International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319 – 6505, Impact Factor: SJIF: 5.438
Available Online at www.journalijcar.org
Volume 6; Issue 2; February 2017; Page No. 2078-2080

Research Article

ASSESSMENT OF PROSTATIC SPECIFIC ANTIGEN (PSA) LEVELS IN MALE PATIENTS ATTENDING MEDICAL CHECK-UP IN SOME PRIVATE CLINICS AND LABORATORIES IN PORT HARCOURT METROPOLIS: A MEASURE OF PROSTATE CLINICAL PATHOLOGY

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ARTICLE INFO

Article History:

Received 30th November, 2016
Received in revised form 30thDecember, 2016
Accepted 4th January, 2017
Published online 28th February, 2017

Key words:

Prostate Specific Antigen, Diabetes, hypertension, Age, Prostate Cancer

ABSTRACT

A prevalence study of Prostate-specific antigen (PSA) levels was performed in male patients attending medical check-up in some private clinics and laboratories in Port Harcourt metropolis. PSA level of 85 male patients was monitored. Age, weight, diabetes, hypertension and basic life style of these patients was taken into consideration while running the PSA investigation. Oral consent was sought from the patients informing them that the investigations will be used for academic exercise. Venous blood sample was taken in a vacutainer containing lithium heparin anticoagulant, separated and the serum used for the PSA test with the aid of automated micro plate Reader. Sixteen of these patients are known diabetics, representing 18.8%. Eighteen of the patients are on hypertensive drugs representing 21.17%, while others are non-diabetics and non-hypertensive. None of the patients is obese.Results obtained show a 45% deviation from the normal value of <4ng/ml. 60% of these deviations are between the ages of 56-70 years of which many of them are from the diabetics and hypertensive group. Among the patients whose PSA values deviated from the normal, 12% has PSA values of 51-82ng/ml and are recommended for biopsy while the remaining 33% had PSA values of 8-22ng/ml with no pains or discomfort and are considered asbenign. This study reveals the age as well as other ailments implication in prostate cases among male patients investigated.

INTRODUCTION

The prostate is a gland the size of a chestnut. It is only present in men, and it is situated under the bladder surrounding the urethra, the passageway that takes the urine to the outside. The gland produces seminal fluid, which is mixed with sperm to make semen. With age, the gland may begin to grow - this happens to most men. The growth may eventually cause problems with urination, because the gland pinches off the urethra as it increases its size.Serum Prostate Specific Antigen (PSA) elevations occur as a result of disruptions in the prostate architecture that allow PSA to enter the circulation. PSA is a valuable tool for detecting Prostate Cancer (PC), but it is not perfect. The test lacks both the sensitivity and specificity to accurately detect the presence of PC. PSA is a prostate-specific marker, not a PC marker. Elevated levels in the blood may be driven by conditions such as benign prostatic hyperplasia (BPH) and prostatitis (Klein and Lowe 1997) or after prostate manipulation (massage, biopsy, or transurethral resection).Increased levels in PC patients cannot be explained by increased synthesis. In fact, PSA expression is slightly decreased in cancer tissue (Qiu *et al.,* 1990).

PSA is a serine protease member of the human kallikrein family. It is produced in both normal and cancerous prostate tissue and secreted into seminal fluid. Its physiologic function is to liquefy semen from its gel form [Lilja, 1985]. Normal prostate architecture keeps PSA confined to the gland, and only a small portion is leaked into the circulation. PSA circulates in free and complexed forms. Free forms represent 5%-35% of total PSA. Complexed forms (65%-95%) are bound to protease inhibitors. Binding inactive protease and PSA in the blood has no catalytic activity [Piironen *et al*., 2001].

PSA is present in small quantities in the serum of men with healthy prostates, but as a man gets older, the prostate often grows and the level of PSA gets higher. It is often elevated in the presence of prostate cancer or other prostate disorders [Catalona *et al.,* 1994]. It is not a unique indicator of prostate cancer, but may also detect prostatitis or benign prostatic hyperplasia [Velonas *et al.,* 2013] 30 percent of patients with high PSA have prostate cancer diagnosed after biopsy.

