



RESEARCH ARTICLE

Histopathological Patterns of Prostatic Lesions with Serum PSA Correlation

Sonam Yadav¹, Rajani Rajkumari², Vijay Rajak³, Vidushi Jain¹, Bhumika Trivedi¹

ABSTRACT

Background: Prostatic lesions are among the most common pathological conditions affecting elderly males. Benign prostatic hyperplasia (BPH), prostatitis, prostatic intraepithelial neoplasia (PIN), and carcinoma prostate constitute the majority of prostatic diseases. Serum prostate-specific antigen (PSA) is widely used as a biomarker for screening, diagnosis, and monitoring of prostatic disorders; however, elevated PSA levels may occur in both benign and malignant conditions.

Aim: To evaluate the histopathological patterns of prostatic lesions and correlate them with serum PSA levels.

Methods: A prospective observational study was conducted at Rabindranath Tagore Medical College, Udaipur, Rajasthan, from February 2024 to February 2026. A total of 180 patients presenting with lower urinary tract symptoms underwent serum PSA estimation and histopathological evaluation of prostatic tissue obtained by TURP, needle biopsy, or prostatectomy. Histopathological findings were correlated with serum PSA levels.

Results: Benign prostatic hyperplasia was the most common lesion (62.2%), followed by BPH with prostatitis (16.1%), prostatic adenocarcinoma (15.6%), and PIN (6.1%). Mean PSA levels were significantly higher in malignant lesions (42.8 ± 18.6 ng/mL) compared with benign lesions (8.6 ± 5.4 ng/mL) ($p < 0.001$). PSA levels > 20 ng/mL demonstrated a strong association with malignancy ($p < 0.001$).

Conclusion: BPH remains the predominant prostatic lesion; however, significantly elevated PSA levels are strongly associated with prostatic carcinoma. Histopathological examination remains the gold standard for definitive diagnosis and should be interpreted alongside serum PSA levels.

Keywords: Prostate, PSA, Histopathology, Benign prostatic hyperplasia, Adenocarcinoma, Prostatic lesions.

Indian J. Pharm. Biol. Res. (2026): <https://doi.org/10.30750/ijpbr.14.4.45>

INTRODUCTION

Prostate gland diseases are a serious global health concern for older men. Prostatic problems are more common as people age, and they have a major impact on lower urinary tract symptoms, lower quality of life, and healthcare utilisation. Benign prostatic hyperplasia (BPH), prostatitis, prostatic intraepithelial neoplasia (PIN), and prostate cancer are the most prevalent prostatic lesions. The most common pathological disorder affecting the prostate is benign prostatic hyperplasia, which is characterised by nodular proliferation of stromal and epithelial elements that causes gland enlargement and urinary blockage. Despite being a benign condition, BPH may show clinically similarly to prostate cancer, requiring a thorough diagnostic assessment[1].

One of the most prevalent cancers in males and a leading cause of cancer-related death worldwide is prostate cancer. Prostate cancer prognosis and treatment outcomes are strongly correlated with the disease stage upon presentation, making early diagnosis essential. Prostatic cancer is still diagnosed and graded exclusively by

¹Junior Resident, Department of Pathology, RNT Medical College, Udaipur, Rajasthan, India

²Resident, Department of Pathology, RNT Medical College, Udaipur, Rajasthan, India

³Associate Professor, Department of Pathology, RNT Medical College, Udaipur, Rajasthan, India

Corresponding Author: Sonam Yadav, Junior Resident, Department of Pathology, RNT Medical College, Udaipur, Rajasthan, India, Email: sonamyadav9321@gmail.com

How to cite this article: Yadav S, Rajkumari R, Rajak V, Jain V, Trivedi B. Histopathological Patterns of Prostatic Lesions with SerumPSACorrelation. Indian J. Pharm. Biol. Res. 2026; 14(3):308-311.

Source of support: Nil

Conflict of interest: None.

Received: 25/09/2026 **Revised:** 03/10/2026 **Accepted:** 14/10/2026

histopathological examination, which also forms the basis of treatment planning. Prostatic epithelial cells produce serum prostate-specific antigen (PSA), a glycoprotein that is frequently used as a biomarker for the identification and

tracking of prostatic disorders. Although PSA elevation is not unique to cancer, it can also happen in benign disorders such BPH, prostatitis, urinary retention, and after prostatic manipulation. Elevated PSA levels may be a sign of prostate cancer(2).

Therefore, linkage with clinical symptoms and histological evaluation is necessary for the interpretation of PSA levels. Numerous investigations have shown a connection between different prostate histopathological abnormalities and serum PSA levels. Increased tumour burden, advanced disease stage, and malignant lesions are typically linked to higher PSA readings. Nonetheless, there is a lot of overlap between benign and malignant diseases, especially in the intermediate PSA ranges(3).

Comprehending the histological range of prostatic lesions and their correlation with serum PSA levels should enhance diagnostic precision and promote early cancer identification. Regarding the clinicopathological nature of prostatic lesions and PSA association, Rajasthan has limited prospective data. In order to assess the histological patterns of prostatic lesions and ascertain their correlation with serum PSA levels in patients exhibiting lower urinary tract symptoms and prostatic enlargement, the current investigation was conducted(4).

