Original Article

Oxidative Stress

Influence of Oxidative Stress in Aging on Antioxidant Levels in Healthy Male and Females

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ABSTRACT

Objective: Specific objective of this study was to determine the oxidative stress and anti-oxidant level in aging among 30 to 62 years of healthy male and female of Peshawar City.

Study Design:-Descriptive Study.

Place and Duration of Study: This study was conducted in Jinnah Medical College, Peshawar with collaboration of Faculty of Pharmacy. Gomal University D.I. Khan from January 2013 to May 2014.

Materials and Methods:-Total 180 study. Subjects were examined and standardized according to essential parameter of age and sex with no history of any disease and were not talking any medicine with same Scio-economic factor used for analysis. 90 male divide into three (03) Groups A,B,C and 90 female Subjects was also divide in 3 Groups A,B,C. Serum Ferric Reducing Antioxidant Power (FRAP) assay of Vitamin C, Vitamin E and Glutathione was determined and analyzed.

Results:-Results were observed with the FRAP values of Vitamin C, E and Glutathione values which are summarized in the table in Show in Figure. Vitamin E, a Secondary antioxidant is very important for generation of other antioxidants.

Conclusion: The decrease of value also indicate that define system is deceased during aging the GSH is an important for defense system of the body. Also decreased during aging, specially in old age after 40 years. It is important to use the supplement with diet to fulfill deficiency of their secondary antioxidant.

Key Word: Oxidative Stress, Antioxidant, FRAP assay

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INTRODUCTION

Oxidative stress is a normal phenomenon in the body. Under normal conditions, the physiologically important intracellular levels of reactive oxygen species (ROS) are maintained at low levels by various enzyme systems participating in the vivo redox homeostasis. Therefore, oxidative stress can also be viewed as an imbalance between the pro-oxidants and antioxidants in the body. Any alteration in homeostasis leads to an increased production of these free radicals, much above the detoxifying capability of the local tissues [(1)]. These excessive free radicals then interact with other molecules within cells and cause oxidative damage to proteins, membranes, and genes.[(2,3,4)] In this process they often create more free radicals, sparking off a chain of destruction. Oxidative damage has been implicated in the cause of many diseases such as cardiovascular diseases, neuronal degeneration, and cancer and has an impact on the body's aging process too.[(5)] Alongside with ROS other redox metals also play a critical role in development of aging, mutation, and tumour.[(6)] .

In regular cellular mechanism, free radicals scavenger vitamin E, C and glutathione along with enzymes like Catalase, Peroxidases, and superoxide dismutase control the mechanism of DNA repair.[(7)]

The studies have shown that with age, ROS levels show accumulation in major organ systems such as liver, heart, brain, and skeletal muscle,[(8,9)] either due to their increased production or reduced detoxification. Thus, aging may be referred to as a progressive decline in biological function of the tissues with respect to time as well as a decrease in the adaptability to different kinds of stress or briefly an overall increase in susceptibility to diseases [(10)].

The antioxidants are the first line of choice to take care of the stress. Small molecular-weight nonenzymic antioxidants (e.g., GSH, NADPH, Trace metal, vitamins E and C, and trace metals, such as selenium) also function as direct scavengers of ROS. These enzymatic and nonenzymatic antioxidant systems are necessary for sustaining life by maintaining a delicate intracellular redox balance and minimizing undesirable cellular damage caused by ROS.[(11)]

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The present study was conducted to find out the antioxidant status in aging with Healthy Male and Female individuals of 30 to 62 years of Peshawar District.

MATERIALS AND METHODS

Group of Subjects: 90 male and 90 female Healthy volunteers, 90, Male subject were medical examination and divide into three Groups, Group A,B,C each containing 30 Healthy volunteers. 90 Female Subject were divide into Group A, (30-40 Years), Group B, (41-50 Years), Groups C (51-62 Years).

Blood Sampling: Blood Sampling (3-5 ml) was done from each subject by venipuncture using aseptic technique. The blood samples were collects by in clean over dried test tube. The blood serum was separated by centrifugations, after separation of serum, it was transferred to glass bottles with plastic caps. Stored in deep freezer till analysis.

Antioxidant Determination: The FRAP (Ferric Reducing Antioxidant Power) assay is a Recitative test used to determine the concentration of Total Antioxidant in VIVO, described as the total concentration of all electron donating reductants. In the presence of antioxidants the FRAP assay measures the reduction of Ferric to ferrous iron. Because the ferric to ferrous ion reduction occurs rapidly with all redundant with half-reduction. The values in the FRAP assay will express the corresponding concentration of electros donating antioxidants.[12] This modified assay was used to measure the antioxidant –Capacity in biological Fluids. Standard curves of Vitamin C, Vitamin E and Glutathione were used. The unit of Measure of FRAP value is Micro mole/L.

Biochemical And Statistical Analysis: Serum FRAP assay was done any modified method. The data was analyzed using Microsoft Excel and SPSS-20 P-Value of <0.05 was considered statistically Significant.

RESULTS

90 male individual were selected with some socio economic factor, with no history any disease and were not talking any medium were divide into three Groups A, (n=30) age between 30-40 years, Groups B, (n=30) 41-50 Years, and Group C, (n=30) 51-60 years, were included in this study. Antioxidant levels vise Vitamin C, Vitamin E and Glutathione were determine by FRAP assay. Mean (± Sum) values of Group A,C were 446.2 ± 4.57, 492.13 ± 8.26, 2462.24 ± 22.8 respectively. Age Group B (41-50 years), 421.4 ± 4.32, 464.21± 4.37 and 2323.2 ± 25.4. The Groups C (n=30) age between 51-60 years the antioxidant Vitamin C, Vitamin E, Glutathione values was 414.3 ± 4.51 , 457.6 ± 7.34, 2256. 4± 21.6 respectively details are given in Table 1.

