

Frequency of Prostatic Adenocarcinoma in Transurethral Resection of Prostatectomy Done for Benign prostatic Enlargement and Correlation with Serum Level of PSA

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ABSTRACT

Background: Around the world, transurethral resection of the prostate, or TURP, is the most often used surgical procedure for treating benign prostatic hyperplasia (BPH). The current study is designed to evaluate the Frequency of prostatic Adenocarcinoma in transurethral resection of prostatectomy and its correlation with serum levels of PSA.

Methods: The Retrospective study was conducted in the Histopathology Lab of Dr. Akbar Niazi Teaching Hospital Islamabad which is an PMDC-approved and ISO-9001-certified hospital. The data for this study was obtained by including consecutive cases of transurethral resection prostatectomy received for analysis in the histopathology lab during the study period. The data was retrieved from Histopathology record files. The slides were viewed and the diagnoses were confirmed. The patient's serum PSA levels were retrieved from pre-operation hospital medical records. The Patients who presented to the histology lab for diagnosis were reassessed using a Questionnaire based on Performa divided into different sections such as socio-demographic data, reasons, History of Diseases, PSA level, Age, and complications. The collected data was analyzed using SPSS Version 21.

Results: In 53 patients 11 were of Prostatic Adenocarcinoma, 14 were benign prostatic hyperplasia and 28 were prostatitis. with number and percentage. Prostate Specific Antigen value was different in patients. The highest reported value was 28ng/ml. The mean was 2.68 ng/ml. Most cases were present between the age group of 50-60 years with 32.1% Prostatic adenocarcinoma frequency was higher in the older age group levels above 4ng/ml were seen in prostatitis and BPH. Conversely, there were cases of prostatic adenocarcinoma with less than/ml PSA levels

Conclusion: PSA levels were raised, above 4ng/ml in 8 cases while low in 3 cases of Prostatic adenocarcinoma. PSA levels were also raised in a case of prostatitis and two cases of BPH. We conclude that PSA levels although suggestive are not entirely specific for prostatic adenocarcinoma.

Keywords: PSA, benign prostatic hyperplasia, Adenocarcinoma, Transurethral resection, hyperplasia

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INTRODUCTION

In older men, benign prostatic hyperplasia (BPH), a benign enlargement of the prostate, and associated lower urinary tract symptoms (LUTS) are prevalent medical situations. Histological prevalence of the disease in the fourth, sixth, and ninth decades of life has been revealed by autopsy studies to be 8, 50, and 80%, respectively.^{1, 2} BPH is a contributing factor to bladder outlet obstruction, which can affect kidney and bladder function and cause bothersome lower urinary tract symptoms if left untreated. Moreover, BPH/LUTS is linked to depression and a lower quality

of life-related to health, as measured by sleep, psychological state, daily activities, and sexual activity. The actual hyperplasia of the prostate gland, known as benign prostatic hyperplasia (BPH), begins to manifest as an age-related condition in almost all men beginning around the age of 40.³ The term "benign prostatic hyperplasia" (BPH) describes the benign prostatic growth that is frequently seen in aging men. Over 50% of men over the age of 60 have benign prostatic hyperplasia. Lower urinary tract symptoms (LUTS) affect 15% to 30% of these men; however, it's important to note that not all of these symptoms are

brought on by hyperplasia; rather, many of them are related to different kinds of bladder smooth muscle (detrusor) dysfunction.³ Many of these men used to disregard LUTS as a natural part of aging and never seek help, but thanks to new medical treatments, increased awareness of prostate cancer, and increased media coverage about men's health, a greater number of men are now seeking assistance. Severe medical complications can arise from benign prostatic hyperplasia.^{3, 4} In England and Wales, prostatectomy accounts for up to 25% of all male surgeries due to acute urine retention; this increases the risk of mortality and morbidity relative to elective surgery.⁵ Furthermore, prolonged urine retention—which can also lead to renal failure—is the reason behind 15% of prostatectomies performed in Wales and England. Urinary tract infections that recur frequently, bladder calculi, and hematuria are additional consequences.⁶ Research on physiology, molecular pathology, and age-related changes in detrusor muscle function is beginning to provide light on potential causes of benign prostatic hyperplasia. For example, males with bigger prostates have greater blood concentrations of insulin-like growth factor 1.^{7, 8} Disturbance of the typical equilibrium between peptide growth factor and androgenic signaling, the functioning of the highly specialized myofibroblasts (stromal cells) that surround the prostate glands (epithelium) is dependent on the effectiveness of a crucial component.⁹ Researchers are adopting cutting edge methods such as surface-enhanced laser desorption and ionization (SELDI)-based proteomics and genomics to examine variations in gene and protein expression between benign and malignant tissue.¹⁰ Over time, these efforts will aid in the development of new treatments for this prevalent disease as well as an explanation of its cause. The causes of bladder dysfunction are also revealed by functional studies. Smooth muscle contractility can be greatly affected by signals sent to smooth muscle cells by small molecules such as nitric oxide and ATP when the urothelium strains.^{10, 11} Selected contemporary methods such as surface-enhanced laser desorption and ionization (SELDI)-based proteomics and genomics are being used by researchers to examine changes in gene and protein expression between benign and malignant tissue.¹² Over time, these efforts will aid in the development of new treatments for this prevalent disease as well as an explanation of its cause. The causes of bladder dysfunction are also revealed by functional studies. When the urothelium stretches, signals to smooth muscle cells via tiny molecules like ATP and nitric oxide can have a significant impact on smooth muscle contractility.¹¹ BPH may not be problematic on its own and may not require medical attention right away. When their LUTS become bothersome, patients most often seek advice from a healthcare professional.¹³ The precise path physiology underlying this relationship remains incompletely understood and it remains uncertain whether this is a causal or coincidental relationship.

