Association between Testosterone and Prostate Cancer among SudanesePatients in Khartoum State

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Abstract:
Background: *Prostate is a compound tubuloalveolar exocrine gland of the male reproductive system in most mammals. It considers differ among species anatomically chemically and physiologically. Prostate cancer also known as carcinoma of the prostate, is the development of cancer in the prostate, a gland in the male reproductive system .Most prostate cancers are slow growing; however, some grow relatively quickly. Testosterone in the presence of a slow-growing prostate cancer is assumed to increase its growth rate. However, the association between testosterone supplementation and the development of prostate cancer is unproven.*
Aim: *To measure testosterone level in prostate cancer patients and to correlate between testosterone level and PSA level with the duration of therapy.*
Material and Methods: *The present study was is analytical cross-sectional study carried out during May to July 2016, at Al Zaiem Al Azhari University, Medical Laboratories Sciences College, and Clinical pathology department. A total one hundred individuals were enrolled in this study, and classified into two groups, 50 prostate cancer patients as case group and 50 healthy individuals as control group. Enzyme immunoassay analysis for testosterone level .The data of prostate cancer types, age, and sex of patients were collected from clinic records.*
Results: *The results were expressed as (mean ± SD), study was found that the level of testosterone in patient with a mean of (3.8/14) it was lower than the control mean of (5.4/9) and also the study found that the level of PSA in patients group with a mean of (28.3/1) is significantly increase when compared to healthy individuals with a mean of (0.8/2) and there was significant difference between two group, the study was found that there was significant correlation between testosterone level and duration of therapy, in the other hand PSA showed no significant association with the duration of therapy.*
Conclusions: *Finally the study concluded that significant reduction of testosterone level in patient with prostate cancer when compare to healthy individuals and there was significant correlation between testosterone level and duration of therapy.*
Keywords:*Testosterone, Prostate Cancer, Prostatic Specific Antigen*

I.   Introduction

Prostate is a compound tubuloalveolar exocrine gland of the male reproductive system in most mammals. It consider differ among species anatomically, chemically and physiologically [1][2].

The function of the prostate is to secrete a slightly alkaline fluid, milky or white in appearance, that in humans usually constitutes roughly 30% of the volume of the semen along with spermatozoa and seminal vesicle fluid [3]. Semen is made alkaline overall with the secretions from the other contributing glands, including, at least, the seminal vesicle fluid. The alkalinity of semen helps neutralize the acidity of the vaginal tract, prolonging the lifespan of sperm [4].

The prostatic fluid is expelled in the first ejaculate fractions, together with most of the spermatozoa, in comparison with the few spermatozoa expelled together with mainly seminal vesicular fluid, those expelled in prostatic fluid have better motility, longer survival and better protection of the genetic material, the prostate also contains some smooth muscles that help expel semen.

Prostate cancer also known as carcinoma of the prostate, is the development of cancer in the prostate, a gland in the male reproductive system [5]. Most prostate cancers are slow growing; however, some grow relatively quickly [6][7]. The cancer cells mayspread from the prostate to other parts of the body, particularly the bones and lymph nodes [8]. It may initially cause no symptoms [7]. In later stages it can lead to difficulty urinating, blood in the urine, or pain in the pelvis, back or when urinating [9]. 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 [7].

Testosterone in the presence of a slow-growing prostate cancer is assumed to increase its growth rate. However, the association between testosterone supplementation and the development of prostate cancer is unproven [10]. Nevertheless, physicians are cautioned about the cancer risk associated with testosterone supplementation [11].

Ethnic groups have different rates of prostate cancer [12], differences in sex hormones, including testosterone have been suggested as an explanation for these differences [12].This apparent paradox can be resolved by noting that prostate cancer is very common in autopsies, 80% of 80-year-old men have prostate cancer [13].

