PARIPEX - INDIAN JOURNAL OF RESEARCH | Volume - 12 | Issue - 03 |March - 2023 | PRINT ISSN No. 2250 - 1991 | DOI : 10.36106/paripex

ORIGINAL RESEARCH PAPER

LEVEL OF SERUM SODIUM AND SERUM POTASSIUM IN ACUTE MYOCARDIAL INFARCTION

Clinical Biochemistry

KEY WORDS: Myocardial Infarction, CVD, Electrolytes, Hypokalemia, Hyponatremia.

Shivam Agarwal	Department of Medical Laboratory Technology, School of Health Sciences, CSJMUKanpur
Dr. Praveen Katiyar	Assistant Professor School of Health Sciences, CSJMU Kanpur
Dr. Awadhesh Kumar Sharma	Associate Professor LPS Institute of Cardiology, & GSVM Medical College Kanpur.
March 1 - 1 To Constitution	

Myocardial Infarction (MI), commonly known as heart attack, is one of the most frequent and non-communicable or chronic diseases that cannot be passed from one person to another person. Myocardial infarction is a dire complication of CVD causing, an increasing number of mortalities worldwide. Myocardial infarction is a serious medical emergency that occurs due to blood flow stopping at the tone of the cardiac arteries which supply blood to the heart causing damage to the myocardial thus increasing myocardial metabolic demand, and decreasing the delivery of oxygen and nutrients to the myocardium via the coronary circulation. Electrolytes such as potassium (K) and sodium (Na) are considered to be major determinates of electrophysiological properties of the myocardium membrane and their imbalance in concentration after MI is common. Serum sodium (Na) and potassium (K) imbalances are fairly common in acute phase of MI patients. Hyponatremia is defined as serum sodium level decreases their normal range <136mmol/L. Hyponatremia is electrolyte abnormality that has been associated with poor outcomes in AMI. Hyponatremia was present on admission in 20.9% of the patients and 60.7% had hyponatremia during the first seven days of hospitalization. Hypokalemia is defined as serum potassium level decreases their normal range <3.5 mmol/L.

INTRODUCTION

ABSTRACT

Cardiovascular disease (CVD) is a global public health associated problem contributing to 30% of global mortality and 10% of the global disease burden. Myocardial Infarction (MI) is one of the leading causes of mortality and morbidity across the world. According to the WHO the prevalence of Myocardial Infarction is more in middle income world and it is well known that males are more commonly affected then females.¹

In India the prevalence ischemic heart diseases among adult were estimated at 97.5 per 1000 population in the urban and 27.1 per 1000 in rural.³ The burden of Myocardial Infraction is increasing in both low income and middle- and- high income countries because of ageing populations, but the burden is highly increase in low-middle income countries because due to much larger population sizes and widespread exposure to increasing levels of risk factor such as unhealthy diet, obesity, tobacco, physical inactivity, diabetes etc.³

Several metabolic changes occur in myocardial infarction, which include increased plasma concentration catecholamines, glucose, free fatty acids, cortisol and cyclic-AMP. There is also decreased triglycerides and initial decrease insulin concentration, followed by an early return to normal value.⁴

Myocardial Infraction

Myocardial Infraction (MI), also known as Heart attack, is one of the most frequent noncommunicable and chronic diseases that cannot passed from one person to another. It worsens with time, affecting the heart's flow rate. It is serious medical emergency that occur due to the blockage of coronary arteries which supply blood to the heart. Due to which, lacks of oxygen to myocardium (hypoxia) causes characteristics chest pain and death of myocardial tissues.⁶

The term AMI (Acute Myocardium Infarction) is defined as a disturbance between myocardial oxygen supply and requirement which result in injury to myocytes and following death of myocytes. The interference of blood supply to heart leads to the gross necrosis of myocardium. Total loss of coronary blood flow results in a clinical syndrome called as associated with ST segment elevation AMI (STE AMI). Partial loss of coronary perfusion is generally scanty severe and known as non-ST-elevation myocardial infarction (NST AMI). The damage of myocardium is permanent because cardiac muscle cannot regenerate and dead tissue is replaced with nonfunctional fibrous tissue.⁶

The WHO European Myocardial Infarction Register criteria were based on clinical history, electrocardiogram results, and enzyme measurements.

- The ECG shows clear abnormal Q waves and ST segment elevation or depression.
- A history of conventional or atypical angina pectoris, as well as ambiguous ECG abnormalities and increased enzymes.
- Fatal cases with naked eye indications of recent heart attack or recent coronary arteries blockage at necropsy, whether abrupt or not (hemorrhage into an atheromatous plaque or embolism, antemortem thrombus).⁷

Symptoms

Cheat Pain, Jaw pain, Sweating, Dizziness, Fatigue, Lightheadedness, Cold sweat, Heartburn, Shortness of breath, Shoulder discomfort, Anxiety, Chest pressure.

Risk Factor

Life style: - Smoking (including secondhand smoke), Junk food, Alcohol, Job stress, No Physical activity, Socioeconomic status, Air pollution, Family history and obesity etc.

Genetics:-The following genes have an association with heart attack: SORT1, MIA3, PCSK9, 2B, COL4A1, MRAS, WDR12, MIA3, ABO, ADAMTS7, SMG6, SNF8, SLC5A3.

Others: - Combined oral contraceptive pills, Use of nonsteroidal anti-inflammatory drugs (NSAISs), Endometriosis, Acute and chronic infection, Late consequence of Kawasaki disease.

Etiology of MI

- 1) Myocardialischemia
- Non-atherosclerotic causes—arteritis, coronary ostial stenosis, coronary vasospasm, embolism, thrombotic

PARIPEX - INDIAN JOURNAL OF RESEARCH | Volume - 12 | Issue - 03 |March - 2023 | PRINT ISSN No. 2250 - 1991 | DOI : 10.36106/paripex

diseases, trauma and outside compression.

