Original Research Article

Evaluation of Spectrum of Prostatic Biopsies Using the Revised Gleason Grading System and Prostate Specific Antigen Assay

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Abstract

Introduction: The incidence of prostatic adenocarcinoma is rising worldwide, and a stratified uniform diagnostic approach is required to develop a treatment protocol for patients. This study was undertaken in a medical college in eastern Uttar Pradesh with the aim to estimate the burden of prostatic lesions in the area and to classify them according to the revised Gleason's grading system.**Materials and Methods**: This was a descriptive type of observational study of three years duration were 238 cases of prostatic biopsies in Pathology department of Heritage institute of medical sciences, Varanasi. The lesions were classified on histopathology according to the revised Gleason's grading system and association of prostatic lesions with serum Prostate Specific Antigen was also evaluated. The results were tabulated as pie chart and percentage and comparison was described. **Results**: The mean age of patients with benign prostatic hyperplasia was 56.74 years while it progressed to 75.5 years in patients with prostatic adenocarcinomas. The most common histopathological diagnosis was benign prostatic hyperplasia followed by BPH with chronic prostatitis. The most common Gleasons score in adenocarcinoma was 7. Serum PSA was found to be significantly raised in patients with prostatic adenocarcinomas in comparison to benign prostatic lesions.**Conclusion**: Benign prostatic hyperplasia is the most common prostatic lesion among adult males in eastern Uttar Pradesh. Implementation and awareness of Revised Gleason's grading system will help in proper stratification and uniformity needed for better communication among pathologist and treating clinicians required for adequate treatment approach.

Keywords: Benign Prostatic Hyperplasia, Prostatic Adenocarcinoma, Prostatic Disorders.

Introduction

In an adult male without significant prostatic hyperplasia the prostatic gland is shaped like an inverted cone and weighs 30-40gm, located within the pelvis, with its base proximally at the bladder neck and its apex distally at the urogenital diaphragm[1].The incidence of prostatic diseases is rising worldwide causing significant morbidity and mortality[2].The spectrum of prostatic diseases includes prostatitis, nodular hyperplasia, prostatic intraepithelial neoplasms and overt carcinoma[3].

Most hyperplasia arises from transitional zone while most of the carcinomas originate in the peripheral zone. It has been postulated that the growth is the result of reduced apoptotic activity showed on histologic analysis[4-6].The assessment of patients with prostatic disease includes relevant history, clinical examination, serum prostate specific antigen assay along with histopathological examination and grading according to the updated Gleason Grading system[7]. An updated Gleason grading system was presented by Jhon Hopkins Hospital[8]. This grading system includes five distinct grading groups as follows-Gleason grade group 1 = Gleason grade score ≤ 6, Group 2 = score 3+4 = 7, Group 3 = score 4+3 = 7, Group 4 = score 4+4 = 8 and Group 5 = score 9 and 10. The Gleason grading system is used as prognostic indicator of prostatic adenocarcinoma. This new classification of prognostic grade grouping was proposed and adopted by WHO 2016 update[9,10].This provided more accurate stratification of tumors and simplified the number of grading categories. This study was undertaken to establish a correlation between histopathological findings of prostatic biopsies and serum prostate specific antigen along with categorisation of prostatic carcinomas according to new Gleason grading system. So far there has been very few such studies in eastern Uttar Pradesh and this study will help in emphasising the significance of serum prostate specific antigen assay in prostatic biopsies and will also update about revised Gleasons grading system.

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Materials and Methods

This observational descriptive study was conducted in the department of Pathology at Heritage institute of medical sciences, Varanasi. All the prostatic transurethral resection chips received during the period of three years from January 2018 to December 2020 were included in the study after the permission from institutional ethics committee. The values of serum prostate specific antigen were retrieved from records wherever possible. The histopathological findings of 238 cases were evaluated by two pathologists and various findings were noted and malignant cases were graded according to revised Gleason Grading system.

Inclusion criteria: All transurethral resection of prostate specimens were included in the study. Exclusion criteria: Inadequate biopsies and poorly preserved prostatic tissue specimens were excluded from the study.

Statistical Analysis: Results were interpreted as percentage and presented in tables.

Results

A total of 238 TURP chips/biopsies were studied in this study over a period of 3 years.Majority of prostatic biopsies were benign in nature (78.24%). 15.96% were premalignant and 5.80% were malignant on histopathology.

The minimum age of presentation was 48 years and maximum age was 83 years. Maximum number of benign cases were reported between 50-59 years and maximum number of malignant cases were between 70-79 years. [Table 1]

On further subclassification of histopathological findings, cases of benign prostatic hyperplasia (Figure1) were 98 (41.17%), with associated prostatitis (Figure 2) were 72 (30.25%), nonspecific granulomatous prostatitis (Figure 3) were 3 (1.26%), basal cell hyperplasia in 9 (3.78%) and squamous metaplasia were 4 (1.78%). Premalignant lesions were represented by atypical adenomatous hyperplasia in 9 (3.78%), low grade prostatic intraepithelial neoplasia (Figure 4) in 17(7.14%) and high grade prostatic intraepithelial neoplasia in 12 (5.04%). Malignant lesions were represented by 14 (5.88%) of the total study population. [Table 2]

The 14 cases previously diagnosed as adenocarcinoma (Figure 5) were graded using the modified Gleason grading system.

