

Enlarged Prostate (BPH)

Benign Prostatic Hyperplasia (BPH) is enlargement of the prostate, a common condition among men over 45 years of age. The degree to which the prostate grows varies from man to man as they age and may constrict the urethra and cause difficulty with urination. Left untreated, BPH may lead to urinary tract infections, bladder or kidney damage, bladder stones or incontinence.

Your doctor may evaluate your condition by asking you questions about the severity and type of symptoms you have and how much of an impact they have on your daily routine. Other tests such as urine flow study, digital rectal exam, prostate-specific antigen (PSA) blood test, cystoscopy, ultrasound or prostate MRI may be used to confirm the diagnosis. Treatment for BPH may depend on the severity of the symptoms and range from no treatment to medication or surgery.



What is benign prostatic hyperplasia?

Benign prostatic hyperplasia (BPH), or benign prostatic hypertrophy, is an enlargement of the prostate, a walnut-sized gland that forms part of the male reproductive system. During ejaculation, the prostate secretes fluid into the urethra, the narrow tube that runs through the center of the prostate. When a man urinates, the bladder squeezes urine out through the urethra.

As a man ages, the prostate can become enlarged. Because it surrounds the urethra right at the bladder exit, the prostate may squeeze or pinch the urethra as it gets larger over time. This may cause difficulty with urination such as a slow stream, the need to strain, increased frequency, urgency to urinate, incomplete emptying of the bladder, and intermittent flow or dribbling.

BPH is the most common disorder of the prostate gland and the most common diagnosis by urologists for males between the ages of 45 and 74. More than half of men in their sixties and as many as 90 percent in their seventies and eighties have some symptoms of BPH.

Although research has yet to pinpoint a specific cause for BPH, theories focus on hormones and related substances like dihydrotestosterone (DHT), a testosterone derivative in the prostate that may encourage the growth of cells.

How is BPH diagnosed and evaluated?

Early diagnosis of BPH is important because if left untreated it can lead to urinary tract infections, bladder or kidney damage, bladder stones and incontinence. Distinguishing BPH from more serious diseases like prostate cancer is important.

Tests vary from patient to patient, but the following are the most common:

- **Filling out a questionnaire:** Your doctor is most interested in the severity and type of symptoms you have, and how much they bother you or impact your life. A simple questionnaire is a common starting point.
- **Urine flow study:** During this test, the patient voluntarily empties his bladder and the amount of flow is measured. A special device can help physicians detect reduced urine flow associated with BPH.
- **Digital rectal examination (DRE):** The physician inserts a gloved finger into the rectum (located next to the prostate) and feels the back of the prostate. Prostate cancers can sometimes be detected as lumps or bumps on the prostate here.

- Prostate-specific antigen (PSA) blood test: Elevated levels of PSA in the blood may sometimes be an indicator of prostate cancer.
- Cystoscopy: In this examination, the physician inserts a thin tube with a tiny camera on the end called a cystoscope through the opening of the urethra at the tip of the penis. The camera allows the physician to inspect the inside of the prostate, urethra channel and bladder.
- Transrectal ultrasound (<https://www.radiologyinfo.org/en/info/us-prostate>) and Prostate Biopsy: There are two potential reasons for this exam: (1) If there is suspicion for prostate cancer, this test may be recommended. The physician uses an ultrasound probe to acquire images of the prostate and guides a biopsy needle into the prostate to remove small slivers of tissue for examination under a microscope. (2) Your doctor may simply want to know the exact size of your prostate to plan prostate surgery for BPH. In this case, only an ultrasound image will be obtained; no needles will be used.
- Transabdominal ultrasound (<https://www.radiologyinfo.org/en/info/abdominus>) : This exam may be performed to measure the size of the prostate and the amount of urine left in the bladder after urination.
- Prostate magnetic resonance imaging (MRI) (https://www.radiologyinfo.org/en/info/mr_prostate) : MRI provides views of the entire prostate with excellent soft tissue contrast.

How is BPH treated?

In some cases, in particular where symptoms are mild, BPH requires no treatment. At the opposite extreme, some men require immediate intervention if they cannot urinate at all or if kidney/bladder damage has occurred. When treatment is necessary, many men will simply require daily medication(s). If this fails to completely treat the symptoms, or if there are signs of damage from BPH, the doctor may recommend minimally invasive endoscopic surgery (no "cuts" into the abdomen). Or, in some cases, traditional surgery may be recommended.

