RESEARCH ARTICLE

'Lipid Profile in Female Breast Cancer: a study from Kerala, South India'

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Abstract

The incidence of breast cancer is on the rise in India.Exposure levels and prevalence of established risk factors may be different in developing and developed nations. The role of dyslipidemia in breast cancer initiation is not completely understood. This study aims to compare the serum lipid levels in female breast cancer patients with normal healthy controls in a rural district in Kerala.

Materials and Methods

Fasting lipid profile of 113 histologically proven female breast cancer patients and 88 healthy females were studied. Statistical analysis were performed using SPSS version 16.

Results

The median age at diagnosis of breast cancer in the study population was 48 years (Standard deviation 10.04). The youngest patient was aged 27 years, and the oldest patient, 82 years. 56.63% (64 out of 113) of the patients were postmenopausal. High levels of Low density lipoprotein (LDL), Triglycerides (TG) and total cholesterol (TC) were observed in breast cancer patients compared to healthy control.

Conclusion

This study supports the hypothesis that total cholesterol, LDL-C and triglycerides are important risk factors in the development of breast cancer. Higher consumption of animal fat and red meat, make the population of Kerala prone to a host of diseases, among them the development of breast cancer.

Background

INTRODUCTION

The incidence of breast cancer is on the rise in India [1]. Aetiology of breast cancer is multifactorial, and includes genotype and lifestyle-related factors. Important lifestyle factors believed to contribute towards the development of breast cancer include obesity, decreased physical activity and excessive consumption of animal fat and alcohol [2]. The role of lipoprotein fractions in the development and proliferation of breast cancer has been reported in many in vitro studies [3, 4,5]. The role of lipid fractions in cancer has extensively studied in developed countries, but it is still a matter of controversy [6, 7, 8]. Exposure levels and prevalence of established risk factors may be different in developing and developed nations.

This study aims to compare the serum lipid levels in female breast cancer patients with normal healthy controls in a rural district in Kerala.

Materials and Methods

This study was conducted in the Department of Biochemistry, Government Medical College,Thrissur. The study group consisted of 113 histologically proven female breast cancer patients and controls were 88 healthy females. 113 consecutive breast cancer patients who underwent surgery in the New Medical College Hospital between October 2012 and December 2013 were selected as cases. Those who were on lipid lowering therapy were excluded from the study population. Patient data including age, menopausal status, grade of the tumor, side which was affected, height and weight were collected. The study was approved by the Institutional Research Committee.

Blood samples were collected after overnight fasting (> 8 hours) by venipuncture. Estimation of serum lipid profile (Total cholesterol-CHOD-POD method; Triglycerides-GPO-POD method, HDL-Cholesterol (HDL-C) - indirect method by selective precipitation of low density lipoprotein cholesterol by phosphotungstate and MgCl2) was carried out using EM 360 Autoanalyser (Transasia) utilizing kits provided by Agappe diagnostics. LDL cholesterol (LDL-C) was calculated using the Friedewald formula.

Statistical analysis was performed using SPSS version 16. Data was analyzed using Student's t test.

p-value less than 0.05 is considered statistically significant.

Results

The median age at diagnosis of breast cancer in the study population was 48 years (Standard deviation 10.04). The youngest patient was aged 27 years, and the oldest patient, 82 years. 56.63% (64 out of 113) of the patients were postmenopausal. 59.29% (67 out of 113) had right-sided tumors and 55.75% (63 out of 113) had grade 2 disease. Age distribution is shown in Table 2 and comparison of lipid profiles of cases and controls in Table 3.

Table: 1 General characteristics of study population

	Cases(N-113)	Controls(n-88)
Age		
Menopausal Status		
Premenopausal	49	30
Post-menopausal	64	58
BMI	22.90±1.51	22.82±1.65
Side of breast affected		
Right	67	
Left	46	
Grade of the tumor		
I	14	
II	63	
III	36	
Diet History		
Non Vegetarian	106	84
Vegetarian	7	4

Table 2. Age distribution of patients and controls

Age	Cases N (%)	Controls N (%)
≤ 30	02(01.7)	0
31-40	20(17.6)	08(09.0)
41-50	47(41.6)	24(27.3)
51-60	28(24.8)	42(47.7)
61-70	12(10.6)	14(06.2)
≥ 70	04(03.5)	0
Total	**113**	**88**

Table 3. Comparison of lipid parameters among cases and controls

	Cases (Mean ± SD)	Controls (Mean ± SD)	p-value
Total Cholesterol	203.43±46.19	192.93±39.6	0.004
HDL-C	62.25±19.74	62.23±21.85	0.946
LDL-C	111.48±44.46	98.80±39.11	0.044
TG	146.56±57.0	169.48±67.4	0.034

Discussion

Carcinoma breast is now the commonest oncological disease among women in Kerala. Changes in lifestyle and diet are thought to be associated with an increase in breast cancer in developing countries [9]. Local eating habits with increased consumption of animal fat, alcohol and sedentary life style have been attributed to many cancers including breast cancer. An association with serum lipids and lipid fractions has been reported in many cancers [10, 11].

Median age of breast cancer patients in the study group was 48 years with around 41.6% (47 out of 113) in the perimenousal age group. It has been reported that this is also the age when prevalence of hyperlipidemia rises among women [12].

In the current study we found that total cholesterol, LDL-C and TG were significantly associated with breast cancer compared to the age-matched control group. This result concurs with the findings of previous studies [11, 13, 14, 15, 16, 17]. No association was observed between HDL-C and breast cancer. Our results are not in agreement with some studies that have failed to show a statistically significant association between total cholesterol and breast cancer [18, 19].

Since endogenous sex steroids are significantly related to the development of breast cancer, it has been hypothesized that cholesterol is an important risk factor for the development of breast cancer [20].It has been reported that low HDL-C is a marker of relative androgen excess [21]. If there is excess androgens in the body, aromatization of these will promote breast cancer development. Elevated levels of LDL-C may result in increased lipid peroxidation, and low HDL-C may also cause accumulation of reactive oxygen species and free radicals, thus favouring tissue injury, and in turn carcinogenesis [22].

Conclusion

Our study supports the hypothesis that total cholesterol, LDL-C and triglycerides are important risk factors in the development of breast cancer. It also reinforces the importance of control of these factors and thereby reducing the incidence and mortality associated with breast cancer.Higher consumption of animal fat and red meat make the population of Kerala prone to a host of diseases, among them the development of breast cancer.

Acknowledgements

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