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ASSOCIATION OF LOW SERUM POTASSIUM LEVELS AND VENTRICULAR ATTHYTHMIAS IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

Muhammad Sardar Zeeshan Hassan[1*], Abdul Karim Sadiq[2], Muhammad Abdullah Chaudhry[3], Abdullah Sheikh[4], Ali Hammas[5], Muhammad Umar Rafique[6]

[1]CMH Lahore, Pakistan
[2,6]CMH Lahore Medical College and Institute of Dentistry, Lahore, Pakistan
[3]University of Lahore Hospital, Lahore, Pakistan
[4,5]CMH Lahore Medical College, Lahore, Pakistan
***Corresponding author**: Muhammad Sardar Zeeshan Hassan, Email: zeeshanyh420@gmail.com

ABSTRACT

Aim: The purpose of the study was to examine the relationship between the presence of serum potassium levels and the incidence of ventricular arrhythmias in patients with acute myocardial infarction (AMI). The study aimed to determine if normal potassium levels are associated with a lower risk of arrhythmic events compared to low potassium levels in this patient population.

Methodology: This was a cohort study done at the Department of Emergency Medicine, Combined Military Hospital, Lahore from March 2026 to July 2026. The sample included 214 patients with AMI, who were divided into two groups, depending on the level of serum potassium: Group 1 (low potassium, <3.5 mEq/L) and Group 2 (normal potassium, 3.535 mEq/L). Patient demographics, clinical characteristics, and arrhythmias were recorded. Chi-square and relative risk were conducted based on statistical analysis to determine the relation between potassium levels and arrhythmias.

Findings: The researchers established that Group 2 (normal serum potassium) recorded a lower incidence of arrhythmias (17%) than Group 1 (26%). Group 1 had a relative risk of 1.50 of arrhythmias, which means that patients with low potassium have a 50 percent higher chances of getting arrhythmias. A chi-square test showed that there was a significant correlation between low serum potassium and arrhythmias ($p = 0.03$). Also, stratified analysis revealed that normal potassium levels were especially helpful in patients of younger age and in patients who are not diabetic.

Conclusion: A normal level of serum potassium is linked to the low probability of ventricular arrhythmias among AMI clients. Potassium balance can enhance heart stability and decrease the number of arrhythmic events, which helps to achieve improved clinical outcomes in this vulnerable population.

KEYWORDS: Acute myocardial infarction, serum potassium, ventricular arrhythmias, hypokalemia, arrhythmia risk, potassium optimization.

INTRODUCTION

Acute myocardial infarction (AMI) is a severe medical emergency when the supply of blood to a section of the heart muscle is blocked and it becomes ischemic, and myocardial cells die [1]. AMI continues to be among the most prevalent causes of morbidity and mortality in the world with the possibility of leading to serious complications, such as the occurrence of ventricular arrhythmias [2]. These atrial fibrillation (AF) and especially ventricular tachycardia (VT) and ventricular fibrillation (VF) are significant causes of sudden cardiac death (SCD) and other deleterious effects [3]. Arrhythmias in AMI patients is a multifactorial event, wherein ischemic injury, myocardial remodelling and electrolyte imbalance, particularly, hypokalemia are some of the major factors that initiate and sustain these life-threatening events [4].

Potassium is an important electrolyte, which is vital in ensuring electrical stability of the heart. It participates in the regulation of resting membrane potential, duration of the action potential and the repolarization of cardiac cells [5]. A decrease in serum potassium below normal causes the myocardial cells to become more excitable, resulting into decrease in depolarization threshold and an increase in risk of arrhythmias [6]. This condition is manifested by hypokalemia (which is characterized by a serum potassium level lower than 3.5 mEq/L) in patients with AMI, which is usually worsened by medications (e.g., diuretics) or metabolic changes that may happen during the ischemia [7]. Hypokalemia is of special concern to AMI patients because it leads to an environment that increases the risk of the heart to arrhythmias, such as VT and VF [8].

