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Interpretation of Prostatic Biopsy at a tertiary care centre

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ABSTRACT

Introduction: Worldwide prostatic carcinoma is the second most frequently diagnosed cancer and the sixth leading cause of cancer death in males. Prostate-specific antigen (PSA), digital rectal examination, and transrectal ultrasound are the tools most commonly used to screen for prostate cancer. Prostatic biopsy is most often preceded by abnormalities found on digital rectal examination (DRE) or serum prostate specific antigen (S.PSA) elevation. This study was planned to know proportion of malignant and benign lesions in histopathologic examination for prostatic lesions in patient who attend OPD/IPD and to analyze the usefulness of serum PSA & ultrasound examination by histopathological confirmation.

Methods: Patients visited to urology department with urinary incontinence and other complaints were evaluated which includes clinical history, signs and symptoms. Rectal examination of patients was done. Serum PSA level and prostatic biopsy were sent of those who were suspected for prostatic disease. Prostate biopsy was obtained by using any one of the following method 1.Transurethral resection biopsy 2. Transrectal biopsy Trucut biopsy.

Results: Out of 300 cases of prostatic biopsy 265 (88.33%) are benign and 35 (11.66%) cases are malignant lesions. Out of 300 cases, 191 (63.66%) are pure benign prostatic hyperplasia, 48(16%) are BPH with chronic prostatitis and 11(3.66%) are BPH with severe prostatitis. Out of 35 cases of prostatic carcinoma 33 (94.28%) cases are adenocarcinoma and 2 cases (5.71%) are transitional cell carcinoma. Out of 262 cases with clinically benign lesions, 258 cases proved benign histopathologically but 4 cases (1.52%) are diagnose malignant. 151 patients have S.PSA less than 4 ng/ml, out of 151, 149 turned to be benign on histopathological examination. 52 patient have S.PSA above 10 ng/ml, out of these 52 cases, 29 have malignancy in HPE examination. Out of 278 cases diagnosed as benign isoechoic by ultra sonography 262 cases have benign lesion on histologic diagnosis and 16 have malignant lesion. Out of 22 cases diagnosed as malignant (hypoechoic asymmetrical) by ultrasonographicaly 19 proved malignant histologically.

Conclusion: The results of this study indicate that transrectal ultrasound, serum prostate specific antigen and digital rectal examination were good tool to differentiate between malignant and benign lesions of prostate. Proportion of malignancies are quiet significant in prostatic lesions and increased with age.

Key words: Prostae–Malignancy–Biopsy–PSA–DRE

1 INTRODUCTION

Prostate in man is fibromusculoglandular organ around the neck of the urinary bladder. Its increase in size gives rise to bladder neck obstruction [1, 2]. Prostate gland divided into an inner (periurethral) and an outer (cortical) zone that cor-

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relates with the physiologic and pathologic features of the organ. The inner zone is the primary site for nodular hyperplasia whereas an outer zone is the site for adenocarcinoma [3]. Benign prostatic hyperplasia (BPH) is a common urological condition in men. Prevelance of nodular hyperplasia of prostate (NHP) range between 20% at age of 40 years to 90% by the age of 80 years [4]. Worldwide prostatic carcinoma is the second most frequently diagnosed malignancy and one of the leading causes of cancer death in males [5]. In India, it is responsible for about 5% of all male cancers [6]. Prostate-specific antigen (PSA), digital rectal examination, and transrectal ultrasound are the methods commonly used for prostate cancer screening [7]. Prostate specific antigen (PSA), a glycoprotein serine protease, was first identified by Wang in 1979[8]. It's commonly used tumor marker of prostatic cancer [9, 10]. Digital rectal examination has been gradually augmented by determination of the serum PSA level [11]. Prostatic biopsy is most often preceded by abnormalities found on digital rectal examination (DRE) or serum prostate specific antigen (S.PSA) elevation [12]. Tran rectal ultrasonography (TRUS) guided systemic needle biopsy is the most reliable method at present to ensure accurate sampling of prostatic tissue in those men at high risk for harbouring prostatic cancer based on DRE or S.PSA findings [13]. Over the past decade, there have been a number of major advances in the diagnosis and treatment of the disorder. Through the use of digital rectal examination, PSA testing and improved biopsy techniques, it is now possible to diagnosed prostate cancer in more men at earlier curable stage [13]. This study was planned to know proportion of malignant and benign lesions in histopathologic examination for prostatic lesions in patient who attend OPD/IPD and to analyze the usefulness of serum PSA & ultrasound examination by histopathological confirmation.

