is so red it is difficult to see through

Blood clots from benign prostatic hyperplasia surgery can pass into the bloodstream and lodge in other parts of the body—most often the legs. Men should contact a health care provider right away if they experience swelling or discomfort in their legs.

**Infection.** Use of a Foley catheter after benign prostatic hyperplasia surgery may increase the risk of a UTI. Anesthesia during surgery may cause urinary retention and also increase the risk of a UTI. In addition, the incision site of an open prostatectomy may become infected. A health care provider will prescribe antibiotics to treat infections.

**Scar tissue.** In the year after the original surgery, scar tissue sometimes forms and requires surgical treatment. Scar tissue may form in the urethra and cause it to narrow. A urologist can solve this problem during an office visit by stretching the urethra. Rarely, the opening of the bladder becomes scarred and shrinks, causing blockage. This problem may require a surgical procedure similar to TUIP.

**Sexual dysfunction.** Some men may experience temporary problems with sexual function after benign prostatic hyperplasia surgery. The length of time for restored sexual function depends on the type of benign prostatic hyperplasia surgery performed and how long symptoms were present before surgery. Many men have found that concerns about sexual function can interfere with sex as much as the benign prostatic hyperplasia surgery itself. Understanding the surgical procedure and talking about concerns with a health care provider before surgery often help men regain sexual function earlier. Many men find it helpful to talk with a counselor during the adjustment period after surgery. Even though it can take a while for sexual function to fully return, with time, most men can enjoy sex again.

Most health care providers agree that if men with benign prostatic hyperplasia were able to maintain an erection before surgery, they will probably be able to have erections afterward. Surgery rarely causes a loss of erectile function. However, benign prostatic hyperplasia surgery most often cannot restore function that was lost before the procedure. Some men find a slight difference in the quality of orgasm after surgery. However, most report no difference.

Prostate surgery may make men sterile, or unable to father children, by causing retrograde ejaculation—the backward flow of semen into the bladder. Men flush the semen out of the bladder when they urinate. In some cases, medications such as pseudoephedrine, found in many cold medications, or imipramine can treat retrograde ejaculation. These medications improve muscle tone at the bladder neck and keep semen from entering the bladder.

**Recurring problems.** Men may require further treatment if prostate problems, including benign prostatic hyperplasia, return. Problems may arise when treatments for benign prostatic hyperplasia leave a good part of the prostate intact. About 10 percent of men treated with TURP or TUIP require additional surgery within 5 years. About 2 percent of men who have an open prostatectomy require additional surgery within 5 years.<sup>2</sup>

In the years after benign prostatic hyperplasia surgery or treatment, men should continue having a digital rectal exam once a year and have any symptoms checked by a health care provider. In some cases, the health care provider may recommend a digital rectal exam and checkup more than once a year.

## How can benign prostatic hyperplasia be prevented?

Researchers have not found a way to prevent benign prostatic hyperplasia. Men with risk factors for benign prostatic hyperplasia should talk with a health care provider about any lower urinary tract symptoms and the need for regular prostate exams. Men can get early treatment and minimize benign prostatic hyperplasia effects by recognizing lower urinary tract symptoms and identifying an enlarged prostate.

## Eating, Diet, and Nutrition

Researchers have not found that eating, diet, and nutrition play a role in causing or preventing benign prostatic hyperplasia. However, a health care provider can give information about how changes in eating, diet, or nutrition could help with treatment. Men should talk with a health care provider or dietitian about what diet is right for them.



## Points to Remember

- Benign prostatic hyperplasia—also called BPH—is a condition in men 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 cause of benign prostatic hyperplasia is not well understood; however, it occurs mainly in older men.
- Benign prostatic hyperplasia is the most common prostate problem for men older than age 50.
- Lower urinary tract symptoms suggestive of benign prostatic hyperplasia may include
  - urinary frequency—urination eight or more times a day
  - urinary urgency—the inability to delay urination
  - trouble starting a urine stream
  - a weak or an interrupted urine stream
  - dribbling at the end of urination
  - nocturia—frequent urination during periods of sleep
  - urinary retention—the inability to empty the bladder completely
  - urinary incontinence—the accidental loss of urine
  - pain after ejaculation or during urination
  - urine that has an unusual color or smell
- The complications of benign prostatic hyperplasia may include
  - acute urinary retention
  - chronic, or long lasting, urinary retention
  - blood in the urine
  - urinary tract infections (UTIs)
  - bladder damage
  - kidney damage
  - bladder stones
- A health care provider diagnoses benign prostatic hyperplasia based on
  - a personal and family medical history
  - a physical exam
  - medical tests
- Treatment options for benign prostatic hyperplasia may include
  - lifestyle changes
  - medications
  - minimally invasive procedures
  - surgery
- The complications of benign prostatic hyperplasia treatment depend on the type of treatment.
- Researchers have not found a way to prevent benign prostatic hyperplasia.
- Researchers have not found that eating, diet, and nutrition play a role in causing or preventing benign prostatic hyperplasia.

## Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) has many research programs aimed at finding treatments for urinary tract disorders, including benign prostatic hyperplasia. For example, the NIDDK sponsored the Medical Therapy of Prostatic Symptoms (MTOPS) clinical research study. This study tested whether the oral medications finasteride and doxazosin, alone or together, can delay or prevent further worsening of symptoms in men with benign prostatic hyperplasia.

The knowledge gained from NIDDK research programs 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](http://www.nih.gov/health/clinicaltrials). For information about current studies, visit [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).

## For More Information

### American Prostate Society

10 East Lee Street, Suite 1504  
Baltimore, MD 21202  
Phone: 1-877-850-3735 or 410-837-3735  
(Tuesday and Friday only)  
Fax: 410-837-8510  
Email: [info@americanprostatesociety.com](mailto:info@americanprostatesociety.com)  
Internet: [www.americanprostatesociety.com](http://www.americanprostatesociety.com)

### The Prostatitis Foundation

1063 30th Street  
Smithshire, IL 61478  
Phone: 1-888-891-4200 or 309-325-7184  
Fax: 309-325-7189  
Internet: [www.prostatitis.org](http://www.prostatitis.org)

### Urology Care Foundation

1000 Corporate Boulevard  
Linthicum, MD 21090  
Phone: 1-800-828-7866 or 410-689-3700  
Fax: 410-689-3998  
Email: [info@urologycarefoundation.org](mailto:info@urologycarefoundation.org)  
Internet: [www.UrologyHealth.org](http://www.UrologyHealth.org)

### For information about prostate cancer, contact the

### National Cancer Institute

BG 9609 MCS 9760  
9609 Medical Center Drive  
Bethesda, MD 20892-9760  
Phone: 1-800-4-CANCER  
(1-800-422-6237)  
Internet: [www.cancer.gov](http://www.cancer.gov)

## ADULT PEDIATRIC UROLOGY & UROGYNECOLOGY

10707 Pacific Street, Ste 101

Omaha, NE 68114

402-397-7989

[www.adultpediatricuro.com](http://www.adultpediatricuro.com)

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You may also find additional information about this topic by visiting MedlinePlus at [www.medlineplus.gov](http://www.medlineplus.gov).

This publication may contain information about medications and, when taken as prescribed, the conditions they treat. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit [www.fda.gov](http://www.fda.gov). Consult your health care provider for more information.

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## National Kidney and Urologic Diseases Information Clearinghouse

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