ANALYSIS OF LEVEL OF ANTIOXIDANTS AS A BIOMARKER OF CARDIOVASCULAR RISK IN OLDER POPULATION OF PAKISTAN

Dr Iqra Iftikhar[1], Dr Hiba Raza[2], Dr Hafiz Muhammad Fahad Nasarullah[3]
[1]Allama Iqbal Memorial Teaching Hospital Sialkot, [2]Sharif Medical and Dental College, Lahore, [3]Shalamar hospital, Lahore.

Abstract:
Introduction: Cardiovascular disease (CVD) is the principal cause of death and disability in the developed countries and the most important cause of premature death worldwide, as outlined by the World Health Organization.
Aims and objectives: The main objective of the study is to analyze the level of antioxidants as a biomarker of cardiovascular risk in older population of Pakistan.
Material and methods: This cross sectional study was conducted in Allama Iqbal Memorial Teaching Hospital Sialkot During 2018. The data was collected from 100 patients of CVD. The data was collected for the analysis of blood antioxidants level among these patients. Blood sample was drawn for the analysis of serum antioxidants. Blood was centrifuged at 4000 rpm for the separation of serum. Then we find the serum antioxidants level by using Ohkawa et al., method.
Results: The data was collected from 100 CVD patients. The mean age of the study patients was 54.4±10.6 years. Cigarette smoking was much more common in men than in women (32.6% vs. 0, p<0.001). The serum levels of creatinine, uric acid, and cTAS were significantly higher in men than in women (0.9±0.2 vs. 0.7±0.1, 7.6±2.1 vs. 6.8±2.3, and.0.4±0.0 vs. 0.3±0.1, respectively; p<0.001).
Conclusion: It is concluded that age was not a determinant affecting the antioxidative barrier, regardless of the presence of CHD.

Corresponding author:
Dr. Iqra Iftikhar,
Allama Iqbal Memorial Teaching Hospital, Sialkot.

QR code

*Please cite this article in press Iqra Iftikhar et al., **Analysis of Level of Antioxidants as a Biomarker of Cardiovascular Risk in Older Population of Pakistan.**, Indo Am. J. P. Sci, 2019; 06(07).*

INTRODUCTION:

Cardiovascular disease (CVD) is the principal cause of death and disability in the developed countries and the most important cause of premature death worldwide, as outlined by the World Health Organization. In the USA, an estimated one in three adults presents atherosclerotic vascular disease, and the global absolute risk of experiencing a major cardiovascular event after age 50 is about 52% for men and 39% for women [1]. Thus, CVD represents a global health problem for healthcare systems in terms of both inability to work and pharmaceutical charges, and strategies to prevent CVD have universal significance on health outcomes and healthcare expenditures. Pathologies that may affect the heart and the blood vessels include hypertension, coronary heart disease, cerebrovascular disease, peripheral vascular disease, heart failure, cardiomyopathies, and rheumatic and congenital heart disease. Indeed, CVD is characterized by a group of disorders, related to intricate interactions among risk factors. [2]. CVDs represent a major health problem worldwide that causes a great public financial effort due to both inability to work and higher pharmaceutical expenditure. Therefore, for their broad and well-recognized importance, strategies to prevent CVDs should be considered as a priority for all citizens and healthcare systems [3].

The main target of primary prevention is the identification of cardiovascular risk factors aimed at reducing of the adverse impact of modifiable factors, such as lifestyle and pharmacological treatments. Furthermore, the evaluation of early and reliable risk factors can be used to identify high-risk subjects before the irreversible effects of the disease (early diagnosis). A growing number of scientific evidence suggests that effective prevention strategies are feasible and useful, also from the economic viewpoint [4].

Antioxidants, including various agents such as enzymes (glutathione peroxidase, superoxide dismutase, and catalase), large molecules (albumin and ferritin), and small molecules (uric acid, glutathione, bilirubin, vitamin C, and vitamin E), play an important role in the cellular protection cascade against oxidative damage [5].

Aims and objectives:
The main objective of the study is to analyze the level of antioxidants as a biomarker of cardiovascular risk in older population of Pakistan

MATERIAL AND METHODS:

This cross sectional study was conducted in Allama Iqbal Memorial Teaching Hospital Sialkot During 2018 The data was collected from 100 patients of CVD. The data was collected for the analysis of blood antioxidants level among these patients. Blood sample was drawn for the analysis of serum antioxidants. Blood was centrifuged at 4000 rpm for the separation of serum. Then we find the serum antioxidants level by using Ohkawa et al., method.

Statistical analysis:
The data was collected and analyzed using SPSS version 19. All the values were expressed in mean and standard deviation.

RESULTS:

The data was collected from 100 CVD patients. The mean age of the study patients was 54.4±10.6 years. Cigarette smoking was much more common in men than in women (32.6% vs. 0, p<0.001). The serum levels of creatinine, uric acid, and cTAS were significantly higher in men than in women (0.9±0.2 vs. 0.7±0.1, 7.6±2.1 vs. 6.8±2.3, and.0.4±0.0 vs. 0.3±0.1, respectively; p<0.001).

