e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(6); 1635-1638

Original Research Article

Relationship between PSA Values and the Histological Spectrum of Prostate Adenocarcinomas

Shaziya Noor[1], Mahesh Prasad[2], Chandershekhar Jha[3]

[1]Tutor, Department of Pathology, Sri Krishna Medical College, Muzaffarpur, Bihar
[2]Associate Professor, Department of Pathology, Sri Krishna Medical College, Muzaffarpur, Bihar
[3]Associate Professor, Department of Pathology, Sri Krishna Medical College, Muzaffarpur, Bihar

Received: 25-01-2024 / Revised: 23-02-2024 / Accepted: 26-03-2024
Corresponding Author: Dr. Mahesh Prasad
Conflict of interest: Nil

Abstract:

Background: Prostate carcinoma is one of the most prevalent carcinomas in older men. Even a slight increase in the prostate specific antigen level (PSA), which is indicative of a variety of benign prostatic tumors, causes these individuals tremendous concern. Prostate specific antigen (PSA) is still a key screening technique for the early identification of prostate cancer when used in conjunction with digital rectal examination (DRE).

Methods: The study was done on 75 prostatic specimens from September 2021 to August 2022 which included both transurethral resection of prostate chips and needle core biopsies received in the department of Pathology, Sri Krishna Medical College, Muzaffarpur, Bihar.

Results: Prostatic adenocarcinomas were common in the age group of 70-79 years with the three common symptoms of dysuria, incomplete voiding and frequency. The most common primary microscopic pattern was Gleason's pattern 3, followed by pattern 4. The most common Gleason's score was 7 (43%) which showed PSA values in the range of 21-50 ng/ml. The p value for serum PSA levels and Gleason score was 0.00001.

Conclusions: The present study showed a strong correlation between Gleason's score and PSA values. It is concluded that as the Gleason's score increases the serum PSA values also increases.

Keywords: Adenocarcinoma of prostate; Gleason`s score; Prostate specific antigen; Trans urethral resection of prostate.

Introduction

The prostate is a retroperitoneal organ encircling the neck of bladder and urethra. It is the largest accessory reproductive organ in male and is an exocrine gland whose secretions form significant component of seminal fluid. Prostatic carcinoma is now the sixth most common malignancy in the world (in terms of number of new cases) and third in importance in men. It represents 9.7% of cancers in men (15.3% in developed countries and 4.3% in developing countries). [1] It is predominantly a disease of elderly. Prostate cancer is responsible for 3% of all deaths in men over age of 55 years. [2] Unlike other Asian countries, India has a fairly high incidence of prostatic carcinoma. [3] As the diet in Asia becomes more westernized, the incidence of clinically significant prostate cancer in this region seems to be increasing. [4] Etiology of prostatic carcinoma is largely unknown till today, rendering disease prevention difficult. Hereditary factors have a role. [5,6] The great differences in the incidence of clinically manifest carcinoma indicate that the nutritional and environ-mental factors also may have an influence on the development and progression of the disease. [7] Diet rich in animal fat especially red meat show strong positive association for development of prostatic carcinoma. [8] Low levels of dietary selenium, vitamin E and vitamin D also play a role. [9] Studies also reveal that there is no definite role of sexual activity, smoking, height & weight of the individual and alcohol consumption. [10] Prostatic carcinoma has to be given importance as its incidence is increasing. This study comprises description of various Gleason's microscopic patterns of prostatic adeno carcinomas encountered in our institution, their associated clinical manifestations and also serum Prostatic Specific Antigen (PSA) level correlations in these cases. It is more necessary to study prostatic carcinomas in the present situation as their incidence keeps growing due to extended male longevity past the 60's.

Materials and Methods

The present study was undertaken on all the prostatic specimens received in the histopathology department of Sri Krishna Medical College and Hos-

pital, Muzaffarpur, Bihar from September 2021 to August 2022. The prostatic material included prostatic biopsies and transurethral resection of prostatic [TURP] chips.

Total of 75 prostatic adenocarcinoma cases only were included in the present study. The material included 60 cases of prostatic needle biopsies and 15 cases of transurethral resection of prostatic chips. The clinical details were obtained from the case files and electronic medical records across hospital information systems. In cases of prostatic biopsy, entire tissue received was fixed and processed. In cases of TURP chips, 3 to 4 cassettes were prepared in each case accommodating the total tissue and weighed approximately 8-10 grams.

