

## Assessment of Pre and Post Operative Lipid and Lipoproteins in Breast Carcinoma Patient's of Kancheepuram District, Tamilnadu, India



### Biotechnology

**KEYWORDS :** Cholesterol; Triglycerides; mastectomy; Lipoprotein

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#### ABSTRACT

*Breast cancer is considered as disease of opulence which usually funnels to high fat consumption and obesity. Hence the study aimed to evaluate the lipid and lipoproteins level in histopathologically proven breast cancer patients before and after surgery in comparison with age matched healthy control. Cholesterol were estimated by cholesterol oxidase method, Triglycerides by glycerol phosphate oxidase and HDL, LDL, VLDL by precipitation method. The cholesterol level was found to decrease after surgery as compared to before surgery. In both the cases, the level of cholesterol showed a significant increase ( $P < 0.05$ ,  $P = 0.0110$ ) compared to control. The levels of Triglycerides (TG) and HDL - cholesterol were found to increase significantly before and after surgery when compared to control and their levels after surgery were found to decrease when compared before mastectomy. In both the cases, their levels were found to increase significantly ( $P < 0.05$ ,  $P = 0.0050$ ,  $0.0070$ ). The level of LDL - cholesterol were found to be insignificant before and after surgery when compared to control ( $P > 0.05$ ,  $P = 0.3822$ ). The levels of VLDL were found to be highly significant before and after surgery in comparison with control but there is no significant change before and after surgery. The present work reflects disturbance in lipid metabolism as risk factor in breast cancer and also translated the benefits of surgery in reducing breast cancer risk and mortality.*

#### INTRODUCTION:

Lipids are the major cell membrane components essential for various biological functions including cell growth and division of normal and malignant tissues. Lipids can also have important roles in signaling, functioning as second messengers and as hormones. Breast cancer is the most frequent cancer among women worldwide. Breast cancer is considered as disease of opulence which usually funnels to high fat consumption and obesity. In neoplasia, there is rapid and excessive cell proliferation which demands more and more new membrane synthesis. These cells fulfill their high demands of lipids from circulation or by synthesis of new lipids or by degradation of lipoprotein [1]. The changes in the concentration of serum lipids in the breast cancer patients may be due to increased production of tumor necrosis factor and inhibition of adipose lipoprotein lipase activity by the action of insulin [2]. Though the cause of breast cancer is unknown; the female sex hormone, estrogen, might act as carcinogenic promoter for cellular growth in breast tissues and reproductive organs. In addition, environmental factors such as exposure to radiation and chemicals may trigger the onset of breast cancer [3]. Several recent epidemiological studies [4 - 12] have investigated lipid profiles in the context of breast cancer, and some have indicated possible associations between cholesterol and lipoprotein levels and breast cancer risk. Hence the present study aimed to determine the changes of serum lipid profiles: total Cholesterol, LDL, HDL, VLDL and TG before and after surgery in breast cancer patients and also compare with normal control of Kancheepuram district women.

#### MATERIALS AND METHODS:

Blood samples were collected from Aringar Anna Cancer Institute, Kancheepuram from 50 clinically and histopathologically proven breast cancer patients before and after surgery and compared with age matched control. The patients were not using hormones, oral contraceptives and were non-smokers. None of them had secondary disorder. Informed consent was obtained from all the participants. The human ethics committee of office of the Director, Govt. Aringar Anna Memorial cancer Hospital, Regional Cancer Center, Karapettai, Kancheepuram vide Ref.No.262/E1/08 has approved the study. Controls consisted of members of the public with no previous history of breast cancer and other cancer related diseases. Blood samples were collected, centrifuged for 15 minutes at 3000rpm and the serum was separated and stored at 4°C for analysis. Total Cholesterol, Triglycerides and HDL - Cholesterol were estimated by enzymatic method. Triglycerides and Total cholesterol were measured at 500nm by standard coupled enzymatic procedures [13, 14]. HDL-cholesterol was determined by the phosphotungstic acid and

magnesium chloride precipitation method [15]. Very low density lipoprotein and low density lipoprotein results are obtained by Friedewald's equation [16], in which:

$$VLDL = TG/5$$

$$LDL = T. Cholesterol - HDL - VLDL$$

The data for biochemical analysis were expressed as mean±SD. Obtained data were analyzed by using independent sample t-test by Statistical Packages for Social Science Software (SPSS 10.0). Statistical analysis where the value of  $P < 0.05$  is considered as significant

#### RESULTS AND DISCUSSION:

The mean body weight of breast cancer patient was 61(range 50 - 74) which alters slightly during the study. Values are mean standard deviation of 50 breast cancer patients and controls are indicated in Table 1.

