

Artmış Lipid Seviyeleri ve Meme Kanseri

Ömer PARLAK¹ Servet KOCAÖZ²

Öz

Meme kanseri, hem gelişmiş hem de gelişmekte olan ülkelerde kadınlarda görülen en sık kanserdir. Metabolik heterojenite tüm kanserlerde mevcut olabilir. Dislipidemi, bağımsız olarak meme kanseri gelişimi ile ilişkilidir. Bu çalışma, çalışma grubundaki 100 meme kanseri hastasından ve kontrol grubu olarak adlandırılan 100 benzer normal kadınlardan alınan serum örnekleri üzerinde yapıldı. Herhangi bir tedavi uygulamadan önce çalışma grubu ve kontrol grubu üzerinde lipid paterni çalışmaları yapıldı. Toplanan serum örnekleri Total kolesterol (TC), HDL, LDL ve Trigliserit konsantrasyonları açısından incelenmiştir. Çalışma grubunda en genç hasta 35 yaşında, en yaşlı hasta 83 yaşında idi. Ortalama yaş $58,41 \pm 11,01$ yıldır. Kontrol grubunda en genç hasta 30 yaşındaydı ve en yaşlı hasta 80 yaşındaydı. TC, LDL, TG seviyeleri bütün evrelerde artmış olarak bulundu ve C-ERB-B2 pozitifliğinde de benzer olan artmıştır. Çalışmamız lipid düzeyleri ile meme kanseri arasındaki ilişkiyi desteklemektedir. Bununla birlikte, bir marker olarak kullanılmak üzere, prospektif de dahil olmak üzere çoklu merkez çalışmalarına ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Lipid düzeyi, meme kanseri

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Increased Lipids Levels and Breast Cancer

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Abstract

Breast cancer is the top cancer in women both in the developed and the developing world. Metabolic heterogeneity may be present in all cancers. Dyslipidemia is independently associated with the development of breast cancer. The present study was carried out on serum samples from 100 breast cancer patients named study group and 100 similar age normal women named control group. Lipid pattern studies were carried out on study group and control group before any treatment. The serum samples so collected were examined for Total cholesterol (TC), High density lipoprotein cholesterol (HDL), Low density lipoprotein cholesterol (LDL) and Triglyceride (TG) concentrations. In the study group the youngest patient was of 35 years old and oldest patient was of 83 years. Mean age was 58.41 ± 11.01 years. In the control group, the youngest patient was of 30 years and oldest patient was of 80 years. TC, LDL, TG levels increased in all grades, which is similar in the of C-ERB-B2 positive status. Our study supports the relationship between increased lipid levels and breast cancer. However, there is a need for multiple center studies, including prospective, to be used as a marker.

Keywords: Lipids level, breast cancer

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INTRODUCTION

Breast cancer is the top cancer in women both in the developed and the developing world. The incidence of breast cancer is increasing in

the developing world due to increase life expectancy, increase urbanization and adoption of western lifestyles. Although some

risk reduction might be achieved with prevention, these strategies cannot eliminate the majority of breast cancers that develop in low- and middle-income countries where breast cancer is diagnosed in very late stages. Therefore, early detection in order to improve breast cancer outcome and survival remains the cornerstone of breast cancer control.¹ Approximately one-half of newly diagnosed breast cancers can be explained by known risk factors, such as age at menarche, first live birth, menopause, and proliferative breast disease. An additional 10 percent are associated with a positive family history. In addition, risk may be modified by demographic, lifestyle, and environmental factors, although their association with breast cancer risk has not been clearly demonstrated.²

Metabolic heterogeneity may be present in all cancers. Identifying biologic markers associated with metabolic heterogeneity, breast cancer subtype and prognosis is of importance in order to discover potential targets for treatment and optimize breast cancer outcomes.³ Dyslipidemia is independently associated with the development of breast cancer.⁴ But, studies contradict.⁵ Recently, the body mass index (BMI) has been shown to be distributed differently to the breast cancer molecular subtypes,⁶ and has also been supported by others.^{7,8} Triglycerides serve as an independent

source for fatty acid oxidation,⁹ an important process that supports the carcinogenic potential of triglycerides and promotes cell proliferation and tumor growth.¹⁰ However, the relationship between pre-diagnostic triglycerides and breast cancer development remains unclear as a molecular subtype.¹¹ It has also been suggested that cholesterol plays a role in breast cancer progression.¹² In contrast, HDL has anti-inflammatory properties¹³ and is inversely associated with the risk of breast cancer.¹⁴ Low HDL may be associated with higher estrogen levels and absolute mammographic intensity.¹⁵⁻¹⁷ In addition, different lipoproteins show that the effect of HDL-cholesterol on breast cancer prognosis is different from the lower breast cancer phenotype,¹⁸ according to progesterone receptor expression.¹⁹

The relation between serum lipids levels and breast cancer risk is unclear; because cholesterol is the precursor to sex steroid hormones, higher levels of cholesterol could possibly increase risk of breast cancer. Present study was planned to evaluate the relationship between serum lipids and breast cancer by menopausal status, type and stage of cancer.

