Prevalence of Hypokalaemia in Acute Myocardial Infarction Patients

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ABSTRACT

Introduction: An acute myocardial infarction (AMI) is a subset of a spectrum of Ischemic Heart Disease that includes unstable angina and AMI with or without ST elevation. The critical role of potassium (K+) in cardiovascular (CV) disease and the importance of maintaining a normo-kalemic state are increasingly being recognized, particularly as relates to new and emerging cardio-protective and reno-protective therapies that promote K+ retention. Hence; we planned the present study to assess the prevalence of hypokalaemia in acute myocardial infarction patients.

Material and methods: We planned the present study to assess prevalence of hypokalaemia in acute myocardial infarction patients. A total of 25 AMI patients were included in the present study. 25 patients with absence of any pathology were taken as normal controls. Collection of venous blood samples was done in the study group on the day of admission within 12 hours from antecubital vein with all aseptic precautions in plain and vacutainers for the purpose of routine baseline blood investigations. The serum separated was used for the estimation of serum potassium levels. All the results were analyzed by SPSS software.

Results: Mean age of the patients of the AMI group and control group was 48.5 and 47.1 years respectively. Mean serum potassium levels among subjects of AMI group and control group was 4.02 and 4.52 mEq/L respectively. Hypokalaemia was found to be present in 24 percent of the AMI group patients.

Conclusion: AMI patients have significantly lower potassium levels in comparison to healthy population, hypokalaemia affecting a significant AMI population.

Key words: Acute, Hypokalaemia, Myocardial Infarction

INTRODUCTION

Among the most common chronic diseases that afflict humans worldwide are diabetes, cardiovascular diseases (CVDs), osteoporosis, arthritis, obesity, chronic obstructive pulmonary disease, inflammatory bowel disease, central nervous system degenerative diseases and some cancers. CVDs and chronic obstructive pulmonary disease not only contribute largely to morbidity and mortality but also put a heavy economic burden on the health care system both at a global and a national level.1,2 Ischemic Heart Disease (IHD) is one of the predominant types of CVD. The two leading manifestations of IHD are angina and acute myocardial infarction. An acute myocardial infarction (AMI) is a subset of a spectrum of IHD that includes unstable angina and AMI with or without ST elevation.3-5

Sodium and potassium have played key roles in the development and maintenance of essential cellular functions throughout more than 2 million years of human evolution. The Na+/K+ adenosine triphosphatase (sodium pump) present in all human cells generates potassium gradient across the cell membrane, which is the main determinant of the resting membrane potential.6,7 The critical role of potassium (K+) in cardiovascular (CV) disease and the importance of maintaining a normo-kalemic state are increasingly being recognized, particularly as relates to new and emerging cardio-protective and reno-protective therapies that promote K+ retention.8 Hence; we planned the present study to assess the prevalence of hypokalaemia in acute myocardial infarction patients.

MATERIAL AND METHODS

We planned the present study in the department of Medicine of the medical institute and included evaluation of prevalence of hypokalaemia in acute myocardial infarction patients. We obtained the ethical approval from institutional ethical committee and written consent after explaining in detail the entire research protocol. A total of 25 AMI patients were included in the present study. Inclusion criteria for the present study included:

- Patient with acute myocardial infarction
- Chest pain lasting more than 20 minutes
- Diagnostic ECG changes with characteristic ECG
alterations consisting of [in Absence of Left ventricular hypertrophy (LVH) and Left bundle branch block (LBBB)] 25 patients with absence of any clinical pathology were taken as normal controls. On admission, detailed history and thorough physical examination of the patients was done. Collection of venous blood samples was done in the study group on the day of admission within 12 hours from antecubital vein with all aseptic precautions in plain and vacutainers for the purpose of routine baseline blood investigations. For serum potassium levels, blood was allowed to clot at room temperature for half an hour and then centrifuged at 3000 rpm for five minutes. The serum separated was used for the estimation of serum potassium levels. All the results were analyzed by SPSS software. Chi-square test was used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

RESULTS
In the present study, we analyzed a total of 25 AMI patients and 25 healthy controls. Mean age of the patients of the AMI group and control group was 48.5 and 47.1 years respectively. Mean serum potassium levels among subjects of AMI group and control group was 4.02 and 4.52 mEq/L respectively. Significant results were obtained while comparing the mean serum potassium levels among AMI group and control group respectively. Hypokalaemia was found to be present in 24 percent of the AMI group patients.

DISCUSSION
In the present study, we observed that mean serum potassium levels among subjects of AMI group and control group was 4.02 and 4.52 mEq/L respectively. Hypokalaemia was found to be present in 24 percent of the AMI group patients.
observed the lowest mortality in those with admission serum K⁺ levels of between 3.5 and < 4.5 mEq/L compared with those who had higher or lower K⁺ levels.13 Shlomai G et al evaluated AMI patients and assessed their serum K⁺ levels. The present study comprised 1277 patients with AMI and normal-range admission K⁺ levels (3.5–5.2 mEq/L). Patients were divided into 4 quartiles based on admission K⁺ levels; “normal-low” (K⁺≥3.5 and K⁺≤3.9), “normal-moderate” (K⁺>3.9 and K⁺≤4.18), “normal-high” (K⁺>4.18 and K⁺≤4.45), and “normal-very high” (K⁺>4.45 and K⁺≤5.2). In patients admitted with AMI, admission serum K⁺ levels of 4.45 to 5.2 mEq/L were not associated with in-hospital ventricular arrhythmias, but were associated with increased short and long-term mortality.14

CONCLUSION

From the above results, the authors concluded that AMI patients have significantly lower potassium levels in comparison to healthy population, hypokalaemia affecting a significant AMI population. However; future studies are recommended.

REFERENCES