

## An Observation on the Significance of Prostate Specific Antigen (PSA) In Chronic Urinary Obstruction of Prostatic Pathology



### Medical Science

**KEYWORDS :** Prostate, Benign, Malignant, Prostate Specific Antigen, Adenocarcinoma.

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### ABSTRACT

*Chronic urinary obstruction due to prostatic pathology (Benign prostatic hypertrophy & Carcinoma of Prostate) is a very common clinical entity. Most clinicians utilize the measurement of serum PSA as the base line screening to differentiate between BPH & Carcinoma of Prostate in patients presenting with chronic urinary obstruction of prostatic pathology as it is a simple test to perform. In recent years, prostate specific antigen (PSA) has established itself as the most useful marker for adenocarcinoma of the prostate and has almost replaced the total acid phosphatase and prostatic acid phosphatase (PAP) for screening, diagnosing and monitoring the prostate carcinoma patients. The PSA levels also rise in benign hyperplasia of prostate (BPH) but to a lesser extent and high values are usually diagnostic of malignant disease. The present investigation was conducted to study the relevance PSA in prostatic disease particularly in the context of hospitalized patients with retention of urine. In this study 200 cases of urinary obstruction due to prostatic pathology were studied. They were evaluated with a combination of DRE, trans abdominal ultrasound and measurement of serum PSA and results correlated with histological findings of the operated specimens. 190 patients were diagnosed with BPH and 10 with adenocarcinoma of prostate. Serum PSA had sensitivity of 90% in detecting Ca Prostate when the level of serum PSA was greater than 4ng/ml. In the range less than 4ng/ml it had a sensitivity of 60.52% in detection of BPH. In this study we infer that serum PSA is a good marker for diagnosis and differentiation between benign and malignant diseases of prostate.*

#### Introduction:

Benign hyperplasia of prostate (BPH) is a common disease in men above 60 years of age, whereas its malignant counterpart, carcinoma of prostate, is the leading cause of mortality amongst all the carcinoma in men. Prostate specific antigen (PSA) has been used for early screening and detection of prostate carcinoma in high risk group although its role in staging the carcinoma has been doubtful. It was first identified by Wang et al. It is a 237-amino acid monomeric serine protease, with a molecular weight of 33-34 kilodaltons. It has been regarded as the best marker for prostate malignancy in recent years, although its plasma concentration also increases in BPH, but to a lesser extent. Since a majority of the prostate patients come to the hospital after urinary retention and catheterization, the levels of this marker may be falsely elevated in these patients. This study was done to see the effect of urinary retention on plasma concentration of PSA in prostatic disease.

#### Materials and Methods:

The present study was conducted in the department of Surgery, Katihar Medical College, Katihar. The material for the present study consisted of 200 patients of chronic urinary obstruction due to prostatic pathology, who attended the surgical outdoor and admitted in different units of the department of surgery, Katihar Medical College, Katihar. The criteria of inclusion were presence of features of chronic urinary obstruction with prostatism and aged 41 years and above. Detailed clinical history was taken. The sera samples were collected from the included patients before doing digital rectal examination. Sera samples were sent for PSA study. The biopsy or the tissue collected after transurethral resection of prostate (TURP) were sent for histopathological examination.

According to the PSA level patients were categorized in three groups.

PSA level less than 4 ng/ml

PSA level 4-10 ng/ml

PSA level more than 10 ng/ml.

According to the histopathological reports patients were divided in to two groups

Benign prostatic hypertrophy  
Carcinoma of prostate

190 patients out of 200 were diagnosed to have benign prostatic hypertrophy (BPH) and 10 patients with adenocarcinoma of prostate.

The data was analyzed for sensitivity, specificity, positive and negative predictive values of PSA study in prostatic disease.

#### Results:

The patients in the study ranged from 41 years to 80 years of age with maximum patients belonging to 6th to 8th decades of life. The aim of this study was to analyze the levels of serum PSA value in prostatic pathology causing chronic urinary obstruction and to correlate this value with carcinomatous and non carcinomatous prostate. Table 1 shows the distribution of patients in respect to Prostate Specific Antigen (PSA) in the study group.

Group	Serum PSA (ng/ml)	Number of patients
1	<4	116
2	4- 10	77
3	>10	07

**Table1- Distribution of patients in respect to Prostate Specific Antigen.**

In this study out of 200 patients 116 (58%) had PSA less than 4ng/ml, 77 (38.5%) had PSA between 4 – 10 ng/ml and 07 (3.5%) had PSA greater than 10ng/ml. Table 2 (A, B& C) shows the serum PSA level with respect to patients having benign prostatic hypertrophy (BPH) and carcinoma of prostate.

