



ROLE OF NATURAL ANTIOXIDANT IN BREAST CANCER PATIENTS

Biochemistry

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ABSTRACT

Background: Breast cancer is a nonexistent entity for a majority of population till a near and dear one suffers from it.

Introduction: Breast cancer is now the most common cancer in most cities in India, and 2nd most common in the rural areas.

Material and Methods: This prospective study was carried out in Obstetrics and Gynecology, oncology and biochemistry department of Annanta institute of medical sciences, Udaipur, India. 100 subjects with 100 controls were enrolled for the study.

Results: we have found decreased level of antioxidant in patients in comparison to control.

Conclusion: Awareness with supplementation of natural antioxidant is beneficial to prevent the risk of Breast cancer

KEYWORDS

Breast cancer, cancer, antioxidant vitamin C, vitamin E.

INTRODUCTION:

Breast cancer is now the most common cancer in most cities in India, and 2nd most common in the rural areas.¹ one fourth (or even approaching one thirds) of all female cancer cases are breast cancers. The most important reason being lack of awareness about breast cancer and screening of the same; more than 50% patients of breast cancer present in stages 3 and 4, and outcome is not as good as earlier stages, however aggressive the treatment may be. The western nations have achieved a steadily improving and good survival mainly because of screening of breast cancer. Out of every 100 breast cancer patients, 2% were in 20 to 30 years age group, 7% were in 30 to 40 and so on. 69% of the patients were above 50 years of age. Presently, 4% are in 20 to 30 yrs age group, 16% are in 30 to 40, 28% are in 40 to 50 age group. So, almost 48% patients are below 50.^{2,3} An increasing numbers of patients are in the 25 to 40 years of age, and this definitely is a very disturbing trend. Of course, one particular reason for higher numbers of younger patients is our population pyramid, which is broad at the base and middle and narrow at top, which means that we have a huge population in the younger age group and much lesser in older age group.⁴ In the year 2012, there were about 2,32,000 breast cancer cases reported in the US, whereas in India, 1,45,000 new cases were diagnosed. This implies that, though, because of India's population, the percentage of total women affected seems less, the breast cancer burden in India has almost reached about 2/3rds of that of the US and is steadily rising.^{5,6}

Oxidative stress is a biochemical condition that occurs when intracellular antioxidants are unable to neutralize pro-oxidants such as reactive oxidant species (ROS). These ROS damage membranes, DNA, lipids, proteins, and carbohydrates, eventually causing cell injury and death. Vitamin C and vitamin E are natural antioxidant. They have many biological functions, antioxidant function, including enzyme activities. They also act on immune function and reduce the risk of breast cancer.⁷

Antioxidants counteract free radicals and prevent tissue and organ damage. Although antioxidants may play a role in the primary prevention of cancer by reducing the oxidative modification of DNA. Till date a very few studies have done in antioxidant and breast cancer relationship in this part of India. So we have planned this study.

MATERIAL AND METHODS:

Study setting, study type: This prospective study was carried out in Obstetrics and Gynecology and department of Biochemistry in Annanta institute of medical sciences, Udaipur.

Study participants & study period: women admitted in gynecology and cancer department between March 2017 –September 2017 in the hospital were examined. Blood pressure was measured by mercury sphygmomanometer in reclining position in right brachial artery. Three readings were taken at 10 minutes interval. Participants having average systolic blood pressure ≥ 140 mm hg and/or diastolic blood pressure ≥ 90 mm Hg were included in the study.

EXCLUSION CRITERIA: Patients with history of hyperuricemia, liver diseases, diabetes, renal diseases, cardiovascular illness, and symptomatic infectious diseases, previous cancer history, were excluded.

Sample size and sampling: 100 subjects with 100 controls were enrolled for the study.

Data collection: After enrollment participants were grouped healthy control and patients with breast cancer. Informed consent was taken from all the participants. The history of all participants was taken. Blood samples of participants were taken from right or left cubital vein and collected in plain and citrate tubes.

Serum level of vitamin C was done by NATELSON method, and read at 520 nm by colorimeter.

Serum level of vitamin E was done by BAKER & FRANK method read at 520 nm.

STATISTICAL ANALYSIS:

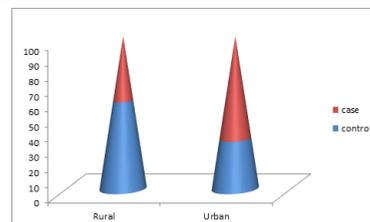
We used unpaired "t" test for comparing the mean level of uric acid, LDH, AST, ALT with maternal outcome. p value < 0.05 was considered statistically significant.

RESULTS:

In this study we have found a statically significant difference level of serum antioxidant in case and control. We have distributed them according to area, marital status, smoking habit and side of Breast having cancer. Then we have estimated serum Vitamin C and Vitamin E level in these groups.

