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Serum concentrations of prostate-specific antigen (PSA) before and after the treatment in patients with prostate cancer

Níveis séricos de antígeno prostático específico antes e após o tratamento em pacientes com câncer de próstata

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ABSTRACT

Introduction: Prostate cancer is the second most prevalent neoplasm in men in Brazil. The prevention is recommended from 45 years for men with a family history of prostate cancer and from the age of 65 to the others. The aim of this study was to evaluate serum prostate-specific antigen (PSA) levels in patients diagnosed with prostate cancer before and after the treatment. Methods: This is a descriptive, cross-sectional and retrospective study, of a quantitative approach, in which were analyzed patients diagnosed with prostate cancer in the city of Parnaíba, Piauí, Brazil. Results: Twenty-nine patients were included, with a mean age of 76.6 years. According to the results of PSA dosing before (PSA1) and after (PSA2) the treatment, 19 (65.5%) patients presented a decrease in PSA2 values. Surgical treatment was required in nine (31%) patients. Radiotherapy was performed in 23 (79.3%) patients and six (20.7%) were undergoing treatment with hormone therapy. No patient underwent chemotherapy. Conclusion: The results of the present study demonstrated declines in PSA values after the treatment for prostate cancer. However, it is necessary to spread the knowledge and raise the awareness of the male population about the importance of early detection to a successfully prognosis and also to increase the men demand for health services and prevention.

KEYWORDS: Prostate neoplasms; Early diagnosis; Prostate-specific antigen.

RESUMO

Introdução: O câncer de próstata é a segunda neoplasia mais prevalente no sexo masculino no Brasil. Para homens com histórico familiar de câncer de próstata a prevenção é recomendada a partir de 45 anos e a partir dos 65 anos para os demais. O objetivo deste estudo foi avaliar os níveis séricos de antígeno prostático específico (PSA) em pacientes diagnosticados com câncer de próstata antes e após o tratamento. Metodologia: Trata-se de um estudo descritivo, transversal e retrospectivo de abordagem quantitativa onde foram analisados pacientes diagnosticados com câncer de próstata no município de Parnaíba, Piauí, Brasil. Resultados: Foram incluídos 29 pacientes, com média de idade de 76,6 anos. De acordo com os resultados da dosagem do PSA antes (PSA1) e após (PSA2) o tratamento, 19 (65,5%) pacientes demonstraram queda nos valores de PSA2. O tratamento cirúrgico foi necessário em nove (31%) pacientes. A radioterapia foi realizada em 23 (79,3%) pacientes e seis (20,7%) estavam realizando tratamento com hormonioterapia. Nenhum paciente foi submetido a quimioterapia. Conclusão: Os resultados do presente estudo demonstraram quedas nos valores de PSA após o tratamento para câncer de próstata. Entretanto, é necessário propagar o conhecimento e conscientizar a população masculina sobre a importância da detecção precoce para que se tenha sucesso no prognóstico e aumente a procura dos homens pelos serviços de saúde e prevenção.

PALAVRAS-CHAVE: Neoplasias da próstata; Diagnóstico precoce; Antígeno prostático específico.

INTRODUCTION

The prostate is a male gland located between the bladder and rectum. It participates in the production of semen, the liquid that carries the sperm produced in the testicles. Over the years, the prostate can increase as result of a benign prostate hyperplasia, or in some cases, it can progress to cancer. In general, the neoplasia is formed due to the growth and uncontrolled multiplication of certain tissues, acquiring the form of tumor[1].

Commonly, in the early stage of prostate cancer there is no presence of symptoms or when it happens, these may be similar to the symptoms detected in the benign prostate tumor. With the advancement of the disease, the patient can present bone pain, urinary problems and, in the most severe cases, generalized infection or renal failure[2]. In Brazil, the number of cases of prostate cancer is alarming. In 2018 it was diagnosed about 62 thousand new cases, with 13,772 deaths and an estimated risk of 66.12 new cases per 100 thousand inhabitants[3].

Currently, the forms of diagnosis of prostate cancer include the rectal examination and the evaluation of prostate-specific antigen (PSA) in serum. The rectal examination should be performed by male subjects, from 40 years of age, once a year. Also, the history of patient has be considered, and there is no consensus on how screening have to be performed in the general population. Thus, the most used methods are the rectal examination and the quantification of serum PSA[4].

In rectal examination it is possible to evaluate the presence of nodules in the prostate gland as its size, consistency and shape. However, one of the limitations of this procedure is that only the back and side of gland can be felt. Another limiting factor is the lack of information of the population that do not perform the exam due to preconception[1]. PSA is the most used serum marker for prostate cancer and its use allows not only screening, but also the diagnosis, prognosis and the monitorization of therapy. It is a highly specific test, which turns it closer to be an ideal tumor marker, even though it can be related to other diseases of prostate[5].

