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# STUDY OF PROSTATIC LESIONS IN CORRELATION WITH PSA LEVELS.

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**ABSTRACT**

**Background:** Prostate specific antigen (PSA) is a protein produced by the cells of the prostate gland. It is generally increased in diseases such as prostatitis, hyperplasia, and malignancy, but the correlation between various lesions affecting the prostate gland and their corresponding rise in PSA value is not constant and exceptions may occur.

**Aims and Objective:** The aim of this study was to find out the spectrum and distribution of various prostatic lesions affecting men, with respect to their age and to find out the correlation between serum total PSA levels and histological findings.

**Materials and Methods:** This study included 150 samples of transurethral resection of the prostate (TURP) received in the histopathology laboratory, over a period of 2 year. All representative tissue sections were taken and paraffin embedded blocks were made, which were finally sliced in a standard microtome of 3microns thickness and stained with hematoxylin and eosin stain. They were examined under light microscopy for final evaluation and diagnosis. PSA levels were recorded in all the patients before surgical procedure was undertaken.

**Results:** About 51% of subjects studied were in the age group of 61–70 years. Maximum number of subjects had PSA ranging from 0 to 4 ng/ml (48.66%). Benign prostatic hyperplasia (38.75%) with or without prostatitis was the predominant lesion(46%).

**Conclusion:** We were able to determine the spectrum of prostatic lesions in different age group and the results indicate that the chances of finding malignancy with increasing values of PSA are more, but not as a rule. It can only give a clue to the histopathologist to examine the sections more thoroughly.

**KEYWORDS :** Benign prostatic hyperplasia, prostate carcinoma, prostate specific antigen.

## INTRODUCTION

The location of the prostate gland is at the neck of the bladder. Its enlargement causes urinary symptoms of static (hesitancy, retention) and dynamic (urgency,dribbling) nature. The incidence of prostatic lesions increases with increasing age[1] Due to the influence ofpathol ogical processes, the cell integrity is lost leading to the release of prostate-specific antigen (PSA) into circulation, lesions such as hyperplasia, inflammation, tumors, may lead to the increase of serum PSA value.[2-4] The increase in PSA values also depends on upon the differentiation of tumor cells. Typically sources for damage can be, cancer, bacterial infection, and prostate infarction and/or destruction of part of the prostate by damage to its blood supply[5] Digital rectal examination and transrectal ultrasonography are a preliminary practical diagnostic methods but have low specificity and sensitivity[6] Various studies done have come to various conclusion. While some of them have found positive correlation which is statistically significant, though not highly significant, some of them have not reached the same conclusion. The issue still remains unresolved as to whether thorough sampling should be done in cases where cytomorphologic features favor benignancy, but PSA values are high. Some authors suggested the use of PSA density instead of absolute PSA values while others advocated use of free PSA values which is a more reliable indicator. This study aims to find out the relationship between various prostatic lesions and serum total PSA levels, and whether there exists a positive correlation between increasing PSA levels and neoplastic pathology of prostate.

## MATERIALS AND METHODS

This is a prospective study carried out in the department of pathology, during a period of 2 years and 150 TURP specimens were received. PSA values of the patients were recorded before the surgical process. Serum PSA levels were estimated using chemiluminescent Assay. TURP specimens, entire tissue was submitted (minimum 4 blocks were taken,each block containing 2grams additional block of each 10grm extra TURP tissue so that chances of sampling error are reduced). The blocks were sliced at 3microns thickness by a standard microtome and the sections were further stained with hematoxylin and eosin stain. Sections were examined under light microscopy. Diagn ostic criteria followed for diagnosing benign prostatic hyperplasia (BPH), prostatitis, prostatic intraepithelial neoplasia (PIN), and adenocarcinoma were adapted from guidelines laid down by World Health Organization (WHO) 2004[7] Gleason's score as laid down by WHO was followed for grading adenocarcinoma.

## RESULTS

Total number of TURP specimen received was 150. Of which 61 (40.66%) were in the age group of 61–70 years. The distribution of lesions with age is shown in Table 1.

