SUMMARY AND CONCLUSIONS

Breast cancer is by far the most common cancer among women worldwide. It is also the leading cause of cancer death in females since annually, 400,000 women die from this disease. In Egypt, breast cancer is estimated to be the most common cancer among females accounting for 37.7% of their total 12,621 with new cases in 2008. It is also the leading cause of cancer related mortality accounting for 29.1% of their total with 6546 deaths. The incidence to mortality ratio is poor (1.9:1). The etiology of breast cancer is multifactorial and several risk factors associated with breast cancer may exert their effects via generation of an oxidative stress status.

Most patients with breast cancer are treated with a combination of the anticancer chemotherapy drugs of 5-fluorouracil, doxorubicin, and cyclophosphamide (FAC). Chemotherapy agents act through various oxidative stress mechanisms to produce free radicals that damage tumor cells. Oxidative stress during cancer therapy also harms healthy tissue. It is possible that taking antioxidant supplements during treatment can protect normal tissues from the damaging of side effects of treatments, and may improve tumor response and patient survival. However, antioxidant supplementation during conventional chemotherapy and radiation therapy is a controversial subject. Some studies suggest taking antioxidants supplements during treatment may be beneficial; however, there are just as many studies that tell us this may be harmful. The scientific evidence on this topic is not strongly for or against taking antioxidant supplements during cancer treatment.

Accordingly the present study is undertaking to explore whether vitamin A and E supplementation during 5-fluorouracil, doxorubicin, and cyclophosphamide (FAC) therapy will have its impact on chemotherapy-induced oxidative stress.

This study is carried out, after the approval of Ethics Committee – Medical Research Institute, on 45 breast cancer patients who were divided into two groups; group (I) which was subjected only to chemotherapy (20 patients) and group (II) which was subjected to chemotherapy plus supplementation with vitamin A and E(25 patients). Markers of oxidative stress including serum MDA, β-carbonyl protein (β -CP) and total antioxidant capacity (TAOC) are measured in patients of those two groups before and after chemotherapy with or without vitamins supplement.

In group (I), vitamins supplemented -ve, the results showed that chemotherapy with FAC resulted in a significant elevation in MDA and β-CP accompanied by a significant decrease in TAOC. These results may indicate that breast cancer patients are subjected to oxidative stress which is manifested by elevation in free radicals production and decreased antioxidant capacity. The developed oxidative stress may have its impact on the breast cancer patients render them subjected to different side effects including chronic fatigue which is the most common side effects.

In group II, vitamins supplemented +ve, and after chemotherapy, while, the mean concentration levels of MDA and β-CP were significantly reduced, the mean total antioxidant capacity level was significantly elevated. Moreover, in group II after chemotherapy and vitamin supplementation, the mean concentration levels of MDA and β-CP were significantly reduced when compared to those in group I after chemotherapy. The observed reduction in free radical production and the interesting increase in total

antioxidant capacity level could be attributed to the antioxidant properties of both vitamins A and E. The improvement in oxidative status in those patients may reduce side effects of chemotherapy agents and might result in an improved quality of life for the patient, and possibly better survival rates.

In conclusion; the present study is an attempt to through more lights on the beneficial effects of providing breast cancer patients with antioxidant vitamins as vitamin A and vitamin E during chemotherapy. Thus, as shown in the present study, the ability of these vitamins to reduce oxidative stress in breast cancer patients during chemotherapy and its subsequent impacts may lead to recommend supplementation of breast cancer patients with antioxidant vitamins as vitamin A and vitamin E during chemotherapy. Also, it is recommended to evaluate the levels of these vitamins in sera of breast cancer patients before and during chemotherapy.

