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ORIGINAL RESEARCH

Assessment of correlation between increasing PSA levels and neoplastic lesions of prostate

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ABSTRACT

Background: The incidence of prostatic lesions increases with increasing age. The present study was conducted to assess correlation between increasing PSA levels and neoplastic lesions of prostate.

Materials & Methods: 80 patients of prostate pathologies were included. In all patients, prostate-specific antigen (PSA) values were recordedusing chemiluminescent assay. Transurethral resection of prostate (TURP) biopsies was fixed in 10% formalin, processed and stained with Haematoxylin and Eosin for histopathological examination.

Results: BPH was seen in 48, HGPIN in 6, LGPIN in 4, prostatitis in 10 and adenocarcinoma in 12 cases. Age group 40-50 years had 12, 2, 2, 2 and 4 cases respectively. Age group 50-60 years had 18, 2, 1, 3 and 2, 60-70 years had 10,1,1,3,3 and >70 years had 8, 1,0,2 and 3 patients respectively. The difference was significant (P< 0.05).PSA 0-7 ng/ml had 32 cases of BPH, 9 cases of prostatitis, 7 cases of HGPIN, 5 cases of LGPIN. 7-14 ng/ml had 6, 2, 3, 1, 14-21 ng/ml had 4, 21-28 ng/ml had 2 cases of BPH and 5 cases of adenocarcinoma and >35 ng/ml had 12 cases of adenocarcinoma respectively. The difference was significant (P< 0.05).

Conclusion: Prostate-specific antigen is specific for prostatic tissue and is raised in both benign and malignant lesions of prostate. In males, benign prostatic hyperplasia is the most common pathology encountered.

Key words: Benign prostatic hyperplasia, prostate-specific antigen, male

INTRODUCTION

The incidence of prostatic lesions increases with increasing age.[1] In the aging male, there is significant tissue remodeling taking place within the prostate.[2] It was postulated that the growth is the result of a disturbed balance between apoptotic and proliferative activities with net reduction in apoptotic activity. Histologic analysis showed a decreased apoptotic activity in glandular and basal epithelial cells of the prostate.[3,4]

Prostate specific antigen (PSA), a glycoprotein serine protease, was first identified by Wang et al. in 1979.[5] Prostate specific antigen (PSA) is a widely used tumor marker for prostatic cancer. It is well known that PSA is prostatic specific, not a disease specific marker. PSA level can increase in non-malignant conditions like benign prostatic hyperplasia,

inflammation, diagnostic and surgical procedures. These conditions can mimic cancer and cause confusion in diagnosing especially in prostatic carcinoma where PSA is used as a screening test.[6]The combination of Digital rectal examination [DRE], Trans Rectal Ultrasonogram which is an indispensable tool to guide a needle biopsy and to estimate the volume of prostate gland for calculating PSA density and Serum PSA estimation, supplemented with biopsy procedures represents a powerful diagnostic tool in the diagnosis of both benign and malignant prostatic lesions.[7]The present study was conducted to assess correlation between increasing PSA levels and neoplastic lesions of prostate.

MATERIALS & METHODS

The present study comprised of 80 patients of prostate pathologies. All gave their written consent for the participation in the study.

Data such as name, ageetc. was recorded. In all patients, prostate-specific antigen (PSA) values were recordedusing chemiluminescent assay. Transurethral resection of prostate (TURP) biopsies was fixed in 10% formalin, processed and stained with Haematoxylin and Eosin for histopathological examination. World Health Organization (WHO) (2004) diagnostic criteria was used.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group(Years)	BPH	HGPIN	LGPIN	Prostatitis	Adenocarcinoma	P value
40-50	12	2	2	2	4	0.03
50-60	18	2	1	3	2	0.02
60-70	10	1	1	3	3	0.01
>70	8	1	0	2	3	0.05
Total	48	6	4	10	12	

Table I, graph I shows that BPH was seen in 48, HGPIN in 6, LGPIN in 4, prostatitis in 10 and adenocarcinoma in 12 cases. Age group 40-50 years had 12, 2, 2, 2 and 4 cases respectively. Age group 50-60 years had 18, 2, 1, 3 and 2, 60-70 years had 10,1,1,3,3 and >70 years had 8, 1,0,2 and 3 patients respectively. The difference was significant (P< 0.05).

