بسم الله الرحمن الرحيم

سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

"البقرة اية ٣٢"

EFFECT OF AEROBIC TRAINING ON ERYTHROCYTES COUNT AND HEMOGLOBIN AMOUNT AFTER RADIATION THERAPY IN BREAST CANCER PATIENTS

By

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تأثير التدريبات الهوائية على عدد كرات الدم الحمراء وكمية الهيموجلوبين بمرضى سرطان الثدى الخاضعين للعلاج الإشعاعى

رسالة مقدمة من
ايهاب عمر عبد المنعم

توطئه
للحصول على درجه ماجستيرالعلاج الطبيعي

كلية العلاج الطبيعى
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Dedication

To..

My father
My mother
My brothers and my sist...
also to My friends

For their patience and continuous support


Introduction

Cancer disease is now one of the most important factors in the global burden of disease. The estimated number of new cases each year is increasing with rate of 60% of those cases occurring in developing countries **(Oussama and Atord, 2006)**.

Although the etiology of breast cancer is unknown, numerous risk factors may influence the development of this disease including genetic, hormonal, environmental, psychobiological and physiological factors. **(Oussama and Atord, 2006)**.

Courneya and Friedenreich, 2007 proposed that exercise plays a vital role in cancer prevention and control. Physical Activity and Cancer Control specific phases along the cancer continuum where exercise has a logical role and identifies two distinct periods before diagnosis and four periods after diagnosis with exercise programs in each phase.

There is a growing body of evidence suggesting that exercise decreases the risk of many of cancers **(American Institute for Cancer Research, 2007)**, also exercise may extend survival for breast and colon cancer survivors are emerging **(Irwin et al., 2008)**.

Statement of the problem

Would the aerobic training have a significant effect on erythrocytes count and hemoglobin amount after radiation therapy in breast cancer patients?

Purposes of the study

The purpose of this study was to determine effects of aerobic training on erythrocytes count and hemoglobin amount after radiation therapy in breast cancer patients.

Hypothesis

It was hypothesized that:

There will be no significant effect of the aerobic training on the erythrocytes count and hemoglobin amount in breast cancer patients receiving radiation therapy.


Subjects, Materials,
and Methods

Criteria for patients selection :

The age of the patients ranged from 45 to 55 years.

All subjects were not bed-ridden females patients

All patients were free from any pathological condition that might affect the results.

All patients received a good explanation of treatment and measurement devices.

All patients were conscious and cooperative.

These patients were divided into two groups

Group (A)

This group will receive the Aerobic training for 15 min for three times per week + Radiation treatment for 6 weeks.

Group (B)

This group will receive the Radiation treatment for 6 weeks.

Equipments

For Measurment

COULTER® LH 500
Hematology Analyzer.

Equipments

For Treatment

Treadmill device

stationary bicycle

Methods

For Evaluation

Erythrocytes count and the hemoglobin amount (ECC & HbA):

A scientist or lab technician performs the requested testing and provides the requesting medical professional with the results of the ECC & HbA.

ECC & HbA were assessed for each patient 3 times along whole period of the study:

-1st analysis was pre-treatment i.e. before applying the therapeutic exercise intervention.

-2nd analysis was post-treatment (1) i.e. after applying a period of 3 weeks of aerobic exercise.

-3rd analysis was post-treatment (2) i.e. after applying a period of 6 weeks of aerobic exercise.


Methods
For Treatment

study group

Patients were receiving selected physical therapy program consisting of Aerobic training for 15 min for three times per week + 5 min warm up and 5 min cool down exercise before and after treatment session for 6 weeks

