FREQUENCY OF PROSTATE CARCINOMA HAVING RAISED SERUM PROSTATE SPECIFIC ANTIGEN LEVEL IN TRANSURETHRAL RESECTION OF PROSTATE

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ABSTRACT

Objective: To determine the frequency of prostate carcinoma having raised serum Prostate Specific Antigen level in Transurethral Resection of Prostate (TURP) specimens sent for histopathology.

Study Design: Descriptive, cross sectional study.

Place and Duration of Study: Department of Histopathology, Combined Military Hospital Multan, from Dec 2015 to Jun 2016.

Methodology: A total of 100 cases were included in the study. The quantitative variables i.e. serum prostate specific antigen (PSA), age & duration of disease were presented by calculating mean and standard deviation. The qualitative variables i.e. benign prostate hyperplasia (BPH), prostatitis, prostate carcinoma and marital status were presented by calculating frequency and percentages. Data was analyzed by using SPSS version 18. Effect modifiers like age, duration of disease and marital status were controlled through stratification. Chi square test was applied after stratification with *p*-value ≤0.05 considered as significant.

Results: Out of 100 cases of TURP, all patients were married. The age of the patients was between 46 and 85 years with an average age of 64.4 years and standard deviation of ± 10.7. Out of 100 cases, 17 cases (17%) were prostate carcinoma, 59 cases (59%) were BPH and 24 cases (24%) were prostatitis. Seventy seven cases (77%) showed abnormal PSA level while 23 cases (23%) have normal levels. Out of 77 cases of abnormal PSA level, 49 cases (63.6%) were BPH, 17 cases (22.1%) were prostate carcinoma and 11 cases (14.3%) were prostatitis. Briefly, 41(41%) patients had serum PSA level > 20ng/ml. Among these, 24 cases (24%) were benign and 17 (17%) were malignant. However, remaining 59 (59%) benign cases had serum PSA level below 20ng/ml. A significant statistical association was seen, *p*-value being <0.05.

Conclusion: The abnormal level of PSA in large number of benign lesions of prostate will be helpful in developing a consensus that it is not a tumor specific antigen.

Keywords: Benign prostate hyperplasia, Prostate specific antigen, Transurethral resection of prostate.

INTRODUCTION

The prostate gland is an essential part of the male reproductive system. Owing to its location at bladder neck, enlargement of the gland leads to urinary obstruction[1]. Prostate secretes prostate specific antigen (PSA) and its elevation may result from any process that disrupts the normal architecture of prostate allowing access of PSA into blood circulation. Therefore, PSA is not only present in small quantities in the serum of men with healthy prostate, but is often elevated in patients with carcinoma or other prostate-associated disorders[2]. Benign prostate hyperplasia (BPH), prostatitis and prostate carcinoma are the three important pathological processes to be studied in detail, as they are frequently encountered[3].

Diagnosis of prostatitis is very necessary, as they are often accompanied by elevation of serum PSA and can be successfully treated with antibiotics. Benign prostate hyperplasia is a common benign disorder, which sometimes requires surgical intervention[4]. On the other hand, prostate carcinoma accounts for more than 25% of all malignancies in men, and is the second leading cause of death after lung carcinoma in United States. The incidence is quite variable among races and in different countries with the highest reported in North America, Australia and

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Scandinavian countries. It is relatively rare in Asian population, but recent data indicate that the incidence is rapidly increasing[5]. In India, the incidence of BPH is estimated to be 92.9% in sixth to seven decade, however, for carcinoma of pros-tate, it is 8 in/100,000[6]. Recently a study by Anushree *et al*[7], most of the patients affected were in sixth decade of their lives having incidence of benign prostate hyperplasia and prostate carcinoma was 90.7% and 9.3% respectively.

In another study by Wadgoankar, the raised PSA value in benign cases was 8.90ng/ml and in malignant cases was 83.06ng/dl. Serum PSA in the range of 0-4ng/ml was significantly asso-ciated with benign lesions and malignant lesions showed value more than 20ng/ml. The incidence of benign prostate hyperplasia was 60% and 15% for prostate carcinoma[8].