- 3) Acute Plaque rupture:-
- $1. \ \ Superimposed \ coronary \ thrombosis$
- 2. Intramural hemorrhage

Serum Electrolytes

Electrolyte is the medical term for salt that is present in blood and others body fluid like CSF, Amniotic fluid, abdominal fluid and balance of these is essential for normal function of cells and organs. There are many several common electrolytes found in blood and body fluid. The balance is significantly important for nerve impulses, muscle function, hydration and pH level. Serum Sodium and Serum Potassium are considered to be the major determinants of electrophysiological properties of myocardial membrane.⁸ Electrolytes play an important role in cellular function, Active transport (Sodiumpotassium pump, calcium pump and Potassium hydrogen pump), intermediary metabolism, enzyme activities and electrical gradients.⁹

Several electrolyte changes have been reported to follow AMI. These electrolyte levels, being modifiable hold an important role in altering the prognosis of such myocardial infarction (MI) patients.¹⁰

Sodium is the most abundant extracellular cation and positively charged electrolytes which helps to maintain fluid levels in the body and facilitates neuromuscular functioning. Serum Sodium disturbance has been also recorded in early phase of Acute Myocardial Infarction in some studies. Normal plasma or serum sodium concentration is 133-146mmol/L. Hyponatremia is decreased sodium level <133 mmol/L in blood with hospitalized patients of AMI. In acute myocardial infraction, non-osmotic release of vasopressin may occur due to the acute development of left ventricular dysfunction; in response to major stress, nausea and pain the most common mechanisms of hyponatremia in adults; or in response to the administration of analgesics and diuretics. Which leads to low sodium level in blood. Hyponatremia may be further disturbed in acute myocardial infarction by the complementary activation of the renin angiotensin system and increased catechocholamine production.¹¹Hyponatremia was present on admission in 20.9% of the patients and 60.7%had hyponatremia during the first seven days of hospitalization.

Potassium is the most abundant intracellular cation and positively charged electrolytes. Serum potassium levels are tightly controlled in humans. Serum potassium disturbance has been also recorded in early phase of Acute Myocardial Infarction in some studies. Normal serum or plasma concentration is 3.5 to 5.0 mmol/L through sophisticated at the cellular, molecular and organ level.¹² Potassium is very important for regulating heartbeat and muscle function. Heart requires potassium for depolarization and contraction. Changes in extracellular and intracellular serum potassium levels modify the electrophysiological properties of the resting membrane potential of the myocardium and subsequently contribute to the occurrence of ventricular arrhythmia.¹⁴ Hypokalemia is a condition in which the serum potassium level is < 3.5 mmol/L and occurs as a determent of excessive morbidity in such patients. Hypokalemia may affect the resting membrane potential of the myocardium, repolarization and relative refractory time, and conduction velocity.¹⁵ Several studies have shown association between hypokalemia with increased occurrence of cardiac arrhythmias in Acute Myocardial Infarction patients.¹⁶ Hypokalemia prolongs ventricular repolarization, often with prominent U waves. This hypokalemia is mostly due to the stress induced catecholamine response that role as hormones, in such of AMI causing increased potassium uptake into cells.¹⁶

Serum sodium (Na) and potassium (K) imbalances are fairly common in acute phase of MI patients. Hyponatremia is defined as serum sodium level decreases their normal range <136mmol/L. Fall in sodium level on day of admission in acute myocardial infarction was observed in various study. Hyponatremia is a common electrolyte abnormality which associated with poor outcomes in acute myocardial infarction (AMI) and several others condition. Hyponatremia is an indicator of heart attack. Serum sodium level is prognostic indicator i.e., increase in sodium level after initial fall of serum on day of MI was indicative of clinical improvement.¹⁶

Hypokalemia is defined as serum potassium level decreases their normal range < 3.5 mmol/L. Hypokalemia prolongs ventricular repolarization, frequently with important U waves. The occurrence of ventricular fibrillation has been exact expected five-fold higher in cases induced catecholamine response that function as hormones, in such patients causing increased potassium uptake into cells. Therefore, estimation of sodium and potassium levels in AMI patients can help assess their prognosis.

Table No. 01 Previous Researcher Find Disturbance In Serum Electrolyte Level In Acute Myocardial Infarction Patients.

