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Original research article

Study was to assess the histopathological features of different types of hyperplasia of prostate, prostatic intraepithelial neoplasia and prostatic carcinoma in transurethral resection of prostate (TURP) samples and needle core biopsies

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Abstract

Aim: The aim of the present study was to assess the histopathological features of different types of hyperplasia of prostate, prostatic intraepithelial neoplasia and prostatic carcinoma in transurethral resection of prostate (TURP) samples and needle core biopsies.

Methods: This prospective study was undertaken at the Akash Institute of Medical Sciences from 2019 to 2021. 120 patients were included in the study.

Results: Most of the cases in the present study were in the range of 61 to 70 years of age (60 cases) followed by 71 to 80 years (37 cases) and 51 to 60 years (19 cases) respectively at the time of biopsy for symptomatic obstructive uropathy. Out of the total 120 cases studied, 109 cases (90.8%) were non-neoplastic and 11 cases (9.2%) harbored neoplasms. The most common clinical symptoms in non-neoplastic lesions are as follows: frequency, retention, hesitancy, urgency dysuria. On digital examination, of 109 non-neoplastic cases, 105 were firm whereas 4 cases were hard in consistency. Out of 11 neoplastic cases, all 11 cases were hard in consistency. On comparing neoplastic and non-neoplastic cases, hard nodule was significantly associated with neoplasms. Serum Prostate Specific Antigen levels were assayed using immunoassay and were available for 80 cases (67.5%). Among these 80 cases, PSA values in 04 (5%) were within normal range (up to 4 ng/dl). In the 109 cases of benign hyperplasia of prostate, varying proportions of glands and stroma was noted, from which, cases showing a characteristic pattern or predominance was identified. Of the 109 cases of benign prostatic hyperplasia, Corpora amylacea were seen in 30.2% of cases. The other findings were basal cell hyperplasia (3.7%) and squamous cell metaplasia (0.9%). Other stromal findings encountered were ectatic thick-walled blood vessels and stromal edema.

Conclusion: TURP plays a significant role in the diagnosis of prostatic lesions. The benign lesions are more common the malignant ones. The modified Gleason score is applied for prostatic cancer, which is simple and accurate to grade these malignancies.

Keywords: Benign prostatic hyperplasia, prostatic intraepithelial neoplasia, prostatic cancer, TURP, needle core biopsy

Introduction

Prostatism is a malady in the geriatric age group with prostatic disease-causing enormous morbidity worldwide [1]. Benign prostatic hyperplasia (BPH) followed by prostatic adenocarcinoma account for most of the cases of prostatic disease. With prostate carcinoma being the second most common diagnosed cancer in men, a systematic investigation of an adult male with prostatic hyperplasia becomes very important [2]. Various prostatic lesions present with same clinical features, diagnosis is essential as their management and prognosis is quite different [3]. Prostatic cancer constitutes about 5% of all malignancy in males [3, 4]. The incidence of prostate cancer has steadily increased in the geriatric age group over the last decade. Thus, the percentage of men who will be diagnosed with prostate cancer and those who will require treatment for their malignancy will rise in the coming years [5].

The routine screening of vulnerable elderly male population with the 3-pronged approach of digital examination, transrectal ultrasonography and estimation of serum Prostate specific antigen (PSA) levels have led to a marked increase in the frequencies of prostatic biopsies [5]. Histopathological examination

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of prostatic biopsies pertain to an accurate diagnosis of all lesions and grading of prostatic carcinoma. Prostate has a spectrum of disease processes which can be easily confused with carcinoma. Transurethral resection of prostate (TURP) and needle core biopsies are most frequently performed surgical procedure in the clinical practice and it aids in early identification of premalignant lesions and incidental prostate cancer which can improve the treatment outcome of patients [6]. Histopathological evaluation plays a major role in the diagnosis and management of prostate lesions as both benign and malignant lesions present with similar clinical presentation [7]. Thus, prostatic specimens have become a significant workload for a pathologist and trans urethral resection prostate (TURP) specimens and prostatic needle core biopsies often pose a diagnostic challenge for the practicing pathologists.