II. Material & Methods

Study approach:
This study is Qualitative approach study
Study design:
 This is analytical cross-sectional study
Study area:
 Khartoum state
Study population:
One hundred individuals were enrolled in this study, and classified into two groups, 50 prostate cancer patients as case group and 50 healthy individuals as control group.
Inclusion criteria:
Patients with prostate cancer.
Exclusion criteria:
 Klienfelters syndrome, primary hypogonadism, second hypogonadism, testicular injury.
Study duration:
 This study was carried out on three months (from May to July).
Collection of Samples:
 Samples were collected using dry, plastic syringes, tourniquet was used to make the veins more prominent, 4ml blood samples was collected in plane containers from each volunteer was collected under septic condition. All blood samples in plane containers were allowed to clot at 25°, and then they were centrifuged at 4000 rpm to obtain the serum samples, and stored in -20° until the analysis.
Testosterone Estimation:
Principle of the Competitive Enzyme Immunoassay:
The essential reagents required for an enzyme immunoassay include antibody, enzyme-antigen conjugate and native antigen. Upon mixing biotinylated antibody, enzyme-antigen conjugate and a serum containing the native antigen, a competition reaction results between the native antigen and the enzyme-antigen conjugate for a limited number of antibody binding sites.
Data analysis:
The data was analyzed using statistical package of social science (SPSS) computer program using frequencies, independent t-test and Pearson correlation , results was expressed as (mean ± SD), and significance difference was consider as (P-value <0.05).
Ethical consideration:
Ethical Clearance was obtain from Chemical Pathology department (University ofAlzaim Alazhry) and Informed Consent was taken from every Participant

III. Result

The study was conducted during the period from May to July, 2016 at the Khartoum state. The present work studied the association between testosterone level and prostate and was included 50 patients with prostate cancer and 50 healthy individual as control.In this study found that the level of testosterone in patient with a mean of (3.8) it was lower than the control mean of (5.4) and there was significant difference between two groups with a p-value of (0.015), table (3.1).In this study found that the level of PSA in patients group with a mean of (28.3) is significantly increase when compared to healthy individuals with a mean of (0.8) and there was significant difference between two group with a p-value of (0.000), table (3.1).
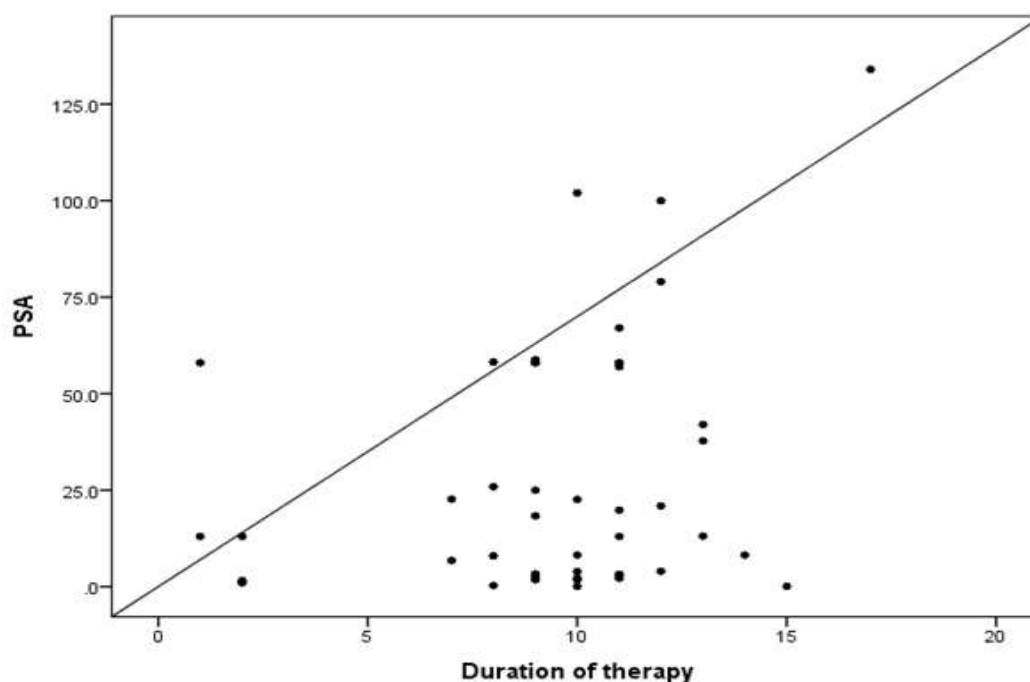
In this study found that there was significant correlation between testosterone level and duration of therapy, figure (3.1). In the other hand PSA showed no significant association with the duration of therapy, figure (3.2).