Study of Study of SerumWaliM V, Yatiraj S. Study of serum sodium and potassium in acute myocardial infarction. J Clin Acute Diagn Res. 2014Hypokal emia Hyponat remiaPotassium in Acute Diagn Res. 2014Boy;8(11):CC07-9. doi: 10.7860/JCDR/2014/10417.5 083. Epub 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227.2016Hypokal emiaElectrolyte LevelLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K. Changes in Acute Level Changes in Acute Myocardial Infarction Patients as Compared to Patients 2016 pp. 9-18. doi: 10.11648/j.ab.20160402.11 Gaza Strip2017Hypokal emia Hyponat remiaA Clinical Serum electrolytes (NA, K, CL) and Electrolytes Nator Med. Healthc. 2017; 4(61), aserum magnesium levels in infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), aserum apatients of acute myocardial infarction patients. International patients of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Oct 2019Hyponat remiaSerum totation patientsSerum The European Society of Cardiology 2018 Article remia2019Hyponat remia	Title	Publication Detail	Year	Result
Serum serum sodium and potassium in acute Potassium in myocardial infarction. J Clin Acute Diagn Res. 2014 Myocardial Nov;8(11):CC07-9. doi: Infarction 10.7860/JCDR/2014/10417.5 083. Epub 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227. Electrolyte Lamia Fasail Abu Marzoq, Level Wafaa Hamad Jaber, Dina K. Changes in Halaid Azzam. Electrolyte Acute Level Changes in Acute Myocardial Infarction Infarction Patients as Compared to Patients as Healthy Individuals in Khan Compared to Younis Governorate, Gaza Healthy Strip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, Khan Younis 2016 pp. 9-15. doi: Governorate, 10.11648/j.ab.20160402.11 Gaza Strip A Clinical Parmar KB, Sharma RN, Shah Serum electrolytes (NA, K, CL) and Electrolytes serum magnesium levels in (na, K, Cl) patients of acute myocardial And Serum infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients Of Acute Myocardial infarction in in myocardial myocardial infarction infarction patients. International patients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of potassium Cardiology 2018 Article levels and reuse guidelines: mortality of sagepub.com/journals-	Study of	WaliM V Yatirai S Study of	2014	Hypokal
SortianSortian Sortian acute myocardial infarction. J Clin AcuteHyponat remiaPotassium in AcuteDiagn Res. 2014Hyponat remiaMyocardialInors(8(1)):CC07-9. doi: 10.7860/JCDR/2014/10417.5 083.Epub 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227.2016Hyponat remiaElectrolyteLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K. Changes in Halaid Azzam. Electrolyte Acute2016Hyponat remiaMyocardialMyocardial Infarction InfarctionPatients as Compared to Patients as Compared to 10.11648/j.ab.20160402.11 Gaza Strip2016 pp. 9-15. doi: Governorate, Gaza 10.11648/j.ab.20160402.11 Gaza Strip2017Hypokal emia emia Hyponat remiaStudy OfJ. A clinical study of serum electrolytes (NA, K, CL) and serum magnesium levels in nfarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients of 10.18410/jebmh/2017/736 AcuteOct Hypokal emia Hyponat remiaElectrolytesS., Hariprasad; M., Basavaraj. Ournal of Advances in Medicine, [S.1], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Oct SerumSerumThe European Society of Cardiology 2018 Article remia2019Hyponat remiaremiaFile remia mortality of sagepub.com/journals-2019Hyponat remia	Serum	serum sodium and	2011	emia
Jordan Hard Potassium in Diagn Res. 2014Tryphate remiaPotassium in MyocardialDiagn Res. 2014remiaMyocardialNov;8(11):CC07-9. doi: 10.7860/JCDR/2014/10417.5 083. Epub 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227.2016ElectrolyteLamia Fasail Abu Marzoq, LevelWafaa Hamad Jaber, Dina K. Halaid Azzam. Electrolyte Accute2016MyocardialMyocardial Infarction Patients as Compared to Patients of acute myocardial A Clinical Parmar KB, Sharma RN, Shah Study Of J. A clinical study of serum electrolytes (NA, K, CL) and serum magnesium levels in nafarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients Of 10.18410/jebmh/2017/736 Acute Myocardial Infarction patients. International patients of Advances in Medicine, [S.I.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Oct 2019Hyponat remia remiaSerumThe European Society of cardiology 2018 Article remia2019Hyponat remia	Sodium and	potassium in acute		Hyponat
ActuteDiagn Res. 2014Diagn Res. 2014MyocardialNov;8(11):CC07-9. doi:10.7860/JCDR/2014/10417.5Infarction10.7860/JCDR/2014/10417.5083. Epub 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227.2016ElectrolyteLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K.2016Changes inHalaid Azzam. Electrolyte Level Changes in AcuteHyponat remiaMyocardialMyocardial Infarction Patients as Compared to Patients as Healthy Individuals in Khan Compared to Younis Governorate, Gaza HealthyStrip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, Khan Younis 2016 pp. 9-15. doi: Governorate, 10.11648/j.ab.20160402.11 Gaza Strip2017A Clinical ElectrolytesParmar KB, Sharma RN, Shah emia2017A Clinical Serum electrolytes (NA, K, CL) and Electrolytes2017; 4(61), Emit Sof acute myocardial And SerumHealthc. 2017; 4(61), Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI:Oct 2018 emia Hyponat remiaElectrolyte S., Hariprasad; M., Basavaraj. Myocardial InfarctionOct Hypokal emia Hyponat remiaElectrolyte S., Hariprasad; M., Basavaraj. Journal of Advances in Medicine, [S.1], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Ott 2019Serum potassium Cardiology 2018 Article levels and rese guidelines: mortality of sagepub.com/journals-2019Hyponat remiaCardiology 2018 Article remia2019	Potassium in	myocardial infarction I Clin		remia
IndividualsDragn Res. D14MyocardialNov;8(11):CC07-9. doi:Infarction10.7860/JCDR/2014/10417.5083. Epub 2014 Nov 20.PMID: 25584210; PMCID:PMC4290227.ElectrolyteLawia Fasail Abu Marzoq,2016HypokalWafaa Hamad Jaber, Dina K.Changes inHalaid Azzam. ElectrolyteAcuteLevel Changes in AcuteMyocardialMyocardial InfarctionInfarctionPatients as Compared toPatients asHealthy Individuals in KhanCompared toYounis Governorate, GazaHealthyStrip. Advances inIndividuals in Biochemistry. Vol. 4, No. 2,Zhan Younis2016 pp. 9-15. doi:Governorate,10.11648/j.ab.20160402.11Gaza StripParmar KB, Sharma RN, ShahSerumelectrolytes (NA, K, CL) andserum electrolytes (NA, K, CL) andserum magnesium levels in(na, K, Cl)patients of acute myocardialInfarctionPatients Of10.18410/jebmh/2017/736AcuteMyocardialInfarctionElectrolyteS., Hariprasad; M., Basavaraj.OctMyocardialInfarctionpatientsJournal of Advances inMedicine, [S.1], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society ofcardiology 2018 Articlelevels andrewiaCardiology 2018 Articlelevels and <td></td> <td>Diagn Res 2014</td> <td></td> <td>Tenna</td>		Diagn Res 2014		Tenna
