ORIGINAL RESEARCH PAPER

Pathology

"A CLINICOPATHOLOGICAL STUDY OF PROSTATE SPECIMENS AND ITS CORRELATION WITH PROSTATE SPECIFIC ANTIGEN LEVELS"

KEY WORDS:

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ABSTRACT

Background: Prostate is fibromusculoglandular organ encircling the neck of the urinary bladder, Benign prostate hyperplasia, prostate carcinoma and prostatitis are three pathologic processes which frequently affect the prostate gland. Prostatic enlargement causes urinary symptoms of static (hesitancy, retention) and dynamic (urgency, dribbling) nature. PSA is a glycoprotein which is expressed by both normal and neoplastic prostate tissue. PSA is used widely as a screening tool for carcinoma prostate. Gleason's microscopic grading is a paramount feature and with PSA are important for diagnosis, management, and prognosis of carcinoma. The purpose of this study is to frame evidence based PSA levels for various prostatic lesions. **Method:** This prospective study was done on total 50 samples. The samples taken were both transurethral resection of prostate and prostatic biopsies. All were grossed, sectioned, stained using H & E, viewed under microscope and graded by Gleason's scoring. **Result:** Total 50 samples were studied, out of which 46 were benign and 4 malignant. Mean age of the cases was 63.13 years. 8% patients had PSA values more than 20 ng/ml. **Conclusion:** PSA is specific for prostate and is one of the best screening tools available for early detection of prostate cancer as it is a well accepted, simple, safe and cost effective method. The early diagnosis of clinically significant cancer obtained by evaluation of PSA levels helps in immediate and effective treatment.

INTRODUCTION:

Prostate is fibromusculoglandular organ encircling the neck of the urinary bladder therefore, enlargement of prostate either due to nodular hyperplasia, prostatic intraepithelial neoplasia (PIN) or adenocarcinoma may give rise to bladder outlet obstruction.[1,2] Prostatic enlargement causes urinary symptoms of static (hesitancy, retention) and dynamic (urgency,dribbling) nature.

Benign prostate hyperplasia, prostate carcinoma and prostatitis are three pathologic processes which frequently affect the prostate gland.[3]Both benign and malignant tumors are hormone (androgen) dependent and are therefore associated with significant morbidity and mortality in male.[4] In the aging male, significant tissue remodeling taking place within the prostate. Histologic analysis also showed a decreased apoptotic activity in glandular and basal epithelial cells of the prostate. Thus, with the increasing age there is a tendency of increasing of prostatic volume.[5,6] Due to the influence of pathological processes, the cell integrity is also lost leading to the release of prostate-specific antigen (PSA) into circulation, that is, the processes inside prostate, such as hyperplasia, inflammation, tumors, may lead to the increase of serum PSA value.[7,8] PSA is a glycoprotein which is expressed by both normal and neoplastic prostate tissue.

PSA is used widely as a screening tool for carcinoma prostate[9]. Even though considerable efforts have been taken to improve the diagnostic quality of prostatic carcinoma, screening and staging parameters are still in the primitive stage. Gleason's grading system is superior and best predictor of disease progression and disease outcome. Gleason's microscopic grading is a paramount feature and with PSA are important for diagnosis, management, and prognosis of carcinoma.[10,11]

MATERIAL AND METHOD:

This prospective study was carried out in histopathology section, Department of Pathology, Saraswathi Institute Of Medical Science, Hapur, U.P from November 2020 to October 2022. Approval of the Ethical committee of Saraswathi Institute Of Medical Science was obtained.

Total 50 cases who were clinically and radiologically recognised or suspected to have prostatic enlargement were studied.

A detailed clinical history including age, chief complaints, nature of symptoms and haematological investigations were done in all cases.

The samples taken were both transurethral resection of prostate and prostatic biopsies. All the prostatic specimens were subjected to a careful and detailed gross examination. Representative tissue sections were taken and fixed in 10 % formalin, processed, embedded and blocks were made which were finally sliced.

Slides were stained with haematoxylin and eosin and every slide was examined thoroughly and looked for the presence of malignancy, prostatic intraepithelial neoplasia, metaplasia, acute and chronic inflammation and other secondary changes associated with benign nodular hyperplasia.

Statistical analysis was done to correlate relation between Prostate specimens and PSA levels.