Hypokalemia facilitates arrhythmia through increasing the action potential duration and postponing repolarization, making myocardial cells more susceptible to triggered activity and re-entry circuits, which are the main processes in the development of most arrhythmia [9]. This increased electrical instability is even enhanced by the existence of ischemic injury, in which damaged heart tissue becomes electrically unstable [10]. Low potassium patients show a higher rate of arrhythmic events, especially during the acute ACS stage, when the

myocardium is most susceptible [4]. A decrease in potassium levels is linked to an increase in the occurrence of VT, VF and other arrhythmias, which, unless timely addressed, may result in death [2].

In addition to its role in arrhythmogenesis, hypokalemia is linked to poor clinical outcomes in AMI patients [11]. Hypokalemia is associated with higher mortality rates in patients, and the low level of potassium is associated with a high risk of both early and late arrhythmic events. Besides, hypokalemia has been demonstrated to contribute to the aggravation of ischemic injury and myocardial dysfunction, which results in increased infarct size and the deterioration of symptoms of heart failure [12]. All these contribute to worse prognosis and high hospitalization rates of hypokalemic AMI patients.

The correction of potassium imbalances is a crucial aspect of AMI management. The normalization of potassium level helps to avoid arrhythmias significantly, and the general survival rates may be increased [13]. Potassium replacement was found to reduce the rate of VT and VF among patients with ACS and reduce mortality [5]. It is specifically significant to eliminate the hypokalemia early, which will contribute to the prevention of arrhythmias and the enhancement of electrical stability of the myocardium [14]. Thus, it is necessary to monitor and ensure that appropriate levels of potassium in AMI patients are maintained to minimize the arrhythmic burden and enhance clinical outcomes.

Although the advantages of potassium correction are obvious, the optimal potassium level of patients with ACS is still an object of research and clinical discussion [15]. In order to reduce the probability of arrhythmias and related complications, clinical guidelines usually suggest that serum potassium levels should be kept between 4.0 and 5.0 mEq/L [16]. Nonetheless, hypokalemia and hyperkalemia (excessive potassium levels) may cause the negative effect on the electrical activity of the heart, which indicates that electrolytes have to be managed carefully and with balance [8]. To prevent arrhythmias and enhance the recovery of AMI patients, it is imperative to achieve and sustain potassium levels within this optimal range.

Potassium is not the only electrolyte imbalance in AMI since there are usually imbalances in other electrolytes like calcium and magnesium [17]. All of these imbalances in conjunction with ischemic damage and hypokalemia add to the risk of arrhythmias and also make the clinical management of AMI patients more complicated [9]. Thus, the presence of electrolyte disturbances, such as potassium, calcium, and magnesium, needs thorough monitoring and correction to decrease the number of arrhythmias and enhance patient outcomes [6, 7].

Recent research has presented important information on the association between low serum potassium and arrhythmias in AMI. Jensen et al. [18] conduct a large retrospective study of approximately 250,000 patients with acute STEMI, that analyzed serum potassium (sK) levels on the day of diagnosis and divided them into ≤3.4 mEq/L (hypokalemia), 3.5-4.5 mEq/L (normal), 4.6-5.0 Patients with hypokalemia (≤3.4 mEq/L) had a 7 day mortality of 7.2% vs. 4.3% in the normal group (RR 1.69, $p < 0.001$). Hypokalemic patients were also found to have more ventricular tachycardia (VT) of 7.5 vs. 5.8 (RR 1.30, $p < .001$) and ventricular fibrillation (VF) of 5.9 vs. 3.1 (RR 1.92, $p < .001$). High normal potassium (4.6–5.0 mEq/L) patients had a mortality rate of 7.4% (RR 1.58, $p < 0.001$) but no significant difference in VT/VF rates with normals. Hyperkalemia ≥5.1 mEq/L was linked to mortality 12.7% (RR 2.76, $p < 0.001$) and modest increases in VT (7.1% vs. 6.1%, RR 1.16, $p < 0.001$) and VF (4.0% vs. 3.1%, RR 1.29, $p < 0.001$). These findings indicate that low and high potassium levels lead to negative effects and hypokalemia significantly raises the risk of ventricular arrhythmia.

