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HISTOPATHOLOGICAL STUDY OF PROSTATIC LESIONS AND ITS CORRELATION WITH PROSTATE SPECIFIC ANTIGEN LEVEL AT TERTIARY CARE HOSPITAL.

Pathology

Dr. Charmi Rana 3rd Year Resident, C. U. Shah Medical College And Hospital, Surendranagar.
Dr. Kruti Vadaliya Senior Resident, GMERS Medical College, Morbi.
Dr. Himani Oza Senior Resident, B.J.Medical College, Ahemdabad.
Dr. Nisha G. Raval Professor And Head Of Pathology Department, C. U. Shah Medical College And Hospital, Surendranagar.

ABSTRACT

Introduction: Prostate, an accessory gland of male reproductive system, gives rise to various pathological conditions leading to disease related morbidity in considerable number of males in their late adulthood. The number of cases has continuously increased over the past decades, partly due to the higher life expectancy. Urinary outflow obstruction is common symptom in such patients. Various causes leading to urinary outflow obstruction are prostatic hyperplasia, inflammation, carcinoma prostate & any other disease process leading to prostatic enlargement. In this architectural system, all tumors fall into a 5-grade system representing a continuum of progressively complex morphologies. Another unique aspect of the system is that rather than being assigned a worst grade, a tumor is assigned an average grade comprising the most prevalent and the second most prevalent pattern (Gleason score = primary + secondary pattern).

Aims and Objectives:

- To describe histopathological features of prostatic lesion.
- To determine Prostate Specific Antigen (PSA) level in various lesion.
- To correlate between histopathological findings and PSA level.

Methods: This was a retrospective study conducted in the Department of Pathology, C.U. Shah medical college, Surendranagar on received specimen with prostate lesions over a period of sixteen months. **Results:** Of the total of 500 cases, 472 were from TURP, 16 were from Prostate biopsy and 12 from Whole prostate. 442 lesions were benign, while 54 malignant. The most common age group for benign lesion was 61-70 years. The most common age group for malignancy was 71-80 years. **Conclusions:** Prostatic lesions are more common lesions in elderly patients. Benign lesion are more common. BPH is common in 6th decade, while carcinoma is common in 6th to 8th decade. PSA, is significantly correlated with benign and malignant lesions. We can use PSA as diagnostic tools for diagnosis of various prostatic lesions.

KEYWORDS

Prostate, BPH, Adenocarcinoma, TURP.

INTRODUCTION:

Prostate, an accessory gland of male reproductive system, gives rise to various pathological conditions leading to disease related morbidity in considerable number of males in their late adulthood. [13]

The number of cases has continuously increased over the past decades, partly due to the higher life expectancy. [4] Urinary outflow obstruction is common symptom in such patients. Various causes leading to urinary outflow obstruction are prostatic hyperplasia, inflammation, carcinoma prostate & any other disease process leading to prostatic enlargement.[13] Prostatic carcinoma is more common in India compared to other Asian Countries.[1] Prostate-specific antigen (PSA) is widely used today for the diagnosis and management of prostatic cancer.[12] Epidemiologic studies have also shown that prostate cancer mortality rates are lowest in areas where the rates of distant- stage disease are lowest, and distant-stage disease is lowest in areas with the highest PSA utilization.[11] In 1966, Donald F. Gleason, created the Gleason grading system based on low- power architectural features of prostate cancer.[2,6,11] Later in 1974, the study [7] was expanded to include more patients. With additional experience, Gleason made further refinements to the system in 1974 and 1977. In this architectural system, all tumors fall into a 5-grade system representing a continuum of progressively complex morphologies. Another unique aspect of the system is that rather than being assigned a worst grade, a tumor is assigned an average grade comprising the most prevalent and the second most prevalent pattern (Gleason score = primary + secondary pattern).

AIMS AND OBJECTIVES:

- To describe histopathological features of prostatic lesion.
- To determine Prostate Specific Antigen (PSA) level in various lesion.
- To correlate between histopathological findings and PSA level.

