



Original Research Article

Analysis of spectrum of Prostate lesions in correlation with Serum Prostate specific antigen levels – A clinicopathological study in a tertiary care centre

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ABSTRACT

Introduction: Diseases of prostate, particularly Benign prostate hyperplasia and prostate adenocarcinoma accounts to considerable mortality and morbidity in elderly male. Serum Prostate specific antigen along with Digital rectal examination and transurethral resection/trucut biopsies of prostate plays a crucial role as initial line of investigation in diagnosis of prostate pathology.

Objectives: This study is undertaken with the aim to analyze various clinico – histopathological parameters of prostate lesions and its correlation with serum Prostate specific antigen.

Materials and Methods: This is a prospective study conducted in Histopathology section of Department of Pathology, Dr. B R Ambedkar medical College and Hospital, Bangalore during June 2017 to June 2019.

Results: A total of 134 cases of prostate specimens were analyzed. Most common lesion to be encountered was Benign Prostate hyperplasia followed by Prostate adenocarcinoma. Most of the benign lesions were found in sixth decade and malignant lesions in seventh decade. Increased frequency of micturition is the most common presenting symptom. Among Prostate adenocarcinoma, the Gleason pattern 4 and the Gleason score 7 is the most commonly encountered. Serum Prostate specific antigen showed correlation with both benign and malignant lesions.

Conclusion: In the current scenario, histopathological analysis of prostate specimens plays crucial role in both diagnosis and management along with other aids such as serum PSA levels and imaging modalities.

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1. Introduction

The prostate is a pear shaped retroperitoneal organ encircling the neck of the bladder and urethra, weighing upto 20 grams. And it is one of the essential organ of the male reproductive system composed of glandular and stromal components and its secretions forming about 30-50% of the seminal fluid volume.¹

Diseases of prostate accounts to significant morbidity and mortality among male population of age over 40 years. Chief presenting symptoms such as increased frequency of micturition and complaints related to incontinence is a regular clinical problem in an Urology OPD.

Among the spectrum of benign and malignant lesions of prostate, Benign Prostatic Hyperplasia and Prostate

Adenocarcinoma are very frequently encountered prostatic diseases in elderly men. In India BPH attributes to 93.3% and prostate is the second leading site of cancer among males according to national cancer registries in India. And according to the same Population Based Cancer Registries (PBCRs), prostate cancer is third most common cancer in Bangalore with Age adjusted rate of 8.9 per 100,000 population and the cancer projection data also shows that number of cases will become doubled by 2020.²

Along with digital rectal examination, measuring of serum prostate specific antigen level is the first line screening tool for prostate carcinoma.³ The upper limit of normal for PSA values is generally considered to be 4.0 ng /mL; between 4 and 10 ng /mL is considered borderline and more than 10 ng /mL is considered high. PSA value of 4 ng/mL is considered cutoff because of its high sensitivity (detection of the largest number of prostate cancers) and

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high specificity (exclusion of the greatest number of men without prostate cancer).⁴

With emerging trends in better health care options and increasing awareness among the public, lesions of prostate has become a one of the common specimen to be received for histopathological diagnosis. The major challenge lies in the fact that various malignant and benign lesions of prostate may have a very similar presentation, however their management and prognosis are quite different, so the histopathological diagnosis plays a crucial role in all these condition. Hence, we have taken up this study in the view of analyzing various lesions of prostate in our tertiary care centre and its correlation with serum Prostate specific antigen levels.

2. Materials and Methods

This is a prospective type of analysis carried over a period of two years between June 2017 to June 2019 at the Histopathology section, Department of Pathology, Dr. B.R Ambedkar Medical college and Hospital, Bangalore. All the types of prostate specimens including Transurethral sections and biopsies were included in the study. Inadequate biopsies and poorly preserved specimens were excluded from study.

All the prostate specimens were subjected to meticulous and detailed gross examination after adequate fixation in 10% formalin saline. Tissue were processed and paraffin embedded. Sections of three to four microns thickness were taken and stained with hema toxyline and eosin. A detailed histopathological examination was done and adenocarcinomas were graded as per World health organization criteria. Clinical details of patients such as age, clinical presentation and diagnosis and serum PSA levels were noted form the histopathological requisition form submitted along with specimen. All the histomorphological finding were correlated with age, clinical presentation and serum PSA levels.

