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Original Research Paper

Medical Science

COMPARISION STUDY OF LIPID PROFILES IN BREAST CANCER PATIENTS AND HEALTHY CONTROL GROUP

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ABSTRACT

Carcinoma of the breast is the second commonest malignancy affecting half a million women worldwide each year. Epidemiological studies have revealed that 1 in 50 women in India can develop breast cancer in their lifetime. A number of epidemiological studies have shown the increased risk of death from cancer with hypocholesterolaemia, although several studies proposed the low levels of cholesterol is a predisposing factor for carcinogenesis. So the present study was planned to investigate the alteration in the lipid profiles of patients with carcinoma of breast in comparison with age matched control women.

Aim: Estimate and compare Serum Lipid Profile for both in Breast cancer patients and normal individuals.

Materials & Methods: Overnight Fasting blood samples of 156 Clinically diagnosed female cases of breast cancer from OPD/IPD of Surgery and Oncology department And same number of normal individuals or control group has been taken from the OPD/IPD of Medicine Department and Emergency Department, S.M.S. Medical College and Hospital, Jaipur.Esmination of Serum Lipid Profiles Such as Total Cholesterol,HDL-Cholesterol, etc. were determine by enzymatic method in fully automated chemistry analyzer.

Observation & Result: Mean±SD (mg/dl) for Serum TG level, in case of Breast Cancer Patients & Control Group were 202.74±53.45 and 178.77±99.36 respectively and p value was 0.008. Similarly, for Serum Cholesterol were 205.62±46.09 and 158.73±41.59 for Breast Cancer and Control group respectively.Also, p value of S.Cholesterol was 0.000. Mean and SD of S.HDL-Cholesterol level for both the groups were 39.20±5.30 and 40.46±8.96 respectively, p value was non significant. As far as S.LDL level was concert for Breast Cancer patients was 125.87±46.97 and for the control group was 81.54±29.21 and p value was 0.000. Level of S. VLDL were 40.55±10.69 and 35.70±19.49 for test group and control group respectively and p value was 0.008.

Summary & Conclusion: Serum Cholesterol,Serum LDL was significantly lower in breast cancer patients whereas Serum TG,VLDL was significantly higher in breast cancer patients. Carcinoma breast is commonest cancer in urban and rural females. Many women donot present themselves for check-up at hospitals or Medical because of varied reasons like illiteracy, monetary reasons and lack of knowledge. .Lots of efforts are needed both from the health systems as well as from local population for early diagnosis of cancer breast

KEYWORDS : Breast Cancer, HDL,VLDL,LDL,Cholesterol

Breast is the most common site of cancer in women.Breast cancer is a disease in which breast cells proliferate abnormally and may present as a breast lump, thickening, or skin change. When breast cancer cells metastasize from the original tumor and enter the blood stream or lymphatic system, they can form secondary tumors, locate in other parts of the body. A biopsy is necessary to confirm the diagnosis and determine the type of cancer present. The incidence of breast cancer increases with age, being uncommon below the age of 32 years; however its behaviour varies from slow to rapid progressive disease despite available treatment. Carcinoma of the breast is the second commonest malignancy affecting half a million women worldwide each year. It is one of the major causes of death among women between 40 and 44 years age group that has become a genuine public health problem. Epidemiological studies have revealed that 1 in 50 women in India can develop breast cancer in their lifetime.1 According to GLOBOCAN (WHO), for the year 2012, an estimated 70218 women died in India due to breast cancer, more than any other country in the world (second: China - 47984 deaths and third: US - 43909 deaths). 2 The etiology of lipid changes associated with breast cancer is multifactorial and relationship of lipid changes to breast cancer is still a subject of controversy. Some studies have found that malignant proliferation of breast tissue in women is associated with changes in plasma lipid and lipoprotein levels. A number of epidemiological studies have shown the increased risk of death from cancer with hypo cholesterolaemia, although several studies proposed the low levels of cholesterol is a predisposing factor for carcinogenesis3 So the present study was planned to investigate the alteration in the lipid profiles of patients with carcinoma of breast in comparison with age matched control women. The aim of this study, therefore, is to find out the effect of lipids on breast cancer risk. and an attempt made to investigate the levels of total cholesterol (TCH), triglycerides (TG), low density lipoproteins (LDL) very low density lipoproteins (VLDL), high density lipoproteins (HDL) in Breast cancer patients.

