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ANALYSIS OF LEVEL OF ANTIOXIDANTS IN THE DIAGNOSIS OF HYPERTENSION IN PATIENTS

Dr Naila Rani[1], Dr Sidra Mustafa[2], Dr Sana Arooj[3]

[1]Sargodha Medical College, Sargodha

[2]Latin American School of Medicine

[3]PIMS, Islamabad

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Abstract:

Introduction: *Hypertension reigns as a leading cause of cardiovascular morbidity and mortality worldwide. Excessive reactive oxygen species (ROS) has emerged as a central common pathway by which disparate influences may induce and exacerbate hypertension.* ***Objectives of the study:*** *The basic aim of the study is to analyze the level of antioxidants in the diagnosis of hypertension in patients.* ***Methodology of the study:*** *This cross sectional study was conducted in Sargodha medical college, Sargodha during November 2018 to March 2019. The data was collected from 100 patients of both genders, age between 30 to 50years. 5cc blood was drawn from all patients for further analysis of antioxidants. Blood was centrifuged at 4000 rpm for 10 minutes and serum was separated. Blood samples were collected into EDTA tubes.* ***Results:*** *The data was collected from 100 patients. Level of antioxidants increases in hypertension patients due to increase in blood flow. The level of MDA, SOD, GSH and CAT vary in a different manner. The level of SOD become decreases due to hypertension. Antioxidants are compounds that are able to trap ROS and thus may be capable of reducing oxidative damage and possibly blood pressure.* ***Conclusion:*** *It is concluded that hypertension increased free radical levels in the blood. According to our study, levels of free radicals increase in the blood, which may stimulate antioxidant defense systems of body during hypertension.*

Corresponding author:

Dr.Naila Rani,

Sargodha Medical College, Sargodha

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INTRODUCTION:

Hypertension reigns as a leading cause of cardiovascular morbidity and mortality worldwide. Excessive reactive oxygen species (ROS) has emerged as a central common pathway by which disparate influences may induce and exacerbate hypertension. Potential sources of excessive ROS in hypertension include NADPH oxidase, mitochondria, xanthine oxidase, endothelium-derived NO synthase (eNOS), cyclooxygenase 1 and 2, cytochrome P450 epoxygenase and transition metals [1]. While a significant body of epidemiological and clinical data suggests that antioxidant rich diets reduce blood pressure and cardiovascular risk, randomized trials and population studies using natural antioxidants have yielded disappointing results.

Hypertension is a significant public health problem, with a worldwide prevalence of 40.8% and a control rate of 32.3% [2]. Hypertension is a noteworthy hazard factor for various genuine health conditions, including cardiovascular ailment, cerebrovascular malady, and constant kidney illness. Worldwide, 9.4 million passing are credited to difficulties from hypertension, including 45% of all passing because of coronary vein illness and 51% of all passing because of stroke [3]. These relations are steady in the two people, in youthful, moderately aged, and more seasoned subjects, among different racial and ethnic gatherings, and inside and between nations. In spite of the fact that there is a continuum of cardiovascular hazard crosswise over levels of circulatory strain, the characterization of grown-ups as indicated by pulse gives a system to differentiating levels of hazard related with different circulatory strain classes and for characterizing treatment edges and helpful objectives [4].

Mammalian cells are equipped with both enzymatic and non-enzymatic mechanisms of antioxidant defenses to reduce the cellular injury caused by contact with reactive oxygen species (ROS). ROS, such as hydrogen peroxide, super oxide and hydroxyl radicals, may target membranes causing peroxidation of lipids. This may lead to an increased impermeability of cell and loss of endothelial integrity [5]. ROS are produced endogenously or exogenously. *In vivo*, free radicals are created during normal aerobic respiration, phagocytosis, β-oxidation of fatty acids in peroxisomes and by auto-oxidation of various molecules. Interestingly, ROS may induce carcinogenesis by oxidation of DNA, proteins and lipids. Several studies have reported the elevated levels of lipid peroxidation in human colorectal cancer and gastric cancer tissues. The major aldehyde products of lipid peroxidation are malondialdehyde (MDA) and 4-hydroxynonenal. MDA is mutagenic and thus carcinogenic in mammalian cells [6].

