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Original Research Article

Lipid profile and its relevance in carcinoma breast

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ABSTRACT

Background: Breast cancer has emerged as a rapidly growing cancer in India and has already replaced cervical cancer. According to global cancer statistics for the year 2008, breast cancer resulted in 46 million deaths. In Asia, incidence rate of breast cancer is lower but is drastically rising. Nevertheless, while dyslipidemia [high LDL-C (low density Lipo-protein-cholesterol) and low HDL-C (high density lipo-protein-cholesterol) levels] has controversial role in this disease; the specific influence of dyslipidemia in breast cancer initiation and progression is not completely understood. So, we undertook this study.
Methods: The study was conducted in the department of general surgery, at Medical College and allied Hospital, in Central rural India between year 2012 and 2014. It was a case control study with a sample size of 50 female participants attending the surgery in patient department, fitting in the inclusion criteria as cases and 50 matching controls. The Data was entered in master chart was statistically analyzed by using SYSTAT version 11 and tests were applied accordingly.
Results: Age is a crucial factor in malignancy, most of the studies show malignancy presents more in elder population when compared to young ones. In most patients were between 31-50 years. The youngest patient was of 36 years and the oldest was 78 years. The mean age of the patients affected was 48.54 years which is close to the values in other studies. This study also demonstrated significantly high (p value<0.01) serum TC (total cholesterol) levels of post-menopausal study group (32%, more) as compared to post-menopausal control group. The increase in Serum TC levels was more in post-menopausal study group as compared with pre-menopausal study group. Present study had not shown a significant difference (p value >0.05) between serum levels of HDL-C levels in pre-and post-menopausal control group and study group, though post-menopausal cases had slightly lower values of HDL-C when compared with pre-menopausal controls.
Conclusions: We conclude from this study that there is a definite positive correlation between carcinoma breast and fasting lipid profile. The pre-and post-menopausal cases showed significant correlation as far as Total Cholesterol and LDL. Whereas there was no significant correlation between HDL, VLDL and TG (triglycerides). Body mass index has no relation with carcinoma breast.

Keywords: Carcinoma breast, Lipid profile, Premenopausal women, Postmenopausal women, Total cholesterol

INTRODUCTION

Breast cancer has emerged as a rapidly growing cancer in India and has already replaced cervical cancer. Advances have been made in early detection of breast cancer, less radical primary therapy and use of radiation therapy and adjuvant chemotherapy. But the etiology remains controversial weight gain, obesity and HDL-C levels are correlated with development of breast cancer in women to explore their possible role prevention of breast cancer.[1] According to global cancer statistics for the year 2008, breast cancer resulted in 46 million deaths.[2] In Western

countries a number of risk factors for breast cancer are supported by strong evidence. Population-based studies have shown that early menarche, late menopause, nulliparity and absence of a history of breastfeeding are the risk factors.[3]

About 5% to 7% of all breast carcinomas are hereditary.[4]In the United States there is a rapid reduction in the number of women receiving postmenopausal women hormone replacement, which brought sharp decline in breast cancer incidence there and in other western countries.[5] The, Gail model has been used in clinical counseling and breast cancer prevention studies in North America and Europe for identification of those women who are at higher risk.[6]

In Asia, incidence rate of breast cancer is lower but is drastically rising. Nevertheless, while dyslipidemia [high LDL-C (low density lipo-protein-cholesterol) and low HDL-C (high density lipo-protein-cholesterol) levels] was already shown to play a key role etio-pathogenesis of cardiovascular diseases, mainly attributed to diet, the specific influence of dyslipidemia in breast cancer initiation and progression is not completely understood.[7-9]

However, studies of this association have reported variable results; some revealed that high HDL-C increased the risk of breast cancer whereas others reported that lower levels of serum HDL-C are associated with an increased risk of breast cancer. So, we tried to undertake this study to know whether there is any correlation prevails in between lipid profile and carcinoma breast.

