

PHYSIOLOGICAL EFFECTS OF SMOKING DURATION ON THE ACCUMULATION OF SOME TRACE AND HEAVY METALS IN ACUTE MYOCARDIAL INFARCTION SUBJECTS

Humam Ali Hade¹, Mohammed R. AbidAli², Elham F. Hamzah³, Enas D. Neama⁴

¹College of Science, Al-Qasim green university, 51013, Babylon, Iraq

²University of Babylon, College of Nursing, Department of Basic and Medical Sciences

³ Medical Physics Department, Al-Mustaqbal University College, Hilla, Iraq

⁴ Medical laboratory technology, Hilla University college, Babylon Iraq

Author for Correspondence E- mail- humam.ali@science.uoqasim.edu.iq

ABSTRACT

Background: Cigarette smoking is a significant modifiable risk factor for cardiovascular illness, including coronary corridor illness, stroke, fringe vascular infection, and congestive cardiovascular breakdown. The aim of this study is to assessment of some trace elements such as Cu, Zn, Mo, Fe, Co, Mg, and Cr and lipids profile in Acute myocardial infarction of prolonged smoker subjects **Methods:** 60 subjects divided into two groups smoker AMI (SAMI) (40 patients) and control (CNT) (20 subjects). Serum Fe, Zn, and Mg were measured by colorimetric method. AAS technique the samples were used to estimation of Serum Cu, Co, Cr, and Mo levels in the samples. **Results:** Serum levels of all heavy and trace elements such as Fe, Zn, Mg, Cu, Co, Cr, and Mo levels were found significant differences between SAMI and CNT groups (P-value < 0.05). **Conclusion:** Smoking status of AMI patients may be the main cause and risk factors to differences of heavy and trace elements and not because only incidence of AMI.

Keywords: Acute myocardial infarction, trace elements, smoking

How to cite : Humam Ali Hade, Mohammed R. AbidAli, Elham F. Hamzah, Enas D. Neama. Physiological effects of smoking duration on the accumulation of some trace and heavy metals in acute myocardial infarction subjects. *Int J Med sci*, 2022;2(3):34-38.

INTRODUCTION

The interruption of blood supply to a part of the heart, and it is almost always due to the formation of occlusive thrombus at the site of rupture or erosion of an athermanous plaque in coronary artery has been called acute myocardial infarction (AMI) (1). Morphologically AMI can be subcategorized into trans mural which is mean of related with atherosclerosis including the significant coronary corridor, it tends to be sub-arranged into foremost, back, or sub-par, transmural dead tissue stretches out Hyperlipidemia can be delegated either essential or optional, contingent upon its makes essential hyperlipidemia is expected a hereditary deformity or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase (3). Hyperlipidemia implies elevated degrees of lipids are in the blood (4). It goes about as a gamble factor for corpulence related an exceptionally high frequency of coronary illness (4). Hyperlipidemia can be delegated either essential or optional, contingent upon its makes essential hyperlipidemia is expected a hereditary deformity or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase (6). Hyperlipidemia can be delegated either essential or optional, contingent upon its makes essential hyperlipidemia is expected a hereditary deformity

or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase (7). Cigarette smoking is a significant modifiable risk factor for cardiovascular illness, including coronary corridor illness, stroke, fringe vascular infection, and congestive cardiovascular breakdown (7). The risky impacts of smoking on the cardiovascular framework are because of the intense consequences for platelets, the capacity of endothelial ancestor cells, vascular endothelial capacity, and pulse fluctuation whether it is latent smokers or aloof smokers (8). The gamble for CAD among smokers is portion related (9). The instruments by which tobacco smoke causes CVD are numerous and are synergistic (10). They incorporate apoplexy, endothelial brokenness, atherosclerosis, and hemodynamic impacts. Smoking improves apoplexy by expanding platelets adherence to endothelium and platelets conglomeration (11), causing endothelial brokenness from oxidative harm brought about by lipid peroxidation and creation of free revolutionaries (12). Additionally, there is proof of raised degrees of C-receptive protein (CRP), fibrinogen, interleukin-6, and leukocytosis in constant smokers (13). Intense and constant smoking has vasoconstrictor impacts on coronary vasculature (14). The aim of this study to assessment of some trace elements such as Cu, Zn, Mo, Fe, Co, Mg, and Cr and lipids profile in Acute myocardial infarction of prolonged smoker subjects.

