Medical Tests for Prostate Problems

National Kidney and Urologic Diseases Information Clearinghouse

U.S. Department of Health and Human Services

NATIONAL INSTITUTES OF HEALTH

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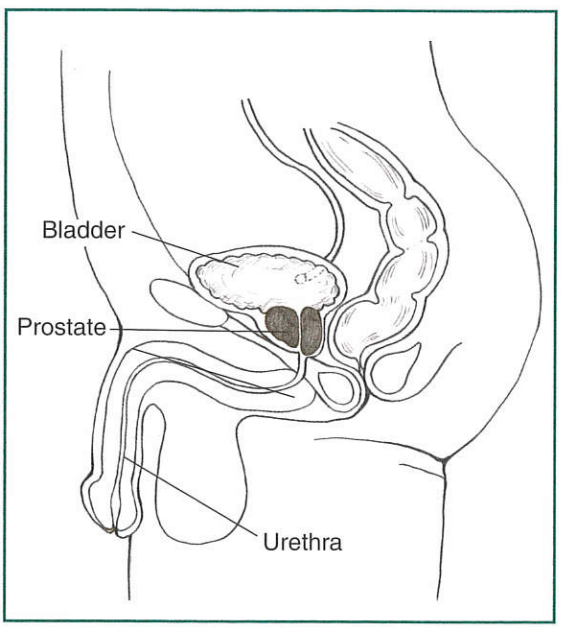
What is the prostate?

The prostate is a walnut-shaped gland that is part of the male reproductive system. It has two or more lobes, or sections, enclosed by an outer layer of tissue. The prostate is located in front of the rectum and just below the bladder, where urine is stored. It surrounds the urethra at the neck of the bladder and supplies fluid that goes into semen.



Side view of male urinary tract

What are some common prostate problems?

The most common prostate problem in men younger than age 50 is inflammation, called prostatitis. Prostate enlargement, or benign prostatic hyperplasia (BPH), is another common problem. Because the prostate continues to grow as a man ages, BPH is the most common prostate problem for men older than age 50. Older men are at risk for prostate cancer as well, but it is much less common than BPH.

What are the symptoms of prostate problems?

The symptoms of prostate problems may include

- urinary retention—the inability to empty the bladder completely
- urinary frequency—urination eight or more times a day
- urinary urgency—the inability to delay urination
- urinary incontinence—the accidental loss of urine
- nocturia—frequent urination at night
- trouble beginning a urine stream
- weak or interrupted urine stream
- blockage of urine
- urine that has an unusual color or odor
- pain after ejaculation or during urination

Different prostate problems may have similar symptoms. For example, one man with prostatitis and another with BPH may both experience urinary urgency. Sometimes symptoms for the same prostate problem differ among individuals. For example, one man with BPH may have trouble beginning a urine stream, while another may experience nocturia. A man in the early stages of prostate cancer may have no symptoms at all. Because of this confusing array of symptoms, a thorough medical exam and testing are vital.

How are prostate problems diagnosed?

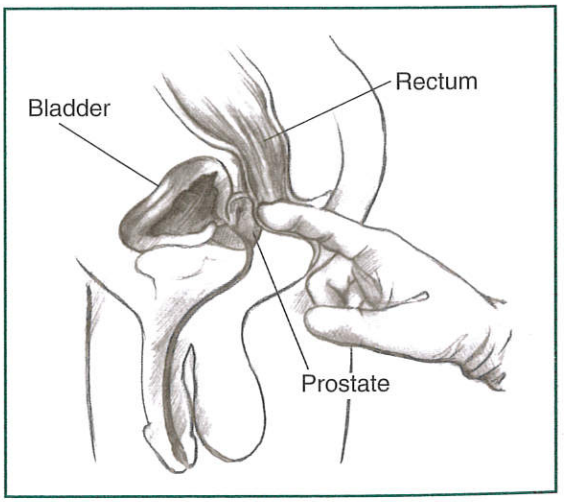
To diagnose prostate problems, the health care provider will perform a digital rectal exam (DRE). The health care provider will also ask the patient

- when the problem began and how often it occurs
- what symptoms are present
- whether he has a history of recurrent urinary tract infections
- what medications he takes, both prescription and those bought over the counter
- the amount of fluid he typically drinks each day
- whether he consumes caffeine and alcohol
- about his general medical history, including any major illnesses or surgeries

Answers to these questions will help the health care provider identify the problem or determine what medical tests are needed. Diagnosing BPH may require a series of medical exams and tests.

How is a digital rectal exam (DRE) performed?

A DRE is a physical exam of the prostate. The health care provider will ask the patient 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 it. The DRE may be slightly uncomfortable, but it is brief. This exam reveals whether the prostate has any abnormalities that require more testing. If an infection is suspected, the health care provider might massage the prostate during the DRE to obtain fluid to examine with a microscope. This exam is usually done first. Many health care providers perform a DRE as part of a routine physical exam for men age 50 or older, some even at age 40, whether or not the man has urinary problems.



Digital rectal exam

What is the first test for detecting prostate problems?