Yet another study by Josephine, the elevation of serum PSA value was observed in both benign prostate hyperplasia (0.87ng/ml-32.33ng/ml) and carcinoma of prostate (7.5ng/ml-229.5ng/ml). However, the incidence of benign prostate hyperplasia along with prostatitis was 25.31%[9].

Previously, scanty data is available on the subject. No local studies have been conducted and there are very few international studies, most of which are conducted in India. It is all the more necessary to study prostatic diseases with special reference to PSA levels in the present situation as their incidence keeps growing in our region.

Keeping this in view, the purpose of current study is to determine the frequency of prostate carcinoma having raised serum PSA level in Transurethral Resection of Prostate (TURP) specimens sent for histopathology. The results of this study will help in establishing the fact that serum PSA levels are not only raised in carcinoma only but can be frequently seen in benign conditions of prostate.

METHODOLOGY

This descriptive cross-sectional study was carried out at Department of Histopathology, Combined Military Hospital, Multan from 8th December 2015 to 7th June 2016, after the approval of ethical committee. Sample size was calculated using WHO sample size calculator. A total of 100 TURP specimens, were selected by non-proba-bility, consecutive sampling tech-nique, between 45-80 years of age, after taking informed consent from patients. Poorly fixed specimens, specimens with scanty tumor tissue and metastatic carcinoma were not included in the study. The specimens were fixed in 10% buffered formalin, grossed and stained with Hematoxylin and Eosin to examine morphology. In order to minimize the bias, all results were verified by the supervisor having more than 15 years of experience. All the data were entered into the pre-designed proforma.

Data was analyzed by using SPSS version 18. The quantitative variables i.e. serum PSA level, age and duration of disease were presented by calculating mean and standard deviation. The qualitative variables i.e. benign prostate hyperplasia, prostatitis, prostate carcinoma and marital status were presented by calculating frequency and percentages. Further effect modifiers like age, duration of disease and marital status were controlled through stratification. Post stratification, chi square test was applied. A *p*-value less than or equal to 0.05 was taken as significance.

RESULTS

During the study, a total of 100 cases of TURP specimens were included from 8th December 2015 to 7th June 2016. Stratification of outcome according to age groups, disease duration and marital status is summarized in table-I.

The age of patients ranged from 46 to 85 years with a mean age of 64.4 years and standard deviation of ± 10.7 (fig-1a). In our study, most of the patients 32 (32%) belonged to age group 66-75 years. All the patients in our study were married.

Out of 100 cases, 42 cases (42%) had duration of less than 3 years and 58 cases (58%) had duration of more than 3 years. The mean disease duration was 2.41 years and standard deviation of ± 1.23 (fig-1b). However, all the patients

diagnosed with prostate carcinoma had duration of more than 3 years.

The mean PSA value was 25.6 and standard deviation of ± 30.1. In our study, PSA level was

Table-I: Stratification of outcome according to age groups, disease duration and marital status (Mean Age = 64.4 ± 10.7 years).

	Cases (n)	%	Prostate carcinoma with raised PSA		*p*-value
			Yes	No	
Age Groups (years) (n=100)					
46	18	18	-	-	0.000
56	30	30	-	-	
66	32	32	7	-	
76	20	20	10	-	
Disease Duration (n=100)					
<3 years	42	42	-	-	0.000
>3 years	58	58	17	-	
Marital Status (n=100)					
Married	100	100	17	-	Can-t be calculate
Unmarried	-	-	-	-	

abnormal in 77 cases (77%) and normal in 23 cases (23%) (fig-1c). Out of 77 cases, 49 cases (63.6%) were of benign prostatic hyperplasia, followed by 11 cases (14.3%) of prostatitis and 17 cases (22.1%) of prostate carcinoma (fig-1d).

Out of 100 cases, 17 cases (17%) had histopathological diagnosis of prostate carcinoma, 59 cases (59%) were of benign prostate hyperplasia and 24 cases (24%) were of prostatitis (fig-1e & fig-2).

The data was statistically significant, *p*-value being <0.05.

