EVALUATION OF EFFICACY OF SERUM PROSTATE SPECIFIC ANTIGEN LEVELS IN DIAGNOSING BENIGN AND MALIGNANT PROSTATIC ENLARGEMENTS

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Abstract
Background and objectives
Study of prostatic lesions has gained more importance because development of prostatic hyperplasia is an almost universal phenomenon in aging men. Prostatic carcinoma is the second most common cause of death in men over age of 55 years. The aim of this study was to evaluate the Serum prostate specific antigen (PSA) levels in patients presenting with enlarged prostate and to evaluate the efficiency of serum PSA to diagnose and differentiate benign and malignant enlargements.

Method
100 patients attending the Nephrology Urology Hospitals OPD with enlarged prostate were evaluated and advised to undergo serum PSA testing.

Results
Among 100 patients evaluated, the efficiency of serum PSA to differentiate benign and malignant lesions was 47% and 67% respectively.

Conclusion
The age specific reference ranges are better than the traditional reference range for screening for prostate cancer in patients with an enlarged prostate and in those with urinary complaints and for planning the management. The age specific reference ranges have the potential to make serum PSA a more discriminating marker for detecting clinically significant cancers in older men (increasing specificity) and to find more potentially curable cancers in the younger men (increasing sensitivity).

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Keywords: Prostate Specific Antigen, Benign and Malignant lesions.

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INTRODUCTION

Prostate gland occupies center stage in the lives of many elderly males. Because of its location at the bladder neck, enlargement of the gland leads to problems related to urinary obstruction.[1] Prostatic carcinoma is more common in India compared to other Asian Countries[2]. It is the 5th cause of cancer in men and 4th in cancer mortality in India. At some time in their lives approximately one in 22 Indian males will be struck by prostatic carcinoma and its incidence is increasing by 3.5% every year[3].

Serum Prostate Specific Antigen (PSA) is an affordable, non-invasive tool for screening and diagnosing prostate cancers and it has been used consistently for many years in the west for screening purposes[4] PSA was first demonstrated in prostatic tissues, then in seminal plasma, purified from prostatic tissue and finally measured in serum of men.PSA in serum was demonstrated to be a clinically important assay for monitoring of prostatic carcinoma.[5] PSA is secreted into seminal fluid in high concentration, in which it is involved in liquefaction of semen coagulum. PSA was widely used as a clinical marker for prostate cancer by 1988 5 Serum PSA levels increases proportionately with advancing clinical stage[6] Studies have shown that serial increases in serum PSA, increases the incidence of occult carcinoma.[7].

MATERIALS AND METHODS

The patients who attended the OPD and those who were admitted in medical and surgical wards, who were clinically suspected to have enlarged prostate were included in the present study.

The estimation of serum PSA was performed quantitatively by enzyme linked fluorescence immunoassay (ELFA). The serum PSA levels which were used were those given by Osterling etal,[8] which were age specific reference ranges in a population of healthy men without a clinically evident prostatic enlargement. The reference ranges used include

- 40-49yrs 0-2.5ng/ml
- 50-59yrs 0-3.5ng/ml
- 60-69yrs 0-4.5ng/ml
- 70 and above 0-6.5ng/ml

RESULTS

Most of the cases with prostatic enlargements were in the age group of 70-79yrs. Out of 67 cases which were categorized as malignant on the basis of the serum PSA levels, 60 were confirmed by histopathology & 7 cases which were diagnosed as malignant by serum PSA levels were confirmed as benign by histopathology.

Categorization of the Prostatic lesions on the basis of the Sr P.S.A. levels, which were confirmed by Cyto-HPE the accuracy for BPH was 47% and 67% for malignant lesions.

Table 1 Categorization of prostatic lesions with serum PSA levels.

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of cases</th>
<th>Histopathological Diagnosis</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td>33</td>
<td>40</td>
<td>82.5</td>
</tr>
<tr>
<td>Malignant</td>
<td>67</td>
<td>60</td>
<td>89.5</td>
</tr>
</tbody>
</table>

Graph 1

Table 2 Age wise distribution of serum PSA (ng/ml) levels in BPH and adenocarcinoma of prostate.
Age Distribution | Benign Hyperplasia of Prostate | Adenocarcinoma of Prostate
---|---|---
40-49 | - | -
50-59 | 1.2 - 2.2 | -
60-69 | 0.6 - 1.2 | 5.3 - 12.3
70-79 | 0.6 - 2.6 | 9.5 - 13.3
80-89 | 0.1-2.7 | 17.5 - 98.7

**DISSCUSSION**

Haid et al.\[9\] reported an accuracy rate of 68% with serum PSA and many patients with PSA values which were between 4-9ng/dl had benign biopsies. In the present study the accuracy rate was 67% which can be attributed to the method of estimation. Babaian et.al\[10\] suggested that PSA levels of < 4 ng/ml conferred a low cancer risk, that PSA levels of >4 ng/dl but of <10ng/dl suggested an intermediate risk and that PSA levels of > 10ng/dl conferred a high risk.

