

Research Article

# Data Analysis of PSA Levels and Age-Wise Distribution of Various Lesions Histopathological Corelation

Shilpa Vaishnav<sup>1</sup>, Ravindra Patwadkar<sup>2</sup>, Shridhan Patil<sup>3</sup>, Shilpa Gatlewar<sup>4</sup>, Priyanka Gaikwad<sup>5</sup>

<sup>1</sup>Head, Department of Pathology, RRB Pathology Laboratory, Dr Hedgewar Rugnalaya, Aurangabad, Maharashtra, India.

<sup>2,3,4,5</sup>Consultant Pathologist, RRB Pathology Laboratory, Dr Hedgewar Rugnalaya, Aurangabad, Maharashtra, India.

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## I N F O

### Corresponding Author:

Shilpa Vaishnav, Department of Pathology, RRB Pathology Laboratory, Dr Hedgewar Rugnalaya, Aurangabad, Maharashtra, India.

### E-mail Id:

shilpa-vaishnav@hedgewar.org

### Orcid Id:

<https://orcid.org/0000-0002-4366-6510>

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## A B S T R A C T

**Introduction:** Prostate specific antigen (PSA) levels are difficult to interpret in all age groups, although they are used for assessing the response to prostate cancer treatment and as a screening tool for prostate cancer detection. A number of benign conditions such as Benign Prostatic hyperplastic hyperplasia and prostatitis might lead to elevated serum PSA concentrations. PSA levels lacks specificity for prostate cancer detection.

Biopsy is a diagnostic tool for prostate disease. The distribution of various lesions from benign to malignant varies with the different age groups.

**Methods:** This retrospective study was conducted for a period of one year from 01 Jan 2021 to 31 December 2021 in Smt. R.R.B. Pathology Laboratory of Dr. Hedgewar Hospital, which is a tertiary care hospital in Aurangabad.

**Result and Conclusion:** Analysis of data suggests that PSA level lacks specificity for prostate cancer detection. Single reading of PSA level is not diagnostic.

**Keywords:** PSA Level, Various age Groups, Histopathology reports, Prostate Biopsy

## Introduction

A proven important role of clinical laboratories to diagnose and control disease by providing accurate findings which help in patient management. PSA is a glycoprotein produced by the prostate gland. Prostate cancer is the fourth most common male malignancy worldwide, commonest in males above 65 years of age. PSA testing aids in the diagnosis, treatment and follow-up of prostate cancer. All men having detectable PSA in the serum and the levels tend to increase with age and size of the prostate. Serum PSA concentrations

increase with age at a rate of 0.04 ng/ml per year in healthy adult males. PSA levels are highly specific for age related prostate disease but not accurate for prostate cancer. Many conditions other than prostate cancer may increase PSA like:

- Acute Bacterial Prostatitis
- BPH
- Digital rectal examination
- Prostate Biopsy
- Exercise (bicycle)
- Trans rectal ultrasound

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Widespread screening using PSA blood tests started in 1991. Overall PSA appears to detect cancer 5-10 years sooner than digital rectal examination. PSA levels should be co-related with histopathological reports to conclude the diagnosis.

**Materials & Methods**

This retrospective study was conducted for a period of one year from 01 Jan 2021 to 31 December 2021 in Smt. RRB Pathology Laboratory of Dr Hedgewar Hospital, which is a tertiary care hospital in Aurangabad. The hospital is having 300 bed and includes specialty and super specialty departments. The medical laboratory involves all disciplines of biochemistry, immunoassay, hematology, clinical pathology, microbiology, serology and histopathology. The laboratory is well equipped with auto analyzers. Architect 1000 SR and Beckman Coulter access 2 equipments are used for immunoassay section. The laboratory has NABL accreditation for all sections including histopathology since 2005.

The laboratory received 840 samples from Outpatient and inpatient departments for analysis of serum PSA levels during 01 Jan 2021 to 31 December 2021. The correlation of PSA level with histopathology was done for 50 biopsies received amongst these screened patients.

**Results**

- 8% patients had PSA levels > 36 and were diagnosed as BPH with prostatitis (Table 1)
- 16% of patients belonged to the age group of 51-60 years and were reported as BPH after histopathological examination
- Maximum (44%) patients were in the age group of 61-70 years. Among them 2 patients were diagnosed as low grade PIN
- Amongst the patients in the age group 71-80 years, 36% were diagnosed as BPH and BPH with prostatitis
- In the age group of 81-90 years, all patients (4%) were diagnosed as BPH (Table 2)

**Discussion**

Diseases of the prostate i.e. both benign and malignant tumours are hormone (androgen) dependent and are associated with significant morbidity and mortality in men.

Digital rectal examination (DRE) and transrectal ultrasonography are a preliminary practical diagnostic method but has low specificity and sensitivity. Abnormal DRE suspected of malignant prostatomegaly though appeared to be more sensitive in diagnosing the malignant cases, but it is confounding as many of the abnormal DRE turn out to be benign by PSA estimation and tissue diagnosis thus suggesting discordance of abnormal DRE and the PSA level.

**Table 1. Co-relation of PSA level with Histopathology**

PSA Level (ng/ml)	BPH	BPH with Prostatitis	Low Grade PIN	High Grade PIN	Adeno Carcinoma	Total (%)
0-5	26	06	--	--	--	64%
5-15	08	02	02	--	--	24%
15-25	02	--	--	--	--	04%
25-35	--	--	--	--	--	--
≥36	--	04	--	--	--	08%

**Table 2. Age wise Distribution of Various Lesions (Table-B)**

Age Group (years)	BPH	BPH With Prostatitis	Low Grade PIN	High Grade PIN	Adeno Carcinoma	Total (%)
40 - 50	--	--	--	--	--	--
51 - 60	08	--	--	--	--	16%
61 - 70	12	08	02	--	--	44%
71 - 80	12	06	--	--	--	36%
81 - 90	02	--	--	--	--	04%

- 32 patients (64%) had a PSA level of 0-5, among whom 26 BPH
- 24% of patients had PSA levels between 5 and 15, out of which 8 were diagnosed as BPH, 2 as BPH with prostatitis and 2 as low grade PIN
- 4 % of the patients had 15-25 PSA levels were also diagnosed as BPH

PSA is routinely done for diagnostic and prognostic indicator for prostate diseases. PSA determination has certain limitations for the diagnosis of prostatic cancer.

It is commonly elevated in benign prostatic hyperplasia and prostatitis, as well as with mechanical manipulation of the prostate gland. These factors, coupled with the biological

variation in PSA concentrations, result in low specificity and low positive predictive value when used as a single measurement.

The increase in serum PSA depends on differentiation of tumour cells. Gleason score and grade grouping are most powerful predictors of biological behaviour and influential factors used in determining treatment. PSA, when combined with Gleason score and clinical stage, improves the prediction of pathological stage for prostatic carcinoma. Adenocarcinoma of the prostate may be clinically suspected based on elevated serum PSA and/or abnormal Digital Rectal Examination (DRE). Single reading of PSA is not a confirmatory diagnostic criteria for prostatic carcinoma.

### **Conclusion**

This one year data analysis suggests that PSA level lacks specificity for prostate cancer detection. Single reading of PSA level is not diagnostic. Serial PSA levels should be performed to assess the patient. Cancer is most likely to produce bound PSA, no conclusion can be done by free PSA level, Maximum number of biopsies revealed benign prostatic disease after histopathology examination even if their PSA levels were raised.

**Conflict of Interest:** None

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