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ORIGINAL ARTICLE

Histopathological Findings in Prostatic Chips and its Correlation with Prostate Specific Antigen Levels

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ABSTRACT

Objectives: To determine the pattern of histological findings in prostatic chips obtained from cases of enlarged prostate gland and to correlate the findings with PSA levels.

Materials and Methods: It was a cross sectional descriptive study conducted in Northwest General Hospital , Peshawar from 1st January 2018 to 23rd December 2021. A total of 500 male cases with features of enlarged prostate, frequency, urgency and dribbling with mean age of 52 ± 12.3 years (range 45 -80 years) were included in the study. The prostatic biopsy specimens were obtained and PSA levels were done in all cases. The histological specimens were subjected to microscopic examinations and findings were recorded in proforma. The findings were correlated with the PSA levels. Mean and standard deviation were used for quantitative data. Frequency and percentages were used for qualitative data

Results: Out of 500 cases of enlarged prostate, benign prostate hypertrophy was seen in 375 (75%) cases. 125 cases (25%) had micro invasive carcinoma prostate . All 375 cases of benign prostate hypertrophy had prostate specific antigen levels less than 4ng. Out of 125 cases of micro invasive carcinoma, 120 (96%) had PSA levels >10ng . Sensitivity of PSA at levels of 10ng/ml for prostatic carcinoma was 96%.

Conclusion: Benign prostate hypertrophy is the commonest lesion in cases of prostate pathology. PSA is useful marker to determine the presence or absence of micro invasive carcinoma in patients with prostate hypertrophy.

Keywords: Benign prostate hypertrophy, micro invasive carcinoma prostate, prostate specific antigen.

INTRODUCTION

Prostate is a glandular organ that is located at the base of urinary bladder in males (1). Its main function is to produce the secretions that provide nutrition to the sperm cells and also help the sperm cells to survive the hostile environment in female genital tract (1). It has a central, peripheral, periurethral and transitional zone on gross examination (1). Under light microscope, the gland has abundant glands having a double layer epithelium i.e basal cuboidal cells and inner columnar cells(1).

Prostate gland can harbor a number of pathologies as the age increses , and thus contributes to morbidity and mortality (2). The incidence of prostate diseases is increasing gradually all over the world (1). The most feared disease entity of prostate is prostatic carcinoma, which is the major cause of death in males all over the world (2, 3). It is reported to be the most common non skin malignancy in males all over the world (4). In United States, the reported annual death rate from prostate carcinoma is about 366000 deaths (5). Currently, there are 1600000 active cases of prostate carcinoma in United states (5). It has been reported that most of the cases with prostatic carcinoma has coexisting benign prostate hypertrophy (BPH).

Prostate biopsy is the gold standard, yet invasive investigation to find the underlying pathology in the gland (1). However, there are certain other diagnostic tools like radiological and serological, but these are associated with lesser sensitivity and specificity as compared to biopsy (1). Histologically, the prostatic carcinoma develops in peripheral area of prostate whereas the BPH develops from transition zone (4).

The commonest diseases that are seen in prostate are benign prostate hypertrophy (BPH), prostate carcinoma and prostatitis (1, 2). Prostate diseases arise commonly in elderly males above 50 years age (6). Common complaints of prostate enlargement include urgency, frequency, urinary retention and dribbling (1). BPH is simply the benign growth of prostate parenchyma and is non malignant lesion(2). On the other hand, prostate carcinoma is a malignant lesion of the prostate parenchyma. Both the diseases are hormone dependant, they occur in old age and there incidence increases with increasing age (7).

Prostate specific antigen (PSA) is an enzyme secreted by the prostate gland . The function of PSA is to keep the semen in liquid state (8-10). The levels of PSA are measured to determine the presence or absence of disease in prostate because the levels are effected if the gland is affected by any disease (11). Recently, the measurement of PSA has become popular as a screening test for ruling out or confirming prostate carcinoma as its levels are raised in prostate carcinoma (1, 2).

Although literature suggests that serum PSA levels are raised in prostate carcinoma, yet , it is reported to have low specificity and sensitivity (2, 11). Therefore, the current study was done in order to find common disease entities in prostate biopsy specimens and correlate these with serum PSA levels.

MATERIALS AND METHODS

It was a cross sectional descriptive study. It was conducted in Northwest General Hospital , Peshawar from 1st January 2018 to 23rd December 2021. A total of 500 male with features of enlarged prostate, frequency, urgency and dribbling , with mean age of 52 ± 12.3 years (range 45 -80 years) were included in the study. The prostatic biopsy specimens were obtained and PSA levels were done in all cases. The prostate specimens were fixed in formalin and were sliced with microtome after embedding them in paraffin wax. The slides were prepared and stained with eosin and hematoxylin stain .The histological specimens were subjected to microscopic examinations and findings were recorded in proforma. The levels of PSA were determined and documented for each diagnosis of the prostate pathology. Mean and standard deviation were used for quantitative data. Frequency and percentages were used for qualitative data. p value of less than 0.05 was considered statistically significant. Sensitivity of PSA level to diagnose prostatic carcinoma was calculated by using formula

Sensitivity = True Postive / True Positive +False Negative

RESULTS

A total of 500 cases suffering from prostate symptom like frequency , urgency and dribblling were included in the study. Mean age of the study sample was 52 ± 12.3 years (range 45 -80 years).

