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RESEARCH ARTICLE

BIO CHEMISTRY

CA-15-3 AND BREAST CANCER

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ABSTRACT

Tumor Markers are a potential powerful means of obtaining information about cancer.CA 15-3 is a well established tumor marker for early detection of recurrent breast cancer .Blood samples were investigated for CA 15-3 level in 50 histopathologically proven breast cancer patients of which 30 patients are untreated and 20 had under gone primary surgery in comparison with 50 normal healthy persons (control) of similar average age limit and body mass. Serum levels of CA 15-3 were significantly in breast cancer patient ($p < 0.05$).

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KEYWORDS

Metastasis, Recurrence, Prognosis, Malignant, Tumor marker

INTRODUCTION

Breast cancer is the most common female- related cancer that leads to death in mostly 40-45 year old women. Breast cancer is the most prevalent malignancy and primary cause of cancer death in women worldwide. The age-adjusted incidence of the new case has been steadily increasing since the middle of1940s [1]. In India, an average of 80,000 women is diagnosed with carcinoma of the breast, and 40,000 women die of the disease every year [2]. The diagnosis of breast cancer at an earlier stage allows a woman more choice in the selection of treatment option. While physical examination and mammography are useful screening procedures for the early detection of breast cancer, they are also labor intensive and require health professionals who are highly trained and experienced. Also, despite efforts to provide accurate diagnosis, these screening procedures can produce a substantial percentage of false positive and false negative results, especially in woman with dense parenchymal breast tissue [3]. Tumor markers are substances identified in the circulation of patients with malignant disease, which may be used in diagnosis (early detection and differential diagnosis), prognostic evaluation and follow–up (therapeutic monitoring and diagnosis of recurrence)[4]. CA 15-3 is a mucin belonging to a large family of glycoprotein's encoded by the MUC1 gene that are heterogeneously expressed on the apical surface of normal epithelial cell types, including those of the breast . It is a breast cancer-associated antigen that is defined by its reaction with monoclonal antibodies115D8 and DF3 [5]. CA 15-3 determination is particularly useful in evaluating recurrence of disease and response to treatment. The potential uses of CA 15-3 in clinical practice fall into two categories improved or more accurate diagnosis and increased convenience or cost effectiveness [6]. CA 15-3 is the most sensitive test in detecting metastatic breast cancer [7]. CA15-3 may be useful marker for the diagnosis of secondary breast cancer [8]. The most obvious role is a direct substitution for a bony scan [6]. The present work is to evaluate CA 15-3 level in breast cancer patients.

MATERIALS AND METHODS

Blood samples was collected from Aringar Anna cancer Institute , Kancheepuram and investigated for CA 15-3 level in 50 Histopathologically proven breast cancer patients of which 30 patients are untreated and 20 had under gone primary surgery in comparison with 50 normal healthy persons(control) of similar average age and body mass. None of them had concomitant disease such as diabetic mellitus, liver disease and rheumatic arthritis. Patients were instructed to follow usual diet. Informed consent was obtained from all the participants. The human ethics committee of office of the Director, Govt. Arignar Anna Memorial cancer Hospital, Regional Cancer Center, Karapettai, Kancheepuram vide Ref.No.262/E1/08 has approved the study. Controls consisted of members of the public with no previous history of breast cancer and other cancer related diseases.

Blood samples were centrifuged for 15 min (3000g) and then serum are separated and stored at 4 ˚C for less than 48 h, for analysis. Serum CA 15-3 estimated by using kit (CIS, High Wycombe),this kit incorporates two monoclonal antibodies,1158 and DF3.The data for biochemical analysis are expressed as

mean ± SD. Statistical comparisons were performed by ANOVA. The results were considered statistical significance comparing normal individuals.

RESULTS

1. Mean age and body weight distribution

Table – 1

Parameters	Controls	Patients
No. of persons	50	50
Mean Age	51.6 ± 8.2	52.9 ± 7.7
Mean body weight (kg)	61.8 ± 5.5	62.7 ± 5.7

The mean body weight of breast cancer patient was 61(range 50 - 74) which alters slightly during the study. Values are means ± standard deviation of fifty breast cancer patients and healthy controls.

2. CA 15-3 status in patients and control (mean ±SD, n=50)

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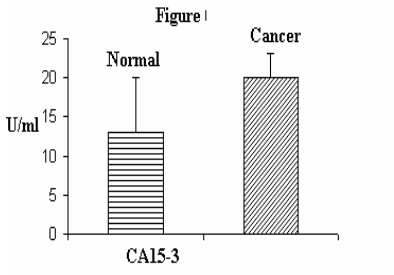
Graph – 1



Graph 1

shows the level of CA 15-3 in normal and breast cancer patients. Serum CA 15-3 concentration was observed significantly elevated in breast cancer patient irrespective of clinical stages. (p < 0.05).

DISCUSSION

The role of tumor markers in the management of breast cancer patients is limited to patients with advanced disease, since these are seldom abnormal in early disease or with local recurrence. Thus tumor marker analysis is appropriate in previously diagnosed patients at high risk for recurrence to detect early disease dissemination and in patients with metastasis disease to evaluate therapeutic response [9].