MyocardialNov,o(11).CODR/29.401.Infarction10.7860/JCDR/2014/10417.5 083. Epub 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227.2016ElectrolyteLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K. Changes in Acute2016LevelWafaa Hamad Jaber, Dina K. Changes in Alaid Azzam. Electrolyte AcuteLevel Changes in Acute Myocardial Infarction Patients as Compared to Patients as Compared to Younis Covernorate, Gaza Healthy Strip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, 2016 pp. 9-15. doi: Governorate, 10.11648/j.ab.20160402.11 Gaza Strip2017A Clinical Serum electrolytes (NA, K, CL) and serum melectrolytes (NA, K, CL) and patients of acute myocardial And Serum infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), 3691-3695. DOI: Patients Of Acute Myocardial InfarctionOctHypokal emia emiaElectrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. DOI: Patients Of Acute Myocardial InfarctionOctHypokal emia Hyponat remiaElectrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. DOI: Patients. International myocardial infarction in myocardial infarction infarctionOctHypokal emia Hyponat remiaElectrolyte dysfunction in myocardial myocardial infarction2019Hyponat remiaElectrolyte dysfunction in myocardial mocalidi offaction mocalidi offaction mocalidi offaction mocalidi offaction aday-3933.2019Hyponat remiaSerum potassium cardiology 2018 Article <br< td=""><td>Muccardial</td><td>Norreg(11):CC07.9 doi:</td><td></td><td></td></br<>	Muccardial	Norreg(11):CC07.9 doi:		
Infarction10.780/19/Div 2014 Nov 20. PMID: 25584210; PMCID: PMC4290227.ElectrolyteLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K. Changes in Halaid Azzam. Electrolyte Level Changes in Acute Myocardial Infarction2016 Hypokal emia Hyponat remiaMyocardialMyocardial Infarction Infarction Patients as Compared to Younis Governorate, Gaza Healthy Strip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, 2016 pp. 9-15. doi: Governorate, Governorate, 10.11648/j.ab.20160402.11 Gaza Strip2017 Hypokal emia emiaA Clinical Electrolytes serum electrolytes (NA, K, CL) and serum electrolytes (NA, K, CL) and serum magnesium levels in infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients of Acute Myocardial Infarction2018 Hypokal emia Hyponat remiaElectrolytes S., Hariprasad; M., Basavaraj. Oct atients. International patientsOct Hypokal emia Hyponat remiaElectrolyte S., Hariprasad; M., Basavaraj. DOI: PatientsOct Hypokal emia Hyponat remiaElectrolyte S., Hariprasad; M., Basavaraj. DOI: PatientsOct Hypokal emia Hyponat remiaElectrolyte Mysocardial in myocardial mifarctionS., Hariprasad; M., Basavaraj. Oct Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.2019 Hyponat remiaSerum potassiumThe European Society of Cardiology 2018 Article rewis adgepub.com/journals-2019 Hyponat remia	Information	10 7960/ICDP/2014/10417 E		
DescriptionDescriptionDescriptionPMID: 25584210; PMCID: PMC4290227.2016Hypokal emiaElectrolyteLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K. Changes in Acute2016Hypokal emiaLevelWafaa Hamad Jaber, Dina K. Changes in AcuteLevel Changes in AcuteHyponat remiaMyocardialMyocardial Infarction Patients as Datients as Healthy Individuals in Khan Compared to Patients as 2016 pp. 9-15. doi: 10.11648/j.ab.20160402.112017Hypokal emiaGovernorate, Governorate, I. 1.11648/j.ab.20160402.112017Hypokal emiaGaza StripA Clinical Patients of acute myocardial infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI:2017Hypokal emiaElectrolytes Myocardial InfarctionS., Hariprasad; M., Basavaraj. DOI:Oct Patients of acute myocardial and Serum moralid myocardial infarction in myocardial infarctionOct Hypokal emiaHypokal emiaElectrolyte S., Hariprasad; M., Basavaraj. DOI:Oct Patients. International myocardial infarctionHyponat remiaElectrolyte Sat9-3933.Serum Cardiology 2018 Article remia2019Hyponat remiaFerum Potassium Cardiology 2018 Article levels and reuse guidelines: mortality of sagepub.com/journals-2019Hyponat remia	marchon	10.1800/JCDR/2014/10411.5		
PMC/200227.ElectrolyteLamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K.LevelWafaa Hamad Jaber, Dina K.Changes inHalaid Azzam. Electrolyte Level Changes in AcuteMyocardialMyocardial InfarctionInfarctionPatients as Compared to Healthy Individuals in Khan Compared toCompared toYounis Governorate, Gaza HealthyHealthyStrip. Advances in 10.11648/j.ab.20160402.11Governorate, Governorate, 10.11648/j.ab.20160402.11Gaza StripA ClinicalParmar KB, Sharma RN, Shah serum electrolytes (NA, K, CL) and serum magnesium levels in nfarction. J. Evid. Based MagnesiumMagnesiumMed. Healthc. 2017; 4(61), 10.18410/jebmh/2017/736AcuteS., Hariprasad; M., Basavaraj. Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.SerumThe European Society of Cardiology 2018 Article remiaPatientsCardiology 2018 Article remiaInfarctionThe European Society of Cardiology 2018 Article remia		DMID: 25594210; DMCID:		
Electrolyte Lamia Fasail Abu Marzoq, Level Wafaa Hamad Jaber, Dina K. Changes in Halaid Azzam. Electrolyte Acute Level Changes in Acute Myocardial Myocardial Infarction Infarction Patients as Compared to Patients as Mealthy Individuals in Khan Compared to Younis Governorate, Gaza Healthy Strip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, Khan Younis 2016 pp. 9-15. doi: Io.11648/j.ab.20160402.11 Gaza Strip A Clinical Parmar KB, Sharma RN, Shah Study Of J. A clinical study of serum electrolytes (NA, K, CL) and serum alectrolytes (NA, K, CL) and Serum Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients Of Acute Myocardial Infarction I0.18410/jebmh/2017/736 Acute Myocardial Infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of Cardiology 2018 Article levels and reuse guidelines: mortality of sagepub.com/journals-		PMC/200227		
Liectrolyte Landa Fasal Abu Marzoq, 2016 Hypokal Level Wafaa Hamad Jaber, Dina K. Changes in Halaid Azzam. Electrolyte Acute Level Changes in Acute Hyponat Myocardial Infarction Patients as Compared to Patients as Healthy Individuals in Khan Compared to Younis Governorate, Gaza Healthy Strip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, Khan Younis 2016 pp. 9-15. doi: Governorate, 10.11648/j.ab.20160402.11 Gaza Strip A Clinical Parmar KB, Sharma RN, Shah Study Of J. A clinical study of serum electrolytes (NA, K, CL) and serum electrolytes (NA, K, CL) and Electrolytes serum magnesium levels in (na, K, Cl) patients of acute myocardial And Serum infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), 3691-3695. DOI: Patients Of 10.18410/jebmh/2017/736 Acute Myocardial Infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum Cardiology 2018 Article levels and reuse guidelines: mortality of sagepub.com/journals-	Til a atrua lanta	FMC4230221.	0010	TT-mailes1