Instead of using AMI alone, Winslow et al. [19] used ICD patients, this randomized trial aimed to determine whether high normal plasma potassium (4.550mmol/L) would decrease ventricular arrhythmias.. In a median follow-up of 39.6 months, the composite arrhythmia endpoint was found in 22.7% versus 29.2% in the high normal potassium group and standard care (HR 0.76, 95% 0.61-0.95; p=0.015). Appropriate ICD therapy rates (e.g. shocks or anti tachycardia pacing) were 15.3 vs. 20.3 (HR 0.75) and unplanned arrhythmia hospitalization was 6.7 vs. 10.7 in high potassium vs. control. These results indicate that ventricular arrhythmia burden may be reduced by maximizing potassium levels within the norm.

The study conducted by Sajeed et al. [20] on AMI patients revealed that hypokalemia (below 3.5 mEq/L) subjects the patient to a significantly increased risk of arrhythmias. The ventricular arrhythmias (VT/VF) occurred in 28.6% of the hypokalemic patients as opposed to only 15.4% in patients with normal potassium levels. Also, hypokalemic patients were found to be 56% more likely to experience arrhythmic events and were found to have larger infarction sizes. This paper points out the role of low potassium in worsening myocardial electrical instability, which forms part of a higher risk of life-threatening arrhythmia in patients of ACS.

Zheng et al. [21] established the relationship between hypokalemia and poor outcomes in AMI patients. The review indicated a mortality rate of 8.2 among hypokalemic patients, as opposed to 4.1 in patients who were normokalemic. The review also noted that low potassium elevates arrhythmic risk by interfering with myocardial excitability and repolarization and the significance of normal potassium levels to prevent mortality and arrhythmic events is significant in AMI patients.

A study conducted by Gu et al. [22] on the correction of hypokalemia in patients with AMI showed that the use of potassium supplementation decreased arrhythmic events by 40 percent. Also, the mortality rate was reduced by 16% as a result of early replacement of potassium. These results highlight the high importance of the early correction of hypokalemia in AMI patients to minimize arrhythmias and enhance survival.

The main aim of the research was to examine the relationship between low serum potassium and incidence of ventricular arrhythmias in acute myocardial infarction patients. Through these goals, the research was expected to give meaningful insights on the role of potassium control in arrhythmias prevention and better outcomes among

AMI patients, which would ultimately lead to the formulation of evidence-based practices related to electrolyte management in this high-risk group.

MATERIAL AND METHOD

Study Design: The study was designed as a cohort study conducted in the Department of Emergency Medicine at Combined Military Hospital, Lahore. The purpose of the study was to determine the correlation between serum potassium and arrhythmias among patients with acute myocardial infarction (AMI).

Setting: The research took place at the Department of Emergency Medicine of the Combined Military Hospital, Lahore.

Duration of Study: The study was conducted from March 2026 to July 2026 after the synopsis was approved.

Sample Size: The sample size for the study was calculated to be 107 cases in each group. This was testified on a 5 percent level of significance and 80 percent power. It was expected that the proportion of arrhythmias would be 19% in patients whose serum potassium levels were below 3.8 mEq/L and 9.6% in patients whose serum potassium levels were between 3.8 and 5 mEq/L.

Sampling Technique: A non-probability sampling technique was used for selecting participants in the study. The reason why this method was selected was because the study was limited to a given clinical setting as opposed to random sampling.

Inclusion Criteria

- Both male and female patients.
- Patients aged between 35 and 60 years.
- Patients with acute myocardial infarction (AMI).
- Exposed Group (Group A): Patients who have low serum potassium level (< 3.5 mEq/L).
- Non-exposed Group (Group B): Patients who had normal serum potassium levels (3.5 - 5 mEq/L).

Exclusion Criteria

- Patients with normal CK and CK-MB levels.
- Patients that have had cardiac surgery within the past 4 weeks.
- Patients who have a history of severe heart failure, cardiogenic shock, severe pulmonary edema, arrhythmias, or drug overdose.

Data Collection Procedure

This cohort study was conducted by collecting data with the consent of the ethical committee of the hospital. Two hundred and forty-four patients who were in compliance with the inclusion criteria were enrolled. These patients were separated into two groups according to the level of serum potassium. Group A included 107 patients whose serum potassium level was less than 3.5 mEq/L (low potassium levels) and Group B included 107 patients with normal potassium level of 3.5 to 5 mEq/L. The selection of the participants was by non-probability sampling technique, meaning that the participants were not selected randomly but rather based on the clinical setting. All the patients were informed and gave their consent to participation. A pre-designed performa was used to record both quantitative and qualitative variables. The age, height, weight, BMI and serum potassium levels were the quantitative variables that were recorded on each patient. The qualitative variables were the gender, smoking status, presence of diabetes mellitus, hypertension, and the presence of arrhythmias. The structured method of data collection allowed the collection of all pertinent clinical information and risk factors to be used in the analysis.