Aim and objectives

Aim in this study was to assess correlation between fasting lipid profile and carcinoma breast. The objectives were to study lipid profile, association between menstrual phase (pre-menopausal and post-menopausal), lipid profile and body Mass Index in breast carcinoma patients.

METHODS

Present study was conducted in the Department of General Surgery, Datta Meghe institute of medical sciences and allied Acharya vinoba bhave rural hospital, Sawangi (m), Wardha, Maharashtra, India between July 2012 and August 2014. It was a case control study with a sample size of 50 female participants attending the surgery in patient department, fitting in the inclusion criteria as cases and 50 matching controls.

Study design was a case control study.

Sample size of the study was constituted of total 100 female patients, out of whom 50 were cases and 50 were controls attending the surgery in admitted in surgery ward, fitting in the inclusion criteria.

Method of sample collection was venous blood samples collected from cases and controls into plain tubes after an overnight fasting for 12 hours. The blood can clot, serum was separated and analysed. The comparative study was carried out in 3 groups viz-

- Pre-and postmenopausal state of breast cancer patients
- Age of breast cancer patient
- The various stages of breast cancer

Healthy females within similar age group with no breast pathology. This study was approved by institutional ethics committee of Datta Meghe Institute of Medical Sciences (Deemed University) in 2012. Written informed consent was taken from every cases and controls. Appropriate rapport with patients was established before history was derived.

Inclusion criteria

Female patients of any age, histologically proven of having breast carcinoma by F.N.A.C. or BIOPSY and those who agreed to sign written consent to participate in study.

Exclusion criteria

Patients with cancer of any other origin apart from carcinoma breast: patients with post-mastectomy or post-chemotherapy status for carcinoma breast, patients receiving any drug which alters lipid profile, Patients on oral contraceptives, Patients without breast carcinoma.

Duration of the study was from July 2012 to August 2014.

Statistical analysis

The Data was entered in master chart was statistically analyzed by using SYSTAT version 11 and tests were applied accordingly. In statistical analysis, the value of $p<0.05$ was considered as significant and $p<0.01$ was considered highly significant.

RESULTS

In most of cases belong to 31-50 and only 8% of cases were less than 30 years (Table 1).

Table 1: Age distribution of patients.

Age (year)	No. of patients (cases) n=50	No. of patients (controls) n=50
<30	4	6
31-40	13	6
41-50	10	6
51-60	16	15
>60	7	17

80% of the cases in this study were from low socio-economic status (Table 2).

Table 2: Socio-economic Status.

Socio-economic status	No. of patients (cases) n=50	No. of patients (controls) n=50
Low	40	43
Medium	10	7
High	0	0

Table 3: Age of menarche.

	No. of patients (cases) n=50	No. of patients (controls) n=50
11years	6	6
12 years	7	12
13 years	7	7
14 years	29	24
15 years	1	1

All study cases attended their menarche before the age of 15 years and 58% of patients attended menarche (Table 3) at the age of 14 years, 66% patients were post-menopausal (Table 4).

None of the patients in the study had a positive family history of breast cancer (Table 5). In the Present study, there were 6% cases belonging to stage I disease. 70% cases of stage II disease and none belong to stage IV disease (Table 6).

Table 4: Menstrual status.

Menstrual status	No. of patients (cases) n=50	No. of patients (controls) n=50
Pre-Menopausal	17 (34%)	14 (28%)
Post-Menopausal	33 (66%)	36 (72%)

Table 5: Family history.

Family history	No. of cases (n=50)	Percentage
Positive	0	0%
Negative	50	100%

Table 6: Clinical TNM staging.

Stage of cancer	No. of patients (n=50)	Percentage
Stage-1	3	6
Stage-2	35	70
Stage-3	12	24
Stage-4	0	0

Though values of BMI were higher in study group, values of Post- menopausal cases were significant ($p<0.05$) as compared to Pre-menopausal cases. The body mass index in cases was 25.23 (±3.91) and in controls it is 25.32 (±3.56), thus the study shows that the cases and controls are comparable along with the age (Table 7).

Table 7: Mean body mass index of controls and cases.