MATERIALS AND METHODS

Study Design

Prospective observational study.

Study Setting

Department of Pathology and Urology, Rabindranath Tagore Medical College, Udaipur, Rajasthan.

Study Duration

February 2024 to February 2026.

Sample Size

180 patients.

Inclusion Criteria

- Male patients aged ≥ 40 years.
- Clinical or radiological evidence of prostatic enlargement.
- Patients undergoing TURP, needle biopsy, or prostatectomy.
- Availability of serum PSA values.

Exclusion Criteria

- Previous prostate surgery.
- Prior hormonal therapy for prostate cancer.

- Inadequate biopsy specimens.
- Patients with incomplete records.

Study Procedure

All patients underwent:

- Detailed clinical evaluation.
- Digital rectal examination.
- Serum PSA estimation.
- Histopathological examination of prostatic tissue.

Histopathological Classification

- Benign Prostatic Hyperplasia (BPH)
- BPH with Chronic Prostatitis
- Prostatic Intraepithelial Neoplasia (PIN)
- Adenocarcinoma Prostate

Statistical Analysis

Data were analyzed using SPSS version 26.

- Chi-square test.
- ANOVA.
- Student's t-test.

A p-value < 0.05 was considered statistically significant.

RESULTS

Table 1: Age Distribution of Patients

Age group (Years)	Number (%)
40–49	12 (6.7)
50–59	36 (20.0)
60–69	72 (40.0)
70–79	46 (25.6)
≥ 80	14 (7.7)

The majority of patients belonged to the 60–69-year age group, accounting for 40% of cases.

Table 2: Histopathological Spectrum of Prostatic Lesions

Histopathological diagnosis	Frequency (%)
BPH	112 (62.2)
BPH with Prostatitis	29 (16.1)
PIN	11 (6.1)
Adenocarcinoma	28 (15.6)

BPH was the most common lesion identified, followed by BPH with prostatitis and adenocarcinoma.

DISCUSSION

The current prospective observational study examined 180 patients' serum PSA levels in connection to the

Table 3: Correlation of Histopathological Diagnosis with PSA Levels

Lesion	Mean PSA (ng/mL)	p-value
BPH	6.8 ± 3.2	<0.001
BPH with Prostatitis	12.4 ± 5.8	
PIN	18.7 ± 8.4	
Adenocarcinoma	42.8 ± 18.6	

Mean PSA levels increased progressively from benign lesions to malignant lesions, with the highest values observed in adenocarcinoma.

Table 4: PSA Categories and Histopathological Findings

Psa level (ng/ml)	Benign lesions	Malignant lesions	p-value
<4	42	0	<0.001
4–10	71	3	
10–20	24	8	
>20	4	17	

Most malignant lesions were associated with PSA values greater than 20 ng/mL, whereas benign lesions predominated in lower PSA categories.

Table 5: Gleason Score Distribution in Adenocarcinoma Cases

Gleason score	Frequency (%)
≤6	6 (21.4)
7	12 (42.9)
8–10	10 (35.7)

Gleason score 7 was the most frequent grade among adenocarcinoma cases.

histological features of prostatic lesions. The results suggest that serum PSA levels strongly positively correlate with malignant pathology, although benign prostatic hyperplasia continues to be the most prevalent prostatic lesion. Most of the patients in this study were in their sixth or seventh decade of life, with the age range of 60 to 69 having the highest prevalence. This result is in line with the known age-related rise in prostatic disorders. Prostatic lesions are more common in older men because of hormonal changes, extended androgenic stimulation, and cumulative cellular abnormalities[5].

The most common histological diagnosis was benign prostatic hyperplasia, which accounted for about two-thirds of all cases. Numerous studies conducted throughout the world have found similar findings, which highlight the

high incidence of BPH in older men. BPH is characterised histologically by hyperplasia of both glandular and stromal components, which causes the prostate gland to gradually expand and block urine outflow[6]. The second most frequent lesion was BPH linked to chronic prostatitis. Prostatic specimens commonly show chronic inflammatory alterations, which can lead to both PSA increase and urine symptoms. The intermediate PSA values seen in this subgroup could be explained by the presence of inflammation and hyperplasia[7].

15.6% of the patients in the current investigation were adenocarcinomas. Several Indian studies assessing the histological patterns of prostatic lesions are similar to this incidence. Prostate cancer diagnosis is still clinically significant because prompt action and better patient outcomes are made possible by early detection. The substantial association between serum PSA levels and histological diagnosis was one of the study's most significant conclusions. Patients with BPH had the lowest mean PSA readings, while those with prostatitis, PIN, and adenocarcinoma gradually had higher mean PSA values. Malignant lesions had the highest PSA levels, indicating that PSA is a valuable biomarker for prostate cancer screening[8].

