ORIGINAL ARTICLE

Histopathological Study of Transrectal Ultrasound Guided Biopsies of Prostate in Patients With Raised Serum Prostate Specific Antigen

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ABSTRACT
BACKGROUND AND OBJECTIVES: Transrectal Ultrasound (TRUS)-guided needle biopsies of prostate are considered as gold standard for the diagnosis of the prostatic cancer. To determine the spectrum of pathological lesions in TRUS-guided needle biopsies of prostate in men with increased serum prostatic specific antigen (PSA) levels with or without symptoms of prostatism and also histopathological characteristics of carcinoma. **METHODS:** A prostatic study carried out at the Department of Pathology, B.J.Medical College, Ahmedabad from May 2016 to July 2016. 200 men underwent TRUS-guided prostate biopsies for suspected prostate cancer. Raised serum PSA levels were arbitrarily divided into mild (> 4 to 10 ng/ml), moderate (> 10.1 to 20 ng/ml) and marked elevations (20.1 ng/ml & more). In most cases, eight core were taken. Each core were processed with routine paraffin method and stained with standard hematoxylin &eosin stain and for reporting of malignant cases, Gleason's grade and score is used. **RESULTS:** The mean age of patients was 66±9 (range: 57-75 years). The mean serum PSA was 13.6±11.2 ng/ml. Mean number of cores obtained per case was 7±2 (range: 5-9). In present study, 150 (75%) cases showed benign lesions and 50 (25%) were malignant. Benign lesions consisted of benign prostatic hyperplasia. 70 of benign cases (46.6%) showed significant inflammatory changes. Among malignant lesions, most were of moderate to high Gleason grades and scores. Mild serum PSA rise was seen in 96 (48%) patients; among these, 91(94.7%) cases showed benign lesions and 5 (5.2%), malignant. 53(26.5%) patients had serum PSA >20.1 ng/ml. Among these, 37(70%) had adenocarcinoma; 16 (30%) hyperplasia; one of the latter with non-specific prostatitis. **CONCLUSION:** The detection rate of prostate cancer is similar to that reported previously from around the world and rises with an increase in serum PSA level and correlate very well.

Keywords: PSA (Prostate specific antigen), TRUS (Trans-Rectal Ultrasound), Prostatic Carcinoma.

INTRODUCTION

Prostate cancer is the most common malignant tumor of solid organ in men throughout the world.[1] It is the second leading cause of the cancer related death in men after lung cancer. The racial and religion differences in the incidence of prostate cancer are well established.[2] In Asian men carcinoma of prostate arises in peripheral zone of the gland in approximately 70% of the cases, classically in the posterior location. The diagnosis is required careful history, physical examination including digital rectal examination (DRE), serum prostate specific antigen, (PSA) estimation, transrectal ultrasound(TRUS) and TRUS-guided needle biopsies of prostate. Among these, the biopsies are considered as gold standard for the tissue diagnosis of the prostatic cancer.[3-8] TRUS- guided needle biopsies of the prostate are the standard method for the early diagnosis of prostate cancer in the most urology centers in the developed world. Hodge et al. recommonded systemic parasagittal sextant biopsies of the prostate with additional biopsies of hypoechoicarea outside the parasagittal plane under TRUS guidance of men with suspected prostate cancer. More recently, extended 10-12 core biopsy protocols have been developed and advocated by many researchers to be more sensitive for the early diagnosis of prostate cancer.

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OBJECTIVES

This study was under taken primarily to determine the spectrum of pathological

lesion in prostate. TRUS- guided biopsies from men with elevated serum PSA with or without prostitism and secondarly to determine the histopathologic characteristics of prostate cancer.

MATERIALS AND METHODS

B.J .Medical college, Civil Hospital Ahmedabad is the one of the largest urology, nephrology and transplant centre of India. Facilities and skill for TRUS-guided prostate biopsies as well as processing and reporting of the biopsies are available at this institute since many years. A prospective and descriptive study was carried out at the department of Histopathology, B. J. Medical College, Ahmedabad from May 2014 to July 2016. The study patients included all adult and elderly males who presented to urology department with or without complaints of prostitsm.[9-15] Their detailed physical examination DRE were performed, followed by appropriate laboratory investigations including determination of serum PSA level were arbitrarily divided in to mild (> 4 to 10 ng/ml), moderate(> 10.1 to 20 ng/ ml) and marked elevations (20.1 or more) and correlated with clinical and biopsy findings.

