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Original Research Article

ASSOCIATION OF LIPID PROFILE WITH OBESITY AMONG BREAST CANCER PATIENTS: A CASE CONTROL STUDY

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ABSTRACT

Background: Breast cancer is one of the most common cancers of all age group all over the world in the females. Role of lipid metabolism and obesity in different cancer development has been well studied but in this study we tried to find their association with breast cancer. Also we studied association of menopausal status with breast cancer. This study is to find any association of lipid profile, obesity and menopausal status in Breast cancer patients.

Methods: A total of 70 histopathologically confirmed cases of breast cancer was included in this study and their lipid profile test was carried out using fully automated biochemistry analyser. Obesity was defined by body mass index (BMI) of 25 kg/m2 or greater as per the Asia-Pacific classification of BMI. Detailed clinical history along with menopausal status was taken and then all data was analysed using the Epi-info-7 software computer programme. Data was expressed as mean(x) and standard deviation (SD), using Mann-Whitney/Wilcoxon Two-Sample Test (Kruskal-Walli's test for two groups) which was equivalent to Chi square.

Results: Out of 70 cases, 56 (80%) cases had high BMI >25 (BMI (kg/m²) whereas 20% had normal BMI and it was significantly higher than control group. It has been found that Total cholesterol (TC), Low density lipoprotein (LDL), Very low density lipoprotein (VLDL) and Triglycerides (TGs) were raised in majority of breast cancer patients whereas High density lipoprotein (HDL) levels were low. Menopausal status was variable in both cases and control group.

Conclusions: It was found that levels of plasma total cholesterol and TGs were specifically raised with high BMI among Breast cancer patients. HDL levels had inverse association with breast cancer. However no significant association was found with menopausal status of patients.

Keywords: Breast cancer, Lipid profile, Obesity, Body mass index

1. INTRODUCTION

Breast cancer is the most common type of cancer in women; about 80-90% of all breast cancers are infiltrating ductal carcinoma.(1) Alteration in the circulatory cholesterol levels has been found to be associated with etiology of breast cancer. There are several reports of

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elevated plasma lipid level such as total lipids, phospholipids, triglycerides, total cholesterol, low density lipoprotein cholesterol LDL and free fatty acids in pre- and post-menopausal breast cancer patients.[2] It has been postulated that changes in the concentration of serum lipids in the breast cancer patients could result in an increase production of tumour necrosis factor and inhibit adipose lipoprotein lipase activity by the action of insulin.[3] Obesity is a public health problem which causes significant impact on the health and wellbeing of populations worldwide.[4] It is a risk factor for cancers, and causes cancer-specific mortality.[5, 6] It has been linked with increased breast cancer risk among postmenopausal women but was inversely relatedto Breast cancerrisk among premenopausal women.[7, 8] Alteration in lipid metabolism is also common in obesity.[9]

2. MATERIAL & METHOD

The present study was carried out in the Department of Pathology, Hamidia Hospital, Bhopal from 1stOct. 2012 to 31stOct. 2013. Ethical permission for the study was obtained from the Ethical Research Committee Gandhi Medical College, Bhopal. Participation was fully voluntary and a written informed consent was taken from the patients after explaining the purpose of study. The study population was histopathologically diagnosed cases of breast malignancies.

Inclusion criteria

- Subjects ready to give voluntary informed consent.
- Histopathologically diagnosed new cases of breast malignancies.

Exclusion criteria

- Patients with any cardiac, renal, and hepatic dysfunction.
- Patients on chemotherapy and or Radiotherapy.

Control

Age and sex matched subjects who do not have breast cancer without any renal, hepatic, or cardiac dysfunction.

Lipid profile estimation included measurement of serum total cholesterol, serum triglycerides and serum HDL and serum LDL and Serum VLDL. All the measurements were done by Biosystems' kits using A25 and A15 analysers.All the data were analysed using the Epi-info-7 software computer programme. Data were expressed as mean(x) and standard deviation (SD), using Mann-Whitney/Wilcoxon Two-Sample Test (Kruskal-Walli's test for two groups) which was equivalent to Chi square. Value of $P < 0.05$ was considered significant, and $P>0.05$ was considered statistically insignificant.