Table-1 Area wise distribution among case and control

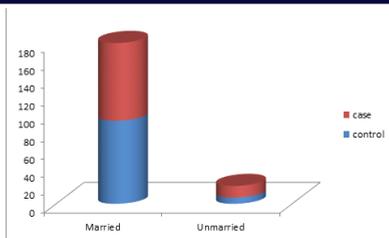
	Rural	Urban	Total
control	58	33	100
case	42	67	100



Figure; 1 shows area wise distribution of case and control

Table-2 Marital status of case and control

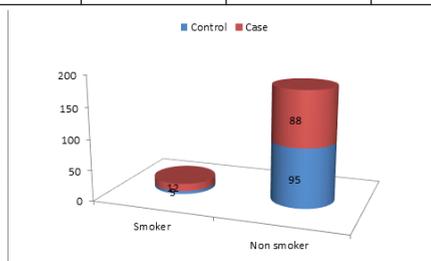
	Married	Unmarried	Total
control	93	07	100
case	87	13	100



Figure; 2 shows marital status of case and control

Table-3 Smoking status among case and control

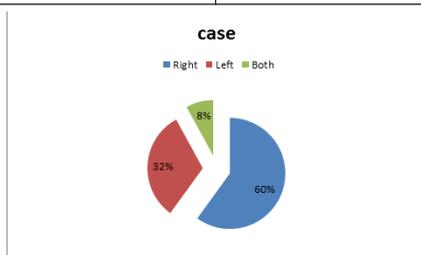
	Smoker	Non smoker	Total
Control	5	95	100
Case	12	88	100



Figure; 3 shows distribution of case and control according to history of smoking habit.

Table-4 Side of breast involve in patients

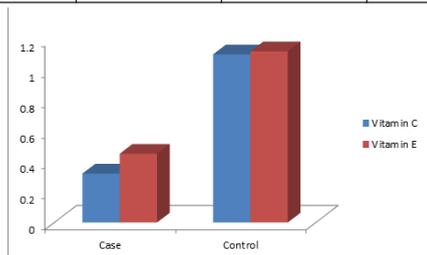
Side involved	case
Right	60
Left	32
Both	08
Total	100



Figure; 4 shows side of breast involve in patients

Table-5 Antioxidant level in case and control

Antioxidant	Case	Control	P-value
Vitamin C	0.32± 0.12	1.10±0.02	<0.0001
Vitamin E	0.45±0.13	1.12 ±0.11	<0.0001



Figure; 5 Shows level of serum antioxidant in case and control

DISCUSSION:

we have determined the level of natural antioxidants in patients and control and then compared it. We have found a strong association between case and control in serum antioxidant level. We have found lower level of vitamin C and E in cases in comparison to control.

In Table 1 we have found distribution of case and control according to their area, main difference in ratio is their lack of awareness of breast cancer in these patients. Table-2 shows marital status of patients.

Breast cancer not only affects patients health even it also affect their personal relationship.

Table-3 shows smoking status of patients, Tobacco smoke contains thousands of chemicals, many of which are known to be mammary carcinogens. Although not initially thought to be a tobacco-related cancer, over the last several decades evidence has been accumulating on the role of both active smoking and secondhand smoking in the etiology of breast cancer.⁸ Table-4 shows side of Brest in patients.

Table -5 shows level of antioxidant in case and control group. Cancer cells operate under a high level of oxidative stress, due to high baseline levels of reactive oxygen species, oncogenic transformation, and metabolic reprogramming.⁹ Oxidative stress occurs due to imbalance between the production of free radicals [superoxide anion (O²⁻), hydrogen peroxide (H₂O₂), hydroxyl radical (OH⁻), nitric oxide (NO), and more] and their elimination by antioxidant defense mechanisms [superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), among others], which induces cell damage caused by lipid peroxidation generating derangement and loss of function and integrity of the cell membrane, as well as DNA damage, promoting genomic instability and cell proliferation, thereby increasing the somatic mutations and neoplastic transformation.^{10,11.}

Ascorbic acid (vitamin C) has been widely used in the treatment and prevention of cancer; nevertheless, the clinical results are still inconclusive. At low concentrations, it has an antioxidant role, preventing oxidation, which induces apoptosis. However, its high content can increase the production of ATP (generated by mitochondria) inducing apoptosis in tumor cell lines, via a pro-oxidant mechanism.¹¹ Studies show dose-dependent antineoplastic activity with influence on apoptosis, cell cycle, and cell signaling, increasing the cytotoxicity of the antineoplastic agent in cell lines of breast cancer treated with mitoxantrone and ascorbic acid.^{12,13,14}

It has been proposed that the dietary supplementation of vitamin E, a lipid-soluble antioxidant, may reduce a woman's risk of developing breast cancer.^{15,16} In animal models, vitamin E has decreased the incidence of carcinogen-induced mammary tumors. Intake and serum levels of vitamin E and their relation to breast cancer have been evaluated in epidemiologic studies.¹⁷ Results of epidemiologic studies, however, have been conflicting. In this , we examine the evidence that is available pertaining to the relationship between vitamin E and breast cancer. Although epidemiologic study results have been inconsistent, further study of this nontoxic vitamin is warranted. Particular attention should be paid to the interactions of other antioxidants with vitamin E and to the duration and timing (pre- vs. postmenopausal) of vitamin E use in determining its preventive utility in breast cancer.^{18,19}

CONCLUSION:

awareness with supplementation of natural antioxidant are beneficial to prevent the risk of breast cancer.

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