Specimens weighing less than or equal to 12 grams were submitted entirely. In cases of excess material one additional cassette for each additional 10 grams of tissue was prepared. Generally, random chips were submitted for processing; however, if some chips were firmer or had a yellow or orange-yellow appearance, they were preferentially submitted. If carcinoma was detected in a TURP specimen, then all the remaining tissue was processed entirely to ensure thorough examination with reference to the pattern and scoring of malignancy. All the tissues were fixed in 10% buffered formalin and paraffin embedded. 3 to 5 micron sections were cut and stained with routine Hematoxylin and Eosin (H & E) stain. All the slides were thoroughly evaluated and the prostatic adenocarcinomas were graded by using Gleason microscopic grading.

Results

The age group of these cases ranged from 50 - 93 years with the mean age of 70 years. 30 cases (40%) out of 75 cases of prostatic adenocarcinoma were in the age group of seventy to seventy nine years (Table-1).

Table 1: Age incidence among prostatic adenocarcinomas in the present study

Age group	No. of cases
40-49	-
50-59	07
60-69	26
70-79	30
80-89	11
90-99	01
Total	75

The patients of prostatic adenocarcinoma have presented with three common symptoms of dysuria, incomplete voiding and frequency each constituting to 26.67% (Table-2).

Table 2: Clinical Presentation

Clinical symptoms	Number of cases	Percentage
Frequency	20	26.67%
Nocturia	01	1.33%
Urgency	-	-
Difficulty in voiding	10	13.34%
Straining	-	-
Poor stream	-	-
Hesitancy	-	-
Incomplete voiding	20	26.67%
Hematuria	02	2.66%
Acute retention	02	2.66%
Dysuria	20	26.67%
Total	75	100%

Gleason grading system based on glandular architecture defines five histological patterns or grades with decreasing glandular differentiation. Gleason's pattern 3 was the most common pattern in the present study. The second most common Gleason's pattern was pattern 4 (Table-3).

Table 3: Gleason's microscopic patterns in malignant lesions studied

Microscopic findings	Pattern	Number of Cases
Loosely arranged round glands	2	25
Small, variably sized glands	3	61
Fused glandular with Cribriform pattern	4	48
Hypernephroid pattern	4	03
Solid sheets	5	12
Comedo necrosis	5	01

Gleason's score was obtained by adding the primary (most predominant) Gleason grade and the secondary (second most predominant) Gleason grade. When no secondary Gleason grade exists, the primary Gleason grade was doubled to arrive at a Gleason score. Among all the 75 prostatic adenocarcinoma cases studied the most common Gleason's score was 7 in 32 cases constituting 43%, followed by score 5 (17%), score 8 and 9 (12% each) (Table-4).

Table 4: Incidence of prostatic adenocarcinoma with reference to Gleason's score

Gleason score	No. of cases	Percentage
2	-	-
3	-	-
4	06	8%
5	13	17%
6	06	8%
7	32	43%
8	09	12%
9	09	12%
10	-	-
Total	75	100%

The adjacent tissue in most of the prostatic adenocarcinoma cases showed nodular hyperplasia as accompaniment. Out of 75 prostatic adenocarcinoma cases, there was coexistence of other lesions such as nodular hyperplasia in 55 cases, chronic prostatitis in 15 cases and High grade prostatic intraepithelial neoplasia [HGPIN] in 05 cases (Table-5).

Table 5: Microscopic findings in adjacent prostatic tissue in adenocarcinoma cases studied

Microscopic findings	No. of cases
Adenofibromyomatous hyperplasia	55
Chronic prostatitis	15
HGPIN	05
Total	75

PSA levels which play an important role in the early detection and screening of prostatic cancer were obtained in all the malignant cases studied. Its value ranged from 4.1 – 70 ng/ml. The serum PSA values were correlated with Gleason's score and showed a positive correlation with statistically significant p value (Table-6).

Table 6: PSA values among adenocarcinomas with various Gleason's score

Gleason's score	4-10 ng/ml	11-20 ng/ml	21-50 ng/ml	>50 ng/ml
3	-	-	-	-
4	6	-	-	-
5	6	7	-	-
6	-	6	-	-
7			32	-
8			8	1
9				9

P value of 0.00001

Discussion

In cancer related deaths in men, the prostatic cancer is the second only to lung cancer. [11] Prostate cancer is responsible for 3% of all deaths in men over age of 55 years. [2] The results of the data analysis in the present study which comprises 75 cases of prostatic adenocarcinoma showed that adenocarcinoma of prostate was common in the age group of 70-79 years (Table-1) with the mean age of presentation being 70 years. The youngest patient was 50 years and the oldest was 93 years.

