Prostate Specific Antigen versus Digital Rectal Examination as screening for ca prostate in Sudanese patients

Mohammed El Imam M. Ahmed[1], Nawal Zaroug Higazi [2], Dafalla O. Abuidris[4], Ali Ahmed Idris [2], Khalid Eltahir Khalid [3], Mustafa Omran [1], Algaili M. Algaili[5]

1- Department of Surgery, Faculty of Medicine, University of Gezira & Department of Urology, Gezira Hospital for Renal Disease and Surgery, Medani, Sudan.

2- Department of Community Medicine, Faculty of Medicine, University of Gezira, Medani, Sudan.

3- Department of Biochemistry and Nutrition, Faculty of Medicine, University of Gezira, Medani, Sudan.

4- Department of oncology, Institute of Molecular biology, Nuclear Medicine &Oncology INMO, University of Gezira, Medani, Sudan.

5- Department of pathology Faculty of Medicine, University of Gezira, Medani, Sudan.

Abstract

Objectives: The aim of this study is to compare the value of digital rectal examination (DRE) and prostate specific antigen (PSA) determination in the detection of prostate cancer among Sudanese patients presenting with lower urinary tract symptoms (LUTS).

Material and Methods: A prospective study was carried out in Gezira Hospital for Renal Diseases and Surgery in the period of June 2003- May 2005. Patients presenting with LUTS, had been screened for prostate cancer using PSA and DRE examination.. Serum PSA and DRE were measured in all patients. Trans rectal biopsy was performed if the PSA was over 4ng and \or abnormal DRE.

Results: A total of 194 elderly male patients presenting with lower urinary tract symptoms (LUTS), 140 of them were at last diagnosed as benign prostate hyperplasia (BPH) and 54 patients were been confirmed with prostate cancer (PCa). Their mean age was 65 years (range 45-90). Elevated level of PSA (> 4 ng/ml) was found in all the patients with prostate cancer (n= 54) and 68.6% (n= 96) of BPH patients. The rate of prostate cancer detection showed to be 25.7% for PSA > 4ng/ml, 13.31% for abnormal (positive) finding of DRE, and 27.8% for combination of the positive DRE and PSA > 4 ng/ml. The rate of BPH detection showed to be 68.6% for PSA > 4ng/ml, 28.6% for positive finding of DRE, and 4.1% for combination of the positive DRE and PSA > 4 ng/ml.

Conclusion: It was found that PSA determination detects a considerable proportion of tumors missed by DRE. And the combination of PSA and DRE escalates the probability of prostate cancer detection,.

Key words: Prostate Specific Antigen, Benign Prostatic Hyperplasia, Digital Rectal Examination, Prostate Cancer, Sudanese,

Correspondence author:

Mohammed El Imam M. Ahmed, MBBS, MD, SIUF, Department of Surgery, Faculty of Medicine, University of Gezira, P.O.Box: 20, Medani-Sudan. E-mail: mohammedimam@hotmail.com

Introduction

Prostate cancer (Pca) is the most commonly diagnosed cancer in men and is one of the leading causes of cancer-related deaths (1). (Pca) is diagnosed in about 1% of men aged 50, rises abruptly in the sixth and seventh decade of life, the highest incidence being recorded in the seventh and eighth decade of life (2). In the diagnosis of prostate cancer, the search for a more sensitive and specific tumor marker than acid phosphatase resulted in the discovery of prostate

specific antigen (PSA) (3-4). Now, PSA is the most important tumor marker in the detection of prostate cancer. When compared with digital rectal examination (DRE), the basic examination that the prevention and early diagnosis of prostate cancer had previously relied on, PSA was demonstrated to detect a significant proportion of tumors missed on DRE (5-7).

Many men with LUTS are screened for prostate cancer with PSA testing and a digital rectal examination (DRE) as a part of a routine prostate assessment. There is general agreement among clinicians that the PSA test has the highest predictive value for prostate cancer as compared to DRE or Trans-rectal ultrasound sonography (TRUS) alone (8-9). Hence, patients with LUTS who have PSA levels higher than 4ng/ml are advised to undergo prostate biopsy to rule out cancer (10). The PSA-based prostate cancer detection is fraught with high false-positive rate. Many concomitant variables such as benign prostate hyperplasia, inflammation/infection or traumatic maneuvers of the prostate gland influence serum PSA levels leading to many unnecessary biopsies.

The efficacy of PSA and DRE in the detection of prostate cancer has been evaluated in a number of studies. As data regarding the utility of serum PSA and DRE in detection of prostate cancer in symptomatic or a symptomatic man presenting with LUTS in Sudanese population is still lacking.

Objectives: The aim of this study is to compare the value of digital rectal examination (DRE) and prostate specific antigen (PSA) determination in the detection of prostate cancer among Sudanese patients presenting with lower urinary tract symptoms (LUTS.

Patients and Methods:

This prospective descriptive study was carried out in Gezira Hospital for Renal Diseases and Surgery in the period of June 2003- May 2005. It is worth noting that this is the only fully specialized hospital dealing solely with urology and nephrology and therefore it shoulders the largest serve from various catchment areas. The patients included in this study were those presented with LUTS, All study subjects were clinically assessed and thoroughly examined, and the *inclusion and exclusion criteria* men above 40 years of age presenting with LUTS specifically attributed to prostate problems were included in the study. The seven-item American Urological Association Symptoms index (AUA- SI) which were summed up to produce an overall score (0-35) (11-12). Men with LUTS caused by any urological malignancy other than prostate, those who had previous prostatic surgery or pelvic radiotherapy or complication of urinary obstruction were excluded from the study. The findings of systemic digital rectal examination (DRE) performed by urologist was noted for all patients as subjective examination according to the following true findings: hard swelling of the prostate, firm swelling, nodular swelling, irregular surface, obligation of middle sulcus attachment to the mucosal of the rectum. As a routine practice, DRE examination was scheduled after collection of blood sample to avoid an increase in serum PSA that may follow digital manipulation of the gland. Inform consent was taken from all study subjects after informed with the study objectives and were invited in writing to present for prostate biopsy.

