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Diagnostic Performance of DRE& PSA in Prostatic Disease Investigations: An Experience at Federal Medical Center, Owerri

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Abstract: **This is a retrospective study of 316 cases of prostatic diseases investigated at the department of histopathology, Federal Medical Center, Owerri , from 2012-2014.Retrieved data included age, PSA, and DRE findings. Mean age of patients was 70.6 years, while that of PSA findings was 37.9ng/ml.43% of the cases was positive for Pca with mean of age and PSA respectively 71.6 years and 51.2ng/ml.BPH was demonstrated in 44.6% with mean of age and PSA respectively 69.5 years and 29ng/ml.5.6% of the abnormal DRE have PSA values below the threshold-4ng/ml ,while the rest was above 4ng/ml. Only a single case of prostatic carcinoma was detected with PSA below 4ng/ml. The peak age of incidence of both BPH and Pca, together with abnormal DRE and PSA, all have highest frequency at 71-80th decade of life. The sensitivity, specificity, and positive predictive value of PSA were 98.4%, 14.2% and 47.4% respectively, while that of DRE were 39.4%,57.2%, 41.3% accordingly. Prostatic neoplasm, commonly existing at 7th to 8th decade of life, can be investigated with the synergistic support of PSA and DRE. While PSA in the study was comparatively impressive in performance, deployment of trained personnel will engender improvement in DRE.**

Keywords: **Digital Rectal Examination, Prostate Specific Antigen, Hyperplasia, Carcinoma.**

I. INTRODUCTION

Prostate gland is the largest accessory organ of the male reproductive system [1],[2], and is mostly afflicted by two major tumors-benign prostatic hyperplasia(BPH) and prostatic carcinoma[3]. The two conditions constitute great source of morbidity and mortality [4].Unlike prostate carcinoma (which manifests geographical variation),BPH is a global phenomenon of men advancing in age[5],[6].

Prostate cancer is one of the major cause of cancer among men[7], and has been found to be more common among men of African descent [8],[9]. Prostate cancer is not uncommon in Nigerian men [6],[4].

Unlike the prostate cancer (which manifests geographical variation), BPH is a global phenomenon of men advancing in age [5]. The two conditions have overlapping symptoms and are often associated with elevated prostate specific antigen (PSA)- a glycoprotein produced chiefly by prostatic epithelium [10],[11],[12].

Prostate cancer is an insidious disease and are usually detected at advanced stage, when cure might have become problematic and hence the need for early investigation [13],[14].The American Cancer Society together with American Urological Association recommended the use of PSA and digital rectal examination (DRE) for screening of the prostate for tumors [11].

At our centre, presentation of PSA values and DRE findings are part of the conditions for accepting prostatic biopsies for histopathological examination. Therefore, this study is set to evaluate the impact of PSA and DRE on prostate tumor diagnosis.

II. MATERIALS AND METHODS

This is a retrospective study of 316 cases of prostatic diseases received and investigated at the Department of Histopathology, Federal Medical Centre, Owerri, from 2012-2014.The samples consist mainly of 8-12 core needle biopsies, received in 10% formalin from various parts of Imo State, and was processed using basic histological technique. The Relevant clinical and personal data such as age, PSA value, DRE findings and histological diagnosis were retrieved from the archived forms and subjected to statistical analysis. The patients DRE findings were grouped into abnormal and normal, while their PSA values are categorized into, 0-4ng/ml,>4-10ng/ml,>10-20ng/ml, and >20groups. Biopsy results were equally grouped into BPH and Pca, and subsequently applied in the calculation of sensitivity and specificity of the screening methods.

III. RESULTS

Of the 316 cases of prostatic diseases studied, 278 (88.5%) were submitted along with PSA values. The mean age of the patients was 70.6 years and that of the PSA levels was 37.9ng/ml. The overall cancer positive cases was 136 (43%), with mean age of 71.6 years; mean PSA value 51.2 ng/ml and range of PSA 0.3 to 680ng/ml. In the same vein, there are 141 (44.6%) BPH positive cases, with mean age 69.5 years, means PSA 29 and range of values 0.2 to 386 ng/ml.

Abnormal digital rectal examination findings were detected in 124 cases: 5.6% for cases having PSA equal or below 4 ng/ml and 94.4% above 4ng/ml. Of the 120 Pca positive cases detected PSA above 4ng/ml: only one case occurred within PSA range 0 – 4ng/ml and 87.3 % above 4ng/ml. Table 1.

The peak age of incidence for both Pca and BPH was 71 – 80 years, and the highest incidence of abnormal DRE and PSA occurred in the same age group. Table 2.