According to study done by Brawn et al [12], the average age of presentation for adenocarcinoma of prostate was 67 years. In a study done by Quian et al. [13] the mean age for carcinoma was 64.4 years (44 to 77years). Our findings were similar to these studies. The various clinical presentations of prostatic diseases can be grouped as obstructive or irritative lower urinary tract symptoms. Irritative symptoms included urgency, increased frequency, dysuria and nocturia. Obstructive symptoms included hesitancy, weak stream, terminal dribbling and acute or chronic retention of urine. In the present study the malignant lesions had 3 common symptoms of dysuria, incomplete voiding and frequency of micturition (Table-2). The incidence of prostatic adenocarcinoma was 20.3% in this study. There is wide variation in the incidence rate of prostate cancer in different parts of the world.

According to the study done by Chandanwale Shirish et al [14] on 100 prostatic specimens over a period of 2 years from 2010 to 2012, the incidence of prostatic carcinoma was 17%. According to the study done by Richard Babaian et al [15] on 151 prostatic specimens between September 1998 and September 1999 at university of Texas M.D Anderson cancer center, prostatic cancer was detected in 24.5% of men biopsied. Bob Djavan et al [16] reported 22% incidence of carcinoma.

Our findings are similar to these studies According to the study done by Bob Djavan et al [16], the mean age of patients was 67yrs and mean Gleason's score was 6. Richard Babaian et al [15] reported the mean age as 62 yrs (range 43-74) and the Gleason score was 6 in 12 patients 7 in 1 and 8 in 1 in his study. The findings of the present study were similar to these studies with the mean age of 70 years and mean Gleason's score of 7.

Conclusion

Thus to conclude, in the present study the incidence of prostatic adenocarcinoma was 20.6%, the common age group was in the range of 70-79 years with common clinical presentations being dysuria, incomplete voiding and frequency of micturition. Gleason grade 3 was the most common pattern seen and the majority of the cases were of Gleason's score 7 with a strong correlation between serum PSA levels and Gleason's score indicating that as the Gleason's score increases the serum PSA values also increases.

References

1. Epstein IJ, Alagaba F, Allsbrook WC Jr., Bastacky S, Gibod BL, De Marzo AM et al. Acinar adenocarcinoma. John N. Eble, Guido Sauter, Jonathan I.Epstein and Isabell A. Sesterhemn (editors). Pathology and Genetics Tumors of urinary system and male genital organs - World Health Organization Classification of Tumors; Lyon, France: IARC Press, 2004; 162-192.
2. Scardino PT, Weaver R, Hudson MA. Early detection of prostate cancer. Hum Pathol.1992; 23(3):211-222.
3. Krishna V. Textbook of Pathology. Orient Longman 2004; 1st ed, 902.
4. Epstein IJ. The lower urinary tract and male genital system. Kumar, Abbas and Fausto (editors). Robbins and Cotran Pathologic basis of disease. 2010, 8th Ed: 996.
5. Carter SB, Bova GS, Beaty HT, Steinberg DG, Childs B, Isaacs BW et al.Hereditary Prostate Cancer: Epidemiologic and clinical features. J Urol 1993; 150:797-802.
6. Woolf MC. An Investigation of the familial aspects of carcinoma of the prostate. Cancer 1960; 13: 739-744.
7. Carter BH, Pianta Dosi S, Isaacs TJ. Clinical evidence for and implications of the Multistep Development of Prostate Cancer. J Urol 1990; 143: 742-746.
8. Nelson GW, De Marzo MA, Isaacs BW. Prostate Cancer. NEJM 2003; 349: 366-381.
9. Mazhar D, Waxman J. Prostate Cancer. Postgrad Med J 2002; 78 (924)590-608.
10. Reiter ER, Dekernion BJ. Epidemiology, etiology and prevention of prostate cancer. Walsh, Retik, Vaughan, Wein. Campbell`s Urology. 8th ed, W. B. Saunder's Company: Philadelphia: 2002; 3003-3060.
11. Murray T, Bolden S, Wingo PA. Cancer statistics. CA Cancer J Clin. 1999; 49(1):8-31.
12. Brawn PN. Adenosis of the prostate; a dysplastic lesion that can be confused with prostate adenocarcinoma. Cancer. 1982; 49(4):826-833.
13. Quian J, Wollan P. The extent and multicentricity of high grade prostatic intraepithelial neoplasia in clinically localized prostatic adenocarcinoma. Hum Pathol. 1997: 28(2):143-148.
14. Chandanwale Shirish Set al, International Journal of Pharmacy and Biological Sciences. Jan-Mar, 2013;3(1):162-178.
15. Babaian RJ, Grunow WA. Reliability of Gleason grading system in comparing prostate biopsies with total prostatectomy specimens. Urology. 1985; 25(6):564–567.
16. Djavan B, Ravery V, Zlotta A, Piotr Dobronski, Dobrovits M, Fakheri M et al. Prospective evaluation of prostate cancer detected on biopsies 1, 2, 3, and 4: When should we stop? J Urol. 2001; 166: 1679-1683.88.