90 female Healthy volunteer were selected, they were also divided into three Groups according to their age. Group A (n=30) 31-40 years, Group B (n=30) 41-50 years and Group C 51-60years old. The antioxidant levels was analyzed and recorded. Mean (±Sum) values were calculated. The results are given in the table 1. The antioxidant starts Vitamin C, Vitamin E and glutathione of Group A, 31-40 years, are as 394.12 ± 3.85, 434.91 ± 4.45 and 2176.41 ± 20.31 respectively. Group B, 386.55 ± 4.12, 426.11± 4.17 and 2133.66± 18.32 respectively and the results of Group C, FRAP value of Vitamin C 384..42±4.18 Vitamin E 423.85 ± 3.15, Glutathione 2122.85 ± 21.56, were recorded.

Table No.1: Mean (±Sum) of Different Antioxidant Levels in Male and Female of Different Age Groups

Age Group	Male Antioxidants (µ MOLE/L)			Female Antioxidants (µ MOLE/L)		
Group (A) (31-40 yr) N=30	**Vitamin C** 446.2 ± 4.57	**Vitamin E** 492.13± 8.26	**Glutathione** 2462.2 ± 24.28	**Vitamin C** ** 394.12 ± 3.85	**Vitamin E** **434.95 ± 4.45	**GSH** * 2176.41 ± 20.31
Group (B) (41-50 yr) N=30	421. 4 ± 4.32	464.21 ± 4.37	2323± 25.4	*386.55 ± 4.12	*426.11 ± 47	**2133.66± 18.32
Group (C) (51-60 yr) N=30	414.3± 4.51	437.6 ± 21.6	2286.4 ± 21.6	*384.42 ± 4.18	*423.85 ± 3.15	**2122.85 ± 21.56
Level of Significance	*** = P<0.02 Very Highly Significant **= P<0.03 Very Highly Significant *= P<0.04 Significant					

FRAP Value Micromole/L

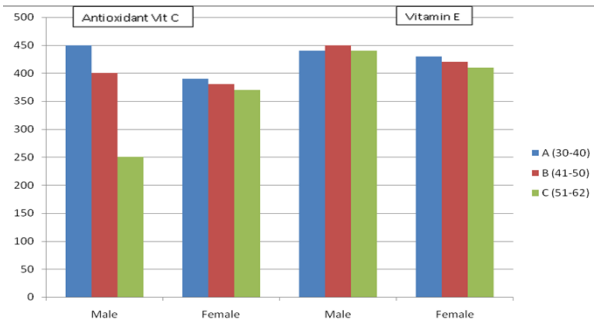

Figure No.1: Comparative FRAP values of Antioxidant in Male and Female of Different Age Groups

FRAP Value Micromole/L

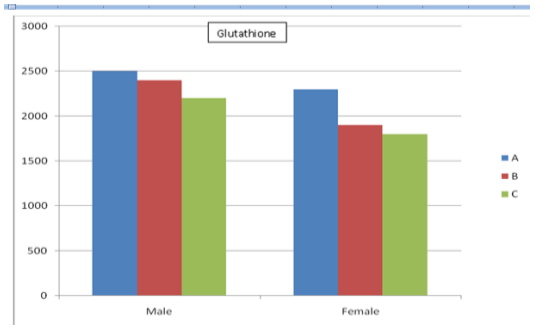

Figure No.2: Comparative FRAP values of Antioxidant in Male and Female of Different Age Groups

DISCUSSION

The result of different age Groups of male and female of healthy individual are summarized in Table 1 and the FRAP values of secondary antioxidants are shown in Figures. These values when compared with male and female a significant decrease in secondary antioxidant. The Vitamin C content was decrease in age Group B & C when compared with age Groups A 30-40 years. This indicates that during aging the Vitamin C content decreased very significantly as compared with the same age Groups of male and females Groups. This value was decreased in old age 50 to 60 years, as time passed the Physiological super glucose has affected on the cells of individual organ in the vitamin C content decrease too much because of rapid process of glycolysis which produce has less oxidative species which affect the organs, ascorbic acid is been found to act as a Cyp inhibitor.[13,14]

Same results were observed with the FRAP value of Vitamin E and Glutathione values which are summarized in the table-1 and Show in Figures. Vitamin E, a Secondary antioxidant is very important for generation of other antioxidants. The decrease of value also indicate that defense system is deceased during aging, the GSH is an important for defense system of the body. Also decreased during aging, specially in old age after 40 years.

Oxidative stress induced damage particularly the involvement of genetic codes and gene protein interaction. Understanding of genetic alterations and molecular mechanism is certainly helping out to reveal the interaction of free radicals and their role in proteomics, genomics and disease development process.[10]

CONCLUSION

Our results show that a decrease in GSH to GSSG ratio indicates a relative shift from a reduced to an oxidized form of GSH, suggesting the presence of oxidative stress at the cellular or tissue level. In aging, an age-related shift from a redox balance to an oxidative profile is observed which results in a reduced ability to buffer ROS that are generated in “normal” condition. Thus a progressive shift in cellular redox status is a primary molecular mechanism contributing to the aging process.[15] It is important to use the supplement with natural diet having Vitamin-C and Vitamin-E to fulfill deficiency of their important secondary antioxidant.

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