

## Histomorphological Study of Prostate Specimens

Nivedita Singh<sup>1</sup>, O. P. Dwivedi<sup>2</sup>

<sup>1</sup>Tutor, Department of Pathology, Nalanda Medical College and Hospital, Patna, Bihar.

<sup>2</sup>Professor, Department of Pathology, Nalanda Medical College and Hospital, Patna, Bihar.

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Corresponding author: Dr Nivedita Singh

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### Abstract

**Background:** Study of prostate lesion has gained more importance because development of prostatic hyperplasia is an almost universal phenomenon in aging men. Benign hyperplasia of prostate (BPH) is the most common urological disorder in men beyond 40 yrs of age and is present in almost all men aged 80-90 years. It is extremely important to differentiate the benign and malignant lesions for which we need histopathological analysis. Histomorphological study of prostate specimens is necessary in the present situation as the incidence of prostate diseases keep growing and due to its increased morbidity and mortality. Aim of the study the histomorphological features of various prostate lesions.

**Materials and Methods:** In this study included 100 prostatic specimens received in the Department of Pathology, NMCH, Patna, Bihar from April 2020 to March 2021. After collecting the history, the specimens were examined, fixed in 10% formalin and bits were given. The sections were stained with Hematoxylin and Eosin and examined under the microscope.

**Results:** Mean age of prostatic lesions was 68.61 years. The most common prostatic lesion diagnosed was BPH followed by adenocarcinoma prostate. 5 cases of prostatic intraepithelial neoplasia also reported. Among BPH, the most common associated lesion was chronic prostatitis. Both BPH and adenocarcinoma was commonly reported in 6<sup>th</sup> decade followed by 7<sup>th</sup> decade.

**Conclusion:** Most common finding in this study was BPH followed by adenocarcinoma, more prone in age group of 61-80 years.

**Keywords:** Benign prostatic hyperplasia; Histomorphological study; Intraepithelial neoplasia; Prostate lesions; Transurethral resection of prostate

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### Background

Prostate gland occupies the center stage in lives of many elderly males. As it is located at bladder neck, enlargement of gland leads to problems related to urinary obstruction [1]. Benign hyperplasia prostate (BHP) is the most common urologic disorder in men

beyond 40 years of age group, which is almost present in men aged 80-90 years of age group [2].

Benign prostatic hyperplasia and adenocarcinoma are common diseases that

account for considerable morbidity and mortality of ageing population. In cancer related deaths in men, the prostatic cancer is the second most common to lung cancer.

In men over age of 55 years prostate cancer is responsible for 3% of all deaths [3].

Benign hyperplasia and carcinoma of the prostate are increasingly frequent with advancing age [4]. The role of a pathologist in assessing them has assumed much importance with the advent of the needle biopsy. Prostatic specimens thus constitute a good percentage of surgical pathology work load [5].

Establishing, or ruling out, the diagnosis of carcinoma of prostate is a wellknown challenge for pathologists for many years and has become an even greater problem in recent times because of increased number of biopsy specimens and often limited amount of carcinoma, or questionable carcinoma, in such samples. There are many pitfalls associated with evaluation of prostatic adenocarcinoma, as there are benign mimickers of prostatic adenocarcinoma. Accurate staging and grading of prostatic carcinoma is mandatory. Many investigators have studied various histomorphological features and tried to assess their usefulness in diagnosing or excluding prostatic adenocarcinoma [3].

Accurate staging and grading of prostatic carcinoma is mandatory, as it helps in the appropriate management of the patients. Many investigators have proposed various methods for grading of prostatic adenocarcinoma. But TNM staging and Gleason's grading system is accepted worldwide [6].

### Material and Methods

This cross section study undertaken in the department of pathology, Nalanda Medical College and Hospital from April 2020 to March 2021. A total number of 100

specimens of prostate were studied which included 99 TURP and one prostatectomy specimen.

Detailed data of the cases which included age of the patient and clinical diagnosis were recorded.

Autolysed specimens were excluded from the study.

After the collection of detailed data, the specimens were examined grossly. Specimens were fixed in 10% buffered formalin. Sections were processed and stained with H and E, special stains like Ziehl-Neelsen were used whenever necessary. Slides were examined under microscope and observations were done.

### Staining techniques

#### a) Hematoxylin and Eosin

- 1) Deparaffinized sections were brought to water.
- 2) Sections were stained with Harris Hematoxylin for 4 minutes and rinsed in tap water.
- 3) Differentiation was done in acid alcohol and sections were blued in tap water for 5 minutes.
- 4) Sections were placed in 1% aqueous eosin for 15 seconds.
- 5) Differentiation was done by washing in running tap water for 30 seconds.
- 6) Sections were cleared in xylene and mounted in DPX.

Results: Nuclei: Blue

Cytoplasm: Shades of pink

#### b) Ziehl-Neelsen staining for Acid fast Bacilli (AFB)

- 1) Deparaffinized sections were brought to distilled water.
- 2) Sections were allowed to stand in hot Carbol fuchsin solution for 5 minutes and washed in running tap water.
- 3) 1% acid alcohol until color turns light pink and color stops running.

