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Prostate Cancer Key Risk Factors and Prevention Strategies

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Abstract: Prostate cancer is one of the most common types of cancer in men, affecting over 1.1 million individuals globally each year. Despite its potential to develop and spread, prostate cancer typically grows slowly. The disease is characterized by symptoms such as difficulty urinating and blood during ejaculation. Key risk factors include age (rare in individuals under 45 and increasing after 50), family history, race (more prevalent in Western countries and particularly among black individuals), hormonal influences (notably testosterone), diet (high in fats and low in vegetables), environmental factors, smoking, obesity, and pesticide exposure. However, the impact of these factors and the interplay between genetic and environmental influences remain underexplored. This study aims to identify and analyze the significant risk factors contributing to prostate cancer development. Methods involve a comprehensive review of existing literature and epidemiological data. Preliminary results indicate that heredity, lifestyle, and environmental exposures significantly contribute to prostate cancer risk. These findings underscore the need for targeted prevention strategies and public health interventions to mitigate the disease's incidence and improve patient outcomes.

Keywords: prostate cancer, risk factors, symptoms, prevention, treatment

1. Introduction

The prostate gland

The prostate gland is a gland that is a component of the male reproductive system. It is situated immediately below the bladder and resembles a chestnut in shape. The prostate gland is nearly round at the top and narrows to a sharp point at the bottom, with a diameter of about 4 cm in its widest area [1].

The prostate gland secretes sperm through the ejaculation of semen, which is similar to a milky liquid released into the urethra at that time. Generally speaking, the prostate is made up of multiple glands, numbering between 30 and 50, each of which contains ample tissue; the prostate also contains numerous smooth muscle bundles; the word prostate is derived from the same Greek word meaning standing before, meaning that the prostate sits before the testicles, according to the scientists who discovered it [2].

Prostate cancer is the 2nd most frequent type of cancer and accounts for 25% of the total number of cancer cases. After lung cancer, cancer is the second greatest cause of mortality and is more common among men.

Signs and symptoms:

- Having difficulty urinating intermittently.
- Diminished, sporadic, or weak urine flow.
- The sensation that the bladder is not entirely emptied.
- Pain or burning during urinating. [3]

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- Blood found in the semen or urine.
- A painful erection.

2. The reasons and the risk Factors

• Age: the danger of prostate cancer rises after the age of fifty. the household.

• Heredity: Research shows that 5–10% of prostate cancer occurrences involve people with accidents in the same place.[4-5]

• Race: Although prostate cancer has more prevalent in the Western world than in the East, particularly in black people, race does have a role in the disease. However, prostate cancer is a side consequence of race.[6]

• Hormones: The most significant component in prostate cell proliferation, and the absence of which prevents cancer from developing, is testosterone. This indicates that prostate cancer does not grow in men who, for whatever reason (such as testicle removal, for example), cannot produce the hormone.[7]

• The probability of prostate cancer is increased by diet, which plays a significant role. A diet high in fats and low in vegetables and fibers raises the chance of prostate cancer.[8]

• How environmental variables affect prostate cancer

• Smoking: Numerous scientific research have demonstrated the detrimental effects of smoking on prostate health since it aggravates inflammation and acts as a trigger for cancer. For this reason, giving up smoking is crucial to maintaining prostate health.[9]

• Obesity: According to early research, men who are obese are 44% more likely to have prostate cancer. This means that fat men are more likely to develop prostate cancer.

• Pesticides: A group of Canadian farmers participated in the first investigation on the connection between pesticides and prostate cancer. This study made it abundantly evident that farms who use insecticides on their crops have a greater risk of prostate cancer than farmers who do not.

3. Complications

Prostate cancer treatment complications include:

• Metastasized cancer, or cancer that spreads. Prostate cancer can travel through your circulation or lymphatic systems to your bones or various organs, or it might spread to neighboring organs like your bladder. Broken bones and suffering can result from prostate cancer that travels to the bones. Prostate cancer is unlikely to be treated if it has spread to various parts of the body, but it can still respond to therapy and be controlled.

• Defecation. Urinary incontinence can result from prostate cancer as well as its treatment. The type of incontinence you have, its severity, and the possibility that it will get better with time all influence how you should be treated. Surgery, catheters, and medication are possible forms of treatment.

• Problems with erection. Prostate cancer and its therapies, such as surgery, radiation, or hormone therapy, can cause erectile dysfunction. Treatment options for erectile dysfunction include surgery, erection-assisting vacuum devices, and medications.

Prostate cancer development

Prostate cancer progresses in four phases, each determined by how the cancer cells divide and proliferate. Selecting the most effective prostate cancer treatment requires an understanding of the cancer's stage. The size of the tumor, its position (within the prostate or outside), whether the malignancy has grown outside the prostate, and the organs

affected (near to or distant from the prostate) are the three parameters that determine the stage of prostate cancer.

