

Comparative Study of Lipid Profile in Patients with Carcinoma Breast Attending a Tertiary Care Hospital of Western Maharashtra

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ABSTRACT

Introduction: Cancer of breast is one of the greatest problem which india is facing. There are many studies done to study association between role of diet and blood lipids. Moreover there are multiple factors both, environmental and genetic which do play a role in evolution of carcinoma breast.

The present study was undertaken to find if any association exists between alterations in lipid profile in carcinoma breast of local population.

Material and methods: A total of ninety one patients with various stages of breast cancer who were being treated at the department of surgery, during Nov 2013 to June 2015 were recruited in the present study. One hundred healthy volunteers were included as controls. Patients were categorized according to age and body mass index with their respective controls. Serum lipid profile was performed in all the cases and control groups using fasting blood samples. Total cholesterol, HDL-cholesterol and Triglycerides were measured by standard kit methods and LDL cholesterol was calculated using Fried Wald's formula.

Results: Serum Total Cholesterol, HDL Cholesterol and LDL Cholesterol have been observed to be significantly elevated in controls when compared with those of cancer patients ($p=0.05$, 0.007 and 0.011 respectively). Triglycerides did not show any significant alteration between that of the cases studied and the controls ($p=0.30$), though the value was more in controls than in cases.

Conclusion: This preliminary study has shown a significant alteration in serum lipid profile of breast cancer patients and healthy group in the local female population. The interesting observation of low levels of HDL cholesterol and high levels of LDL cholesterol, Total Cholesterol and Triglycerides in controls rather than in cases, needs further evaluation by extending the investigation further on and also extending the study on larger study group. This result could be partly explained by the fact that low cholesterol in cases is the result of the effect of cancer rather than not on the cause of cancer.

Key words: Lipid profile, Cancer Breast.

INTRODUCTION

India is the country of diversity, which accounts for variation in the health care infrastructure. The health care facility pattern in India is heterogeneous, there are some regions where basic health facility have yet to reach. There are also some regions where people are aware of breast cancer. Carcinoma breast is commonest cancer in urban and rural females.^{1,2} Many women do not present themselves for check up at hospitals or medical because of varied reasons like illiteracy, monetary reasons and lack of knowledge. There are many patients who present themselves late when the disease has progressed to metastatic stage and at this stage they come

to seek treatment.^{3,4} Lots of efforts are needed both from the health systems as well as from local population for early diagnosis of cancer breast. Alone india accounts for 100,000 cases of breast cancer annually.^{5,6} One of the study conducted in New Delhi showed⁷, the histo-morphological types seen in breast cancer patients shows that invasive ductal carcinoma not otherwise specified (IDC NOS) was found to be the most common type (88%) followed by infiltrating lobular carcinoma (3.7%), colloid carcinoma (1.1%), ductal carcinoma in situ (DCIS) (1.1%), and metaplastic types (0.9%).

Low serum high-density lipoprotein cholesterol (HDL-C) is an important component of the metabolic syndrome and has recently been related to increased breast cancer risk in overweight and obese women. Breast cancer patients are known to be at increased risk for developing other chronic diseases including cardiovascular disease. Studies by different investigators have shown a correlation between increased dietary fat or hypercholesterolemia and the occurrence of breast cancer. The results have demonstrated an unfavourable lipid profile in untreated breast cancer patients with high atherosclerosis indexes.⁸

Low cholesterol increases the cancer risk association suggesting that lower cholesterol was not the cause but the result of cancer.⁹ It also affects various signaling pathways and proteins, either by direct conjugation to proteins (ie, sonic hedgehog), or by modifying the activities of membrane proximal signaling pathways and proteins such as the cell survival kinase, AKT.^{10,11} Certain signal transduction pathways seem to be highly sensitive to manipulations in circulating cholesterol levels.^{12,13}

We planned to undertake the study to compare the levels of circulating lipids in cancer and control patients with the aims and objectives to estimate the biochemical parameters such

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as Serum lipid profile (Total Cholesterol, Triglyceride, HDL, LDL) in cancer breast patients and normal healthy controls.

MATERIAL AND METHODS

The study was carried out at SKNMC and GH, a tertiary level teaching hospital. The study was conducted for a period from Nov 2013 to June 2015. Ethics clearance was obtained from institutional ethics committee and informed consent was obtained from the patients and all GCP guidelines were followed for the study. A total of 191 individuals (91 cases and 100 controls) were selected for the study. Histopathological confirmed cases from age 25-70 years were included in study. Inclusion criteria was Age matched individuals and patients other than breast cancer in the hospital served as controls. Exclusion criteria included seriously ill patients, first degree relatives of cases, pregnant women and women with gynecological problems. Detailed history as per performa, height, weight measurement was done. Structured questionnaire for finding of the risks factors was asked to the patients. Two ml of fasting venous blood was collected in plain bulb and serum was separated by centrifugation and analyzed on the same day for lipid profile, that is Total Cholesterol (TC), Triglycerides (TG), high density lipoprotein (HDL) and low density lipoprotein (LDL).

