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Evaluation of Serum Prostate Specific Antigen in Benign and Malignant Enlargements of Prostate.

Prafulla Kumar Mishra[1], Madusmita Acharya[2]

[1]Professor & Head, Department of Biochemistry, Veer Surendra Sai Institute of Medical Science & Research, Burla, Odisha, India
[2]Associate Professor, Department of Biochemistry, Veer Surendra Sai Institute of Medical Science & Research, Burla, Odisha, India

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ABSTRACT

Background: Prostatic enlargement is a common cause of bladder outlet obstruction among men in India. The enlargement usually leads to lower urinary tract symptoms, irrespective of whether it is benign or malignant. **Methods:** Forty six patients attending surgical outpatient department of Hi-Tech Medical College, Rourkela with symptoms of bladder outflow obstruction and prostate enlargement were studied. **Results:** The maximum numbers of patient recruited in the study were in the age range of 56–65 years and 66–75 years, having 14 (30.4%) and 11 (23.9%) cases, respectively. Out of 31 cases which were categorized as malignant on the basis of the serum PSA levels, 27 were confirmed by histopathology & 4 cases which were diagnosed as malignant by serum PSA levels were confirmed as benign by histopathology. Categorization of the Prostatic lesions on the basis of the Sr P.S.A. levels, which were confirmed by Cyto-HPE the accuracy for BPH was 50% and 67.4 % for malignant lesions. **Conclusion:** Patients with symptomatic prostate enlargement, serum PSA should be seen as a continuum with increasing risk of prostate malignancy.

Keywords: Prostatic enlargement, PSA, Benign and Malignant Lesions.

INTRODUCTION

Prostatic enlargement is a common cause of bladder outlet obstruction among men in India. The enlargement usually leads to lower urinary tract symptoms,[1] irrespective of whether it is benign or malignant. With wide acceptance of serum prostate-specific antigen (PSA) estimation,[2] the ability to differentiate malignant from benign prostatic enlargement with or without symptoms before instituting definitive treatment has increased.[3] Prostate gland occupies center stage in the lives of many elderly males. Because of its location at the bladder neck, enlargement of the gland leads to problems related to urinary obstruction.[4] Prostate specific antigen is a serine protease, elaborated almost exclusively by epithelial cells lining the acini and ducts of prostate. Once produced, it is secreted into the prostatic ductal system and is present in high concentrations in seminal plasma in which it serves the purpose of liquefying the seminal coagulum. It gains access to general circulation by seeping through disrupted physiological barrier in diseases affecting the prostate gland. Serum Prostate Specific has been used consistently for many years in the west for screening purposes PSA was first Antigen (PSA) is an affordable, non-invasive tool for screening and diagnosing prostate cancers and it demonstrated in prostatic tissues,[5] then in seminal plasma, purified from prostatic tissue and finally measured in serum of men.PSA in serum was demonstrated to be a clinically important assay for monitoring of prostatic carcinoma.[6] Thus, though PSA can play an important role in early detection and screening of carcinoma of the prostate, its usefulness is limited by false-positive and false-negative results. To improve the ability of PSA to detect organ-confined carcinoma of the prostate, and reliably differentiate between carcinoma of the prostate and BPH, several new concepts have emerged in recent years, including PSA density, PSA velocity, age-specific PSA and free PSA. This present study shows the role of PSA and PSAD as a marker in the diagnosis of benign and malignant enlargements of the prostate.

Name & Address of Corresponding Author
Dr Madusmita Acharya,
Associate Professor, Department of Biochemistry, Veer Surendra Sai Institute of Medical Science & Research, Burla, Odisha.

MATERIALS AND METHODS

This study was conducted in the Department of Biochemistry in association with Department of Surgery, Hi-Tech Medical College & Hospital Rourkela, Odisha, India, during the period from September 2016 to August 2017. Forty six patients attending surgical outpatient department of Hi-Tech Medical College, Rourkela with symptoms of

bladder outflow obstruction and prostate enlargement were studied. The estimation of serum PSA levels were assessed by enzyme□linked fluorescent assay (ELFA) using Mini VidasBiomerieux□ELFA strip reader using the kit of Vidas. The serum PSA levels which were used were those given by Osterling et al,[7] which were age specific reference ranges in a population of healthy men without a clinically evident prostatic enlargement.

RESULTS&DISCUSSION

The present study included 46 patients of prostatomegaly. The maximum numbers of patient recruited in the study were in the age range of 56–65 years and 66–75 years, having 14 (30.4%) and 11 (23.9%) cases, respectively[Table1]. Out of 31 cases which were categorized as malignant on the basis of the serum PSA levels, 27 were confirmed by histopathology & 4 cases which were diagnosed as malignant by serum PSA levels were confirmed as benign by histopathology[Figure 1]. Categorization of the Prostatic lesions on the basis of the Sr P.S.A. levels, which were confirmed by Cyto-HPE the accuracy for BPH was 50% and 67.4 % for malignant lesions. The age of the youngest patient of prostatomegaly in the present study was 46 years, and older one was 85 years. [Table1 & Figure 1] Shows the age of occurrence of prostatomegaly and its tissue diagnoses. In the present study, PSA levels in cases of BPH were <4 ng/ml in 26.08%, 4-10 ng/ml in 32.6% and >10 ng/ml in 41.3% cases. There was statistically significant correlation between PSA and age, higher levels were found with increasing age[Table2].