- **Stage I**

Localized prostate carcinoma (T1) refers to small carcinomas that are inadvertently discovered during biopsies that are driven by elevated PSA levels and are specific to prostatitis. Based on the likelihood of recurrence, these carcinomas are divided into three groups:

High-risk localized prostate cancer; low-risk localized prostate cancer; and localized prostate cancer of intermediate risk.

To evaluate the likelihood of recurrence for limited malignancies, the Gleason score, PSA level, and tumor size are utilized. It displays the cancer cells' level of aggression [10].

- **Stage II**

prostate cancer at its advanced stages During an examination of the anus, the doctor looks for a hardened region of the prostate and uses this information to diagnose cancer.

Currently, the cancer is still limited to the gland and is asymptomatic, so the patient is unaware that it even exists.

- **Stage III**

prostate cancer that has spread to nearby lymph nodes At this point, digital exams are typically used to identify cancer. The majority of the prostate is solid at this point, indicating the presence of cancer. It's also likely that the disease has spread to the nearby lymph nodes and seminal vesicles [11].

- **Stage IV**

metastatic prostate cancer: This kind of the disease has spread to adjacent organs such the lymph nodes, pubic bone, and rectum.

4. Diagnosis

- Anal examination (TR): Rectal examination, which involves imaging anomalies and assessing consistency and size, is part of the clinical examination. The prostate is palpated with an index finger across the rectum's wall to determine its size, consistency, and regularity. Even when the prostate biopsy score is higher than normal, this test can occasionally identify cancer; although, not all tumors are detected by this method.
- Blood examination Prostate-specific antigen (PSA): It is an enzyme that the prostate naturally secretes in all men, healthy or not, at a rate of under four nanograms per ml of blood, or more than 10 nanograms per ml of blood in cases of cancer.
- Analyzing urine In contrast to a tissue-normal prostate, PCA3 is a not-coding gene (ARN) that appears in prostate cancer. Urine is used to measure it following prostate massage.
- Prostate biopsy: This is a highly accurate diagnostic procedure that involves expanding the prostate through the rectum or the perineum, then extracting a mass of prostate tissue. Occasionally, the sample is repeated to examine prostate tissue in multiple locations to ascertain the degree of the cancer. The sample is taken, and it is examined under an optical microscope to look for any cancerous cells.
- Ultrasound: After inserting an ultrasound probe into the rectum, the waves of the probe provide an image of the interior structures. In order to get tissue samples and determine the extent and scope of the cancer's spread, a small needle can be inserted through the prostate.

Prostate cancer treatment

- Medical surgery

Hugh Hampton Young, a urologist, performed the first prostatectomy in 1905. Accompany Favorite Surgical treatment is intended to eradicate cancer radicalistically, and this can only be accomplished by completely excising the prostate, which includes the urethral canal and its capsula, as well as the portion of the bladder's neck above it, the seminal Vesicles, the final part of the carrier vessel, and the ejaculatory duct. After this, the bladder is reconnected to the remaining portion of the urethral canal. urinary tract. This procedure is not without risk and complexity.

• External radiotherapy

It is utilized for treating locally advanced forms of prostate cancer as well as high-risk local prostate cancer. After designating the region to be cured using a scanner, this procedure involves the use of radiation to eliminate cancer cells and inhibit their proliferation while conserving the surrounding normal organs and tissues as far as possible [12].

• Hormonal therapy

This type of treatment aims to lower the amount of male hormones called "androgens," which are usually produced in the the testis and aid in the development of the prostate tumor. Examples of these hormones include testosterone. Tumors can shrink over time as their hormone level is lowered, and individuals whose tumors have spread outside of the gland are frequently treated with hormonal therapy. Within a year or two, the cancerous tumor reacts to hormone therapy, and most tumors eventually start to emerge from the uterus.

• Chemotherapy

This treatment destroys cancer cells, but regrettably, it also destroys healthy cells in the process. It damages and kills a lot of good, healthy cells. Prostate cancer patients rarely receive this medication since the negative consequences, which include hair loss, outweigh the positive aspects. persistent stress, nausea, lightheadedness, and depression [13].

Preventing Cancer

• Playing sports

Men who engage in physical activity and expend at least 4,000 calories a week can lower their risk of developing prostate cancer by 47 to 88%.

• Tomatoes: Research suggests that eating more cooking tomato products can reduce the incidence of prostate tumors by 20% compared to a diet free of tomatoes. "Lycopene" is thought to be the primary chemical with anti-cancer properties. It is one of the essential antioxidant molecules that, by shielding the DNA linked to prostate cancer cells, slows or stops the growth of malignant tumors.

• Reducing fat: About 30% of males under the age of fifty will have prostate cancer. Cutting back on fatty foods slows the rate at which cancer spreads.

• Natural vitamin D intake: Getting your fill of vitamin D from natural sources, such as sunlight exposure, can potentially lower your chance of developing cancer.