Prostate specific antigen in this study shows a sensitivity of 98.4%, specificity of 14.2% and positive predictive value of 47.4%. Table 3 ; while sensitivity, specificity and positive predictive values for DRE in the diagnosis of prostatic carcinoma were 39.4%, 57.2% and 41.3% respectively. Table 4.

TABLE 1: PSA RELATIONSHIP WITH Pca, BPH/PROSTATIC AND DRE

PSA RANGE	DRE		PROSTATE DISEASE	
	AB	NORM	Pca	BPH
0 – 4	7	15	1	20
>4 – 10	20	15	9	24
>10 – 20	26	36	18	42
>20	71	96	92	72

TABLE 2: AGE RELATIONSHIP WITH PSA, DRE, PROSTATE DISEASES

A	DRE		PSA		PROSTATE DISEASE	
	AB	NORM	AB	NORM	Pca	BPH
<40	1	2	2		2	
41 – 50	5	3	4	3		8
61 – 60	38	56	75	11	33	60
71 – 80	53	66	99	5	57	63
81 – 90	18	32	38	1	25	25
91 – 100		5	10	2	13	8
>100		1	1		1	

TABLE 3: PSA VS HISTOLOGY REPORT

	Pca + ve	Pca – ve
PSA + ve	120	133
PSA – ve	2	22
TOTAL	122	155

Sensitivity = 98.36%

Specificity = 14.19%

Positive predictive value = 47.43%

Table 4: HISTOLOGY

	Pca + ve	Pca – ve
DRE + ve	52	74
DRE – ve	80	99
TOTAL	132	173

Sensitivity = 39.39%

Specificity = 57.2%

Positive predictive value = 41.3%

IV. DISCUSSION

Investigation of prostatic diseases is commonly done with PSA, DRE and histopathologic examination which is the gold standard [15]. This is the case in our center. In this study the mean age of patients was 70.6 years, with peak age of patients with abnormal DRE, elevated PSA values, Pca and BPH – all fall within 71-80 years, portraying prostatic disease as being common among the elderly. This is in accordance with Mario et al.[16].The peak occurrence of two diseases at 7^{th} decade of life, also conform to the report of Ifere et al.[6]. It might be as a result of late presentation of cases, as benefits of PSA and DRE are yet to be utilized fully in our locality.The BPH /Pca ratio in this study is far cry from preponderance of BPH reported by Anjorin et al.[17],which could be an evidence that prostatic carcinoma is becoming more common.

This work shows that the mean PSA value in prostate cancer is higher than that of BPH, but less than the prostate carcinoma PSA reported by [18]. This variance might be due to difference in the degree of disruption of prostatic epithelium [10]. 94.4% of the abnormal DRE occurred within PSA range above 4ng/ml. This is an evidence that in most of the cases which DRE was performed there was elevated PSA. Regrettably, a reasonable number of the samples are submitted and accepted without either PSA /DRE findings or both in defiant to departmental rule. This not heartwarming. In the case of prostatic carcinoma, in relation with PSA ranges; only one case of prostatic carcinoma occurred within PSA range O-4ng/ml.This is rather more impressive when compared with 15% observed in Walsh et al.[19].Furthermore, Mc Neal et al. [20] noted that prostate cancers detected at low PSA are likely to be clinically insignificant disease. This tends to give credibility to PSA as a screening tool, although not in compliance with Yildirim et al. [12],who asserted that the PSA value above the traditional threshold of 4ng/ml will likely miss substantial proportion of cancers. The nature of the work (not being screening project), might have influenced the outcome. The number of patients in this study, with histologically proven BPH and PSA above 4ng/ml is quite above the range recorded by Mistry and Cable [21], in a mata-analysis confirming considerable overlap in PSA values between BHP and Pca.

This work shows high sensitivity and low specificity in the use of total PSA for diagnosis of prostate cancer, which was in accordance with the case reported by Thomson et al.[22].In the case of DRE, the sensitivity is lower, while specificity is moderate. This is quite comparable with the one reported by Naji et al. [23], showing weakness of DRE as a single tool for diagnosis of prostatic cancer. Walsh et al.[19], recorded higher sensitivity with moderate specificity.DRE is better

performed by a trained personnel for optimal result. Reasonable number of samples investigated in our center comes from outside, in that case cannot give a good account of how the screening analysis was performed. The positive predictive value for both PSA and DRE in this study is relatively high – above the ones reported by Tsukamoto et al. [24] and Naji et al [23]. It is really a reflection of burden of prostatic disease in our environment.

From the forgoing, it is obvious that prostatic neoplasm are still common in our environment, with highest incidence at advanced age of 60-70years of age, and can be detected earlier with synergistic application of DRE and PSA. Though the two the techniques are not perfect, but useful enough for early detection of cancer of the prostate.PSA use in this work was impressive, while DRE still have some lapses, possibly emanating from the nature of performance of the procedure.

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