

Assessment of Specific Prostate Antigens Levels in Patients with Prostate Diseases

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ABSTRACT

Background: Specific prostate antigen (PSA), sometimes referred to as (gamma-semينو) protein or kallikrein-3 (KLK3), the glycoprotein enzyme encoded via KLK3 gene in the humans. Members of the family of peptidases related to kallikrein, PSA is released via the prostate gland's epithelial cells. PSA is produced for the ejaculate. **Objectives:** To determine the impact of prostate diseases on the levels of specific prostate antigens in serum of patients that are released from the prostate gland. **Methodology:** This study comprised 36 apparently healthy control males and 60 man (patients) who complained of prostate illnesses and were receiving medical care and examinations at Al-Sadr Hospital, Al- Hakeem Hospital, and National Teaching Hospital for Oncology in the Al-Najaf governorate of Iraq. Their ages ranged from 31 and 70 years. Serum specimens were collected from both patients and seemingly healthy controls. The serum specimens were examined using ELISA to determine the level of total specific prostate antigen. Statistical package for the social sciences (SPSS) 25 was utilized to analyze the data, the LSD value was derived utilizing the ANOVA test for data analysis. **Results:** Our results showed that individuals with prostate disorders had higher total prostate- specific antigen levels in their sera as compared to the healthy control group, raising in the tPSA levels in serums is connected with prostate cancer group compared with other prostate diseases. An increase in specific prostate antigen levels in sera is associated to a rise in the age. **Conclusion:** A significant elevation of mean PSA level in prostate diseases groups in comparison with healthy control groups. A significant elevation of mean PSA level prostate cancer and prostatitis in comparison with other prostate diseases groups. The high tPSA levels with rising the age. **Keywords:** Patients of prostate disease, serum, tPSA, and ELISA.

Article Information

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INTRODUCTION

Specific prostate antigen (PSA), sometimes referred to as (gamma-semينو) protein or kallikrein-3 (KLK3), the glycoprotein enzyme encoded via KLK3 gene in the humans. Members of the family of peptidases related to kallikrein, PSA is

released via the prostate gland's epithelial cells. PSA is produced for the ejaculate [1,2]. Normal blood levels of PSA are quite low. Research that indicated that 99% of 472 men who appeared to be in good health had a total PSA level under 4 ng/mL, the higher of normal is lower 4 ng/ml, was the basis for the reference range of less than 4 ng/mL for the first viable

PSA test, the Tandem-R PSA test from Hybritech, which was published in February of 1986 [3]. Prostate infections, irritations, recent ejaculation, benign prostatic hyperplasia or hypertrophy (BPH) [4], or digital rectal examination (DRE) can all raise PSA readings [5]. or prostate cancer patients [6] are frequently offered as the more typical benign explanations for elevated serum PSA levels [7]. However, patients with prostate disease have high levels of PSA in their serum, suggesting that PSA may seep into the bloodstream from the prostate gland. Serum specific prostate antigen (PSA) remains a somewhat contentious screening technique for the healthy and asymptomatic men because increased PSA level can be linked with a variety of benign prostate diseases. Infections prostate, benign prostatic hyperplasia, trauma, and inflammation can raise serum levels of PSA, lowering the sensitivity of the bio-marker for predicting cancer of prostate [8]. Patients with urinary tract infections have elevated serum levels of specific prostate antigen (PSA), which may be an accident or a reflection of the prostate's natural defenses [9].

METHODOLOGY

In this study, sixty male patients with prostate disorders who sought medical attention and examinations at Al-Sadder

Hospital, Al Hakeem General Hospital, and National Teaching Hospital for Oncology in the Al-Najaf governorate of Iraq were included. Their ages ranged from 31 - 70 years old, with a mean $\pm$ standard deviation of (52 $\pm$ 53). Additionally, 36 men in the seemingly healthy control group who were in the same age range as the patients (31–70 years), Mean $\pm$ SD (50 $\pm$ 2.9), had no previous history of prostate or urinary tract infections. Serum specimens have been taken from patients and a healthy-control group. The total specific prostate antigens level (PSA) is determined by ELISA analysis of serum specimens. SPSS-25 was used to analyze data. The ANOVA-test was utilized to extract the value LSD, and the Z- test was also utilized.

RESULTS

Mensuration of the Mean Specific prostate antigen in Study Groups:

Table (1) show high significant differences ($p=0.0001$) in mean levels of total specific prostate antigen in prostate diseases patients groups compared with control group, had high mean of tPSA level in serum of prostate diseases groups (29.2 $\pm$ 28.8 ng /ml), while was tPAS level in the healthy control group in serum the mean (2.5 $\pm$ 2.7 ng /ml).

Table (1): Comparison mean PSA between prostate diseases and control groups.