Table 1: Shows the age and PSA in benign prostatic hyperplasia(BPH)

Age groups	Number of malignant lesions (%)	Number of benignlesions (%)	Total numberof cases (%)
≤ 45	0 (0.0%)	0 (0.0%)	0 (0.0%)
46-55	9 (29.03%)	1 (6.6)	10 (21.7%)
56-65	11 (35.5%)	3 (20.0)	14 (30.4%)
66-75	4 (12.9%)	7 (46.0)	11 (23.9%)
76-85	1 (3.2%)	4 (26.0)	5 (10.9%)
>85	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	31 (100%)	15 (100%)	46 (100%)

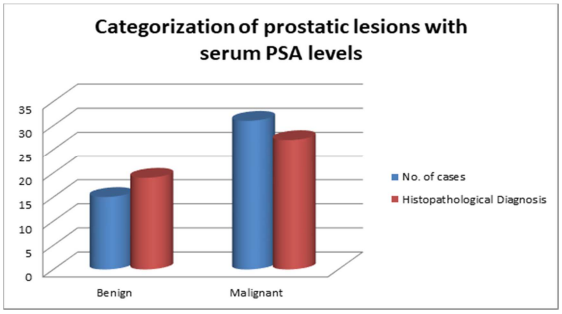

Figure 1: Categorization of prostatic lesions with serum PSA levels.

Haid et al.[8] reported an accuracy rate of 68% with serum PSA and many patients with PSA values which were between 4-10 ng/dl had benign biopsies. In the present study the accuracy rate was 67% which can be attributed to the method of estimation. Babaian etal,[9] suggested that PSA levels of < 4 ng/ml conferred a low cancer risk, that PSA levels of >4 ng/dl but of <10ng/dl suggested an intermediate risk and that PSA levels of > 10ng/dl conferred a high risk. llis et al,[10] reviewed the serum PSA levels in BPH and PIN and found that a majority of the men with BPH had other pathological processes like inflammations, PIN or occult cancer with with serial increases in PSA levels. In the present study 4 cases which were diagnosed as malignant based on serum PSA were benign histolgically which were due to any inflammation Speight etal,[11] compared the traditional normal ranges of serum PSA to the age specific normal ranges and concluded that the age specific normal ranges were helpful in increasing the specificity of PSA by eliminating some eliminated values of PSA in men who were in the 60s and 70s. In the present study, the age specific reference range was very much useful in categorising these lesions as the serum PSA was near the traditional normal range, but clearly above the age specific normal range. Bains etal,[12] found a significant association between the PSA levels and glandular proliferation. Chronic prostatitis and glandular proliferation are the 2 most important factors which contribute to Serum PSA elevation in hyperplastic prostates.

Table 2: Distribution of total prostate□specific antigen with various prostatic lesions

Total PSA (ng/ml)	Number of malignant lesions (%)	Number of benignlesions (%)	Total numberof cases (%)
≤ 4	12 (38.7%)	0 (0.0%)	12 (26.08%)
4.0-10.0	13 (41.9%)	2 (13.3%)	15 (32.6%)
>10	6 (19.35%)	13 (86.7%)	19 (41.3%)
Total	31(100%)	15(100%)	46(100%)

Brawer et al,[13] screened 1249 patients for prostate carcinoma on the basis of their serum PSA levels and concluded that PSA represented an important adjunct to DRE for the early detection of prostate carcinoma. Guthman et al,[14] studied 100 patients with biopsies and correlated the findings with the pre biopsy sr PSA levels and ultrasound findings and found that a significant percentage of patients with a benign DRE and an elevated Sr. PSA value harboured a clinically significant but potentially curable prostatic malignancy. Richie et al,[15] studied the efficacy of sr PSA in the early detection of prostatic carcinoma in men who were aged <50 yrs and found that the sensitivity of PSA was 75% and that its specificity was 87%. Aus et al,[16] observed that the cancer detection rate was significantly higher in the patients who had 5 or more biopsies than in those had 4 or less and with sr PSA levels which were <10ng/dl, while the detection rate was

unaffected by the number of biopsies which were taken if the serum PSA alone was above 10ng/dl. Smart et al,[17] while docu- menting the facts and fiction of prostate cancer in USA, observed that an annual PSA blood test and DRS which were done on all the men who were over 50 yrs of age, followed by the appropriate treatment, had decreased the number of deaths which was caused by prostate cancer. In all the studies which have been mentioned, there was a considerable overlap of the Sr PSA levels in the cases with benign and malignant prostatic lesions. In the present study, there were two cases in which the sr PSA levels were in the higher limit of the normal, but which on FNAC and HPE turned out to be malignant, emphasizing the fact that the age specific reference range of sr PSA was a better tool for screening prostatic malignancies than the traditional reference range. The diagnostic accuracy of Sr. PSA in the present study was 67%which was mainly due to the use of the age specific reference range for serum PSA. Chadwick et al,[18] assessed the value of serum PSA as a screening test and found it to be better than a digital rectal examination. Ferrero et al,[19] however suggested that the results of PSA must be interpreted cautiously, as they could be elevated in cases of prostatitis, prostate infarction, lithiasis and abscess formation. Gustafsson et al,[20] found that the positive predictive value had increased to 4% when only a digital rectal examination was used and that it had increased to 71% when serum PSA was used along with DRE. Nadler et al,[21] concluded that the prostatic volume and inflammation were the most important factors which contributed to the serum PSA elevation in men without clinically detectable prostate cancer. Ronnett et al,[22] found that in patients with high grade prostatic intraepithelial neoplasia on the biopsy material and elevated serum PSA values, BPH may account for the elevated serum PSA levels. More likely, because of the association between the high grade prostatic intraepithelial neoplasia and carcinoma, these patients have an undiagnosed carcinoma as the source of the elevated serum PSA values.

CONCLUSION

In conclusion, In Indian patients with symptomatic prostate enlargement, serum PSA should be seen as a continuum with increasing risk of prostate malignancy. The serum PSA levels are a good indicator for the glandular proliferation of the prostate and they can be used as a marker to check for the progression of prostate carcinoma.

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