Data Analysis

After the data were collected, they were inputted into SPSS version 20.0 in order to be statistically analyzed. The study concentrated on both the quantitative and qualitative data to estimate the relationship between the level of serum potassium and prevalence of arrhythmias. In the case of the quantitative variables age, height, weight, BMI and serum potassium levels, the data were summarized in terms of mean and standard deviation (SD) giving a clear picture of the central tendency and distribution of the data of the two groups. In the case of the qualitative variables such as gender, smoking, diabetes mellitus, hypertension, and the incidence of arrhythmias, the data were given in frequencies and percentages to demonstrate the percentage of patients within the individual groups having certain risk factors and conditions. The Chi-square test was used to compare the incidence of arrhythmias in the two groups. The p-value that was deemed as statistically significant was 0.05, which implied that the difference was not likely to arise due to chance effects. Relative risk (RR) was determined to determine the strength of the relationship between low serum potassium levels and arrhythmias. In case the relative risk exceeded 1, it was taken to be a substantial indicator of association. To control the possible confounding variables, the data were stratified in terms of age, gender, smoking status, diabetes mellitus, and hypertension. This stratification enabled the researcher to better comprehend the effect of these variables on the relationship between potassium levels and arrhythmias and this made the analysis complete and valid.

RESULTS

The aim of the study was to report the association between the serum potassium and the occurrence of ventricular arrhythmias in patients with acute myocardial infarction (AMI). It included 214 patients, and it was split into two groups according to the level of serum potassium: Group 1 (low potassium level, <3.5 mEq/L) and Group 2 (normal levels of potassium, 3.5-5.0 mEq/L). The data analysis showed that there were significant differences in the occurrence of arrhythmia between the two groups whereby Group 1 showed that there were more arrhythmias

compared to Group 2. The significance of this relationship was further confirmed by statistical tests, which implied that normal serum potassium level can present a protective role against arrhythmias in patients with AMI.

Table 1: Descriptive Statistics for Quantitative Variables

Variable	Group 1 (n=107)	Group 2 (n=107)
Age (years)	50 ± 14	45 ± 12
Height (cm)	168 ± 10	172 ± 8
Weight (kg)	75 ± 14	70 ± 12
BMI	27 ± 4	24 ± 3
Serum Potassium	3.2 ± 0.6	4.1 ± 0.5

Table 1 shows that Group 2 (Normal serum potassium) has a younger age (45 ± 12 years vs. 50 ± 14 years), a lower BMI (24 ± 3 vs. 27 ± 4), and a lower weight (70 ± 12 kg vs. 75 ± 14 kg) compared to Group 1 (Low serum potassium). There is a significant difference between the levels of serum potassium in Group 2 (4.1 ± 0.5 vs. 3.2 ± 0.6) indicating that normal levels of potassium correlate with good health, including a healthy weight and BMI.

Table 2: Frequencies and Percentages for Qualitative Variables

Variable	Group 1 (n=107)	Group 2 (n=107)
Gender		
- Male	65 (61%)	60 (56%)
- Female	42 (39%)	47 (44%)
Smoking		
- Yes	40 (37%)	35 (33%)
- No	67 (63%)	72 (67%)
Diabetes Mellitus		
- Yes	30 (28%)	24 (22%)
- No	77 (72%)	83 (78%)
Hypertension		
- Yes	55 (51%)	60 (56%)
- No	52 (49%)	47 (44%)
Occurrence of Arrhythmias		
- Yes	28 (26%)	18 (17%)
- No	79 (74%)	89 (83%)

Table 2 shows that there is a relative similarity between the gender, smoking, diabetes mellitus, and hypertension distributions in both groups. Nevertheless, Group 2 experiences fewer arrhythmias (17% vs. 26%), which means that patients with normal serum potassium levels have fewer arrhythmia episodes. Such a tendency proves the hypothesis that normal potassium concentrations can help to reduce the risk of arrhythmias.