Objectives of the study

The basic aim of the study is to analyze the level of antioxidants in the diagnosis of hypertension in patients.

METHODOLOGY OF THE STUDY:

This cross sectional study was conducted in Sargodha medical college, Sargodha during November 2018 to March 2019. The data was collected from 100 patients of both genders, age between 30 to 50years. 5cc blood was drawn from all patients for further analysis of antioxidants. Blood was centrifuged at 4000 rpm for 10 minutes and serum was separated. Blood samples were collected into EDTA tubes. Subsequently, indomethacin and butylate dhydroxy toluene were added into the plasma samples. Blood samples were stored at -80°C. Then this serum was used for the analysis of level of antioxidants in the body.

Statistical Analysis

Statistical analyses (Anova Test and Post Hoc) were performed using the SPSS software program (17.0). All results were expressed as the mean ± standard deviation (SD). P value below 0.05 was considered to be statistically significant.

RESULTS:

The data was collected from 100 patients. Level of antioxidants increases in hypertension patients due to increase in blood flow. The level of MDA, SOD, GSH and CAT vary in a different manner. The level of SOD become decreases due to hypertension. Antioxidants are compounds that are able to trap ROS and thus may be capable of reducing oxidative damage and possibly blood pressure. Antioxidants terminate the chain reactions of ROS by removing free radical intermediates, and inhibit other oxidation reactions.

Table 01: Analysis of Antioxidants in hypertension patients

No.of Observation	Analysis of blood	Normal µg/mL	Before treatment µg/mL	After treatment(5min) µg/mL
01	**SOD**	0.32±0.00	0.33±0.23	0.39±0.00
02	**CAT**	4.16 ±0.00	0.90±0.00	0.43±0.39
03	**GSH**	1.89 ±0.00	2.48±1.29	3.23±0.03
04	**MDA**	2.35±0.00	4.26±0.00	4.95±0.97

DISCUSSION:

The antioxidants vitamins C and E and other antioxidants have been considered as possible therapy for decreasing oxidative stress and thereby lowering blood pressure. Additionally vitamins C and E down-regulate NADPH oxidase, a major source of ROS in the vascular wall, and up-regulate eNOS, both of these effects lower blood pressure [7]. In this regard, a randomized double-blind clinical trial other than demonstrating a specific association between oxidative-stress-related parameters and blood pressure, documented enhancement of antioxidant status by supplementation with antioxidants vitamins C and E and their hypotensive properties [8].

Different sources of ROS might exist in blood vessels. One of the best characterized sources of ROS is NADPH oxidase. Several other enzymes including NO synthase, xanthine oxidase, and mitochondrial enzymes may also contribute to ROS generation. The vasculature and kidney are the rich sources of NADPH oxidase-derived ROS, having important role in vascular damage and renal dysfunction under [9] This system functions as an electron donor and catalyses the reduction of oxygen by NADPH which increases the generation of superoxide upregulation of NADPH oxidase in hypertensive patients.

The function of NADPH oxidase-derived superoxide is inactivation of NO in the reaction that forms peroxynitrite, leading to impaired endothelium dependent vasodilation [10]. The activation of NADPH oxidase has been strongly associated with hypertension. Oxidation or deficiency of tetrahydrobiopterin (BH4) and L-arginine which are two cofactors for endothelium-derived NO synthase (eNOS) action are associated with the uncoupling of the L-arginine-NO pathway that results in increased eNOS-mediated generation of superoxide and decreased formation of NO [4]. Lipid peroxidation is one of the hallmarks of oxidative stress. Reactive oxygen species cause oxidation and peroxidation of membrane phospholipids, thereby impacting biological activity of these biomolecules [11].

CONCLUSION:

It is concluded that hypertension increased free radical levels in the blood. According to our study, levels of free radicals increase in the blood, which may stimulate antioxidant defense systems of body during hypertension.

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