

Serum Level of CA15.3 and CEA in Women Affected with Breast Cancer

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Abstracts: The tumor marker CA15.3 is the most specific indicator of breast cancer ever known. CEA as the first tumor marker discovered, has been applied in following the patients' responses to different types of treatment for cancer. This study was carried out to assess the serum level of these two markers in the breast cancer patients. In this cross-sectional descriptive study, the serum level of CA15.3 using ELISA and that of CEA using IRMA were recorded in all the breast cancer female patients. The collected data were analyzed via SPSS. For the 306 female patients studied, the age mean was 48.8 (an age-range of 21-81 years) and the mean concentration of CA15.3 serum was 29.9 U mL⁻¹ (normal limit is 6-36, whereas this range was 3-330). The CEA serum level mean was 9.6 ng mL⁻¹ in the patients (normal limits is 0-50 ng mL⁻¹, whereas this range was 0.6-329). The CA15.3 value was higher than the normal limits in 54 patients (17.6%) and the CEA value was higher than the normal limits in 38 patients (12.4%). There was a significant difference in CA15.3 serum level ($p < 0.01$) in different age groups, the age group of 71-80 having the greatest value. Of 54 patients who had an increase in CA15.3 level, only 24 showed an increase in the CEA level, showing no significant correlation between these two markers ($p = 0.154$, $r = 0.32$). Regarding the non-specificity of CEA as a marker of breast cancer and its low sensitivity and also for the lack of its proper correlation with a more specific marker, i.e., CA15.3, it is advisable to revise determination of CEA in such patients.

Key words: CA15.3 • CEA • breast cancer

INTRODUCTION

CA15-3 is a marker tumor, having a relation with breast cancer [1]. This marker is often used at the time of the treatment and recovery from the disease [1-4].

Some studies show that CA15-3 increases rarely in the beginning of breast cancer incidence [5] while others indicate that it often increases [6]. It may increase in pancreas cancer [5, 7], also in lung and ovary [5] as well as in spleen cancers [8]. It may increase in non-malignant cases in hepatitis and cirrhosis as well [9].

CEA is a tumor marker produced in fetus before birth, It's production, however, stops after birth. In does not exist in normal adults. Glycoprotein increases in cancers of organs such as uterus [10], lung [11], breast [12-14], spleen [15, 16], stomach and intestine [17, 18], colon [19, 20], kidney [21], pancreas [22] and the people consuming tobacco [23] as well as in non-malignant tumors such as peritoneal tumor [24]. It is used as a good marker of prognosis in the treatment of cancers. This marker has a relationship with cancers and their recurrences.

On the whole, these tumor markers are used to prognoses the results of treatment, care and recurrence of the disease.

The aim of this study was to determine the mean of the serum level of CA15.3 and CEA in the group under study and to determine the frequency distribution of the serum level of CA15.3 and CEA while higher than normal. Also the relationship between CA15.3 and CEA while higher than normal was to be determined.

MATERIAL AND METHODS

This cross-sectional descriptive study was carried out on 306 women suffering from breast cancer in the year 2005. The disease had been confirmed pathologically and the patients had been treated with surgery, chemotherapy, radiotherapy or a combination of these and referred to Yazd Central Laboratory of Medical Sciences University filling in the relevant questionnaire. 5cc of venous blood was taken from each, poured in tubes and 3 h later its serum was separated and kept in a freezer with the temperature of -80°C temperature. For 15 days, CA15.3 was measured through ELISA and CEA through IRMA on the basis of the kit brochure purchased from Radim - the Italin Inc.

Data including the descriptive tables were analyzed by chi-square and Pearson Correlation tests through SPSS program.

Table 1: CA15-3 Serum level mean in the subjects according to their age

Age	Number	Mean	Standard		
			Deviation	Minimum	Maximum
21-39	56	19.6	11.8	7	40
40-49	106	35.2	48.8	9	230
50-59	88	30.7	44.8	3	330
60-69	45	28.8	35.4	8	254
70-80	11	40.6	35.5	10	143
Total	306	29.9	38.4	3	330

Table 2: CEA Serum level mean in the subjects according to their age

Age	Number	Mean	Standard		
			Deviation	Minimum	Maximum
21-39	56	8.20	42.2	0.6	306.0
40-49	106	10.80	26.3	0.8	125.7
50-59	88	14.10	48.1	0.7	329.0
60-69	45	4.29	11.7	0.9	82.1
70-80	11	14.80	17.4	1.0	56.4
Total	306	9.60	33.0	0.6	329.0

Table 3: The Correlation between CEA and CA15-3 in the subjects

CA15-3	CEA					
	Normal		Abnormal		Total	(%)
	No.	(%)	No.	(%)		
Normal	238	77.7	14	4.57	252	82.3
Abnormal	30	9.8	24	7.8	54	17.7
Total	268	87.5	38	12.65	306	100
Chi- square	p < 0.01					
Pearson Correlation	r = 0.32, P = 0.154					

RESULTS

Of 306 female patients studied, the age mean was 48.8 (an age-range of 21-81) and the mean concentration of CA15.3 serum (its normal limit is 6-36 U mL⁻¹) was 29.9U mL⁻¹ (range from 3 to 330). The highest mean of CA15-3 was related to the age group of 70-80. The women mostly suffering from the disease were within the age range of 40-49 as indicated in Table 1. The CEA serum level mean was 9.6 ng mL⁻¹ (normal limit is 0-50 ng mL⁻¹, whereas this range was 0.6-329) as shown in Table 2. The CA15-3 was higher than normal in 54 patients (17.6%). Also CEA was higher than normal in 38 patients (12.4%) representing a significant difference (p<0.01).

As Table 3 reads, 24 patients had CEA and CA15-3 higher than normal showing no significant correlation between the two markers (p=0.154, r=0.32).

DISCUSSION

Research has shown that tumor markers are appropriate guides for screening as well as treatment and immunologic care of breast cancer [25]. CEA is not good for breast cancer

screening [25], however, it is good for staging and treatment maps of the patients [25]. American Oncology Association does not recommend these two markers for diagnosis, but they are required to be studied in relation to breast cancer as strong markers. In this study, as shown in Table 1, 306 women suffering from breast cancer, their age average of whom was 48.8, were studied. In another study carried out in Fars province, the age average of the subjects studied was 59; this, however, may be due to the low number of the subjects [26]. In a separate study performed in Tabriz medical sciences university, the age average of the patients came to 43.3%. In this study the age range of the patients was 21-80, but in a similar study carried out in America the age-range was 14-70 and higher [25]. In our study, the number of the patients who had CA15-3 higher than normal, was more than the patients who had CEA higher than normal and this difference was significant (p<0.01).

In a similar study performed in America and Taiwan, CA15-3 has been introduced as a marker better than CEA to assess and prognose the treatment results in women affected with breast cancer [30].

As the results of the study show, regarding the non-specificity of CEA as the marker of breast cancer and its low sensitivity as well as its lack of sufficient correlation with the more specific marker, i.e. CA15-3, it is essential to reassess the effectiveness of CEA in such patients. Also it is suggested to consider CA15-3 as a better marker in reliably evaluating and prognosing breast cancer cases.

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