The aim of the present study was to assess the histopathological features of different types of hyperplasia of prostate, prostatic intraepithelial neoplasia and prostatic carcinoma in transurethral resection of prostate (TURP) samples and needle core biopsies.

Materials and Methods

This prospective study was undertaken in the Akash Institute of Medical Sciences from 2019 to 2021. 120 patients were included in the study.

Source of data

Specimens were obtained from patients who underwent transurethral resection of prostate (TURP) and core biopsies, after consent, in the Akash Institute of Medical Sciences.

Sample size was calculated based on 3 years retrospective analysis in Akash Institute of Medical Sciences from June 2015 to May 2018. For 3 years a total of 180 specimens of TURP chips and needle biopsies of prostate have been received in Akash Institute of Medical Sciences, making an average of 60 cases per year. Based on this data the sample size would be 120 as all biopsies and respected specimens of TURP chips and needle biopsies of prostate received from 2019 to 2021 (2 years) were subjected to study.

Method of data collection

- Demographic, clinical and laboratory data of each patient were taken from the clinical charts.
- Specimens were received in 10% formalin. All transurethral resection prostate (TURP) samples were weighed and core biopsies numbered. After careful and detailed gross examination, they were submitted for processing.
- All specimens until four cassettes are filled, if excess, one additional cassette for each additional 10 g of tissue (each cassette holds approximately 2 g).
- Sections were stained with Hematoxylin and Eosin stains and examined for various morphological lesions.
- Histopathological grading and scoring by Gleason system was done in all cases of adenocarcinoma of prostate.

Inclusion criteria

All TURP chips and core biopsy specimens from prostate.

Exclusion criteria

Specimens inadequate for opinion.

Statistical analysis

This was a descriptive study. Data was analyzed using descriptive statistics leveraging SPSS software version 20. Results are depicted in the form of percentages and graphs.

Results

Table 1: Age incidence of various prostatic lesions, nature of lesion, symptoms

Variables	Non-neoplastic	Neoplastic	%
Age			
51-60	19(17.4%)	-	19(15.8%)
61-70	52(47.7%)	8(72.7%)	60(50%)
71-80	35(32.1%)	2(18.2%)	37(30.8%)
81-90	3(2.8%)	-	3(2.5%)
>90	-	1(9.1%)	1(0.8%)
Total	109(100%)	11(100%)	120(100%)
Nature of specimen			
Needle biopsy	5(62.5%)	3(37.5%)	8(100%)
TURP	104(92.9%)	8(7.1%)	112(100%)
Symptoms			

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Frequency	66(60.6%)	_	66(55%)
Retention	47(43.1%)	3(27.3%)	50(41.7)
Hesitancy	20(18.3%)	8(72.7%)	28(23.3%)
Urgency	14(12.8%)	_	14(11.7%)
Dysuria	9(8.3%)	_	9(7.5%)
Dribbling	_	8(72.7%)	8(6.7%)
Hematuria	_	3(27.3%)	3(2.5%)

Most of the cases in the present study were in the range of 61 to 70 years of age (60 cases) followed by 71 to 80 years (37 cases) and 51 to 60 years (19 cases) respectively at the time of biopsy for symptomatic obstructive uropathy. Among 109 non-neoplastic cases, majority belonged to the age group of 61-70 years in which the youngest case was 51 years and the oldest is 86 years with a mean of 68.69 years and of the 11 neoplastic cases most were in the 61 to 70-year age group range in which the youngest was 66 and the oldest was 96 years with a mean age of 70.64 years. Out the total 120 cases studied, 109 cases (90.8%) were non-neoplastic and 11 cases (9.2%) harbored neoplasms. The most common clinical symptoms in non-neoplastic lesions are as follows: frequency, retention, hesitancy, urgency dysuria. Frequency and retention were more common findings among the non-neoplastic cases accounting for 60.6% and 43.1% respectively. Among neoplastic lesions, hesitancy and dribbling were common and accounts for 72.7% each respectively.