3. Results

A total of 134 prostatic specimens were analyzed during this 2 year period in wide range of age group from 42 to 91 years. All the lesions of prostate were categorized into Benign, Premalignant and malignant. Most of the benign lesions were encountered in the age group of 60- 69 years and malignant lesions showed the peak in age group of 70-79 years. Majority of specimens received were TURP chips.

Most common presenting symptom was increased frequency of urination (26.11%) followed by difficulty in voiding (21.60%).

Out of 134 prostate specimens, majority of histopathological findings were Benign accounting to 99 cases (73.88%) followed by malignant lesions accounting to 19 cases (14.19%).

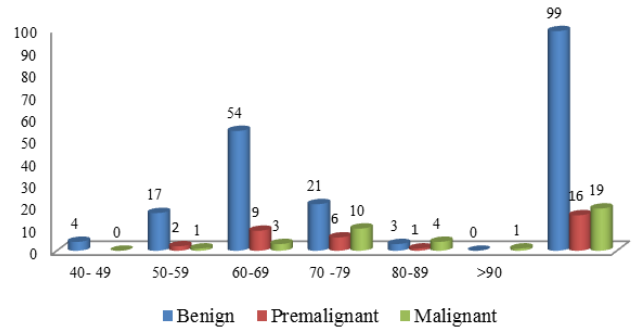


Fig. 1: Age wise distribution of Prostate lesions

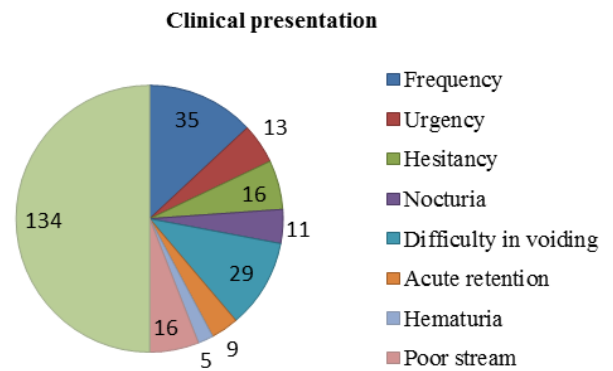


Fig. 2: Distribution of various Clinical Symptoms

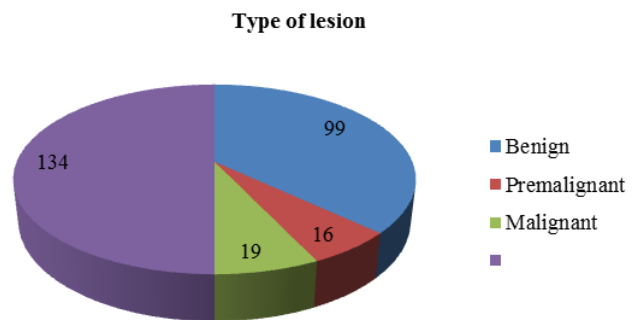


Fig. 3: Distribution of type of Prostate lesions.

Among the Benign lesions, Benign prostatic hyperplasia accounts for the major bulk comprising of 84 cases (62.68%) , followed by Basal cell hyperplasia accounting to 6 cases (4.47%). Out of 84 cases of BPH, 17 cases were associated with Chronic prostatitis.

Among pre malignant lesions High grade Prostatic intraepithelial neoplasia accounted for 13 cases (9.70%) and majority was seen in association with prostate adenocarcinoma and Atypical adenomatous hyperplasia consisted for 3 cases (2.23%).

Prostate adenocarcinomas accounted to 19 cases (14.17%). The Gleason score 7(9 cases, 47.36%) was the

commonly encountered with Gleason pattern 4 (9 cases, 47.36%) being the common pattern. Perineural invasion seen in 5 cases (26.31%).

Analyzing the distribution of various lesions of prostate depending upon their microscopic findings and serum PSA values, we found that maximum number of Prostate adenocarcinomas had serum PSA levels ≥ 20 ng /dl. Most of the Premalignant lesions were distributed within the PSA range of 4.0- 10.0 ng/dl . Maximum number of benign lesions was seen in the PSA range of ≤ 4 ng/ml. In our study the results of comparison of serum PSA levels in benign and malignant lesions of prostate revealed a positive correlation between the increase in PSA levels and malignant lesions.