Patient performing the warm up and cool down exercise on the bicycle

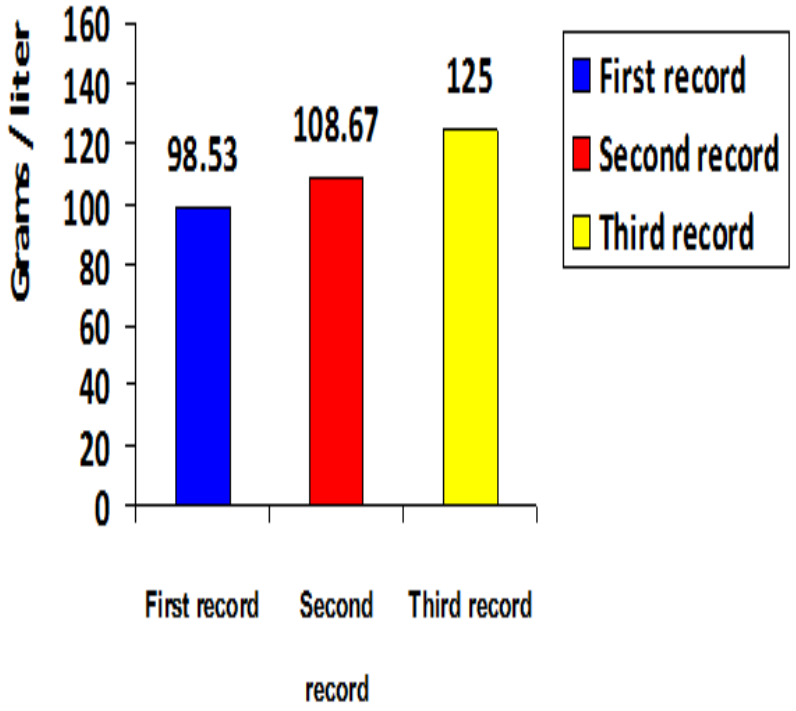
Instructing the patient along the treadmill procedures then performing exercise

Control group

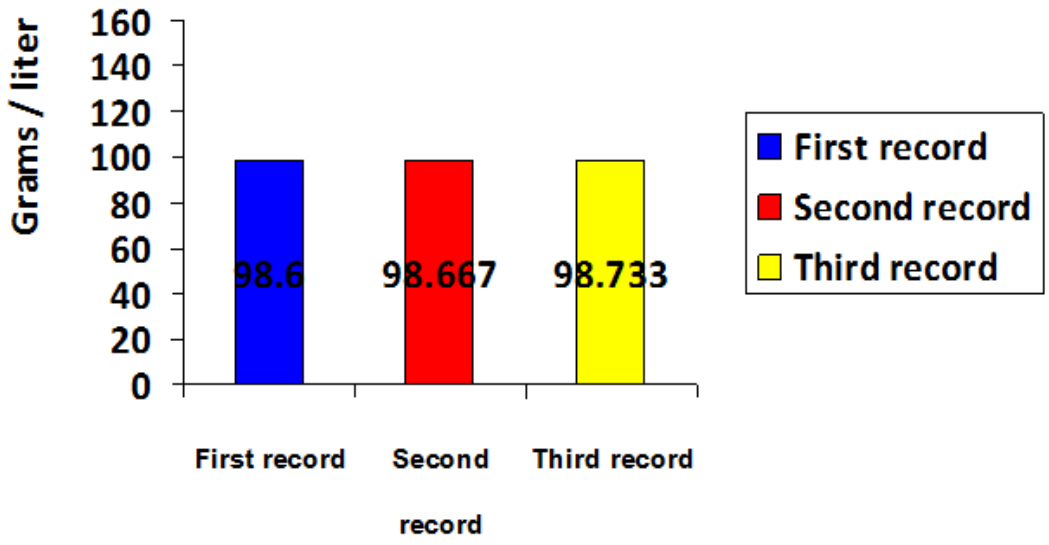
Patient received Radiation therapy which is a highly targeted and highly effective way to destroy cancer cells in the breast that may stick around after surgery. Radiation can reduce the risk of breast cancer recurrence by about 70%.


