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Prostate Cancer: A Public Health Problem

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ABSTRACT

Prostate cancer is an affectation acquired in old age, men who develop it may have genetic factors, other predisposing diseases such as benign prostatic hyperplasia and bad habits such as alcoholism and smoking that may be the cause of developing the affectation. The identification of risk factors as well as their early treatment can significantly reduce morbidity and mortality

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INTRODUCTION

The prostate is a grey retroperitoneal organ with a hard consistency that surrounds the neck of the bladder and the urethra and lacks a differentiated capsule; it has endocrine, testicular and hypothalamic interrelationships as well as a high degree of oncogenic potential.[1]

Prostate cancer is a hormone-dependent neoplasm that is the third leading cause of death in men in Mexico, with an estimated 41,000 new cases per year. Before the age of 50 years this disease is not frequent, rarely occurs before 45 and its prevalence increases from the fifth decade of life by 20% and this increases by 70% between 70 and 80 years. [2]

There are remarkable and strange differences between countries and races in the incidence of this disease, because in addition to hereditary factors, environmental factors and lifestyles are also important, so in this study we aimed to find the different predisposing factors that lead to a greater chance of developing prostate cancer in Mexico and the U.S. between 50 and 70 years of age, in addition to finding data on the disease both its etiology and its pathophysiology, with its morphology and how to diagnose it. [3,4]

BACKGROUND

Prostate cancer is a very dangerous disease that is especially found in men when they reach old age, we decided to focus on the factors that predispose this disease in adults who are between 50 and 70 years old, by analyzing it we want to be able to inform the community the things that can make us more susceptible to have the disease so that people can be prevented from this disease since it is a fairly common cause of death in the world, we also want to inform the medical community and provide a reliable source so that doctors can advise their patients to prevent their patients who are part of the most affected population, also after defining the risk factors we are going to compare between Mexico and the United States, we decided to compare these two countries because we live in Mexico, it is a third world country which can be detrimental in the development of the disease and the economic factor can be a very important feature both for the ease of treatment and the ease of preventing the disease, there may also be other changes such as climate, lifestyle, life expectancy and genetics; All of these objectives are attempted to be fulfilled with the information collected and thus be able to meet the expectation of obtaining accurate and effective data. [5,6]

References to cancer have been found since ancient Egypt with descriptions of affections that according to the symptomatology we can infer that it was cancer, throughout history more findings were made related to the disease, from the Greeks to the Germans did their research to find the cause, pathogenesis and treatment of this affectation. Prostate cancer is an affectation acquired in old age, men who develop it may have genetic factors, other predisposing diseases such as benign prostatic hyperplasia and bad habits such as

alcoholism and smoking that may be the cause of developing the affectation. [7]

In history, different ways of identifying prostate cancer have been developed, such as the prostate specific antigen blood test, a modern way of doing it, or another more classic way of trying to make a diagnosis is the palpation of the prostate gland and if abnormalities are found on touch, a biopsy is performed to examine and confirm the existence of the pathology. [8]

Nowadays the pathogenesis of the disease has come to suspect several more6specific triggering factors, treatments for the disease and the way to detect it has also evolved in a benign way, the rate of disease onset has been reduced thanks to the information provided to the community accentuating the way to prevent the development by environmental, genetic and physical factors. All these advances bring us closer and closer to finding the etiology, diagnosis and ideal treatment for the condition. [8]

The prostate is a retroperitoneal organ found below the bladder of grey colour and hard consistency that surrounds the neck of the bladder and the urethra and also lacks a differentiated capsule. It is a single gland measuring approximately 4cmx3cmx2cm; it grows slowly from birth to puberty, then rapidly until about 30 years of age, remaining stable until about 45 years of age, and then there is the possibility of further enlargement. [9]

The prostate secretes a milky, acidic fluid with a varied compound of substances: citric acid in the prostatic fluid, used by sperm to produce ATP via the Krebs cycle; composed also of different proteolytic enzymes, such as prostate-specific antigen (PSA), pepsinogen, lysozyme, amylase and hyaluronidase that break down clotting proteins secreted by the seminal vesicles; by seminoplasmin from prostatic fluid is an antibiotic capable of destroying bacteria and may act by decreasing naturally occurring bacterial growth in semen. It presents endocrine, testicular and hypothalamic interrelationships as well as a high degree of oncogenic potential. Prostate cancer is a hormone-dependent neoplasm. [9]

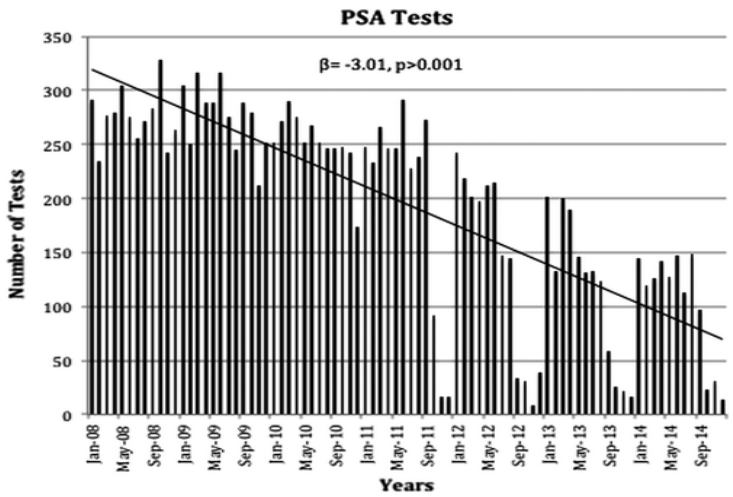
EPIDEMIOLOGY

Around the 90's in the United States of America, the American Urological Society (AUA) and the American Cancer Society (ACS) began to recommend an annual prostate exam. This resulted in a decrease in the statistics of the incidence of prostate cancer, since by 1992 the incidence of cancer was 237.4 per 100,000 people. Within these statistics, men over 75 years of age were recommended to undergo the exam, since the U.S. Preventive Services Task Force mentioned that this was the population with the highest risk. [10]