AIM & OBJECTIVES:

- Estimate the serum lipid profile in breast cancer patients.
- Compare the serum lipid profile of Patient group with Control groups.

MATERIALS & METHODS:

A Hospital based case-control study was planned, including 156 Clinically diagnosed female cases of breast cancer from OPD/IPD of Surgery and Oncology department And same number of normal individuals or control group has been taken from the OPD/IPD of Medicine Department and Emergency Department, S.M.S. Medical College and Hospital, Jaipur. The blood samples of the Breast cancer patients taken from outdoor & indoor in morning after overnight fasting. Blood samples of control group taken after overnight fasting. The samples left standing for one hour; Serum separated at 2500 rpm centrifugation and analyzed on fully automated analyzer randox(imola).

PRINCIPLE OF ASSAY:-

- In this study we will investigate serum levels of HDL-cholesterol, LDL-cholesterol, Total cholesterol and

Triglycerides in Breast cancer patient and healthy controls.

- Serum levels of Lipids will be measured by colorimetric technique in fully Automated chemistry analyzer randox(imola)

METHODOLOGY

- Estimation of total cholesterol: Enzymatic method (CHOD-PAP)

PRINCIPLE

The enzyme cholesterol esterase is used to hydrolyze the cholesterol esters present in the serum to free cholesterol and free fatty acids. The enzyme cholesterol oxidase in the presence of oxygen to oxidizes the cholesterol to cholest-4-en-3one and hydrogen peroxide. Hydrogen peroxide oxidizes phenol and 4-aminoantipyrine to produce red color that can be measured spectrophotometrically.

CALCULATION:

$$\text{Total Cholesterol (mg/dl)} = \frac{\text{Abs of sample}}{\text{Abs.of Standard}} \times 200$$

NORMAL VALUE

TOTAL CHOLESTEROL

Desirable: <200 mg/dl
Borderline high: 200 -239 mg/dl
High: > or =240 mg/dl

- Estimation of Serum HDL-Cholesterol:

PRINCIPLE:

The Method is in a two reagent format and depends on the properties of a unique detergent, as illustrated. This method is based on accelerating the reaction of cholesterol oxidase (CO) with non-HDL un-esterified cholesterol and dissolving HDL selectivity using a specific detergent.

In the first reagent, non-HDL unesterified cholesterol is subject to an enzyme reaction and peroxide generated is consumed by a peroxidase reaction with DSBmT yielding a colorless product. The second reagent consists of a detergent capable of solubilizing HDL specifically, cholesterol esterase (CE) and chromagenic coupler to develop color for the quantitative determination of HDL cholesterol. This may be referred to as the Accelerator Selective Detergent methodology.

EXPECTED VALUES

HDL CHOLESTEROL

Low HDL: <40 mg/dl
Borderline low: 40-59 mg/dl
Normal: > or =60 mg/dl

- Estimation of serum triglycerides:(GPO-PAP method)

PRINCIPLE:

Serum triglycerides are hydrolyzed to glycerol and free fatty acids by lipase.In the presence of ATP and glycerol kinase (GK), the glycerol is converted to glycerol-1-phosphate. The glycerol-1-phosphate is then oxidized by glycerol phosphate oxidase (GPO) to yield hydrogen peroxide. The condensation of hydrogen peroxide with 4-chlorophenol and 4-aminophenazone (4-AA) in the presence of peroxidase (POD) produces a red colored quinonimine dye which absorbs at, or near 500nm. The intensity of the colored complex formed is directly proportional to the triglycerides concentration of the sample.

