Original Research Article

Atherogenic Plasma Index Levels of Colon Cancer Patients After Chemotherapy

Abstract;

Objectives: Despite newly developed treatment modalities, colorectal cancer is still the leading cause of cancer deaths. In recent years, studies have been carried out to suggest that lipid metabolism may play a role in cancer development and metastasis**.**

Methods ; Lipid metabolism both in conventional chemotherapy. It has also been found that it plays a central role in resistance to targeted therapies. In our study, we planned to compare the atherogenic plasma index levels of patients diagnosed with colon cancer before chemotherapy and in the month of chemotherapy.

Results and Conclusions; Evaluating the effect on the atherogenic plasma index after chemotherapy, we thought that lipid-regulating treatments would contribute to both cancer development and disease control.

Keywords: Atherogenic plasma index, lipoprotein, cancer,colon

Introduction

Despite the newly developed treatment modalities, colorectal cancer is still the 3rd in cancer deaths (1,2). Studies have been carried out in recent years that lipid metabolism may play a role in cancer development and metastasis. A relationship has been found between lipids and disease formation in cancers such as breast prostate lung (3-7). The molecular mechanisms of drug resistance include alteration of the drug-specific binding site, decreased drug permeability that can enzymatically deactivate the drug, and/or gene mutations that can increase the pumping out of drugs across the plasma membrane. Many of these processes are associated with altered lipid metabolism. Lipid metabolism has been found to play a central role in both conventional chemotherapy and resistance to targeted therapies. Atherosclerosis and cancer have been associated with chronic inflammation. Uncontrolled cell proliferation and oxidative stress are common factors in the formation of both diseases. Inflamation plays a central role in the formation of atherosclerosis. Changes in blood lipid values after chemotherapy cause negative effects on chronic inflammation and may contribute to recurrence and metastasis in later periods. Monitoring lipid changes after treatment may contribute to disease control. The atherogenic plasma index (AIP) is an index that consists of

triglycerides and high-density lipoprotein cholesterol. It has been used to measure blood lipid levels and is widely used as an optimal indicator of cardiovascular diseases associated with dyslipidemia (8). In our study, we planned to compare the atherogenic plasma index levels of patients diagnosed with colon cancer before chemotherapy and at the 6th month of chemotherapy. The effect of colon cancer chemotherapy treatment on lipids is unclear. We evaluated the effect on the atherogenic plasma index after chemotherapy and thought that lipid-regulating treatments would contribute to both cancer development and disease control.

Material Method

The blood lipid profile and hemogram parameters, which were routinely checked in cases over the age of 18 with a histopathological diagnosis of colon cancer, were scanned and recorded until 01.06.2017 -30.06.2021. The lipid parameters, which are routinely checked in the patients who received chemotherapy for the treatment of colon cancer, were recorded before the treatment and at the 6th month of the treatment. The atherogenic plasma index (log (triglyceride/HDL-C)) was calculated before and after the chemotherapy and compared. The study was approved by Afyon University of Health Sciences clinical research ethics committee with the number 519- 2011-KAEK-2.

Analyzes and Result

Table 1. Descriptive statistics for participants

Variable	Groups	F	%
Gender	Male	25	67,6
	Female	12	32,4
	Total	37	100,0

As seen in Table 1, 67.6% of the 37 individuals participating in the research were men and 32.4% were women.

Table 2. Descriptive statistics for the participants

individuals	N	M_{age}	sd
Weight	37	69,59	11,47
Age	37	61,40	11,16

As seen in Table 2, the average weight of the individuals participating in the research was 69.59±11.47, and the average age of the individuals was 61.40±11.16.

Table 3. Analysis of the patients' pre/post treatment values

Measurements	Variables	N	$\bar{x}$	Std. Deviation	Std.Error	t	df	p
Pair 1	B.T. monocyte	37	,5711	,25136	,04132	,914		,367
	A.T. monocyte	37	,5378	,26250	,04315			
Pair 2	B.T. HDL-C	37	46,4595	14,69050	2,41510	1,778		,84
	A.T. HDL-C	37	41,1351	12,43463	2,04424			
Pair 3	B.T. LDL-C	37	109,4865	36,74735	6,04123	-,660		,513
	A.T. LDL-C	37	113,3784	31,73620	5,21740			
Pair 4	B.T.Total Cholesterol	37	186,0541	39,45106	6,48571	-1,416	36	,165
	A.T. Total Cholesterol	37	200,3514	71,67256	11,78290			
Pair 5	B.T. PAİ	37	,5543	,28587	,04700	-1,372		,179
	A.T. PAİ	37	,6288	,29495	,04849			
Pair 6	B.T. TG	37	181,7027	122,20631	20,090059	-,484		,631
	A.T. TG	37	191,6486	98,99248	16,274266			
Pair 7	B.T. Glucose	37	122,4595	49,76589	8,18146	-,062		,951
	A.T. Glucose	37	122,9459	31,16796	5,12398			

BT: before treatment, AT; After treatment, PAİ; Plasma atherogenic index.

As can be seen in Table 3, according to the results of the paired sample t-test analysis performed on the values, between B.T. Monocyte and A.T. Monocyte, between B.T. HDL-C and A.T. HDL-C, between B.T.. LDL-C and A.T. LDL-C, between B.T.Total Cholesterol and A.T.

Discussion

There was no effect on the atherogenic plasma index measured at the 6th month of our patients who received FOLFOX (5 fluorouracil, folinic acid, oxaliplatin) chemotherapy for the treatment of colon cancer. No significant changes were detected in lipid parameters after chemotherapy. It has been determined in many studies that chemotherapy treatment causes changes in lipid metabolism.

In a study conducted in 18 lymphomas, 18 breast cancers, 14 small cell lung cancers, and 7 urethetial carcinomas, total cholesterol and low-density lipoprotein cholesterol (LDL-C) were

increased after chemotherapy in patients other than breast cancer patients (Ref. 9). The tendency to increase in serum triglyceride levels was found to be statistically significant in breast cancer patients (9). In a study, a decrease in LDL-C and an increase in high-density lipoprotein cholesterol (HDL-C) were found in patients with less metastatic colon cancer who were given combined chemotherapy with antiangiogenic therapy (10). An increase in triglycerides and a decrease in HDL-C were detected in bexarotene chemotherapy used for the treatment of cutaneous T-cell lymphoma (11).

It is thought that the change in lipids in colorectal cancer affects the prognosis. In a study, an increase in cholesterol levels and a decrease in triglyceride and HDL-C levels were found in patients with colorectal cancer after adjuvant chemotherapy. In addition, HDL-C elevation was found to be prognostic (12). In our study, no change was detected in the serum lipid profile. Radiotherapy and chemotherapy treatment are side effects of heart failure, hypertension, thromboembolism and atherosclerosis (13). Both radiotherapy and chemotherapy treatment cause inflammation and endothelial cell activation, which leads to the onset of atherosclerosis. It also causes inhibition of thrombolysis. It causes instability in previously formed plaques. Altered expression of thrombolysis-related proteases is involved in atherosclerotic plaque progression and in the process of cancer invasion and metastasis (14).

Conclusions; there are a limited number of studies in the literature examining lipid changes after colorectal cancer chemotherapy. Lipid change and its mechanism after chemotherapy treatment remain unclear. The number of patients in our study is limited. We think that there is a need for more extensive research by increasing the number of patients.

CONSENT: It is not applicable.

ETHICAL APPROVAL: The study was accepted by Afyon Karahisar University of Health Sciences clinical research ethics committee with the decision number 519-2011-KAEK-2.

COMPETING INTERESTS: Authors have declared that no competing interests exist.

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