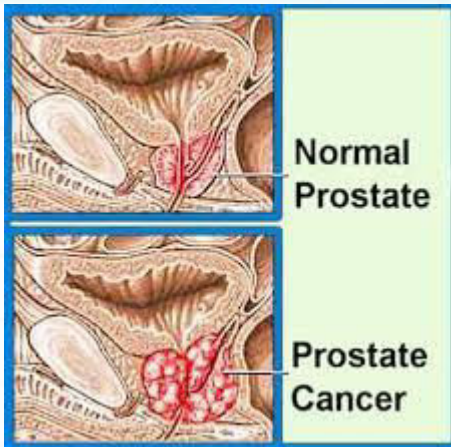


Prostrate cancer



Prostrate cancer is the development of cancer in the prostrate, a gland in the male reproductive system. Most prostate cancers are slow growing; however, some grow relatively fast. The cancer cells may spread from the prostate to other parts of the body, particularly the bones and lymph nodes. It may initially cause no symptoms. In later stages it can cause difficulty urinating, blood in the urine, or pain in the pelvis, back or when urinating. A disease known as benign prostatic hyperplasia may produce similar

symptoms. Other late symptoms may include feeling tired due to low levels of red blood cells.

The prostate gland makes fluid that forms part of semen. The prostate lies just below the bladder in front of the rectum. It surrounds the urethra (the tube that carries urine and semen through the penis and out of the body).

Prostate cancer is the most common cancer in men in the United States, after skin cancer. It is the second leading cause of death from cancer in men. Prostate cancer occurs more often in African-American men than in white men. African-American men with prostate cancer are more likely to die from the disease than white men with prostate cancer.

Almost all prostate cancers are adenocarcinomas (cancers that begin in cells that make and release mucus and other fluids). Prostate cancer often has no early symptoms. Advanced prostate cancer can cause men to urinate more often or have a weaker flow of urine, but these symptoms can also be caused by benign prostate conditions.

Prostate cancer usually grows very slowly. Most men with prostate cancer are older than 65 years and do not die from the disease. Finding and treating prostate cancer before symptoms occur may not improve health or help you live longer. Talk to your doctor about your risk of prostate cancer and whether you need screening tests.

Symptoms

Early prostate cancer usually causes no symptoms. But more advanced prostate cancers can sometimes cause symptoms, such as:

- Problems passing urine, including a slow or weak urinary stream or the need to urinate more often, especially at night.
- Blood in the urine
- Trouble getting an erection (erectile dysfunction)

- Pain in the hips, back (spine), chest (ribs), or other areas from cancer that has spread to bones
- Weakness or numbness in the legs or feet, or even loss of bladder or bowel control from cancer pressing on the spinal cord.

Other conditions can also cause many of these same symptoms. For example, trouble passing urine is much more often caused by Benign Prostatic Hyperplasia (BPH) than cancer. Still, it's important to tell your doctor if you have any of these problems so that the cause can be found and treated, if needed.

Causes

On a basic level, prostate cancer is caused by changes in the DNA of a prostate cell. Scientists have made great progress in understanding how certain changes in DNA can make normal prostate cells grow abnormally and form cancers. DNA is the chemical in each of our cells that makes up our genes, the instructions for nearly everything our cells do. We usually look like our parents because they are the source of our DNA. However, DNA affects more than how we look.

Inherited DNA mutations

Inherited DNA changes in certain genes seem to cause about 5% to 10% of prostate cancers. Several mutated genes have been linked to a man's inherited tendency to develop prostate cancer, including:

RNASEL (formerly HPC1): The normal function of this tumor suppressor gene is to help cells die when something goes wrong inside them. Inherited mutations in this gene might let abnormal cells live longer than they should, which can lead to an increased risk of prostate cancer.

BRCA1 and BRCA2: These tumor suppressor genes normally help repair mistakes in a cell's DNA (or cause the cell to die if the mistake can't be fixed). Inherited mutations in these genes more commonly cause breast and ovarian cancer in women. But inherited BRCA changes also account for a very small number of prostate cancers.

DNA mismatch repair genes (such as MSH2 and MLH1): These genes normally help fix mistakes (mismatches) in DNA that are made when a cell is preparing to divide into 2 new cells. (Cells must make a new copy of their DNA each time they divide.) Men with inherited mutations in these genes have a condition known as Lynch syndrome, and are at increased risk of colorectal, prostate, and some other cancers.

Other inherited gene mutations may account for some cases of hereditary prostate cancer, although none of these is a major cause. More research is being done on these genes.

DNA Mutations: Most DNA mutations related to prostate cancer seem to develop during a man's life rather than having been inherited.

Every time a cell prepares to divide into 2 new cells, it must copy its DNA. This process is not perfect, and sometimes errors occur, leaving flawed DNA in the new cell. It is not clear how often these DNA changes might be random events, and how often they are influenced by other factors (diet, hormone levels, etc.). In general, the more quickly prostate cells grow and divide, the more chances there are for mutations to occur. Therefore, anything that speeds up this process may make prostate cancer more likely.

The development of prostate cancer may be linked to increased levels of certain hormones. High levels of androgens (male hormones, such as testosterone) promote prostate cell growth, and might contribute to prostate cancer risk in some men.

Some researchers have noted that men with high levels of another hormone, insulin-like growth factor-1 (IGF-1), are more likely to get prostate cancer. IGF-1 is similar to insulin, but it affects cell growth, not sugar metabolism. However, other studies have not found a link between IGF-1 and prostate cancer. Further research is needed to make sense of these findings.