Body mass index (kg/m2)		
	Cases (n=50)	**Controls (n=50)**
BMI	25.23±3.91	25.32±3.56

There is significant increase in levels of Total Cholesterol (TC) in breast cancer patients as compared to controls, indicating that there is an association between TC and breast cancer.

This study also demonstrated ($t=2.16$) significantly high (p value<0.03*) and serum TC levels of in Study group, as compared to control group consisting of the variables pre-and post-menopausal females. Our present study does not show a significant difference (p value >0.64) between serum levels of HDL-C in pre-and post-menopausal control group and study group, respectively, though post-menopausal cases had slightly lower values as compared to pre-menopausal controls.

Present study shows that levels of serum LDL-C were higher in breast cancer patients as compared to control group and the ($t=2.59$) values were highly significant ($p<0.01$*).

In the study, the mean total cholesterol in premenopausal cases was 239.52 while in post-menopausal cases was 259. In controls the pre-menopausal mean of total cholesterol was 164.42 while in post-menopausal controls it was 171.11.

In cases, the mean HDL was 53.82 in pre-menopausal and in post-menopausal it was 52.0. The LDL level in premenopausal cases was 156.7 and in post-menopausal controls it was 178.33.

In cases, the mean VLDL was 29.0 in premenopausal and in post-menopausal it was 28.66. While TG in premenopausal cases was 100.47 and in postmenopausal cases it was 102.96.

In premenopausal controls, the mean HDL level was 41.92 and in post-menopausal controls it was 43.16. The mean LDL level in premenopausal controls was 99.78 and in post-menopausal controls it was 104.91.

The mean VLDL was 22.71 in premenopausal controls and 23.02 in post-menopausal controls. While TG level was 111.14 in the premenopausal controls and 125.69 in post-menopausal controls (Table 8).

Table 8: Lipid profile, and serum lipid levels.

		Cases		Controls	
Parameters	**Normal range**	**Pre-menopausal (n=17)**	**Post-menopausal (n=33)**	**pre-menopausal (n=14)**	**Post-menopausal (n=36)**
Total cholesterol (mg/dl)	160-200	239.52±16.77	259±35.03	164.42±46.41	171.11±26.75
		P=0.03*, t=2.16		P=0.52, t=0.63	
HDL (mg/dl)	35-75	53.82±11.97	52.0±13.61	41.92±17.46	43.16±10.47
		P=0.64, t=0.46		P=0.75, t=0.31	
LDL (mg/dl)	50-160	156.70±13.80	178.33±32.81	99.78±31.27	104.91±23.40
		p=0.01*, t=2.59		P=0.53, t=0.63	
VLDL (mg/dl)	20-40	29.0±6.50	28.66±6.096	22.71±13.05	23.02±10.76
		P=0.85, t=0.18		P=0.93. t=0.08	
TG (mg/dl)	65-160	100.47±36.52	102.96±29.47	111.14±40.83	125.69±65.95
		P=0.79, t=0.26		P=0.44, t=0.77	

DISCUSSION

Age is a crucial factor in malignancy, most of the studies show malignancy presents more in elder population when compared to young ones. In the present study majority of patients were between 31-50 years. The youngest patient was of 36 years and the oldest was 78 years. The mean age of the patients affected was 48.54 years which is close to the values in other studies.[1,2,9,10] We are working at rural center, so in the study all the participants were from rural areas. None of the patients were from urban area. In other studies, the mean age was, 48.32, 58, 45.83, 48, 48.54 years, so there is no effect whether the patient lives in rural or urban area, the variables are same.

It was considered previously that, carcinoma breast is a disease of riches, but the globalization has changed the concepts and perceptions, in the study there was no significant difference between socio economic status of cases and controls. 80% of patients belonged to low socio-economic status, contradictory to western population where breast cancer has a higher incidence in the more affluent social classes, in contrast none of our patients was from high socio-economic status.

