



ORIGINAL RESEARCH PAPER

Pathology

CLINICOPATHOLOGICAL SPECTRUM OF PROSTATIC LESIONS AT TERTIARY HEALTH CARE CENTRE

KEY WORDS: Nodular prostatic hyperplasia, Prostatic intraepithelial neoplasia, Prostate carcinoma, Serum prostate specific antigen,

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ABSTRACT

Intoduction: The prostate is one of the most commonly affected organs in males with increasing age, accounting for significant mortality and morbidity. Of the diseases which affect the prostate, the most frequently encountered in clinical practice are Nodular Prostatic Hyperplasia, Carcinoma of prostate and Prostatitis. **Objectives:**This study is undertaken with the aim to analyze various Histopathological spectrum of prostate and it's clinical correlation. **Material and methods:** This is a observational cross sectional retrospective and prospective study conducted in the Department of Pathology, at tertiary care centre in South Gujarat during the period from January 2018 to April 2021. **Results:** A total of 125 cases of prostate specimens were analyzed. Most common lesion encountered was Nodular Prostatatic hyperplasia followed by Prostate adenocarcinoma. Most of the lesions were found in 7th decade. Increased frequency of micturition was the most common presenting symptom. Among Prostate adenocarcinoma, the Gleason pattern 3 and the Gleason score 7 was 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.

1. Introduction

The prostate is a retroperitoneal organ. The prostate is one of the most commonly affected organs in males with increasing age, accounting for significant mortality and morbidity. Of the diseases which affect the prostate, the most frequently encountered in clinical practice are Nodular Prostatic Hyperplasia, Carcinoma of prostate and Prostatitis Benign prostatic hyperplasia is an extremely common condition in men over the age of 50 years. The clinical incidence of this disease is only 8% during the 4th decade, but it reaches 50% in the 5th decade and 75% in the 8th decade It has become very necessary to study prostatic carcinomas in the present situation as their incidence keeps growing due to extended male longevity past the 60's. Prostate cancer is responsible for 3% of all deaths in men over age of 55 years. Screening of prostatic lesions constitute digital rectal examination, prostate specific antigen and transrectal ultrasound, but biopsy remains the gold standard diagnostic tool for the final diagnosis.

The purpose of this study was to analyse the clinicopathological spectrum prostatic lesions at a tertiary health care hospital, to analyse adenocarcinoma of prostate according to 2014 Modified Gleason microscopic grading and grade group comparison according to the International Society of Urological Pathology (ISUP) and to correlate histologic findings with pre-operative serum PSA levels.

2. Materials and methods

This is a descriptive observational cross sectional retrospective & prospective type of analysis carried from January 2018 to April 2021 at the Histopathology section, Department of Pathology at tertiary care centre in South

Gujarat. All the types of prostate specimens including Transurethral sections , prostatectomies 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% buffered formalin saline. Tissues were processed and paraffin embedded. Sections of three to four microns thickness were taken and stained with hematoxyline and eosin. A detailed histopathological examination was done and adenocarcinomas were graded according to 2016 WHO classification and histological grading was done using modified Gleason system (2014 ISUP) 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 findings were correlated with age, clinical presentation and serum PSA levels.

3. Results

The present study was carried out at Department of Pathology, at tertiary care centre in South Gujarat during the period from January 2018 to April 2021. Out of 125 cases analyzed there were 110 cases of non-neoplastic lesions (88%) and 15 cases of neoplastic lesions (12%) among all prostatic lesions (Table 1). Among non-neoplastic lesions, 109 cases of NPH along with one case of acute prostatitis were reported. Among the neoplastic lesions, there was clustering of cases in the age group of 60 to 80 years together constituting 80% with nil cases observed in younger age group. Benign lesions were more common in age group of 60-69 years. Frequency of urination was most common presenting symptom (35 cases - 28%) followed by difficulty in voiding (30 cases - 24%)

