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ORIGINAL RESEARCH

Assessment of total PSA and free PSA levels in female patients with breast cancer

[1]Dr. Ruhi Mahajan, [2]Dr. Rishabh Gupta, [3]Dr. Servishet Saraf, [4]Dr. Jharna Verma

[1]Assistant Professor, Department of Biochemistry, ASCOMS and Hospital, Siddhra, Jammu, Jammu and Kashmir, India
[2,3]Post Graduate, Department of Surgery, ASCOMS and I, Siddhra, Jammu, Jammu and Kashmir, India
[4]Senior Resident, Department of Plastic Surgery, CMC Ludhiana, Punjab, India

Correspondence:
Dr. ServishetSaraf
Post Graduate, Department of Surgery, ASCOMS and I, Siddhra, Jammu, Jammu and Kashmir, India

ABSTRACT

Background:Breast cancer continues to be a significant health threat, being the second most common cancer among Indian women. The present study was conducted to assess total PSA and free PSA levels in female patients with breast cancer.

Materials & Methods: female patients with tumours growth of breast were included. Patients were classified into benign and malignant growth according to WHO classification. Patients were classified into group I (breast growth) and healthy subjects were put in group II. Parameters such as serum total prostate specific antigen (TPSA), serum free prostate specific antigen (FPSA) was recorded.

Results: Age group 20-40 years had 30 in group I and 28 in group II and 40-60 years had 35 in group I and 37 in group II. There were 38 benign and 27 malignant lesions of breast. The difference was significant (P< 0.05). The mean total PSA in benign lesions was 12.2, in malignant was 15.7 and in group II was 1.8 and free PSA was 0.15 in benign, 0.22 in malignant and 2 in group II. The difference was significant (P< 0.05).

Conclusion: Both benign and malignant breast tumour patients exhibited high level of free and total prostate specific antigen.

Key words: benign, malignant breast tumour, prostate specific antigen

INTRODUCTION

Breast cancer continues to be a significant health threat, being the second most common cancer among Indian women.[1] Prostate specific antigen (PSA), a 33 kDa serine protease which has already been established as a valuable marker for screening, diagnosis and management of prostate cancer has been suggested to have a number of potential roles in breast cancer.[2] PSA, found in a very low but detectable levels in the circulation of women, is likely to be originated from breast tissue.[3] Similar to prostate PSA, production of breast PSA is said to be under hormonal control and androgens in particular are believed to upregulate the expression of PSA gene through androgen receptor.[4]

PSA is a glycoprotein that was believed to be produced by epithelial cells of the prostate gland. Later on, studies inferred that PSA is not prostate-specific and is also secreted by hormonally regulated tissues such as breast, ovaries and endometrium.[5] PSA exists in free and bound forms. Because of its very low concentrations in females than males, the diagnostic utility of serum PSA in breast cancer was restricted previously.[6] However, a

significant improvement in detecting serum PSA using ultrasensitive diagnostic methods has lead to observation of significant higher concentrations in breast neoplasms. Bound form of PSA predominates in normal females, and benign breast conditions in contrast to serum-free PSA in breast cancer.[7] The present study was conducted to assess total PSA and free PSA levels in female patients with breast cancer.

MATERIALS & METHODS

The present study comprised of 65 female patients with tumours growth of breast. The consent was obtained from all patients.

Data such as name, age etc. was recorded. Patients were classified into benign and malignant growth according to WHO classification. Clinical staging of the malignant cases was done according to American Joint Committee on Cancer Staging. Patients were classified into group I (breast growth) and healthy subjects were put in group II. Parameters such as fasting plasma glucose, lipid profile, serum urea, serum creatinine along with estimation of serum total prostate specific antigen (TPSA), serum free prostate specific antigen (FPSA) and serum testosterone was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Group I	Group II
20-40	30	28
40-60	35	37

Table I shows that age group 20-40 years had 30 in group I and 28 in group II and 40-60 years had 35 in group I and 37 in group II.

Table II Benign and malignant growth

Parameters	Number	P value
Benign	38	0.91
Malignant	27	

Table II, graph I shows that there were 38 benign and 27 malignant lesions of breast. The difference was significant (P< 0.05).

