Section: Pathology

Original Research Article

HISTOMORPHOLOGICAL STUDY OF VARIOUS PROSTATIC LESIONS IN ASSOCIATION WITH SERUM PROSTATE SPECIFIC ANTIGEN LEVELS

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ABSTRACT

Background: Prostatic lesions range from benign proliferative disorders to malignant neoplasms, with nodular hyperplasia and adenocarcinoma being most common. Serum prostate-specific antigen (PSA) serves as an adjunct marker but requires histological confirmation for definitive diagnosis. **Materials and Methods:** 65 patients undergoing prostate biopsy or TURP for suspected pathology were included. Tissue samples were processed, stained, and categorized as benign, premalignant, or malignant. Gleason grading was applied to adenocarcinoma. Serum PSA was estimated using immunoassay methods. Study Design: Prospective observational study. Study Setting: Department of Pathology, D.Y. Patil Medical College, Kolhapur, conducted between 2022 and 2024. **Result:** The mean age of patients was 65.72 ± 8.05 years, with most cases in the 61–70year group (40%). Nodular hyperplasia was the most frequent lesion (60%), followed by NHP with chronic prostatitis (16.92%), HGPIN (9.23%), and NHP with granulomatous prostatitis (4.62%). Malignancies included adenocarcinoma (7.69%) and urothelial carcinoma with HGPIN and NHP (1.54%). Among adenocarcinomas, 60% had Gleason score 5+4=9, while 20% each had scores of 4+3=7 and 3+5=8. Mean PSA levels were 3.74 ng/mL in NHP, 10.55 ng/mL in NHP with chronic prostatitis, 4.0 ng/mL in granulomatous prostatitis, 14.02 ng/mL in HGPIN, 86.17 ng/mL in adenocarcinoma, and 24.1 ng/mL in urothelial carcinoma. Overall mean PSA was 12.51 ± 22.39 ng/mL. Malignancies were more frequent above 60 years. **Conclusion:** Benign nodular hyperplasia predominated, but high-grade adenocarcinoma was also observed. Serum PSA levels correlated with disease severity, rising from benign to premalignant and malignant lesions. PSA is a valuable adjunct but histopathology remains the diagnostic gold standard.

INTRODUCTION

For Indian males, prostatic lesions are a serious health issue. The male prostatic gland, located at the bladder's neck, is the biggest accessory gland.[1]

Nodular hyperplasia of the prostate (NHP), the most prevalent of prostatic diseases, is frequently encountered in older men.

The second most frequent malignancy to be clinically identified is prostate cancer, which is also the fifth most frequent cause of cancerrelated mortality in males globally.

Prostate cancer is currently the second most common location of cancer among men in urban India, making it a significant and increasing public health concern.[2,3]

It is the most prevalent malignant tumor in males over 65. Prostate cancer prevalence increases with age and can reach 60% in men when they are 80 years old.[4,5]

Several factors, including age, race, family history, hormone levels, and environmental influences are suspected to play a role in pathogenesis. Because of the location of prostate gland at bladder neck, enlargement of the gland leads to problems related to urinary obstruction.[6-8]

Prostate cancer screening and diagnosis are currently mostly based on prostate-specific antigen (PSA) values.PSA, a glycoprotein is produced by the epithelialcells of prostatic tissue with normal levels of 0-4ng/ml. The secretory cells in the prostatic ducts and acini generate PSA, a serine protease belonging to the kallikrein family.

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PSA levels are influenced by the patient's ageand prostatic size. In healthy elderly male with no evidenceof prostatic cancer, PSA increases by 3.2% per year. PSAvalue varies not only with advancing age but also withdifferent geographical areas.[1,11]

Age-wise Distribution of Serum PSA Levels,[11] Men aged 50-59: Normal PSA level: 0 to 3.5 ng/mL, Men aged 60-69: Normal PSA level: 0 to 4.5 ng/mL, Men aged 70-79: Normal PSA level: 0 to 6.5 ng/mL, Men aged 80 and older: Normal PSA level: Can be higher, but specific thresholds are often individualized due to increased variability.