Healthcare professionals should pay attention to BPE and BOO because they have been associated with noteworthy outcomes other than symptom severity.¹⁴ For instance, men with larger prostate glands than those with smaller prostates have higher incidence rates of acute episodes of urinary retention and the surgical procedures that follow. Additionally, urinary tract infections, bladder stone formation, secondary changes in the anatomy and function of the bladder, and eventually deterioration of the upper urinary tract may be caused by sub vesical obstruction, or BOO.¹⁵ Prostate-specific antigen (PSA), one of the most useful and often used tumor indicators in oncology, is predominantly produced and released by the prostate epithelium.¹⁶ Elevations of PSA in the serum are observed when the epithelial lining is affected by prostate cancer.¹⁷ Despite being organ-specific, PSA is not specific to prostate cancer because it is increased in patients with prostatic hyperplasia (BPH), prostatitis, prostatic ischemia and infarction, acute urine retention, and recent prostate biopsy.¹⁸ Serum PSA levels are not significantly affected by diagnostic methods such as transrectal ultrasonography (TRUS), cystoscopy, or digital rectal examination (DRE).¹⁹ Numerous writers have convincingly shown that PSA and BPH are correlated using the Hybritech Tandem-R test.²⁰ The average percentages have been 23% and 5%, respectively, for PSA readings in BPH between 4 and 10 ng/mL and above 10 ng/mL.² When it comes to PSA levels in BPH, there can be additional issues involved. Patients with BPH frequently require indwelling catheters to control acute or chronic retention; this might be the reason for any elevated PSA levels that follow.²¹ It is critical to know in clinical evaluations if PSA concentrations rise in response to transurethral catheter use alone.²² This study aims to determine that serum PSA levels can be significantly elevated in BPH, prostatitis, and prostate cancer and that a considerable proportion of patients with clinically benign prostatic enlargement have prostate adenocarcinoma.

MATERIAL AND METHODS

All Ethical Considerations are followed during this retrospective study. Confidentiality of data was maintained. Ethical Clearances is approved by Islamabad Medical and Dental College Institutional Review Board (IBR Letter No. 54/IMDC/IRB-2021) for the study "Frequency of Prostatic adenocarcinoma in transurethral resection prostatectomy done for benign prostatic enlargement and correlation with serum level of PSA". A Retrospective Study of BPH cases in tertiary Care hospital undergoing transurethral resection prostatectomy and Correlation with age and PSA levels.

The retrospective study was conducted in the Histology Department of Dr. Akbar Niazi Teaching Hospital Islamabad which is an approved and ISO-9001-certified hospital. Non-probability convenient sampling was done. Patients who underwent TURP for prostatic enlargement and LUTS

during study period were included in the study. All patients who underwent transurethral resection of prostate were included in the study. Patients who were known cases of advanced prostate cancer and were operated to alleviate symptoms. Patients whose histopathological reports or slides were not available for review. Patients who didn't give consent and proper data was not filled are excluded in this study. The data for this study was obtained by including consecutive cases of transurethral resection prostatectomy received for analysis in the histopathology lab during the study period. The data was retrieved from Histopathology record files. The slides were viewed and the diagnoses were confirmed. The patient's serum PSA levels were retrieved from pre-operation hospital medical records. The Patients who presented to the histology lab for diagnosis were reassessed using a Questionnaire based on Performa divided into different sections such as socio-demographic data, reasons, History of Diseases, PSA level, Age, and complications. The collected data was analyzed using SPSS Version 21.

Results

A total number of 53 patients were included, in which 11 patients were of Prostatic Adenocarcinoma, 14 were benign prostate hyperplasia and 28 were prostatitis (Table 1).

