Blood Cells Depletion after Chemotherapy in Iraqi Women with Breast Cancer

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Abstract

The research was aimed to study the effect of chemotherapy on white blood cells especially lymphocytes, and the relationship between chemotherapy and red blood cells, platelets in women with breast cancer. Our results showed that the mean ± SE of White Blood Cells (WBCs) and lymphocytes before treatment was significantly higher than the mean ± SE of lymphocytes and WBCs after treatment at (P<0. 01), the mean ± SE of Red Blood Cells (RBCs) and platelets before treatment was higher than the mean ± SE of RBCs and lymphocyte after treatment at (P<0. 01). The reason probably due to the poor nutrition and the effect of cancer of the breast on erythropoiesis on the cases, or metastasis to the bone marrow from breast cancer can be associated with suppression of blood cells synthesis. We concluded that chemotherapy for breast cancer is in association with long-term changing in immune system parameters and other cells during clinical management.

Key words: *chemotherapy, breast cancer, Blood cells depletion*

Introduction

Breast cancers are the most common in women and causes more than half a million deaths in the world [1]. Treatment is surgical tumour resection in combination with endocrine therapy, radiotherapy and using of chemotherapy. Chemotherapy is a therapy of choice in thirty percent of patients [2], and is recommended when cancer shows poor diagnosis features, including enlargement in nodal size, high grade, and lack of expression of progesterone and estrogen receptors [3]. Chemotherapy also reduces the rates of metastatic recovery and increasing in survival rates [4, 5]. Treatment of chemotherapy is already in association with a wide effects on tissues with non-target, for example, immune system substantial impacts. Neutrophils reduction is often regarded as the most dangerous haematological toxicity and can be associated with infections that may force chemotherapy dose reduction and delays may compromise treatment [6, 7]. The level of blood neutrophil is known to recover after chemotherapy with agood management and this transient reduction in the number of neutrophils is not have common persistent results. Treatment with chemotherapy also cause problems in the adaptive immune system overall the body. Number of research have reported effects of chemotherapy on the number of lymphocytes in breast cancers women during the period of therapy or more than three months after the last dose of chemotherapy and cause reduction in the number of lymphocyte levels in the blood[12]. Reduction in the number of lymphocytes shortly following chemotherapy for other types of cancers is also well established. Depression in the number of T and B cells for more than 12 months after chemotherapy have been

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reported, while others have found all lymphocyte cells except T- helper cells to recover to its pre-treatment levels at the same time-point, even after a particularly dose intense chemotherapy regimen, while T- cytotoxic lymphocyte cells levels recover more rapidly after chemotherapy than T-helper cells [9,11] and that cause reduction in the number of naïve cells, and in contrast increasing in memory cells population [12]. In addition to lymphocyte reduction, chemotherapy may reduce other types of blood cells as red blood cells and thrombocytes.

Materials and Methods

The experimental groups: The experimental groups used consist of 250 women with breast cancer.

Blood samples collection: Five millileter (ml) of blood samples were aspirated from each woman patient and control cubitus vein to test the hematological parameters. Complete Blood count (CBC) was measured by (CBC) method (Rubby from abbut, USA).

Statistical analysis: The Statistical Analysis System [13] program was used to compare between control and patient groups in study parameters. T- test was used to significant compare between means in this study.

Results

Table (1) showed the mean ± SE of WBCs and lymphocytes before treatment was significantly higher than the mean ± SE of WBCs and lymphocytes after treatment at (P<0. 01). Table (1) was also showed the T-test for lymphocytes was significantly higher than T-test for WBCs.

Table (1): Comparision between before and after treatment in WBC and Lymphocytes

Treatment	Mean ± SE	
	WBC	Lymphocyte (%)
Before	7.80 ± 0.41	33.33 ± 2.95
After	4.06 ± 0.22	14.33 ± 1.51
T-test	0.929 **	6.596 **
P-value	0.0001	0.0001
** (P<0.01).		

Table (2) showed the mean ± SE of RBCs and PLT before treatment was significantly higher than the mean ± SE of RBCs and PLT after treatment at (P<0. 01). Table (2) also showed the T-test for PLT was significantly higher than T-test for RBCs at (P<0. 01).

Table (2): Comparision between before and after treatment in RBC and PLT

Treatment	Mean ± SE	
	RBC	PLT
After	4.79 ± 0.12	3.19 ± 0.15
Before	315.11 ± 10.48	165.46 ± 7.92
T-test	0.398 **	26.091 **
P-value	0.0001	0.0001
** (P<0.01).		

Discussion

In the recent study, our results showed that the level of all blood cells types before treatment was higher than the level of these cells after treatment, this finding is similar to the finding of [14,15] who find that chemotherapy cause declining in blood cells, also to the finding of [16] find similar result in chinese patients. The mean ±SE of WBCs Before and after chemotherapy was lower than the Mean ±SE of lymphocyte ($p<0.01$), the mean ±SE of WBCs Before and after chemotherapy was higher than the Mean ±SE of lymphocyte ($p<0.01$). This result is in agreement with the result of [17]. The mean ± SE of WBCs and lymphocytes before treatment was significantly higher than the mean ± SE of WBCs and lymphocytes after treatment at (P<0. 01). The mean ± SE of RBCs and PLT before treatment was significantly higher than the mean ± SE of RBCs and PLT after treatment at (P<0. 01). A higher percentage of anemia reported in this study after chemotherapy compared with the lower Caucasian values in the study of [18] and the control group in this study, the reason probably due to the poor nutrition of Iraqi patients and the effect of cancer of the beast on erythropoiesis on the cases compared with the control group, or metastasis to the bone marrow from breast cancer can be associated with suppression of erythropoiesis. Bone marrow metastasis also may be associated with defective thrombopoiesis causing malignancy induce thrombocytopoiesis.

Conclusion

Chemotherapy of breast cancer is associated with changing in immune system parameters and red blood cells that should be considered during clinical management.

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