(Figure 1).The most common histopathological diagnosis was NPH (104 cases – 83.2%) followed by acinar adenocarcinoma (15 cases - 12%). 4(3.2%) cases of NPH with prostatitis, 1(0.8%) case of NPH with basal cell hyperplasia and 1(0.8%) case of acute prostatitis were also encountered. PSA values were available in only 70 of the total 125 cases. Among the 70 cases 34 cases had PSA value between 0 and 4 ng/ml, 16 cases had PSA value 4-10 ng/ml, 11 cases had PSA value 10.1-20 ng/ml and 9 cases had PSA value >20 ng/ml(Table 2). On comparison of serum PSA levels with various types of histopathological lesions, almost all patients of benign lesions had PSA levels within the range of 0-10 ng/ml. 60% patients with prostate adenocarcinoma had PSA levels >20 ng/ml, followed by 30% patient with PSA levels 10.1-20 ng/ml and 10% patient with PSA level 4-10 ng/ml. In the present study most frequently observed predominant patterns were pattern 3 and 4 seen in 6 (40%) and 5(33.33%) cases respectively. 4(26.66%) cases showed pattern 5. No cases showed pattern 1 or 2 in present study .In the present study out of 15 cases the most common Gleason score given in adenocarcinoma cases was score 7(3+4) (4 cases – 26.66%), followed by score 8 (3 cases–20%),score 9 (3 cases–20%) , score 6 (2 cases-13.33), score 7(4+3)(2 cases – 13.33%) and score 10 (1 case - 6.66%)(Table 3). Out of 15 cases of adenocarcinoma , Gleason grade groups 2 & 5 were observed in (26.66% each), followed by Grade group 4(20%) ,and Grade groups 1 & 2 (13.33% each). In the present study out of 15 cases of prostatic adenocarcinoma PNI was found in 6(40%) of the total cases.

Table 1: Age wise frequency of the various prostatic lesions(N=125).

Age range (years)	NPH(%)	Acute prostatitis(%)	Adenocarcinoma(%)	Total n(%)
30-39	2(1.8)	-	-	2(1.6)
40-49	4(3.6)	-	-	4(3.2)
50-59	18(16.5)	1	1(6.6)	20(16)
60-69	41(37.6)	-	9(60)	50(40)
70-79	37(33.9)	-	3(20)	40(32)
>80	7(6.4)	-	2(1.3)	9(7.2)
Total	109(87.2)	1(0.8)	15(12)	125(100)

Figure 1: Pie chart showing clinical presentation of prostatic lesions(N=125).

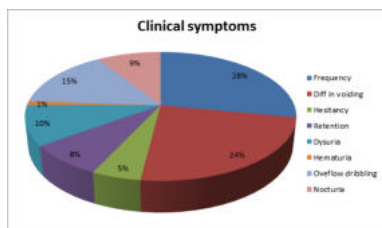


Table 2: PSA Level in benign and malignant prostatic lesions(N=70).

PSA(ng/ml)	Benign lesions(%) (n=60)	Malignant lesions(%) (n=10)	Total (%) (n=70)
<4	34(56.66%)	0(0.0)	34(48.57%)
4-10	15(25%)	1(10%)	16(22.86%)
10.1-20	8(13.33%)	3(30%)	11(15.71%)
>20	3(5%)	6(60%)	9(12.86%)

Table 3:Analysis of cases of adenocarcinoma of prostate according of Gleason score & Grade group.

Gleason score & Grade group(GG)	Number of cases	Percentage(%)
6(3+3) - GG1	2	13.33%
7(3+4) – GG2	4	26.66%

7(4+3) – GG3	2	13.33%
8(4+4) –GG4	3	20%
9(4+5) – GG5	-	20%
9(5+4) – GG5	3	
10(5+5) – GG5	1	6.66%
Total	15	100%

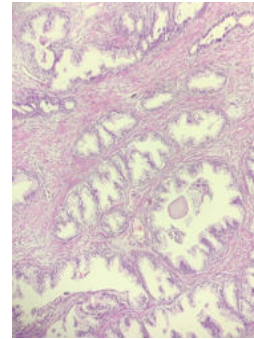


Figure 2: Photomicrograph of Nodular hyperplasia of prostate(H&E,10x)

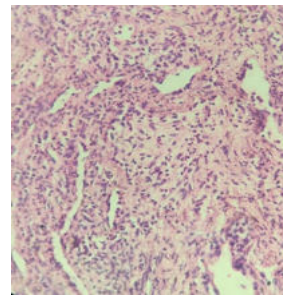


Figure 3: Photomicrograph of Acute Prostatitis (H&E,40x).