Table 2: Digital rectal examination findings of prostatic lesions

DRE		**Non-neoplastic**	**Neoplastic**	**Total**
Firm		105(96.3%)	-	105(87.5%)
Hard		4(3.7%)	11(100%)	15(12.5%)
Total		109(100%)	11(100%)	120(100%)
PSA(ng/dl)		Non- neoplastic	Neoplastic	%
0-4		4(5.8%)	_	5%
4.1-10		52(75.4%)	_	65%
10.1-20		11(15.9%)	_	13.8%
>20	21-40	2(2.9%)	2(18.2%)	5%
	41-60	_	3(27.3%)	3.7%
	61-80	_	6(54.5%)	7.5%
Total		69(100%)	11(100%)	80(100%)

On digital examination, of 109 non-neoplastic cases, 105 were firm whereas 4 cases were hard in consistency. Out of 11 neoplastic cases, all 11 cases were hard in consistency. On comparing neoplastic and non-neoplastic cases, hard nodule was significantly associated with neoplasms. Serum Prostate Specific Antigen levels were assayed using immunoassay and were available for 80 cases (67.5%). Among these 80 cases, PSA values in 04 (5%) were within normal range (up to 4 ng/dl). These were non-neoplastic on histopathology. In 52(75.4%) cases, the PSA levels were in the borderline range of 4.1-10ng/dl, all cases were non-neoplastic on histopathology. 11(15.9%) cases were found to have a PSA ranging from 10.1-20 ng/dl which were reported as non-neoplastic on histopathology. 2(2.9%) cases had significant elevation of PSA with levels >20ng/dl. Out of 11 neoplastic cases, 6(54.5%) cases constituted between 61-80ng/dl followed by 3(27.3%) were in the 41-60ng/dl range and 2(18.2%) cases were in 21-40ng/dl with a mean of 57.9.

Table 3: Predominant histologic patterns in benign prostatic hyperplasia and Prostatitis in benign prostatic hyperplasia and other morphologic features in benign prostatic hyperplasia

Hyperplasia	**Total (n=109)**
Adenomyomatous hyperplasia	80(73.40%)
Adenofibromyomatous hyperplasia	24(22.10%)
Adenofibromatous hyperplasia	4(3.70%)
Other morphologic features in BPH	**Total**
Basal cell hyperplasia	4(3.70%)
Corpora amylacea	33(30.2%)
Squamous metaplasia	1(0.90%)

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In the 109 cases of benign hyperplasia of prostate, varying proportions of glands and stroma was noted, from which, cases showing a characteristic pattern or predominance was identified. Of the 109 cases of benign prostatic hyperplasia, Corpora amylacea were seen in 30.2% of cases. The other findings were basal cell hyperplasia (3.7%) and squamous cell metaplasia (0.9%). Other stromal findings encountered were ectatic thick-walled blood vessels and stromal edema.

Table 4: Different patterns in prostatic adenocarcinomas

Findings	No. of cases (n=11)	%
Small discrete glands	9	81.8
Fused glands	5	45.4
Trabeculae	1	9.1
Zell-ballen	1	9.1
Sheets	2	18.2

Eleven cases of prostatic adenocarcinoma were reported in the present study. All of them exhibited different growth patterns and were scored using the modified Gleason grading system (modified ISUP 2005). In this study, the commonest pattern seen was discrete arrangement of glands, seen in 9 (81.8%) cases. 5 cases (45.4%) showed fused glandular pattern. One case each (9.1%) of trabecular and cribriform patterns were described. Neoplastic cells arranged in sheets were reported in 2(18.2%) case.

Table 5: Distribution of prostate adenocarcinoma cases according to Gleason score

Score	No. of cases (n=11)	%
Primary Gleason Score		
1.	0	0.0
2.	0	0.0
3.	5	45.5
4.	5	45.5
5.	1	9.0
Secondary Gleason Score		
1.	0	0.0
2.	0	0.0
3.	8	72.7
4.	2	18.3
5.	1	9.0

In the present study, the eleven cases of adenocarcinoma were scored with Gleason primary and secondary scores. The common primary scores were 3 and 4, accounting for 5(45.5%) cases each respectively. One (9.0%) case was given a score of 5. The common secondary scores were 3 and 4, accounting for 8 (72.7%) and 2(18.2%) cases respectively. One (9.0%) case was given a secondary score of 5.