Biopsy technique:

TRUS guided needle biopsies of the prostate gland were performed only in those patients who had serum PSA level more than 4 ng/ml and/ or abnormal DRE suspicious of prostate cancer. Ultrasound guidance was provided and Biopsies were obtained.[16] Patients were laid in right or left lateral decubitus position and the prostate was imaged in the sagittal plane. Biopsies were obtained using an automatic biopsy gun and18 gauge biopsy needle. Mostly 8 cores were taken in each patients, one of each from predetermined site so that to include all major zones of the prostate tissue. Ninth core was taken from the suspected area (if present). In a few small prostates, lesser number of cores was also obtained.[17-19] Only first time biopsies were included. Repeat biopsies were not included in the analysis.

Pathological study:

The biopsy specimens were processed and studied at the Histopathology laboratory. Gross examination of the biopsies included precise size and colour of the cores. The biopsies were processed by routine paraffin method, cut at 3-5 um and stained by haematoxylin and eosin (H&E) for detailed microscopic examination. The later was done by two pathologist, first independently and then jointly to arrive at consensus diagnosis.[20-22] The histological types of the lesions of the biopsy were determined and recorded in the report. The histopathological grading and scoring by Gleason system was done in all cases of Adenocarcinoma of prostate (figure-1). Demographic, clinical and laboratory data of each patient was taken from the clinical charts. Histopathological features were noted from original biopsy reports. The primary and secondary patterns were combined to give a Gleason's score and core biopsies were graded and scored according to it.

Statistical analysis:

Simple descriptive statistics such as mean +_ SD were used for continuous variables such as age and clinical and laboratory parameters. Percentage was used for categorical data. For comparisons of prostate cancer and non cancer group ap value of less than 0.05 was considered significant.

OBSERVATIONS

The mean age of patients was 66 ± 9 (range: 57-75 years). The mean serum PSA was 13.6 ± 11.2 ng/ml. Mean number of cores obtained per case was 7 ± 2 (range: 5-9). In present study, 150 (75%) cases showed benign lesions and 50 (25%) were malignant. Among malignant lesions, most were of moderate to high Gleason grades and scores. Only approximately 26% of prostatic adenocarcinomas were associated with low to intermediate serum prostatic specific antigen (S.PSA) level. In contrast to this, approximately 74% prostatic adenocarcinomas were associated with high serum prostatic specific antigen (S.PSA) level.

Table 1: Comparison of clinical and laboratory characteristic among patients with and without cancer on prostate core biopsies.

	Positive Biopsy	Negative Biopsy	P Value	Total
Patient's [No. (%)]	50 (25%)	150(75%)		200
Age [Mean ±SD]	67± 8	66± 9	0.57	66± 9
Age Range [No.(%)]				
50-60 (year)	17(34)	50(33.3)		67(33.7)
61-70 (Year)	20(40)	75(50)		95(45)
>70 Year	13(26)	25(16.7)		38(28.3)
Mean PSA Level (ng/ml)	23.6± 13.2 ng/ml	10.1± 8.2 ng/ml	0.001	13.6± 11.2 ng/ml
PSA Range[no.(%)]				
4-10	5(10)	91(60.66)		96(35.66)
10.1-20	8(16)	43(28.66)		51(22.33)
>20.1	37(74)	16(10.66)		53(42)
Cores	7± 1	7±1	0.34	7± 1
[mean± SD]				

Most of the patients having gleason score >6 also showed markedly high level of serum PSA. 104 out of 200 patients (52%) had serum PSA level > 10.1 ng/ml. Of these, 45(43.2%) patients had prostatic adenocarcinoma and 59(56.8%) benign changes. When higher cut off value of serum PSA was used at > 20.1 ng/ml, 53 out of 200(26.5%) patients showed this degree of increase in Serum PSA. Among these, 37(70%) had adenocarcinoma. 16(30%) hyperplasia, one of the later with non specific prostatitis. In our study, only 8% (4/50) prostate cancer patients had gleason score < 7. Of the 150(55.5%) cases with benign lesion, 69(46%) patients had benign prostatic hyperplasia with nonspecific prostatitis and of these,81(54%) patients had chronic nonspecific prostatitis.

Figure 1: Gleason grading system

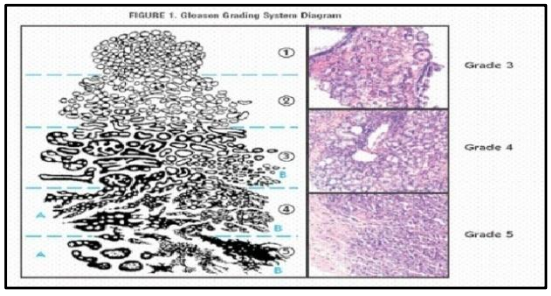


Figure 2: Benign Prostatic Hyperplasia

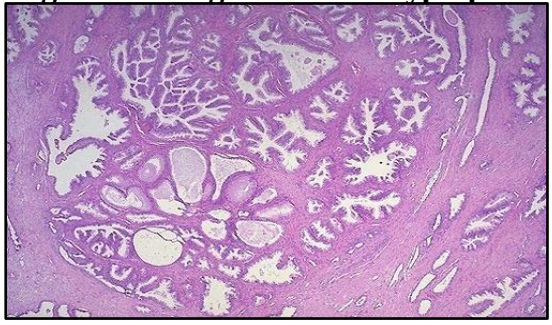


Table 2: Histopathological characteristics of prostate cancer observed in 50 patients with raised serum prostate specific antigen levels.