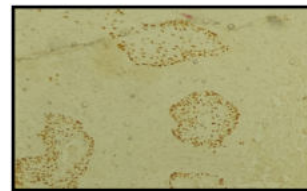


Figure 4: Photomicrograph of Immunohistochemistry for P63 for above case highlights Basal Cell Proliferation (IHC, 10x)

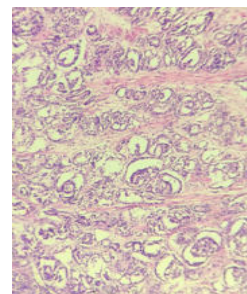


Figure 5: Photomicrograph of Prostatic adenocarcinoma Gleason pattern 4 (H&E, 10x).

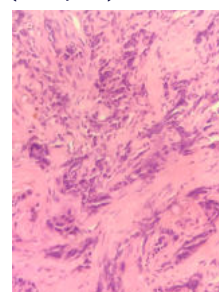


Figure 6: Photomicrograph of Prostatic adenocarcinoma Gleason pattern 5 (H&E 40x).

Discussion

The incidence of prostatic lesions increases with the advancing age, prostatic cancer is the second most common cancer among males. Diagnosis is usually done by microscopic study of transrectal core biopsy and TURP is the commonly performed surgery. In the present study, we had more of 110 (88%) TURP specimens followed by trucut needle biopsy 13(10.4%) and open prostatectomy specimens 2(1.6%). In the present study most of the specimens received were TURP(88%), which were similar to study by Bhatta S et al (88.54%) and R Sujatha et al This could be due to fact that TURP is preferred surgery for nodular hyperplasia of prostate as it is a simple procedure with fewer complications. Most common clinical symptom in the present study was frequency of micturition, second was difficulty in voiding which is similar to findings by Sanjaykumar C et al and RSujathaet al .

Urinary symptoms are secondary to urethral obstruction by enlarged prostatic gland. In the benign proliferative lesions, NPH was seen in the majority of patients. Out of 125 cases NPH was diagnosed in 109(87.2%) of cases and it was the major type of lesion found in this study. Comparison of the frequency of NPH cases in prostate specimens is correlated with Archana C. Buch et al, Chandrahas Ramesh Godbole et al , A. Josephine et al- and Prof. Alaa Ghani Hussain et al study.

NPH is the most common prostatic lesion. Lesions of prostate are extremely common over the age of 50 years. The clinical incidence of this disease is only 8% during the 4th decade, but it reaches 50% in the 5th decade and 75% in the 8th decade . Nodular prostatic hyperplasia (NPH) and carcinoma of the prostate are increasingly frequent with advancing age.

The frequency of all prostate diseases in this study rose steeply from the 6th decade, peaked at the seventh decade of life after which it declined gradually until the 9th decade of life.

Comparison of the age wise distribution of NPH cases in prostate specimens is comparable with Atchyuta. Mathi et al , Sanjaykumar C. Chauhan et al and Bhakti D Deshmukhet al . In present study peak incidence of NPH is in 7th & 8th decade of life, which is similar to above studies.

NPH is commonly found to be associated with prostatitis. This is because the urethra passes through the prostate gland, so when there is hypertrophy of the gland it leads to urinary obstruction of the urethra. The microbes found in the stagnant urine increase the chances of the development of a chronic infection of urinary bladder and prostate.

We also found 1(0.8%) case of NPH with Basal cell hyperplasia which is lower than the study by Rashid N et al . It is a benign mimicker of prostate carcinoma. Mahapatra et al (2019) studied various mimickers of prostate carcinoma also found basal cell hyperplasia to be the most common. Other benign lesions that mimic adenocarcinoma are prostate atrophy, clear cell hyperplasia, cribriform hyperplasia, and very rarely atypical adenomatous hyperplasia. Out of these, we found only single case of NPH with basal cell hyperplasia. It is essential to be aware of these mimickers by the pathologist to avoid overdiagnosis of prostatic carcinoma.

