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# Triad of serum PSA, DRE and biopsy in diagnosing prostatic diseases- How useful it is?

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ABSTRACT

**Introduction:** Prostate specific antigen (PSA) is a glycoprotein produced by prostatic acini and prostatic tissue. Its concentration increases in prostatic diseases. Concentration above 4 ng/ml is considered abnormal but there is no clear-cut point between normal and abnormal PSA levels. PSA is considered as serum marker for prostatic cancer but it is organ specific, not cancer specific. Digital rectal examination (DRE) is a routine part of prostate cancer screening. Biopsies are performed when PSA test and DRE are abnormal.
**Aims and Objectives :** The study is an attempt for comparative analysis among serum PSA, age, DRE, and biopsy results for the institution of specific treatment at an early stage.
**Materials and Methods:** Study was performed on 200 patients with different prostatic lesions in the Department of Pathology, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh. Clinical, DRE, PSA and histopathological biopsy were performed and analyzed by correlating the data.
**Results:** In our study 77.5% had normal (0-4 ng/ml) PSA level and 13.5% had >10 ng/ml PSA levels. BPH was the most common diagnosis (54.0%), followed by prostatitis (20.0%), BPH with prostatitis in 16.0% and carcinoma (10.0%). Serum PSA with positive DRE ranged from 1.2 ng/ml to 56 ng/ml while in negative DRE ranged from 0.18 ng/ml to 9.6 ng/ml.
**Conclusions:** PSA is specific for prostate but not for prostatic diseases. With increasing age serum PSA also increases. Conjunction of serum PSA with other variables like age, DRE and biopsy makes a better diagnosis of prostatic diseases.



## 1. Introduction

Prostate specific antigen (PSA) is a glycoprotein that is expressed by both normal and neoplastic prostate tissue. PSA has a half-life of 2.2 days.[1] PSA is the enzyme that is responsible for liquefaction of semen within a few minutes after it has clotted.[2] It is produced by the lining cells of prostatic acini and prostatic tissue, and is considered as the serum marker for prostatic carcinoma. Unfortunately PSA is specific for prostate but not for prostatic disease. Its concentration is also increased in BPH (benign prostatic hyperplasia), PIN (prostatic intra-epithelial neoplasia) and prostatitis.[3]

Concentration above 4 ng/ml is considered abnormal. Prostate cancer prevention trial (PCPT) study, which included biopsy regardless of PSA level, demonstrated that there is no level of PSA below which prostate cancer risk falls to zero.[4] PSA levels are indicative of a continuum of risk- higher the level, higher is the risk. These observations indicate that there is not a clear cutpoint between "normal" and "abnormal" PSA levels.[5]

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Digital rectal examination (DRE) is a routine part of prostate cancer screening and provides important prognostic information.[6] The digital rectal examination (DRE) is a key component in the early evaluation of patients with disorders of defecation including constipation and fecal incontinence. Confident performance of a DRE requires dedicated training for the clinician and hands-on experience with the technique. DRE can yield a diagnostic accuracy comparable to specialized physiologic tests, including anorectal manometry.The prostate can be felt through the rectal wall. In this process health care practitioner checks for the lobes of the prostate, their symmetry, any nodules, growths, enlargement, pain, any anal fissures or masses that could indicate an enlarged prostate, haemorrhoids or rectal cancer.[7]

In clinical practice, biopsies are generally performed only when the results of a PSA test or DRE is abnormal. This leads to misdiagnosis of most small prostatic cancers present in many older men. The patients with LUTS (Lower urinary tract symptoms) who have serum PSA levels higher than 4 ng/ml are primarily advised to undergo prostate biopsy to rule out cancer.[8] However, PSA is organ specific but not cancer specific, so the presence of other prostate diseases such as BPH, and prostatitis may influence its effectiveness for cancer detection. Hence, the PSA-based prostate cancer detection is fraught with high false-positive rate.[9]

Neither PSA nor DRE is sensitive, specific, predictive or accurate enough on its own to be an ideal screening or diagnostic test. Therefore, optimal evaluation of patients with suspected carcinoma prostate is best achieved with both the tests even in unscreened populations.[10]

The present study is an attempt to have a comparative analysis among serum PSA and multiple variables like age, DRE findings and biopsy results. This study may enable us to find out the extent of correlation of serum PSA levels with other findings so that a specific treatment can be instituted at an early stage.