	Patients [No. (%)]
Biopsy Gleson Grade	
3	12(6)
4	14(7)
5	24(12)
Biopsy Gleson Score	
6	8(4)
7	4(2)
8	10(5)
9	16(8)
10	12(6)
Positive Biopsy Cores	
1	6(12)
2	2(4)
3	3(6)
4	3(6)
5	5(10)
7	5(10)
8	22(44)

Figure 3: Many Glands in this example are fused GLEASON GRADE 4

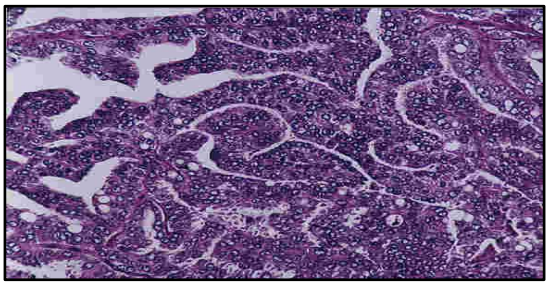
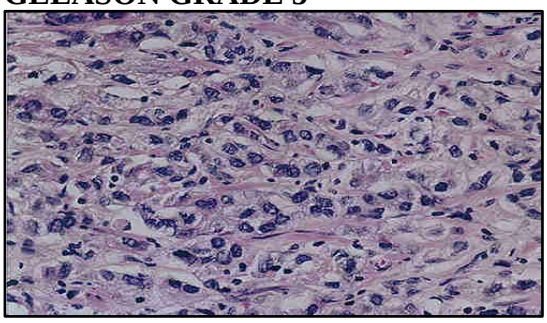


Figure 4: Tumor cells are arranged in solid sheets with no gland formation. GLEASON GRADE 5



The prostate cancer is seen typically in elderly patients and its frequency rises with increasing age. In this context, the mean age of ourpatients is concordent with that reported previously in national and international studies. This may partly be due to the small size of samplein the present study. In our study most patients were symptomatic , 92% were presented with lower urinary tract symptoms (LUTS) commonly known as prostatism. Very few patients (8%) presented for the prostate cancer at asymptomatic stage. This is understable given the low level of awareness of this cancer among the general population. The overall cancer detection rate in TRUS- guided biopsies in our series was 25%. This corresponds fairly well with many previously reported from all over world. All this studies included patients with raised serum PSA associated with or without prostatism, as in our study. However different level of serum PSA and different biopsy strategies were employed in these studies, which are reflected in slight in differences in cancer detection rates. In the significant number of patients with raised serum PSA, TRUS-guided biopsies showed benign hyperplatic or inflammatory lesions rather than cancer. The proportion of benign lesion was greater in patients with mild to moderate elevation of serum PSA. In contrast, cancer was more frequent increases with marked elevation of serum PSA. Similar observations have been noted in previous study as well. These findings show that simply a rise in S. PSA level >5ng/ml does not indicate that patient has prostate cancer because benign conditions such as hyperplasia and prostatitis can also increase the serum PSA level. In our study, 53 (26.5%) patients has S.PSA level of >20ng/ml, of which 37 (70%) patient had Adenocarcinoma,16 (30%) patients has hyperplasia, one of the later had active prostatitis. This is an interesting finding which shows that patients with markedly elevated serum PSA level are more likely to be adenocarcinoma in their biopsies than benign changes, as in previous studies. It was that the level of serum PSA increased with Gleason grade and score of the tumour. In our study, majority of cancers (38/50, 76 %) belonged to intermediate to high grade category. Similar score were also moderate to high in majority cases. Most of the patients having grade 3 or above showed markedly high level of PSA.

CONCLUSION

The detection rate of prostate cancer is similar to that reported previously from around the world and rises with an increase in serum PSA level and correlate very well. Study confirms the high prevalence of adenocarcinoma prostate among the high S. PSA level patient. It also concludes that high S.PSA level also coincide with high degree of prostate adenocarcinoma (Gleason'Ss grade 4 or 5)

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