Normal prostate architecture prevents PSA from leaving the gland and only permits a small amount to enter the bloodstream, allowing for serum detection. A strong correlation exists between serum PSA levels and the risk of prostate cancer.[1]

Due to PSA leakage into the blood, which is abundantly generated by prostatic cancer cells and occurs 10 years or more before clinical disease, it may be increased in individuals with prostate cancer. Along with digital rectal examination (DRE), PSA has been widely used during the past 50 years as a marker in the detection of prostate cancer.

The American Cancer Society has advised DRE and PSA testing for yearly check-ups of males 50 years of age or older since 1993, leading to early identification and treatment.[9]

The necessity and frequency of PSA screening should be individualized based on a patient's overall health, life expectancy, and risk factors for prostate cancer.[9]

Both benign and malignant pathologies can cause an increase in total serum PSA levels, but the chances of finding malignancy increases with rising values of total serum PSA levels.

PSA levels also seem to be higher in situations like NHP, prostatitis, or external prostate interventions through biking or catheterization.

Therefore, serum PSA is frequently utilized as a screening technique to assess the necessity for biopsy in addition to characteristics such as growing age, race, family history, and digital rectal examination results.[1,10,11]

Therefore, the present study was undertaken to study the association between histomorphological findings of various prostatic lesions and serum PSA levels.

MATERIALS AND METHODS

The study included all the specimens and biopsies of various prostatic lesions, which were received at the Department of Pathology between 2022 and 2024.Biopsy samples were processed for Formalin-Fixation and Paraffin-Embedded (FFPE) technique and staining was routinely done with Haematoxylin and Eosin (H & E) stain. After informed consent, clinical information such as patient name, age, symptoms, PSA values as well as clinical diagnosis made provisionally were collected from history sheets and inpatient department forms. Age wise distribution of prostatic lesions, Histomorphological details, histological diagnosis, Gleason score and grade and serum PSA levels data were statistically analyzed.

Method: Histopathological examination was performed on TURP Chips, prostatectomy specimens and core needle biopsies of prostate and histopathological diagnosis in association with S.PSA levels were made. The specimens received from the Surgical Department were weighed, measured in 3 dimensions and the measurements were noted then fixed overnight in 10% buffered formalin. Prostatectomy specimens were weighed and measured in three dimensions, then cut serially (at 4-5 mm thickness) before fixing. The location, size, color, distance from all the surgical resected margins of the lesion were noted. After fixation, sections were taken from all the resected margins and sections from each 1 cm of the maximum diameter of the lesion were submitted.

For TURP Chips if the entire tissue is 10g or less, all the tissue was taken in four cassettes. For specimens more than 10g, the initial 10g were submitted, and with one cassette for every additional 5g.

For needle biopsies received number of cores were counted and length of the longest and smallest cores were noted. And all the cores were submitted.

Paraffin embedded blocks were prepared and sectioned using microtome and stained with routine Hematoxylin and Eosin. Then detailed light microscopy study was done and gross features, microscopic findings and final diagnosis were noted in a proforma.

RESULTS

Majority of the patients belonged to the age group of 61-70 years, accounting for 40.0%, followed by 51-60 years (30.77%), 71-80 years (27.69%), with the least being >80 years (1.54%). The mean age of patients was found to be 65.72 years, which was found to be statistically significant.

Table 1: distribution of patients as per their age

Age group	Frequency	Percentage	Mean age
51-60	20	30.77%	56.95 ± 2.62
61-70	26	40.0%	64.85 ± 2.87
71-80	18	27.69%	75.83 ± 2.99
>80	1	1.54%	82.0 ± 0
TOTAL	65	100%	65.72 ± 8.05

The p-value is < .00001. The result is significant at p < .05.