LevelWafaa Hamad Jaber, Dina K. Halaid Azzam. Electrolyte Level Changes in Acuteemila Hyponat remiaAcuteLevel Changes in AcuteHyponat remiaMyocardialMyocardial InfarctionPatients as Compared to Healthy Individuals in Khan Compared to Younis Governorate, Gaza HealthyHealthy Individuals in Khan Strip. Advances in 10.11648/j.ab.20160402.11Hyponat remiaGovernorate, Governorate, Individuals in Biochemistry. Vol. 4, No. 2, 2016 pp. 9-15. doi: Governorate, I0.11648/j.ab.20160402.112017Hypokal emiaA ClinicalParmar KB, Sharma RN, Shah Study Of J. A clinical study of serum patients of acute myocardial infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), 3691-3695. DOI: Patients Of Acute2018Hyponat remiaBagnesium Myocardial InfarctionS., Hariprasad; M., Basavaraj. DOct DOctOct Hypokal emia Hyponat remiaElectrolyte S., Hariprasad; M., Basavaraj. Journal of Advances in Medicine, [S.I.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.2019Hyponat remiaSerum potassium cardiology 2018 Article reuse guidelines: mortality of sagepub.com/journals-2019Hyponat remia	Liectrolyte	Lamia Fasali Abu Marzoq,	2016	нурока
Changes in AcuteHalaid Azzam. Electrolyte Level Changes in AcuteHyponat remiaAcuteLevel Changes in AcuteremiaMyocardialMyocardial InfarctionremiaInfarctionPatients as Compared toremiaPatients asHealthy Individuals in KhanremiaCompared toYounis Governorate, GazaremiaHealthyStrip. Advances instrip. Advances inIndividuals inBiochemistry. Vol. 4, No. 2,remiaKhan Younis2016 pp. 9-15. doi:Governorate,Governorate,10.11648/j.ab.20160402.11emiaGaza Strip10.11648/j.ab.20160402.11emiaA ClinicalParmar KB, Sharma RN, Shah2017Serumelectrolytes (NA, K, CL) and serum magnesium levels in infarction. J. Evid. BasedHyponat remiaAnd Seruminfarction. J. Evid. BasedremiaMagnesiumMed. Healthc. 2017; 4(61), levels In3691-3695. DOI:Patients Of Acute10.18410/jebmh/2017/736emiaAcutemyocardial infarctionmyocardial infarctionHyponat remiaInfarctionpatients. International journal of Advances in Medicine, [S.1], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.2019Hyponat remiaSerumThe European Society of potassium2019Hyponat remiaPotassiumCardiology 2018 Article remiaremiaInfarctionreuse guidelines: sagepub.com/journals-2019Hyponat remia	TeAel	Wafaa Hamad Jaber, Dina K.		emia
AcuteLevel Changes in AcuteremiaMyocardialMyocardial InfarctionremiaInfarctionPatients as Compared toPatients as Compared toPatients asHealthy Individuals in KhanCompared toCompared toYounis Governorate, GazaHealthyHealthyStrip. Advances inIndividuals in Biochemistry. Vol. 4, No. 2,Khan Younis2016 pp. 9-15. doi:Governorate,10.11648/j.ab.20160402.11Gaza StripParmar KB, Sharma RN, ShahA ClinicalParmar KB, Sharma RN, ShahSerumelectrolytes (NA, K, CL) andelectrolytesserum magnesium levels in(na, K, Cl)patients of acute myocardialAnd Seruminfarction. J. Evid. BasedMagnesiumMed. Healthc. 2017; 4(61),Levels In3691-3695. DOI:Patients Of10.18410/jebmh/2017/736AcutemyocardialMyocardialmyocardial infarctioninfarctionpatients. InternationalpatientsJournal of Advances inMedicine, [S.1], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society of potassiumCardiology 2018 Articlelevels andreuse guidelines: mortality ofsagepub.com/journals-	Changes in	Halaid Azzam. Electrolyte		Hyponat
MyocardialMyocardial InfarctionInfarctionPatients as Compared toPatients asHealthy Individuals in KhanCompared toYounis Governorate, GazaHealthyStrip. Advances inIndividuals inBiochemistry. Vol. 4, No. 2,Khan Younis2016 pp. 9-15. doi:Governorate,10.11648/j.ab.20160402.11Gaza StripInticicalA ClinicalParmar KB, Sharma RN, ShahStudy OfJ. A clinical study of serumelectrolytes (NA, K, CL) andHyponatremiaserum magnesium levels in(na, K, Cl)patients of acute myocardialAnd Seruminfarction. J. Evid. BasedMagnesiumMed. Healthc. 2017; 4(61),Levels In3691-3695. DOI:Patients Of10.18410/jebmh/2017/736AcutemyocardialMyocardialinfarctioninfarctionpatients. InternationalpatientsJournal of Advances inMedicine, [S.1], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society ofpotassiumCardiology 2018 Articlelevels andreuse guidelines:mortality ofsagepub.com/journals-	Acute	Level Changes in Acute		remia
InfarctionPatients as Compared toPatients asHealthy Individuals in KhanCompared toYounis Governorate, GazaHealthyStrip. Advances inIndividuals inBiochemistry. Vol. 4, No. 2,Khan Younis2016 pp. 9-15. doi:Governorate,10.11648/j.ab.20160402.11Gaza StripParmar KB, Sharma RN, ShahA ClinicalParmar KB, Sharma RN, ShahStudy OfJ. A clinical study of serumelectrolytes (NA, K, CL) andHyponatremiainfarction. J. Evid. BasedMagnesiumMed. Healthc. 2017; 4(61),Levels In3691-3695. DOI:Patients Of10.18410/jebmh/2017/736AcuteMyocardialMyocardialmyocardial infarctioninfarctionpatients. InternationalpatientsJournal of Advances inMedicine, [S.1.], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society ofpotassiumCardiology 2018 Articlelevels andreuse guidelines:mortality ofsagepub.com/journals-	Myocardial	Myocardial Infarction		
Patients asHealthy Individuals in Khan Younis Governorate, Gaza Strip. Advances in Individuals in Biochemistry. Vol. 4, No. 2, Khan YounisYounis Governorate, Gaza Strip. Advances in Biochemistry. Vol. 4, No. 2, Khan YounisHealthy Strip. Advances in Biochemistry. Vol. 4, No. 2, (Khan Younis)Hypola Reministry. Vol. 4, No. 2, Khan YounisA Clinical Gaza StripParmar KB, Sharma RN, Shah electrolytes (NA, K, CL) and patients of acute myocardial infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In Patients of 10.18410/jebmh/2017/736 Acute Myocardial InfarctionHypokal emia Hyponat remiaElectrolyte S., Hariprasad; M., Basavaraj. Oct infarctionOct Hypokal emia Hyponat remiaElectrolyte Sugstantion S., Hariprasad; M., Basavaraj. Outal infarction infarctionHypokal emia Hyponat remiaElectrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. Oct Electrolyte dysfunction in myocardial infarction infarctionHypokal emia Hyponat remiaSerum patientsJournal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.2019 2019Serum potassium cardiology 2018 Article rewia mortality of sagepub.com/journals-2019 2019Hyponat remia	Infarction	Patients as Compared to		
Compared to HealthyYounis Governorate, Gaza Strip. Advances in Biochemistry. Vol. 4, No. 2, Khan YounisStrip. Advances in Biochemistry. Vol. 4, No. 2, Khan YounisHypola 2016 pp. 9-15. doi: Governorate, 10.11648/j.ab.20160402.11Gaza StripA Clinical Gaza StripParmar KB, Sharma RN, Shah emia2017 emiaA Clinical Study Of Serum LectrolytesParmar KB, Sharma RN, Shah electrolytes (NA, K, CL) and patients of acute myocardial infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients Of Acute Myocardial InfarctionHyponat remiaElectrolyte SuperviseS., Hariprasad; M., Basavaraj. Oct Electrolyte dysfunction in myocardial infarction in myocardial infarctionHypokal emia Hyponat remiaElectrolyte dysfunction in myocardial journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Oct 2019Hyponat remia remiaSerum potassium cardiology 2018 Article reuse guidelines: mortality of sagepub.com/journals-2019Hyponat remia	Patients as	Healthy Individuals in Khan		
