

## **Original Research**

# **Potassium levels and acute myocardial infarction**

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### ARTICLE INFO



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### ABSTRACT

**Aims:** The present study was conducted for assessing correlation of Potassium levels and acute myocardial infarction.

**Materials & methods:** A total of 80 patients were enrolled. Demographic, clinical, laboratory, and treatment data were obtained. AMI was diagnosed on the basis of the triad of chest pain, electrocardiogram changes, and elevated serum cardiac enzyme levels. Serial serum potassium levels during hospitalization were obtained from the patients' medical records and were reviewed. Patients were categorized into 6 groups to determine the relation between mean serum potassium and long-term mortality: <3.0, 3.0 to <3.5, 3.5 to <4.0, 4.0 to <4.5, 4.5 to <5.0, and 5 mEq/L.

**Results:** Out of 80 patients, number of subjects with lower potassium levels i.e <3.0 mEq/L are 8 and death rate is 37.5 % whereas death rate is less in patients with potassium levels in the range of 3.5 to 4.5 mEq/L and further mortality increases with increased level of potassium i.e more than 5.0 mEq/L. This shows a U- shaped relationship between the mortality rate and the potassium levels.

**Conclusion:** This study shows that there is a U shaped relationship between potassium levels and mortality rate of myocardial infarction.

### **Introduction:**

Acute myocardial infarction is one of the leading causes of death in the developed world. The prevalence of the disease approaches three million people worldwide, with more than one million deaths in the United States annually. Acute myocardial infarction can be divided into two categories, non-ST-segment elevation MI (NSTEMI) and ST-segment elevation MI (STEMI). Unstable angina is similar to NSTEMI.<sup>1,2</sup>

Serum K (sK) level is critical in cardiovascular diseases for the prevention of adverse events. Most of the body K is intracellularly located (98%), and a level of 3.5-5.3 mmol/L is maintained by intra and extracellular shifts and renal excretion. Hypokalemia is defined as sK levels of <3.5 mmol/L and plays an important role in cardiovascular disease pathogenesis. Studies showed that at the acute phase of myocardial infarction (MI), hypokalemia occurs that as a consequence could lead to

ventricular arrhythmia. 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).<sup>3,4,5</sup> Hence; the present study was conducted for assessing correlation of Potassium levels and acute myocardial infarction.

### **Materials & methods:**

We conducted the present study to assess the correlation between potassium levels and acute myocardial infarction. A total of 80 patients were enrolled. Demographic, clinical, laboratory, and treatment data were obtained. AMI was diagnosed on the basis of the triad of chest pain, electrocardiogram changes, and elevated serum cardiac enzyme levels. Serial serum potassium levels during hospitalization were obtained from the patients' medical records and were reviewed.

Patients were categorized into 6 groups to determine the relation between mean serum potassium and long-term mortality: <3.0, 3.0 to <3.5, 3.5 to <4.0, 4.0 to <4.5, 4.5 to <5.0, and 5 mEq/L.

#### Results:

Out of 80 patients, number of subjects with lower potassium levels i.e <3.0 mEq/L are 8 and death rate is

37.5 % whereas death rate is less in patients with potassium levels in the range of 3.5 to 4.5 mEq/L and further mortality increases with increased level of potassium i.e more than 5.0 mEq/L. This shows a U-shaped relationship between the mortality rate and the potassium levels.

Potassium levels (mEq/L)	Number of patients	Number of deaths due to MI	Mortality percentage(%)
< 3.0	8	3	37.5
3.0 to <3.5	10	2	20
3.5 to <4.0	12	1	9.1
4.0 to <4.5	14	1	7.1
4.5 to <5.0	24	10	52.2
> 5.0	12	8	66.7
Total	80		

**Table: Potassium levels and mortality due to MI**

#### Discussion:

The results of the current analysis demonstrated that a Ushaped relation exists between mean serum potassium level and long-term mortality among patients with AMI. The lowest long-term mortality was found in the group of patients with potassium levels of 3.5 to <4.0 mEq/L, whereas the patients with potassium levels of 4.5 or <3.5 mEq/L showed higher mortality.<sup>6,7</sup> With respect to ventricular arrhythmias, there was no significant difference among the groups, even at the extremes of potassium levels (5.0 or <3.5 mEq/L). Clinical practice guidelines recommend maintaining serum potassium levels between 4.0 and 5.0 mEq/L in patients with acute myocardial infarction (AMI). These guidelines are based on small studies that associated low potassium levels with ventricular arrhythmias in the pre-blocker and pre reperfusion era.<sup>8,9</sup> We conducted the present study to assess the correlation between potassium levels and acute myocardial infarction. A total of 80 patients were

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enrolled. Demographic, clinical, laboratory, and treatment data were obtained.

Current studies examining the relationship between potassium levels and mortality in AMI patients are lacking. To determine the relationship between serum potassium levels and in-hospital mortality in AMI patients in the era of -blocker and reperfusion therapy. 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 post admission 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).<sup>10</sup> Hierarchical logistic regression was used to determine the association between potassium levels and outcomes after adjusting for patient- and hospital-level factors. Measures All-cause in-hospital mortality and the composite of ventricular fibrillation or cardiac arrest. There was a U-shaped relationship

between mean post admission 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 post admission 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.<sup>11</sup> AMI was diagnosed on the basis of the triad of chest pain, electrocardiogram changes, and elevated serum cardiac enzyme levels. Serial serum potassium levels during hospitalization were obtained from the patients' medical records and were reviewed. Patients were categorized into 6 groups to determine the relation between mean serum potassium and long-term mortality:<3.0, 3.0 to <3.5, 3.5 to <4.0, 4.0 to <4.5, 4.5 to <5.0, and 5 mEq/L.

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.

### Conclusion:

This study shows that there is a U shaped relationship between potassium levels and mortality rate of myocardial infarction.

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