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Table 2: distribution of patients as per their histological diagnosis

Histological diagnosis	Frequency	Percentage
Adenoca (acinar type)	5	7.69%
high-grade prostatic intraepithelial neoplasia (HGPIN)	6	9.23%
NHP	39	60.0%
NHP with chronic prostatitis	11	16.92%
NHP with granulomatous prostatitis	3	4.62%
Urothelial carcinoma with HGPIN with NHP	1	1.54%
TOTAL	65	100%

NHP was the most common histological diagnosis amongst 39 (60.0%) patients, followed by NHP with chronic prostatitis in 11 (16.92%), high-grade prostatic intraepithelial neoplasia (HGPIN) in 6(9.23%), Adenoca (acinar type) in 5 (7.69%) and Urothelial carcinoma with HGPIN with NHP in 1 (1.54%).

Table 3: distribution of patients as per their histomorphological findings

Histomorphological findings	Frequency	Percentage
Low grade urothelial carcinoma invading prostatic tissue with HGPIN with NHP	1	1.54%
infiltrative glands, single-cell layer, nuclear atypia, mitosis, central necrosis and adjacent PIN	3	4.62%
infiltrative glands, single-cell layer, nuclear atypia, mitosis, central necrosis, adjacent PIN, and crystalloids	1	1.54%
infiltrative glands, single-cell layer, nuclear atypia, mitosis, central necrosis, adjacent PIN, and papillary structure	1	1.54%
Nuclear atypia, Single cell layer at places	6	9.23%
Papillary infoldings, Cystically dilated glands, Basal cells, Granuloma, Adenosis	3	4.62%
Papillary infoldings, Cystically dilated glands, Corpora Amylacea, basal cell hyperplasia at places	39	60.0%
Papillary infoldings, Cystically dilated glands, Corpora Amylacea, basal cell hyperplasia, mononuclear cell infiltrates	11	16.91%
TOTAL	65	100%

NHP was the most common histological diagnosis amongst 39 (60.0%) patients, followed by NHP with chronic prostatitis in 11 (16.92%), high-grade prostatic intraepithelial neoplasia (HGPIN) in 6(9.23%), Adenoca (acinar type) in 5 (7.69%) and Urothelial carcinoma with HGPIN with NHP in 1 (1.54%).

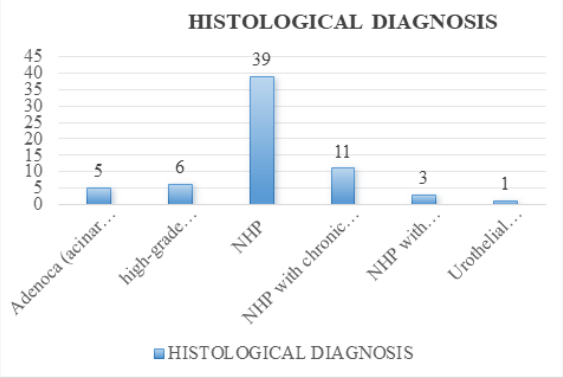

Figure 1: distribution of patients as per their histological diagnosis

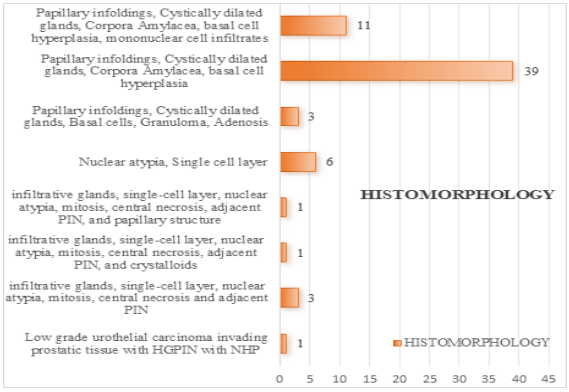

Figure 2: distribution of patients as per their histomorphological findings.