HealthyStrip. Advances in Biochemistry. Vol. 4, No. 2, Khan YounisStrip. Advances in Biochemistry. Vol. 4, No. 2, Khan YounisBiochemistry. Vol. 4, No. 2, Science of the p. 9-15. doi: Governorate, IO.11648/j.ab.20160402.11Hypokal emiaGaza StripA ClinicalParmar KB, Sharma RN, Shah a Clinical Study of serum electrolytes (NA, K, CL) and patients of acute myocardial infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients of 10.18410/jebmh/2017/736Hypokal emia remiaElectrolyte S., Hariprasad; M., Basavaraj. Oct Myocardial infarctionOct Electrolyte dysfunction in myocardial infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerum DotassiumThe European Society of remia2019Hyponat remia	Compared to	Younis Governorate, Gaza		
Individuals in Biochemistry. Vol. 4, No. 2, Khan Younis 2016 pp. 9-15. doi: Governorate, 10.11648/j.ab.20160402.11 Gaza Strip A Clinical Study Of Serum Electrolytes NA, Cl) patients of acute myocardial And Serum infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In Seque Myocardial Infarction Electrolyte S., Hariprasad; M., Basavaraj. Cardiology 2018 Article patients Serum The European Society of potassium Cardiology 2018 Article Internation Internation Cardiology 2018 Article Internation Sagepub.com/journals- Internation Internat	Healthy	Strip. Advances in		
Khan Youms2016 pp. 9-15. doi:Governorate,10.11648/j.ab.20160402.11Gaza StripParmar KB, Sharma RN, Shah2017A ClinicalParmar KB, Sharma RN, Shah2017Study OfJ. A clinical study of serumemiaSerumelectrolytes (NA, K, CL) andHyponatElectrolytesserum magnesium levels inremia(na, K, Cl)patients of acute myocardialHyponatAnd Seruminfarction. J. Evid. BasedremiaMagnesiumMed. Healthc. 2017; 4(61),serum agnesion levels inLevels In3691-3695. DOI:serumPatients Of10.18410/jebmh/2017/736emiaAcutemyocardialinfarction inInfarctionElectrolyte dysfunction in2018ElectrolyteS., Hariprasad; M., Basavaraj.OctAcuteJournal of Advances inHyponatmodicine, [S.1.], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society ofSerumCardiology 2018 Article2019levels andreuse guidelines:remiamortality ofsagepub.com/journals-2019	Individuals in	Biochemistry, Vol. 4, No. 2,		
Governorate, Gaza Strip10.11648/j.ab.20160402.11Gaza StripParmar KB, Sharma RN, Shah Study Of2017Hypokal emiaA ClinicalParmar KB, Sharma RN, Shah J. A clinical study of serum electrolytes (NA, K, CL) and patients of acute myocardial And Serum infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI:Hyponat remiaPatients Of Acute Myocardial Infarction10.18410/jebmh/2017/736Hypokal emiaElectrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. DOI:Oct 2018Hypokal emiaElectrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. DOI:Oct 2018Hypokal emiaJournal of Advances in Medicine, [S.1], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Serum Cardiology 2018 Article remia2019Hyponat remia	Khan Younis	2016 pp. 9-15. doi:		
Gaza StripHypokalA ClinicalParmar KB, Sharma RN, Shah2017A ClinicalParmar KB, Sharma RN, Shah2017Study OfJ. A clinical study of serumemiaSerumelectrolytes (NA, K, CL) andHyponatElectrolytesserum magnesium levels inremia(na, K, Cl)patients of acute myocardialremiaAnd Seruminfarction. J. Evid. BasedremiaMagnesiumMed. Healthc. 2017; 4(61),serumLevels In3691-3695. DOI:3691-3695. DOI:Patients Of10.18410/jebmh/2017/736emiaAcutemyocardialmyocardial infarctionInfarctionElectrolyte dysfunction in2018ElectrolyteS., Hariprasad; M., Basavaraj.OctAgsinctionElectrolyte dysfunction in2018in myocardialmyocardial infarctionHyponatinfarctionpatients. InternationalHyponatpatientsJournal of Advances inMedicine, [S.1], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society of potassium2019Cardiology 2018 Articleremialevels andreuse guidelines: sagepub.com/journals-2019	Governorate,	10.11648/j.ab.20160402.11		
A Clinical Parmar KB, Sharma RN, Shah 2017 Hypokal Study Of J. A clinical study of serum emia Serum electrolytes (NA, K, CL) and Hyponat Electrolytes serum magnesium levels in remia And Serum infarction. J. Evid. Based remia Magnesium Med. Healthc. 2017; 4(61), remia Levels In 3691-3695. DOI: Patients Of 10.18410/jebmh/2017/736 Acute 3691-3695. DOI: Patients of Hypokal Myocardial Infarction emia Infarction Electrolyte dysfunction in emia Seysunction Electrolyte dysfunction in 2018 infarction patients. International Hyponat patients Journal of Advances in Hyponat Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of 2019 Hyponat potassium Cardiology 2018 Article remia remia levels and reuse guidelines: emia remia	Gaza Strip			
Study OfJ. A clinical study of serum electrolytes (NA, K, CL) and serum magnesium levels in patients of acute myocardial And Serum infarction. J. Evid. Based Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI:emia Hyponat remiaPatients Of Patients Of Acute Myocardial Infarction10.18410/jebmh/2017/736 Levels In Serum agnesium (No.18410/jebmh/2017/736Hypokal emiaElectrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. Oct Electrolyte dysfunction in in myocardial infarction patients. International patientsOct Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerum potassiumThe European Society of cardiology 2018 Article rewia remia2019Hyponat remia	A Clinical	Parmar KB, Sharma RN, Shah	2017	Hypokal
Serumelectrolytes (NA, K, CL) and serum magnesium levels in patients of acute myocardial infarction. J. Evid. BasedHyponat remiaAnd SerummagnesiumMed. Healthc. 2017; 4(61), Levels InBasedImage: Serum agnesium levels in infarction. J. Evid. BasedImage: Serum agnesium levels in remiaImage: Serum agnesium levels in remiaPatients Of Patients Of Acute10.18410/jebmh/2017/736Image: Serum agnesium levels in agnesium levels In 3691-3695. DOI:Image: Serum agnesium levels in remiaImage: Serum agnesium levels in remiaElectrolyte dysfunctionS., Hariprasad; M., Basavaraj. Electrolyte dysfunction in in myocardial infarctionImage: Serum agnesium levels in patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerum potassiumThe European Society of reuse guidelines: remia2019 remiaHyponat remiaremia remia	Study Of	J. A clinical study of serum		emia
Electrolytes serum magnesium levels in patients of acute myocardial infarction. J. Evid. Based remia Magnesium Med. Healthc. 2017; 4(61), Levels In 3691-3695. DOI: Patients Of 10.18410/jebmh/2017/736 Acute 10.18410/jebmh/2017/736 Myocardial Infarction Infarction Electrolyte S., Hariprasad; M., Basavaraj. Oct Electrolyte dysfunction in in myocardial infarction Hypokal emia gatients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. remia Serum The European Society of potassium 2019 Serum The European Society of reuse guidelines: mortality of 2019	Serum	electrolytes (NA, K, CL) and		Hyponat