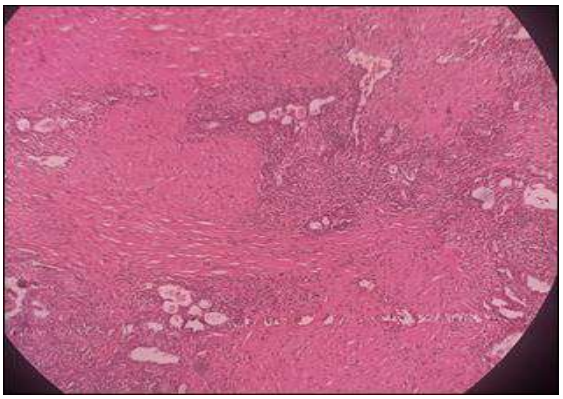

Fig 1: Photomicrograph showing densely inflamed prostatic tissue with lymphocytes. (100X H & E Stain). Chronic Prostatitis

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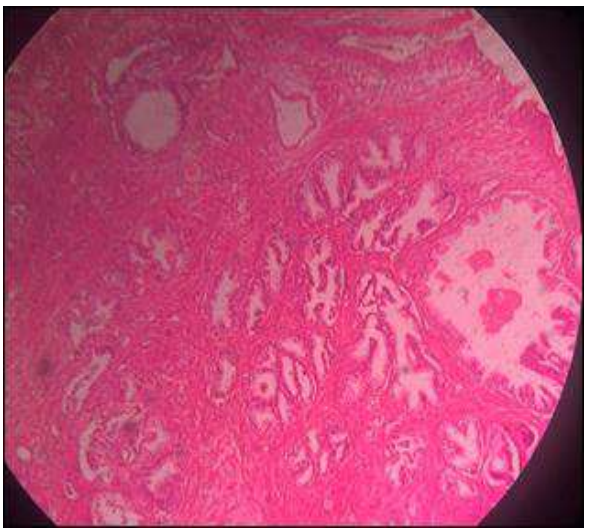

Fig 2: Photomicrograph showing proliferation of cystically dilated gland and stromal proliferation. (100X H & E) Benign Prostatic Hyperplasia

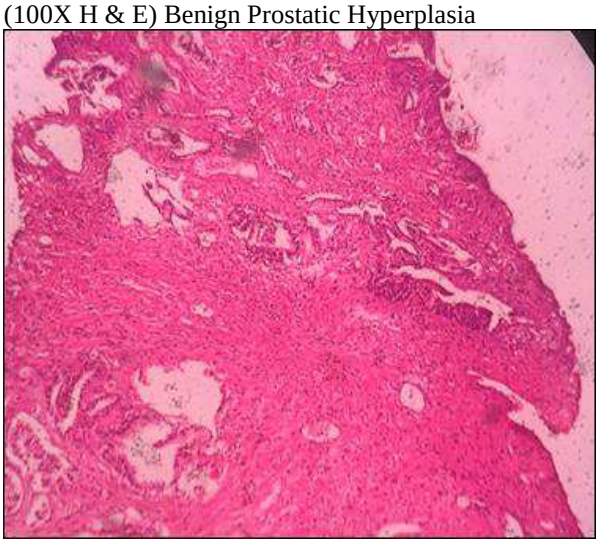

Fig 3: Photomicrograph of Low grade prostatic intraepithelial neoplasia., H &E(100x)