Table 4: distribution of patients as per their grading of gleasons score

Gleasons score	Frequency	Gleasons grading
4+3=7	1 (20.0%)	3
3+5=8	1 (20.0%)	4
5+4=9	3 (60.0%)	5
	5 (100%)	

Majority of the patients (3 out of 5) had a Gleason's score of 9 which was graded as grade 5, with only 1 patient each with Gleason's score of 7 & 8 graded 3 & 4 respectively.

Table 5: mean serum psa levels in various histological diagnosis

Type of lesions	Histological diagnosis	Frequency	Mean serum psa levels
MALIGNANT (6)	Urothelial carcinoma..with HGPIN with NHP	1	24.1 ± 0.0
	Adenoca (acinar type)	5	86.17 ± 12.58
PREMALIGNANT (6)	High-grade prostatic intraepithelial neoplasia (HGPIN)	6	14.02 ± 6.71
BENIGN (53)	NHP	39	3.74 ± 2.82
	NHP with chronic prostatitis	11	10.55 ± 6.22
	NHP with granulomatous prostatitis	3	4.0 ± 1.56
	TOTAL	65	12.51 ± 22.39

The p-value is < .00001. The result is significant at p < .05.

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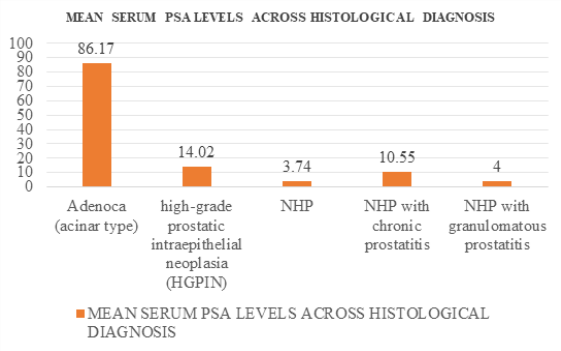
The mean PSA levels were found to be 12.51. Amongst the 53 benign, 6 pre-malignant & 6 malignant lesions, the mean serum PSA levels were found to be 6.10, 14.02 & 55.13 respectively.
On further subclassification, the mean PSA levels were found to be highest to lowest whereinAdenoca (acinar type), Urothelial carcinoma with HGPIN with NHP, high-grade prostatic intraepithelial neoplasia (HGPIN), NHP with chronic prostatitis, NHP with granulomatous prostatitis & NHP to be 86.17, 24.1, 14.02, 10.55, 4.0 & 3.74 respectively. It was found to be statistically significant.



Graph 4: mean serum psa levels in various histological diagnosis

The maximum numbers of affected patients were in the age group of 61-70 years across, Adenoca (acinar type), Urothelial carcinoma with HGPIN with NHP, high-grade prostatic intraepithelial neoplasia (HGPIN), NHP with chronic prostatitis, NHP with granulomatous prostatitis & NHP, followed by 71-80 years in Adenoca (acinar type), high-grade prostatic intraepithelial neoplasia (HGPIN) & NHP with chronic prostatitis; whereas it was 51-60 in NHP with chronic prostatitis & NHP with granulomatous prostatitis.

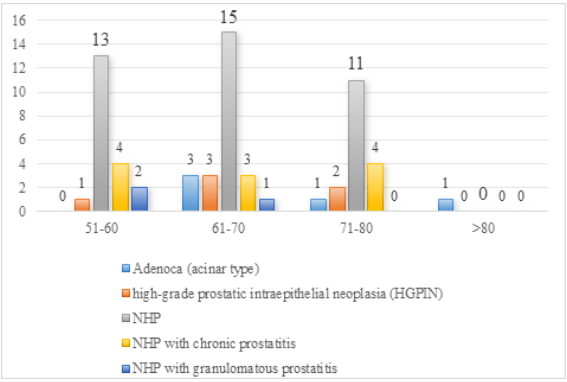


Figure 5: age wise distribution of various prostatic lesions.