Cancer declined in older people around the 2000s, but continuing to be more prevalent in the adult population than in younger people. But in the year 2004 to 2012 there was a substantial turnaround, as it was occurring more in younger men rather than older people, which researchers say they attribute this to it being a more aggressive cancer. In 2000, the National Health Interview Survey (NHIS) found that 57% of men with prostate cancer were over the age of 50, but the peak incidence was between the ages of 60-74 years with 52% of presentation. [11]

The age of highest incidence was between 68 and 77 years, in the U.S. population. And it mentions that the incidence of a man having the disease is 184.1 per 100,000 U.S. population. But in 2012 it was noted that there was an increase in younger men around the age of 55 . But the place where its population was increasing by 90.7% was for the Caribbean population, because in the last epidemiological overview of prostate cancer worldwide, this was shown as the most incidence , and being the cities, Barbados, Trinidad and Tobago, Martinique were the city with more presentation, but it was noted that it was the presentation of this disease was 44% in black men and 29% white. [12]

More recent studies taking patients between 2008 and 2014 show a significant decrease in the detection of Prostate Specific Antigen (PSA), which may mean that various advances (both in serological testing and timely clinical detection) may help in the reduction of this neoplasm. [12]



PSA tests from 2008 to 2014 specified by months. [12]

As in this same study, it can be seen how the age of prevalence of prostate cancer was decreasing considerably, except for the 40 year-old group, which remained stable. Coinciding with the decrease in PSA. [12]

Mexico, an upper middle-income country, is currently undergoing an epidemiological transition, in which mortality patterns are influenced by technological and medical advances. Currently, the main public health problems in the country are chronic degenerative diseases. [13]

ETIOLOGY

It is suspected of the participation of various factors such as the incidence in men it is said that 13% of the gender will have the disease in his life, so it is recommended to men since 2000 that adults over 75 years are made to annual reviews to see if there is any cancer in formation, it has been found that race also influences the occurrence of cancer, According to studies carried out in 2000 in the USA, African-Americans are twice as likely to die of cancer as white men. The level of development of a nation can also be related to the appearance of cancer, although it can appear in both developed and developing countries, it is practically a fact that those countries that are in the process of development will have more problems to treat the affectation; family history, hormone concentrations, obesity, smoking, sexually transmitted infections and environmental influences also play a role in the development of the disease. The increase in the incidence of this disease during migrations from regions of high to low incidence is compatible with the environmental character, as has been suspected the involvement of diet as a high consumption of fat and / or carcinogenic meats on the effects on this pathology, but there are some other factors that are more relevant and feasible for the predisposition of the disease.For example, chronic inflammation increases the risk of prostate cancer development, thus seeing that inflammatory signals play a fundamental role in oncogenic transformation and in the formation of immunosuppressive microenvironments in cancer. [15]

Genome-wide association studies have reported a polymorphic variant located in the region of the β-microseminoprotein (MSMB gene) associated with increased PC risk. The T allele has also been associated with modification of transcription factor binding sites reducing the promoter activity of the MSMB gene. The T allele alters the production of MSMB, a prostate secretory protein 94 amino acids (PSP94) and one of the most abundant proteins secreted by the prostate. This protein, present in blood and seminal plasma, regulates apoptosis induced by prostate growth and also under postcoital conditions of vaginal pH and low calcium concentration, exhibits antimicrobial activity. [15]

Matrix metalloproteinases, vitamin D receptor and androgen metabolism polymorphisms have been critical features in different studies of their genotype-phenotype association. [15]

It is believed that the length of the repeats is inversely related to the speed at which prostate cancer develops in rodent models and this belief can be confirmed by the effectiveness of castration and anti-androgen treatment against this type of cancer. But this will not always be enough as tumors will acquire mechanisms to adapt to low levels of androgens, allowing their activation by non-androgenic mediators and inducing their proliferation, allowing the activation of various signaling pathways, avoiding the need for androgen receptors. [15]

CONCLUSIONS

Prostate cancer is a neoplasm with a fairly high prevalence nowadays in older adults over 40 years old. When making a comparison of Mexico with a population as important as the United States it can help us to know that although at first glance they are similar with respect to predisposing factors, in this work we can realize how each population has its respective risk factors when it comes to developing this type of neoplasm.

The fact of making known the prevalence, specific risk factors and symptomatology can help to detect it in early stages and to know which are the causes that can originate more frequently in what type of population specifically.

In addition, when we compare ourselves with a first world country such as the United States, we can realize which tests have become obsolete due to their low specificity when it comes to making an effective diagnosis, as well as which new tests can offer us an effective and specific rapid diagnosis against this neoplasm. We have thought about the decrease in the use of certain examinations and tests is due to the importance of consensus in the use of any screening test among professionals from different specialties who wish to optimize the effectiveness and safety of early detection of this disease that is gaining ground among patients at younger ages.

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