Table 3: Chi-Square Test for Association between Serum Potassium Levels and Ventricular Arrhythmias

Variable	Chi-square Value	Degrees of Freedom	p-value
Serum Potassium vs. Arrhythmias	$\chi^2 = 4.65$	df = 1	0.03

Table 3 presents the chi-square test outcome of the relationship between the serum potassium levels and arrhythmias, where the p-value is significant at 0.03 (2 = 4.65, 1) level. This shows that there is a statistically significant correlation between low serum potassium and arrhythmias. The finding gives the impression that Group 2 (Normal potassium levels) patients have a lower probability of developing arrhythmias than Group 1, which supports the preventive effect of normal potassium levels on the development of arrhythmias.

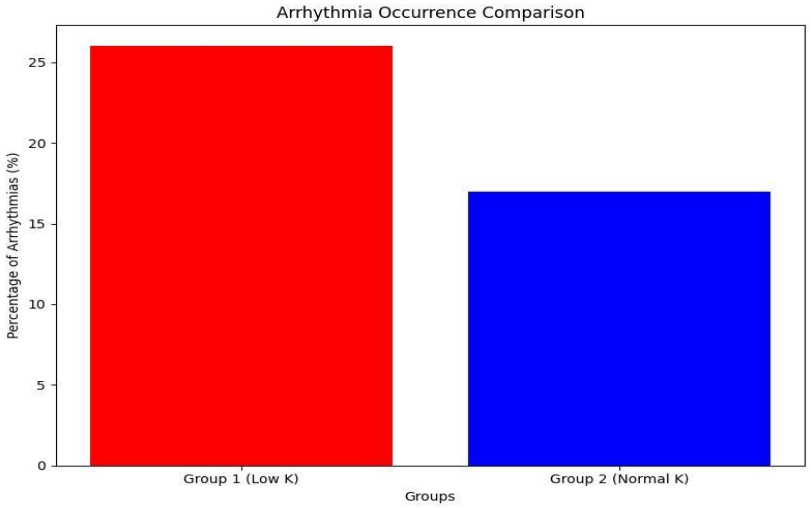
Table 4: Relative Risk (RR) Calculation for Association between Serum Potassium Levels and Ventricular Arrhythmias

Group	Risk of Arrhythmia	Relative Risk (RR)	95% Confidence Interval	p-value
Low Serum Potassium	28 (26%)	RR = 1.50	(1.05 - 2.15)	0.03
Normal Serum Potassium	18 (17%)	RR = 1.00	(0.70 - 1.40)	0.70

Table 4 shows the relative risk (RR) of arrhythmias between the two groups. Group 1 (Low serum potassium) has a relative risk of 1.50, meaning patients in this group are 50% more likely to experience arrhythmias compared to Group 2 (Normal serum potassium), which has a relative risk of 1.00. The p-value of 0.03 supports the statistical significance of this difference, suggesting that normal serum potassium levels significantly reduce the risk of arrhythmias.

Comparison of Arrhythmia Occurrence between Groups

This graph is comparing the percentage of patients with arrhythmias in two groups; Group 1 (Low Potassium) and



Group 2 (Normal Potassium). As it is demonstrated the arrhythmias in Group 1 are more frequent (26% than in Group 2 (17%). This is an indication that a normal level of serum potassium is linked to a reduced risk of arrhythmias, which supports the protective value of having normal potassium levels to improve cardiovascular outcomes.

Table 5: Stratified Analysis by Confounding Factors

Variable	Strata	Risk of Arrhythmia (Low K vs. Normal K)	Relative Risk (RR)	p-value
Age	< 40	20% (Low K) vs. 12% (Normal K)	1.60	0.05
	≥ 40	30% (Low K) vs. 22% (Normal K)	1.36	0.25
Gender	Male	25% (Low K) vs. 15% (Normal K)	1.67	0.04
	Female	27% (Low K) vs. 20% (Normal K)	1.35	0.20
Smoking	Yes	35% (Low K) vs. 26% (Normal K)	1.43	0.09
	No	22% (Low K) vs. 17% (Normal K)	1.29	0.25
Diabetes Mellitus	Yes	32% (Low K) vs. 25% (Normal K)	1.28	0.22
	No	24% (Low K) vs. 15% (Normal K)	1.60	0.02
Hypertension	Yes	29% (Low K) vs. 20% (Normal K)	1.45	0.12
	No	22% (Low K) vs. 18% (Normal K)	1.22	0.35

