Prostate Cancer Contribution to Elevated PSA levels: A Screening Study

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ABSTRACT

OBJECTIVE: To investigate the causes of elevated prostate specific antigen (PSA) levels in patients with lower urinary tract symptoms (LUTS) through transrectal ultrasound guided biopsy (TRUS biopsy), regardless of prostate volume. **METHODS:** Retrospective study was conducted between January 2008 and December 2009 to find the cause of elevated PSA levels in sixty six (N=66) patients from the outpatient department in Guryyte General Hospital, AlJouf. Age of the patients was between 52 and 90 years and PSAlevel ranged between 5 ng/ml and 26 ng/ml . All patients were presented with some degree of lower urinary tract symptoms (LUTS) and high PSA levels for age. They underwent TRUS biopsies performed by a Radiologist and Urologist **RESULTS:** Out of the total sixty six patients, twenty two (33%) of them with a PSA range between 5.1ng/ml and 26 ng/ml were found to have Benign Prostatic Hyperplasia (BPH) and Prostatitis. Eighteen patients (29.5%) with a PSA level between 9.3 ng/ml and 25.6 ng/ml were diagnosed as adenocarcinoma of the prostate. Sixteen patients with PSA between 12ng/ml and 26 ng/ml were diagnosed as BPH. Ten patients with PSA between 9.3ng/ml and 16 ng/ml were found to have Prostatitis (15.15%). **CONCLUSION:** Benign prostate hyperplasia and chronic prostatitis are the two major causes of elevated serum PSA in our cohort followed by prostate cancer. With regards to the PSA level in chronic prostatitis and in prostate cancer, no significant difference was noted. The conclusion reached is that TRUS biopsy is mandatory to determine the exact cause of an elevated PSA level.

الملخص

الاهداف: معرفة اسباب ارتفاع مستوي مولد المضادات (الانتيجين) الخاص بالبروستات للمرضي الذين يعانون من اعراض في الجهاز البولي السفلي , وذلك بأخذ خزعة باستخدام الموجات فوق الصوتية عبر المستقيم وبغض النظر عن حجم البروستات. **المنهج:** اجريت الدراسة ما بين يناير 2008 وديسمبر 2009 لمعرفة اسباب ارتفاع مستوي مولد المضادات (الانتيجين) الخاص بالبروستات على66 من مرضي العيادات الخارجية بمستشفى القريات العام بالجوف , اعمار المرضي كانت بين 52 الي 90 سنة و مستوي مولد المضادات الخاص بالبروستات تراوح بين 5 نانو جرام / ملم الي 26 نانو جرام / ملم . كل المرضي كانوا يشتكون من اعراض في الجهاز البولي السفلي مع ارتفاع في مستوي مولد المضادات مقارنة بالعمر , وقد تم أخذ خزعة باستخدام الموجات فوق الصوتية عبر المستقيم بواسطة اخصائي الاشعة واخصائي المسالك البولية. **النتائج:** 22 مريض (33%) من اجمالي 66 مريض والذين يتراوح مستوي مولد المضادات لديهم من 5.1 نانو جرام / ملم الي 26 نانو جرام / ملم وجد ان لديهم ورم حميد بالبروستات و التهاب بالبروستات. 18 مريض (29.5) والذين يتراوح مستوي مولد المضادات لديهم من 9.3 نانو جرام / ملم الي 25.6 نانو جرام / ملم وجد ان لديهم ورم سرطاني بالبروستات 16 مريض والذين يتراوح مستوي مولد المضادات لديهم من 12 نانو جرام / ملم الي 26 نانو جرام / ملم وجد ان لديهم ورم حميد بالبروستات. 10 مرضي والذين يتراوح مستوي مولد المضادات لديهم من 9.3 نانو جرام / ملم الي 16 نانو جرام / ملم وجد ان لديهم التهاب بالبروستات (15.15%). **الإستنتاج:** الورم الحميد للبروستات والالتهاب المزمن للبروستات اهم سببين لارتفاع مستوي مولد المضادات الخاص بالبروستات في زمرة هذه الدراسة يتبعه سرطان البروستات (لم يلاحظ دلالة احصائية), خلصت الدراسة الي ان أخذ خزعة باستخدام الموجات فوق الصوتية عبر المستقيم من الضروريات لتحديد اسباب ارتفاع مستوي مولد المضادات الخاص بالبروستات

INTRODUCTION

Prostate cancer is the most common malignancy among men and second cause of death after lung cancer. Statistically, if men live long enough, they will eventually develop prostate cancer. Prostate cancer differs from most other cancers in that, with the exception of metastatic disease, stage at diagnosis has a small impact on overall survival [1]. Several studies investigated the ability of new biomarkers to improve prostate cancer diagnosis reducing unnecessary biopsies and to discriminate between aggressive and slow-growing cancers avoiding overtreatment.

Recently, Prostate cancer antigen 3 (PCA3) and phi (prostate health index) have been proposed as useful tools in prostate cancer patient care [2,3]. The investigated alternative methods for predicting the prostate volume, and prostate- specific antigen (PSA)

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was propounded as a feasible proxy for predicting prostate volume [4,5]. It has been reported that serum PSA is inversely correlated with body mass index (BMI) [6,7]. Many urologists are more labile to perform extended prostate biopsy rather than the conventional sextant biopsy. The studies reported previously are on the comparison of sextant with extended biopsies. It has been suggested the extended prostate biopsy to improve the cancer detection rates compared to standard sextant prostate biopsy [8]. Transrectal ultrasound guided prostate biopsy is a recommended diagnostic method with the minimum of 6-10 systematically taken, peripherally directed biopsy samples [9].