A PSA test measures the level of prostate specific antigen (PSA) in the blood. It can help to diagnose prostate disease. PSA was approved by the United States Food and Drug Administration (FDA) in 1986 to monitor men with prostate cancer (PC). In 1994, it was approved for cancer detection. PSA testing revolutionized our ability to diagnose, treat, and follow-up patients. In the last decades, PSA screening has led

to a substantial increase in the incidence of PC. This increased detection has caused the incidence of advanced-stage disease to decrease at a dramatic rate, and most recently diagnosed PC today are localized tumours with a high probability of cure (Ung *et al*., 2002).

Despite the shift toward improved detection and early diagnosis, controversy still exists regarding the merits of screening. As a result of PSA screening, the lifetime risk of being diagnosed with PC has increased to 16%, whereas the risk of dying from the disease is only 3.4% [Ries *et al.,* 2007].There is currently no consensus among health organizations regarding routine PSA screening for PC. Opponents claim there is no conclusive evidence that early detection and treatment influence the overall death rate, and screening can result in great morbidity. However, there is evidence that screening is responsible for a decrease in cancer-specific mortality. A study assessed PC mortality in Tyrol, Austria. In this region, 86.6% of men had gone through PSA testing at least once, and radical prostatectomy was the primary treatment option. Cancer mortality declined at a significantly faster rate in Tyrol than in the rest of Austria, where screening was not as widely used (54% vs. 19%, p = 0.001). The investigators concluded that the reduction in mortality was probably due to early detection, consequent down-staging and effective treatment [Bartsch *et al.,* 2008].
Ethnicity, age, and body mass index (BMI) can also influence PSA levels. Black men without PC show higher levels compared with white men, probably reflecting a higher expression by benign prostate tissue [Fowler *et al.,* 1999]. Lower levels of PSA in obese men, which may be related to the influence of oestrogen, can mask the presence of significant cancer (Baillargeon *et al.,* 2005). This study evaluates the PSA levels of male patients attending medical check-up in some private clinics and medical laboratories in Port Harcourt metropolis, Nigeria, with a view to ascertain theprostate clinical pathology of such men.

MATERIALS AND METHODS

Collection of blood samples

Venous blood samples were taken from a total of eighty-five (85) men who visited some private hospitals and laboratories in Port Harcourt metropolis either for follow-up or medical check-up in a vacutainer containing lithium heparin anticoagulant. The samples were centrifuged using ordinary bucket centrifuge and serum collected for Prostate Specific Antigen investigation. PSA level of 85 male patients was monitored. Age, weight, diabetes, hypertension and basic life style of these patients was taken into consideration while running the PSA investigation. Oral consent was sought from the patients informing them that the investigations will be used for academic exercise. Sixteen of these patients are known diabetics, representing 18.8%. Eighteen of the patients are on hypertensive drugs representing 21.17%, while others are non-diabetics and non-hypertensive. None of the patients is obese.

Analysis

The serum samples were analysed for PSA levels using standard operating procedure of Enzyme linked Immunosorbent Assay (ELISA) principle with the aid of automated microplate well Reader.
Results