MATERIAL AND METHODS

After Institutional Ethical Committee approval, the present study was carried out on

serum samples from 100 breast cancer patients named study group and 100 similar age normal women named control group. The control group consists of healthy women who were not taking any hormone preparation. Having history of diabetes, hypertension, coronary artery disease, metabolic syndrome, endocrine disorders, renal and hepatic failure or taking oral contraceptive or any form of hormonal medication, having family history of breast cancer or suffering from any other malignancy/benign breast disorders were excluded from the study.

The diagnosis of breast carcinoma was made by Tru-Cut Biopsy and confirmed by histopathological examination. Lipid pattern studies were carried out on study group and control group before any treatment. Whole blood sample of 5ml was taken from each participant of study group and control group. After clotting, sample was centrifuged for serum separation. All patients in the study group and the control group were fasted for at least 8 hours before taking samples. The serum samples so collected were examined for Total cholesterol (TC), High density lipoprotein cholesterol (HDL), Low density lipoprotein cholesterol (LDL) and Triglyceride (TG) concentrations. In our study, there was no significant distribution in pre and post-menopausal patients.

Statistical Analysis

All data was analysed using the Statistical Package for Social Sciences (SPSS) software computer program version. Data were expressed as mean (M) and standard deviation (SD) following analyses using student t-test, which was performed for comparison between control and patient groups. A value of $p < 0.05$ was considered significant.

RESULTS

In our study was carried out on serum samples from 100 breast cancer patients named study group and 100 similar age normal women named control group. In the study group the youngest patient was of 35 years old and oldest patient was of 83 years. Mean age was 58.41 ± 11.01 years. In the control group, the youngest patient was of 30 years and oldest patient was of 80 years. Mean age of the control group was 56.86 ± 10.48 years ([Table 1](#)). The measured lipid levels (LDL, HDL, TC, and TG) in both groups are shown in [Table 2](#). The LDL, TC and TG levels in the study group were significantly higher. The HDL level was also found to be lower according to the control group.

In this study, 40 patients were grade 3, 44 patients were grade 2, and 16 patients were grade 1. LDL, TC and TG levels were found to be higher in all stages of breast cancer patients than in the control group at all stages.

Although there was no significant difference between the grades ([Table 3](#)).

Lipid levels were determined according to C-ERB-B2, (also known as HER2) as positive and negative status. LDL and TC levels were found to be higher in the study group compared to all C-ERB-B2 positivity levels and were statistically significant. TG, was found to be increased in C-ERB-B2 3+ and this was statistically significant. HDL levels were also lower in C-ERB-B2 1+ and 2+ compared to the control group and statistically significant. In contrast, HDL levels were found to be similar in patients with C-ERB-B2 3+ ([Table 4](#)).

DISCUSSION AND CONCLUSION

Breast carcinoma is one of the major surgical problems developing besides advanced nations. Relationship between serum lipid profiles and breast cancer are uncertain. Local eating habits increased fat diet, increased alcohol consumption, smoking, country of residence, pregnancy, endogenous hormones, less exercise, environmental factors together with genetics predisposition are important factors related to breast carcinoma.²⁰⁻²³ Current study, it is planned to evaluate the relationship with the lipid profile breast cancer.

Study by Ray at al. various serum lipid levels, namely triglycerides, total cholesterol, HDL,

LDL. Triglycerides, total cholesterol and LDL cholesterol were significantly Breast cancer cases are higher than controls. They included 138 histologically proven cases of breast cancer along with 146 control females in their study.²⁴ Study by Xing Li and colleagues in 1044 breast cancer patients Preoperative serum levels of TG and HDL have been shown to be independent predictors of outcome in breast cancer patients.²⁵ Similarly in our research, the LDL level of the study group was determined as 123,19 mg / dl and the mean of the control group was found to be 95.83 mg / dl, which was statistically significantly higher (p value 0.002).

In the present study on comparison of TC among study group and control group it was found that mean TC among study group was 198.43 mg/dl and in control group was 171.97 mg/dl with p-value 0.003 (<0.05), which is significant. Bhat et al.²⁶ studied over 120 women, including 60 breasts. Cancer patients with 25 to 80 age group and 60 healthy women as a control with similar age range. They evaluated the role of Lipid Profile in breast cancer. They saw a significant increase TC, TG and LDL controls. Both pre-menopausal and TG and TG gains and post-menopausal cases of HDL-cholesterol not changed. We have not separated patients pre or post-menopausal. In the study group, the mean HDL was 49.95 mg / dl and the control group

average was 57.24 mg / dl. This is statistically significant (p: 0.017 <0.05).