Weight was measured using standard electronic weighing scale. Blood lipid profile was done using biochemistry analyser. Serum Total Cholesterol was estimated by CHOD-PAP method, Serum Triglycerides by GPO-PAP method, HDL Cholesterol by PEG precipitation method and LDL Cholesterol in mg/dl was calculated by subtracting HDL + TG/5 from the Total Cholesterol.

STATISTICAL ANALYSIS

Statistical data was analysed using appropriate tests. Continuous data was computed as mean \pm standard deviation (SD). The Student's t-test was applied for comparison of mean values and χ^2 statistics was used for qualitative data.

RESULT

Out of the total of 191 individuals studied, The maximum age in case of cases was 50 years as compared with the controls where the age was 46 years this was statistically significant. The Body mass index in case of cases was 24.2 as compared with the control which was 26.6. This was statistically not significant. Total Cholesterol in cases of cases is 165 mg/dl as compared with the control which is 176. This was statistically significant. Total Triglyceride in case of cases is 135 mg/dl as compared with controls which is 143 mg/dl. This was statistically not significant.

High Density lipoproteins in cases of cases is 43 mg/dl as compared with the control which is 52mg/dl. This was statistically highly significant. Low Density Lipoprotein in cases of cases is 180 mg/dl as compared with the control which is 198 mg/dl. This was statistically significant. Very Low Density Lipoprotein in case of cases is 27 mg/dl as compared with controls which is 28 mg/dl. This was statistically not significant. Table 2 illustrates a correlation between total cholesterol and HDL and LDL in cases of Cases.

DISCUSSION

Several previous studies have investigated the association between cholesterol levels and breast cancer risk. Indians are more likely to consume energy-dense foods and less likely

to consume recommended amounts of fruits and vegetables, which increases the risk of obesity, cancer, and other conditions including dyslipidemia. In our study, we demonstrated a statistically significant difference in the levels of Total Cholesterol, Triglycerides and HDL cholesterol, which were less in cases as compared with controls.

In the study conducted by Adana A. Llanos et al demonstrated a statistically significant reduction in breast cancer risk among African American women with high levels of total cholesterol. Furthermore, a significant increase in breast cancer risk among women with low HDL levels was observed. These data support an inverse association between cholesterol levels, which has been previously reported.¹⁴⁻¹⁹ The Italian study by Fiorenza et al reported significant differences in mean levels of total cholesterol (181 vs 204 mg/dL), HDL (49 vs 57 mg/dL), and LDL (107 vs 124 mg/dL) among breast cancer cases and controls, which were similar to our findings. Additionally, and maybe more importantly, they indicated that HDL levels were even lower among patients with metastatic disease. Our observation that low HDL levels may be associated with an increased risk of breast cancer is in line with the hypothesis that high HDL levels may elicit a protective effect. HDL transports circulating cholesterol within the arteries back to the liver for excretion and/or re-utilization. It is therefore plausible that as Total Cholesterol levels increase, potentially stimulating increases in HDL levels, breast cancer risk subsequently decreases (and vice versa) However, our finding of an inverse association between LDL and breast cancer cannot be as easily explained. Fiorenza et al also demonstrated a significant inverse association between LDL, and breast cancer risk.²⁰ and suggested this association might be due to increased activity of the LDL receptor, which promotes the removal of LDL from circulation, thereby reducing breast cancer risk. Gaard et al²¹ indicated that this association may be an indication that LDL levels are affected by the presence of the disease, rather than by influencing its development although more data are needed to determine the biological mechanisms for the

Char-acters	Control		Cases		P value
	N	Mean (SD)	N	Mean (SD)	
AGE	100	46(\pm 11)	91	50(\pm 13)	0.0295*
BMI	100	26.6(\pm 7.2)	91	24.2(\pm 7.3)	0.072 NS
TC	100	176(\pm 42)	91	165(\pm 40)	0.05*
TG	100	143(\pm 52)	91	135(\pm 63)	0.300 NS
HDL	100	52(\pm 25)	91	43(\pm 16)	0.007**
LDL	100	198(\pm 51)	91	180(\pm 42)	0.011 *
VLDL	100	28(\pm 10)	91	27(\pm 12)	0.39 NS

NS = Not significant, * = p<0.05 significant, ** = p<.001 Highly significant, Values in bracket shows SD.

Table-1: Showing baseline characters of the participants:

Total cholesterol	HDL
	0.189123
	LDL
	0.84166

Table-2: Showing corelation of total cholesterol and HDL and LDL (cases)

effect of plasma cholesterol and the HDL and LDL lipoproteins on breast cancer, several reasons as to why there may be an inverse association have been proposed. A biologically plausible explanation for the association between cholesterol and breast cancer is through the production of cholesterol. Decreased levels of HDL have been reported to be associated with increased levels of cytokines.^{22,23} which have been shown to be related to both obesity and breast cancer.

CONCLUSION

The multifaceted nature of the complex metabolic pathways in which cholesterol participates allows this lipid to play multiple roles in cancer progression. It is also to know more in details about the cause and effect relationship. Further studies on the detailed mechanisms of cholesterol effects on cancers are warranted, and could lead to new avenues for therapeutic intervention, particularly in controlling progression to late stage disease.

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