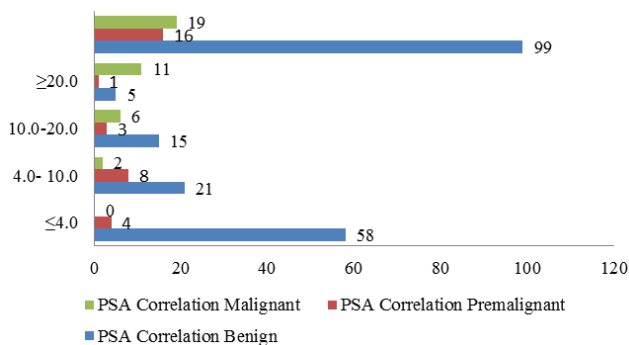


Fig. 4: Comparison of Serum PSA levels among the prostate lesions.

4. Discussion

BPH and carcinomas of prostate are the two common complaints of men in geriatric age causing various types of obstructive urinary symptoms. DRE, transurethral ultrasonography, raised PSA level, and needle biopsy/Trucut needle biopsy are a standard protocol used to reach the final diagnosis.⁵

In our study TURP specimens were the most commonly received specimens in our department, which in concordance with studies conducted by Mittal et al⁶ and Shakya et al.⁷

In our study majority of benign lesions were encountered in sixth decade and malignant lesions were common in seventh decade, which was similar to studies conducted by Sanjaykumar C. Chauhan et al,⁸ Aslam et al,⁹ Akhtar et al¹⁰ and Patel SK et al.¹¹ All the lesions were encountered above the age of 40 years only. And decrease in cases above 80 years of age reflects the life span of male population in our area.

And most common presentation was increased frequency of micturition, which comparable with studies conducted by Sanjaykumar C. Chauhan et al,⁸ Akhtar et al¹⁰ and Patel SK et al.¹¹

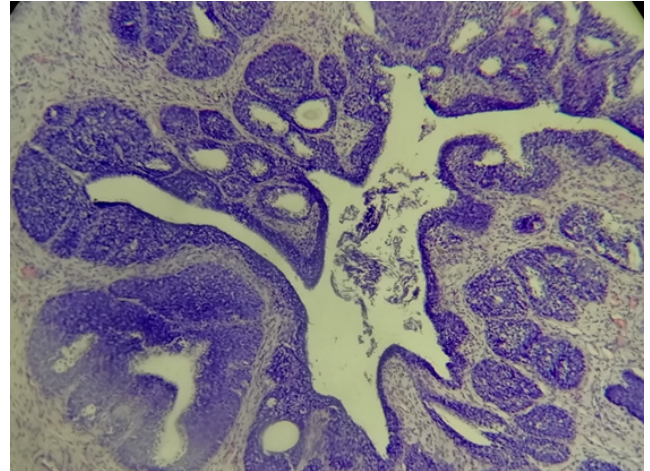


Fig. 5: Basal hyperplasia of prostate. (H & E 10X).

Among the various histopathological diagnosis, Benign prostatic hyperplasia was most commonly encountered followed by prostate adenocarcinoma, which was in concordance with all the studies mentioned above.^{6–11} Chronic prostatitis were found associated with nearly one-fourth of BPH cases similar to Josephine et al.¹²

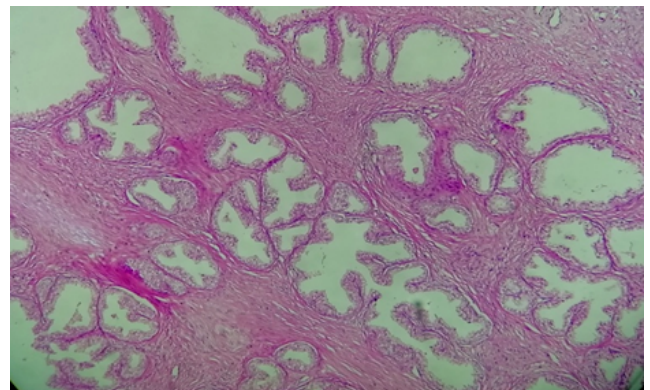


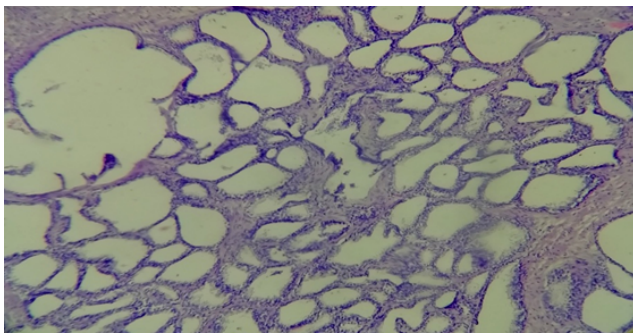
Fig. 6: Benign Prostate hyperplasia (H& E 10x)