(na, K, Cl)patients of acute myocardial infarction. J. Evid. BasedMagnesiumMed. Healthc. 2017; 4(61), 3691-3695. DOI:Patients Of Patients Of Myocardial Infarction10.18410/jebmh/2017/736Acute Myocardial InfarctionS., Hariprasad; M., Basavaraj. Oct Electrolyte dysfunction in myocardial infarctionHypokal emia Hyponat remiaElectrolyte offarctionS., Hariprasad; M., Basavaraj. Oct Electrolyte dysfunction in myocardial infarctionHypokal emia Hyponat remiaSerum patientsJournal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerum potassiumThe European Society of reuse guidelines: mortality of sagepub.com/journals-2019Hyponat remia	Electrolytes	serum magnesium levels in		remia
And Seruminfarction. J. Evid. BasedMagnesiumMed. Healthc. 2017; 4(61),Levels In3691-3695. DOI:Patients Of10.18410/jebmh/2017/736AcuteNoncompositionMyocardialInfarctionInfarctionElectrolyte dysfunction inwyocardialElectrolyte dysfunction inin myocardialmyocardial infarctioninfarctionpatients. InternationalpatientsJournal of Advances inMedicine, [S.1.], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society of cardiology 2018 Articlelevels andreuse guidelines: sagepub.com/journals-	(na, K, Cl)	patients of acute myocardial		
Magnesium Levels InMed. Healthc. 2017; 4(61), 3691-3695. DOI:Patients Of Acute10.18410/jebmh/2017/736Myocardial Infarction10.18410/jebmh/2017/736Electrolyte dysfunction in myocardial infarctionS., Hariprasad; M., Basavaraj. Electrolyte dysfunction in myocardial infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerumThe European Society of cardiology 2018 Article sagepub.com/journals-2019Hyponat remia	And Serum	infarction. J. Evid. Based		
Levels In3691-3695. DOI:Patients Of Acute10.18410/jebmh/2017/736Myocardial Infarction10.18410/jebmh/2017/736Electrolyte dysfunctionS., Hariprasad; M., Basavaraj. Electrolyte dysfunction in myocardial infarctionOct 2018Hypokal emia myocardialElectrolyte dysfunction in myocardial infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerumThe European Society of reuse guidelines: mortality of sagepub.com/journals-2019Hyponat remia	Magnesium	Med. Healthc. 2017; 4(61),		
Patients Of Acute 10.18410/jebmh/2017/736 Acute Myocardial Infarction Infarction Electrolyte S., Hariprasad; M., Basavaraj. Oct dysfunction Electrolyte dysfunction in myocardial infarction 2018 infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Hyponat remia Serum The European Society of potassium 2019 Hyponat remia Ievels and mortality of sagepub.com/journals- 2019 Hyponat	Levels In	3691-3695. DOI:		
Acute Myocardial Infarction S., Hariprasad; M., Basavaraj. Electrolyte S., Hariprasad; M., Basavaraj. dysfunction Electrolyte dysfunction in in myocardial myocardial infarction infarction patients. International patients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum Serum The European Society of potassium Cardiology 2018 Article levels and reuse guidelines: mortality of sagepub.com/journals-	Patients Of	10.18410/jebmh/2017/736		
Myocardial Infarction S., Hariprasad; M., Basavaraj. Oct Hypokal Electrolyte S., Hariprasad; M., Basavaraj. Oct Hypokal dysfunction Electrolyte dysfunction in in myocardial myocardial infarction 2018 emia infarction patients. International patients. International remia patients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. ntr2-1176, sep. 2018. ISSN 2349-3933. Proprint Serum The European Society of potassium Cardiology 2018 Article reuse guidelines: 2019 Hyponat remia	Acute			
Infarction Hariprasad; M., Basavaraj. Oct Hypokal Electrolyte S., Hariprasad; M., Basavaraj. Oct Hypokal dysfunction Electrolyte dysfunction in 2018 emia in myocardial myocardial infarction 2018 emia patients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. remia 1172-1176, sep. 2018. ISSN 2349-3933. 2349-3933. Hyponat Serum The European Society of 2019 Hyponat potassium Cardiology 2018 Article remia remia levels and reuse guidelines: sagepub.com/journals- Image: Cardiology 2018 Article	Myocardial			
Electrolyte S., Hariprasad; M., Basavaraj. Oct Hypokal dysfunction Electrolyte dysfunction in 2018 emia in myocardial myocardial infarction 2018 emia infarction patients. International Hyponat remia patients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. Hyponat 1172-1176, sep. 2018. ISSN 2349-3933. Hyponat Serum The European Society of 2019 Hyponat potassium Cardiology 2018 Article remia remia levels and reuse guidelines: sagepub.com/journals- Hyponat	Infarction			
dysfunctionElectrolyte dysfunction in myocardial2018emia Hyponatin myocardialmyocardial infarction patients. International2018emia HyponatpatientsJournal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933.Hyponat remiaSerumThe European Society of potassium2019Hyponat remiaLevels and mortality ofreuse guidelines: sagepub.com/journals-2019Hyponat remia	Electrolyte	S., Hariprasad; M., Basavaraj.	Oct	Hypokal
in myocardial myocardial infarction infarction patients. International patients Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of potassium Cardiology 2018 Article levels and reuse guidelines: mortality of sagepub.com/journals-	dysfunction	Electrolyte dysfunction in	2018	emia
infarction patients. International Journal of Advances in Medicine, [S.1.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of Cardiology 2018 Article reuse guidelines: mortality of sagepub.com/journals-	in myocardial	myocardial infarction		Hyponat
patients Journal of Advances in Medicine, [S.l.], v. 5, n. 5, p. 1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of Cardiology 2018 Article 2019 Hyponat remia potassium Cardiology 2018 Article remia levels and reuse guidelines: mortality of sagepub.com/journals-	infarction	patients. International		remia
Medicine, [S.1.], v. 5, n. 5, p.1172-1176, sep. 2018. ISSN2349-3933.SerumThe European Society of Cardiology 2018 Article reuse guidelines: mortality of sagepub.com/journals-	patients	Journal of Advances in		
1172-1176, sep. 2018. ISSN 2349-3933. Serum The European Society of potassium 2019 Cardiology 2018 Article remia levels and reuse guidelines: mortality of sagepub.com/journals-		Medicine, [S.l.], v. 5, n. 5, p.		
2349-3933. Serum The European Society of potassium 2019 Hyponat Devels and reuse guidelines: mortality of sagepub.com/journals- remia		1172-1176, sep. 2018. ISSN		
Serum The European Society of potassium 2019 Hyponat potassium Cardiology 2018 Article remia levels and reuse guidelines: remia mortality of sagepub.com/journals- remia		2349-3933.		
potassium Cardiology 2018 Article remia levels and reuse guidelines: mortality of sagepub.com/journals-	Serum	The European Society of	2019	Hyponat
levels and reuse guidelines: mortality of sagepub.com/journals-	potassium	Cardiology 2018 Article		remia
mortality of sagepub.com/journals-	levels and	reuse guidelines:		
	mortality of	sagepub.com/journals-		