The first test for detecting prostate problems is a blood test to measure prostate-specific antigen (PSA), a protein made only by the prostate gland. This test is often included in routine physical exams for men older than age 50. Because African American men have higher rates of getting, and dying from, prostate cancer than men of other racial or ethnic groups in the United States, medical organizations recommend a PSA blood test be given starting at age 40 for African American men. Medical organizations also recommend a PSA blood test be given starting at age 40 for men with a family history of prostate cancer. Some medical organizations even recommend a PSA blood test be given to all men starting at age 40.

If urination problems are present or if a PSA blood test indicates a problem, additional tests may be ordered. These tests may require a patient to change his diet or fluid intake or to stop taking medications. If the tests involve inserting instruments into the urethra or rectum, antibiotics may be given before and after the test to prevent infection.

Why is a prostate-specific antigen (PSA) blood test performed?

A PSA blood test is performed to detect or rule out prostate cancer. The amount of PSA in the blood is often higher in men who have prostate cancer. However, an elevated PSA level does not necessarily indicate prostate cancer. The U.S. Food and Drug Administration has approved the PSA blood test for use in conjunction with a DRE to help detect prostate cancer in men age 50 or older and for monitoring men with prostate cancer after treatment. However, much remains unknown about how to interpret a PSA blood test, its ability to discriminate between cancer and problems such as BPH and prostatitis, and the best course of action if the PSA level is high.

When done in addition to a DRE, a PSA blood test enhances detection of prostate cancer. However, the test is known to have relatively high false-positive rates. A PSA blood test also may identify a greater number of medically insignificant lumps or growths, called tumors, in the prostate. Health care providers and patients should weigh the benefits of PSA blood testing against the risks of follow-up diagnostic tests. The procedures used to diagnose prostate cancer may cause significant side effects, including bleeding and infection.

What are additional tests for detecting prostate problems?

If the DRE or the PSA blood test indicates a problem may exist, the health care provider may order additional tests, including urinalysis, urodynamic tests, cystoscopy, abdominal ultrasound, transrectal ultrasound with prostate biopsy, and imaging studies such as magnetic resonance imaging (MRI) or computerized tomography (CT) scan.

Urinalysis

Urinalysis is the testing of a urine sample for abnormal substances or signs of infection. The urine sample is collected in a special container in a health care provider's office or commercial facility and can be tested in the same location or sent to a lab for analysis.

If an infection is suspected, the health care provider may ask that the urine sample be collected in two or three containers during a single urination to help locate the infection site. After the first collection, the health care provider will have the patient stop the urine stream for a prostate massage before collecting more urine. If signs of infection appear in the first container but not in the others, the infection is likely to be in the urethra. If the urine contains significantly more bacteria after the prostate massage or bacteria are in the prostate fluid itself, the infection is likely to be in the prostate.

Urodynamic Tests

Urodynamic testing is any procedure that looks at how well the bladder, sphincters, and urethra are storing and releasing urine. Most urodynamic tests focus on the bladder's ability to hold urine and empty steadily and completely. If the prostate problem appears to be related to urine blockage, the health care provider may recommend tests that measure bladder pressure and urine flow rate. One test involves urinating into a special device that measures how quickly the urine is flowing and records how many seconds it takes for the peak flow rate to be reached. Another test measures postvoid residual, the amount of urine left in the bladder when urination stops. A weak urine stream and urinary retention may be signs of urine blockage caused by an enlarged prostate that is squeezing the urethra. Some urodynamic tests are performed in a health care provider's office without anesthesia. Other urodynamic tests are performed in a health care provider's office, outpatient center, or hospital with local anesthesia.

Cystoscopy

Cystoscopy is a procedure that allows the health care provider to look for blockage in the lower urinary tract. A cystoscope is a tubelike instrument used to look inside the urethra and bladder. After a solution numbs the inside of the penis, the health care provider inserts the cystoscope through the opening at the tip of the penis and into the lower urinary tract. By looking through the cystoscope, the health care provider can determine the location and degree of the urine blockage. A cystoscopy is performed in a health care provider's office, outpatient center, or hospital with local anesthesia. The procedure is usually performed by a urologist, a doctor who specializes in treating problems of the urinary tract and the male reproductive system.

