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ASSOCIATION OF BREAST CANCER AND SERUM TRACE ELEMENT LEVEL.

Biochemistry

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ABSTRACT

Background: Cancer has recently become one of the most obsessing issues in the world, since both its incidence and impact on world economy has become enormously huge. Breast cancer is potentially life threatening malignancy that develops in one or both breasts.

Aim: To estimate the serum level of trace elements copper, zinc in female which are newly diagnosed with breast cancer To establish any correlation between level of trace elements in severity of breast cancer disease.

Methods : Copper and zinc was estimated by di Br-PAESA method and 5-Brom-PAPS Johnsen and R.Eliasson (1987) on semi auto analyser and read at 580 nm and 570 nm.

Results : Serum levels of copperan d zinc in breast cancer patient suggests a strong positive and negative correlation.

Conclusion : serum levels of these trace element can be use as a marker for early diagnosis of breast cancer.

KEYWORDS

Breast cancer, cancer, copper, zinc.

Introduction: In recent years, the association between trace elements and cancer has been Seen, where some trace metals are claimed to be carcinogenic and capable of inducing a toxic effect through the formation of free radicals and acting as cofactors in the Oxidative damage of biological macromolecules and DNA.[1] Cancer has recently become one of the most obsessing issues in the world, since both its incidence and impact on world economy has become enormously huge. This life threatening disease in it is many forms have affected a lot of human lives since it not only disturbs the physical and physiological function of the human cells but also its effects extend to seriously damaging the patient's quality of life.[2] Global burden of cancer is 14.1 million new cases and 8.2 million cancer related deaths in 2012. Breast cancer is the most common cancer affecting women worldwide nearly 1.7 million cases diagnosed in 2012 representing 12% of all new cases and 25% of all cancers in women. 6.3 million Patients are living with breast cancer for the past 5 years. [3] Incidence and Mortality worldwide: states that In India alone 83000 new cases are diagnosed each year with 19 per 100000 females whereas the number is 210 per 100000 females in USA may be in part due to improved screening and better awareness about the problem.[4] Every woman is at risk for developing breast cancer. Several relatively strong risks Factors for breast cancer that affect large proportions of the general population have been known for some time. However, the vast majority of breast cancer cases occur in women who have no identifiable risk factors other than their gender (3). The "established" risk factors for breast cancer are female gender, age, previous breast cancer, benign breast disease, hereditary factors (family history of breast cancer), early age at menarche, late age at menopause, late age at first full-term pregnancy, postmenopausal obesity, low physical activity, race/ethnicity and high-dose exposure to ionizing radiation early in life.[5,6,7]

Due to aforementioned literature of breast cancer patients in southern part of Rajasthan, we have planned this study.

Material and methods:

The study included oncology unit and Biochemistry department of Geetanjali medical college and hospital 2015 to May, 2016.

INCLUSION CRITERIA

A total of 100 female (mean age 25 to50) cases was selected for the study and was divided into two groups.

Group I: - It was consist of healthy females control subjects (n=50).

Group II: - It was consist of newly diagnosed breast cancer females subjects (n=50).

By routine examination and tests, we ensured that all the subjects were healthy and there are no signs and symptoms or history of breast tumor and diseases.

EXCLUSION CRITERIA: - Patients have any major systemic illness.

1. Patient other than breast cancer
2. Already diagnosed patient of breast cancer, patient are taking chemotherapy Terminal stage patients, metastasis patients.

Sample collection

Informed consent was obtained from all subjects for participating in the study.5 ml Blood sample was collected by vein puncture using an aseptic technique. Sample was collected in two vials one is plain for trace elements and for routine CBC EDTA vial is used.

Copper was estimated by di Br-PAESA method on semi auto analyser and read at 580nm

Principle:

Copper,released from ceruloplasmin, in an acidic medium, reacts with Di-Br-PAESA to form a coloured complex. intensity of the complex formed is directly proportional to the amount of copper present in the sample. Read at 580 nm.

Zinc:

Colorimetric method with 5-Brom-PAPS Johnsen and R.Eliasson (1987). Zinc estimation was done by semi-auto analyzer and samples were read at 570 nm.

Principle:

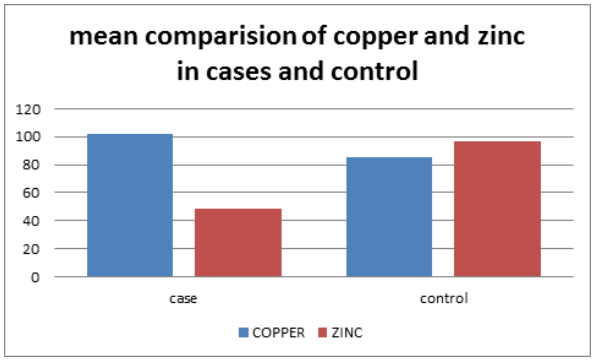
Zinc in an alkaline medium reacts with Nitro-PAPS to form a purple colored complex. Intensity of the complex formed is directly proportional to the amount of zinc present in the sample.

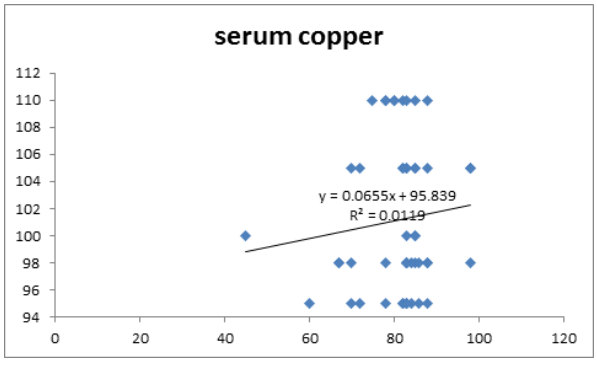
Statically analysis: we have done analysis by using software graphpad online. Consider $p<0.05$ is as significant value.

Results:

Table 1.Comparison of serum levels of copper and zinc in cases of breast cancer and control.

S.No.	Parameters	Mean ± SD (n=50)		p-value
		Patients	Controls	
1.	Copper	101.78 ± 5.93	85.38 ± 3.16	<0.0001
2.	Zinc	49.64 ± 5.71	93.34 ± 7.06	<0.0001





r= 0.10, it shows a significant positive correlation in serum copper value in breast cancer patients

Discussion: Breast cancer continues to be one of the most common cancers and a major cause of death among women worldwide. We had determined the level of trace elements (copper, zinc) and anemia profile in the serum of all the patients as well as in controls and finally the results of breast cancer patients were compared with that of controls.

In our study the mean copper level is high (101.78 ± 5.93) in cases as compared to control (85.38 ± 3.16). Similarly, the level of zinc in cases was lower (49.64 ± 5.71) as compared to controls (93.34 ± 7.06). In line with this, Yücel et al reported that the mean serum copper level in patients with breast cancer were significantly higher than the control group. In addition, the mean serum zinc level in patients with breast cancer was significantly lower than the control group. Studies suggested that the role of Cu and Zn in tumor development could be related to their action as enzymatic co-factors involved in carcinogenesis. In addition, copper and zinc belong to the group of oxidant metals causing disruption of the oxidative balance. [8]

The study thus concluded that serum levels of copper is higher as compared to controls and zinc is lower as compared to controls in breast cancer.

Conclusion : so we can use, the serum levels of these trace element as a marker for early diagnosis of breast cancer as adjuvant to other methods as well as by providing supplementation of these trace elements we can improve the prognosis of patient.

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