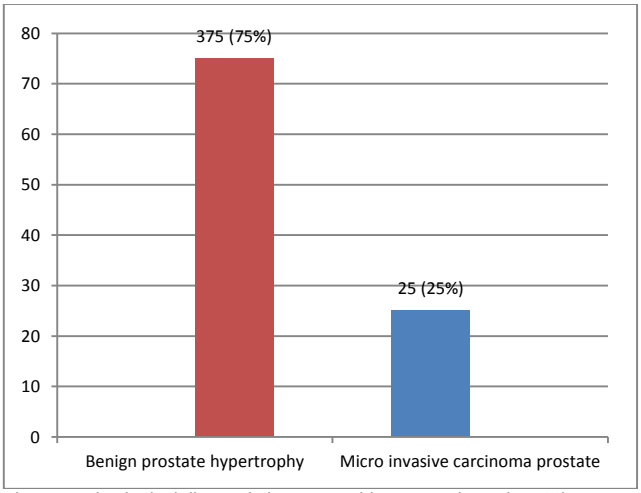

Figure 1: Histological diagnosis in prostate biopsy specimen (n=500)

Table 1: PSA levels in different diagnoses of enlarged prostate (n=500)

S.No	Histological diagnosis	n (%)	PSA levels (ng)
1	Benign prostate hypertrophy	375 (75%)	<4
2	Micro invasive carcinoma prostate	120 (24%)	>10
		5 (1%)	<4

Table 2: Sensitivity of PSA in diagnosing microinvasive carcinoma prostate (n=125)

S.No	Histological diagnosis	n (%)	PSA levels (ng)	Sensitivity
	Micro invasive carcinoma prostate	120 (24%)	>10	96%
		5 (1%)	<4	

DISCUSSION

Prostate is a gland that commonly gets involved by pathological entities in old age men (8). To determine the presence or absence of pathology in prostate, the biopsy is commonly used diagnostic modality. However, serum PSA levels is believed to be elevated in prostate carcinoma but there is still debate among the researchers whether PSA may be used as a screening tool for prostate diseases or not (8).

In our study, most of cases were of old age. Similar findings were reported from different studies done by Shah from Pakistan, Rajani from India, Hussain from Iraq and Yadav M from India (1, 11-13). Literature suggests that the incidence of prostate lesions , commonly BPH and prostate carcinoma ,increase with increasing age (1). In incidence of these lesions is reported to be 75% in 8th decade as compared to only 8% in 4th decade (1).

In our study, the commonest lesion in prostate biopsy specimens was BPH ,followed by prostate carcinoma. Similar findings are reports by Butch AC in 2021(2). Rajani D from India reported similar findings in 2020 (1). Similar pattern of lesions was reported by different studies done by Shah, Hussain AG from Iraq, Josephine A, Neha A, Bhatta S, Yadav M (11-16). Testosterone hormone causes the hypertrophy of the gland by binding to DHT receptors in prostate(2). Further more, it also causes stimulation of fibroblast growth factor and transforming growth factor which further causes enlargement of the gland (2). The same hormone is reported to be involved in pathogenesis of prostate carcinoma(15). Literature suggests that men who have comparatively higher levels of testosterone are more prone to develop prostate cancer(15)

In BPH, the glands and stroma undergoes hyperplasia and it arise from transitional zone of the gland (15)(7). The glands are oftenly dilated and may contain corpora amylacea (15). On the other hand , prostate carcinoma arise from peripheral area of prostate(7). Microscopically, in prostate carcinoma, the glands are small in size and are crowded together (15). The nucleoli are prominent, and cytoplasm is amphophilic(15).

In our study, PSA levels was higher in cases of prostate carcinoma . The sensitivity of PSA at levels above 10 ng for diagnosing prostate carcinoma in our study was very high i.e 96%. Similar findings were shown in a study done by Shah in 2019 (11). Similarly, in a study done by Fu S in 2018 , sensitivity of PSA to predict prostate carcinoma was found to be high i.e 74 % (17).

Literature suggests that PSA levels are raised in cases of prostate cancer and so can help in early screeing of prostate cancer(8)(10). Using this marker in all cases of prostate hypertrophy can help in early diagnosis of prostate cancer even in the early stages of ths disease (8). The normal PSA level is less than 4ng/ml. Levels of 4-10 ng/ml are considered borderline while those above 10 ng/ml are considered abnormal (8). Levels above 10 ng/ml suggest prostate cancer(8). Despite these cut off values, its use as a diagnostic test is not recommended so far(10). This is due to low specifity and sensitivity of the marker and also due to the reason that its levels re raised in some cases of BPH (17). Moreover, some 20% cases of prostate carcinoma patient have normal PSA levels (17, 18). Moreover , two clinical trials conducted recently showed that use of PSA as a screening test has no benefit overall while one clinical trial recommended its use as a screening test (18).

