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A STUDY OF CALCIUM, MAGNESIUM AND ZINC IN PATIENTS OF ACUTE MYOCARDIAL INFARCTION IN SOUTHERN RAJASTHAN

Anaesthesiology

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ABSTRACT

Background: Myocardial infarction is the most dreadful complication of coronary artery disease, accounting for 20-25% of death in developed countries.

Aim & Objective-: To determine the levels of Zn, Ca and Mg and evaluate their relation in patients with myocardial infarction.

Methods: A prospective cross sectional observational study done in biochemistry department of Geetanjali medical college and hospital Udaipur, Rajasthan from October 2016 to march 2017.This study involves 100 subjects, including age and sex matched control. Parameters included were Zinc, Calcium and Magnesium.

Results: Significantly low levels of Zn (69.41 ± 12.18µg/dl) and Mg (1.77 ± 0.35 mg/dl) with high levels of Ca (12.96 ± 1.34 mg/dl) were detected in MI patients as compared to normal controls.

Conclusion: Early intervention in correcting the levels of Zn, Mg and Ca within normal range can improve the prognosis of MI patients.

KEYWORDS

Myocardial infarction, coronary artery disease, cardiovascular disease.

INTRODUCTION:

Myocardial infarction is the most dangerous complication of coronary artery disease and is also the most common cause of mortality.[1] According to WHO 20-25% deaths in developed countries are due to MI. Early. Cardiovascular diseases, especially coronary heart disease (CHD), are epidemic in India [2] Myocardial infarction is one of the dangerous manifestations of coronary artery disease and is one of the commonest causes of mortality. [3]It has now become an important health problem despite advancement in diagnosis and management over the last few decades. [4]The World Health organization estimated in 2004, that 12.2% of worldwide deaths were from ischemic heart disease.[5] It is well established that several trace elements are of great importance in a number of biological processes, mostly through their action as activators or inhibitors of enzymatic reactions, by competing with other elements and proteins for binding sites, by influencing the permeability of cell membranes, or through other mechanisms[6,7,8]

Large number of workers has reported different parameters such as serum level of calcium, magnesium and zinc but still the relationship of these metals have not been established in the patients of MI in this region of Rajasthan hence this study was undertaken.

MATERIALS AND METHODS:

This cross sectional, observational study was performed at Geetanjali medical college and Hospital, Udaipur, Rajasthan, from October 2016 to March 2017. A total of 100 subjects between the age of 30 to 70 were included. After explaining the study procedure, detailed clinical history and relevant clinical examination was done and written consent was taken from all the subjects. The 100 subjects were divided into two groups.

Group A: - 50 patients with diagnosed MI based on ECG findings and other clinical examinations by cardiologist. These patients were selected from patients attending the cardiology department.

Group B: - 50, age and sex matched healthy normal subjects not suffering from any heart disease and without any family history of heart related diseases.

Inclusion criteria: Confirmed cases of acute myocardial infarction (AMI).

Exclusion criteria: patients suffering from metabolic disorders, malnutrition, those taking vitamin and mineral supplements, pregnant women, DM, hypothyroidism, liver and renal diseases, family history of dyslipidemia, and those taking lipid lowering drugs, vitamin E supplements, OCP, thyroxin & β- blockers and having any other systemic illness were excluded from this study.

5 ml blood samples were collected in plain test tubes for estimation of Zn, Ca and Mg. RA. All the tests were performed on Semi auto analyzer.

RESULTS:

Microsoft Office Excel 2007 was used for all calculations and SSPS software version 11.5 was used for statistical analysis. Student's unpaired, two tailed t-test was used to analyze all statistical data. P-value less than 0.05 (P<0.05), less than 0.001 (P<0.001) and more than 0.05 (P>0.05) were considered statistically significant(S), highly significant (HS) and non-significant (NS) respectively.

Table1: Comparsion of serum calcium, zinc and magnesium levels in both the groups.

Parameter	Group	Number(n)	Concentration (Mean±SD)	P-value
S. Calcium (mg/dl)	Case (AMI)	50	12.96 ± 1.34	<0.01*
	Control	50	9.62 ± 1.52	
S. Magnesium (mg/dl)	Case (AMI)	50	1.77 ± 0.35	<0.01*
	Control	50	2.31 ± 0.49	
S. Zinc (µg/dl)	Case (AMI)	50	69.41 ± 12.18	<0.01*
	Control	50	98.66 ± 17.55	

DISCUSSION:

In present study we found low levels of Zn (69.41±12.18) and Mg (1.77±0.35) in MI patients which were significantly higher as compared to control group, Zn (98.66±17.55) and Mg (2.31±0.49). Our findings were consistent with the findings Wendy et al and Halstead et al. Serum Ca levels were found to be elevated in AMI patients (12.96±1.34) as compare to the control (9.62±1.52). Similar findings were proposed by P.Kusuma et al. [8]

Mg modulates Ca and K channels, low levels of Mg are responsible for cardiac arrhythmias in AMI patients. [9] Administeration of Mg stabilizes these channels and prevents arrhythmias.AMI is a stressful condition and it stimulates polymorphs to produce leukocytes endogenous modulator (LEM), which increases the uptake of Zn by liver and decreases the levels of Zn in the blood.[10]

CONCLUSION:

From the present study, it can be concluded AMI result in low levels of Zn, Mg and high levels of Ca. These micro nutrients can be used to monitor the prognosis of AMI patients.

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