Table 6: age wise distribution of various prostatic lesions

AGE GROUP	Adenoca (acinar type)	high-grade prostatic intraepithelial neoplasia (HGPIN)	NHP	NHP with chronic prostatitis	NHP with granulomatous prostatitis	Urothelial ca with HGPIN with NHP
51-60	0	1	13	4	2	0
61-70	3	3	15	3	1	1
71-80	1	2	11	4	0	0
>80	1	0	0	0	0	0
TOTAL	5	6	39	11	3	1

Table 7: distribution according to age and diagnosis of prostatic lesions

Age (years)	Diagnosis of prostatic lesions			Total (%)
	Benign (%)	Premalignant (%)	Malignant (%)	
51-60	14 (26.92%)	2 (33.33%)	4 (57.14%)	20 (30.77%)
61-70	23 (44.23%)	2 (33.33%)	1 (14.29%)	26 (40.0%)
71-80	15 (28.85%)	2(33.34%)	1 (14.29%)	18 (27.69%)
>80	0 (0.0%)	0 (0.0%)	1 (14.28%)	1 (1.54%)
Total	52 (100.0%)	6 (100.0%)	7 (100.0%)	65 (100%)

Amongst benign type of lesions, most commonly affected age group was 61-70 years accounting to 23 (44.23%), followed by 71-80 years with 15(28.85%).
Amongst pre-malignant type of lesions, all age groups were equally affected with 2 patients in each group, except with >80years age group.
Amongst malignant type of lesions, most commonly affected age group was 51-60 years accounting to 4 (57.14%), followed by 1 patient each across in each age group.

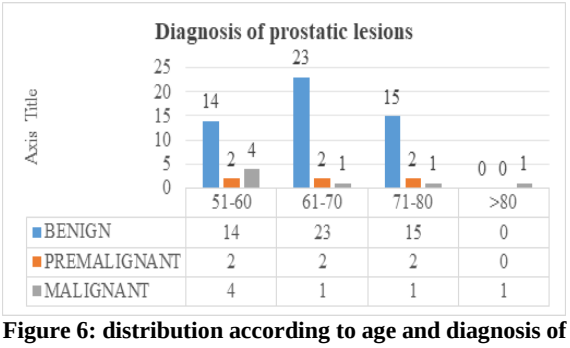


Figure 6: distribution according to age and diagnosis of prostatic lesions

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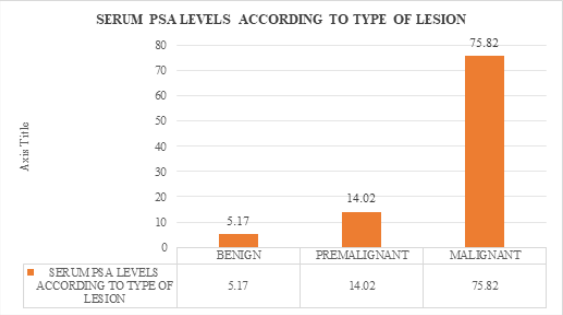
Table 8: comparison of serum psa levels according to type of lesions

Prostatic lesions	Serum PSA levels (ng/ml)		P value
	Mean	SD	
Benign	5.17	4.60	<0.0001
Pre-malignant	14.02	6.71	
Malignant	75.82	27.72	

The mean PSA level in benign, pre-malignant & malignant type of lesions was found to be 5.17, 14.02 & 75.82 respectively.



Graph 7: comparison of serum psa levels according to type of lesions

DISCUSSION

Prostate is a male reproductive accessory organ which can undergo changes at a rapid rate after the age of 50 years, leading to numerous pathological conditions. Amongst the various pathological conditions, the most commonly anticipated conditions are benign prostatic hyperplasia (BPH), carcinoma prostate, and prostatitis.[12,13]

Globally, Nodular hyperplasia of prostate (NHP) affects over 200 million men, predominantly those over the age of 50. Additionally, prostate cancer is the second most common malignancy in men and ranks as the fifth leading cause of cancer-related deaths.[3,16]