2 MATERIAL AND METHOD

This study was carried out in Pathology Department of a tertiary care centre. It is an observational prospective study over a period from August 2009 to September 2011.

Patients visited to urology department with urinary incontinence and other complaints were evaluated which includes clinical history, signs and symptoms. Rectal examination of patients was done. Serum PSA level and prostatic biopsy were sent of those who were suspected for prostatic disease.

Specimens for S.PSA were collected in dry sterile plain bulb. Kit of Abott based on principle of chemiluminescence immunoassay (CLIA) was used.

Biopsies from prostate obtained by using any one of the following method Transurethral resection biopsy 2) Transrectal biopsy-Trucut biopsy.

Specimen was received in 10% formalin. After proper fixation of received specimen i.e. after 24 hour, detailed gross examination of tissue was carried out. A bit of 3 mm thickness was taken and processed in automatic tissue processor for 24 hour for further fixation, complete dehydration, clearing and for embedding in a stepwise fashion. Paraffin blocks were prepared and cut to obtain their sections of 3 micrometer thickness. Slides were prepared and stained with routine H&E stain. After a slide preparation detail examination of slide with its HPE report is carried out.

Following criteria's were used for benign lesion in prostate

Well mixed glandular and stromal component. Glands are lined by a layer of secretory cells at luminal side and surrounded by a single layer of flattened cells that resembles myoepithelial cells. They were based on intact basement membrane and cytological criteria's for malignancy were absent.

Following criteria's malignant lesion (adenocarcinoma): Back to back arrangement of gland. Glands are lined by a single layer. Myoepithelial cell layer is absent. Cell lining glands show atypia, increased mitotic activity, pleomorphism and prominent nucleoli.

3 RESULT

This study was carried out in Pathology Department of a tertiary care centre. It is an observational prospective study over a period from August 2009 to September 2011.

Out of 300 cases of prostatic biopsy 265 (88.33%) are benign and 35 (11.66%) cases are malignant lesions. Out of 300 cases, 191 (63.66%) are pure benign prostatic hyperplasia, 48(16%) are BPH with chronic prostatitis and 11(3.66%) are BPH with severe prostatitis. Low incidence of Prostatitis is probably due to advanced antibiotic therapy for urinary tract infection. Out of 35 cases of prostatic carcinoma 33(94.28%) cases are adenocarcinoma and 2 cases (5.71%) are transitional cell carcinoma. Two cases of transitional cell carcinoma type are of high grade. Histopathological diagnosis in prostatic biopsy received by transurethral biopsy and transrectal biopsy in benign lesions are 98.41% and 81.03% respectively. Out of 262 cases with clinically benign lesions, 258 cases proved benign histopathologically but 4 cases (1.52%) are diagnose malignant histopathologically which are suspected benign clinically. 151 patients have S.PSA less than 4 ng/ml, out of 151, 149 turned to be benign on histopathological examination. 52 patient have S.PSA above 10 ng/ml, out of these 52 cases, 29 have malignancy in HPE examination. 97 patients have S.PSA between 4-10 ng/ml, out of which 93 have benign and 4 have malignancy on HPE.