CALCULATION:

$$\text{Conc. of Triglycerides (mg/dl)} = \frac{\text{Abs.of Sample}}{\text{Abs.of Standard}} \times 200$$

Expected values:

TRIGLYCERIDES

NORMAL: <150 MG/DL
BORDERLINE HIGH: 150-199 MG/DL
HIGH: ≥ 200 MG/DL

- **Estimation of Serum VLDL-cholesterol and LDL-cholesterol:**
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- VLDL was estimated by TG/5 based on the average ratio to cholesterol in VLDL
- Serum LDL was estimated from the Freidwald and Fredrickson's (1972) formula, which is LDL=Total Cholesterol-[HDL+VLDL]

EXPECTED VALUES:

- **Best:** Less than 100 mg/dl (less than 70 mg/dl for persons with a history of heart disease or those at very high risk)
- **Near Best:** 100 - 129 mg/dl
- **Borderline High:** 130 - 159 mg/dl
- **High:** 160 - 189 mg/dl
- **Very High:** 190 mg/dl and higher

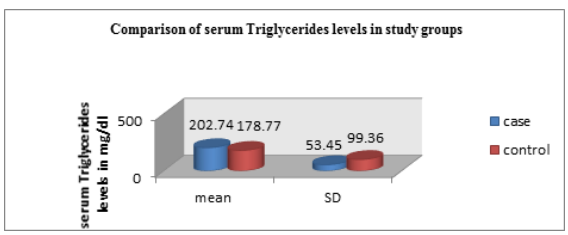
OBSERVATION:

Groups	No. of cases (n)	S. TG (mg/dl)	t-value	p-value
Breast Cancer Patients	156	202.74 ± 53.45	2.654	0.008
Control	156	178.77 ± 99.36		

*Values presented as Mean± SD

This Table Shows the level of S. Triglyceride level in Breast Cancer Patients and Control group of 156 individual each are 202.74±53.45 mg/dl and 178.77±99.36 mg/dl respectively . Value presented as Mean ±SD. The value of t-value and p-value are 2.654 and 0.008 respectively.

FIGURE 1: COMPARISON OF S. TRIGLYCERIDE LEVELS IN THE STUDY GROUPS



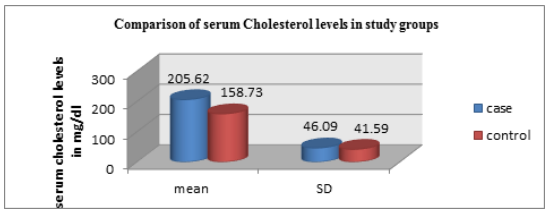
This figure shows the comparison graph between mean serum triglycerides level in Breast Cancer Patients & Control group are 202.74 mg/dl and 178.77mg/dl respectively whereas SD in Breast Cancer group and Control group are 53.45mg/dl and 99.36mg/dl respectively.

TABLE 2: COMPARISON OF S. CHOLESTEROL LEVELS IN THE STUDY GROUPS

Groups	No. of cases (n)	S. Cholesterol (mg/dl)	t-value	p-value
Breast Cancer Patients	156	205.62 ± 46.09	9.439	0.000
Control	156	158.73 ± 41.59		

*Values presented as Mean± SD
This Table Shows the level of S. Cholersyerol level in Breast Cancer Patients and Control group of 156 individual each are 205.62±46.09 mg/dl and 158.73±41.59 mg/dl respectively . Value presented as Mean ±SD. The value of t-value and p-value are 9.439 and 0.000 respectively

FIGURE 2: COMPARISON OF SERUM CHOLESTEROL LEVELS IN STUDY GROUPS



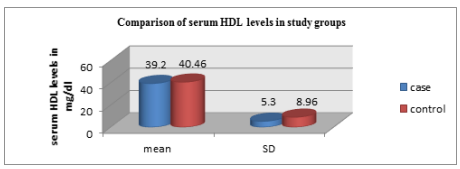
This figure shows the comparison graph between mean serum Cholesterol level in Breast Cancer Patients & Control group are 205.62 mg/dl and 158.73mg/dl respectively whereas SD in Breast Cancer group and Control group are 46.09mg/dl and 41.59mg/dl respectively.