Results

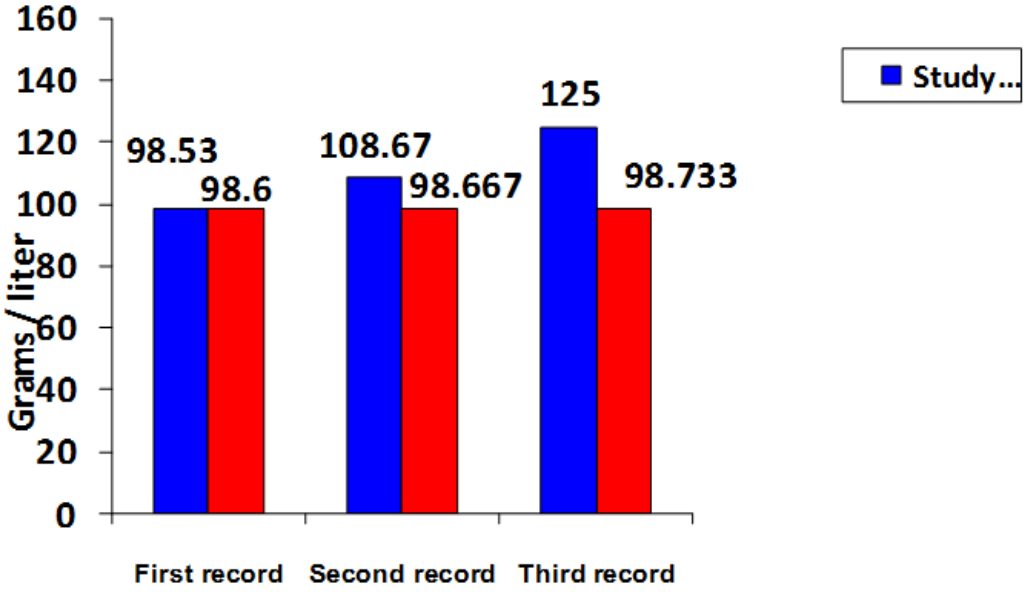
Results of Hb amount scale



Bars representing the mean values of the Hb amount in grams / liter the 3 records of the study group (A) (Aerobic exercise training).

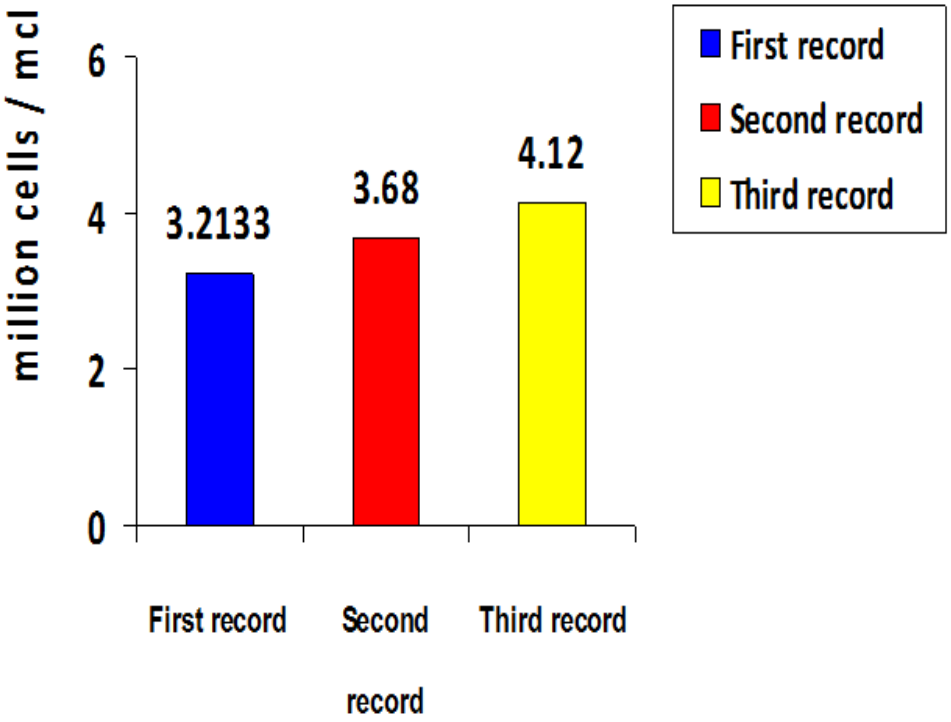


Bars representing the mean values of the Hb amount in grams / liter the 3 records of the control group (B) (Radiation therapy group).