Table 01: Clinical and laboratory characteristics of patients with and without CAD in whole and in subgroups separated by gender

	All patients		
	Control	CVD	*P-value*
Age, years	49.20±10.70	56.95±9.53	<0.001
BMI, kg/m^2	27.36±4.55	28.04±4.25	0.237
Hypertension	27 (30.7)	78 (44.8)	0.027
Diabetes	4 (4.5)	36 (20.7)	0.001
Hyperlipidemia	39 (44.3)	117 (67.2)	<0.001
FH of CAD	8 (9.1)	25 (14.4)	0.223
FBS, mg/dL	102.93±36.77	119.23±43.39	0.002
Gensini score	0	28.5 (8 to 59)	<0.001
LVEF, %	54.30±5.90	50.79±9.28	0.002
cTAS, mmol/L	0.37±0.89	0.39±0.93	0.050

DISCUSSION:

Previous studies provided confusing results on the relationship of the presence of cardiovascular diseases to TAC. Several studies found significantly lower blood antioxidants and TAC in patients with CHD [6]. Similarly, several studies found that in metabolic syndrome and HA patients exhibit decreased antioxidant protection and increased lipid peroxidation. However, no significant changes of TAC were observed during and after the incidence of MI or between hypertensive patients and normal controls [7]. Vassalle et al. identified higher values of TAC measured by OXY-adsorbent test in hypertensive individuals in comparison to subjects without HA. Elevated values of TAC were also found in patients with atherosclerosis in comparison with healthy age-gender-matched counterparts [8].

Each measure of antioxidant status has its own limitations. Direct measurement of ROS has been described, but these species are transient in nature; the procedure is complex, and the results have not always shown to be reliable. The methods for calculating measured TAS (mTAS), measurement of TAS levels in the plasma using a spectrophotometer, are relatively inexpensive and usually straightforward [0]. However, colorimetry as one of the most widely used methods for measuring total oxidant status involves either fluorescence or chemiluminescence, which requires sophisticated techniques; these technologies are unavailable in many routine clinical biochemistry laboratories, or even if available, their routine use is limited [10].

CONCLUSION:

It is concluded that age was not a determinant affecting the antioxidative barrier, regardless of the presence of CHD. We showed through a cross-sectional analysis on a large healthy population that a reduced antioxidant capacity is significantly associated with cardiovascular risk factors.

REFERENCES:

1. E. M. deGoma, R. L. Dunbar, D. Jacoby, and B. French, "Differences in absolute risk of cardiovascular events using risk-refinement tests: a systematic analysis of four cardiovascular risk equations," Atherosclerosis, vol. 227, no. 1, pp. 172–177, 2013.
2. M. Pisoschi and A. Pop, "The role of antioxidants in the chemistry of oxidative stress: a review," European Journal of Medicinal Chemistry, vol. 97, pp. 55–74, 2015.
3. Montezano, M. Dulak-Lis, S. Tsiropoulou, A. Harvey, A. M. Briones, and R. M. Touyz, "Oxidative stress and human hypertension: vascular mechanisms, biomarkers, and novel therapies," The Canadian Journal of Cardiology, vol. 31, no. 5, pp. 631–641, 2015.
4. Ceconi, A. Boraso, A. Cargnoni, and R. Ferrari, "Oxidative stress in cardiovascular disease: myth or fact?" Archives of Biochemistry and Biophysics, vol. 420, no. 2, pp. 217–221, 2003.
5. N. A. Strobel, R. G. Fassett, S. A. Marsh, and J. S. Coombes, "Oxidative stress biomarkers as predictors of cardiovascular disease," International Journal of Cardiology, vol. 147, no. 2, pp. 191–201, 2011.
6. R. Kohen and A. Nyska, "Oxidation of biological systems: oxidative stress phenomena, antioxidants, redox reactions, and methods for their quantification," Toxicologic Pathology, vol. 30, no. 6, pp. 620–650, 2002.
7. R. Schnabel and S. Blankenberg, "Oxidative stress in cardiovascular disease: successful translation from bench to bedside?" Circulation, vol. 116, no. 12, pp. 1338–1340, 2007.
8. S. Blankenberg, H. J. Rupprecht, C. Bickel et al., "Glutathione peroxidase 1 activity and cardiovascular events in patients with coronary artery disease," The New England Journal of Medicine, vol. 349, no. 17, pp. 1605–1613, 2003.
9. U. Cornelli, R. Terranova, S. Luca, M. Cornelli, and A. Alberti, "Bioavailability and antioxidant activity of some food supplements in men and women using the D-Roms test as a marker of oxidative stress," The Journal of Nutrition, vol. 131, no. 12, pp. 3208–3211, 2001.
10. M. Carratelli, L. Porcaro, M. Ruscica, E. De Simone, A. A. Bertelli, and M. M. Corsi, "Reactive oxygen metabolites and prooxidant status in children with Down's syndrome," International Journal of Clinical Pharmacology Research, vol. 21, no. 2, pp. 79–84, 2001.