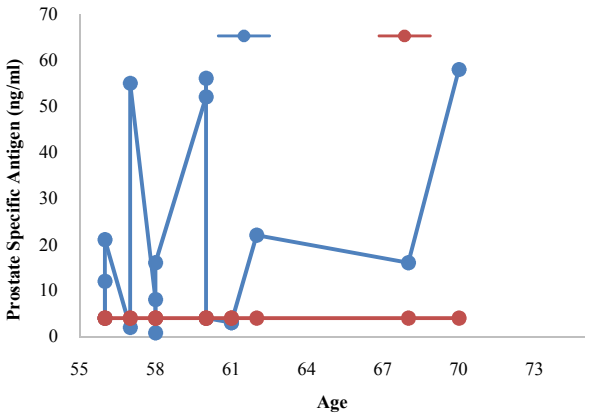

Figure 1 Prevalence study of PSA levels of patients who are Diabetic

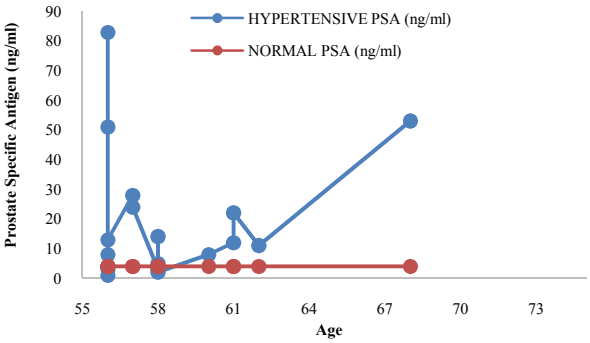

Figure 2 Prevalence study of PSA levels of patients who are on Antihypertensive drugs

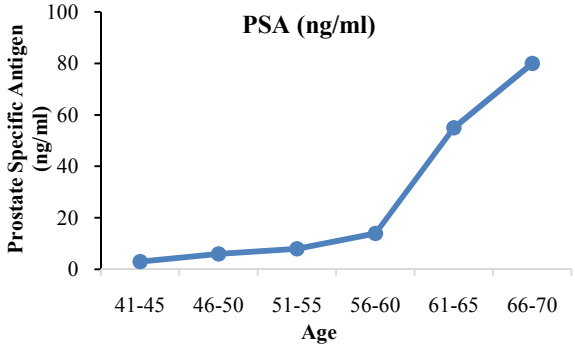

Figure 3 Prevalence study of PSA levels of patients with emphasis on Age

DISCUSSION/CONCLUSION

Serum PSA measurements show variable reliability when it comes to diagnosis of Prostate cancer, given the dynamics of PSA physiology (Mohan and Gupta 2012). This study reveals the age as well as other factors implicated in prostate pathological cases among male patients investigated. Age-specific PSA levels have been suggested for young men, because PSA levels usually rise with age as implicated in the research.Similarly, a seminal study of age-specific reference range by Oesterling *et al.,* (1993) reported on a community-based population that had no evidence of prostate cancer showed that PSA levels correlated with age.Thus while certain values may be normal for a 60-year old, it may more likely to signify cancer in men between ages 40 and 49. However, investigations are yet to show that using age-specific PSA values will increase the detection of curable cancers.Serum PSA estimation still remains a standard test in the diagnosis and management of prostate cancer (Kim and

Andriole 2016). Presently the standard cut-off of 4ng/ml is still considered normal for men between age 50 and 70 (Deantoni 1997). The result showed an elevated PSA level for diabetic patients and was collaborated in a study which showed that in diabetic men, the symptoms of BPH are worse than in men without diabetesand that diabetic men have a slower urine flow compared to non- diabetic men (Stamatiou*et al*., 2009. However, Wallner *et al.,* (2011) observed that Caucasian men with type 2 diabetes experience smaller increases in serum PSA levels as they age compared to men without diabetes and that older men had more rapid increases in serum PSA levels compared to younger men, and men without diabetes had more rapid increases in serum PSA levels compared to men with diabetes. Recent studies in Europe and America are revealing that there is a surprising connection between long term high blood pressure and the development of certain cancers especially prostate cancer in men. More disturbing is the link between high blood pressure and mortality rates in men diagnosed with prostate cancer (Nemec 2013). This study showed a marked increase in men 56 years of age and a progressive increase in PSA level of older men from 68 years and above who are taking antihypertensive drugs. This indicates that increase in serum PSA levels may not be associated with the use of antihypertensive drugs. Wallner *et al.,* (2011) observed that hypertension, however, was not associated with rate of change in serum PSA levels. This study suggests further investigation to establish the duration of diabetes, diabetic-therapeutic complaint patients and levels of PSA in such patients.

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