**Table: 1**

Age and Body weight (mean ± SD) of Control (n= 50) & Patients (n= 50) with breast cancer.

S. No	Parameters	Control	Patient
1	No. of persons	50	50
2	Mean age (year)	46 ± 4.3	44 ± 2.5
3	Mean body weight(Kg)	61.8 ± 5.5	62.5 ± 5.7

The mean and standard deviation of Total Cholesterol, Triglycerides, HDL - Cholesterol, LDL - Cholesterol and VLDL status in breast cancer patients before and after surgery in comparison with age matched control are indicated in Table 2.

**Table 2: Lipid profile of control, breast cancer patients before and after surgery**

Parameter (mg/dL)	Control	Before surgery	After surgery
Cholesterol	200 ± 49.50	278.2 ± 18.10*	255.1 ± 19.5*
Triglycerides	120.8 ± 33	219.5 ± 30.7*	160.8 ± 54.86*
HDL	51.6 ± 10.2	27.29 ± 14.70*	24.65 ± 14.17*
LDL	127.5 ± 34.4	124.2 ± 32.8♣	120 ± 38♣
VLDL	24.2 ± 6.5	41.89 ± 13.3*	37.61 ± 13.13*

Table 2 title should be above the table. Malignant proliferation of breast tissue in women has been associated with changes in plasma lipid and lipoproteins levels [17]. Total cholesterol, Triglycerides, LDL-cholesterol, and HDL-C levels are correlated with development of breast cancer in women to explore their possible role prevention of breast cancer. The possibility that lipid abnormalities in cancer patients might represent an acute phase response caused by the delivery of cytokines produced by inflammatory cells, around the tumor or by the tumor cells itself. An earlier study reported that lipids might primarily affect the gonads, and subsequently higher estradiol secretion could influence the development of malignancies in the mammary glands and lymphoid system [18]. Total cholesterol was significantly elevated in breast cancer patients before and after surgery as compared to control and similar finding was reported by Maddy [19] and Ray et al [20]. This report also suggests that higher concentration of TG may lead to the decreased level of sex hormone-binding globulin, resulting in higher amount of free estradiol, which may likely to increase breast cancer risk [21]. Our results also propose that higher concentrations of TC and TG may either play a role in carcinogenesis or are responsible for higher incidence of breast cancer. The level of TG and VLDL were also significantly higher in breast cancer patients before and after surgery compared to control. Their levels lowered

after surgery. The levels of HDL were significantly lowered in breast cancer patients when compared to control but the level of LDL showed no significant changes. The exact mechanism of hyper triglyceridemia and decreased HDL-C concentration in breast cancer patients is not known. However, it has been suggested that lipoprotein lipase (LPL) may regulate the clearance of TG from blood to tissue and its activity in white adipose tissue decreases in cancer hosts, contributing to the hyper triglyceridemia [22]. Several studies have reported lower levels of HDL cholesterol in breast cancer patients than in control subjects [23 - 26]. Further there are several reports that have shown that tumor progression from localized to metastatic disease is associated with decreasing HDL - cholesterol level [27, 24]. Kokoglu et al. reported significant increase in triglycerides and VLDL - cholesterol and decrease in HDL and LDL cholesterol in patients with stage IV disease when compared to those with stage I breast cancer [28]. This is sync with our study except the levels of LDL cholesterol doesn't show any significant changes before and after surgery in breast cancer patient when compared to control. Changes in the lipid profile could be due to dietary factor or hormonal factor, an increased estrogen activity, which is believed to be involved in the development of breast cancer [29]. Hence our findings are consistent with these studies that alteration in lipid and lipoproteins as an indicator of disturbed metabolism of sex steroid hormones in mammary carcinoma.

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