• Drinking green tea: Green tea inhibits the development of blood vessels which supply malignant tumors, therefore stopping them from spreading.

• Turmeric: It has the yellow dye "Curcumin" in it, which has amazing anti-cancer qualities. It stops prostate cancer from developing and also stops tumor cells from spreading when they do [14-15].

5. Conclusion

Prostate cancer remains one of the most prevalent malignancies among men, affecting over 1.1 million individuals globally each year. This cancer typically progresses slowly, with symptoms such as difficulty urinating and blood during ejaculation, primarily afflicting men over 45 and those with a familial predisposition. The complexity

of prostate cancer treatment significantly impacts patients' reproductive capabilities and psychological well-being. While prevention strategies, including dietary modifications and smoking cessation, can mitigate the risk, further research is imperative to explore advanced diagnostic techniques, more effective treatments, and comprehensive support systems to enhance patient outcomes and quality of life.

REFERENCES

[1] V. Zaichick, "A systematic review of the zinc content of the normal human prostate gland," Biological Trace Element Research, vol. 199, no. 10, pp. 3593-3607, 2021.

[2] J. R. Rider, K. M. Wilson, J. A. Sinnott, R. S. Kelly, L. A. Mucci, and E. L. Giovannucci, "Ejaculation frequency and risk of prostate cancer: updated results with an additional decade of follow-up," European Urology, vol. 70, no. 6, pp. 974-982, 2016.

[3] A. Dayon, "Rôle de la sphingosine kinase-1 dans la survie et la progression des cellules tumorales prostatiques LNCaP vers l'androgéno-indépendance" [Role of sphingosine kinase-1 in survival and progression of LNCaP prostate tumor cells to androgen independence], Doctoral dissertation, Toulouse 3, 2008.

[4] A. D. Grigore, "Reassessment of Neurite-Like Processes in a Neuroendocrine Prostate Cancer Model," Doctoral dissertation, Rice University, 2020.

[5] M. N. Bashir, "Epidemiology of prostate cancer," Asian Pacific Journal of Cancer Prevention, vol. 16, no. 13, pp. 5137-5141, 2015.

[6] S. Gharbieh, F. Reeves, and B. Challacombe, "The prostatic middle lobe: clinical significance, presentation and management," Nature Reviews Urology, vol. 20, no. 11, pp. 645-653, 2023.

[7] S. Henry, "Analyse de la reproductibilité et de la performance du scoring de l'IRM multiparamétrique pour la détection du cancer de la prostate" [Analysis of the reproducibility and performance of multiparametric MRI scoring for prostate cancer detection], Doctoral dissertation, 2015.

[8] M. Oczkowski, K. Dziendzikowska, A. Pasternak-Winiarska, D. Włodarek, and J. Gromadzka-Ostrowska, "Dietary factors and prostate cancer development, progression, and reduction," Nutrients, vol. 13, no. 2, p. 496, 2021.

[9] A. El Khamlichi, "Contribution à l'étude phytochimique et biologique d'une Fabacée endémique du Maroc, Calycotome villosa subsp. intermédia" [Contribution to the phytochemical and biological study of an endemic Moroccan Fabaceae, Calycotome villosa subsp. intermédia].

[10] D. L. Suzman and E. S. Antonarakis, "Castration-resistant prostate cancer: latest evidence and therapeutic implications," Therapeutic Advances in Medical Oncology, vol. 6, no. 4, pp. 167-179, 2014.

[11] B. Amadou, "Epidemiological-Clinical and Paraclinical Profile of Prostate Tumors in the Urology Department of the Center Hospitalier Universitaire Gabriel Toure about 1350 Adenomectomy Specimens," Sch J Med Case Rep, vol. 2, pp. 146-149, 2023.

[12] M. Brown, L. Cato, and R. Jeselsohn, "Hormone-responsive cancers," in Yen and Jaffe's Reproductive Endocrinology, pp. 717-741, Elsevier, 2019.

[13] A. H. de Vries, S. J. van Luijk, A. J. Scherpbier, E. L. Hendrikx, E. L. Koldewijn, C. Wagner, and B. M. Schout, "High acceptability of a newly developed urological practical skills training program," BMC Urology, vol. 15, pp. 1-8, 2015.

[14] É. Niaf, "Aide au diagnostic du cancer de la prostate par IRM multi-paramétrique: une approche par classification supervisée" [Assistance in the diagnosis of prostate cancer by multiparametric MRI: a supervised classification approach], Doctoral dissertation, Université Claude Bernard-Lyon I, 2012.

[15] Lehaire, J., "Détection et caractérisation du cancer de la prostate par images IRM 1.5 T multiparamétriques" [Detection and characterization of prostate cancer by 1.5 T multiparametric MRI images], Doctoral dissertation, Université de Lyon, 2016.