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# ORIGINAL ARTICLE

## Serum potassium levels in acute myocardial infarction

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***ABSTRACT:***

**Background**: This study was conducted to assess Serum potassium levels and mortality in acute myocardial infarction. **Material and methods**: There were 100 volunteers in total for this study, divided into two groups of 50. Group 1 consisted of individuals in good health and served as the control group. The individuals in Group 2 were those with acute MI. Participants in the research and control group provided informed consent after hearing about the protocol and study's objectives. Using all required aseptic procedures, blood samples were taken from the anticubital vein in simple vacutainers within 12 hours of the admission date for the purpose of measuring serum K+ in both groups. Following a 30-minute clotting period at room temperature, the blood was centrifuged for five minutes at 3000 rpm. Based on the isolated serum, an estimate was made. By utilizing flame-photometry, the potassium concentrations in the blood were ascertained. Statistical analysis was conducted using SPSS software. **Results**: There were total 56 males as well as 44 females in the current study. Out of 50 subjects with AMI, 30 were men and 20 were women. It had been noticed that serum potassium concentrations among subjects having AMI had been less (2.99 mmol/L) as compared to the subjects in control group (5.23 mmol/L). **Conclusion**: It had been declared from the outcomes that serum potassium levels among subjects with AMI were less as compared to controls.

**Keywords**: potassium, acute myocardial infarction

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## INTRODUCTION

Potassium homeostasis is critical to prevent adverse events in patients with cardiovascular disease. Several studies have demonstrated a relationship between low serum potassium levels, usually less than 3.5 mEq/L, and the risk of ventricular arrhythmias in patients with acute myocardial infarction (AMI).[1-3] On the basis of these studies, experts and professional societies have recommended maintaining potassium levels between 4.0 and 5.0 mEq/L,[4,5] or even 4.5 to 5.5 mEq/L,[6] in AMI patients.

However, most prior studies were conducted before the routine use of β-blockers, reperfusion therapy, and early invasive management in eligible patients with AMI. In addition, these studies were small (usually <1000 patients), which precluded a robust assessment of the relationship between potassium levels and mortality.

Acute myocardial infarction (AMI) is one of the leading causes of death in the developed world. The prevalence of the disease approaches 3 million people worldwide, with more than 1 million deaths in the United States annually. AMI can be divided into 2 categories: non–ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI). Unstable angina resembles an NSTEMI, but normal cardiac markers distinguish it.[7-9]This study was conducted to assess Serum potassium levels and mortality in acute myocardial infarction.

## MATERIAL AND METHODS

There were 100 volunteers in total for this study, divided into two groups of 50. Group 1 consisted of individuals in good health and served as the control group. The individuals in Group 2 were those with acute MI. Participants in the research and control group provided informed consent after hearing about the protocol and study's objectives. Using all required aseptic procedures, blood samples were taken from the anticubital vein in simple vacutainers within 12 hours of the admission date for the purpose of measuring serum K+ in both groups. Following a 30-minute clotting period at room temperature, the blood was centrifuged for five minutes at 3000 rpm. Based on the isolated serum, an estimate was made. By utilizing flame-photometry, the potassium concentrations in the blood were ascertained. Statistical analysis was conducted using SPSS software.

## RESULTS

**Table 1: Gender-wise distribution of subjects.**

| Gender | Group 1 | Group 2 | Total |
|---|---|---|---|
| Males | 26 | 30 | 56 |
| Females | 24 | 20 | 44 |

| | | | |
|---|---|---|---|
| Total | 50 | 50 | 100 |

There was total 56 males as well as 44 females in the current study. Out of 50 subjects with AMI, 30 were men and 20 were women.

**Table 2: Serum potassium concentrations in both the groups.**

| Parameter | Control group (Group 1) | AMI group (Group 2) |
|---|---|---|
| Serum K+ levels (mmol/L) | 5.23 | 2.99 |

It had been noticed that serum potassium concentrationsamong subjects having AMI had beenless (2.99 mmol/L) as compared to the subjects in control group (5.23 mmol/L).