The most predominant pattern of prostatic adenocarcinoma was found to be 4 in this study. The second commonest pattern was sum of primary and secondary pattern as score 7 (4 + 3) in 6 cases, 3+3 in 4 cases, 4+4 in 2 cases and 5+4 in 2 cases. [Table 3]

Serum PSA level was found to be correlating with spectrum of prostatic lesion i.e all benign cases including benign prostatic hyperplasia, prostatitis, basal cell hyperplasia, squamous metaplasia and nonspecific granulomatous prostatitis showed serum PSA levels lesser than 10ng/ml, premalignant lesions had level of 10-20ng/ml while malignant adenocarcinomas had values more than 20ng/ml in this study.[Table 4]

Table 1: Distribution of cases in various age groups

Age range(years)	Number of cases	Percentage (%)
<50	39	16.38
50-59	72	30.25
60-69	68	28.57
70-79	35	14.70
80 or above	24	10.08
Total	238	100

Table 2: Distribution of histopathological lesions of prostate biopsies

Histopathological diagnosis	Number of cases	Percentage (%)
Benign prostatic hyperplasia	98	41.17
BPH with chronic prostatitis	72	30.25
Nonspecific granulomatous prostatitis	03	1.26
Basal cell hyperplasia	09	3.78
Atypical adenomatous hyperplasia	09	3.78
Low grade prostatic intraepithelial neoplasia	17	7.14
High grade prostatic intraepithelial neoplasia	12	5.04
Squamous metaplasia	04	1.78
Prostatic adenocarcinoma	14	5.88
Total	238	100

Table 3: Pattern of updated Gleason score in prostatic adenocarcinoma

Gleason's score	Primary+ secondary	Number of cases
6	3+3	04
7	3+4	06
	4+3	
8	4+4	02
9	4+5	02
	5+4	
10	5+5	00
Total		14

Table 4: Distribution of PSA range in various prostatic lesions

PSA range(ng/ml)	BPH	Prostatitis	PIN	Adenocarcinoma
0-4	48	10	00	00
4.01-10	42	54	02	00
10.1-20	08	08	22	00
20.01-100	00	00	05	14
Total cases	98	72	29	14

