International Journal of Clinical and Diagnostic Pathology

ISSN (P): 2617-7226
ISSN (E): 2617-7234
www.patholjournal.com
2021; 4(4): 36-39
Received: 25-08-2021
Accepted: 27-09-2021

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Study of serum prostate specific antigen levels in patients with prostate lesions

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DOI: https://doi.org/10.33545/pathol.2021.v4.i4a.421

Abstract
In order to see a relationship between histopathology and PSA levels, group of 100 men were studied which included obtaining there Histopathological diagnosis and serum PSA levels before surgical intervention. We found that most common pathology encountered in prostate specimen is BPH. Most of disease of prostate occur in the age group of 61-70 years. With increasing PSA levels the possibility of malignancy increases. But Poorly differentiated tumor may not correlate with PSA level because the tumor cells may not produce PSA as they have lost differentiation.

Keywords: serum PSA, BPH, prostatic adenocarcinoma

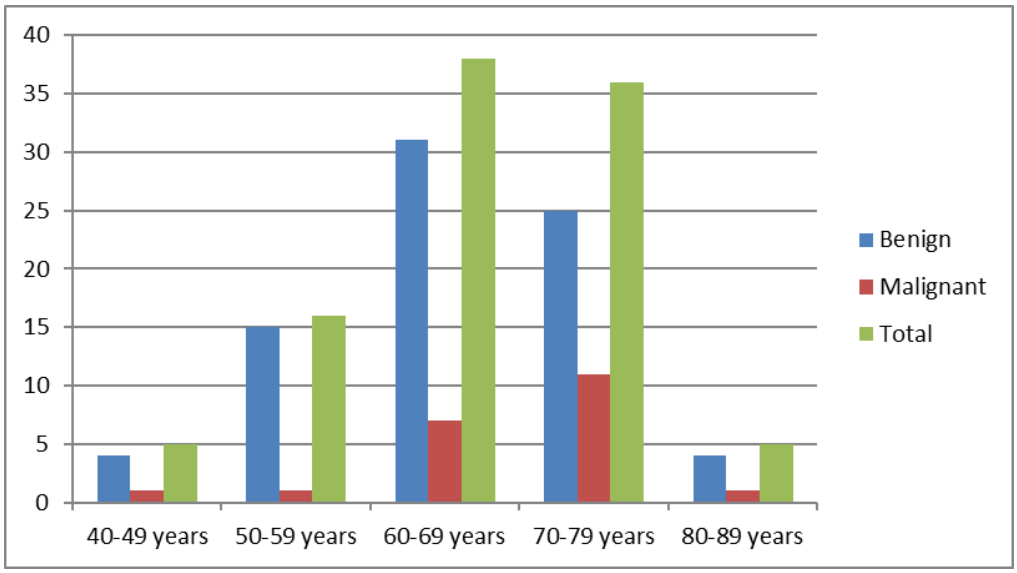
Introduction
Prostate specific antigen (PSA) is a glycoprotein enzyme secreted by epithelial cells of the prostate. PSA is a member of the kallikrein related peptidase family, which is an important tumor marker in the diagnosis of prostatic adenocarcinoma.
Prostatic carcinoma is an important growing health problem, presenting a challenge to urologists, radiologists and pathologist [1, 2]. Prostate cancer is the leading cause of new cancer in men and is second only to lung cancer as a leading cause of cancer related deaths in men [3].
PSA is present in serum of men, with normal prostate, but the levels are elevated in pathological conditions like prostatitis, hyperplasia and prostatic carcinoma. Conditions like inflammation, hyperplasia and malignancy, there is destruction of cell integrity which leads to release of PSA into circulation. This produces increase in serum PSA level. In prostatic adenocarcinoma, the malignant cells produce less PSA then healthy epithelial cells. But as there is great increase in number of cells in carcinoma, the PSA produced is more and serum levels are raised. In prostatic carcinomas, serum PSA value depends upon the differentiation of the tumor cells. The poorly differentiated prostatic tumors will have low serum PSA levels when compared to well differentiated tumors.