A higher number of biopsy samples increases the degree of prostate cancer detection. Schroeder *et al* proved that the prostate DRE has a low predictive value in detection, at which point a substitution with a more sensitive test was proposed [10]. A study of 76,693 men aged 55 – 74 in the United States found no decrease in prostate cancer mortality in men who received annual testing compared with usual care in 10 and 13 years of follow-up [11,12]. In addition to prospective trials, a number of investigators have explored the impact of the PSA testing through ecological analyses, comparing the rates of PSA testing indifferent geographic areas to rates of prostate cancer diagnoses and mortality [13,14,15]. The detection of low-risk tumors that may not clinically progress during lifetime. However, preoperative tools (such as PSA and DRE) lack accuracy to avoid many negative biopsies and to predict confined PCa at radical prostatectomy (RP) [16]. Ultrasonography, especially transrectal ultrasonography (TRUS), is consideredto be the gold standard for measurement of prostate volume [17]. Despite its accuracy, however, routine measurement of prostate volume by TRUS is clinically not feasible owing to its cost and invasiveness [4]. Prostate specific antigen (PSA) blood test, together with an abnormal digital rectal examination (DRE), improve the ability to detect prostate cancer. Carvalhal *et al* suggest the use of the prostate DRE in patients with low PSA values, as prostate cancer was established in 14-30% of the cases with PSAT values between 1 and 4 ng/ml, with abnormal DRE findings [18]. Prostate cancer, benign prostate hypertrophy (BPH) and inflammation (chronic prostatitis) are well known reasons for high PSA levels.

METHODS

Between January2008 and December 2009, a total number of sixty six patients aged between 52 and 90 years, complaining of lower urinary tract symptoms (LUTS) attended our urology Clinic at Guryyte general hospital, Aljouf, Guryyte city, KSA. Urological assessment was performed including thorough medical and urological history, physical examination, routine investigations, ultrasound of urinary bladder included prostate volumes and PSA serum levels. Their PSA were between 5.1 ng/ml and 26 ng/ml. All patients were prepared for TRUS biopsies after obtaining an informed consent . Anticoagulants and aspirin were stopped one week before the procedure. All patients were instructed to take Ciprofloxacin 500 mg twice daily and Metronidazole 500 mg three times daily one day before the procedure as well (laxative) suppositories.

On the day of the procedure, a pain killer in the form of Diclofenac sodium 75 mg was given intramuscularly 30 minutes before patients were placed in the left lateral side with the knees flexed to the chest, local Lidocaine gel 5% was applied prior to digital rectal examination. Ultrasound probe was used to delineate suspicious areas and guide the biopsy needle through the prostatic tissue.

Generally, complications were at low rate. In our study Three patients developed acute prostatitis with fever , they were admitted to urology department for I.V antibiotics. Two patients developed hematuria which subsided three days later.

RESULTS

TRUS biopsies were performed and sent to histopathology department. Among the study population (N=66) the highest percentage of TRUS biopsies belong to BPH + Prostatitis group (33%) followed by other groups (Table 1). The significant PSA levels were found in BPH (12-26 ng/ml) followed by adenocarcinoma (9.3- 25.6 ng/ml), BPH + Prostatitis (5.1-26) and Prostatitis (9.3 – 16 ng/ml).

DISCUSSION

Serum PSA elevation is relatively common in chronic prostatitis, prostate cancer and benign prostate hyperplsia. Prostatitis may cause a rise in PSA levels which could lead to false positive screens and referral

for biopsy to investigate possible prostate cancer. Prostatitis is the most common cause of falsely elevated serum PSA level. Prostatitis is a common condition affecting many if not most men over a period in their lives. It can occur virtually at any age. There appears to be a minimal relationship between prostatitis and prostate cancer, as well as most patients who have prostate cancer demonstrate some kind of prostatitis on biopsy, both diseases are so common that it is difficult to prove a causal interrelationship. Subclinical histological prostatitis , an unusual form of chronic prostatitis simulates adenocarcinoma as it can cause high serum PSA level. Prostate volume and inflammation are the most important factors contributing to serum PSA elevation in men without clinically detectable is the most common malignancy in males, substantially causing an elevated PSA level. Cancers of <1 ml volume usually do not elevate PSA , and 16% of normal men who have PSA>4 ng/ml and 19% of prostatic cancers have normal PSA .

Table 1: The percentage of TRUS biopsies and PSA levels of the study groups

TRUS biopsies samples	Number of patients (N=66)	Percentage (%)	PSA ng/ml
BPH + Prostatitis	22	‘33%	5.1-26
Adeno-carcinoma	18	29.5%	9.3-25.6
BPH	16	24.5%	12-26
Prostatitis	10	15.15%	9.3-16

Conclusion

Benign prostatic hyperplasia and chronic prostatitis are the major causes of elevated serum PSA levels followed by prostate cancer. The PSA level in chronic prostatitis and in prostate cancer, no significant difference was noted. This renders TRUS biopsy as mandatory to determine the exact cause of elevated PSA.

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