Ellis et al.\[11\] reviewed the serum PSA levels in BPH and PIN and found that a majority of the men with BPH had other pathological processes like inflammations, PIN or occult cancer with with serial increases in PSA levels. In the present study 7 cases which were diagnosed as malignant based on serum PSA were benign histologically which were due to any inflammation

Speight et.al.\[12\] compared the traditional normal ranges of serum PSA to the age specific normal ranges and concluded that the age specific normal ranges were helpful in increasing the specificity of PSA by eliminating some eliminated values of PSA in men who were in the 60s and 70s. In the present study, the age specific reference range was very much useful in categorising these lesions as the serum PSA was near the traditional normal range, but clearly above the age specific normal range.

Bains et.al.\[13\] found a significant association between the PSA levels and glandular proliferation. Chronic prostatitis and glandular proliferation are the 2 most important factors which contribute to Serum PSA elevation in hyperplastic prostates.

Brawer et al.,\[14\] screened 1249 patients for prostate carcinoma on the basis of their serum PSA levels and concluded that PSA represented an important adjunct to DRE for the early detection of prostate carcinoma. Guthman et al.,\[15\] studied 100 patients with biopsies and correlated the findings with the pre biopsy sr PSA levels and ultrasound findings and found that a significant percentage of patients with a benign DRE and an elevated sr PSA value harbour a clinically significant but potentially curable prostatic malignancy. Richie et al.,\[16\] studied the efficacy of sr PSA in the early detection of prostatic carcinoma in men who were aged <50 yrs and found that the sensitivity of PSA was 75% and that its specificity was 87%. Aus et al.,\[17\] observed that the cancer detection rate was significantly higher in the patients who had 5 or more biopsies than in those had 4 or less and with sr PSA levels which were <10ng/dl, while the detection rate was unaffected by the number of biopsies which were taken if the serum PSA alone was above 10ng/dl. Smart et al.,\[18\], while documenting the facts and fiction of prostate cancer in USA, observed that an annual PSA blood test and DRS which were done on all the men who were over 50 yrs of age, followed by the appropriate treatment, had decreased the number of deaths which was caused by prostate cancer. In all the studies which have been mentioned, there was a considerable overlap of the Sr PSA levels in the cases with benign and malignant prostatic lesions. In the present study, there were two cases in which the sr PSA levels were in the higher limit of the normal, but which on FNAC and HPE turned out to be malignant, emphasizing the fact that the age specific reference range of sr PSA was a better tool for screening prostatic malignancies than the traditional reference range. The diagnostic accuracy of Sr. PSA in the present study was 67%which was mainly due to the use of the age specific reference range for serum PSA. Chadwick et al.,\[19\] assessed the value of serum...
PSA as a screening test and found it to be better than a digital rectal examination. Ferrero et al.,[20] however suggested that the results of PSA must be interpreted cautiously, as they could be elevated in cases of prostatitis, prostate infarction, lithiasis and abscess formation. Gustafsson et al.,[21] found that the positive predictive value had increased to 4% when only a digital rectal examination was used and that it had increased to 71% when serum PSA was used along with DRE. Nadler et al.,[22] concluded that the prostatic volume and inflammation were the most important factors which contributed to the serum PSA elevation in men without clinically detectable prostate cancer. Ronnett et al.,[23] found that in patients with high grade prostatic intraepithelial neoplasia on the biopsy material and elevated serum PSA values, BPH may account for the elevated serum PSA levels. More likely, because of the association between the high grade prostatic intraepithelial neoplasia and carcinoma, these patients have an undiagnosed carcinoma as the source of the elevated serum PSA values.

CONCLUSION

The serum PSA levels are a good indicator for the glandular proliferation of the prostate and they can be used as a marker to check for the progression of prostate carcinoma. They can be used as a marker of choice in the primary diagnosis of a prostatic enlargement, when an early diagnosis is required or when invasive methods like FNAC/Biopsy are not possible due to the patients’ conditions. They can also be used as a marker for a prostatic malignancy in cases of disseminated unknown primary malignancies. The age specific reference ranges are better than the traditional reference range for screening for prostate cancer in patients with an enlarged prostate and in those with urinary complaints and for planning the management.

The age specific reference ranges have the potential to make serum PSA a more discriminating marker for detecting clinically significant cancers in older men (increasing specificity) and to find more potentially curable cancers in the younger men (increasing sensitivity).

REFERENCES

effective is the diagnostic triad / J Surg Oncol. 1994 May; 56(1): 32-38