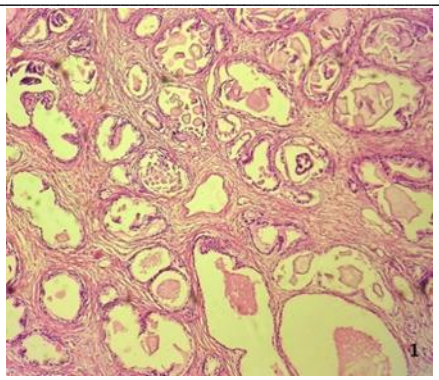

Fig 1: Proliferating glands in benign prostatic hyperplasia

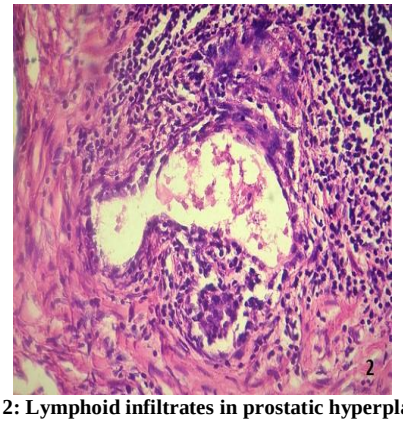

Fig 2: Lymphoid infiltrates in prostatic hyperplasia

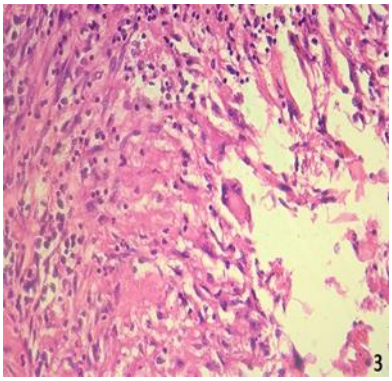

Fig 3: Granulomatous inflammation

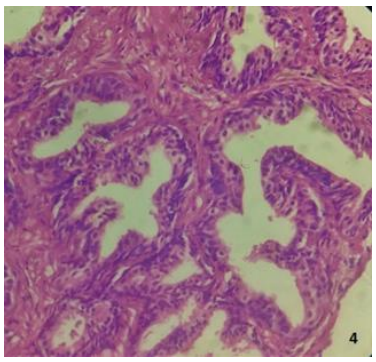

Fig 4: Hyperplastic papillary proliferation into the lumen

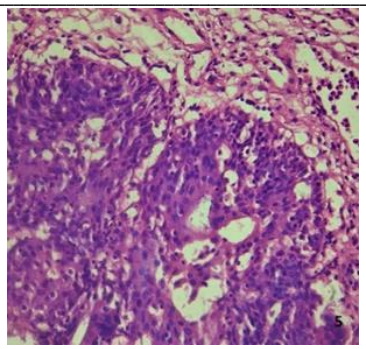

Fig 5: Nests of tumor cells in adenocarcinoma prostate

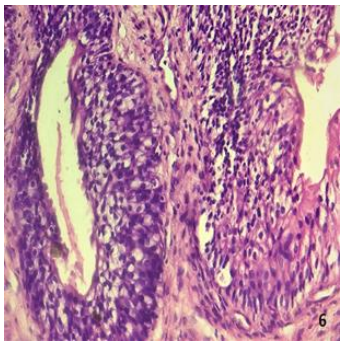

Fig 6: Hyperplasia of basal cells with clear cell change

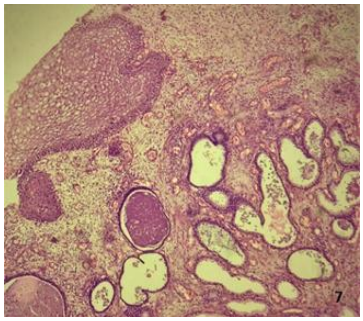

Fig 7: Squamous metaplasia with benign prostatic hyperplasia

Discussion

Prostatic diseases are the most common cause of morbidity and mortality worldwide[11]. The incidence of prostatic diseases increases with advancing age and diagnosis is usually made by transrectal core needle biopsy[12,13].The international society of urological pathology (ISUP), conference was conducted in 2014, in Chicago and the newer development was introduced into the 2016, world health organization (WHO) classification of tumours of the urinary system and male genital organ[14,15].The major outcome were to include cribriform, fused and poorly formed glands into gleason pattern 4.

In our study, mean age was 61.28 years, mean age for benign prostatic hyperplasia was 56.74 years and mean age for prostatic carcinoma was 75.5 years. In view of the findings obtained, commonly involved age group with prostatic diseases are 60-69 years and for prostatic carcinomas this shifts to 70-79 years. These findings are in concordance with studies by Jasani et al, Anushree et al, Aslam et al and Akhtar et al[16-19].

The chief presenting complaint of patients was increased frequency of micturition, nocturia, dysuria and dribbling of urine. This study had benign lesions in 81.92% cases and malignant lesions in 18.08% cases. Similar findings were seen in studies by Puttaswamy et al and Banerjee B et al[20,21] Benign prostatic hyperplasia being the most common histopathological lesion observed with 41.17% which is in concordance with study by Mittal et al which showed 40% cases[22].Prostatitis as a coexisting finding in benign prostatic hyperplasia accounted for 30.25% cases similar to study by DP Murthy et al having finding of 30%[23].In our study the finding of prostatic intraepithelial neoplasia was seen in 12.18% cases which was similar to study by Maru AM et al[24].

The incidence of prostatic adenocarcinoma in this study was 5.88%. These cases showed different growth patterns and were classified according to revised Gleason grading system. The major revision in the WHO 2016 classification was to include cribriform fused and poorly formed glands into Gleason grade 4 and also differentiate Gleason score & into two Predominant Gleason patterns (3+4 and 4+3)[9,10].The incidence of prostatic adenocarcinoma in various studies ranges from 12.5% was reported by Aslam et al[18] to 24.3% by Sinha et al.[25] Our study showed a lower incidence which could be due to the stages of disease when medical attention is seeked by patient as also suggested by Anjorin et al[26]Basal cell hyperplasia (Figure 6) was the another finding in our study (3.78% cases) which was similarly reported by Mittal et al[12] in 5.4% cases. Three cases of nonspecific granulomatous prostatitis which were negative for Acid fast bacilli were also seen. Squamous metaplasia was also noted in

few cases in our study (Figure 7). In this study there were 9 cases of atypical adenomatoid hyperplasia which was similar to study by Nghiem et al[27].

Prostate specific antigen is elevated by any morphological changes which allow diffusion of protease into the microvascular circulation. About 30-50% of patients with benign prostatic hyperplasia have elevated serum PSA concentration and in prostatic adenocarcinoma this is increased in 20-92% of cases depending upon tumor size. Measurement of serum PSA along with TURP biopsies is the most sensitive method to access prognosis of the disease[27].

In our study, most of the cases of benign prostatic lesions presented with serum PSA levels in range of 0.55 to 14.o ng/ml and malignant prostatic carcinomas had PSA range of 26.18 to 94.6ng/ml. Studies by Lekili M et al, Waran KK et al and Banerjee et al had similar findings[21,29,30]. The limitation in this study is less number of cases of prostatic adenocarcinoma and fewer cases in which serum prostate specific antigen was done in prostatic diseases.

Conclusion

This observational study revealed that benign prostatic hyperplasia was the most common lesion among older males and screening should be advised in all males regularly.

PSA showed significant association with prostatic carcinoma, and it should be done in all cases were TURP biopsies are performed.

Awareness of the revised Gleason grading system is required to simplify the impact of architectural pattern on prognosis of prostatic adenocarcinomas.

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