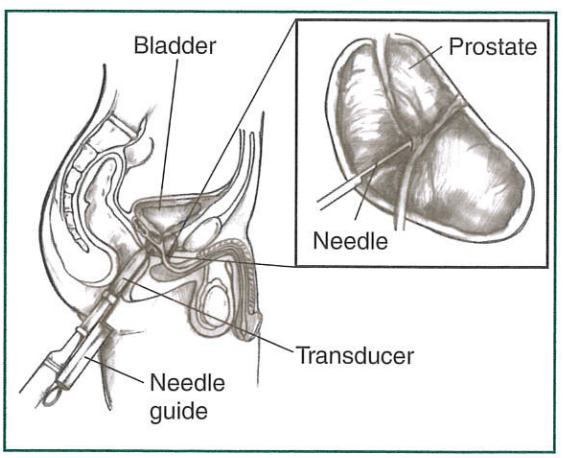
Abdominal Ultrasound

Ultrasound uses a device, called a transducer, that bounces safe, painless sound waves off organs to create an image of their structure. The transducer can be moved to different angles to make it possible to examine different organs. In abdominal ultrasound, the health care provider applies a gel to the patient's abdomen and moves a handheld transducer over the skin. The gel allows the transducer to glide easily, and it improves the transmission of the signals. The procedure is performed in a health care provider's office, outpatient center, or hospital by a specially trained technician and interpreted by a doctor, usually a radiologist—a doctor who specializes in medical imaging. Anesthesia is not needed. An abdominal ultrasound can create images of the entire urinary tract. The images can show damage or abnormalities in the urinary tract resulting from urine blockage at the prostate.

Transrectal Ultrasound with Prostate Biopsy

Transrectal ultrasound is most often used to examine the prostate. In a transrectal ultrasound, the health care provider 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 abnormal-looking areas, such as tumors. Transrectal ultrasound cannot definitively identify prostate cancer.

To determine whether a tumor is cancerous, the health care provider uses the transducer and ultrasound images to guide a needle to the tumor. The needle is then used to remove a few pieces of prostate tissue for examination with a microscope. This process, called biopsy, can reveal whether prostate cancer is present. A transrectal ultrasound with prostate biopsy is usually performed by a doctor in a health care provider's office, outpatient center, or hospital with light sedation and local anesthesia. The biopsied prostate tissue is examined in a laboratory by a pathologist—a doctor who specializes in diagnosing diseases.



Transrectal ultrasound with prostate biopsy

MRI and CT Scan

An MRI is a test that takes pictures of the body's internal organs and soft tissues without using x rays. The MRI machines use radio waves and magnets to produce detailed pictures. An MRI may also involve the injection of dye. A CT scan uses a combination of x rays and computer technology to create three-dimensional (3-D) images. A CT scan may also involve the injection of a dye. MRI and CT scan images can help identify abnormal structures in the urinary tract, but they cannot distinguish between cancerous tumors and noncancerous prostate enlargement. Once a biopsy has confirmed cancer, these imaging techniques will show how far the cancer has spread. MRIs and CT scans are usually performed at an outpatient center or hospital by a specially trained technician and interpreted by a radiologist; anesthesia is not needed. For an MRI, light sedation may be used for people with a fear of confined spaces.

What happens after the prostate tests?

Urodynamic tests and cystoscopy may cause mild discomfort for a few hours after the procedures. Drinking an 8-ounce glass of water every half-hour for 2 hours may help reduce discomfort. The health care provider may recommend taking a warm bath or holding a warm, damp washcloth over the urethral opening to relieve discomfort. A prostate biopsy may produce pain in the area of the rectum and the perineum, which is between the rectum and the scrotum. A prostate biopsy may also produce blood in urine and semen.

An antibiotic may be prescribed for 1 or 2 days to prevent infection. Patients with signs of infection—including pain, chills, or fever—should call their health care provider immediately.

How soon will prostate test results be available?

Results for simple medical tests such as some urodynamic tests, cystoscopy, and abdominal ultrasound are often available soon after the test. The results of other medical tests such as PSA blood test and prostate tissue biopsy may take several days to come back. A health care provider will talk with the patient about the results and possible treatments for the problem.

Eating, Diet, and Nutrition

Eating, diet, and nutrition have not been shown to play a role in causing or preventing prostate problems.

Points to Remember

- Common prostate problems are prostatitis and benign prostatic hyperplasia (BPH).
- Prostatitis is the most common prostate problem for men younger than age 50.
- BPH is the most common prostate problem for men older than age 50.
- Older men are at risk for prostate cancer, but it is much less common than BPH.
- Because different prostate problems have similar symptoms, diagnosing the problem may require a series of medical exams and tests.
- Medical tests to detect prostate problems include prostate-specific antigen (PSA) blood test, urinalysis, urodynamic tests, cystoscopy, and abdominal ultrasound.
- If prostate cancer is suspected, transrectal ultrasound with prostate biopsy is performed.
- Some medical tests require no preparation, while others may require changes in diet and fluid intake or a stop of medications.
- Some medical tests may be slightly uncomfortable. Others cause mild discomfort for a few hours after the procedure.
- Some medical test results are available soon after the test, while other medical test results may take several days to come back.

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) conducts and supports a variety of research in diseases of the kidney and urinary tract. Much of the research targets disorders of the lower urinary tract, including prostate problems. The knowledge gained from these studies is advancing scientific understanding of why prostate problems develop and may lead to improved methods of diagnosing and treating prostate problems.

The benefits of prostate cancer screening are still being studied. For example, the National Cancer Institute is conducting a long-term study to determine whether certain screening tests reduce the number of deaths from prostate, lung, colorectal, and ovarian cancers. The DRE and the PSA blood test are also being studied to see whether yearly screening will decrease the risk of dying from prostate cancer.

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research. For information about current studies, visit *www.ClinicalTrials.gov.*

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