Table (3.1): Comparison mean& SD for Testosterone & PSA level among patients with prostate cancer and healthy individual.

	Case	Control	P value
Testosterone	3.798±3.8382 (.1-14.0)	5.351±2.1712 (.0-9.4)	0.015
PSA	28.362±32.0205 (.1-134.0)	0.718±2.5848 (.2-9.5)	0.000
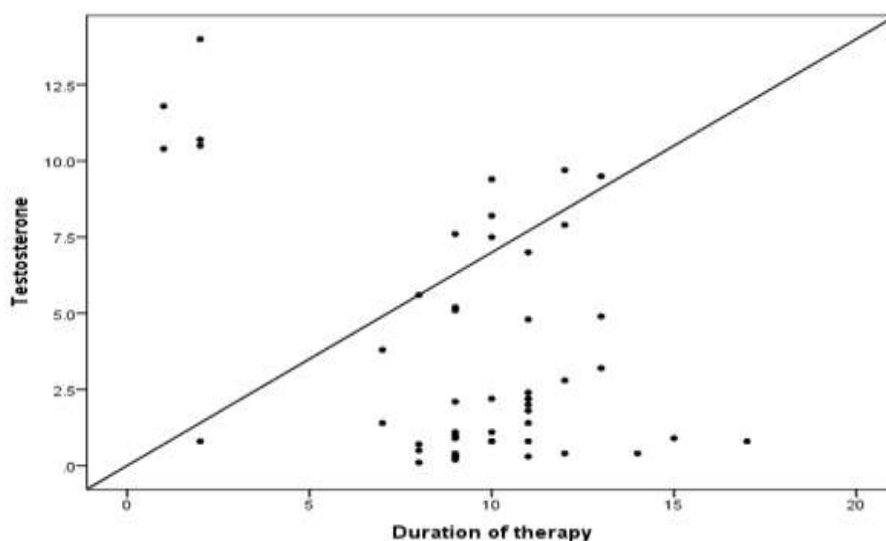
Figure (3.1): Correlation of Duration of therapy and Testosterone in case group.R= .444P value .001

Figure (3.2) Correlations of Duration of therapy with PSA.R= .269P value .059

IV.   Discussion

In this study found that the level of testosterone in patient was lower than the control group and there was significant difference between the two groups, this agreed with Hsing AW and several studies that reported an association between serum testosterone levels and prostate cancer when compare to control group [14], while Carter analyzed the hormone levels of a cohort of patients followed for 15 years before they developed benign prostatic hyperplasia or prostate cancer, and failed to demonstrate any significant association with serum testosterone[15], hypothesized a possible inhibition of testosterone production by PSA resulting in a low serum level of the hormone.

Morgentaler et al, showed that the percentage of men with prostate cancer was greater among those with low serum testosterone levels [16], this disagree with this present study in that high percentage found with normal testosterone level in prostate cancer patients and the second percentage found with low level of testosterone , hypothesized small sample size used.

In this study found that there was significant correlation between testosterone level and duration of therapy in the other hand PSA showed no significant correlation with the duration of therapy.

V.   Conclusion:

From this it concluded that there is significant reduction of testosterone level in patient with prostate cancer when compared to healthy individuals. And there was significant correlation between testosterone level and duration of therapy while PSA was shown no significant correlation with the duration of therapy. It concluded that testosterone can be good prognostic factor in men diagnosed with prostate cancer.

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