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ANALYSIS OF LIPID PEROXIDATION STATUS IN CERVICAL CANCER FEMALE PATIENTS AFTER RECEIVING RADIO AND CHEMO THERAPY

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Abstract:

Introduction: *Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. Cancer is caused by both external factors (tobacco, infectious organisms, chemicals, and radiation) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism).* ***Objectives of the study:*** *This study aim to investigate the level of antioxidants (lipid peroxidation) in cervical cancer female patients after receiving radio and chemo therapy at different stages.* ***Materials and methods:*** *The whole experimental work was conducted at the different hospitals of Mandi Bhalwal with the permission of Jinnah hospital Lahore during March 2018 with the permission of ethical committee. Those cervical cancer patients who receiving radiotherapy, chemotherapy and adjuvant radiotherapy were selected to study the antioxidants status in the diseased condition.* ***Results:*** *The data present in this table explains the levels of MDA in cervical cancer females. The data suggest that lipid peroxidation is increases in cervical cancer. The reason is due to high damage of membrane and lipid peroxidation poducts.* ***Conclusion:*** *By reducing oxidative stress, antioxidants counteract the effects of chemotherapy-induced oxidative stress on the cell cycle and enhance the cytotoxicity of antineoplastic agents. After going through the above data it can be easily concluded that prevalence of gynecological carcinomas is increasing in Pakistan and something needs to be done about it.*

Key words: *Cancer, Antioxidants, Therapies*

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INTRODUCTION:

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. Cancer is caused by both external factors (tobacco, infectious organisms, chemicals, and radiation) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism). These contributory factors may act collectively or in sequence to initiate or promote carcinogenesis [1].

Cancer development is a multistage process that requires the collective action of manifold events that occur in one cell alone. Cancer treatment by radiation and anticancer drugs reduces inherent antioxidants and induces oxidative stress, which increases with disease succession [2]. The possible causes of cancer include, damage to DNA by reactive oxygen species, which are at highest rank in the development and onset of cancer [3].

Studies have shown that with the passage of time the prevalence of cancer is increasing throughout the world. However a major bulk of this increased load can be attributed to early screening and more effective diagnostic methods [3]. Cancer is the 2nd leading cause of death in both adults and children worldwide. The most common causes of cancer mortality in adults are the Lung cancers. However on basis of Incidence the most common cancer in adults are the Breast/prostate cancers. Studies have shown that in Pakistan due to lack of awareness women do not understand the symptoms that they are facing leading to delays in reporting their ailment and thus usually present at a very late stage of the disease [4]. This constitutes one of the major reasons why it has become difficult to diagnose, intervene and treat cancer (Malignant Tumor) in its early stages of development. Following is a list of the few of the symptoms in which the suspicion of cancer may arise and thus must be ruled out:

1. Abnormal vaginal bleeding or discharge
2. Pelvic pain or pressure.
3. Abdominal or back pain.
4. Bloating.
5. Changes in bowel and/or bladder habits (increased urination, constipation, diarrhea)
6. Itching or burning of the vulva
7. Weight loss(chacexia)[5]

Objectives of the study

This study aim to investigate the level of antioxidants (lipid peroxidation) in cervical cancer female patients after receiving radio and chemo therapy at different stages.

MATERIALS AND METHODS:

The whole experimental work was conducted at the different hospitals of Mandi Bhalwal with the permission of Jinnah hospital Lahore during March 2018 with the permission of ethical committee. Those cervical cancer patients who receiving radiotherapy, chemotherapy and adjuvant radiotherapy were selected to study the antioxidants status in the diseased condition. This study group was divided into further two groups for analysis.