Malignant lesions were primarily linked to PSA values higher than 20 ng/mL, according to the study of PSA categories. On the other hand, the majority of benign lesions were limited to PSA values less than 10 ng/mL. These results align with the biological behaviour of prostate cancer, in which increased tumour burden and disturbance of glandular architecture lead to increased release of PSA into the bloodstream. The study does, however, also draw attention to PSA's shortcomings as a stand-alone diagnostic test. Certain benign illnesses, especially BPH with prostatitis, have been linked to elevated PSA levels. This overlap highlights the need for histological confirmation prior to making a cancer diagnosis. A delayed diagnosis or needless biopsies could result from relying just on PSA readings[9].

According to the Gleason score distribution, the majority of adenocarcinoma cases had intermediate-grade tumours (score 7). This result implies that a large number of patients had somewhat differentiated diseases when they were first diagnosed. Elevated PSA levels were linked to higher Gleason scores, which indicate more aggressive and burdensome tumours. The prospective approach, comparatively high sample size, and thorough histopathological evaluation of the current study are its strong points. The study does have some drawbacks,

though. It was carried out at a single facility, and there were no long-term follow-up data on survival and illness progression. Newer imaging modalities and biomarkers were also not assessed[10].

Notwithstanding these drawbacks, the results highlight the significance of integrating serum PSA measurement with histopathological analysis for precise diagnosis and treatment and offer insightful information about the clinicopathological nature of prostatic lesions[11].

CONCLUSION

According to the current study, benign prostatic hyperplasia is the most prevalent histological lesion of the prostate, followed by adenocarcinoma, PIN, and lesions linked to prostatitis. Prostatic problems are more common as people age, especially in their sixth and seventh decades of life. Histopathological diagnosis and serum PSA levels were significantly correlated. PSA levels above 20 ng/mL were strongly linked to adenocarcinoma, and malignant lesions showed significantly higher PSA values than benign lesions. However, certain benign illnesses also showed higher PSA levels, underscoring the limits of PSA as a single diagnostic tool.

The gold standard for a conclusive diagnosis is still histopathological investigation, which should be interpreted in conjunction with serum PSA levels and clinical symptoms. Early prostate cancer identification is made easier and diagnostic accuracy is increased when PSA estimation and tissue diagnosis are used together. To improve risk classification in patients with prostatic lesions and refine the diagnostic value of PSA, further multicentric studies with larger patient populations and sophisticated biomarkers are advised.

REFERENCES

1. B. Rajashekar Reddy, Rameswarapu Suman Babu, Sujatha. P. Retrospective and prospective study of prostate cancer for a period of five years. *Asian Pacific Journal of Health Sciences*, 2014;1(3):142–145.
2. Nisar Ahmed, Mahakshit Bhat, Ankit Kayal JG. Serum Correlation With Various Histopathology Of Prostatic Lesions With Special Reference To Malignant Pathology. *Int J Med Pub Heal*. 2024;14(4):798–801.
3. Kumar S, Mishra C, Sahu BK, Kar SS, Dixit S. Clinicopathological correlation of various prostatic lesions with serum prostate-specific antigen level – A hospital-based cross-sectional study. *Natl J Physiol Pharm Pharmacol*. 2023;13(06):1–8.
4. Maiti S, Das SK, Bose K, Paul A. Spectrum Of Prostatic Malignancy And Its Correlation With Serum Prostate Specific Antigen Level In Trucut Biopsy And Specimen Of Prostate. *Int J Acad Med Pharm*. 2025;7(5):483–7.
5. Jayani, Parmita, Arpita Nishal, Deepshikha Dave S, Kankariya, Ravina Purohit AN. Clinicopathological Spectrum Of Prostatic Lesions At Tertiary Health INDIAN J O F Res. 2021;12(3):199–202.
6. Pooja Khandwe, Sheela Chikhalikar DK and AP. Clinicopathological Correlation of Prostatic Lesions with Serum PSA Levels: An Observational Analysis. *J Multidiscip Res Healthc*. 2025;11(2):61–70.
7. Shetty P, Singh BMK, Shetty T, Bishnu A. Correlation of prostate specific antigen level with histopathological findings in patients with prostatic disease. *Trop J Pathol Microbiol*. 2016;2(3):152–8.
8. Anwer T, Atique A, Sinha R, Das M, Kumar T. Histopathological Patterns of Prostatic Lesions with Serum PSA Correlation : A Retrospective Observational Study. *Int J Curr Pharm Rev Res*. 2026;18(5):1523–31.
9. Sihag D, Laddha P. Correlation of various histopathological lesions of prostate with serum prostate specific antigen and gleason grading. *Indian J Pathol Oncol*. 2021;8(2):213–7.
10. Mahadev KS, Vani BR, V SM. Histopathological Study of Prostatic Carcinoma in Relation to Gleason Grade , Serum PSA and Ki67 Immunomarker. *Ann Pathol Lab Med*. 2015;5(8):697–704.
11. Sujatha R, Jaishree T, Manjunatha YA. Analysis of spectrum of Prostate lesions in correlation with Serum Prostate specific antigen levels – A clinicopathological study in a tertiary care centre. *IP J Diagnostic Pathol Oncol*. 2020;4(2019):175–9.