MATERIALS AND METHODS

This is a retrospective study conducted in the Department of Pathology, C.U. Shah medical college, Surendranagar on received specimen with Prostate lesion over a period of sixteen months (January 2024 to April 2025). During this period of time, we have taken 500 cases of prostate for the study. Each tissue was weighed by fine electronic scale. Resected specimens of prostate were preserved in 10% neutral buffered formalin and fixation done, processed for paraffin sectioning and stained by routine haematoxylin and eosin stains. All sections were examined and various histopathological diagnosis were noted.

Inclusion Criteria:

All biopsies of prostatic tissue included, which were received at our department.

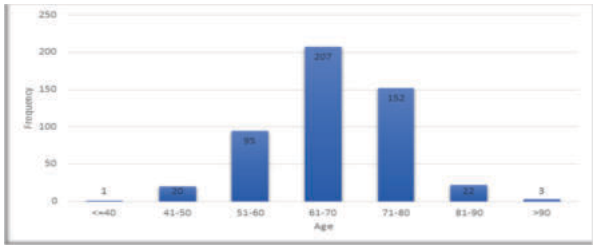
Statistical Analysis

After collecting primary data, statistical analysis was done in the form of percentage and proportion was represented in tables.

OBSERVATION RESULT

Table 1: Age Distribution Of Study Subjects With Prostatic Lesions

Age	Frequency (N)	Percentage (%)
<=40	1	0.2
41-50	20	4
51-60	95	19
61-70	207	41.4
71-80	152	30.4
81-90	22	4.4
>90	3	0.6
Total	**500**	**100**



Graph 1: Age Distribution Of Study Subjects With Prostatic Lesions

In our study, majority of patients with prostatic lesions were aged 61-70years, accounting for 41.4% of the 500 participants. This was followed by those aged 71-80 years (30.4%) and 51-60 years (19%). Smaller proportion observed in <40 years group (0.2%).

Table 2: Types Of Biopsies Received

Type of biopsy	Number
TURP	472 (94.4%)
Trucut	16(3.2%)
Whole prostate	12(2.4%)
Total	**500(100%)**

Table no 2 shows that commonly received biopsy is TURP chips (94.4%) than trucut biopsy (3.2%) and whole prostate (2.4%).

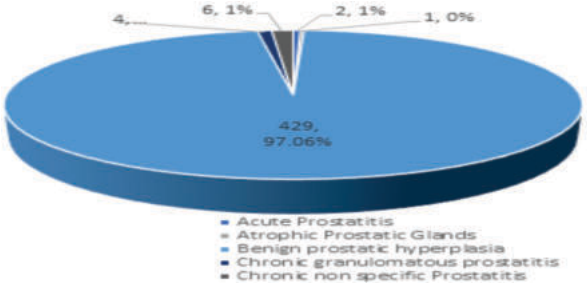
Table 3(A): Distribution Of Lesions According To Their Morphological Diagnosis

Type of lesion	Number	Percentage (%)
Benign	442	88.4
Metastatic	1	0.2
PIN	2	0.4
Malignant	54	10.8
Non conclusive	1	0.2
Total	**500**	**100**

Table no 3(A) show that benign lesions (88.4%) are more common than malignant lesion and PIN.

Table 3(B): Types Of Benign Lesions And Their Distribution

Type of benign lesions	Number of lesions
Acute Prostatitis	2
Atrophic Prostatic Glands	1
Benign prostatic hyperplasia	429
Chronic granulomatous prostatitis	4
Chronic non specific Prostatitis	6
Total	**442**

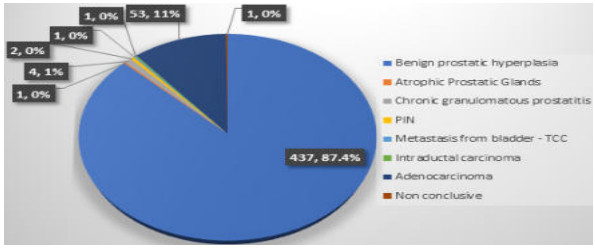


Graph 2: Distribution Of Benign Lesions And Number Of Lesions

In our study, Benign prostatic hyperplasia (97.06%) is the most common finding in benign lesion than Atrophic prostatic glands (0.23%).