MATERIALS AND METHODS

Determination of Serum Fe, Zn, and Mg

Acute myocardial infarction of prolonged smoker patients. Hyperlipidemia can be delegated either essential or optional, contingent upon its makes essential hyperlipidemia is expected a hereditary deformity or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase.

$$\text{Fe } (\mu\text{g/dl}) = [(A_{\text{Sample}}) \div (A_{\text{Standard}})] \times 200 \text{ (Standard Concentration)}$$

$$\text{Zn } (\mu\text{g/dl}) = [(A_{\text{specimen}}) \div (A_{\text{standard}})] \times 200$$

$$\text{Mg}_{\text{mg/dl}} = [\text{Abs}_{(\text{Assay})} \div \text{Abs}_{(\text{Standard})}] \times 2_{\text{mg/dl}} \text{ Standard concentration}$$

Determination of Serum Cu, Co, Cr, and Mo:

In the nuclear retention spectrometry (AAS) strategies, the examples are disintegrated into free, unbiased molecules and enlightened by lamp that discharges the nuclear range of the component under investigation. Planning of standard bend of minor components by expansion of 10 μl of (0, 25, 50, 75, 100) ppb of Cu, Co, Cr, and Mo answer for the graphite container of graphite heater nuclear ingestion instrument (figure 1).