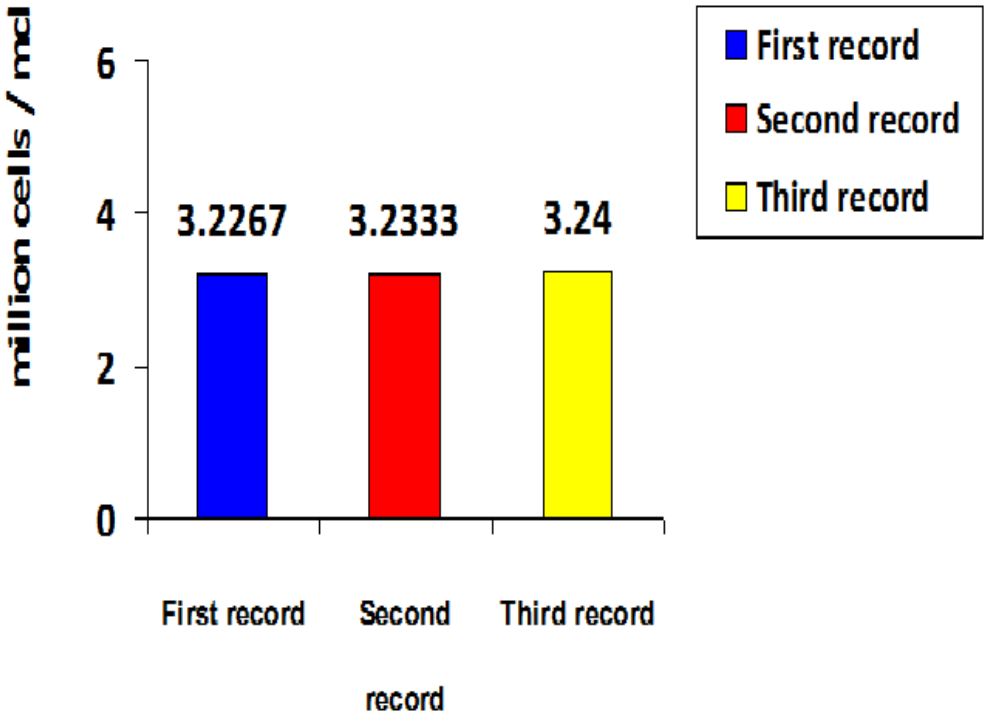


Bars representing the mean values of the Hb amount in grams / liter between the 3 records of the study group (A) and control group (B).

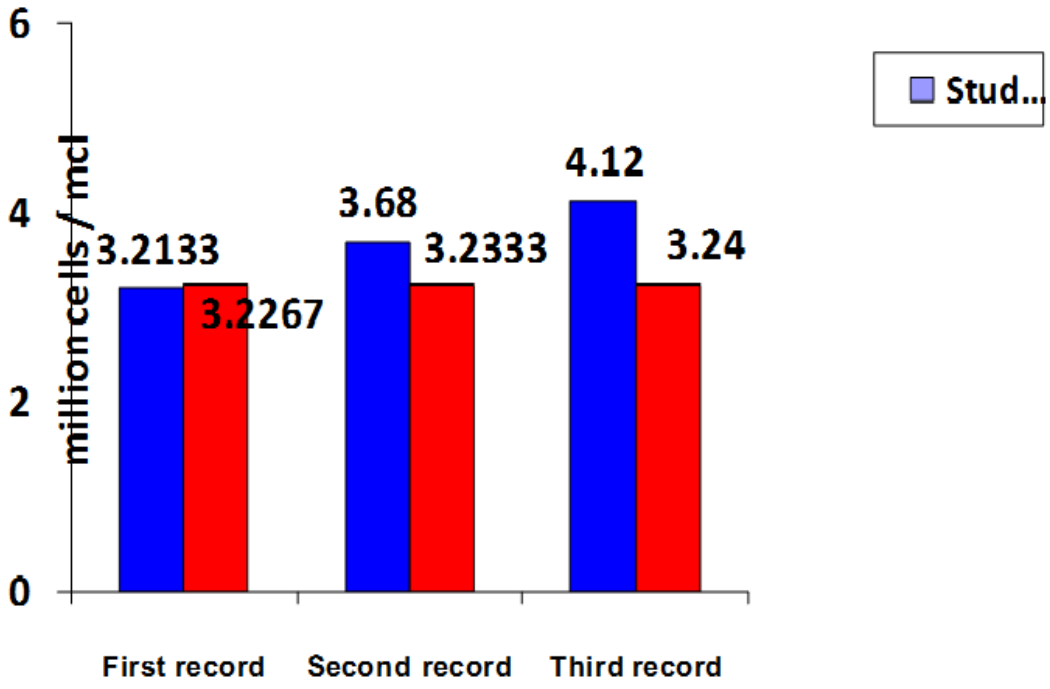
Results of erythrocytes count (ECC) scale