Materials And Methods
This retrospective study was performed at department of pathology at B.J. Medical college Ahmadabad during the period of March 2021 to October 2021. The study included 100 cases whose transrectal Ultra-sonography (TRUS) guided prostate biopsy and needle core biopsy were studied in our hospital. The specimen were sent in formalin to pathology department. Gross examination of the biopsies included precise length and diameter and colour of the cores. The biopsies were processed with paraffin embedding, cut at 3–5 μm and stained by haematoxylin and eosin (H&E) for detailed microscopic examination. The histopathological grading and scoring by Gleason system was carried out in all cases Adenocarcinoma of prostate [4]. Preoperative serum PSA levels are noted in these cases. PSA levels in these cases were compared with the Gleason's grade of these tumors.

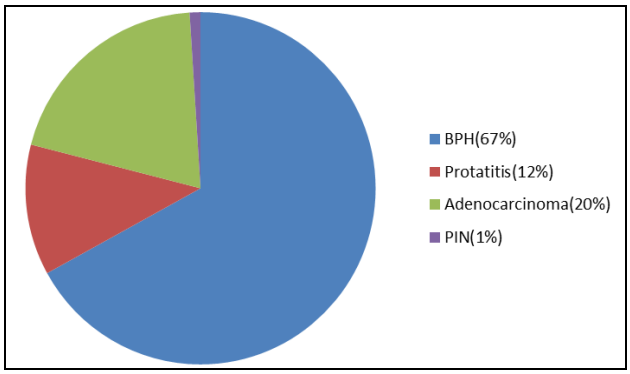
Results
A total number of 100 cases were studied. The cases were distributed in the age group of 40 to 90 years as shown in Table 1 & Graph 1

Table 1: Age wise distribution of cases

Age	Benign	Malignant	Total
40-49 years	4	1	5
50-59 years	15	1	16
60-69 years	31	7	38
70-79 years	25	11	36
80-89 years	4	1	5