## 2. Materials and Methods

The present study was performed on 200 patients with different prostatic lesions, who presented with features related to the disease in the Department of Pathology, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh.

After thorough clinical and digital rectal examination of the patients, PSA was performed by ELISA based methods in the serum samples. Histo-pathological biopsies/TURP (Trans-urethral resection of the prostate) specimens were processed, stained with haematoxylin and eosin stain and analysed. All the data obtained were correlated with each other.

## 3. Observation

Majority of the cases 70 (35.0%) were seen in the seventh decade of life, followed by 57(28.5%) in the sixth decade.(Table 1) Majority of the cases 140 (70.0%) had multiple complaints of increased frequency of urine, hesitancy, urgency, dysuria and dribbling of urine.(Table 2)

Majority of the cases 155 (77.5%) had normal (0-4 ng/ml) PSA level with 27 cases (13.5%) had >10 ng/ml PSA levels.(Table 3) On DRE, majority of the cases, 121 (60.5%) had firm to hard consistency of prostate, while obliterated median sulcus was seen in 37 cases (18.5%).Tenderness was present in 141 cases (70.5%) while prostatic surface was irregular in 137 (68.5%) cases.

The range of serum PSA noted in patients with positive DRE findings ranged from 1.2ng/ml to 56 ng/ml while the range of serum PSA level in negative DRE was 0.18ng/ml to 9.6 ng/ml. (Table 4)

Histopathological finding of benign prostatic hyperplasia was seen in 108(54.0%) cases, followed by prostatitis (Figure 1) in 40(20.0%) cases and carcinoma of prostate (Figure 2) was seen in 20(10.0%) cases. (Table 5)

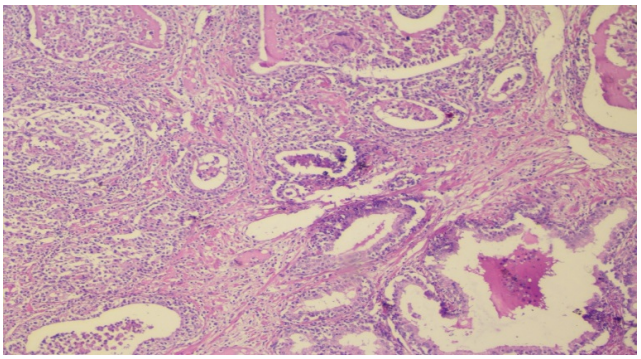

**Figure 1:** Section shows prostatic gland with marked mixed inflammation in the interstitium. Haematoxylin and Eosin x40X.

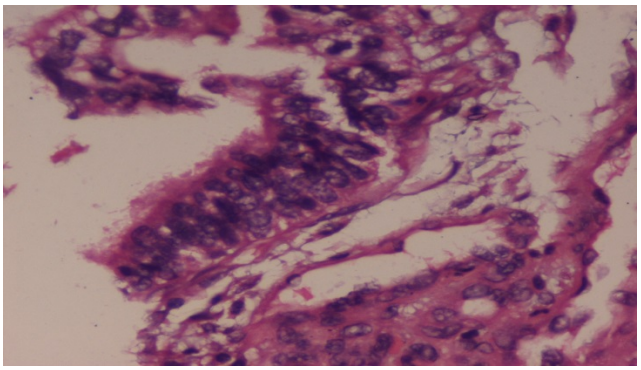

**Figure 2:** Section shows distorted glands with marked stratification of lining epithelium and marked cytologic atypia. Haematoxylin and Eosin x40X

