



ORIGINAL RESEARCH PAPER

Biochemistry

STUDY OF SERUM MALONDIALDEHYDE LEVELS IN TYPE 2 DIABETICS WITH MYOCARDIAL INFARCTION

**KEY WORDS:** DM: Diabetes mellitus , CVD: cardiovascular disease, MDA: Malon di aldehyde

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ABSTRACT

**Introduction:** Diabetes mellitus (DM) increases the incidence of cardiovascular diseases (CVDs) (1, 2) Although elevated levels of serum MDA have been reported in type 2 diabetes, there is paucity of literature on the extent of serum MDA levels in type 2 diabetes cases with myocardial infarction, a macrovascular complication.

**AIMS AND OBJECTIVES:** To measure the levels of serum MDA in type 2 diabetes patients with MI and type 2 diabetes patients without complications.

**Material and Methods:** Type 2 diabetics patients of MGM MC .Aurangabad , were selected. They were divided in two groups. Group I: Thirty patients of either sex diagnosed with Type 2 D.M without any complications. Group II: Thirty patients of either sex having type 2 D.M with myocardial infarction.

**Control :** Thirty patients having similar age groups of either sex comprised the control group; they were non-diabetic, non-hypertensive and non-smokers;

**METHOD:** Estimation of MDA was done by thiobarbituric acid reactive substance assay according to the method described by Mahffouz.[12]

**RESULTS:** In both test-groups the serum MDA level were significantly higher as compared with the controls ( $P < 0.01$ ) and in between the diabetic groups it was found to be significantly higher in diabetes with myocardial infarction ( $P < 0.01$ ).

**CONCLUSION :** In diabetic patients a major factor that is responsible for enhanced free radical generation is hyperglycemia through auto-oxidation of glucose; it may be an important risk factor for cardiovascular disease.[13]

Introduction

Diabetes mellitus (DM) increases the incidence of cardiovascular diseases (CVDs) (1-5) Acute myocardial infarction (AMI) is associated with obstruction of coronary artery, myocardial ischemia leading to myocardial necrosis and generation of reactive oxygen species (ROS).(6,7) Hyperglycemia, the characteristic feature of diabetes, has been reported to be responsible for the elevated levels of free radicals in the plasma.[8] There is recent evidence that increased oxidative stress in diabetes contributes to the development of diabetic complications.(9) Oxygen derived free radicals and reactive oxygen species interact with lipid bilayer of cell membrane resulting in lipid peroxidation.[10] Malondialdehyde (MDA) is a stable end product of lipid peroxidation.(11) Although elevated levels of serum MDA have been reported in type 2 diabetes, there is paucity of literature on the extent of serum MDA levels in type 2 diabetes cases with myocardial infarction, a macrovascular complication.

**AIMS AND OBJECTIVES:** To measure the levels of serum MDA in type 2 diabetes patients with MI and type 2 diabetes patients without complications.

Material and Methods

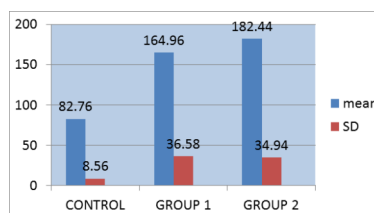
- This cross sectional study was conducted in Department of Biochemistry MGM MC Aurangabad . Total 60 Type 2 diabetic patients from Medicine OPD were selected. They were divided in two groups.
- Group I: Thirty patients of either sex diagnosed with Type 2 D.M without any complications. They were non-hypertensive, non-smokers .Physical examination, E.C.G were done to rule out ischemic heart disease and chronic infections.
- Group II: Thirty patients of either sex having type 2 D.M with myocardial infarction. These subjects were confirmed type 2 D.M cases who had suffered an attack of myocardial infarction as confirmed by E.C.G changes.
- Control :** Thirty patients having similar age groups of either sex comprised the control group; they were non-diabetic, non-hypertensive and non-smokers;
- METHOD:** 6 ml of venous blood was collected, 1 ml of blood in oxalate fluoride bottles for estimation of glucose, the rest in plain sterile bottles and allowed to clot. Serum was separated for estimation of MDA . Estimation of MDA was done by thiobarbituric acid reactive substance assay according to the method described by Mahffouz.[12]

RESULTS :

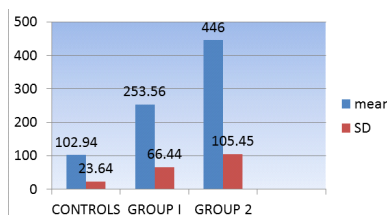
**Table-1** Showing P < 0.01 Control vs. type 2 DM without complications; Control vs. type 2 DM with myocardial infarction

GROUP	AGE	BLOOD SUGAR FASTNG	BLOOD SUGAR POSTMEAL
(GROUP I) Type 2 DM without complications ( No.:30)	52 ± 12.22	164.96 ± 36.58 mg%	253.56 ± 66.44 mg%
(GROUP II) Type 2 DM with myocardial infarction ( No.:30)	54 ± 9.1	182.44 ± 34.94 mg%	446 ± 105.45 mg%
GROUP III Control ( No.:30)	46 ± 9.2	82.76 ± 8.56 mg%	102.94 ± 23.64 mg%

**Table-2** Fasting blood glucose levels in controls, group 1 and group 2 cases



**Table -3** Graphical representation of serum MDA levels in controls, group 1 and group 2 cases



**RESULTS:**

- Statistically analysis revealed that mean FBG level in both types of DM were significantly higher ( $P < 0.05$ ) than that in the control group,
- Mean FBG value in type 2 DM without any complications was compared with those with myocardial infarction, no significant differences were observed.
- In both test-groups the serum MDA level were significantly higher as compared with the controls ( $P < 0.01$ ) and in between the diabetic groups it was found to be significantly higher in diabetes with myocardial infarction ( $P < 0.01$ ).

**DISCUSSION**

- In diabetic patients a major factor that is responsible for enhanced free radical generation is hyperglycemia through auto-oxidation of glucose; it may be an important risk factor for cardiovascular disease.[13].

This is due to excessive free radical induced damage and glycation of serum proteins leading to activation of receptors for advanced glycation end products, which initiates the process of atherosclerosis.[14] Excessive oxygen derived free radicals are generated in the early stage of myocardial infarction. Involvement of oxygen free radicals in the pathophysiology of inflammation ischemia and reperfusion damage in a number of organs and tissues had been reported in literature.[15] Apart from good glycaemic control, supplementation by anti-oxidants in subjects of increased MDA levels in type 2 DM may help in reducing oxidative stress which is one of the causes of myocardial infarction.. As Such studies may provide greater insight in the role of oxidative stress along with other predisposing factors in the precipitation of events like myocardial infarction and the need to use anti-oxidants a prophylactic step.

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