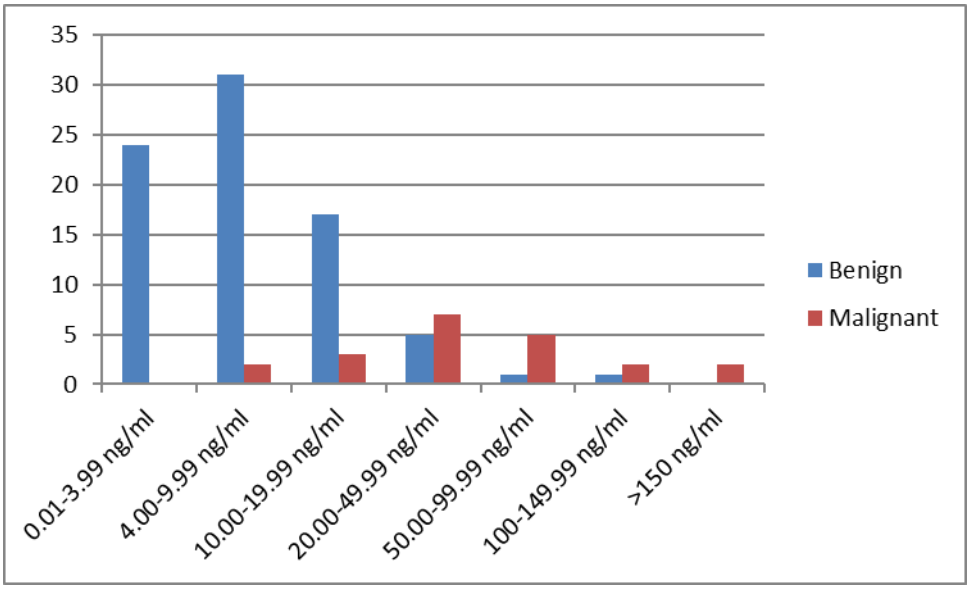


Graph 1: Age wise distribution of cases



Graph 2: Lesion wise distribution of cases

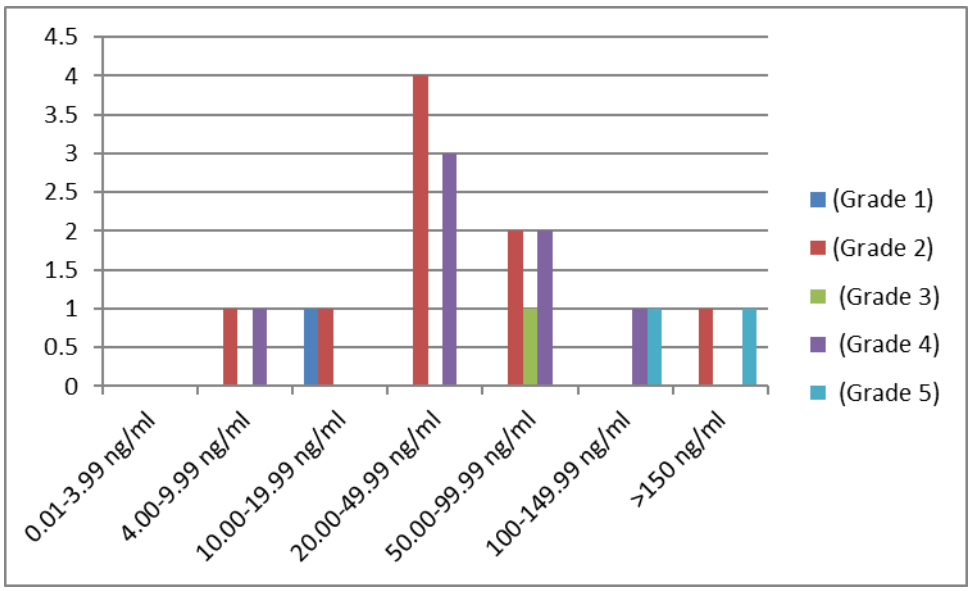
- Maximum number of benign and malignant lesions were in the age group of 60 – 69 years.
- Out of 100 cases, which 79 were benign and 21 were Malignant.
- Benign condition includes Benign prostatic hyperplasia (BPH), prostatitis.
- Malignant conditions includes Adenocarcinoma, prostatic intraepithelial neoplasia.



Graph 3: PSA level wise distribution of cases

PSA levels in all the cases were studied (Graph 2).

- In our study 24 case was found to have PSA levels less than 4ng/ml.
- 33 cases had PSA levels in the range of 4.0 – 9.99 ng/ml. Out of these 31cases were benign and 3 case was malignant.
- In the PSA range of 10 –19.99 ng/ml, 20 cases were noted, out of which 17 were benign and 3 were malignant.
- 12 cases had PSA values in the range of 20 –49.99 ng/ml, out of which 5 were benign and 7cases were malignant.
- In the range of 50 – 99.99 ng/ml, 6 cases were noted, out of which 1 cases was benign and 5 cases were malignant.
- 3 cases had PSA values in the range of 100-149.99 ng/ml, out of which 1 cases was benign and 2 cases were malignant.
- There were 2 cases which had PSA values of more than 150 they were malignant.



Graph 4: PSA level correlation with

- PSA levels in prostatic carcinomas were compared with Gleason's grade of the tumor (graph 4). Maximum numbers of prostatic adenocarcinomas were in grade 2 [7cases].

Discussion

Prostatic carcinoma is the most common malignancy among men and is responsible for 10% of cancer deaths [5]. The gold standard triad for diagnosing prostate cancer comprised DRE, PSA level, and transrectal ultrasonography [6]. Incidence of prostatic carcinoma is low in patients with hyperestrogenism resulting from liver cirrhosis and does not occur in before puberty. Occupational exposure, smoking, venereal diseases, sexual habits and diet do not show any demonstrable correlation with prostatic carcinoma [7]. Clinical stage, Gleason's score and serum PSA are independent prognostic factors in prostatic carcinoma and help to choose a definitive treatment in carcinoma [8]. The U.S. Food and Drug Administration [FDA] in the United States has approved that the annual screening of the prostatic cancer in men of age 50 and older is by assessing serum PSA levels. If the PSA levels are between 4 to 10 ng/ml, then it is considered to be suspicious and a repeat PSA test is performed. Finally prostate biopsy should be taken for histopathological analysis, if indicated [9]. This study shows 79% of cases as benign while 21% of cases were malignant.

In our study no malignancy was detected with PSA values in the range of 0 – 3.99 ng/ml. In our study histological grade III carcinomas were related to PSA levels of 20 and above, while grade I was restricted to PSA level of less than 20 ng/ml and grade II carcinomas did not have any correlation with specific PSA levels.

Conclusion

We conclude that most common pathology encountered in prostate specimen is BPH. Most of disease of prostate occur in the age group of 61-70 years. With increasing PSA levels the possibility of malignancy increases, although malignancies were seen at low PSA levels also. Moreover, positive relation was seen between higher level of PSA and Gleason score. But Poorly differentiated tumor may not correlate with PSA level because the tumor cells may not produce PSA as they have lost differentiation.

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