Result:

The study comprised of 50 samples both benign and malignant.

Table 1: Age distribution of cases:

Age group (in years)	No of cases	Percentage (%)
40-60	7	14
61-80	41	82
81-100	2	4
Total	50	100

1. Among the 50 participants, the mean age was found to be 63.16±8.044 years.
2. Maximum numbers of the cases i.e., 41 (82%) were in the age group of 61-80 years.

Table 2: Clinical diagnostic categories of prostatic lesions:

Types of prostatic lesions	No of lesions	Percentage (%)
BPH	46	92
Carcinoma	4	8
Total	50	100

In this study the maximum number of prostatic lesions i.e, 46 (92%) cases were diagnosed clinically as BPH and only 4 (8 %) cases of Ca prostate.

Table 3: Gleason score and prostatic carcinoma.

Gleason score	No. of cases	Percentage (%)
5-6	1	25
7	2	50
8-10	1	25
Total	4	100

Out of 4 cases, 1 (25%) case had a Gleason score of 8 (poorly differentiated) and only 1 (25%) case with 6 (well differentiated) as its Gleason score.

Table 4: Relation of PSA levels with nature of lesions

PSA(ng/ml)	Benign	Malignant	Total
0-4	4	0	4
4.1-10	34	0	34
10.1-20	8	0	8
>20	0	4	4
Total	46	4	50

1. The rise in PSA levels were observed in relation to prostatic lesions from benign to malignant.
2. A positive association was observed between PSA levels and the nature of prostatic lesions ($p < 0.001$)

Table 5: Distribution of PSA among prostatic lesions:

HPE	No. of cases	Mean PSA±S.D(ng/ml)
Benign	46	8.23±5.02
Malignant	4	31.8±8.99

The mean score of PSA in benign lesions was 8.23±5.02 and for malignant lesions was 31.8±8.99.

DISCUSSION:

Prostatic lesions are on the rise in Indian men because of increasing life expectancy and discovery of relatively better diagnostic method. For improving the detection rate of carcinoma prostate. Digital Rectal Examination(DRE) is neither specific nor sensitive enough to detect prostate cancer.[12] DRE should be combined with a high sensitivity test. PSA testing is one such high sensitive test. The present study was therefore undertaken to study the diagnostic efficacy of PSA in prostatic lesions. This study consists of 50 cases who presented with prostatomegaly.

In the present study, age of patients who got their PSA levels checked ranged from 40 to 100 years. Maximum number of cases i.e. 41 cases were in the age group of 61- 80 years and least number of cases i.e 2 cases was in the age group 81-100 years. Mean age of the study was 63.16±8.044 years. This was comparable with studies done by Parthiban, et al (2016).[13] Ramalingiah, et al (2015).[14] Sinha, et al (2011).[15]

In the present study all the 50 patients who got their PSA levels checked, 4 (8%)patients had PSA values more than 20 ng/ml. This was comparable with studies by Dhok, et al. (2017)[16], Parthiban, et al (2016).[13]

In the present study, the most common diagnosis was of BPH i.e. (88%). The percentage of Adenocarcinoma cases in our study was 8% while it was 32% in the study done by Jasani, et al.[17]

Out of the 4 cases diagnosed as Adenocarcinoma in the present study, Gleason scoring was done for all 4 cases given the score. In the present study, majority had moderately-poorly differentiated adenocarcinoma followed by poorly differentiated which was in concordance with the study done by Gurumurthy, et al.[19] However in the study done by Khatib, et al[18] prostate adenocarcinoma with Gleason scoring of 5-6 and 7 had the least number of cases. In the present study, maximum benign lesions had PSA levels of 4.1- 10ng/ml which was similar to the study done by Alpeshpuri, et al (69%).[20]

CONCLUSION:

1. PSA is specific for prostate and is one of the best screening tools available for early detection of prostate cancer as it is a well accepted, simple, safe and cost effective method.
2. The early diagnosis of clinically significant cancer obtained by evaluation of PSA levels helps in immediate and effective treatment.
3. The method of collection of blood sample for PSA estimation has only few complications which do not require any active management.
4. But the standard value of 0-4.0 ng/ml being normal does not hold true in most of the cases.
5. As PSA levels increases with age, hence both benign and malignant cases can cause an increase in the PSA levels.

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