Early age at menarche has been consistently associated with an increased risk of breast cancer. In this study, we found 58% of patients had their menarche at 14 years, which supports the evidence that early menarche is associated with longer exposure of breast tissue to estrogen stimulation leading to carcinoma breast. It is reported that women who experience menarche at an early age (before age 12) have a 20% increase in risk compared to women who experience menarche at or after 14 years of age. In other studies, the age of menarche was 14 years.[11,12]

Among all the participants studied 66% were pre-menopausal and rest were post-menopausal, which is in correlation with other studies. Other studies revealed premenopausal age between 60 to 66 years and postmenopausal age between 33 to 40 years.[2,9,13,14]

Previous studies that have evaluated the significance of family history of Breast cancer risk but have reported variable results. A pooled analysis of existing prospective cohort studies found no interaction for effects of family history on breast cancer. Women with a positive family history of breast cancer should be especially alert to the importance of maintaining a lean body mass as an important way to lower breast cancer risk after menopause. We could not found any positive family history in our participants. In other studies population 2.8 % and 5.1% of breast cancer patients had a family history of breast cancer.[15,16]

In our series 6% of cases were in Stage I, 70% of cases in Stage II and 24% of cases were stage III and none were from stage IV. This reflects the late presentation of cases in Indian population due to lack of awareness and illiteracy. Other studies also favour this study, in other studies the patient presented in stage II were, 28.4%, 44%, 46%, and 51%.[1,13,17,18]

Obesity is a well-known risk factor for postmenopausal breast cancer irrespective of race or country. In present study, when BMI (kg/m2) values were compared between controls and Study Group according to menstrual status, it was found that BMI of Post-menopausal cases was non-significant. BMI of Pre-menopausal cases though higher than controls, it was found to be non-significant ($p>0.05$). The increased risk in postmenopausal women is explained possibly due to increased level of circulating Estradiol and reduced level of sex hormone-binding globulin by the conversion of androgens to estrone in adipose tissue.[1,8,14,19] In other studies, in controls it was 22.8, 31.49, 28.35, and 26.3 and in Controls it was 23.8, 25.39, 24.4, and 24.8.

Lipid profile and its correlation with carcinoma breast was our mainstay of study shows significantly increased

levels of TC in breast cancer patients as compared to controls, indicates that there is an association between TC and breast cancer. This study also demonstrated significantly high (p value<0.01) serum TC levels of post-menopausal Study group (32%, more) as compared to post-menopausal control group. The increase in Serum TC levels was more in post-menopausal study group as compared with pre-menopausal study group. This is in accordance with other studies.[8,12-14,19-21]

The present study had not shown a significant difference (p value >0.05) between serum levels of HDL-C in pre- and post-menopausal control group and study group, respectively, though post-menopausal cases had slightly lower values as compared to pre-menopausal controls. This result agrees with the observations found no significant difference between HDL-C levels in pre-or post-menopausal study and control group. As far as significance of HDL value is concerned, the results of the study resemble with earlier studies.[8,19-21] Present study had shown that levels of serum LDL-C were higher in breast cancer patients as compared to control group and the values are comparable with some studies. In other studies p values were, 0.001, 0.02, 0.03, 0.02, 0.1 and 0.04.[8,12,14,19-21]

CONCLUSION

Most of cases were from low socio-economic status and all cases were from rural areas. Majority of cases attended menarche at 14 years of age in present study, carcinoma breast is more common in post-menopausal women, bulk of the cases were in stage II and none of the cases belonged to stage IV. Present study demonstrated significantly high p value and serum TC levels of post-menopausal Study group, as compared to post-menopausal control group.

There was no significant difference between serum levels of HDL-C in pre-and post-menopausal control group and study group, respectively, though post-menopausal cases had slightly lower values as compared to pre-menopausal controls. The levels of serum LDL-C were higher in breast cancer patients as compared to control group. In premenopausal controls, the mean HDL level was statistically non-significant.

We conclude that there was a definite positive correlation between carcinoma breast and fasting lipid profile. The pre-and post-menopausal cases showed significant correlation as far as Total Cholesterol and LDL. Whereas there was no significant correlation between HDL, VLDL and TG. The role of Body Mass Index could not be correlated with carcinoma breast.

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