Prostate Cancer

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Pathophysiology

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Prostate Cancer

Definition

Cause

Prostate Cancer is the most common cancer other than skin cancer affecting American men today.

The prostate is a walnut-sized gland located just below the bladder and in front of the the rectum.

It is caused when the prostate begins to grow abnormal or cancerous cells. The exact Cause of prostate cancer is unknown. Some researchers believe that diet may be important

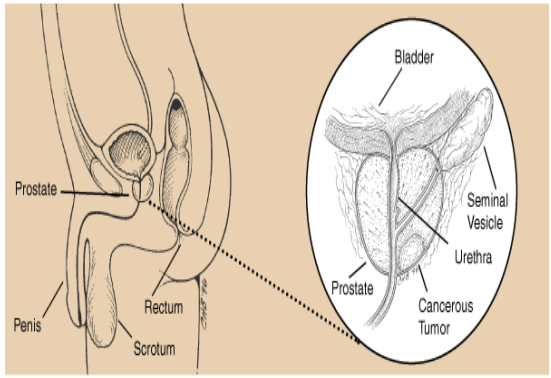
Risk Groups

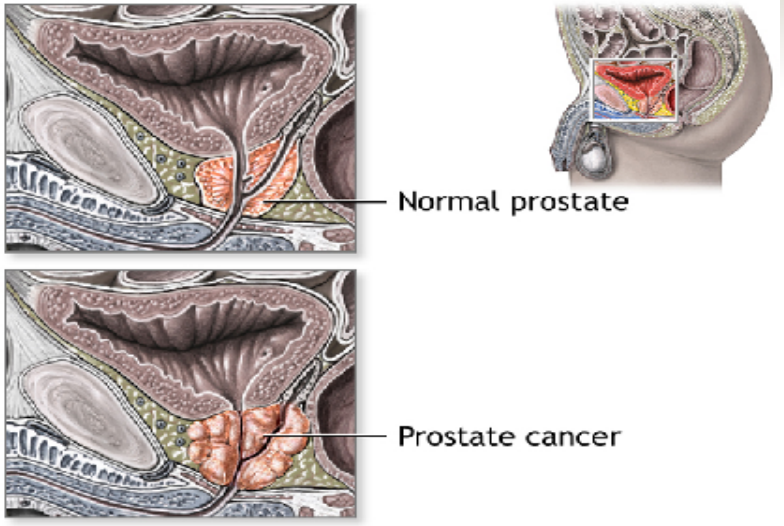
Men in the United Stated have a much higher rate of the disease than those in many other countries. It is thought that the higher fat in the American diet may be one reason for this.

Pathophysiology

The prostate is a zinc-accumulating, citrate-producing organ. The protein ZIP1 is responsible for the active transport of zinc into prostate cells. One of zinc's important roles is to change the metabolism of the cell in order to produce citrate, an important component of semen. The process of zinc accumulation, alteration of metabolism, and citrate production is energy inefficient, and prostate cells sacrifice enormous amounts of energy (ATP) in order to accomplish this task. Prostate cancer cells are generally devoid of zinc. This allows prostate cancer cells to save energy not making citrate, and utilize the new abundance of energy to grow and spread. The absence of zinc is thought to occur via a silencing of the gene that produces the transporter protein ZIP1. ZIP1 is now called a tumor suppressor gene product for the gene SLC39A1. The cause of the epigenetic silencing is unknown. Strategies which transport zinc into transformed prostate cells effectively eliminate these cells in animals. Zinc inhibits NF-KB pathways, is anti-proliferative, and induces apoptosis in abnormal cells. Unfortunately, oral ingestion of zinc is ineffective since high concentrations of zinc into prostate cells is not possible without the active transporter, ZIP1. Loss of cancer suppressor genes, early in the prostatic carcinogenesis, have been localized to chromosomes 8p, 10q, 13q, and 16q. P53 mutations in the primary prostate cancer are relatively low and are more frequently seen in metastatic settings, hence, P53 mutations are late event in pathology of prostate cancer.

Pathophysiology 2





Risk Factors

Age: The most significant risk for developing prostate cancer is age. Researchers estimate that over 63% of all men with prostate cancer are over the age of 70.

Family history: You are more likely to get prostate cancer if your father or brother had it, or if you have a close female relative who has had breast cancer.

Race: Men of African descent are more likely to get prostate cancer than whites or those of Asian descents. According to the American cancer society, 1 man in 7 men will diagnose with PC.

Geography: North American and European men are more likely to have it compare to men living in Asia, Africa, Central or South America.

Diet: Men who eat high-fat foods such as red meat and full fat diary products are more prone to have prostate cancer than men who eat more fruits and vegetables.

Symptoms
Complications

- Frequent urination (especially at night).
- Difficulty urinating.
- Weak urine flow.
- Interrupted urine flow.
- Pain or burning during urination or ejaculation.
- Blood in the urine or semen.
- Persistent pain in the hips, back or pelvis.
- Urinary Incontinence.
- Bowel problems.
- Erectile dysfunction or impotence.
- Retrograde ejaculation (the sperm leaves the prostate gland but cannot exit the body and is forced backwards into the bladder).
- Infertility.

Diagnosis/ Exams & Tests

- Digital rectal exam
- Prostate-specific antigen (PSA) test.
- Transrectal Ultrasound
- Biopsy
- Transrectal Biopsy
- Transperineal biopsy
- CT scan
- Bone scan
- Chest x-ray

Treatment

The treatment of prostate cancer depends on the stage of your disease, your age, and your overall health. If you are symptom-free, or you are older, or you have another serious illness, your doctor may choose to treat you with just regular tests. These will check for cancer growth.

If your doctor recommends treatment, it may include:

Surgery to remove the cancer cells.

Radiation therapy (high-dose x-rays or other high-energy rays to kill cancer cells).

Hormone therapy (hormones to stop cancer cells from growing).

Chemotherapy (drugs to kill cancer cells).

Biological therapy (using the body's immune system to fight disease).

References

American Cancer Society 1599 Clifton Road, N.E. Atlanta, GA 30329
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McCance, K. & Huether, S. E. *Pathophysiology: The biologic basis for disease in adults and children*. (7th edition) St. Louis: C.V. Mosby, 2015. [M &H]

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