In general, changes in tumor markers accurately and consistently reflected changes in disease status but the pertinent issue, whether the use of tumor markers in clinical practice will lead to more effective treatment remain controversial. CA 15-3 is a marker of distant metastasis in breast

carcinoma with high specificity and moderate sensitivity[6]. In general, the following conclusions maybe drawn from other studies although results are inconsistent: (a) in normal individuals, Ca15-3 levels vary from0 to about 30 U/ml; values of 30 or more are raised; (b) some non-breast malignancies and other diseases, such as renal disorder. In our present study, the negative predictive value of CA 15-3 was low and a negative value had limited clinical relevance. This is due to the fact the tumor markers remain within normal limit and the facts that all patients with widely disseminated disease display tumor abnormalities. The positive predictive values for CA 15-3 in breast cancer patients were high reflecting the high sensitivity of this marker for metastatic disease[10,11]. Elevated CA 15-3 levels are more common in metastatic breast cancer patients than with other tumor markers. CA15-3 has been shown to be elevated in 95% of cases where metastasis existed[12].

In the present study, the levels of CA 15-3 were normal in all patients except nine of the postoperative patients showed a slight elevated level. This indicates recurrence of the disease. Previous studies also indicate the risk in tumor marker is the early sign of disease progression [13]. Our results suggest that only very slight increase in the level of CA 15-3 in benign tumor than normal. Therefore the abnormal increase in the levels of CA 15-3 could occur only in advanced condition.

CA 15-3 serum levels are influence by disease extent [14]. Previous study also reported an elevated level of CA 15-3 in metastatic condition [9]. The failure of CA 15-3 return to normal after initial therapy including surgery and adjuvant chemo hormonal therapy, suggested the presence of occult metastatic disease [9].

CONCULSION

This study also suggests that there is a very slight increase in CA15-3 of few patients indicating a chance of disease progression or recurrence. CA15-3 abnormalities could occur only during metastases. Hence none of the patient had reached the metastatic condition. CA15-3 is only one breast cancer marker among others. Addition of other markers such as carcinoembryonic antigen (CEA) or the erythrocyte sedimentation rate can raise the sensitivity of the serum marker testing in breast cancer considerably. Hormone therapy plays an important role in overall treatment of breast cancer. A regular self examination of breast is a foremost preventable measure for breast cancer.

REFERENCE

1. Bland K..I, Beenken SW, Copeland E.M. The breast. In: F.C Brunicardi, D.K Anderson, T.R Billjar, D.L Dunn, J.G Hunter, R.E Pollock(8th eds), Schwartz principles of surgery, 2005,pp. 453-496.
2. Globocan 2002, IARC [http://www.sunmed.org/incidence.html].
3. Bigler L.R, Streckfus C.F, Copeland L, Burns R, Dai X, Kuhn M, et al, The potential use of saliva to detect recurrence of disease in women with breast carcinoma. J Oral Pathol Med, 31: 421 – 31, (2002).
4. Barros A.C, Fry W.Jr, Nazario A.C, Santos M.O, Sato M.K, Experience with CA 15.3 as a tumor marker in breast cancer. Eur J SurgOncol, 20:130-133,(1994).
5. Hayes D.F, Sekine H, Ohno T, Abe M, Keefe K, Kufe D.W, Use of murine monoclonal antibody for detection of circulating plasma DF3 antigen levels in breast cancer patients. J Clin Invest,75:1671-1678, (1985).

6. Tomlinson I.P.M, Whyman,A, Barrett J.A and Kremer J.K, Tumor marker CA 15-3: possible uses in the routine management of Breast cancer. European Journal of cancer, 3H(6): 899-902, (1995).
7. Dnistrain A.M, Schwartz M.k, Greenberg E.J, et al, Carcinoma – associated mucin antigen as circulating tumor markers in breast cancer patients. Breast Cancer Res and Treat, 16:163Abst, (1990).
8. Robertson J.F.R, Pearson D, Prvi M.R, Selby.C, Badley R.A, Pearson J, Blamey R.W and Howell A, Assessment of four Monoclonal Antibodies as serum markers in Breast cancer. Eur F cancer, 26 (11/12):1127-1132, (1990).
9. AnnDnistrian A, Morton Schwartz K, Ernest Greenbery J, Carol Smith A and Delia Schwarty C, CA 15-3 and Carcinogenic antigen in clinical evaluation of breast cancer. Clinica chimica Acta, 200: 81 – 94, (1991).
10. Dinistrain A.M, Schwartz M.K, Greenberg E.J, et al, Evaluation of CA M26, CA M29, CA15-3, CEA as circulating tumor markers in breast cancer patients. Tumor Biol, 12:82-90, (1919).
11. Gunczler P, Ogris E, Maca S, Danmayr E, Tumor markers in breast cancer : on the diagnostic value of the serum determination in clinical freedom from tumor and manifest disease. Onkologie , 12: 209-214, (1989).
12. James T.W.U. Diagnosis and management of cancer using serologic tumor markers. In: Henry JB (eds). *Clinical Diagnosis and Management by Laboratory Methods*.20th Edn, New York, WB Saunders, 2001, pp. 1028 - 1042.
13. J.F.R. Robertson, W.Jaeger, J.J.Symendera, C. Selby, R. Coleman, A. Howell, J. Winstanley, P.E. Jonssen, E. Bombardieri, J.R.C. Sainbury, H.Gronberg, E.Kumpulainen and R.W. Blamey, The objective measurement of remission and progression in metastatic breast cancer by use of serum tumor makers, S0959-8049(98)00297-4.
14. Tampellini M, Gorzegno G, Sarobba G.M., Durando A, AreseP, Manzen E, Castiglione F, Malters A.De, Nuzzo F, Dogliottti L, Relationship between estrogen receptor (ER) status in primary breast cancer specimen and serum CA 15-3 levels at first relapse of disease. poster friday , S105 (1998).