Blood samples were collected in 5 ml sterile vacutainers containing ethylene diamine tetra acetic acid (EDTA). After blood clotting, the samples were centrifuged within 20 minutes after collection at 500 x g for 10 min, and sera were stored at -20 ºC until assay. The total prostate-specific antigen was assessed using an immunoradiometric assay (Skybio, London, UK) based on two anti-PSA antibodies: ^{125}I- labeled and other one as solid phase. All tubes were counted for 100 seconds on multi-well gamma counter and data was processed by a computer program. PSA levels less than 4 ng/ml were considered as normal, those between 4-10 ng/ml as diagnostic gray zone and above 10ng/ml as indicative of cancer. All data was analyzed by using the statistical software package SPSS 11. For comparison of serum PSA levels between malignant and non-malignant group, unpaired t-test was used. $P < 0.05$ was considered significant.

Results:

A total of 194 elderly male patients presenting with lower urinary tract symptoms (LUTS), 140 of them were at last diagnosed as benign prostate hyperplasia (BPH) and 54 patients were been confirmed with prostate cancer (PCa). Their mean age was 65 years (range 45-90). The age

distribution among cancer patients in relation to PSA were shown in (*Table 1*).

Age group Years	Prostate cancer		BPH	
	PSA< 4 ng/ml	PSA > 4ng/ml	PSA < 4ng/ml	PSA > 4ng/ml
25-45	0	0	4	0
46-50	0	0	4	8
51-60	0	20	28	24
61-70	0	12	40	34
71-80	0	16	8	22
81-90	0	6	4	8
Total	0	54	44	96

Table 1: Age versus PSA level in Pca &PBH

Based on DRE findings and/or high PSA levels, 54 patients were diagnosed to have prostate cancer, and 140 with benign prostate hyperplasia (BPH) were identified according to BPH criteria (signs of prostatism, and prostate enlargement on DRE). Elevated level of PSA (> 4 ng/ml) was found in all the patients with prostate cancer (n= 54) and 68.6% (n= 96) of BPH patients.

Prostate biopsy was performed in all of the 54 patients with prostate cancer, while in 126 (90.0%) of 140 patients with BPH (*Table 2*)

Method of screening	No. of Prostate cancer (%) (n=54)	No. of BPH (%) (n=140)
PSA < 4 ng/ml	0	44 (31.4)
PSA > 4 > 10 ng/ml	52 (96.3)	88 (62.9)
PSA > 10 ng/ml	2 (3.7)	8 (5.7)

Table 2: Comparison of prostate cancer and BPH percentage detected by prostate specific antigen and biopsy.

The rate of prostate cancer detection showed to be 25.7% (n= 52) for PSA > 4 ng/ml, 13.3% (n= 26) for positive (abnormal) finding of DRE, and 27.8% (n= 54) for combination of the positive (abnormal) DRE and PSA > 4 ng/ml. The rate of BPH detection showed to be 68.6% (n= 96) for PSA > 4ng/ml, 28.6% (n= 40) for positive finding of DRE, and 4.1% (n= 8) for combination of the positive DRE and PSA > 4 ng/ml (Table 3). Thus, elevated PSA pointed to the diagnosis of prostate cancer in 100%, and abnormal DRE in 88.9%.

Method of screening	No. of Prostate cancer (%) - (Relative Predictive value)	No. of BPH (%)
Abnormal (positive) DRE	26(48.1%), (13.31)	40 (28.6)
PSA > 4 ng/ml	52(96.3%), (25.7)	96 (68.6)
Abnormal DRE and/or PSA > 4ng/ml	54 (100%)(27.8)	8 (4.1)

Table 3: Diagnostic value of PSA and/versus DRE.

Discussion:

BPH is the most common cause of prostatic enlargement, but carcinoma is the most feared one. Carcinoma of the prostate is the second most common cause of death from malignancy in males. Hence, a reliable method for early detection is required, a job which best taken care of by PSA, clearly the most tumor specific antigen known. The results are objective, quantitative and examiner independent, and the procedure quite acceptable to the patient, given its noninvasive nature. But it is far from being an ideal tumor marker. Since its clinical introduction by Wang et al, (13) it has been an equivocally demonstrated that PSA is organ-specific but not disease specific.

PSA when used alone cannot be used as an effective screening tool for carcinoma of the prostate due to its low sensitivity and specificity, especially in low and intermediate range. Large series have shown that 21-43% cancers will occur in patients with PSA in normal range (0-4 ng/ml) (14-15), in this study none of the cancer patients has normal PSA. However, our study demonstrated the elevated PSA and DRE pointed to the diagnosis of prostate cancer in 100% and 88.9% respectively. These results are comparable to those previously reported from an American study on 82% and 55% of prostate tumors detected by PSA and DRE, respectively (16). The results of the present study as well as recent literature reports indicate that PSA detects a

significant number of prostate tumors missed in DRE (17-19). Our results also demonstrated that the rate of prostate cancer detection showed to be 26% for combination of the positive DRE and PSA > 4 ng/ml, while it was only 4.1% in BPH patients. These results indicate that the probability of successful prostate cancer detection increases when this method is used in combination with DRE, as also suggested by other authors (17-19).

Conclusion

Total PSA is the most useful screening test for the diagnosis of prostate cancer and its determination detected a considerable proportion of tumors missed by DRE. The addition of DRE improves the detection rate of prostate cancer over PSA alone.

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