In this study on the comparison of TG between the study group and the control group, it was found that the mean TG was 83.69 mg / dl in the study group and 149.72 mg / dl in the control group with p value of 0,001 (<0.05), this is important. In a study by Manuela Gago-Dominguez et al. the risk of breast cancer in C-ERB-B2 negative was significantly increased by the increase of circulating triglyceride levels.²⁷

In this study, LDL, TC and TG levels were found to be higher in all grades of breast cancer patients than in the control group at all stages (p<0.05). Although there was no significant difference between the grades. In a study by Raza et al.²⁸ hyperlipidemia was significantly high in breast cancer patients with lymph node metastasis. On increase in tumor grade I to II, increase in total cholesterol (4%), LDL-cholesterol 23% and 11% increase in triglycerides was observed. On tumor size increase from ≤ 2 to 2.5cm, increase observed in total cholesterol (1.7%) triglycerides (2%) and LDL (3%) whereas HDL was (2%) low.

In our study, as the C-ERB-B2 levels increased, LDL and TC levels were also increased. TG, was found to be increased in C-ERB-B2 3+. HDL levels were also lower in C-ERB-B2 1+ and 2+. In contrast, HDL levels were found to be similar in patients with C-

ERB-B2 3+. Dominguez et al. the risk of breast cancer in C-ERB-B2 negative was significantly increased by the increase of circulating triglyceride levels.²⁷

Our study supports the relationship between increased lipid levels and breast cancer. Thus, TC, LDL, TG levels increased in all grades, which is similar in the of C-ERB-B2 positive status. However, there is a need for multiple center studies, including prospective, to be used as a marker.

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Table 1: Distribution according to age groups

Age Groups	Control group (n)	Study group (n)
≤40	8	3
41-50	15	13
51-60	47	51
61-70	18	22
>70	12	11
Total	100	100
Mean age	56.86±10.48	58.41±11.01

Table 2. Lipid profile of study and control groups

Lipids Levels (mg/dl)	Study Group (Average ±SD*)	Control Group (Average ±SD)	p-value
LDL	123.19 ± 40.61	95.83 ± 19.39	0.002
HDL	49.95± 14.43	57.24 ± 11.71	0.017
Total cholesterol	198.43± 43.73	171.97 ± 22.67	0.003
Triglycerides	149.72± 52.21	83.69 ± 38.32	0.001

*SD: Standart Deviation; **p-value < 0.05 – significant, >0.05 – Non significant

Table 3. Lipid profile of Women with Breast Cancer according to grade

	Lipids Levels (mg/dl) (Average ±SD)			
	LDL	HDL	Total cholesterol	Triglycerides
Control group (n=100)	95.83 ± 19.39	57.24 ± 11.71	171.97 ± 22.67	83.69 ± 38.32
Study Group				
Grade 1 (n=16)	112.18±26.37	52.51±12.02	186.91±23.68	135.45±38.02
p-value*	0.1879	0.0036	0.1663	0.0002
Grade 2 (n=44)	127.54±32.66	45.09±8.10	208.29±22.14	141.69±52.43
p-value	0.0002	0.2510	0.0001	0.0004
Grade 3 (n=40)	122.19±30.14	48.77±12.63	191.39±24.53	155.35±66.06
p-value	0.0024	0.0073	0.0321	0.0002

*p-value < 0.05 – significant, > 0.05 – Non significant

Table 4. Lipid levels of C-ERB-B2 positive and negative status

		Lipids Levels (mg/dl) (Average ±SD)			
		LDL	HDL	Total cholesterol	Triglycerides
C-ERB-B2	Control Group	95.83 ± 19.39	57.24 ± 11.71	171.97 ± 22.67	83.69 ± 38.32
	Negative (n=39)	123.33±41.67	48.50±12.34	197.77±43.60	160.37±54.63
	p-value*	0.001	0.004	0.004	1
	1+ (n=19)	116.36±24.03	53.57±9.74	195.64±25.81	117.50±43.45
	p-value	0.003	0.162	0.002	0.007
	2+ (n=20)	128.07±40.92	44.93±13.94	191.73±46.87	158.20±62.84
	p-value	0.001	0.002	0.033	1
	3+ (n=22)	124.22±49.27	53.72±19.44	207.28±52.41	151±72.11
	p-value	0.004	0.22	0.001	0.003

*p-value < 0.05 – significant, > 0.05 – Non significant.