**Table 1:** Age wise distribution of cases

| Age Groups(Yrs) | No of Cases | Percentage |
|---|---|---|
| 40-50 | 23 | 11.5 |
| 51-60 | 57 | 28.5 |
| 61-70 | 70 | 35.0 |
| >70 | 50 | 25.0 |

**Table 2:** Chief presenting complaints of the patients

| Symptoms | No of cases | Percentage |
|---|---|---|
| Frequency of urine | 15 | 7.5 |
| Hesitancy | 05 | 2.5 |
| Urgency | 20 | 10.0 |
| Dysuria | 08 | 4.0 |
| Dribbling of urine | 12 | 6.0 |
| All of the above | 140 | 70.0 |

**Table 3:** Serum PSA levels in different patients

| Serum PSA levels | No of cases | Percentage |
|---|---|---|
| 0-4 ng/ml | 155 | 77.5 |
| 4-6 ng/ml | 12 | 6.0 |
| 6-10 ng/ml | 06 | 3.0 |
| >10 ng/ml | 27 | 13.5 |

**Table 4:** DRE (Digital Rectal Examination) findings of the cases

| DRE Examination | | No of Cases | Percentage |
|---|---|---|---|
| consistency | Soft | 79 | 39.5 |
| | Firm to hard | 121 | 60.5 |
| Obliterated median sulcus | | 37 | 18.5 |
| Tenderness | | 141 | 70.5 |
| Prostatic surface | Smooth | 63 | 31.5 |
| | Irregular | 137 | 68.5 |

**Table 5:** Histopathological findings of cases

| Histopathological Findings | No of cases | Percentage |
|---|---|---|
| BPH | 108 | 54.0 |
| Prostatitis | 40 | 20.0 |
| BPH with Prostatitis | 32 | 16.0 |
| Carcinoma Prostate | 20 | 10.0 |

## 4. Discussion

Majority of our patients, 77.5% had serum PSA level of <4 ng/ml and only 27 cases (13.5%) had serum PSA level of >10 ng/ml. With increasing age, the serum PSA levels showed a rising trend. The results of our study were comparable to reports by Greene et al in 2019.[11]

It was observed in our study that most of the patients 140(70.0%) had multiple complaints of increased frequency of urine, hesitancy, urgency, dysuria and dribbling of urine.[12]

On digital rectal examination, consistency was firm to hard in 121(60.5%) with obliterated median sulcus in 37(18.5%) cases and tenderness in 141(70.5%) cases.The prostatic surface was irregular in 137(68.5%) cases. The range of serum PSA noted in patients with positive DRE findings ranged from 1.2 ng/ml to 56 ng/ml. These results were similar to reports by Antony et al in 2019.[1]

In our study, benign prostatic hyperplasia was the most common diagnosis in 54.0% cases followed by prostatitis in 20.0% cases. BPH with prostatitis was seen in 16.0% cases, while carcinoma prostate was seen in 10% of cases, findings similar to the studies done by Hirachandet al,[13] Maru et al[14] and Lakhey et al.[15]

PSA is specific for prostate but not for the prostatic disease. Its concentration was also found to increase in BPH, prostatic intraepithelial neoplasia and prostitis. Recent reports from prostatic, lung, colorectal and ovarian cancer screening Trial (PLCO) and the European Randomized Study of screening for prostatic cancer (ERSPC) doubted the benefit of PSA screening alone.[16,17]However, serum PSA level generally correlates with the risk of prostate cancer and hence serum PSA has been used in prostatic carcinoma screening and for diagnostic, therapeutic and prognostic purposes.[18]

## 5. Conclusions

Our study highlights the significance of collective studies of multiple factors related to the prostatic disease and role of serum PSA levels and other variables like age, DRE and biopsy in diagnosing prostate related diseases.

## 6. Conflict of Interest

None.

## 7. Source of Funding

None.

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