In the present study there were 15(12%) cases of adenocarcinoma out of 125 prostate specimens identified. Frequency of adenocarcinoma is comparable with Harsha Gajjar et al , Nasiru Raheem et al, Rashid N et a and Hirachand S et al . Both Benign Prostatic Hyperplasia and Carcinoma of prostate show parallel rise in incidence with advancing age. In the present study the most common age

group affected was between 60-69 years (7th decade). These findings are similar to above studies.

In the present study PSA values were available in 10 cases of prostatic adenocarcinoma. In which majority of cases 6(60%) of adenocarcinoma had marked elevation of PSA level(>20 ng/ml), followed by 3(30%) cases had PSA value 10.1-20 ng/ml and 1(10%) cases had PSA value 4-10 ng/ml. Comparing PSA levels in benign and adenocarcinoma cases, it was seen that with increasing PSA levels number of benign cases decreases while number of adenocarcinoma cases increases. Serum PSA determination has certain limitations for the diagnosis of prostate cancer. Serum PSA levels are slightly elevated in cases of NPH because of prostate tissue specific protease property of PSA. In a significant number of patients with raised serum PSA, TRUS-guided biopsies showed benign hyperplastic or inflammatory lesions rather than cancer. The proportion of benign lesions was greater in patients with mild or moderate elevations of serum PSA. In contrast, cancer was more frequent in cases with marked elevations in serum PSA The increase in serum PSA depends on differentiation of tumor cells. Gleason grading is one of the most powerful predictors of biological behavior and influential factors used in determining treatment. PSA, when combined with Gleason score and clinical stage, improves the prediction of pathological stage for prostate carcinoma.

In the present study, the most common Gleason score obtained was 7 in 6(40%) out of the total 15 adenocarcinoma cases, followed by Gleason score 8 & 9 comprising each of in 3(20%) cases ,score 7 in 2(13.335) cases and score 10 in 1(6.66%) cases. which is in concordance with studies conducted by Reeti Rajani et al , Prof. Alaa Ghani Hussain et al and Shilpa K Patel et al . The Gleason grading of prostatic carcinoma correlates with tumor aggressiveness, tumor volume, serum PSA levels, prognosis, and influence of the treatment policy.

In the present study Immunohistochemistry was performed on 6 out of 15 cases of prostatic adenocarcinoma & in 1 case of NPH with basal cell hyperplasia. Prostatic adenocarcinoma cases showed negativity for basal cell markers(p63 & HMWCK) whereas ,NPH with basal cell hyperplasia highlighted basal cell proliferation . Immunohistochemical detection of basal cells is widely used to help in the diagnosis or exclusion of prostatic carcinoma in diagnostically challenging cases. When dealing with small foci of atypical glands with some suspicious (but not diagnostic) architectural or cytologic features of prostatic carcinoma, negative basal cell marker staining in the atypical glands would favour a diagnosis of adenocarcinoma.

Conclusion

Histomorphological examination of prostate specimens remains the gold standard in diagnosis and management of prostate cancer though the present study showed that there is a statistically positive correlation between histological diagnosis and serum Prostate specific antigen(PSA) levels . Histomorphological examination is also important to avoid the over diagnosis of the carcinoma whenever there is high index of clinical suspicion specially with increased serum PSA levels. Although the light microscopic findings remain the gold standard for the diagnosis of prostatic carcinoma, difficult cases may benefit from immunohistochemical studies.

The International society of urological pathology(ISUP) 2005 and 2014 modifications of Gleason grading system have profoundly changed the way prostatic carcinoma are graded and managed. It is critical for the pathologist to have an organized methodical approach when considering the morphological features enabling a definitive diagnosis of prostate cancer.

Identification of premalignant lesions and incidental prostate cancer can improve the treatment outcome of patients. It is essential that conventional clinicopathological parameters such as Gleason score are integrated together with imaging findings, and molecular markers to provide better and more accurate prediction of tumor behavior ultimately helping patients take right treatment decision.

The present study concluded that in diagnosing prostatic adenocarcinoma, evaluating a constellation of architectural, cytoplasmic and nuclear features along with ancillary features is essential. Undertaking newer studies with pro-PSA and BPSA (Benign prostate specific antigen) levels are the need of the hour to stop the false alarms in actual cases of nodular hyperplasia of prostate (NPH) presenting with critically raised levels of prostate specific antigen (PSA).

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