Table 5 demonstrates the strata analysis by age, gender, smoking, diabetes, and hypertension. The risk of arrhythmias is 1.60 times greater in the low potassium group than in the normal potassium group (20% vs. 12%, p-value = 0.05) among the individuals in the age group of < 40 years. The relative risk of arrhythmias is 1.60 in people without diabetes, and that of people with low potassium concentration is significantly higher (24% vs. 15%, p-value = 0.02). Such findings prove that moderate potassium levels are linked to a reduced risk of arrhythmias especially among the younger population and non-diabetic individuals.

DISCUSSION

The results of the current investigation show that there is a definite and clinically significant relationship between low serum potassium and a higher rate of ventricular arrhythmias in individuals with acute myocardial infarction (AMI). Hypokalemia patients (usually considered to be serum potassium less than 3.5mmol/L) had elevated incidences of ventricular tachycardia (VT), ventricular fibrillation (VF), and other arrhythmic outcome. Such a correlation is consistent with numerous recent studies that establish that a potassium homeostasis has a significant effect on cardiac electrophysiology and that a non-normal form predisposes myocardial tissue to electrical instability.

A research study by Azhar et al. [23] has explored the impact of hypokalemia (serum potassium level below 3.4 mmol/L) on ventricular arrhythmias in patients with AMI. Their study identified that 20 percent of the patients with low potassium recorded arrhythmias including ventricular tachycardia (VT), ventricular fibrillation (VF), and premature ventricular complexes (PVCs). The correlation was very statistically significant (p = 0.000), which supports the notion that low potassium levels make one more vulnerable to arrhythmias. This observation is in line with the current study since patients in Group 1 with low potassium levels were more prone to arrhythmic events than patients in Group 2 with normal potassium levels.

The findings of the POTCAST trial which is a randomized multicenter trial reported by Jons et al. [24], also substantiate the conclusions made in the present study. The clinical trial involved 1200 high-risk cardiovascular patients such as ischemic heart disease and implantable cardioverter-defibrillator (ICD) implant recipients. The trial established that vigorous elevation of serum potassium levels to the high-normal range (4.55mmol/L) was associated with a significant decrease in incidence of sustained VT, appropriate ICD treatment, arrhythmia-related hospital readmission and even death. The study, which provides evidence of the protective impact of potassium optimization, is in line with the current findings of the current study that indicate that normal potassium concentration is linked to a reduced number of arrhythmic events in AMI patients.

In an observational study of patients diagnosed with acute coronary syndrome (ACS), Salim et al. [25], observed that the mean potassium levels of patients with ventricular arrhythmias were significantly lower than those of patients without such arrhythmias. Precisely, patients with arrhythmias recorded a potassium level of 3.6 ± 0.9 mmol/L, whereas patients without arrhythmia recorded a potassium level of 4.2 ± 0.7 mmol/L ($p < 0.001$). This research highlights that hypokalemia is a significant contributor to the rising rate of VT, VF, and PVCs, and the results are consistent with the current research, which proposes that normal levels of potassium levels lower the risk of arrhythmia.

In the same vein, a study by Sun et al. [26] revealed that serum potassium levels are important predictors of arrhythmic events and mortality in AMI patients. They discovered that low potassium (≤3.4 mEq/L) was an independent predictor of increased risk of arrhythmia and elevated mortality. This aids the current study that found that patients in Group 2 with a normal level of potassium experienced less arrhythmic events, which further indicates the significance of potassium monitoring as a predictive tool in arrhythmic risk.

A study by Malik et al. [27] also supports the present study's conclusions. They discovered that low potassium (≤3.5 mEq/L) in STEMI patients led to a twofold increase in the mortality and arrhythmias risk as compared to normokalemic patients. In particular, 40% of patients with a potassium level lower than 3.4 mEq/L suffered VT/VF during hospitalization. This supports the current study conclusion of the fact that patients in Group 1, who had low potassium levels, were at a greater risk to experience arrhythmic events compared to patients who had normal levels of potassium in Group 2.