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Appendix (1)

Serum malondialdhyde (MDA) concentrations (nmol/ml) in all different studies groups

Number of cases	Control Group (Group I)		Vitamin-treated Group (Group II)	
	Before chemotherapy (n=20)	After chemotherapy (n=20)	Before chemotherapy (n=25)	After chemotherapy (n=25)
1	8.819	12.673	11.448	6.551
2	12.67	14.714	12.714	8.795
3	7.979	11.653	9.612	4.285
4	5.122	10.632	10.69	7.979
5	10.836	15.0	6.714	3.714
6	9.612	14.918	10.87	6.142
7	10.857	14.102	12.67	8.367
8	13.0	14.918	8.816	4.285
9	10.408	13.734	12.673	12.285
10	14.408	16.183	7.571	3.897
11	14.489	12.857	10.877	6.551
12	12.489	16.142	12.265	8.367
13	8.102	14.06	12.897	8.918
14	10.04	12.061	11.653	8.163
15	12.673	10.285	9.224	5.938
16	14.489	12.653	9.408	7.183
17	12.061	12.865	10.632	5.938
18	9.653	12.011	10.02	7.979
19	8.102	10.523	11.32	8.698
20	8.795	9.92	9.225	6.836
21			11.874	9.6122
22			10.0	7.265
23			12.045	9.224
24			11.5	9.15
25			12.3	8.71

Appendix (2)

Serum carbonyl protein (CP) concentration ($\mu M^{-1}cm^{-1}$) in all different studies groups

	Control Group (Group I)		Vitamin-treated Group (Group II)	
Number of cases	Before chemotherapy (n=20)	After chemotherapy (n=20)	Before chemotherapy (n=25)	After chemotherapy (n=25)
1	16.745	5.836	15.927	9.854
2	15.836	19.65	16.927	11.29
3	17.545	25.127	16.309	9.618
4	14.381	34.909	16.381	11.49
5	16.018	31.29	14.4	7.454
6	13.781	33.672	16.545	9.472
7	14.963	19.636	15.872	13.29
8	13.29	26.036	13.472	9.472
9	16.927	27.654	15.49	10.909
10	14.49	31.29	16.945	14.58
11	13.4	24.018	15.854	9.654
12	15.618	24.127	13.818	8.48
13	17.109	28.49	16.781	13.29
14	15.963	31.54	17.145	13.472
15	16.8	27.654	15.909	9.836
16	16.8	24.381	14.145	9.145
17	15.872	28.381	16.727	13.49
18	14.52	27.12	6.745	13.09
19	12.021	25.012	15.924	9.836
20	10.3	16.9	16.2	11.272
21			14.145	8.181
22			16.745	11.436
23			15.7	12.4
24			16.3	13.9
25			13.8	9.7

Appendix (3)

The total antioxidant capacity (ug/ml) in different studies groups

	Control Group (Group I)		Vitamin-treated Group (Group II)	
Number of cases	Before chemotherapy (Group Ia) (n=20)	After chemotherapy (n=20)	Before chemotherapy (n=25)	After chemotherapy (n=25)
1	0.98	0.854	0.933	1.918
2	0.985	0.856	1.72	2.5
3	1.002	0.654	1.81	2.76
4	1.2	0.632	1.23	1.429
5	0.985	0.521	1.43	2.105
6	0.935	0.785	1.373	2.364
7	1.325	0.846	1.302	2.075
8	1.523	0.528	2.137	2.804
9	1.231	0.698	1.92	1.431
10	1.256	0.541	1.2	2.364
11	0.854	0.879	1.21	1.702
12	1.652	1.002	0.973	1.644
13	1.023	0.658	1.017	2.364
14	1.654	0.209	1.0172	2.102
15	0.254	1.589	0.182	2.768
16	0.897	0.98	1.381	1.871
17	1.987	1.003	1.973	2.831
18	1.532	0.589	2.275	3.426
19	0.954	0.79	1.918	1.918
20	0.97	0.73	1.05	1.12
21			1.11	1.91
22			0.76	1.77
23			0.809	1.34
24			1.25	2.12
25			1.03	2.56

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دور الامداد بفيتامينات أ وهـ فى التوازن الأوكسيدى فى مريضات سرطان الثدى

رسالة مقدمة

بقسم كمياء طبية تطبقية / معهد البحوث الطبية –جامعة الإسكندرية

ضمن متطلبات درجة

الماجستير

فى

الكيمياء الطبية التطبيقية

من

فردوس خميس مصطفى

بكالوريوس علوم ٢٠٠٤

معهد البحوث الطبية
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٢٠١٤

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للحصول على درجة

الماجستير

فى

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لجنة المناقشة والحكم على الرسالة **موافقون**

الأستاذة الدكتورة / ----------

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