The relation of S.PSA value 4-10ng/ml and histopathological diagnosis is affected by age of patients which is seen in table below. Out of 278 cases diagnosed as benign isoechoic by ultra sonography 262 cases have benign lesion on histologic diagnosis and 16 have malignant lesion. Out of 22 cases diagnosed as malignant (hypoechoic asymmetrical) by ultrasonographicaly 19 proved malignant histological. [Table 1]

Benign prostatic lesions are common in 6^{th} and 7^{th} decade with maximum in 6^{th} decade. The percentage decreases as age increases. Prostatic malignancies are common in 8^{th} and 9^{th} decade, percentage of incidence increases with age increases. [Table 2]

When S.PSA level is between 4-10 ng/ml, 28 patients with age above 70 have diagnosed as benign lesion. But when S.PSA between 4-10 ng/ml and patient age in between 61-70 years of age, there are 9.3% chance of malignancy. [Table 3]

S.PSA value is < 4ng/ml in 127 patients in age between 51-70 years indicating 60.47% of patients in 6^{th} & 7^{th} decades have S.PSA <4 ng/ml which is due to dominance of benign lesion in this age group. High incidence of malignancy in age above 70 years resulted in S.PSA value > 10 ng/ml in 28 of all 70 patients, 28 out of 70 patients have S.PSA level between 4-10 ng/ml due to increase in S.PSA with increase in age. [Table 4]

For same age group mean serum prostatic antigen values are higher for malignant lesions than benign lesions & S.PSA level increases as age increases. [Table 5]

4 DISCUSSION

This study was carried out in Pathology Department of a tertiary care centre. It is an observational prospective study over a period from August 2009 to September 2011.

Our studies showed 87.33% benign lesions in prostatic biopsy which is comparable to studies by Garg M et al [14] and Kshitij et al [15] which were reported 78.3% and 85.89% benign lesions respectively. Like that proportion of adenocarcinoma is also being comparable to these studies.

According to Stenberg study [16] incidence of primary transitional cell carcinoma ranges from 1 to 4% without bladder involvement. In present study of 35 malignant lesions, 2 cases (5.7%) are primary transitional cell carcinoma.

In our study maximum prostatic cases reported in 7^{th} decades of age. Number of cases with its percentage is comparable to Gil et al [17] study in all the decades, except more cases in 8^{th} decade in Gil et al study than present study is due to higher life expectancy in western country.

M Norberg et al [18] & F Lee et al [19] showed 109(75%) and 31(93%) malignant lesion confirm on HPE out of 146 & 33 cases respectively which were malignant in ultra sonography. These studies are comparable to present study.

In present study 31 (81.57%) cases are malignant on HPE, out of 38 cases which showed features of malignancy on digital rectal examinations. H H Tan et al [20] reported 80%, comparable to our study.

In present study mean serum PSA values in prostatic carcinoma & lesions without prostatic carcinoma were 19.05 ng/ml & 4.76 ng/ml respectively, which are comparable to results obtained by R Damiano et al [21] in 2003.

In our study mean serum PSA (ng/ml) values were 1.67, 4.13, 4.64 & 6.3 in age group of 40-49, 50-59, 60-69 & >70 yrs respectively. Arvind P. Ganpule [22] et al showed mean serum PSA (ng/ml) values 1.0, 1.2, 1.5 & 1.9 in age group 40-49, 50-59, 60-69 & >70 yrs respectively. In our study mean serum PSA values are high as compare to Arvind P. Ganpule et al study because our study group patients having some prostatic complaints where as Arvind P. Ganpule et al study was community based study. But in both study mean serum PSA values increase with age, that shows that serum PSA values are specific for prostate but not for prostate carcinoma.

5 CONCLUSION

The results of this study indicate that transrectal ultrasound, serum prostate specific antigen and digital rectal examination were good tool to differentiate between malignant and benign lesions of prostate. In periphery, based on finding of these three parameter patient may be refer to specialized centre for further evaluation. Proportion of malignancies are quiet significant in prostatic lesions and increased with age.

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An ethics clearance was obtained from institutional ethics committee.