Graph I Distribution of patients

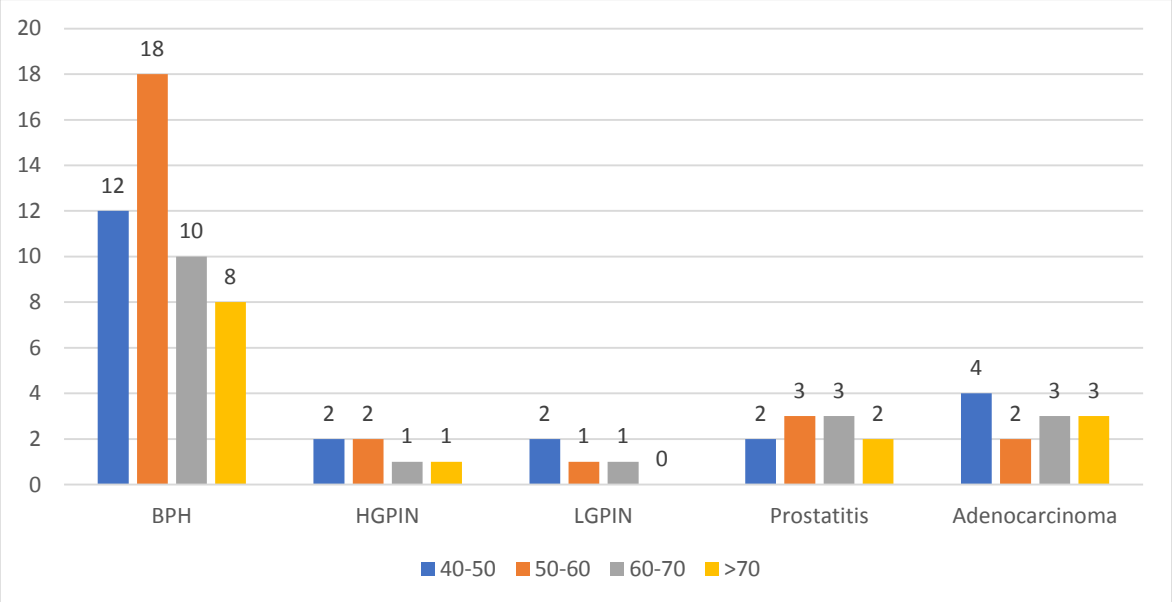
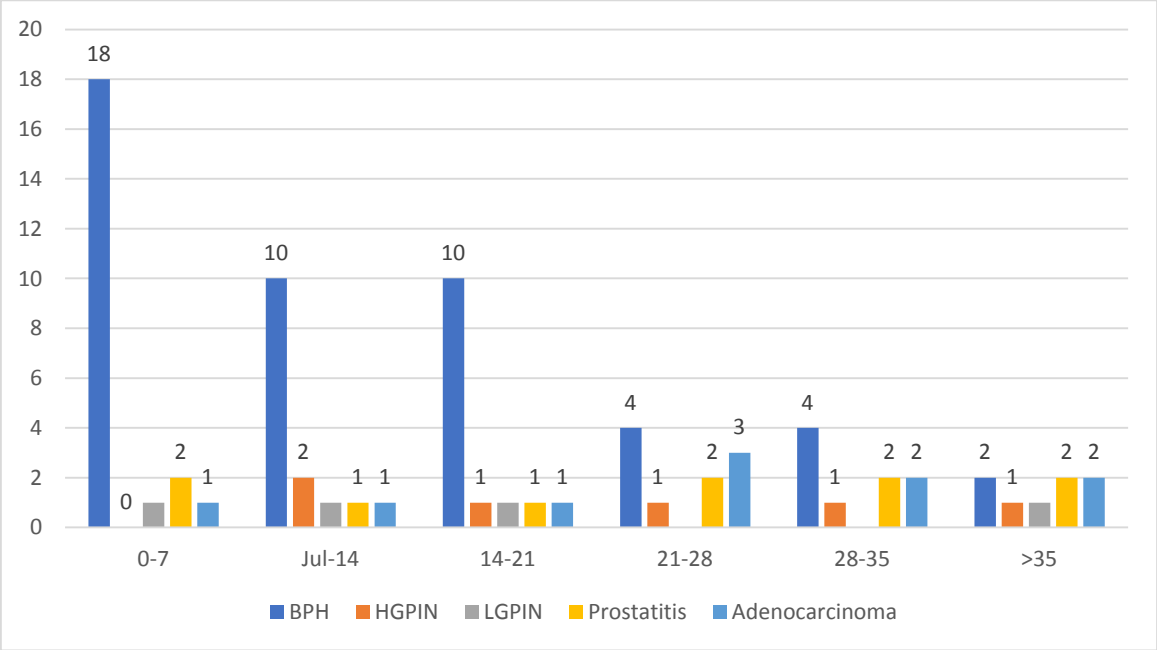


