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THE STUDY OF OXIDENTS AND ANTIOXIDENTS IN PATIENTS OF ACCUTE MYOCARDIAL INFARCTION

Biochemistry

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ABSTRACT

Oxygen free radicals cause injuries in ischemic heart. In this condition there is an increase in the concentration of serum uric acid levels which is a significant cardiovascular risk for acute myocardial infarction (AMI). A recent study also showed that low zinc levels cause tissue injury and oxidative stress. Free radicals, Malondialdehyde (MDA) which is an end product of lipid peroxidase accumulates during ischemic heart affect at very low oxygen tension. In acute myocardial infarction (AMI) the antioxidant defusing the system include enzymes such as Superoxidase Dismutase (SOD), Glutathione Peroxidase (GP4) to combat the injury caused free radical is altered. Raised serum uric acid levels and low zinc concentrations increased cardiovascular risk.

KEYWORDS

Free radicals, ischemic heart, serum uric acid, zinc, malondialdehyde, myocardial infarction, oxidants, antioxidants and oxidative stress.

INTRODUCTION

Oxidative stress is dependent with several aspects. Age and living habits play an important role in the development of cardiovascular diseases. It may also affect many vital organs and vital functions significantly brain and the heart. Acute myocardial infarction (AMI) is the most severe and critical event in cardiovascular dysfunctions and arises a consequences of myocardial ischemia due to coronary occlusion and its dysfunction. Oxygen free radicals cause injuries in the ischemic heart; free radicals like malondialdehyde (MDA), an end product of lipid per-oxidation accumulate during ischemic heart at a very low oxygen tension [2]. In acute myocardial infarction (AMI) the antioxidant defusing the system include enzymes such as superoxidase dismutase (SOD), glutathione peroxidase (GP4) to combat the injury cause free radical is altered[3]. Raised serum uric acid levels and low zinc concentrations increases the cardiovascular risk. This association is mostly found in above 50 years of age people [4]. Zinc metal affects cellular antioxidant and plays an important role in various diseases and tissue injury[5]. The present study is aim to investigate status of oxidant and antioxidant in acute myocardial infarction (AMI) and correlation between the levels of malondialdehyde (MDA), superoxidase dismutase (SOD), glutathione peroxidase (GP4) and, serum uric acid.

MATERIALS AND METHODS:

A total numbers of 85 patients' age group 30 – 75 years and 100 normal healthy controls studied. The diagnosis of acute myocardial infarction (AMI) was carried out by *ICCU, Department of Cardiology and the Department of Biochemistry*, Ayaan Institute of Medical Sciences, Ayaan Hospital & Research Centre, RR Dist. Telangana State, *India based* on clinical presentation, electrocardiography (ECG) and biochemical parameters. Among 85 patients 25 were hospitalized in ICCU with chest pain.Their ST segment was elevated 2 mm in two or more consecutive leads of ECG. Their CPK (MB), SGOT (AST), LDH were elevated where as normal healthy controls were found normal. At the same time malondialdehyde (MDA), serum uric acid and zinc were analysed by Cobas 311.

RESULTS

Out of 85 cases of acute myocardial infarction (AMI), 67 (81.33%) were males and 18 (18.67%) were females and mean age of cases were 52.68 ± 1.74 years. Out of 100 controls 78 (78%) were males and 22 (22%) were females and mean age of controls were 51.44 ± 1.310 years. Significantly increased levels of plasma time malondialdehyde (MDA) (6.647 ± 0.210 vs 3.801 ± 0.2012), serum uric acid (10.532 ± 0.162 vs 3.5 ± 1.212). Significant decreased levels of serum zinc (92.60±2.164 vs 105.53 ± 3.102) whole blood superoxidase dismutase (SOD) (172.70 ± 1.978 vs 189.4 ± 5.123), glutathione peroxidase (GP4) 4631 ± 112.5 vs 5462 ± 85.72

Parameter	Mean ± SEM		
	Cases	Controls	p
Plasma MDA (nmol/ml)	6.647 ± 0.210	2.801 ± 0.1981	<0.0001
Serum Zinc (ug/dl)	92.60 ± 2.164	105.53 ± 3.102	<0.0082
Serum uric acid (mg/dl)	10.532 ± 0.162	3.5 ± 1.212	<0.0001
Whole blood SOD (U/ml)	172.70 ± 1.978	189.4 ± 5.123	<0.0001
Whole blood GPx (U/L)	4631 ± 112.5	5462 ± 85.72	<0.0001

< 0.05 was considered as statically significant SEM: Standard error of mean

MDA: Malondialdehyde, SOD: Superoxidase dismutase, GPx: Glutathione peroxidase

Parameter	Gender	Mean ± SEM		
		Cases	Controls	p
Plasma MDA	Male	6.647 ± 0.210	2.801 ± 0.1981	<0.0001
	Female	6.647 ± 0.210	2.801 ± 0.1981	<0.0001
Serum Zinc	Male	92.60 ± 2.164	105.53 ± 3.102	<0.0082
	Female	6.647 ± 0.210	2.801 ± 0.1981	<0.0001
Serum uric acid	Male	10.532 ± 0.162	3.5 ± 1.212	<0.0001
	Female	6.647 ± 0.210	2.801 ± 0.1981	<0.0001
Whole blood SOD	Male	172.70 ± 1.978	189.4 ± 5.123	<0.0001
	Female	6.647 ± 0.210	2.801 ± 0.1981	<0.0001
Whole blood GPx	Male	4631 ± 112.5	5462 ± 85.72	<0.0001
	Female	6.647 ± 0.210	2.801 ± 0.1981	<0.0001

P < 0.05 was considered as statically significant SEM : Standard error of mean

MDA: Malondialdehyde, SOD: Superoxidase dismutase, GPx: Glutathione peroxidase

CONCLUSION:

Raised malondialdehyde (MDA) and decreased zinc, glutathione peroxidase, and superoxide desmutase levels increases oxidative stress. Even being a defense, uric acid is raised as it is abundantly present in our body. Thus, acute myocardial infarction (AMI) exhibits oxidative stress dependent changes irrespective of gender.

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