Studies have shown the difficulty of men performing preventive tests for prostate cancer, mainly because they think their masculinity will be impaired. In addition, it is still frequent in the family environment, a socialization of ideas that do not stimulate a masculine behavior of self-care, since throughout the personal trajectory the care of the men is generally mediated by feminine figures like mother, companion and daughter. Thus, is common that men did not go to an appointment with the urologist[6]. Community actions can contribute to the reduction of preconception and especially to the control of cases of prostate cancer, such as educational actions aimed at the male population, over 50 years old or with a family history of prostate cancer in the family[3]. The clarification about the importance of perform preventive tests, especially for patients in the risk groups, may contribute significantly to the reduction of cases of prostate cancer mortality in our population.

Therefore, the aim of this study was to evaluate the serum levels of PSA and also the different treatment methods used in patients with prostate cancer in the city of Parnaíba, Piauí, northeastern Brazil.

METHODS

This study was approved by Ethics Committee of Federal University of Piauí, *Campus* Ministro Reis Veloso (CAAE: 88060518.6.0000.5669) and was performed in partnership with a private clinic specializing in cancer care and treatment in the city of Parnaíba, Piauí.

This is a descriptive, cross-sectional and retrospective study. Were evaluated the cases of prostate cancer in the city of Parnaíba, Piauí from January 2015 to August 2018. Data as age, date of inclusion, performed tests to diagnose prostate cancer, results of serum PSA, the frequency of medical monitoring, the neoplasia score, if surgery was necessary, and the evolution of patient were included. All patients had their identity preserved throughout the period of development of this study.

Were included adult patients older than 18 years and forwarded at the treatment for prostate cancer in the private clinic during the proposed period. The patients attended out of period or that for some reason some of the data needed for analysis were not available were excluded.

The data were analyzed in SPSS (Statistical Package for Social Science) software version 23.0. A multivariate analysis was performed to evaluate the factors that could influence the development of more severe prostate cancer. For comparison purposes, the chi-square test was used with significance level p <0.05.

RESULTS

A total of 29 patients diagnosed with prostate cancer were included. The age of the patients ranged from 66 to 90 years, with an average of 76.6 (SD: ± 6.67 years). There were no recorded data on level of education, monthly income, race and civil status of the patients. Cancer detection was done by PSA in serum of the patients, and was no possible to determine if the rectal examination was previously performed.

Surgical treatment for tumor removal was required in nine (31%) patients. Radiotherapy was performed in 23 (79.3%) patients and in six (20.7%) the treatment with hormone therapy was performed. No patient underwent chemotherapy treatment.

According to the results of PSA serum dosage of before and after the treatment, 19 (65.5%) patients shwoed a decrease in the values after the beginning of the indicated treatment. In seven (24.1%) cases, the PSA remained constant. However, an increase in the PSA serum dosage after the treatment was detected in three (10.3%) patients (Figure 1). The mean of PSA serum dosage before treatment initiation, regardless of the method of choice, was 68.43 ng / dL (SD: ± 93.86 ng / dL), ranged from 0.01 ng / dL to 404.0 ng / dL. On the other hand, the mean of PSA serum dosage after the treatment was 25.92 ng / dL (SD: ± 44.84 ng / dL), ranged from 0.01 ng / dL to 150.0 ng / dL (p=0.04).