Research indicates that prostate carcinoma is the most common non-skin cancer in the Western world and the second leading cause of cancer-related deaths among men.[14,17]

In our country - India, there exists a fluctuation in the ranking of carcinoma of prostate between the 2nd to the 10th rank across metro cities as per the national cancer registry.[18,19]

In 1979, Wang et al. identified prostate-specific antigen (PSA) as a significant marker for screening and monitoring prostate malignancies. Additionally, the American Cancer Society recommends annual digital rectal examinations and PSA screening for men aged 50 and above.[20]

Irrespective of the various prostatic pathologies, it is Nodular hyperplasia of prostate (NHP), which is the most common pathology, which is trailed by other prostatic pathologies.[1]

In our study, majority of the patients belonged to the age group of 61-70 years, accounting for 40.0%, followed by 51-60 years (30.77%), 71-80 years (27.69%), with the least being >80 years (1.54%). The mean age of patients was found to be 65.72 years, which was found to be statistically significant.

Deshpande NS et al. reported similar findings, noting that the most commonly affected age group was between 60-70 years, accounting for 46.03% of cases, with a mean age at diagnosis of 67.84 years.[1] Our results were also in agreement with Chauhan et al,[2] reporting 65.5 years, Lakhey et al,[15] reporting it to be 67.61 years & Vani et al,[21] reporting 63.9 years.

Similarly, Shailaja Prabhala et al,[22] reported the mean age of prostatic carcinoma to be 66.5 years. However, Sihag and Laddha et al,[3] reported a slightly higher mean age of 69.7, but reported similar results in terms of affected age group, which is 61-70 years, followed by 71-80years age.

We classified the 65 prostatic lesions into three major categories as benign, pre-malignant and malignant lesion, wherein we recorded 53 benign & 6 pre-malignant & malignant lesions each.

On further, subcategorization we recorded NHP as the most common histological diagnosis amongst 39 (60.0%) patients, followed by NHP with chronic prostatitis in 11 (16.92%), high-grade prostatic intraepithelial neoplasia (HGPIN) in 6 (9.23%), Adenoca (acinar type) in 5 (7.69%) and Urothelial carcinoma with HGPIN with NHP in 1 (1.54%).

Kavita Kumari et al. reported that among a total of 110 patients, benign lesions accounted for 63.6% of cases, malignancies for 29.1%, and prostatic intraepithelial neoplasms for 7.3%.[23]

Deshpande NS et al. reported 54 (85.71%) benign lesions and 8 (12.70%) malignant lesions, indicating a higher prevalence of benign over malignant lesions. They observed 38 (60.32%) cases of benign prostatic hyperplasia (BPH), 14 (22.22%) cases of BPH with prostatitis, and a single case each (1.59%) of BPH with granulomatous prostatitis and basal cell hyperplasia. Among the malignant lesions, there were 7 (11.11%) cases of prostate cancer (PCa), one (1.59%) case of metastatic transitional cell carcinoma (TCC) of the bladder, and one (1.59%) case of high-grade prostatic intraepithelial neoplasia (HGPIN).[1]

Wadgaonkar et al. reported similar findings, with their study showing 83.75% cases of BPH with and without prostatitis, 13.75% cases of prostate cancer (PCa), and 1.25% each of metastatic transitional cell carcinoma (TCC) and prostatic intraepithelial neoplasia (PIN). These results are consistent with the studies by Partibhan et al., Chauhan et al., Lakhey et al., and Vani et al.[2,13,20,21]

On further correlating the type of histological diagnosis with the most commonly affected age group, we found the… maximum… numbers of affected …patients were… in the age …group of

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…61-70 …years across, …Adenoca …(acinar type), Urothelial carcinoma with HGPIN with NHP, high-grade prostatic intraepithelial neoplasia (HGPIN), NHP with chronic prostatitis…, NHP with granulomatous prostatitis & NHP, followed by 71-80 years in Adenoca (acinar type), …high-grade …prostatic …intraepithelial neoplasia …(HGPIN) &…NHP with …chronic prostatitis; …whereas it was 51-60 in NHP with chronic prostatitis & NHP with granulomatous prostatitis. Herein, benign & pre-malignant conditions were more common in 61–70 year, but in malignant cases 51–60years age group individuals were more commonly affected.