3. RESULTS

The present case control study included 70 cases of breast cancers and age and sex matched 70 controls that presented in Department of Pathology, Gandhi Medical College, Bhopal. The salient observations made in this study are as follows.

Out of all the females included majority were in between 41 to 50 yearsof age group in both cases and control group while none was below 30 years in both the groups. (Table 1) In both the groups more than 60% females were postmenopausal. (Table 2) out of 70, 33 (47.15%) females in case group and 24 (34.29%) females in control group were obese with BMI value more than 25 kg/m^2.(Table 3) Serum Total cholesterol, LDL, VLDL and TGLs levels were

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raised significantly in cases as compared to controls. HDL was significantly lower in cases as compared to control group. (Table 4)

Table 1: Distribution of cases and control according to age group

Age (years)	No. of cases	Percentage	No. of controls	Percentage
31-40	07	10.00%	04	5.55%
41-50	31	44.29%	34	48.8%
51-60	18	25.71%	15	21.55%
61-70	11	15.71%	15	21.55%
71-80	03	4.29%	02	2.88%
Total	70	100.00%	70	100%

Table2: Distributions of cases and controls according to menopausal status

Menopausal status	Cases (70)	percentage	Controls (70)	percentage
Premenopausal	24	34.2%	25	35.7%
Postmenopausal	46	65.8%	45	64.3%
Total	70	100%	70	100%

Table 3: Distribution of cases and controls according to BMI

BMI (kg/m²)	Cases	Percentage	Controls	Percentage
18.5-25 (optimal)	14	20.00%	07	10.00%
25-30 (overweight)	23	32.85%	39	65.71%
>30 (obese)	33	47.15%	24	34.29%
Total	70	100%	70	100%

Table 4: Lipid profiles values in cases and control group

Variables	Mean (Cases)	Mean (control)	Min	Max	p-value
Total Cholesterol	136.62± 16.9	128.24±16.08	105	178	0.003
LDL Cholesterol	124.11±15.98	120±15.24	101	172	0.681
HDL Cholesterol	45.82±7.02	51.15±8.5	32	60	0.001
VLDL Cholesterol	32.6±4.02	30.7±3.97	22	44	0.414
TGL	162.92±40.07	141.5±30.76	110	220	0.002

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4. DISCUSSION

Maximum incidence of breast cancer was observed in 41-50 years of age group. This is similar to study by Kumar k et al, they observed maximum cases between 30-60 years, however Pikul Laisupasin et al in 2013found age incidence of 40-70 years in majority of patients. [10, 11]In the present study it was found that mean values of total cholesterol and triglycerides was raised in cancer patients as compared to controls and this difference was statistically significant(p-value<0.05) whereas mean value of HDL was low in cancer patients as compared to controls and was statistically significant .LDL and VLDL values were also high in cancer patients as compared to controls but did not show any significant correlation.These findings werein agreement to the previous studies by Kumar k et al in 1991 and by Laisupasin P et al(2013).[11, 12]In present study it was found that menopausal status had no significant correlation with lipid profile. These findings were similar to the studies done by van 't Veer LJ (2002) and Kamal Eldin A et al. [13, 14]In present study Breast cancer patients with BMI > 25 kg/m² had significant association with breast cancer similar results were found by Akinwunmi Paul Kekune et al in their study. [15]

5. CONCLUSION

Obesity and dyslipidemia were significantly higher in breast cancer patients than control. Menopausal status had no significant correlation with Breast cancer. Several reports have documented the role of lipid metabolism in carcinogenesis, but there are limited data on the dynamics of lipid metabolism in cancer survival and recurrence. Whether adiposity could trigger changes in the vasculature to promote abnormal lipid metabolism among breast cancer patients is yet to be clearly understood. More studies are necessary to clarify this association.

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