Groups	Treatment
A	Control
B	Breast cancer (before and after radiotherapy)

Blood collection

5.0 ml blood sample was taken from vein. Blood was further processed for the estimation of MDA. Commercially available enzymatic kits of Randox were used. Blood was centrifuged at 4000 rpm for 10 minutes and serum was separated. Blood samples will be collected into EDTA tubes from fasting proteins. The blood will be centrifuged and indomethacin and butylated hydroxytoluene will be added into the plasma samples before they will be stored at -80°C until analysis**.**

Determination of Antioxidants

MDA in tissue was estimated by the method of Ohkawa et al. (1979). 0.2 ml tissue homogenate of each group was taken in test tubes and add 200 µl of 8.1% sodium dodecyl sulfate (SDS), Then add 1.5 mL of 20% acetic acid solution (pH 3.5) and 1.5 mL of 0.8% TBA. The mixture was made up to 4.0mL with distilled water and heated in a water bath at 90◦C for 60 min.

After cooling with tap water, 1.0mL of distilled water and 5.0 mL of n-butanol were added and shaken vigorously and centrifuged at 4000 rpm for 10 minute upper butanol layer was taken and its absorbance at 532 nm was read.

RESULTS:

The data present in this table explains the levels of MDA in cervical cancer females. The data suggest that lipid peroxidation is increases in cervical cancer. The reason is due to high damage of membrane and lipid peroxidation poducts.

Table 01: MDA values of all therapies and control group

Groups	CONTROL	MDA(moles/ml)	
		FEMALES (n=15)	
		BEFORE	AFTER
	2.35		
0	0.00	4.26±0.00	5.24±0.00
R1	0.00	2.99±0.38	4.95±0.97
R2	0.00	2.95±1.02	5.13±1.06
R1+B	0.00	3.76±0.70	5.89±0.91
R2+B	0.00	3.26±0.00	6.58±0.00
B	0.00	0.00±0.00	0.00±0.00
Total	2.35	3.16±0.80	5.27±0.98

Means±SD
R1=Received Radio Therapy Single Time
R2=Received Radio Therapy Two Times
R1+C=Received Radio Therapy Single Time + Chemotherapy
R2=Received Radio Therapy Two Times + Chemotherapy
C=Only Received Chemotherapy
0=received no therapy

DISCUSSION:

Cancer therapy, such as chemotherapy, can result in the generation of excess ROS/RNS. Thus cancer therapy and the resulting production of excess oxidative stress can damage biological systems other than tumors[6]. The burden of gynaecological cancer is on the rise worldwide, but it is higher in developing than developed countries, with approximately five million new cancer cases diagnosed annually. The need for novel independent prognostic factors in metastatic breast cancer patients is much lower than the need for dynamic blood markers, which can indicate the treatment efficiency in a reliable and early fashion. Serum tumor markers are an easy, quick, cheap, but rather imprecise and sometimes misleading tool, to monitor the treatment efficacy[7]. However, they are particularly valuable for treatment monitoring in patients that have disease that cannot be evaluated by radiology [8].

Ovarian cancer has the highest mortality rate among gynecologic cancers, even in developing nations. Late stage diagnosis requires long, complex, very aggressive and costly treatment; thus, the management of ovarian cancer in developing countries poses a great challenge. Predictive biomarkers that can guide treatment decision have been sought after to identify subsets of patients who would be “exceptional responders” to specific cancer therapies, or individuals who would benefit from alternative treatment modalities [9].

These malignancies constitute the third leading site of malignancy in women after breast and ovary. Similarly, one study from India reported that uterine (129 cases) are the third most common malignancy in the female genital tract after cervix, and ovary. In uterus, the main histological type of cancer was endometrial tumor with 66 patients, followed by sarcoma patients. Adenocarcinoma was the most common histological type of endometrial tumor [10].

CONCLUSION:

By reducing oxidative stress, antioxidants counteract the effects of chemotherapy-induced oxidative stress on the cell cycle and enhance the cytotoxicity of antineoplastic agents. After going through the above data it can be easily concluded that prevalence of gynecological carcinomas is increasing in Pakistan and something needs to be done about it.

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