Table 3(C): Morphological Distribution Of All Lesion

Type of lesions	Number of lesions
Benign prostatic hyperplasia	437
Atrophic Prostatic Glands	1
Chronic granulomatous prostatitis	4
PIN	2
Metastasis from bladder - TCC	1
Intraductal carcinoma	1
Adenocarcinoma	53
Non conclusive	1
Total	**500**

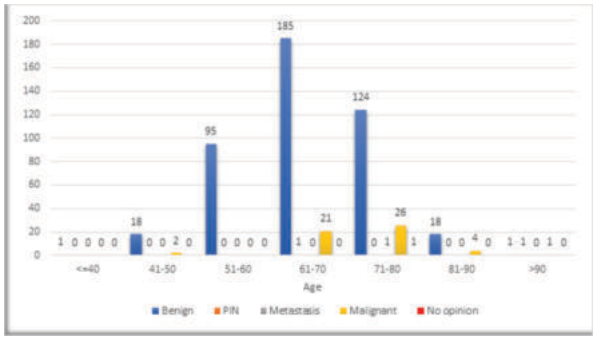


Graph 3: Chart Of Morphological Distribution Of All Lesion

Table no 3(C) and graph 3 show Benign prostatic hyperplasia(87.4%) is the most common type of lesion and Adenocarcinoma is 10.6%.

Table 4(A): Distribution Of Lesion According To Age Group.

Age/ Lesion	Benign	PIN	Metastasis	Malignant	No opinion	Total
<=40	01(0.2%)	0	0	0	0	01(0.2%)
41-50	18(3.6%)	0	0	2(0.4%)	0	20(4%)
51-60	95(19%)	0	0	0	0	95(19%)
61-70	185(37%)	1(0.2%)	0	21(4.2%)	0	207(41.4%)
71-80	124(24.8%)	0	1(0.2%)	26(5.2%)	1(0.2%)	152(30.4%)
81-90	18(3.6%)	0	0	4(0.8%)	0	22(4.4%)
>90	1(0.2%)	1(0.2%)	0	1(0.2%)	0	3(0.6%)
Total	**442(88.4%)**	**2(0.4%)**	**1(0.2%)**	**54(10.8%)**	**1(0.2%)**	**500(100%)**



Graph 4: Distribution Of Age With Type Of Lesion

Chi square test=34.42 with significance level 0.05 and our P value is 0.005 so these variables are significantly correlated with each other.

Table no 4(A) and graph 4 show that benign lesion is common in 6th and 7th decade while malignant lesion is common in 6th, 7th and 8th decade.

Table 4(b): Correlation Between Age And Type Of Lesion

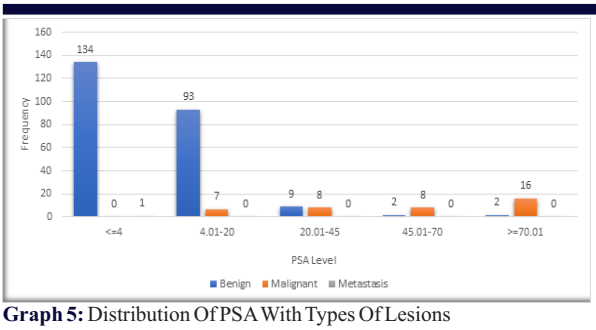
Type of Lesion	Age					
	<=40	41-50	51-60	61-70	71-80	>=81
Benign prostatic hyperplasia	1	17	95	183	122	19
Atrophic Prostatic Glands	0	1	0	0	0	0
Chronic granulomatous prostatitis	0	0	0	2	2	0
PIN	0	0	0	1	0	1
Metastasis from bladder - TCC	0	0	0	0	1	0
Intraductal carcinoma	0	0	0	1	0	0
Adenocarcinoma	0	2	0	20	26	5
Non conclusive	0	0	0	0	1	0
Total	**1**	**20**	**95**	**207**	**152**	**25**

Here our data is qualitative so to know the association between age and type of lesion we conduct non parametric chi square test. So, our chi square test value is 28.12 with significance level 0.05 and our P value is 0.03 which show significant association between these variables.