Table II Correlation of PSA level and prostatic lesions

PSA (ng/ml)	BPH	HGPIN	LGPIN	Prostatitis	Adenocarcinoma	P value
0-7	18	0	1	2	1	0.01
7-14	10	2	1	1	1	0.04
14-21	10	1	1	1	1	0.03
21-28	4	1	0	2	3	0.05
28-35	4	1	0	2	2	0.04
>35	2	1	1	2	2	0.01
Total	48	6	4	10	12	

Table II, graph II shows that PSA 0-7 ng/ml had 32 cases of BPH, 9 cases of prostatitis, 7 cases of HGPIN, 5 cases of LGPIN. 7-14 ng/ml had 6, 2, 3, 1, 14-21 ng/ml had 4, 21-28 ng/ml had 2 cases of BPH and 5 cases of adenocarcinoma and >35 ng/ml had 12 cases of adenocarcinoma respectively. The difference was significant (P< 0.05).

Graph II Correlation of PSA level and prostatic lesions



DISCUSSION

The high sensitivity and low specificity of PSA testing in the diagnosis of prostate cancer is a problem in clinical practice.[8] Use of PSA testing alone has reduced specificity owing to the influence of prostate volume and other factors such as infection and manipulation.[9,10] Even with this disadvantage, however, PSA measurement is still used in clinical practice given that no new biomarkers are currently accepted for the diagnosis of prostate cancer. The general cut-off for the PSA level is 4.0 ng/mL.[11,12] With the use of this cut-off, the cancer detection rate ranges from 35% to 42.3% for 10- to 12-core biopsy. A higher PSA level may relate to a greater likelihood of positive tissue diagnosis, a higher Gleason score, and a greater likelihood of bone metastasis.[13,14]The present study was conducted to assess correlation between increasing PSA levels and neoplastic lesions of prostate.

We found that BPH was seen in 48, HGPIN in 6, LGPIN in 4, prostatitis in 10 and adenocarcinoma in 12 cases. Age group 40-50 years had 12, 2, 2, 2 and 4 cases respectively. Age group 50-60 years had 18, 2, 1, 3 and 2, 60-70 years had 10,1,1,3,3 and >70 years had 8, 1,0,2 and 3 patients respectively. Josephine et al[15] studied the spectrum of prostatic lesions among the biopsies received in a rural hospital.Among the one hundred and six cases of

prostatic biopsies received, 79 (74.52%) cases were of Benign prostatic hyperplasia, two cases (1.89%) were Prostatic intraepithelial neoplasia and 25 cases (23.58%) were carcinoma of prostate. Prostatitis was the most common associated lesion in cases of benign prostatic hyperplasia presenting in 25.31% patients. Among the carcinoma patients, 20 cases (80%) were of Adenocarcinoma of prostate and 5 cases (20%) were small cell carcinoma of prostate. Both Benign prostatic hyperplasia and Carcinoma prostate were common in the seventh decade. Most common clinical presentation was difficulty in micturition. Most common histological type of Carcinoma prostate was Adenocarcinoma. Serum PSA estimation was done in 49 cases of prostate biopsies. Elevations of serum PSA levels were noted in both BPH and Carcinoma prostate patients. 8 cases of BPH, had serum PSA values in the range of 0-4ng/ml. Six cases of Carcinoma prostate had serum PSA values in the range of >80 ng/ml.