Diagnosis

Most prostate cancers are first found during screening with a prostate-specific antigen (PSA) blood tests.

If certain symptoms or the results of early detection tests – a PSA blood test and/or DRE – suggest that you might have prostate cancer, your doctor will do a prostate biopsy to find out.

A biopsy is a procedure in which a sample of body tissue is removed and then looked at under a microscope. A core needle biopsy is the main method used to diagnose prostate cancer. It is usually done by a urologist, a surgeon who treats cancers of the genital and urinary tract, which includes the prostate gland.

Using transrectal ultrasound to “see” the prostate gland, the doctor quickly inserts a thin, hollow needle through the wall of the rectum into the prostate. When the needle is pulled out it removes a small cylinder (core) of prostate tissue. This is repeated from 8 to 18 times, but most urologists will take about 12 samples.

Though the procedure sounds painful, each biopsy usually causes only a brief uncomfortable sensation because it is done with a special spring-loaded biopsy instrument. The device inserts and removes the needle in a fraction of a second. Most doctors who do the biopsy

will numb the area first by injecting a local anesthetic alongside the prostate. You might want to ask your doctor if he or she plans to do this.

The biopsy itself takes about 10 minutes and is usually done in the doctor's office. You will likely be given antibiotics to take before the biopsy and possibly for a day or 2 after to reduce the risk of infection.

For a few days after the procedure, you may feel some soreness in the area and will probably notice blood in your urine. You may also have some light bleeding from your rectum, especially if you have hemorrhoids. Many men also see some blood in their semen or have rust colored semen, which can last for several weeks after the biopsy, depending on how frequently you ejaculate.

Your biopsy samples will be sent to a lab, where a pathologist (a doctor who specializes in diagnosing disease in tissue samples) will look at them under a microscope to see if they contain cancer cells. If cancer is present, the pathologist will also assign it a grade (see the next section). Getting the results usually takes at least 1 to 3 days, but it can sometimes take longer.

Even when taking many samples, biopsies can still sometimes miss a cancer if none of the biopsy needles pass through it. This is known as a false-negative result. If your doctor still strongly suspects you have prostate cancer (because your PSA level is very high, for example) a repeat biopsy might be needed to help be sure.

Pathologists grade prostate cancers according to the Gleason system. This system assigns a Gleason grade, using numbers from 1 to 5 based on how much the cells in the cancerous tissue look like normal prostate tissue.

- If the cancerous tissue looks much like normal prostate tissue, a grade of 1 is assigned
- If the cancer cells and their growth patterns look very abnormal, it is called a grade 5 tumor
- Grades 2 through 4 have features in between these extremes
- If cancer is present, most biopsies are grade 3 or higher, and grades 1 and 2 are not often used

Since prostate cancers often have areas with different grades, a grade is assigned to the 2 areas that make up most of the cancer. These 2 grades are added to yield the Gleason score (also called the Gleason sum). The higher the Gleason score, the more likely it is that the cancer will grow and spread quickly.

The Gleason score can be between 2 and 10, but most biopsies are at least a 6.

There are some exceptions to this rule. If the highest grade takes up most (95% or more) of the biopsy, the grade for that area is counted twice as the Gleason score. Also, if 3 grades

are present in a biopsy core, the highest grade is always included in the Gleason score, even if most of the core is taken up by areas of cancer with lower grades.

- Cancers with a Gleason score of 6 or less are often called well-differentiated or low-grade.
- Cancers with a Gleason score of 7 may be called moderately-differentiated or intermediate-grade.
- Cancers with Gleason scores of 8 to 10 may be called poorly-differentiated or high-grade.

Along with the grade of the cancer (if it is present), the pathologist's report also often contains other pieces of information that can give a better idea of the scope of the cancer. These can include:

- The number of biopsy core samples that contain cancer (for example, "7 out of 12")
- The percentage of cancer in each of the cores
- Whether the cancer is on one side (left or right) of the prostate or both sides (bilateral).

Treatment

Depending on the situation, the treatment options for men with prostate cancer might include:

- Expectant management or active surveillance
- Surgery
- Radiation therapy
- Cryosurgery
- Hormone therapy
- Chemotherapy
- Vaccine treatment
- Bone-directed treatment

These treatments are generally used one at a time, although in some cases they may be combined.

The treatment you choose for prostate cancer should take into account:

- Your age and expected life span
- Any other serious health conditions you have
- The stage and grade of your cancer
- Your feelings (and your doctor's opinion) about the need to treat the cancer right away
- The likelihood that each type of treatment will cure your cancer (or help in some other way)
- Your feelings about the possible side effects from each treatment

Many men find it helpful to get a second opinion about the best treatment options based on their situation, especially if they have several choices. Prostate cancer is a complex disease, and doctors can differ in their opinions regarding the best treatment options. Speaking with doctors who specialize in different kinds of treatment may help you sort through your options.

The main types of doctors who treat prostate cancer include:

- Urologists: surgeons who treat diseases of the urinary system and male reproductive system (including the prostate)
- Radiation oncologists: doctors who treat cancer with radiation therapy
- Medical oncologists: doctors who treat cancer with medicines such as chemotherapy or hormone therapy

Your primary care doctor can also be a helpful source of information as you sort through your treatment options. It's important to discuss all of your treatment options, including goals and possible side effects, with your doctors to help make the decision that best fits your needs.

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