## DISCUSSION

Acute MI is accompanied by a catecholamine surge. Catecholamine by stimulating Na-K-ATPase pump shifts K intracellularly, thus causing redistributional hypokalemia, and as a result, non-ischemic myocardium is hyperpolarized.[10] As a consequence, electrical inhomogeneity occurs and leads to ventricular arrhythmia. Most prior studies had proposed an increased rate of ventricular arrhythmia during the acute course of MI that was found to be associated with hypokalemia.[11]

The stabilization of cardiac electrical conduction, which mediates proper heart activities, depends on the physiological potassium level. Electrolyte imbalances give rise to conditions such as hypo- and hyperkalemia, which have been linked to malignant arrhythmia and abrupt death. Hypokalemia has been proposed as a potential risk factor for ventricular arrhythmias in the context of acute coronary syndrome (ACS). Higher serum potassium levels have a consistent prognostic significance in populations of ACS patients, according to recent studies.[12]

This study was conducted to assess Serum potassium levels and mortality in acute myocardial infarction.

In this study, there were total 56 males as well as 44 females in the current study. Out of 50 subjects with AMI, 30 were men and 20 were women. It had been noticed that serum potassium concentrations among subjects having AMI had been less (2.99 mmol/L) as compared to the subjects in control group (5.23 mmol/L).

**Goyal A et al[13]** determined the relationship between serum potassium levels and in-hospital mortality in AMI patients in the era of β-blocker and reperfusion therapy. Retrospective cohort study using the Cerner Health Facts database, which included 38,689 patients with biomarker-confirmed AMI, admitted to 67 US hospitals between January 1, 2000, and December 31, 2008. All patients had in-hospital serum potassium measurements and were categorized by mean postadmission serum potassium level (<3.0, 3.0-<3.5, 3.5-<4.0, 4.0-<4.5, 4.5-<5.0, 5.0-<5.5, and ≥5.5 mEq/L). Hierarchical logistic regression was used to determine the association between potassium levels and outcomes after adjusting for patient- and hospital-level factors. All-cause in-hospital mortality and the composite of ventricular fibrillation or cardiac arrest. There was a U-shaped relationship between mean postadmission serum potassium level and in-hospital mortality that persisted after multivariable adjustment. Compared with the reference group of 3.5 to less than 4.0 mEq/L (mortality rate, 4.8%; 95% CI, 4.4%-5.2%), mortality was comparable for mean postadmission potassium of 4.0 to less than 4.5 mEq/L (5.0%; 95% CI, 4.7%-5.3%), multivariable-adjusted odds ratio (OR), 1.19 (95% CI, 1.04-1.36). Mortality was twice as great for potassium of 4.5 to less than 5.0 mEq/L (10.0%; 95% CI, 9.1%-10.9%; multivariable-adjusted OR, 1.99; 95% CI, 1.68-2.36), and even greater for higher potassium strata. Similarly, mortality rates were higher for potassium levels of less than 3.5 mEq/L. In contrast, rates of ventricular fibrillation or cardiac arrest were higher only among patients with potassium levels of less than 3.0 mEq/L and at levels of 5.0 mEq/L or greater. Among inpatients with AMI, the lowest mortality was observed in those with postadmission serum potassium levels between 3.5 and <4.5 mEq/L compared with those who had higher or lower potassium levels.

The study conducted by **Walim V et al[14]** was undertaken to study any changes in the serum electrolytes with special reference to serum sodium and potassium in cases of AMI and study the correlation of serum sodium and potassium in the severity and outcome of AMI. Hundred people were included in study divided equally in study and control groups. Study group comprised confirmed diagnosis of recent onset of AMI. The blood samples of both the groups were analysed for Serum electrolytes (Na+, K+) by flame-photometry (Bio-Lab Diagnostic kit). There was statistically significant decrease in sodium and potassium levels in across all age groups & in both sexes of study group compared to control group. Significant high level of sodium was observed in AMI patients who are smokers and AMI patients with Diabetes whereas the level was low in AMI patients with hypertension. Potassium levels were low in AMI patients with Diabetes whereas the change was insignificant in association with smoking and hypertension. Decrease in sodium level was due to hypoxia and ischaemia, which increase the permeability of sarcolemma to sodium whereas decrease in potassium level was influenced by the catecholamine levels which are elevated in early acute myocardial infarction.

## CONCLUSION

It had been declared from the outcomes that serum potassium levels among subjects with AMI were less as compared to controls.

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