Amongst benign type of lesions, most commonly affected age group was 61-70 years accounting to 23 (44.23%), followed by 71-80 years with 15 (28.85%). Amongst pre-malignant type of lesions, all age groups were equally affected with 2 patients in each group, except with >80years age group.

Amongst malignant type of lesions, most commonly affected age group was 51-60 years accounting to 4 (57.14%), followed by 1 patient each across in each age group.

Almost similar results were obtained by …Mishra et al., who in …their study reported the highest number of …BPH patients to be …19 …(45.23%) cases in the age group 61–70 years, …followed by in ……the age group 71–80 years…. Prostatitis… in 61–70-year age group with 5 …(55.55%) & PIN also in 61–70-year age constituting 4 (57.3%) cases. However, carcinoma cases… were highly prevalent in the …age group of 71–80 years having… 4 (57.15%) cases and 61–70-year age group has 3 cases (42.85%).[12]

Kavita Kumari et al,[23] also agreed that benign… prostatic hyperplasia… patients …ranged between 60-69 years …with a… mean age was 67.4, whereas prostatic intraepithelial… neoplasm and malignancy… were common… in 8th decade… with mean age 69.25 …and 68.3 years respectively.

Also, Jasani et al,[24] in 2012 and Albashari et al,[25] in 2014 reported 7th& 8th decade as the most… common age… group for… malignancies.

All studies reported …61-70 years to be most common age for benign lesions; however, in case of malignant lesions, we found the most commonly affected age group to be 51-60 years of …age group in contrast to 71-80 years of age group.

A histo-morphological assessment of our study subjects showed the most common findings of NHP as Papillary infoldings, Cystically dilated glands, Corpora Amylacea, basal cell hyperplasia at places in 39 (60.0%) patients; & further there was also presence of mononuclear cell infiltrates in 11 (16.91%) patients of NHP with chronic prostatitis, in addition to the most common findings. In 6 of HGPIN patients we found Nuclear atypia with single cell layer at places.

Further, infiltrative glands, single-cell layer, nuclear atypia, mitosis, central necrosis and adjacent PIN noted in 5 patients of adenoca (acinar type) & Papillary infoldings, Cystically dilated glands, Basal cells, Granulomas, Adenosis was recorded in 3 patients of NHP with granulomatous prostatitis.

We also reported one case of Urothelial carcinoma invading prostatic tissue with dysplastic epithelium and infiltrating tumour composed of urothelial cells with high grade prostatic intraepithelial neoplasia with NHP.

We also used Gleason's score & grading as it is one of the most powerful predictors of biological behavior and influential factors used in determining treatment.[3]

In our study, we recorded that majority of the patients (3 out of 5) had a Gleason's score of 9 which was graded as grade 5, with only 1 patient each with Gleason's score of (4+3) & (3+5) graded 3 & 4 respectively.

A study done by Shailaja Prabhala et al,[22] reported that the majority of the patients have a Gleason's score of (3+4) amongst 63.3% patients, followed by (3+3), (5+4) & (5+5) in 2 patients each respectively.

Prostate-specific antigen is the most critically clinical valuable……biochemical marker… of the prostate,…as it is made by… prostate & can be used as a definite marker for prostatic tissue.[26] Therefore, it has been highly advocated & been used over the years as an effective marker of prostate levels, to determine any underlying changes at the initial level; even before the need of any surgical intervention including biopsy.