Group	Mean $\pm$ SD: PSA (ng/ml)	P value
Patient	29.2 $\pm$ 28.8	0.0001
Control	2.5 $\pm$ 2.7	

Mensuration of Mean Prostate specific antigen among the Patients Groups:

Table (2), exhibited height significant differences ($p<0.01$) in mean of tPSA levels, when comparison between the groups of prostate diseases. The PSA appeared to have a higher level in patients of prostate cancer have

mean (37.3 $\pm$ 38.1 ng /ml), and in patients of prostatitis have mean (20.6 $\pm$ 21.2ng /ml) high than PAS in other patients of prostate diseases. The showed significant differences ($P<0.01$) in mean of PSA levels in patients of prostate cancer when compared with benign prostatic hyperplasia (BPH), prostatitis patients

was (20.6 ± 21.2 ng /ml) and (16.9 ± 17.3 ng /ml) respectively.

There was not a significant different between serum level of specific prostate

antigens in prostatitis group and benign prostatic hyperplasia group (P value = 0.2).

Table (2): Comparison Mean $\pm$ SD of PSA between differences prostate diseases groups.

Groups	Mean $\pm$ SD PSA (ng/ml)	P -value
Prostatitis	20.6 ± 21.2	0.00072
Control	2.5 ± 2.7	
Prostatitis	20.6 ± 21.2	0.2 NS
BPH	16.9 ± 17.3	
Prostate Cancer	37.3 ± 38.1	0.0002
Control	2.5 ± 2.7	
Prostate Cancer	37.3 ± 38.1	0.043
Prostatitis	20.6 ± 21.2	
Prostate Cancer	37.3 ± 38.1	0.01
BPH	16.9 ± 17.3	
BPH	16.9 ± 17.3	0.0001
Control	2.5 ± 2.7	

Mensuration of Mean PSA among the Patients age Groups:

The highest mean level of PSA were restricted to age groups (51-60) and (61-70) in prostate disease patients when compared with other age groups in same groups was statistically significant-differences ($P < 0.01$).

There are statistically significant variations ($P < 0.05$) in mean of PSA was highest in the age groups in both groups of prostate cancer patients when compared with the same age groups in other studying groups as shown in Figure (1).

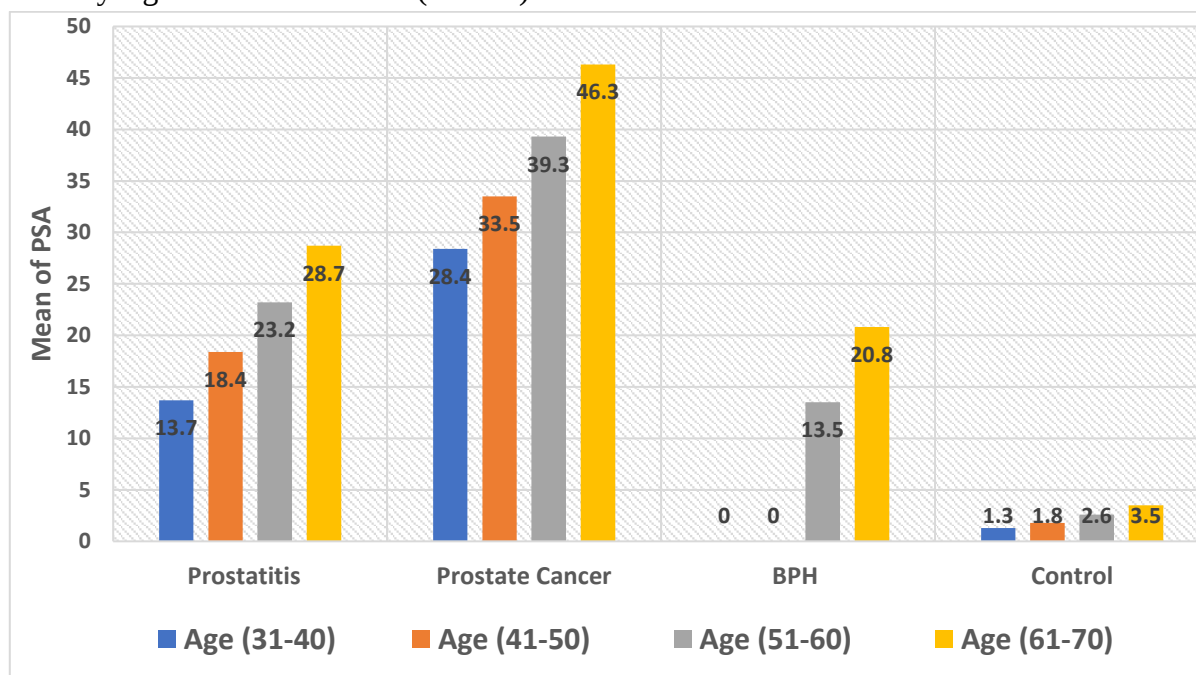


Figure (1): Represent the mean of PSA levels according Age groups.