PIN is a well established precursor lesion for prostatic carcinoma. Currently conventional use of the term 'PIN' without qualification refers to only high grade PIN (HGPIN). The clinical importance of recognising PIN is based on it being strongly associated with carcinoma of prostate. PIN has a high predictive value as a marker for adenocarcinoma and its identification in biopsy specimens of the prostate should necessitate a thorough search for invasive carcinoma.¹³ In our study we encountered 13 cases of PIN, majority was seen in association with adenocarcinoma.

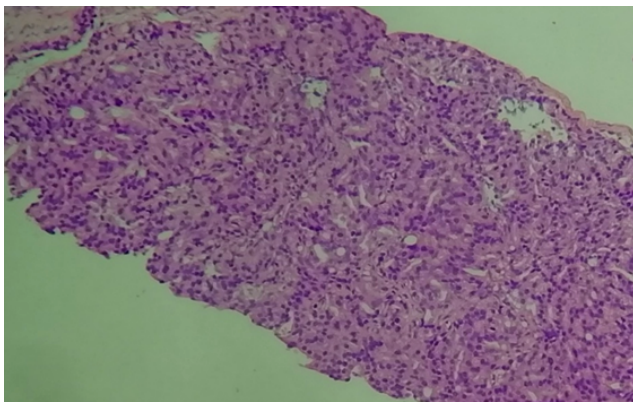
The Gleason grading of prostatic carcinoma correlates with tumor aggressiveness, tumor volume, serum PSA levels, prognosis, and influence of the treatment policy.¹²

Table 1: Histomorphological spectrum of Prostate lesions.

S. No	Type of Lesions	Number of cases	Percentage
Benign lesions			
1.	Benign hyperplasia of prostate	87	64.92%
2.	Basal cell hyperplasia	6	4.47%
3.	Non specific Granulomatous prostatitis	3	2.23%
4.	Acute prostatitis	2	1.49%
5.	Prostate Abscess	1	0.74%
Premalignant lesions			
8.	Prostatic Intraepithelial neoplasia	16	9.70%
9.	Atypical adenomatous hyperplasia.	3	2.23%
Malignant lesions.			
10.	Prostate adenocarcinoma	19	14.17%
	Total	134	100%

**Fig. 7:** High grade Prostate Intraepithelial neoplasia. (H & E 10x)

In our study, Gleason pattern 4 and Gleason score of 7 was most commonly seen pattern, which is concordance with studies conducted by Deshmukh et al,¹³ Sanjaykumar C. Chauhan et al,⁸ and Josephine et al.¹²

**Fig. 8:** Prostate Adenocarcinoma. (H & E 10x)

PSA is elevated by any change that destroys the normal architecture of the prostate which allows diffusion of protease into the microvascular circulation.¹⁴

In our study most of the benign conditions had serum PSA value less than 4 ng/dl and malignant lesions had more than 20ng/dl, which was in concordance with studies done

by , Sanjaykumar C. Chauhan et al,⁸ Patel SK et al¹¹ and Lekili et al.¹⁵

It should never be used alone as screening tool due to various controversies related to low predictive value and increase in the range even in few of the benign conditions. We also encountered high serum PSA level in two benign conditions.

We also found that by comparing PSA levels in BPH and adenocarcinoma cases, it was seen that with increasing PSA levels number of benign cases decreased while number of malignant lesion increases.

5. Conclusion

Diseases of prostate has caused considerable challenges to both urologist and pathologist. From our study we have concluded that BPH is the most commonly encountered lesion followed by adenocarcinoma in an elderly male with prostatism. We also found the strong correlation of increasing levels of serum PSA with adenocarcinoma. However, histomorphological examination of prostate specimens remains the gold standard in diagnosis and management of Prostate cancer and to avoid the over diagnosis of the same under high index of clinical suspicion with increased serum PSA level.

6. Source of Funding

None.

7. Conflict of Interest

None.

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