Table 1: Frequency of different diseases occurring in our study

Disease	Frequency	Percentage
Prostatitis	28	52.8
Prostatic Adenocarcinoma	11	20.8
BPH	14	26.4
Total	53	100.0

The highest frequency was seen in the age group 50-60 years. Younger patients had prostatitis. Prostatic adenocarcinoma was more frequent in the 75-80 age groups (Table 2).

Table 2: Frequency of different diseases in each age group occurring in our study.

Disease	Age in years				Total
	40-50	50-60	60-70	70-85	
Prostatitis	5	13	10	0	28
Prostatic Ad	0	0	1	10	11
BPH	0	4	6	4	14
Total	5	17	17	14	53

Ad;adenocarcinomas

Prostate Specific Antigen value was different in patients. The highest value reported was 28. Mean was 2.68. PSA levels in BPH and prostatitis were <4ng/ml. One patient with prostatitis and two with BPH had PSA levels more than 4ng/ml. In a significant number of cases, 3 out of 11 prostatic adenocarcinomas also had PSA levels less than 4ng/ml (Table 3).

DISCUSSION

A study carried out in a rural area of China, 1043 men were interviewed; however, 67 of them were not included because their questionnaires were missing blanks. 45 patients had a PSA greater than 4 ng/ml

The largest age group was 50-54 (18.24%), while the smallest group was 80 years or older (4.61%).²³ The study's findings are consistent with our own because, of the total number of cases, 32.1% fell within the 50-60 age range.

Table 3: PSA levels in different groups of diseases occurring in our study.

Disease	PSA-Range (ng/ml)			Total
	<4	4-10	>10	
Prostatitis	27	1	0	28
Prostatic Ad	3	7	1	11
BPH	12	2	0	14
Total	42	10	1	53

Ad;adenocarcinomas

Only two of the forty-five cases with elevated PSA in this study had prostatic adeno- carcinoma; in contrast, eight of the eleven cases with elevated PSA in our study had adenocarcinoma. In one study, the prevalence of BPH was found to be 10.04 percent. As people aged, its prevalence rose, rising from.²⁴ Prostate hyperplasia and prostatitis were found to be significant risk factors for BPH based on the correlation analysis between the associated risk factors and BPH.²⁵ There was no correlation found between BPH and diabetes, hypertension, smoking, drinking, or obesity.²⁶ Our data are related to this study as well. 53 (56.38%) of the 94 first-degree relatives of the cases and five (4.72%) of the 106 first-degree relatives of the controls had BPH, according to a study.²⁷ Of the cases of BPH, heritability seemed to account for 40.48%. 43.28, 71.37, 9.67, 5.67, 2.70, 53.36, and 19.12% were the heritability of incomplete emptying, frequency, intermittency, urgency, weak stream, straining, and nocturia. In Zhengzhou's rural areas, the overall prevalence of BPH in men 40 years of age or older was 10.04%, and the heritability of prostatic.^{27, 28} An analysis of 163 prostate cases recorded in Pakistan between 2014 and 2018 revealed that 98 (60.1%) of these cases involved benign prostatic hyperplasia, which was most frequently diagnosed in men between the ages of 61 and 70.²⁹

Men between the ages of 51 and 60 were more likely to develop prostate adenocarcinomas with Gleason scores of 8 to 10. The diagnosis showed an increasing trend (p-value=0.053) in these five years, these prostatic diseases. The most commonly diagnosed prostatic disease in men (p-value=0.140) is benign prostatic hyperplasia, which is followed by prostatitis and adenocarcinoma. Eleven of the fifty-three patients in our study had benign prostate hyperplasia, fourteen had prostate adenocarcinoma, and twenty-eight had prostatitis.^{30, 31}

A 2386 TURP patients were included in a large sample study from Pakistan.³² The prevalence of unintentional carcinoma was examined. The sixth and seventh decades of life were the most common for patients to present with incidental prostatic carcinomas. Prostate cancer was found in 10.72% of the 2386 TURP specimens overall.³² T1b was the pathological

stage for the majority of patients (90.9%) who had incidental carcinoma.³³ The frequency was as high as 20.8% in our study because there were 11 incidental cases out of 53. Advanced-stage prostatic adenocarcinoma is diagnosed more often and at an earlier age, according to studies conducted in Pakistan.^{34, 35} An annual rise (p-value=0.053) has been observed in the number of cases of prostatic diseases diagnosed. To promote early diagnosis and treatment, national-level research and health policies are necessary.³⁴

CONCLUSION

PSA levels were also raised in a case of prostatitis and two cases of BPH. We conclude that PSA levels although suggestive are not entirely specific for prostatic adenocarcinoma. Prostatic diseases are common in the age group between 50-60. Awareness and annual checkups are very necessary for early diagnosis and prevention of diseases because these diseases may lead to death.

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