TABLE 3: COMPARISON OF S. HDL-CHOL LEVELS IN THE STUDY GROUPS

Groups	No. of cases (n)	S. HDL-Chol (mg/dl)	t-value	p-value
Breast Cancer Patients	156	39.20 ± 5.30	- 1.512	NS
Control	156	40.46 ± 8.96		

*Values presented as Mean± SD
This Table Shows the level of S. HDL-Cholesterol level in Breast Cancer Patients and Control group of 156 individual each are 39.20±5.30 mg/dl and 40.46±8.96 mg/dl respectively . Value presented as Mean ±SD. The value of t-value and p-value are -1.512 and NS respectively

FIGURE 3: COMPARISON OF S. HDL-CHOL LEVELS IN THE STUDY GROUPS

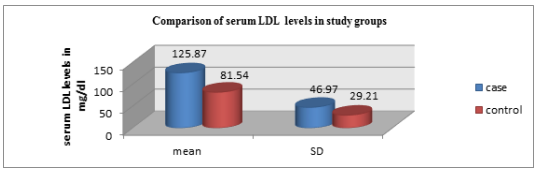


This figure shows the comparison graph between mean serum HDL-Cholesterol level in Breast Cancer Patients & Control group are 39.2 mg/dl and 40.46mg/dl respectively whereas SD in Breast Cancer group and Control group are 5.3mg/dl and 8.96mg/dl respectively.

Groups	No. of cases (n)	S. LDL (mg/dl)	t-value	p-value
Breast Cancer Patients	156	125.87 ± 46.97	10.010	0.000
Control	156	81.54 ± 29.21		

*Values presented as Mean± SD
This Table Shows the level of S. LDL level in Breast Cancer Patients and Control group of 156 individual each are 125.87± 46.97mg/dl and 81.54±29.21 mg/dl respectively . Value presented as Mean ±SD. The value of t-value and p-value are 10.010 and 0.000 respectively

FIGURE 4: COMPARISON OF S. LDL LEVELS IN THE STUDY GROUPS



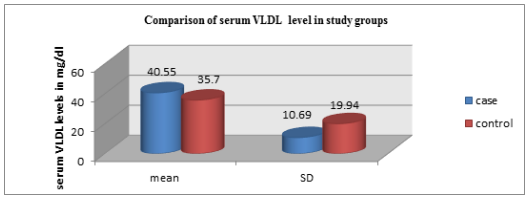
This figure shows the comparison graph between mean serum LDL level in Breast Cancer Patients & Control group are 125.87mg/dl and 81.54mg/dl respectively whereas SD in Breast Cancer group and Control group are 46.97mg/dl and 29.21mg/dl respectively.

TABLE 5: COMPARISON OF S. VLDL LEVELS IN THE STUDY GROUPS

Groups	No. of cases (n)	S. VLDL (mg/dl)	t-value	p-value
Breast Cancer Patients	156	40.55 ± 10.69	2.667	0.008
Control	156	35.70 ± 19.94		

*Values presented as Mean± SD
This Table Shows the level of S. VLDL level in Breast Cancer Patients and Control group of 156 individual each are 40.55± 10.69mg/dl and 35.70±19.94 mg/dl respectively . Value presented as Mean ±SD. The value of t-value and p-value are 2.667 and 0.008 respectively.

FIGURE 5: COMPARISON OF S. VLDL LEVELS IN THE STUDY GROUPS



This figure shows the comparison graph between mean serum VLDL level in Breast Cancer Patients & Control group are 40.55mg/dl and 35.70mg/dl respectively whereas SD in Breast Cancer group and Control group are 10.69mg/dl and 19.94mg/dl respectively.

RESULTS & DISCUSSION:

In this study, the Mean Serum TG level in breast cancer patients was 202.74±53.45 mg/dl while in case of control group it's was 178.77±99.36 mg/dl.This difference was statistically significant (pvalue=.008). The present study was supported by some scholars. According to J.R.Peelain et al4 in 2012, the TG levels were significantly higher in women with node-negative invasive cancer(0.94+/-1.04mg/ml) than in those with noepithelial proliferation(0.83+/-1.04mg/ml,p=0.03). Another study conducted by Vinayak V Kshirsagar et al5 in 2016 showed that Total Triglyceride incase of casesis 135mg/dl as compared with controls which is143mg/dl. This was statistically not significant (pvalue0.30). A study conducted by Vatten and Foss et al6 in 1990 demonstrated negative,but notstatistically significant association for TG with breast Cancer incidence, which showed further insignificance after adjustment for BMI and serum TC.