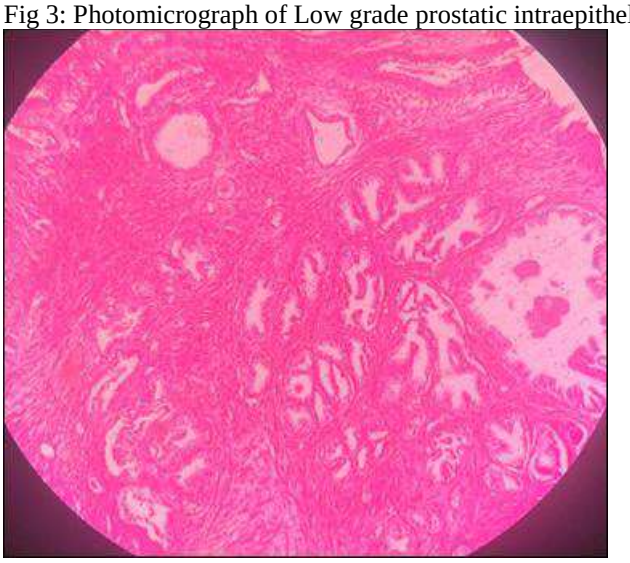

Fig 4: Benign prostatic hyperplasia showing hyperplastic glandular and stromal components H &E(100x)

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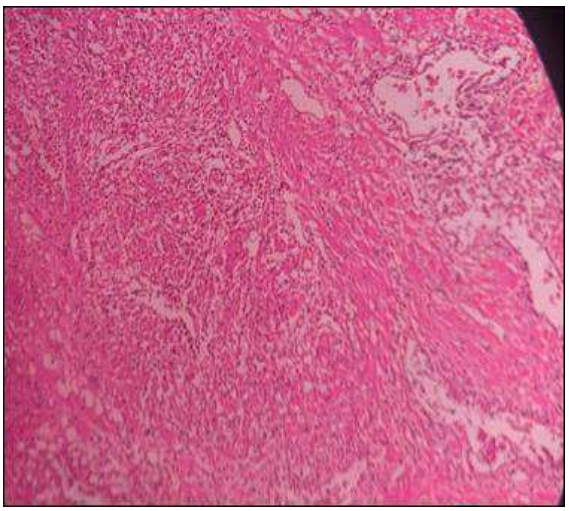

Fig 5: Photomicrograph of Granulomatous prostatitis, H&E, 100X

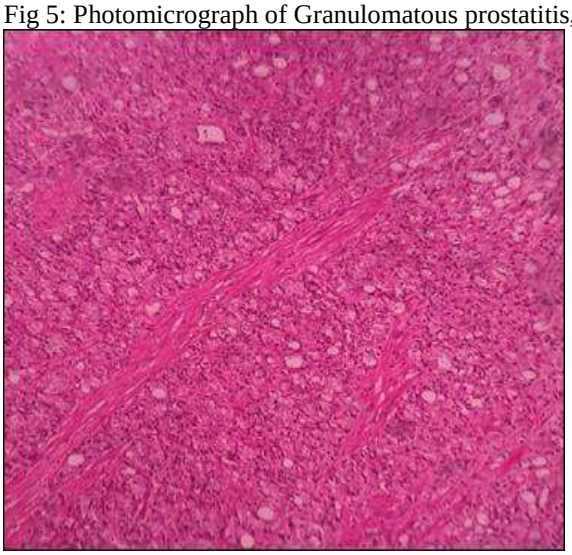

Fig 6: Photomicrograph of Prostatic adenocarcinoma, gleason score, 5+4=9, Grade V. H&E, 100X

Discussion

Benign prostatic hyperplasia (BPH) followed by prostatic adenocarcinoma account for most of the cases of prostatic disease. With prostate carcinoma being the second most common diagnosed cancer in men, a systematic investigation of an adult male with prostatic hyperplasia becomes very important [8]. Various prostatic lesions present with same clinical features, diagnosis is essential as their management and prognosis is quite different [9]. Prostatic cancer constitutes about 5% of all malignancy in males [10, 11].