- 4) Sections were washed in running tap water for 5 minutes and rinsed in distilled water.
- 5) Counter staining was done with methylene blue for 30 seconds and rinsed in tap water.
- 6) Sections were dehydrated, cleared in xylene and mounted in DPX.

Results: Acid-fast bacilli – Bright red

Background – Blue

### Sample size of estimation

Using estimation technique, the sample size is 36 for  $\alpha$  5% and effect size 10%.

### Statistical analysis

Data was entered in Microsoft Excel spreadsheet. Descriptive statistics like frequency and proportions were calculated. Categorical variables were analysed using Chi square test. Epi info software was used in the data analysis.

### Results

100 prostatic specimens were studied which included 99 TURP specimens and one prostatectomy specimen. On gross examination, all the TURP specimens were showing multiple grey white to grey brown bits of tissue. Prostatectomy specimen received was showing nodular hyperplasia grossly.

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

Age group (years)	Number of cases	Percentage
40-50	2	2%
51-60	22	22%
61-70	38	38%
71-80	30	30%
81-90	8	8%

In our study majority of the specimens received were from the patients of 6th decade followed by 7th decade with the mean age of 68.61 years. The youngest age from which case received was 45 and the oldest 90 years. Most of them were clinically diagnosed as benign prostatic hyperplasia. Prostatic diseases are seems to be less in the 4th and 8th decade. Fewer incidences of cases in 8th decade may probably due to the less life expectancy in that age group.

**Table 2: Distribution of neoplastic and non-neoplastic lesions of prostate in thecases studied**

Lesions	Number of cases	Percentage
Non-neoplastic lesion	81	81%
Neoplastic lesion	19	19%

Among the 100 cases studied, majority were diagnosed as non-neoplastic (81%) and the rest neoplastic (19%).

**Table 3: Distribution of various neoplastic lesions of prostate**

Neoplasm	Number of cases	Percentage
Adenocarcinoma	14	73.7%
HGPIN	3	15.8%
LGPIN	2	10.5%
Total	19	100%

Among the neoplastic lesions, adenocarcinoma prostate (73.7%) was predominant, followed by HGPIN and LGPIN.

**Table 4: Frequency distribution of BPH and its associated lesions**

Nonneoplastic lesions (81)	No. of cases	Percentage
BPH alone	63	77.7%
BPH with chronic prostatitis	12	14.8%
BPH with acute prostatitis	2	2.5%
BPH with granulomatous prostatitis	1	1.2%
BPH with Basal cell hyperplasia	1	1.2%
BPH with Squamous metaplasia	1	1.2%
BPH with Transitional metaplasia	1	1.2%

All the non-neoplastic lesions in this study were BPH and the associated lesions along with it. Most common associated lesion along with BPH was chronic prostatitis followed by acute prostatitis. Other associated lesions were granulomatous prostatitis (1), basal cell hyperplasia (1), squamous metaplasia (1) and transitional metaplasia (1). ZN staining was done for in case of granulomatous prostatitis, which was negative for AFB.

**Table 5: Age distribution of neoplastic cases**

Age group (years)	Number of cases (total 19 cases)	Percentage
40-50s	0	0%
51-60	3	15.8%
61-70	9	47.4%
71-80	6	31.6%
81-90	1	5.3%

**Table 6: Age distribution of non-neoplastic lesion (BPH)**

Age group (years)	No. of cases (Total 81 cases)	Percentage
40-50s	2	2.5%
51-60	19	23.5%
61-70	29	35.8%
71-80	24	29.6%
81-90	7	8.6%

Both neoplastic and non-neoplastic lesions of the prostate were common in the age group of 61-70 years and were less common in the 4th decade.

There is no statistically significant difference between the age distribution of neoplastic and non-neoplastic conditions (Chi square=2.605, df=5, p=0.76).

**Table 7: Age distribution of adenocarcinoma prostate**

Age group (years)	No. of Adenocarcinoma prostate (Total-14 cases)	Percentage
40-50	0	0%
51-60	3	21.4%
61-70	7	50%
71-80	4	28.6%
81-90	0	0%

Among the neoplastic lesion adenocarcinoma prostate was the common lesion and it is more commonly detected in the age group of 61-70 yrs followed by 71-80 yrs. In this study we have not reported any cases of carcinoma prostate above the age of 80 yrs and below the age of 50 yrs.

In this study we have reported 5 cases of prostatic intraepithelial neoplasia, in which 3 cases were HGPIN and 2 were LGPIN. 2 cases of HGPIN was detected in the age group of 61-70 yrs. Among the 2 cases of LGPIN, 1 is reported in 7<sup>th</sup> decade and one in 8<sup>th</sup> decade.

In cases of adenocarcinoma prostate, Gleason grading, scoring and ISUP grade grouping was done and recorded. Gleason score ranges from score 6 to 9 with a median score of 7.