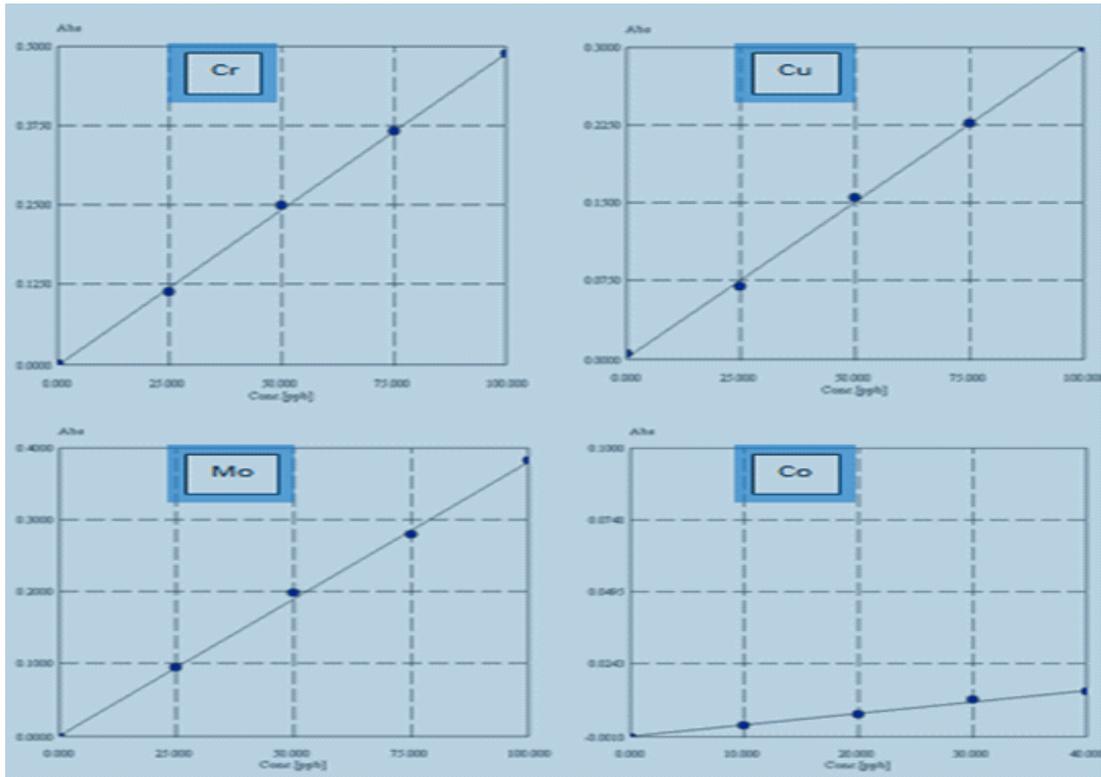


Fig.1:standard curves of trace elements assay by AAS

RESULTS

The aim of this study to assessment of some trace elements such as Cu, Zn, Mo, Fe, Co, Mg, and Cr and lipids profile in Acute myocardial infarction of prolonged smoker patients (57.33 ± 2 years) and the mean age of control (56.22 ± 3 years). There were high difference in BMI between SAMI and CNT groups, as shown in Table 1:

The aim of this study to assessment of some trace elements such as Cu, Zn, Mo, Fe, Co, Mg, and Cr and lipids profile in Acute myocardial infarction of prolonged smoker patients

Table 1: Shows the characteristics of study sample

Parameters	SAMI N=40	CNT N=20	P-Value
Age (years) Mean \pm SD*	57.33 ± 2	56.22 ± 3	0.334
Age range (years)	48 – 74	42 – 71	0.565
Gender (M : F)	22 : 18	12 : 8	0.025*
Body mass index (Kg / m ²) Mean \pm SD	29.22 ± 1.89	23.2 ± 3.0	0.000*

Serum levels of all trace elements such as Fe, Zn, Mg , Cu, Co, Cr, and Mo levels were found significant differences between SAMI and CNT groups(P-value < 0.05).

Table 2: Trace elements levels in both groups

PARAMETERS	SAMI Mean \pm SD N=40	CNT Mean \pm SD N=20	P-Value*
Fe	176 ± 22	98 ± 12	0.000
Zn	49 ± 3.9	66 ± 5	0.000
Mg	1.88 ± 0.09	2.54 ± 0.77	0.000

Cu	124±26	189±17	0.000
Co	0.22±.09	0.67±0.088	0.000
Cr	0.54±0.06	0.98±0.076	0.000
Mo	0.16±0.065	0.74±0.031	0.000

DISCUSSION

In study, concentrations of heavy metals Fe, Zn, Mg, Cu, Co, Cr and Mo were compared in the SAMI and CNT and the relationship between smoking status and higher concentrations of the metals was estimated. To recapitulate, the results indicated that concentrations of the analyzed trace and heavy metals were significantly differs in the blood serum of the SAMI group compared to CNT group. Hyperlipidemia can be delegated either essential or optional, contingent upon it makes essential hyperlipidemia is expected a hereditary deformity or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase. Cigarette smoking is a significant modifiable risk factor for cardiovascular illness, including coronary corridor illness, stroke, fringe vascular infection, and congestive cardiovascular breakdown. The risky impacts of smoking on the cardiovascular framework are because of the intense consequences for platelets, the capacity of endothelial ancestor cells, vascular endothelial capacity, and pulse fluctuation whether it is latent smokers or aloof smokers (15). Factors that were associated with smoking status were found in the category of socio-demographic characteristics, risk factors for AMI, and clinical care, but not in symptoms of AMI. This study found no association between ages of patients and control due to AMI and smoking status. In the other hand, the previous study showed similar results (16). The aim of this study to assessment of some trace elements such as Cu, Zn, Mo, Fe, Co, Mg, and Cr and lipids profile in Acute myocardial infarction of prolonged smoker patients (17,18). Hyperlipidemia can be delegated either essential or optional, contingent upon its makes essential hyperlipidemia is expected a hereditary deformity or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase. The smoking duration effect on cadmium, lead, and iron levels was not significant in our study. Hyperlipidemia can be delegated either essential or optional, contingent upon its makes essential hyperlipidemia is expected a hereditary deformity or family background of hyperlipidemia brought about by the diminishing movement of lipoprotein lipase (19). Serum levels of all trace elements such as Fe, Zn, Mg, Cu, Co, Cr, and Mo levels were found significant differences between SAMI and CNT groups (P-value < 0.05). the changing study parameters of this may be due to smoking status effects on levels of trace and heavy metals.