CONCLUSIONS

Micro invasive carcinoma is rare in patients of prostate hypertrophy yet it can be identified if multiple prostatic chips are examined in such cases. PSA level is highly sensitive for diagnosing microinvasive prostatic carcinoma.

Limitations: The study was done in a single tertiary care center and thus the result might not be representative of the whole population .

Recommendations: We recommend that in every case of enlarged prostate , multiple prostatic chips should be examined histologically so as to not miss the microinvasive carcinoma prostate. Moreover, PSA levels is higly sensitive and can be used to predict diagnosis of microinvasive carcinoma prostate.

Conflict of Interest: The authors declare no conflict of interest.
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REFERENCES

1. Rajani R, Mehta N, Goswami H. Histopathological study of prostatic lesions at tertiary care centre. Int J Clin Diagn Pathol. 2020;3(2):172-6.
2. Buch AC. Histopathological Spectrum of Lesions of Prostate. Saudi J Pathol Microbiol. 2021;6(6):229-33.
3. Liu F-C, Lin K-CHJ-R, Pang S-T, Yu H-P. Prostate resected weight and postoperative prostate cancer incidence after transurethral resection of the prostate: A population-based study. Medicine. 2019;98(3).
4. Yamashiro JR, de Riese WT. Any Correlation Between Prostate Volume and Incidence of Prostate Cancer: A Review of Reported Data for the Last Thirty Years. Research and Reports in Urology. 2021;13:749.
5. Wang G, Zhao D, Spring DJ, DePinho RA. Genetics and biology of prostate cancer. Genes & development. 2018;32(17-18):1105-40.
6. Bansal N, Gill MK. Comparison of Diagnostic Yield of Digital Rectal Examination, Serum Prostate Specific Antigens, Transrectal Ultrasound with Histopathology of Prostate. Journal of Research in Medical Education & Ethics. 2018;8(1):74-8.
7. Kumari J, Toppo S, Pratap V. Incidence of Carcinoma Prostate in Cases of Benign Prostatic Hyperplasia in Rims Ranchi Jharkhand.
8. Dhok A, Lahoti AM, Dhote S, Taori AK, Ingole S, Mudaliar PN, et al. Role of Serum PSA in Diagnosis of Prostate Cancer with Histopathological Correlation and Predictive Value of Serum PSA in Early Detection of Prostate Cancer. Journal of Medical science and clinical research. 2017;5(7).
9. Mazhar Mw, Tahir H, Mahmood J, Shahzadi Mb, Saif S. Apai Polymorphism Frequencies And Prostate Cancer Patients In Punjab, Pakistan. Quantum Journal of Medical and Health Sciences. 2021;1(4):1-13.

10. Tkac J, Gajdosova V, Hroncekova S, Bertok T, Hires M, Jane E, et al. Prostate-specific antigen glycoprofiling as diagnostic and prognostic biomarker of prostate cancer. Journal of the Royal Society Interface Focus. 2019;9(2):20180077.
11. Shah RS, Pandey DR. Relation of Age and Serum Prostatic-Specific Antigen level with Histopathological diagnosis in Transurethral Resection of Prostate specimen, an Experience from Eastern Tertiary Hospital. Journal of Nepalgunj Medical College. 2019;17(2):62-5.
12. Hussain AG, Khalid H. Pattern Of Prostatic Lesions A Histopathological Study With Clinical Correlation In A Sample In Iraqi Male Patients. 2021.
13. Yadav M, Desai H, Goswami H. Study of various histopathological patterns in prostate biopsy. Int J Cur Res Rev. 2017;9(21):58-63.
14. Josephine A. Clinicopathological study of prostatic biopsies. Journal of clinical and diagnostic research: JCDR. 2014;8(9):FC04.
15. Neha A. Pattern of prostate diseases-A histopathological study in Jammu. Int Journl of Basic and Appl Med Sci. 2014;4(3):163-7.
16. Bhatta S, Hirachan S. Prostatic lesions: Histopathological study in a tertiary care hospital. Journal of Manmohan Memorial Institute of Health Sciences. 2018;4(1):12-9.
17. Fu S, Zhang X, Niu Y, Wang R-T. Prostate specific antigen, mean platelet volume, and platelet distribution width in combination to discriminate prostate cancer from benign prostate hyperplasia. Asian Pacific journal of cancer prevention: APJCP. 2018;19(3):699.
18. Greene KL, Albertsen PC, Babaian RJ, Carter HB, Gann PH, Han M, et al. Prostate specific antigen best practice statement: 2009 update. The Journal of urology. 2013;189(1):S2-S11.