Prostate-…specific antigen (PSA) is a …serine… protease in the kallikrein family, made by …secretory cells within the prostatic ducts and acini. Normal prostate architecture keeps PSA… confined to the… gland while allowing only fraction to be leaked into the …circulation which… enables its… detection in serum. PSA circulates in free and …complexed form. …Complexed forms… are bound to protease… inhibitors. …Therefore, it is clear that Serum PSA levels strongly correlate with the risk of prostate cancer.[1,27]

Normal… levels of PSA… is usually less than… 4 ng/ml with variation… as per… the age of the patient, …where…in levels <4 ng/ml in men of 60 years or less and levels < 6.5 ng/ml in men aged 60-…80 years… are normal.[28]

For… variations, disruption… of the normal… architecture of the prostate causing diffusion… of protease into the microvascular circulation is responsible, where…in there is an elevation in the prostate-specific antigen levels.[3]

Serum PSA is a widely used screening tool to assess the need for biopsy in prostate conditions. Elevated PSA levels can also occur in Nodular hyperplasia of prostate (NHP), prostatitis, or due to external factors such as bicycling or catheterization.[1]

On correlating the mean PSA level amongst the histological diagnosis in our study, we found… that amongst the 53 benign, … 6 pre-malignant & 6 malignant lesions, the mean serum PSA levels were found to be 6.10, 14.02 & 55.13 respectively. The mean… PSA levels… were… found to… be 12.51.

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Deshpande NS et al.,[1] recorded the mean… PSA value… for benign lesions was 6.57 ng/ml &… Mean… PSA for… PCa cases were … 35.05 ng/ml. Chauhan et al,[2] recorded the mean PSA for PCa to be 59.65, whereas Akhter et al,[29] reported it to be 703.95.

Mishra et al., in their study reported only… 6.98% (3) benign cases had a normal level… of serum PSA (10 ng/mL. However, … in serum PSA levels… of 4–10 ng/mL, there was… overlapping of… 86.04% (37) benign… cases, 85.72% (6)… cases of PIN, and 28.53% (2)… cases of … carcinoma

On further sub-classification, the mean PSA levels were found to be highest to lowest whereinAdenoca (acinar type), Urothelial carcinoma with HGPIN with NHP, high-grade prostatic intraepithelial neoplasia (HGPIN), NHP with chronic prostatitis, NHP with granulomatous prostatitis & NHP to be 86.17, 24.1, 14.02, 10.55, 4.0 & 3.74 respectively. It was found… to be statistically… significant in… our study

Adenocarcinoma was the most common type of carcinoma, which is also seen in agreement with the study results of the Kavita Kumari et al.[23]

To exclude other causes of elevated PSA, additional PSA derivatives such as PSA density (PSA divided by gland volume), PSA doubling time, PSA velocity (rate of change of PSA over time), and age- and race-specific PSA reference ranges are commonly employed to enhance specificity.[1]

Thus, the American Cancer Society recommends annual digital rectal examination and PSA screening for men aged 50 years and older. However, PSA's limitation lies in its low specificity for detecting prostate cancer. Nevertheless, it remains one of the convenient, cost-effective, and non-invasive methods for screening.[1]

Even though we carried out the study with a sufficient sample size, yet ours was a single center study with limited assessment parameters. Therefore, to understand the properties & effectiveness of PSA as a diagnostic as well as a prognostic marker, we recommend large scale multi-centric single database study to be carried out in the future. For… satisfactory… management of patient, a high… degree of the… awareness of the advances along… with team… approach has… become… imperative.

CONCLUSION

The study found malignant lesions to be most common in 61-70years age group, whereas it was 51-60 years. We also noted an exponential increase in the serum PSA levels in carcinoma cases in comparison to other types of lesions which shows the use of serum PSA as a diagnostic test of choice to determine the presence of cancer of the prostate. The strong correlation between serum PSA levels and lesion severity underscores the clinical utility of serum PSA in the diagnosis and management of prostatic diseases. Future research should focus on longitudinal studies to further elucidate the predictive value of serum PSA and histopathological features in the progression of prostatic diseases.

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