Table no 4(B) show benign lesions are more common in 6th and 7th decade while carcinomas more common in 6th, 7th and 8th decade.

Table 5(A): Distribution Of PSA With Types Of Lesions

PSA/ Lesion	Benign	Malignant	Metastasis	Total
<=4	134(47.85%)	0	1(0.36%)	135(48.21%)
4.01-20	93(33.21%)	7(2.5%)	0	100(35.71%)
20.01-45	9(3.21%)	8(2.86%)	0	17(6.07%)
45.01-70	2(0.71%)	8(2.86)	0	10(3.57%)
>=70.01	2(0.71%)	16(5.72%)	0	18(6.43%)
Total	**240(85.71%)**	**39(13.96%)**	**1(0.33)**	**280(100%)**



Graph 5: Distribution Of PSA With Types Of Lesions

Chi square is = 163.04 with significance level 0.05 and p value is 0.00001 . So, these variables are significantly correlated with each other's.

Table no 5(A) and graph no 5 show PSA is significantly correlated with type of lesion (e.g. More level of PSA more likely chances of malignant lesion.)

Table 5(B): Corelation Between PSA And Lesions

Type of Lesion	PSA Level			
	<=4	4.01-10	10.01-19	>19
Benign prostatic hyperplasia	95	48	20	7
BPH with prostatitis	4	3	0	0
Chronic granulomatous prostatitis	3	0	0	0
Nodular prostatic hyperplasia	32	18	4	6
PIN	0	1	0	0
Metastasis from bladder - TCC	1	0	0	0
Intraductal carcinoma	0	0	0	1
Adenocarcinoma	0	4	2	31
Total	**135**	**74**	**26**	**45**

Chi square = 156.51 and P = 0.0001 so these variables are significantly correlated with each other's.

Table no 5(B) show there is correlation between PSA and lesions.

Table No 6: Distribution Of Malignant Cases In Gleason Grade Group.

Gleason grade group	Gleason score	No. of cases	Percentage (%)
1	(3+3)6	13	24.53
2	(3+4)7	16	30.19
3	(4+3)7	8	15.09
4	(3+5)8	4	7.55
	(5+3)8	5	9.43
5	(4+5)9	5	9.43
	(5+4)9	1	1.89
	(5+5)10	1	1.89
Total		**53**	**100**

Table No 7: Distribution Of Lesion With Invasion.

Invasion/Lesion	Prostatic acinic adenocarcinoma	Percentage (%)
Perineural	13	68.42
Lymphovascular	2	10.53
perineural and lymphovascular	1	5.26
Perineural and intraneural invasion	2	10.53
Perineural and perivascular invasion	1	5.26
Total	**19**	**100**

Table no 8: Distribution of PSA level with Gleason grade.

PSA/ Gleason grade	1	2	3	4	5
<4-20	3	0	1	2	0
20.01-45	2	3	0	1	2
45.01-70	2	4	0	1	1
>=70.01	0	5	6	3	1
Total	**7**	**12**	**7**	**7**	**4**

DISCUSSION

Benign prostatic hyperplasia (BPH) and adenocarcinoma are common diseases that account for considerable morbidity and mortality of ageing population. [1] It is the 5th cause of cancer in men and 4th in cancer mortality in India.[1]

Obstructive symptoms included hesitancy, weak stream, terminal dribbling and acute or chronic retention of urine. Irritative symptoms included urgency, increased frequency, dysuria and nocturia.

In our study maximum number of adenocarcinoma cases are in 6th, 7th and 8th decade. Bhakti et al[4] also showed maximum number of cases in 8th decade, Jasani et al[9] showed a greater number of cases in 7th decade of life. All studies show cases of malignancy are more common after 60 years as worldwide data.

Table 1: Comparison Of Age Prevalence Of Adenocarcinoma

Authors	Age (Decade)
Jasani et al [9] (2012)	7th decade
Bhakti et al [4] (2014)	8th decade
Present study (2025)	6th-8th decade

TURP chips formed bulk of the specimens in our study, accounting for 94.4% of total specimens (Table 2 of observation and result).