DISCUSSION

Prostatic diseases are common in men beyond middle age. Among these, the three most important diseases are benign prostatic hyperplasia, prostate carcinoma and prostatitis. The prostate carcinoma is the most common malignancy and leading cause of death in men. Serum PSA level is used as important marker of tumor progression as well as for early detection of ongoing process. However, the recent literature shows its abnormal levels mostly in non-

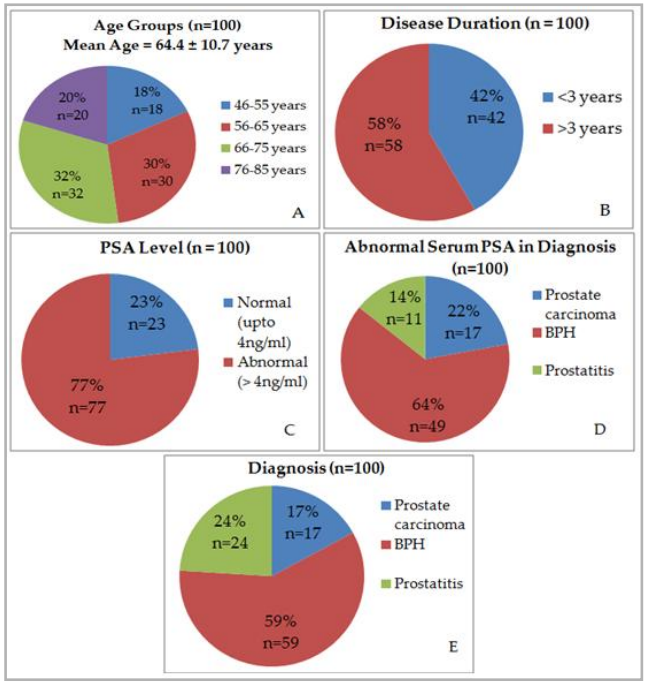

Figure-1: Distribution of cases according to (a): Age Groups, (b): Disease duration, (c): PSA level, (d): Abnormal PSA, (e): Diagnosis.

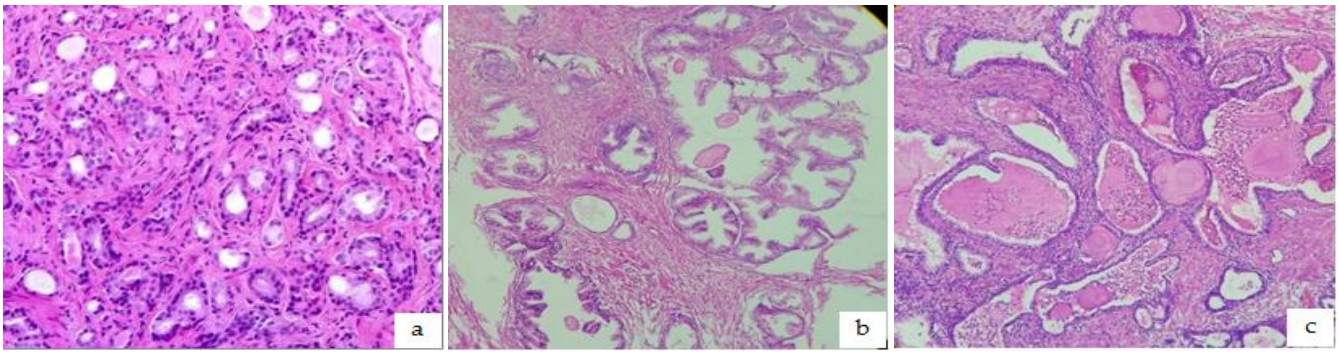

Figure-2: Photomicrographs showing, (a): Prostatic adenocarcinoma, (b): Benign prostatic hyperplasia, (c): Prostatitis.

neoplastic lesions. Relativelyless is known about this within the Asian populations, particularly Pakistani population. The results of this study will help in establishing the fact that serum PSA levels are not only raised in carcinoma only but can be frequently seen in benign conditions of prostate.