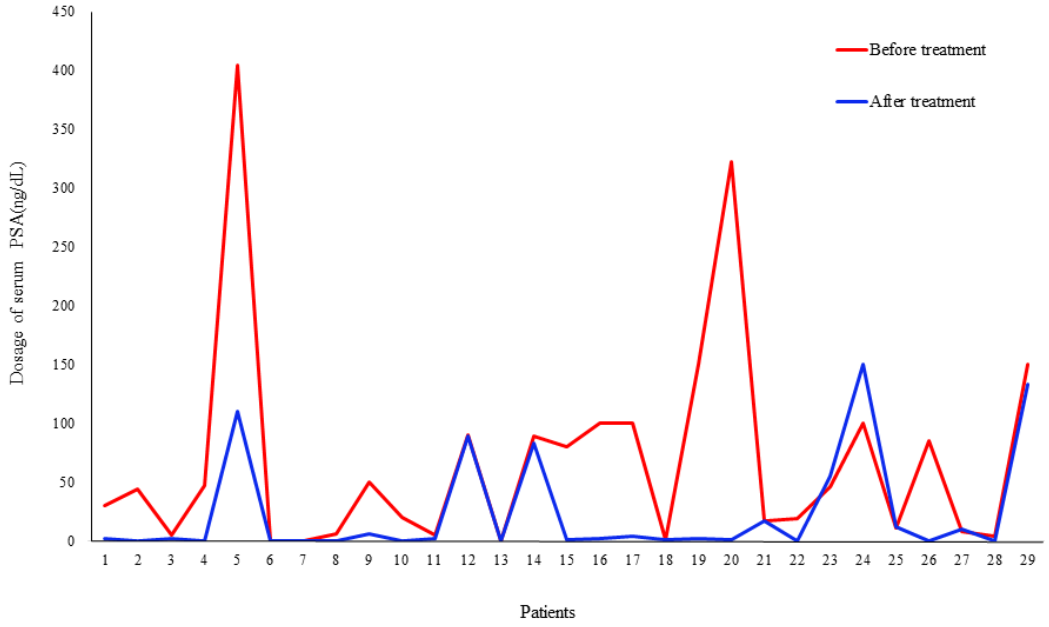

Figure 1. Dosage of serum PSA in patients diagnosed with prostate cancer before and after the treatment.

Based on Gleason system, 22 (75.8%) patients presented prostate cancer scores ranging from 5 to 7, four (13.7%) patients had a score ≥ 8, and three (10.3%) were classified as a score less than 5 (Figure 2). A multivariate analysis showed that both age and PSA serum values before the treatment contributed to the classification of prostate cancer in the more severe stages (Gleason scores 7 and 8) (data not shown). All these patients had over 60 years of age.

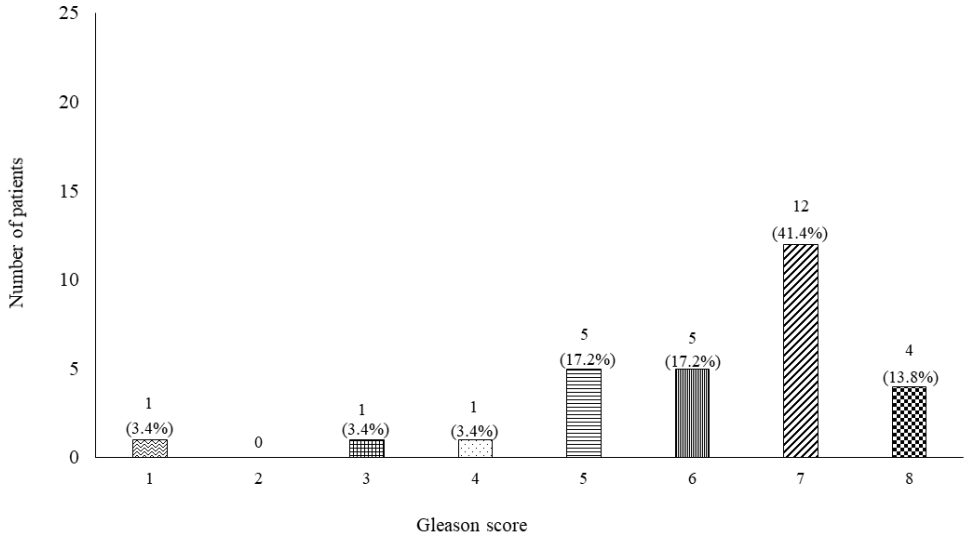

Figure 2. Number of evaluated patients classified as Gleason score according to the evolution of prostate cancer.

Of the 29 patients evaluated, 11 (37.9%) performed medical monitoring every two months, nine (31%) were followed up monthly, eight (27.6%) were doing medical follow-up every three months and one (3.4%) was in his first medical monitoring.

DISCUSSION AND FINAL CONSIDERATIONS

Prostate cancer is the fifth most frequent cancer in the world and is the second that most affect men above 65 years[7]. In Brazil, more than 68,000 new cases are diagnosed annually. Thus, it is important to highlight the importance of early diagnosis, once it increases the chances of success on treatment. One of the factors that seems to contribute to the increase in the new diagnosed cases is the better in life expectancy, as well as an improvement in the sensitivity of the methods used for early diagnosis, and the dissemination of awareness campaigns[1].

The implementation of PSA as a prostate tumor marker, since its approval by the Food and Drug Administration (FDA) in 1994, was a major advance in combating of the disease. This dosage, associated with rectal examination, allows the detection of prostate cancer even in the early stages, which allows an early diagnosis and reduces the chances of evolution in tumor growth[8].

Currently, the internationally movement known as “blue November” has been widely spread in order to alert the male population to the importance on prevention of prostate cancer. This movement reaches approximately 1.1 million people in the world, being the main countries involved Australia, New Zealand, the United States, and Canada, among others, including Brazil[9]. However, the resistance to adhesion to prostate cancer prevention is still common. This fact can be attributed mainly to the methodology of rectal examination, preconception or a lack of concern by the men about the own health[10].