Author's contributions

RA and NM designed the study. Data collection was done by RA, AJ and AKG. RA, AKG and NG performed the data analysis for the study. AKG, NG, AJ and RA did review of literature. AKG, NM, AJ and RA wrote the manuscript, and it was critically reviewed by NM and AKG. Final approval of submitted version by RA,AJ and AKG. All authors read and approved the final manuscript.

Declaration of interests

All authors declare that they have no competing interests.

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Table 1. Histopathological findings of prostatic lesions, relationof histopathological diagnosis tomethods of biopsy, clinical diagnosis, USG findings and S. PSA levels.

Characteristics	No. of cases		Percentage
Histopathological findings			
Malignant	35		11.66
Benign	265		88.33
Total	300		100
Histopathological diagnosis in benign lesions			
BPH	191		63.66
BPH with chronic prostatitis	48		16
BPH with severe prostatitis	11		3.66
BPH With acute on chronic prostatitis	5		1.66
BPH with moderate prostatitis	4		1.33
BPH with abcess	1		0.33
BPH with few atypical glands	1		0.33
BPH with extensive stromal proliferation	1		0.33
Basal cell hyperplasia	1		0.33
Granulomatous prostatitis	1		0.33
Prostatic infarct with squamous metaplasia	1		0.33
Total	265		
Histopathological diagnosis in malignant lesions			
Adenocarcinoma	33		94.28
Transitional Cell Carcinoma	02		5.71
Methods of biopsy and diagnosis			
Method of Biopsy	Results on HPE		No. Of cases
	Benign	Malignant	
Transurethral Biopsy	124 (98.41%)	2 (1.59%)	126 (100%)
Transrectal Biopsy	141(81.037%)	33 (18.8%)	174 (100%)
Total	265	35	300
Comparision of clinical and histopathological diagnosis			
Clinical Diagnosis	Histopathological Diagnosis		Total
	Benign	Malignant	
Benign	258	04	262
Malignant	7	31	38
Total	265	35	300
Comparision of radiological (USG) and histological diagnosis			
Radiological Diagnosis	Histopathological Diagnosis		Total
	Benign	Malignant	
Benign	262	16	278
Malignant	03	19	22
Total	265	35	300
Relation of s. psa with histological diagnosis			
S.PSA Level ng/ml	Histological Diagnosis		Total
	Benign	Malignant	
<4	149	02	151
4-10	93	04	97
>10	23	29	52
Total	265	35	300

Table 2. AGE GROUP DISTRIBUTION WITH DIAGNOSIS

Age Group	No. Of Cases	%	Benign	%	Malignant	%
< 50	20	6.66%	20	100%	00	0.0%
51-60	90	30%	84	93.3%	06	6.6%
61-70	120	40%	103	85.83%	17	14.16%
71-80	59	19.6%	49	83.05%	10	16.94%
> 80	11	3.66%	09	81.81%	02	18.18%
Total	300	100	265		35	

Table 3. S. PSA BETWEEN 4-10NG/ML AND AGE SPECIFIC HPE DIAGNOSIS

Age Group	S. PSA between 4-10 ng/ml		Total
	Benign	Malignant	
< 50	10	00	10
51-60	26	01	27
61-70	29	03	32
71-80	21	00	21
>80	07	00	07
Total	93	04	97

Table 4. AGE SPECIFIC DISTRIBUTION OF S. PSA LEVEL IN 300 PATIENTS

Age Range (years)	S. PSA LEVEL <4 ng/ml	4-10ng/ml	>10ng/ml	Total No. of Patients
< 50	10	10	00	20
51-60	56	27	07	90
61-70	71	32	17	120
71-80	13	21	25	59
>80	01	07	03	11
Total	151	97	52	300

Table 5. Age specific prostate specific antigen values (ng/ ml)

Age Group	Mean Serum PSA (ng/ml) Malignant lesions of prostate	Benign lesions of prostate
40-49	-	1.67
50-59	16.8	4.13
60-69	18.9	4.64
>70	19.3	6.3

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