**Table 8: Gleason pattern**

Gleason pattern	Primary pattern Number of cases (%)	Secondary pattern Number of cases (%)
1	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)
3	4 (28.6%)	9 (64.3%)
4	6 (42.8%)	2 (14.3%)
5	4 (28.6%)	3 (21.4%)

**Table 9: Gleason score**

Gleason score	No. of cases (Total no. of cases 14)	Percentage
6	2	14.3
7	6	42.8
8	3	21.4
9	3	21.4

The most common Gleason pattern noted in our cases is grade 3. The most common primary pattern was 4 and the most common secondary pattern was 3. The most common Gleason score was 7 (6 out of 14 cases), followed by score 8 and 9. No carcinoma cases of Gleason score 2 to 5 and score 10 has reported.

The most common ISUP Grade group reported was Grade group 3 followed by 4. Among 14 cases which has diagnosed as prostate carcinoma in histopathology, only 4 cases there was clinical suspicion of carcinoma. Rest 10 cases are clinically diagnosed as BPH.

### Discussion

Out of 100 cases studied the most common age group affected by prostate lesions was 6th decade. In our study the youngest patient diagnosed with BPH was 45 years and the

oldest was 90 years. In comparison to our study, the studies done by Achyuta Mathi *et al*, [7] Zeenath Beegum *et al* [8] and Chandanwale Shirish *et al* [3] also showed 6th decade men are commonly affected by prostatic diseases.

In our study of 100 prostatic cases received 99 cases were TURP specimens and one prostatectomy specimen. TURP specimens contributes to the major type of specimens received in many other studies also [7,9,10]. This may be due to the fact that TURP is a simple procedure with little complication when compared to open prostatectomy and its being the treatment of choice of benign prostatic hyperplasia.

BPH and adenocarcinoma prostate are the common pathological processes affecting prostate gland. As in almost all studies, BPH was the most common lesion encountered in

our study, followed by adenocarcinoma prostate. In the present study 81% of the cases were diagnosed as BPH, 14% as adenocarcinoma prostate which was similar to the study done by Chandanwale Shirish *et al*, [3] in which BPH was 83% and carcinoma was 17%. In the study done by Sachanbhat *et al*, [11] 92.6% cases were reported as BPH and 7.4% as adenocarcinoma prostate.

In the present study, BPH as well as adenocarcinoma prostate were most commonly reported in the age group of 61-70 year, comparable to the study done by Ashish Joshee *et al* [9] and Sudhagupta *et al* [10]. In the study done by Anushree CN *et al*, [1] adenocarcinoma prostate was most common in 7th decade, and also another study done by Deshmukh *et al* [12] showed the incidence of BPH is more common in 7th decade.

Similar to other studies, [7,10,13] among the cases of BPH, the most common associated lesion with it was chronic prostatitis followed by acute prostatitis and granulomatous prostatitis. In the present study we reported cases of squamous metaplasia, transitional metaplasia and basal cell hyperplasia along with cases of BPH in comparison to the study done by Achyutha M *et al* [7].

In our study 3 cases of HGPIN and 2 cases of LGPIN were reported out of the 100 cases, while in the study done by Anushree CN *et al*, [1] 5% cases of HGPIN and 8% cases of LGPIN were reported.

In the present study, out of the 14 cases of adenocarcinoma prostate, the commonest Gleason score was 7 similar to the study done by Patel *et al* [14] and Sudha Gupta *et al*. [10]

In contrast, the study done by Deshmukh *et al*, [12] showed the most common Gleason score as 9.

Similar to the studies done by Deshmukh *et al* [12] and Achyutha M *et al*, [7] the most common Gleason pattern observed in our study was Gleason pattern 3.

In the present study out of the 100 cases received, 8 cases were clinically suspected or diagnosed as carcinoma prostate. On histopathological examination 4 out of that 8 cases was diagnosed as adenocarcinoma prostate, rest 3 cases turned out to be BPH in microscopic examination of the sample received and 1 case was diagnosed as PIN.

In our study, 14 cases were diagnosed as adenocarcinoma prostate on histopathological examination, among which only 4 cases were clinically suspected as malignancy and rest 10 cases were clinically diagnosed as BPH.

These observations indicate that histopathology plays an important role in the diagnosis of prostate diseases, being it ruling out malignancy or confirming it and helps clinician to make appropriate treatment for the patient. Histopathological study of small biopsies is an important tool which can be used to rule out the presence of carcinoma, hence preventing patient undergoing unnecessary surgeries.

### Conclusion

It may be concluded from the present study that prostatic diseases are most commonly affect males in age group of 6th and 7th decade, with benign prostatic hyperplasia being the most common lesion followed by adenocarcinoma prostate. In our study it is found that both BPH and adenocarcinoma prostate are most commonly seen in men of 6th decade. It is noted in our study that histopathological examination is necessary for the diagnosis, especially in case of carcinoma, as it helps in the proper treatment. Even, the detection of premalignant lesions like prostatic intraepithelial neoplasia by histopathology

helps clinician to do proper intervention and prevent the development of malignancy.

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