DISCUSSION

A protein called prostate specific antigen is formed by both healthy and malignant cells of prostate [10]. PSA is detectable in all males, however it is higher in the patients of prostate disorders (for example, cancer, infection, and the benign hyper-trophy). Its levels can be considerably elevated in patients that suffer from prostate cancer, and height levels in the larger tumor burden [11]. The results in the study patients groups (prostate diseases), there were 60 patients with high levels of total specific prostate antigen (tPSA). Table (1) demonstrates the asinificant association between total prostate specific antigen in comparison to the control group ($P=0.005$). Asimilar conclusion was obtained via Sherif *et al.* (2012) and Hara, *et al.* (2004) who discovered elevated total specific prostate antigen levels in males with prostate disorder [12,13].

The results agreed with study by Pagana *et al.* reported that PSA is high in prostate diseases patients (e.g., infection, cancer and benign hypertrophy) [11]. levels of PSA can be also raised by the Benign Prostatic Hyperplasia (BPH), prostatitis, irritation [14], urinary tract infection [9]. However., some the prostatic illnesses can provide raise level of tPSA results because of the PSA specificity and sensitivity [15]. The PSA could raise in cancer prostate , BPH, prostatitis of bacterial and prostatic procedures including transurethral resections, prostate massages, and prostate biopsies and raise tPSA in urinary tract infection, urinary obstruction [16]. PSA levels may rise with acute inflammation or a silent infection. Furthermore, several scientists have the reported that treating chronic-prostatitis with antibiotic and anti-inflammatory medicines decreases tPSA level and requirement for the prostate biopsy [17]. In a 2008 study, the PSA velocity (PSAV) was discovered beneficial more than PSA-double

time (PSA-DT) in identifying males who have a life-threatening illness before beginning therapy [18].

The results in the study in Table(2), displayed high significant changes ($p<0.01$) in mean of PSA levels, when comparison between the groups of prostate diseases. The PSA appeared to have a higher level in patients of prostate cancer have mean (37.3 ± 38.1 ng /ml), and in patients of prostatitis have mean (20.6 ± 21.2 ng /ml) high than PAS in other patients of prostate diseases. The showed significant differences ($P<0.01$) in the mean of PSA levels in patients of prostate cancer when compared with prostatitis and BPH patients. These results match up with results of Guan *et al.*[19] who discovered that patients with malignant tumors prostate had greater serum PSA levels than those with benign tumors ($P<0.0001$)[19]. Specific prostate antigen (PSA) levels in blood are a commonly utilized prognostic indicator of prostate cancer progression [20]. Since blood PSA levels are typically not sufficient for accurate cancer diagnosis, further changes have been made to increase PSA's specificity as a tumor biomarker [21,22].

More importantly, PSA stays in the prostate cells even after they develop into cancerous. Cells of prostate cancer often display inconsistent or weak PSA staining, due to disturbance of their normal functionality. As a result, individual cells of prostate cancer produce less PSA than normal cells; rather than the individual activity of these cells, the elevated blood levels in patients of prostate cancer are caused by the vast number of these cells. However, cells persist positive for the antigen in the majority of prostate cancer patients, which can be utilized to determine metastases [23].

In this study, the mean of high PSA levels in prostate disease patients was compared with age groups and healthy control in Figure (1),

there significant disparities were concentrated in the (51–60) and (61–70) age ranges $P=0.01$ in prostate diseases patients. These results match up with studies of Hosseini *et al.* [24] who found a significantly association between age and the serum level of PSA ($p=0.0001$).

Additionally, the current results were consistent with the earlier findings of Oesterling *et al.* [25], who observed that the levels of prostate specific antigen significantly increased with patient age. Age and PSA levels had a linear and positive correlation. PSA levels increased significantly that with the age, which may rise in prostate size with proceeding the age. Serum total specific prostate antigens levels show a direct positive correlation with both age and prostatic volume, noting that prostatic volume itself also increases with age. changes that related to the age with prostate volume that leads to BPH progress are not taken into consideration by the typical tPSA reference range is (0.0 - 4.0) ng/mL. Oesterling *et al.* suggested that using age-related reference ranges would enhance the diagnosis rates of cancer among younger men, and increase older men's PSA testing specificity. [26]. Kovac *et al.*, according that baseline levels of PSA are a reliable indicator of a men long term risk of the prostate cancer in 55–60 age range. The actuarial 13- year incidence of this cohort's clinically significant cancer of prostate diagnoses[27].

CONCLUSIONS

- 1- A significant elevation of mean PSA level in prostate diseases groups in comparison with healthy control groups
- 2- A significant elevation of mean PSA level prostate cancer and prostatitis in comparison with other prostate diseases groups.
- 3- The number significant between PSA with age in studying groups.

RECOMMENDATIONS

- 1- Larger samples size in include larger number from prostate diseases in all country.
- 2- Take another factor or parameter to studying groups.
- 3- Measuring PSA after therapy to know the effect therapy on PSA level.

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