CONCLUSION

Smoking status of AMI patients may be the main cause and risk factors to differences of heavy and trace elements and not because only incidence of AMI.

Disclosures and Conflict of Interest

Non

Ethical Issues

This study was approved by the Ethics Committee of Al-Qasim Green University.

Acknowledgements

We thank all subjects (SAMI and CNT) whom contributed to this work.

REFERENCES

1. Bloomfield P.,Bradbury A, Grubb N.R.,Newby D.E,chapter 18 In:Boon N.A., Colledge N. R .,Walker B.R. 20 Edition, Davidson`s Principle and Practice of Medicine, UK: Churchill Livingstone Elsevier(2006)pp591.
2. 2-Rezen A.G. Morphology of acute myocardial infarction at pre-necrotic stage. *Cardiology*(2010); 50(1):4-8.
3. 3-Rayan T. J., Antman EM. ,Brooks NH.:ACC/AHA guidelines for the management of patients with acute myocardial infarction.(1999); update. 100:1016-30.
4. 4-Wood MA., Stifter WF., Simpson CS. Coronary arteriographic finding soon after non Q-wave myocardial infarction. *N Engl J. Med.* (1986); 315:417-23.
5. 5- Jupta R., Jushi V..Mohan K., Reddy S. Epidemiology and causation of coronary heart disease and stroke in India(2008); 94:16-26.
6. 6- Beaglehole R. (The world Health Report History)WHO(2004);P 120-41.
7. 7-White HD., Chew DP.,Acute MI. *Lancet* (2008);372(9638):570-84.
8. 8-Allender S., Scarborough P., Peto V., Rayner M.European Cardiovascular Disease Statistics.(2008);65:20-25.
9. 9-ESC/ACC.EUR Heart J 2000;21(18):1502-1513.
10. 10- Valentin f.,Eric J,Cardiovascular Pathology In;Kumar V., Abbas AK.,Fausto N.,Mitchel RN..ROBBIN`S Basic Pathology, 18th Edition. UK: Sander`s Elsevier(2007) p413-18.
11. 11- Libby P. THE PATHOGENESIS OF ATHEROSCLEROSIS. In: Kasper DL., Braunwald E., Fauci AS., Hauser SL.*et al.* HARRISON`S PRINCIPLE OF INTERNAL MEDICINE,(16th Edition),USA. McGraw-Hill (2005) pp1429-32.
12. 12-Robert A. and Jane E. Hyperlipidemia(High blood fat).*Clinical Endocrinology and Metabolism.*(2005). 90;32.
13. 13-Stone N. Secondary causes of hyperlipidemia ,*Med .Clin .North Am.*(1994).78:117-141.
14. 14-Harvel R. and Rapaport E. Management of primary hyperlipidemia. *New England Journal of Medicine.* (1995);332:1491-1498.
15. 15- Stang A, Stang M. An inter-state comparison of cardiovascular risk factors in Germany. *Dtsch Aerzteblatt Online.* 2014;111:530–6.
16. Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, et al. 2017 ESC guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J.* 2018;39:119–77.
17. Lamas, G.A.; Navas-Acien, A.; Mark, D.B.; Lee, K.L. Heavy metals, cardiovascular disease, and the unexpected benefits of chelation therapy. *J. Am. Coll. Cardiol.* 2016, 67, 2411-2418.
18. Revis, N.W.; Zinsmeister, A.R.; Bull, R. Atherosclerosis and hypertension induction by lead and cadmium ions: an effect prevented by calcium ion. *Proc. Natl. Acad. Sci. U.S.A.* 1981, 78, 6494-6498.
19. Kim, Hyungjo, Chol Shin, and Inkyung Baik. "Associations between Lifestyle Factors and Iron Overload in Korean Adults." *Clinical nutrition research* 5.4 (2016): 270-278.