Bars representing the mean values of the ECC in million cells / mcl the 3 records of the study group (A) (Aerobic exercise training).



Bars representing the mean values of the ECC in million cells / mcl the 3 records of the control group (B) (Radiation therapy).



Bars representing the mean values of the ECC in million cells / mcl of the 3 records in the study (A) and control (B) groups.


Discussion

Franklin et al., 2000 recommended that the risk-stratification approach to exercise participation. The level of exercise risk corresponds to the heart disease risk factors which a person may have. These factors (high blood pressure, abnormal cholesterol levels, and family history of heart disease, smoking habit, obesity, and abnormal glucose tolerance) may indicate danger in beginning an exercise program.

Salem et al., 2010 designed a study to elevate the impact exercise programmed on glycemic control, plasma lipid values, blood pressure. They explored that exercise might greatly benefit many patients be improving their metabolic profile, dis-lipidemia aiding in their weight loss and maintain their in blood pressure.

Mitsumi et al., 2006 concluded that exercise and physical activity are essential factors on health. Exercise promotes human ability in contrast to psychological, social, economic problems. The ability of physical activity is varied in people. This variety has direct relation with organs of body by activity. One of these organs is blood circulation and its transferring components of oxygen which has an important role during and after adaption with activity.

Sawka et al., 2000 revealed that the plot of blood volume changes over time with exercise training demonstrating that the relative change (%D) in plasma volume can increase within 24 h following exercise and achieve ~10% above pre-training by 1 to 4 d. In the early stage (initial 2 week of training), nearly all blood volume expansion can be accounted for by plasma volume expansion. After 2–3 week of exercise training, erythrocyte volume expansion is observed and increases, at an undetermined rate, until all vascular volumes achieve ~ 8–10% above the pre-training baseline. As a result of this new equilibrium between plasma and erythrocyte volumes, hematocrit (Hct) is re-established at its pre-training value.

Mahmoud et al., 2005 showed that exercise trainings have effect on HB and RBC concentration in comparison to none active persons. Some investigators have measured alterations in hematocrit (Hct) to estimate changes in plasma and blood volume with exercise training. They suggested that this approach may be acceptable if applied during the initial 2 week of training where changes in erythrocyte volume appeared after 2–3 week.

Courneya and Friedenreich, 2007 proposed that exercise plays a vital role in cancer prevention and control. Physical Activity and Cancer Control Framework that highlights specific phases along the cancer continuum where exercise has a logical role and identifies two distinct periods before diagnosis and four periods after diagnosis with exercise programs in each phase.

Herrero et al., 2006 found that this combined program improves the quality of life (QOl) and the overall physical fitness of breast cancer survivors following even a brief (6-week) exercise program. Also Lauridesen et al., 2005 discovered that the optimal time for treatment was 6 to 8 weeks postoperatively.

Recommendations

More studies assigning the efficacy of aerobic exercise in treatment of breast cancer patients.

-A similar study should be conducted with other physical therapy modalities.

-Follow-up studies of various treatment durations would be of great interest.

-A similar study should be done in another cancer types.

-Further studies should be undertaken to a large number of patients providing better statistical analysis of data.

-Further researches should be extended for a longer period than 12 weeks.

-Further researches could include a comparison between another physiotherapeutic modalities and protocols.


THANK YOU