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ANALYSIS OF SERUM HYPOKALEMIA IN ACUTE MYOCARDIAL INFARCTION IN PAKISTAN

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Abstract:
*Introduction: Hypokalemia refers to a serum potassium concentration (SPC) of <3.5 mEq/l, occurs frequently in hospitalized patients and is associated with ventricular arrhythmias as well as an overall poor prognosis after cardiovascular events. **Objectives of the study:** The basic aim of the study is to analyse the serum potassium levels and mortality in acute myocardial infarction in Pakistan. **Methodology of the study:** This cross sectional study was conducted in DHQ Hospital, Rajanpur during 2018 to 2019. The data was collected from 100 male and female patients with myocardial infarction. We determine the impact of plasma potassium concentration for patient survival following myocardial infarction. Current guidelines emphasize the importance of avoiding hypokalemia, advising that patients diagnosed with myocardial infarction should be given potassium supplements, if necessary, to maintain serum potassium in the range of 4.0-5.0 mmol/L. **Results:** The data was collected from 100 patients of MI. Mean age of male patients was found to be 64.12±12.34 and female patients was 46.21±10.24. There was statistically significant decrease in serum sodium and potassium levels in study group among both the ages compared to normal healthy control group. **Conclusion:** It is concluded that reduction in sodium level was assessed only in patients with AMI as compared to healthy persons. Estimation of serum electrolyte is of utmost importance for diagnosis and prognosis of AMI.*

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INTRODUCTION:

Hypo- and hyperkalemia have been shown to increase cardiovascular and total mortality in patients with acute myocardial infarction (AMI). Hypokalemia refers to a serum potassium concentration (SPC) of <3.5 mEq/l, occurs frequently in hospitalized patients and is associated with ventricular arrhythmias as well as an overall poor prognosis after cardiovascular events [1]. Hyperkalemia is defined as a SPC of >5.0 mEq/l and can have a variety of adverse consequences, such as cardiac arrhythmias, in patients hospitalized after a cardiovascular event. Extracellular (serum) potassium concentration is normally maintained within the approximate reference range of 3.5-5.2 mmol/L; this is important for normal cardiac function. Both reduced serum potassium (hypokalemia) and increased serum potassium (hyperkalemia) can, if sufficiently severe, be associated with potentially lethal cardiac arrhythmia [2].

Some recommend a higher target of 4.5-5.5 mmol/L. The study, which was conceived to test the validity of this expert advice, involved retrieval of the medical records of 38,689 patients admitted with acute myocardial infarction (AMI) to 67 US hospitals for the period 2000-2008 [3]. Each of these patients was assigned to one of seven groups, depending on their mean serum potassium concentration for the duration of hospital stay [4].

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) [5].

A recent study sought to determine the impact of plasma potassium concentration for patient survival following myocardial infarction. Current guidelines emphasize the importance of avoiding hypokalemia, advising that patients diagnosed with myocardial infarction should be given potassium supplements, if necessary, to maintain serum potassium in the range of 4.0-5.0 mmol/L [6].

Objectives of the study

The basic aim of the study is to analyse the serum potassium levels and mortality in acute myocardial infarction in Pakistan.

METHODOLOGY OF THE STUDY:

This cross sectional study was conducted in DHQ Hospital, Rajanpur during 2018 to 2019. The data was collected from 100 male and female patients with myocardial infarction. We determine the impact of plasma potassium concentration for patient survival following myocardial infarction. Current guidelines emphasize the importance of avoiding hypokalemia, advising that patients diagnosed with myocardial infarction should be given potassium supplements, if necessary, to maintain serum potassium in the range of 4.0-5.0 mmol/L. Serum potassium was measured in the emergency department and repeatedly thereafter throughout hospitalization, and was used in the analysis, along with a large array of clinical and laboratory variables.

Statistical analysis

The data was collected and analysed using SPSS version 19.0. All the values were expressed in mean and standard deviation.

RESULTS:

The data was collected from 100 patients of MI. Mean age of male patients was found to be 64.12±12.34 and female patients was 46.21±10.24. There was statistically significant decrease in serum sodium and potassium levels in study group among both the ages compared to normal healthy control group. Serum sodium, potassium, chloride, calcium levels were significantly lower in the AMI patients and magnesium levels were slightly raised among cases than controls.

Table 01: Analysis of comparison of electrolytes

Serum (mmol/L)	case	control	p-value
Sodium	82.641±6.412	94.612±5.241	0.001
Potassium	4.234±1.156	4.562±1.214	0.728
Magnesium	6.624±2.562	2.431±1.124	0.001
Chloride	72.421±6.561	78.432±6.112	0.134
Calcium	3.431±0.456	4.428± 1.141	0.005

DISCUSSION:

Most likely there is also an increase in circulatory catecholamines in patients with an unconfirmed myocardial infarction. Patients with anterior infarction and those with larger infarcts tended to have more hypokalemic episodes than those with inferior and those with smaller infarcts. Such findings raise the possibility that the association between infarct size and the occurrence of severe ventricular arrhythmias, which has previously been could, to some extent, depend on the more frequent development of hypokalemia in patients with large infarcts [7]. Our results fit with the hypothesis that a higher sympathetic tone increases the risk for development of hypokalemia. On the other hand, a higher initial heart rate did not significantly increase the risk for development of hypokalemia [8].

MI patients were found to have hyponatremia which could be attributed to the fact that non osmotic secretion of vasopressin impairs the water secretion causing dilutional hyponatremia [9]. AVP or vasopressin is known to regulate tone and cardiac contraction and may adversely affect cardiac hemodynamics and myocardial remodelling. Hyponatremia on admission or early development of hyponatremia in patients with acute STelevation myocardial infarction is an independent predictor of 30-day mortality, and prognosis worsens with the severity of hyponatremia [10].

CONCLUSION

It is concluded that reduction in sodium level was assessed only in patients with AMI as compared to healthy persons. Estimation of serum electrolyte is of utmost importance for diagnosis and prognosis of AMI.

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