The number of patients evaluated in the present study could have been higher. According to the information obtained at the particular clinic included in this study, the no adherence to the methods of prevention of the male population is frequent. Thus, the search for medical care only occurs when the clinical condition of the patient is already advanced. In the public network of health of the city of Parnaíba, the patients with PSA levels considered abnormal values are referred to the urologist for realization of rectal examination. It should be noted that there is no single and exclusive method for the detection of this neoplasia. Therefore, the dosage of serum PSA should not be used as the unique diagnostic test for prostate cancer, but should be associated with other techniques[11].

The dosage of PSA becomes an important tool in the early diagnose of prostate cancer, due its capacity of detect if the individual is developing the cancer when the levels of the enzyme begin to increase. Thus, this test allows the choose of the most appropriate therapy according to the stage of the disease, which is determined by histopathological exams[12].

In the present study, the first dosage of PSA (PSA1) was performed in patients diagnosed with prostate cancer and before the beginning of the treatment. During the treatment, other dosage of PSA (PSA 2) was performed to follow the evolution. The majority of patients presented decrease in PSA2 levels, however, a few cases of increased values after the treatment were observed. This fact could be attribute to the recent serum dosage of PSA2 right after the treatment of the patients, since it is required approximately 24 to 36 months of treatment in order to observe a significant evolution in the PSA values[13].

In a study developed in the state of São Paulo, it was verified that of the 992 men evaluated, 73.2% reported having had the PSA exam previously. The rectal examination, ultrasonography, and biopsy were also cited by the participants, and in some cases, their accomplishment concomitant was observed[14]. It has been shown that the ratio among the free and specific fraction with a level of 2.5 to 3.9 ng / mL of PSA in men, and a normal rectal examination can be used as a parameter to the identification of prostate cancer. In addition, a ratio ≤ 15 between the free and specific PSA contributes to a greater detection of the condition. Thus, the use of this parameter can be used as an indicative for biopsy, complementing the diagnose of prostate cancer[15].

According to the severity and the chance of progression of the disease, several studies have demonstrated epidemiologically the occurrence of this pathology in different regions of Brazil. A study conducted in the city of Aracajú, Sergipe, evaluated the incidence and the rates of mortality due prostate cancer for a period of ten years. It was demonstrated a progressive incidence over the evaluated period, with 1,490 new cases and 334 deaths due to this pathology[16]. In a study performed in the city of Marília, São Paulo, it was demonstrated that neoplasias are among the three main causes of chronic diseases in the elderly population. However, the risk of prostate cancer in this municipality fells 83.3% among men aged 60 to 69 years, and 30.5% in patients with 70 to 79 years of age[17]. These data reforces the need of more campaigns to raise awareness of the population, and also the importance of performing the PSA in tracking this pathology, avoiding its progression.

Commonly, prostate tumors are classified in grades and varies from 1 to 5. The grade 1 represents the tumor with the lowest risk, while grade 5 is associated with higher severity. Thus, this classification is associated with the Gleason score, which is a sum of the predominant primary standard degree of tumor, observed in the patient, with the secondary one, which represents the most common histological grade. As example, the differenced neoplasias with score 2 (1 + 1), and the most undifferentiated being 10 (5 + 5). Tumors with scores 2 and 4 are well differentiated, whereas 5 and 7 are moderately differentiated and 8 to 10 are undifferentiated tumors[3,18].

In the present study, three (10.3%) patients had a Gleason score of less than 5, representing a 25% chance that the cancer would spread beyond the prostate in 10 years. In 22 (75.8%) patients, the Gleason score detected was between 5 and 7, therefore, these patients presented about 50% chance of cancer spreading in 10 years. In four (13.7%) patients, the Gleason score was greater than 8. In these cases, the patients had a 75% of chance of cancer spreading

beyond the prostate in 10 years. This classification is important once it allows identifying the cases where the patients can present alterations in other organs, thus affecting their survival. It has already been demonstrated that patients with locally advanced neoplasms classified as high risk have an increase in survival when submitted to long-course hormone therapy associated with radiotherapy[13].

The results of the present study demonstrated that most of the patients were successfully treated and presented decrease in the dosage of serum PSA. Additionally, the adoption of measures to prevent and diagnose by the Health Department of the municipality and others responsible government agencies are necessary, since the number of patients evaluated could have been higher.

Thus, more studies are important and necessary since they contribute to the clarification of the population about the ways of preventing prostate cancer and also favors the breakdown of the preconception that still exists. It is necessary to spread the knowledge about the importance of the early detection of prostate cancer to a successful prognosis and also, to make the male population aware of the irreversible consequences arising from the preconception related to the ways of preventing prostate cancer.

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