This can be explained by the fact that TURP is the treatment of choice for BPH, as it is the simple procedure with fewer complications as compared to open prostatectomy. In our study, benign lesions are 88.4%, PIN are 0.4%, malignant lesions are 10.8%, metastatic 0.2% and no opinion 0.2%. Deepak et al[5] study shows 77. 64% cases were benign, 1.76% cases were PIN and 20.58% cases were malignant and Banyameen et al[3] showed in their study 75% cases were benign, 10% cases were PIN and 15% cases were malignant. Hirachand et al [8] showed in their study 79.68% cases were benign, 10.15% cases were PIN and 10.15% cases were malignant. All these studies show benign lesion are most common which is correlated with our study.

Table 3: Comparison Of Incidence Of BPH

Authors	Number of cases	Percentage
Jasani et al [9] (2012)	102/180	56%
Deepak et al [5] (2016)	125/170	73.52%
Hirachand et al [8] (2017)	95/128	74.21%
Present study (2025)	224/500	88.4%

In all the studies shows BPH lesion's percentage is greater than 50% which shows its higher incidence.

Table 4: Comparison Of Age Prevalence For BPH

	Age (Decade)
Jasani et al [9] (2012)	6th decade
Bhakti et al [4] (2014)	7th decade
Hirachand et al [8] (2017)	7th decade
Present study (2025)	6th decade

Worldwide about three quarters of all cases occur in men aged 65 years or more[4] Adenocarcinoma accounted for 10.8% cases in our study.

Bhakti et al [4] had 7.96% of adenocarcinoma cases and Jasani et al[9] has 32% of adenocarcinoma cases.

Table 5: Incidence Of Adenocarcinoma

Authors	Number of cases	Incidence
Jasani et al[9] (2012)	58/180	32%
Bhakti et al[4] (2014)	18/226	7.96%
Deepak et al[5] (2016)	35/170	20.58
Hirachand et al[8] (2017)	13/128	10.15
Present study (2025)	54/500	10.8%

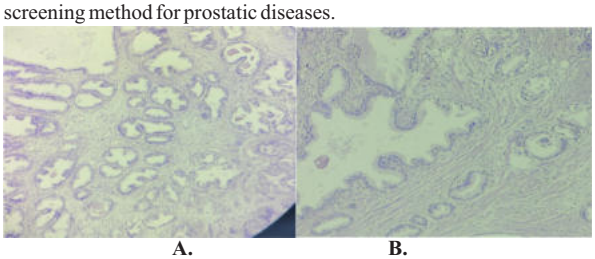
PSA is a good marker for prostatic carcinoma, a normal PSA level (0-4 ng/ml) does not exclude diagnosis of carcinoma.

Table 6: Benign And Malignant Prostatic Lesion: Comparison Between PSA Levels With Other Studies

Lesion	Benign Prostatic Hyperplasia				Malignant prostatic lesions			
PSA value (ng/ml)	Jasani et al.	Chandanwale et al.	Bhakti et al.	Present study	Jasani et al.	Chandanwale et al.	Bhakti et al.	Present study
<4	67.30 %	32.08 %	23.40 %	55.84 %	1.70%	0%	0%	2.5%
4.01-10	27.40 %	49.06 %	69.02 %	29.17 %	12%	17.65 %	22.22 %	10%

>10	8.80%	18.86 %	7.04%	14.99 %	86.20 %	82.35 %	77.78 %	87.5 %

In our study serum PSA is significantly correlated with type of lesions as serum PSA level increase in malignancy. So, it can be used as screening method for prostatic diseases.