In our study, the most common prostatic lesion was BPH accounting for 90.8% of the cases studied, which is similar to other studies done in India. Angurana N *et al.* [12] studied 150 cases of prostate and found a similar incidence of BPH (93%). The incidence of prostatic carcinoma in various studies ranged from 7% reported by Angurana N[12] to 21.7% reported by Garg M *et al.* [13] 9.2% of carcinomas were reported in our study, the findings of which are identical to Kumar M *et al.* [14] Enlargement of prostate is an age-related process. Incidence increases with increase in age, beginning in the forties. Most men over the age of 50 years will have histological evidence of BPH. In the present study, 47.7% of the cases were in the 61-70-year range, which is similar to the findings of Talukder SI *et al.* [15] and Kumar M *et al.* [16] who reported 36.1% and 51.9% of cases respectively, in this age range. Among the non-neoplastic lesions, common symptoms were frequency of micturition (60.6%) and retention (43.1%) followed by hesitancy (18.3%) and urgency (12.8%). These findings are similar to the symptoms reported by Puttaswamy K *et al.* [17], in their study on an urban population in Bangalore, who found frequency and hesitancy to be the common symptoms accounting for 52% each, followed by retention (42%). In another study by Kumar M *et al.* [16], poor stream of urine (90.08%) was the common complaint in most patients, followed by frequency and hesitancy.

The usefulness of PSA as an early detector of prostatic cancer by itself is questionable owing to the overlap of PSA values in patients with BPH and in those with organ confined prostate cancer. Maru A *et al.* [18] have explained this phenomenon as follows: as men grow older, their prostate glands may become leakier and the physiological barriers that keep the PSA in the prostate duct system may become more permeable, allowing the antigen to enter the circulation via capillaries and lymphatics. The study done by Sinha *et al.* [19] showed 48% of non-neoplastic lesions with significantly elevated PSA of more than 20 ng/dl. The higher levels noted by us could possibly be related to the increased incidence of prostatitis in

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our study. In the present study, nodular hyperplasia accounted for 57.5% of cases. Basal cell hyperplasia was seen in 3.7% of the cases with BPH, which is similar to the incidence reported by Mittal *et al*. [20] (5.4%). Other commonly encountered findings in BPH are prostatitis and metaplasia.

Patchy mild acute and chronic inflammation is present in most adult prostates and is probably a normal finding. When the inflammation is severe, extensive, or clinically apparent, the term prostatitis is warranted. Prostatitis is classified into three broad categories, acute, chronic and granulomatous prostatitis. It is associated with increased serum PSA levels, which return to normal following treatment [21]. In the present study, all cases of prostatic adenocarcinoma exhibited different growth patterns and were categorized depending on the primary and secondary pattern. The common patterns in this study were, small discrete glands (81.8%), fused glands (45.4%) and sheets (18.2%). Garg M *et al*. [13] found small discrete glands as the most common pattern (61.6%) in their study. Fused glands, sheets and cribriform patterns were also commonly reported by Garg M *et al*. [13], accounting for higher grades of prostatic carcinoma. In our study, the common primary Gleason scores are 3(45.5%) and 4(45.5%) which is similar to other study by Kumar M *et al*. [16] with scores 3(40%) and 4(43.6%). Another study by Krishnappa R *et al*. 85 reported primary score 4(54.5%) as the most common score; they also reported score 2(12.7%) commonly, which is not the case in our study.

Conclusion

Enlargement of the prostate is an age-related process. Distinction of non-neoplastic and neoplastic lesions by clinical examination and PSA levels alone is not always possible. There is considerable overlap of PSA values amongst non-neoplastic and neoplastic lesions. Although benign and malignant lesions of prostate are distinct and are well studied, there are some benign lesions that often mimic cancer causing diagnostic dilemma. These lesions have not been fully studied and lack standardization. Therefore, more thorough histopathological examination of prostatic tissue is needed to identify these lesions and to correlate its relation with prostatic carcinomas, which in turn will lead to early diagnosis and appropriate treatment. The present study highlighted the importance of histopathology in the diagnosis prostate lesions. Incorporating recent criteria and terminology in the final pathology report serves as a guiding tool for treatment and underscores its prognostic utility.

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