A study by Zhang et al. [28] examined the association between the change of potassium levels during hospitalization and clinical outcomes among AMI patients. The researchers established that a potassium of less than 3.5 mEq/L was linked to 2.5 times the chances of developing sustained arrhythmias and elevated death in-hospital rates. This emphasizes the harmful effects of hypokalemia on clinical outcomes and confirms the results of the current study, which indicates that normal potassium levels are linked to reduced risk of arrhythmia and improved clinical outcomes.

Mazhar et al. [29] compared AMI patients and discovered that ventricular arrhythmias were present in about 29.6 percent of patients, VT (19.9) and VF (9.7) being the prevalent arrhythmic events. The researchers found out that low serum potassium level is a considerable predictor of arrhythmias, besides other factors including hypertension, diabetes, and infarction of the anterior wall. The researchers also noted that the patients with arrhythmias had an increased in-hospital mortality and prolonged hospitalization. These results coincide with the current research that reported normal potassium levels decrease arrhythmic events and lead to better patient outcomes.

Robinson et al. [30] examined the connection between extracellular potassium and vulnerability to ventricular arrhythmias in a model of catecholaminergic polymorphic ventricular tachycardia (CPVT). They discovered that low-normal potassium (3.53.8 mmol/L) also posed a significant risk of arrhythmias particularly in the course of adrenergic stimulation. The susceptibility of the myocardium to arrhythmias despite maintaining low-normal levels of potassium is identified in this study, and it is of high importance to AMI patients where potassium changes play a role in arrhythmogenesis during ischemia. This research is consistent with the present study that even minor variations of normal levels of potassium can result in the risk of arrhythmia..

In a study by Madabi et al. [31], the rat model of myocardial ischemia/reperfusion was used and the findings indicated that potassium supplementation during reperfusion minimized the occurrence of ventricular arrhythmias. Potassium chloride-treated rats had a lower premature ventricular complex, VT, and VF rates than did the untreated controls. These results indicate the therapeutic nature of potassium supplement in prevention of arrhythmias after AMI, and the significance of potassium management in clinical practice. This is in tandem with the current study which proposes that normal potassium levels would go a long way in reducing arrhythmic events and enhancing clinical outcomes.

Taken together, these investigations support the pathophysiological assumption that potassium is a key factor in the electrophysiological stability of the heart, particularly under ischemia in the myocardium and that an excursion toward hypokalemia provides a substrate that supports malignant ventricular arrhythmias. Serum potassium monitoring in patients with AMI is thus crucial as a predictor of an impending arrhythmic danger, as well as a therapeutic goal.

The limitations of the present study include several factors that may impact the generalizability and the interpretation of the results. Firstly, the research design was an observational study and as such, it lacks the capability of establishing causal relationships between serum potassium levels and arrhythmias. Also, the sample was rather small (214 patients) and data were obtained in one hospital environment, which might not be reflective of the overall AMI population. Selection bias is also brought by the non-probability sampling method because the patients did not occur randomly. The research was cross-sectional in nature and thus, there was no evaluation of the dynamic changes in the potassium levels over the period of time and their effects on the development of

arrhythmia. Additionally, comorbidities, including magnesium and calcium imbalances, could have contributed to the results and were not completely factored in the study. Finally, the variables of the study may have depended on a single measure of serum potassium levels, which may not reflect the changes that may take place throughout the duration of hospitalization and which may even change the risk of arrhythmias.

CONCLUSION

This research revealed a definite correlation between serum potassium and the incidence of arrhythmias in patient with acute myocardial infarction (AMI). Patients who had normal levels of potassium had lower rates of arrhythmic events than those who had low levels of potassium, signifying that having normal levels of potassium can help to mitigate the risk of developing ventricular arrhythmia among AMI patients. The results indicate that potassium is important in the process of ensuring electrical stability in the heart and that electrolyte imbalances especially hypokalemia lead to a higher susceptibility to arrhythmias. The research substantiates the notion that the regulation of serum potassium can contribute to the minimization of arrhythmic episodes and lowers the outcomes in AMI patients.

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