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Transrectal Ultrasound Guided Biopsy of Prostate in Patients with Raised Serum Prostate Specific Antigen – A Histopathological Study

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"TRUS biopsy histology – Carcinoma prostate"

Abstract: ***Introduction: Transrectal ultrasound (TRUS)-guided needle biopsy of prostate is considered gold standard for the diagnosis of prostatic cancer. Objectives of the study: To determine the spectrum of pathological lesions in TRUS-guided needle biopsies of prostate in men with increased serum prostatic specific antigen (PSA). Materials & methods: A prospective study carried out at the Department of Urology, Government Royapettah Hospital from May 2014 to July 2016. 100 men underwent TRUS guided prostate biopsies for suspected prostate cancer. In most cases, 12 cores were taken. Each core was processed with routine paraffin method and stained with standard hematoxylin & eosin stain and for reporting of malignant cases Gleason's grade and score was used. Results: The mean age of patients was 66±9 years (range: 57-78 years). The mean serum PSA was 13.6±11.2 ng/ml. In present study, 75(75%) cases showed benign lesions and 25 (25%) were malignant. Benign lesions consisted of benign prostatic hyperplasia. 46 of benign cases (46%) showed significant inflammatory changes. Among malignant lesions, most were of moderate to high Gleason grades and scores. Conclusions: The detection rate of prostate cancer rises with an increase in serum PSA level.***

Keywords: Carcinoma Prostate, Prostate specific antigen, TRUS biopsy

1. Introduction

Prostate cancer is the most common malignant tumor of solid organs in men throughout the world**1**. It is the second leading cause of cancer related deaths in men after lung cancer. Carcinoma of the prostate arises in the peripheral zone of the gland in approximately 70% of cases, classically in the posterior location (1). The diagnosis requires careful history, physical examination including digital rectal examination (DRE), serum prostate specific antigen (PSA) and transrectal ultrasound (TRUS) and TRUS-guided needle biopsies of the prostate. Among these, TRUS biopsy is considered the gold standard for tissue diagnosis of prostatic cancer (2).

2. Aims and Objectives

This study was undertaken to determine the spectrum of pathological lesions in prostate TRUS guided biopsies from men with elevated serum PSA with or without symptoms and secondarily to determine the histopathological characteristics of prostate cancer in men.

3. Methodology

A prospective and descriptive study was carried out at the department of urology, Govt Royapettah medical college, Chennai from May 2014 to July 2016. The study patients included all adult or elderly males, who presented to urology clinic with or without symptoms. Their detailed physical examination and DRE were performed, followed by appropriate laboratory investigations including determination of serum PSA.

Biopsy technique

TRUS guided needle biopsies of the prostate gland were done in those patients who had serum PSA levels ≥ 4 ng/ml and/or abnormal DRE suspicious of prostate cancer. Patient was laid in right or left lateral position and the prostate was imaged .Biopsies were obtained using an automatic biopsy gun and 18 gauge biopsy needles. Mostly 12 cores were taken in each patient, one each from the predetermined sites so that to include all major zones of the prostate tissue. Only first time biopsies were included. Repeat biopsies were not included in the analysis.

Pathologic study:

The biopsy specimens were processed and studied at the Histopathology laboratory. Gross examination of the biopsies included precise size and color of the cores. The biopsies were processed by routine paraffin method, cut at 3-5 um and stained by hematoxylin and eosin (H&E) for detailed microscopic examination. The later was done by two pathologists, first independently and then jointly to arrive at consensus diagnosis. 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 . Demographic, clinical and laboratory data of each patient was taken from the clinical chartsThe primary and secondary patterns were combined to give a Gleason's score and core biopsies were graded and scored according to it.(3)

Statistical analysis

Percentages were used for categorical data. For comparisons of prostate cancer and the non-cancer group a p value of less than 0.05 was considered significant.

4. Results

The mean age of all patients was 66±9 years; range was from 57 to 78 years. There was no significant difference in the mean age of the 2 groups (p= 0.57).The main presenting symptoms of the patients were: retention of urine in 37% patients, weak stream in 33.3%, frequency in 27.7%, urgency in 16.6%, hematuria in 12.9%, incomplete emptying in 11.1%, nocturia in 11.1%, hesitancy in 7.4%, and post void dribbling in 5.5% patients. Overall 92% patients were symptomatic at the time of presentation.

The mean serum PSA value was 13.6±11.2 ng/ml. The mean PSA was significantly higher in cancer. Most of the patients having Gleason score ≥ 6 also showed markedly high levels of serum PSA. 52% had serum PSA ≥ 10.1 ng/ ml. Of these, 43. 2% patients had prostatic adenocarcinoma, and 56.8% had benign changes. 26.5% patients had PSA ≥ 20.1 ng/ml. Among these, 70% had adenocarcinoma, 30% hyperplasia.

In our study, only 8% of prostate cancer patients had Gleason scores of less than 7. Of the 75 cases with benign lesions, 46% patients had benign prostatic hyperplasia with nonspecific prostatitis and of these, 54% patients had chronic non specific prostatitis

5. Discussion

Prostate cancer is seen typically in elderly men and its frequency rises with increasing age. In this context, the mean age of our patients is concordant with that reported previously in local and international studies(4). This may partly be due to the small size of the sample in the present study. In our study, most patients were symptomatic; 92% presented with lower urinary tract symptoms (LUTS) commonly known as prostatism. Very few patients (8%) presented with prostate cancer at asymptomatic stage. This is due to 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 series from around the world (5,6,7,8,9).All these studies included patients with raised serum PSA associated with or without prostatism.However, different levels of serum PSA and different biopsy strategies were employed in these studies, which are reflected in slight differences in cancer detection rates. 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. Similar observations have been noted in previous investigations as well (3). These findings show that benign conditions such as hyperplasia and prostatitis can also increase the serum PSA levels (10,11).

In our study, 26.5% patients had PSA levels of ≥ 20ng/ml, of which 70% patients had adenocarcinoma, 30% patients had hyperplasia. This is an interesting finding which shows that patients with markedly elevated serum PSA levels are more likely to harbor adenocarcinoma in their biopsies than benign changes, as in previous studies. It was observed that the levels of serum PSA increased with increasing Gleason grade and score of the tumor. In our study, majority of cancers (76%) belonged to intermediate to high grade category. Similarly, scores were also moderate to high in majority of cases. Most of the patients having grade 3 or above showed markedly high levels of PSA.

6. Conclusions

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 conclude that high S. PSA level also coincide with high degree of prostate adenocarcinoma (Gleason's grade 4 or 5).

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