The mean age in our study is 64.4 years, which is in concordance with a study conducted in by Josephine[9] in India, the mean age in this study being 65.5 years. However, it is 63.5 years and 65.8 years in the Pakistan and Iranian studies conducted by Kash *et al*[10] and Moslemi *et al*[11], respectively. Our mean age is 3.4 years younger compared to study carried out by Anunobi *et al*[12] in Lagos, Nigeria and 4.8 years younger compared to the mean age in the study conducted by Albasri *et al*[13] in Madinah, Saudi Arabia.

The peak age group in our study is 66-75 years which is comparable to the studies carried out by Wadgaonkar *et al*[8] in India, Aslam *et al*[14] in Pakistan and Josephine[9] in India respectively.

The mean value of serum PSA observed in our study is 25.6%. It is higher in contrast to the studies carried out by Janbaziroudsari *et al*[15] in Iran and Kash *et al*[10] in Pakistan, the mean percentage in these studies are 13.7% and 19.6%, respectively. In present study, abnormal PSA is seen in 77 cases (77%), out of which 49 cases (63.6%) are of benign prostatic hyperplasia, 11 cases (14.3%) are of prostatitis and 17 cases (22.1%) belongs to prostate carcinoma. It is comparable to the study conducted in India by Anushree *et al*[7], having abnormal serum PSA in BPH (26.4%), prostatitis (18.3%) and prostate carcinoma (83.4%) respectively. The difference in percent expression might be due to different sample size. The serum PSA in prostate carcinoma is higher as compared to a study carried out in Africa by Erhabor 2 (6.6%). The difference might be due to the regional variation.

The cases of prostate carcinoma observed in present study were 17 (17%). It is in concordance with the study carried out by Wadgaonkar *et al*[8] (15%), in Indian population. However, it is lower as compared to a study carried out in Nigeria by Anunobi *et al*[12] (29.3%) and higher as compared to a study conducted in India by Alpesh *et al*[16] (6.87%), in Saudi Arabia by Albasri *et al*[13] (7.7%) and in Seoul, Korea by Cho *et al*[17] (6.5%). The percentages are different in the studies carried by Janbaziroudsari *et al*[15] (32.4%) and Moslemi *et al*[11] (56%) in Iranian population.

The cases of benign prostatic hyperplasia in our study are 59 (59%), representing the most common entity. It is in concordance with the study carried out by Jasani *et al*[18] (56%), in Indian population. It is also close to the study conducted in Iran by Janbaziroudsari *et al*[15] (62.6%) and in Nigeria by Nwafor *et al*[19] (62.8%). However, it is lower than the studies conducted in India by Alpesh *et al*[16] (81.53%), Josephine[9] (74.52%) and Albasri *et al*[13] (80.3%). It is different in the studies conducted byMoslemi *et al*[11] (23%) and Kash *et al*[10] (49.7%) in Iran and Pakistan respectively.

In present study, the cases of prostatitis are 24 (24%). It is close to the study conducted in India by Wadgaonkar *et al*[8] (22.5%). However, it is higher than the study conducted in Iran by Moslemi *et al*[11] (21%).