In this study we found Mean Serum cholesterol level of breast cancer patients was 190.93+42.80mg/dl while for controls was

191.25+42.31mg/dl This difference was statistically significant(pvalue=0.018). Our study correlated with the study conducted by Dr.Seema Mishra7 in 2015 and she observed that hypocholesterolaemia with decresed HDL Cholesterol and increased Triglycerides in patients of Breast Cancer. Similarly, according to Vinayak V Kshhirsagar et al5 in 2016, Total Cholesterol level in Breast Cancer patients was 165 mg/dl as compared with control group which was 176mg/dl. This was statically significant (p value 0.05). Contrast study conducted by J.K.Peela et al4 in 2012, showed that Serum TC was significantly elevated in patients with carcinoma of Breast when compared with control group and p value 0.0046. Another study conducted by Kamal Eldin A. et al8 in 2012, showed that the value of T-C was significantly increased in all four stages of Breast Cancer compared with that of control group.

In this study we found Mean Serum HDL level of breast cancer patients was 41.16+5.56mg/dl while for controls was 42.91±8.40mg/dl. This difference was statistically significant(pvalue=0.016). VinayakV Kshirsagar et al5 in 2016,which showed High Density lipoproteins in cases of cases is 43mg/dl as compared with the control which is 52mg/dl. This was statistically highly significant (pvalue0.007). According to J.R.Peela et al4 in 2012 showed that Serum HDL-C was significantly elevated in patients with carcinoma breast when compared with controls(p=0.004). Another scholar, Dr.Seema Mishra7 in 2015 observed that hypocholesterolaemia with decreased HDLcholesterol in breast cancer patients.

In this study we found Mean Serum LDL level of breast cancer patients was 107.46 + 43.70 mg/dl while for controls was 122.10 ±47.71mg/dl.This difference was statistically significant (pvalue=0.005). According to study conducted by Vinayak V Kshirsagar et al5 in 2016 which showed that Low Density Lipoprotein in cases of cases were 180mg/dl ascompared with the control which were 198mg/dl.This was statistically significant (pvalue0.011).

Another study conducted by J.R.Peela in et al4 in 2012 showed that levels of LDL-C and TGs did not show any significant changes between the cases studied and the controls (p=0.42and0.092respectively).

In this study we found Mean Serum VLDL level of breast cancer Patients was 44.60+11.76mg/dl while for controls was 38.29±11.71mg/dl.This difference was highly statistically significant (p value=0.000).According to Pikul L et al9,the level of TG, LDL-C, VLDL-C (mean ± SD) in Breast cancer patients were 148.20+94.95,143.68+40.01and29.63+18.9 while in control group were 217.48+47.66 and 59.45+15.89 respectively.They found thatTG, LDL-C and VLDL-C levels in breast cancer group were significantly higher than controls group(P <0.001). Contrast study conducted by Vinayak V Kshirsagar et al5 in 2016showed VeryLow DensityLipoprotein in case of cases was 27mg/dl as compared with controls which was 28 mg/dl. This was statistically not significant(pvalue0.39).

SUMMARY & CONCLUSION:

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. Many women donot 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 metastaticst age and at this stage they come to seek treatment.Lots of efforts are needed both from the health systems as well as from local population for early diagnosis of cancer breast.

CONCLUSION OF THIS STUDY WERE THAT:

- Serum Cholesterol,Serum LDL was significantly lower in breast cancer patients in compare with healthy
- women.
- This study shows Serum TG,VLDL was significantly higher in breast cancer patients in compare with control group.
- The current study has shown a significant alteration in the Serum lipid Profile in breast cancer patients .It is highly recommended that People should reduce weight and control blood cholesterol levels in Order to reduce risk of breast cancer since there is contrasting Evidence on the correlation of lipid levels and breast cancer,there is a Need for large ,multicentric and randomized trials.

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