A. B.

Fig:1 Nodular Prostatic Hyperplasia. Note the overall nodular configuration and papillary infoldings. [H & E stain-A. 4X and B.10X]

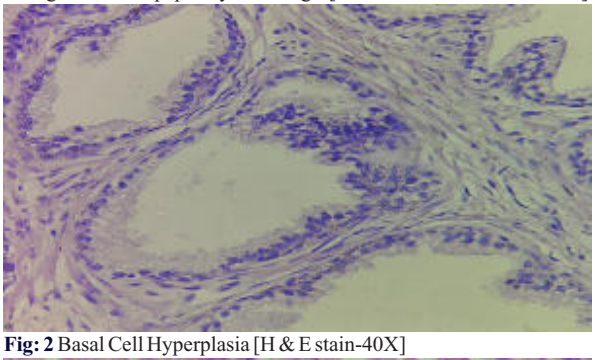


Fig: 2 Basal Cell Hyperplasia [H & E stain-40X]

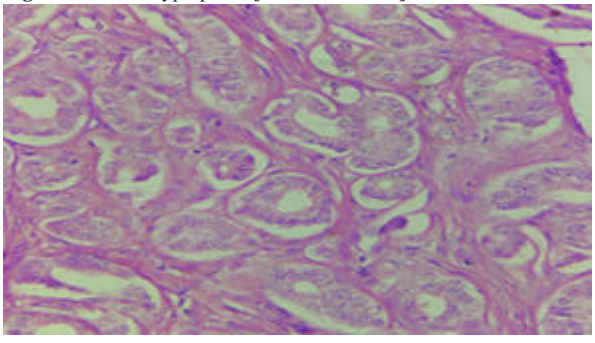
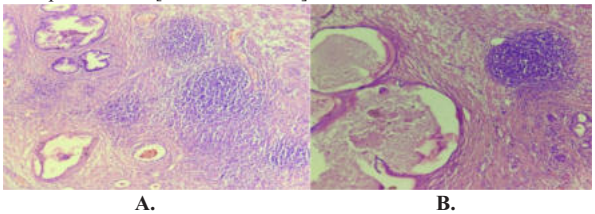


Fig: 3 Prostatic adenocarcinoma; showing marked nuclear enlargement with prominent nucleoli. Few nuclei show presence of multiple nucleoli. [H & E stain-40X]



A. B.

Fig: 5 Benign Prostatic Hyperplasia; showing lymphoid Aggregates. [H & E stain-10X]

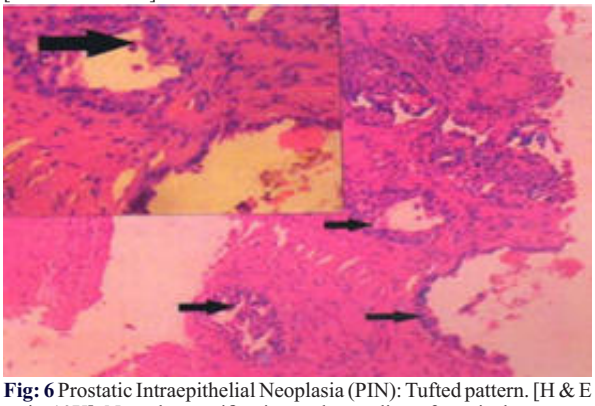


Fig: 6 Prostatic Intraepithelial Neoplasia (PIN): Tufted pattern. [H & E stain-10X]. Note the stratification and crowding of atypical secretory cells. Prominent nucleoli are seen. (Inset- H & E stain - 40X)

CONCLUSION

This study was conducted at the Pathology Department of C.U.Shah Medical college and Hospital, Surendranagar. Study shows that 88.4% patients are diagnosed with benign lesion, 10.8% patients are diagnosed with malignant lesion, 0.2% patients are diagnosed with metastatic condition and only 0.4% patients of PIN. Out of 500 patients, 280 patients PSA levels are available which shows 51.79% patients PSA level is greater than 4.

BPH is common in 6th decade, while carcinoma is common in 6th to 8th decade.

According to the age of the patient and clinical symptoms of lower urinary tract, further examination, and investigations like P/R digital examination, ultrasonographic study and serum PSA levels should be done.

PSA, is significantly correlated with benign and malignant lesions. We can use PSA as diagnostic tools for diagnosis of various prostatic lesions.

Considering the condition of the patient, further needle biopsy or TURP can be performed.

Histopathological study plays an very important role in diagnosis, treatment, and prognosis of the patient.

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