**Table 1 : Age incidence of Prostatic lesions**

| Age(yrs) | BPH & Prostatitis | PIN | Adenocarcinoma | Total |
|---|---|---|---|---|
| 41-50 | 03(2%) | 01(0.66%) | - | 04(2.66%) |
| 51-60 | 17(11.33%) | 02(1.33%) | 01(0.66%) | 20(13.3%) |
| 61-70 | 53(35.33%) | 02(1.33%) | 06(4%) | 61(40.66%) |
| 71-80 | 43(28.66%) | 06(4%) | 06(4%) | 55(36.66%) |
| 81-90 | 07(4.66%) | 02(1.33%) | 01(0.66%) | 10(6.66%) |
| Total | 123(82%) | 13(8.66%) | 14(9.33%) | 150(100%) |

PSA values were classified into intervals of 4 ng/ml. The number of lesions, when correlated with PSA, showed maximum number of cases (73, 48.66%) in the PSA range of 0–4 ng/ml. The lowest no of cases(3, 2.66%) were seen in the PSA range of 12.1–16 ng/ml. The correlation of lesions in each PSA range group is shown in Table2. Of 150 cases, 95 (63.33%) were of BPH, followed by BPH with prostatitis 28 (18.66%), the prostatic intraepithelial neoplasia 13 (8.66%)and adenocarcinoma 14(9.33%)cases. Distribution of lesions depending upon their microscopic appearance and PSA values, it was seen that maximum number of adenocarcinoma lesions was seen to occur between PSA ranges of 7.4-48.2 ng/ml. Most of the PIN lesions were distributed within the PSA range of 2.8-26.2 ng/ml. Maximum number of BPH lesions were seen in the PSA range of 0.6-22.8 ng/ml. The results of comparison of serum PSA levels in benign and malignant lesions revealed a positive correlation between the increase in PSA levels and malignant lesions. The rising PSA levels are associated with higher chances of malignant lesions, but it cannot be concluded as a rule.

**Table2: Serum PSA levels in the cases studied**

| PSA levels(ng/dl) | 0—4 | 4.1—8 | 8.1—12 | 12.1—16 | 16.1--20 | >20.1 |
|---|---|---|---|---|---|---|
| BPH & Prostatitis | 69(46%) | 23(15.33%) | 8(5.33%) | 1(0.66%) | 4(2.66%) | 18(12%) |
| PIN | 4(2.66%) | 2(1.33%) | 2(1.33%) | 1(0.66%) | 1(0.66%) | 3(2%) |
| Adenocarcinoma | - | 1(0.66%) | 1(0.66%) | 1(0.66%) | 2(1.33%) | 9(6%) |
| Total | 73(48.66%) | 26(17.33%) | 11(7.33%) | 3(2.66%) | 7(4.66%) | 30(20%) |

## DISCUSSION

In our study, we found prostatic lesions were mostly associated

within the age group of 61–70 years. This study shows 75% of the cases were benign ( BPH with/without prostatitis) while 25% of cases were malignant (PIN, adenocarcinoma). In a similar recent study by Puttaswamy et al., a total of 62 prostate biopsies were studied over a 2-year period which included TURP (88.70%) and needle biopsy specimens (11.30%). The most common pathology encountered was benign lesions constituting 80.6%. Premalignant and malignant lesions constituted 19.4%.[8] Abdel-Meguid et al. found in their study the prevalence of prostatic inflammation with BPH in about 20.1% cases.[9] The results in our study were almost comparable with their study. In a study by Shakya et al., they found two cases of PIN among 106 cases (1.88%) [10]. In a similar study done by Lakhey et al(11), Sushma et al(12) they found 13(22.5%) and 18(31.15%) cases of PIN. In our study, the incidence of prostatic adenocarcinoma was 9.33% while that of PIN was 8.66%. This is almost correlating with the findings of the study done by Sushma et al., where they reported 14(17.5%) malignant cases in their study of 80 cases of prostatic specimen. Anushree et al., in a study described prostate carcinoma to be prevalent in a mean age of 66 years and peak prevalence in the age group of 61–70 years[13] In our study the maximum number of cases of adenocarcinoma were in the age group of 61–70 years. Levels of serum PSA may vary according to the age of the patient. A study by Umbehr et al., showed acute and chronic inflammation of prostate to be more commonly associated with high levels of serum PSA[13]. Kiehl et al., in their study also concluded that BPH and prostatitis is associated with PSA elevation when glandular epithelium is disrupted[14]. In our study ,most of the patients with benign pathology had PSA in the range of 0–4 ng/ml (48.66%), while only a few (20%) had PSA levels above 20 ng/ml. A study by Lekhli et al. showed 32% of prostate adenocarcinoma patients had serum PSA value >20 ng/ml[15]. In our study, we found 6% of adenocarcinomas had PSA values over 21 ng/ml. In another study done by Anushree et al., they found 24% of prostate adenocarcinoma patients with serum PSA>20 ng/ml.(16)

## CONCLUSION

Thus, we conclude that the most common pathology encountered in prostate specimens is BPH. Most of the diseases of prostate occur in the age group of 61–70 years. Both benign and malignant pathologies can cause an increase in serum PSA levels, but the chances of finding malignancy increases with rising values of PSA, although not highly significant.

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