- Drug treatment: The FDA has approved several drugs to relieve common symptoms associated with an enlarged prostate, including drugs that inhibit the production of the hormone DHT and drugs that relax the smooth muscle of the prostate and bladder neck to improve urine flow.

For surgery, there are many procedures to choose from, and the choice depends largely on your specific prostate anatomy, and surgeon preference and training. These procedures all have a common goal of widening the urethral channel as it passes through the prostate. Procedures include the following:

- Transurethral resection of the prostate (TURP): The most common or "gold standard" surgical treatment for BPH, TURP involves the insertion of an instrument called a resectoscope through the urethra to remove the obstructing tissue, almost like removing the core from an apple, thus widening the channel.
- Laser surgery: When a TURP procedure is done with a laser instead of traditional scraping, the procedures are similar although differently named, depending on the type of laser used. They include Holmium Laser Ablation (HoLAP), PVP or Greenlight laser. The physician passes the laser fiber through the urethra into the prostate and then delivers bursts of energy to vaporize obstructing prostate tissue.
- Transurethral incision of the prostate (TUIP): In this procedure, the surgeon widens the urethra by making a few small incisions in the prostate gland and the neck of the bladder where it joins the urethra.
- Transurethral microwave thermotherapy (TUMT): In TUMT, a device sends computer-regulated microwaves through a catheter to heat and destroy excess prostate tissue. TUMT does not cure BPH, but it reduces urinary problems.
- Transurethral needle ablation (TUNA): This minimally invasive approach delivers low-level radiofrequency energy through twin needles to destroy prostate tissue and widen the urinary channel, which may improve urine flow.
- UroLift system treatment: This minimally invasive procedure widens the urethra by placing tiny implants that hold the enlarged prostate tissue out of the way, thus improving urine flow.
- High-intensity focused ultrasound: The use of ultrasound waves to destroy prostate tissue is a promising new area of treatment that is still undergoing clinical trials in the United States.
- Open surgery: For very large prostates, traditional TURP and laser surgery may be ineffective. In open surgery, the surgeon

makes an external incision and removes the enlarged tissue from inside the gland. The entire prostate is not removed, but rather the outer "shell" or capsule of the prostate remains.

- Holmium Laser Enucleation of the Prostate (HoLEP): This is a minimally invasive version of the traditional open surgery, reserved for large prostates. No incision is made. This is a specialized type of procedure currently performed only by select centers in the United States. The procedure duplicates open surgery, with a shorter time requiring a urinary catheter.
- Prostate artery embolization: For this procedure, an interventional radiologist inserts a hollow wire into the artery in the leg and maneuvers it to the arteries that only supply the prostate. The radiologist will then inject material to slow or stop blood flow to the prostate, which can cause it to shrink or soften. This is a relatively new procedure and may not be widely available; it may require enrolling in a clinical trial to be eligible for this treatment.

Which test, procedure or treatment is best for me?

- *Lower Urinary Tract Symptoms-Suspicion of Benign Prostatic Hyperplasia* (<https://www.radiologyinfo.org/en/info/acs-lower-urinary-tract-symptoms>)

Disclaimer

This information is copied from the RadiologyInfo Web site (<http://www.radiologyinfo.org>) which is dedicated to providing the highest quality information. To ensure that, each section is reviewed by a physician with expertise in the area presented. All information contained in the Web site is further reviewed by an ACR (American College of Radiology) - RSNA (Radiological Society of North America) committee, comprising physicians with expertise in several radiologic areas.

However, it is not possible to assure that this Web site contains complete, up-to-date information on any particular subject. Therefore, ACR and RSNA make no representations or warranties about the suitability of this information for use for any particular purpose. All information is provided "as is" without express or implied warranty.

Please visit the RadiologyInfo Web site at <http://www.radiologyinfo.org> to view or download the latest information.

Note: Images may be shown for illustrative purposes. Do not attempt to draw conclusions or make diagnoses by comparing these images to other medical images, particularly your own. Only qualified physicians should interpret images; the radiologist is the physician expert trained in medical imaging.

Copyright

This material is copyrighted by either the Radiological Society of North America (RSNA), 820 Jorie Boulevard, Oak Brook, IL 60523-2251 or the American College of Radiology (ACR), 1891 Preston White Drive, Reston, VA 20191-4397. Commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is prohibited.

Copyright © 2023 Radiological Society of North America, Inc.