Graph IBenign and malignant growth

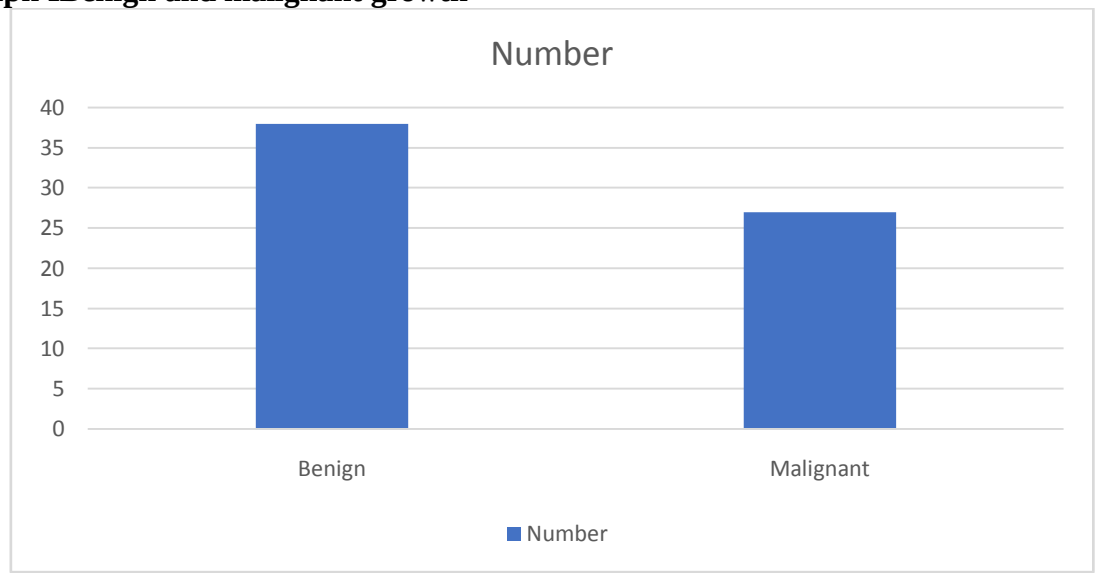

Table III Assessment of Serum total PSA and free PSA

Group	Total PSA (ng/l)	Free PSA (ng/l)
Benign	12.2	0.15
Malignant	15.7	0.22
Group II	1.8	2
P value	0.01	0.05

Table III shows that mean total PSA in benign lesions was 12.2, in malignant was 15.7 and in group II was 1.8 and free PSA was 0.15 in benign, 0.22 in malignant and 2 in group II. The difference was significant (P< 0.05).

DISCUSSION

Breast tumours are one of the leading causes of morbidity and mortality among the various types of cancers affecting women globally.[8] In India, breast cancer is the second most common cancer diagnosed in women after cervical cancer, and the incidence is found to be rising.[9] In 2008, it was estimated that there were 115,251 new cases of breast cancer with an age standardised incidence rate of 22.9/100,000. By 2030, it is estimated that the number of new cases of breast cancer in India will reach just under 2,00,000 per annum.[10,11] Various screening and diagnostic modalities are available for the detection of breast cancer. 'Triple test' is one of the common accepted diagnostic procedures for identifying breast tumours having its own limitations; and hence, the search for new diagnostic interventions is needed.Diagnosis by detecting specific breast-derived products in blood may be an easier way to diagnose.[12] In this context, the role of tumour markers in the diagnosis of breast tumours is of special interest.[13,14] The present study was conducted to assess total PSA and free PSA levels in female patients with breast cancer.

In present study, age group 20-40 years had 30 in group I and 28 in group II and 40-60 years had 35 in group I and 37 in group II. Black et al[15]measured and compared the relative proportions of free PSA and PSA complexed to the serine protease inhibitor alpha 1-antichymotrypsin in the serum of women with breast cancer or benign breast disease or women with no known malignancies. PSA was measured with an established immunoassay for total PSA and a novel immunoassay for free PSA, both of which had a detection limit of 0.001 microgram/litre (1 ng/litre). The percentage of breast cancer patients with free PSA as the predominant molecular form (> 50% of total PSA) in serum was five times higher than that of healthy women or women with benign breast disease, and PSA decreased in the serum of breast cancer patients after surgery. The diagnostic use of free PSA for breast cancer is limited at this point, due to the low diagnostic sensitivity (approximately 20%); however, free PSA as the predominant molecular form shows a high diagnostic specificity (approximately 96%) in comparison to women free of breast cancer or with benign breast disease. These results suggest that the clinical applicability of free PSA for breast cancer diagnosis and the biological mechanism behind its increase should be further investigated.

We found that there were 38 benign and 27 malignant lesions of breast. We found that mean total PSA in benign lesions was 12.2, in malignant was 15.7 and in group II was 1.8 and free PSA was 0.15 in benign, 0.22 in malignant and 2 in group II. Swathiet al[16]assessed the utility of serum total and free PSA in combination with carcinoembryonic antigen (CEA) and carbohydrate antigen 15-3 (CA 15-3) in diagnosis of breast cancer. Seventy two female patients (38 with benign breast disease and 34 with malignant breast disease) who were histologically, cytologically confirmed with diagnosis of primary breast tumours were investigated. Serum total prostate specific antigen (PSA), Free PSA, CEA, CA 15-3 were analysed by enzyme linked immunosorbent assay (ELISA) method. Diagnostic performance of markers was studied using receiver operating characteristic curve and logistic regression analysis. Sensitivity, specificity, positive predictive value (PPV) and negative

predictive value (NPV) were calculated.Patients with malignant breast cancer had significantly higher levels of all tumour markers compared to benign breast tumours. A significant decrease in total PSA, CEA and a statistically insignificant decrease in free PSA concentrations were seen in malignant breast cancer patients after surgery. Performance of total PSA was best among all the markers with 100% sensitivity, NPV, 94.7% specificity and 94.4% PPV.

CONCLUSION

Authors found that both benign and malignant breast tumour patients exhibited high level of free and total prostate specific antigen.

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