CONCLUSION

The approach to the primary diagnosis of prostatic enlargements has changed radically in recent years. It is believed that serum PSA level is mostly used in the diagnosis of prostate carcinoma. However, elevated levels do not result from carcinoma only. It can also be raised in benign prostatic hyperplasia and prostatitis, because it is a prostate specific antigen not a tumor specific.In our study population, the abnormal levels are mostly seen in non-neoplasticconditions as compared to neoplastic ones. Therefore, raised serum PSA levels should not considered as a carcinogenic marker only but also a good indicator of hyperplastic and inflammatory processes of prostate. However, the elevated levels of serum PSA in benign conditions need to be studied on a larger scale to see a true picture of this entity in our Pakistani population.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Epstein JI. The lower urinary tract and male genital system. In: Kumar V, Abbas AK, Fausto N, Aster JC, editors. Robbins and cotran pathologic basis of disease. 8th ed. Philadelphia: Saunders Elsevier; 2010: 994-95.
2. Erhabor O, Zama I, Mainasara AS, Shehu RA, Iwueke IP, Festus A, et al. Prostate specific antigen (PSA) screening among apparently healthy men of african descent in Sokoto, North Western, Nigeria. Int Blood Res Rev 2014; 2(1): 37-47.
3. Epstein JI, Netto GJ. The prostate and seminal vesicles. In: Mills SE, Carter D, Greenson JK, Reuter VE, Stoler MH, editors. Sternberg's diagnostic surgical pathology. 5th ed. Philadelphia: Lippincott Williams and Wilkins; 2010: 1871-913.
4. Rosai J. Male reproductive system. In: Rosai J, Ackerman L, editors. Rosai and ackerman's surgical pathology. 10th ed. St. Louis: Mosby; 2011: 1287-398.
5. Ro JY, Kim KR, Shen SS, Amin MB, Ayala AG. Tumors and tumor-like conditions of the male genital tract. In: Fletcher CDM, editor. Diagnostic histopathology of tumors. 4th ed. Philadelphia: Elsevier Saunders; 2013: 872-950.
6. Bid HK, Konwar R, Singh V. Benign prostatic hyperplasia: is it a growing public health concern for India? Indian J Med Sci 2008; 62(9): 373-74.
7. Anushree CN, Venkatesh K. Morphological spectrum of prostatic lesions: a clinicopathological study. Med Inn 2012; 1(2): 49-54.
8. Wadgaonkar AR, Patil AA, Mahajan SV, Yengantiwar RP. Correlation of serum prostate specific antigen (PSA) level in various prostate pathology in elderly men. Int J Basic Appl Med Sci 2013; 3(2): 274-81.
9. Josephine A. Clinicopathological study of prostatic biopsies. J ClinDiagn Res 2014; 8(9): 04-06.
10. Kash DP, Lal M, Hashmi AH. Utility of digital rectal examination, serum prostate specific antigen, and transrectal ultrasound in the detection of prostate cancer: a developing country perspective. Asian Pac J Cancer Prev 2013; 15(7): 3087-91.
11. Moslemi MK, Lotfi F, Tahvildar SA. Evaluation of prostate cancer prevalence in Iranian male population with increased PSA level, a one center experience. Cancer Manag Res 2011; 3(1): 227-31.
12. Anunobi CC, Akinde OR, Elesha SO, Daramola AO, Tijani KH, Ojewalo RW. Prostate diseases in Lagos, Nigeria: a histologic study with TPSA correlation. Niger Postgrad Med J 2011; 18(2): 98-104.
13. Albasri A, El-Siddig A, Hussainy A, Mahrous M, Alhosaini AA, Alhujaily A. Histopathologic characterization of prostate diseases in Madinah, Saudi Arabia. Asian Pac J Cancer Prev 2014; 15(10): 4175-79.
14. Aslam HM, Shahid N, Shaikh NA, Shaikh HA, Saleem S, Mughal A. Spectrum of prostatic lesions. Int Arch Med 2013; 6(1): 36-39.
15. Janbaziroudsari H, Mirzaei A, Maleki N. Association of serum prostate-specific antigen levels with the results of the prostate needle biopsy. Bull Cancer 2016; 103(9): 730-34.
16. Maru AM, Makwana HH, Lakum NR, Chokshi T, Agnihotri A, Trivedi N. Study on correlation between PSA & various prostatic pathology. Int J Med Sci Public Health 2014; 3(6): 735-37.
17. Cho HJ, Shin SC, Cho JM, Kang JY, Yoo TK. The role of transurethral resection of the prostate for patients with an elevated prostate-specific antigen. Prostate Int 2014; 2(4): 196-202.
18. Jasani JH, Patel HB, Gheewala B, Vaishnani HV, Bhuva K. Diagnostic utility of prostate specific antigen for detection of prostate lesions. Int J Biomed Adv Res 2012; 3(1): 268-72.
19. Nwafor CC, Keshinro OS, Abudu EK. A histopathological study of prostate lesions in Lagos, Nigeria: a private practice experience. Niger Med J 2015; 56(5): 338-43.