We found that PSA 0-7 ng/ml had 32 cases of BPH, 9 cases of prostatitis, 7 cases of HGPIN, 5 cases of LGPIN. 7-14 ng/ml had 6, 2, 3, 1, 14-21 ng/ml had 4, 21-28 ng/ml had 2 cases of BPH and 5 cases of adenocarcinoma and >35 ng/ml had 12 cases of adenocarcinoma respectively.Lojanapiwat et al[16]studied the correlation and diagnostic performance of the PSA level with cancer diagnosis, aggressiveness of prostate cancer (Gleason score>7), and bone metastasis. A total 1,116 patients who underwent transrectal ultrasound and prostate biopsy were retrospectively studied. The patients were divided into subgroups by baseline PSA level as follows: ≤4, 4.1–10, 10.1–20, 20.1–50, 50.1–100, and >100 ng/ mL. A positive biopsy result was found in 395 patients (35.39%). The PSA level corresponded well with the diagnosis of prostate cancer and a positive bone scan but moderately well with Gleason score as shown by AuROC for diagnosis of prostate cancer (0.82), positive bone scan (0.88), and Gleason score>7 (0.78). The specificity of a PSA level of 4.1–10, 10.1–20, 21.1–50, 50.1–100, and >100 ng/ mL in the diagnosis prostate cancer was 9.3, 55.5, 87.5, 98.2, and 99.7, respectively.

The limitation the study is small sample size.

CONCLUSION

Authors found that Prostate-specific antigen is specific for prostatic tissue and is raised in both benign and malignant lesions of prostate. In males, benign prostatic hyperplasia is the most common pathology encountered.

REFERENCES

1. Fitzpatrick JM. PSA measurement in the treatment of BPH. BJU Int. 2004;93:2-4.
2. Lakhey M, Ghimire R, Shrestha R, Bhatta AD. Correlation of serum free prostate-specific antigen level with histological findings in patients with prostatic disease. Kathmandu Univ Med J 2010;8:158- 63.
3. Bid HK, Konwar R, Singh V. Benign prostatic hyperplasia; is it a growing public health concern for India? Indian J Med Sci 2008;62:373-4.
4. Josephine A. Clinicopathological study of prostatic biopsies. J Clin Diagn Res 2014;8:4-6.
5. Wang MC, Valenzuela LA, Murphy GP, Chu TM. Purification of human prostate specific antigen. Invest Urol 1979;17:159-63.
6. Konwar R, Chattopadhyay N, Bid HK. Genetic polymorphism and pathogenesis of benign prostatic hyperplasia. BJU Int 2008;102:536- 44.
7. Cotran RS, Kumar V, Robbins SI. Prostate. Robbins Pathologic Basis of Disease, 6th ed., Philadelphia: Saunders Co.,1994. pp.1025-34.
8. Wang MC, Valenzuela LA, Murphy GP, Chu TM. Purification of human prostate specific antigen. Invest Urol 1979;17:159-63.

9. Pinsky PF, Kramer BS, Crawford ED, Grubb RL, Urban DA, Andriole GL, et al. Prostate volume and prostatic specific antigen levels in men enrolled in a large screening trial. Urology 2006;68:352-6.
10. Mansoor I. Pattern of prostatic diseases in Saudi Arabia. The internet journal of Pathology. TMISSN 2003;2:1528-8307.
11. Lokuhetty MD, Wijsinghe HD, Abeysuriya DT, Samarasinghe UC. Transrectal ultrasound guided prostatic biopsies: a single centre experience in Sri Lanka. Ceylon Med J 2009;54:6-9.
12. Puttaswamy K, Parthiban R, Shariff S. Histopathological study of prostatic biopsies in men with prostatism. J Med Sci Health 2016;2:11-17.
13. Banerjee B, Iqbal BM, Kumar H, Kambale T, Bavikar R. Correlation between prostate specific antigen levels and various prostatic pathologies. J Med Soc 2016;30:172-5.
14. Hirachand S, Dangol UM, Pradhanang S, Acharya S. Study of prostatic pathology and its correlation with prostate specific antigen level. Journal of Pathology of Nepal. 2017 Mar 30;7(1):1074-7.
15. Karunasinghe N, Minas TZ, Bao BY, Lee A, Wang A, Zhu S, Masters J, Goudie M, Huang SP, Jenkins FJ, Ferguson LR. Assessment of factors associated with PSA level in prostate cancer cases and controls from three geographical regions. Scientific reports. 2022 Jan 7;12(1):1-6.
16. Josephine A. Clinicopathological study of prostatic biopsies. Journal of clinical and diagnostic research: JCDR. 2014 Sep;8(9):FC04.
17. Lojanapiwat B, Anutrakulchai W, Chongruksut W, Udomphot C. Correlation and diagnostic performance of the prostate-specific antigen level with the diagnosis, aggressiveness, and bone metastasis of prostate cancer in clinical practice. Prostate international. 2014 Sep 1;2(3):133-9.