Table 2 ( A ) :

		A	
PSA (ng/ml )	Carcinoma	BPH	Total
<4	1	115	116
4-10	4	73	77
>10	5	2	07

Table 2 ( B ) :

		B	
PSA (ng/ml )	Carcinoma	BPH	Total
<4	1 ( c )	115 ( d )	116
>4	9 ( a )	75 ( b )	84

Sensitivity of PSA >4 ng/ml in cancer detection =  $a / a + c * 100 = 9 / 9 + 1 * 100 = 90 \%$

Specificity of PSA >4 ng/ml in cancer detection =  $d / b + d * 100 = 115 / 75 + 115 * 100 = 60.52 \%$

Positive predictive value of PSA >4 ng/ml in cancer detection =  $a / a + b * 100$

=  $9 / 9 + 75 * 100 = 10.71 \%$

Negative predictive value of PSA >4 ng/ml in cancer detection =  $d / b + d * 100$

=  $115 / 75 + 115 * 100 = 60.52 \%$

Table 2 ( C ) :

		C	
PSA (ng/ml )	Diseased	Non Diseased	Total
<4	115 ( a )	1 ( b )	116
>4	75 ( c )	9 ( d )	84

Sensitivity of PSA <4ng/ml in BPH detection =  $a / a + c * 100 = 115 / 115 + 75 = 60.52 \%$

Specificity of PSA <4ng/ml in BPH detection =  $d / b + d * 100 = 9 / 1 + 9 * 100 = 90 \%$

Positive predictive value of PSA <4ng/ml in BPH detection =  $a / a + b * 100$

=  $115 / 115 + 1 * 100 = 99.13 \%$

Negative predictive value of PSA <4ng/ml in BPH detection =  $d / b + d * 100$

=  $9 / 1 + 9 * 100 = 90 \%$

### Discussion:

With the advent of PSA in clinical practice the rate of diagnosing localized prostate cancer and / or prostate cancer in early stage has got a surge and at the same time incidence of regional and metastatic prostate cancer has declined. (Mettlin et al 1996 ).PSA has such a profound impact on prostate cancer screening that concern has arisen that it may detect and subsequently result in the treatment of clinically insignificant tumours. In the present study, sensitivity of PSA greater than 4 ng/ml in detection of prostate cancer was 90 % and positive predictive value was 10.71 %. Positive predictive value of PSA greater than 4 ng/ml was calculated by various workers. Labrie et al (1992 ) found it to be 33 %,Brawer et al (1992 ) 31 % and Catalona et al (1994 ) 28-35 %. Brawer et al (1992 ), Catalona et al (1994 ) and Stone et al (1994 ) concluded that the approximate chance of carcinoma prostate is one in three when PSA is between 4 – 10 ng/ml and one in two when PSA is greater than 10 ng/ml. In our study, in PSA range 4 – 10 ng/ml, 4 patients out of 77 had carcinoma prostate. In PSA greater than 10 ng/ml, 5 out of 7 had carcinoma. This anomalous result may be due to less number of patients with carcinoma of prostate in this study. In PSA range 4 – 10 ng/ml, 73 out of 77 had BPH whereas in the range greater than 10 ng/ml two out of seven had BPH. In PSA range <4 ng/ml out of 116, one patient had carcinoma and 115 had BPH. In PSA range >4 ng/ml, out of 84, nine patients had carcinoma prostate and 75 had BPH. Findings of our study were broadly in conformity of the various workers from various parts of the world.

### Conclusion:

Chronic urinary obstruction due to prostatic pathology (Benign prostatic hypertrophy & Carcinoma of Prostate) is a very common clinical entity. In recent years, prostate specific antigen (PSA) has established itself as the most useful marker for screening, diagnosing and monitoring the prostate carcinoma patients. In our study 200 patients of chronic urinary obstruction due to prostatic pathology were evaluated. The serum PSA levels were evaluated and correlated with the histopathological findings of biopsied or operated specimens of their prostates to find out the relevance of PSA study. It was found that serum PSA level correlated well with the prostatic pathology. It had sensitivity of 90 % in detecting carcinoma of prostate when the level was greater than 4ng/ml. In the range less than 4ng/ml it had a sensitivity of 60.52 % in detection of BPH. We conclude that serum PSA is a very good marker in detecting prostatic disease and also to differentiate between benign and malignant diseases of prostate.

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