DISCUSSION

www.worldwidejournals.com

PARIPEX - INDIAN JOURNAL OF RESEARCH | Volume - 12 | Issue - 03 |March - 2023 | PRINT ISSN No. 2250 - 1991 | DOI : 10.36106/paripex

patients with acute myocardial infarction: A systematic review and meta- analysis of cohort studies	permissions DOI: 10.1177/2047487318780466 journals.sagepub.com/hom e/ejpc	2019	Hyponat remia
The association of hyponatremi a and clinical outcomes in patients with acute myocardial infarction: a cross- sectional study	Cordova Sanchez A, Bhuta K, Shmorgon G, Angeloni N, Murphy R, Chaudhuri D. The association of hyponatremia and clinical outcomes in patients with acute myocardial infarction: a cross-sectional study. BMC Cardiovasc Disord. 2022 Jun 18;22(1):276. doi: 10.1186/s12872-022-02700- y. PMID: 35717160; PMCID: PMC9206366.	JUNE 18 2022	Hyponat remia
Serum potassium level, variability and in-hospital mortality in acute myocardial infarction	Zhang X, Wang M, Zhu Z, Qu H, Gu J, Ni T, Wang Y, Wang X, Zhang R, Li Q. Serum potassium level, variability and in-hospital mortality in acute myocardial infarction. Eur J Clin Invest. 2022 Jul;52(7):e13772. doi: 10.1111/eci.13772. Epub 2022 Mar 22. PMID: 35294777.	March 16 2022	Hyponat remia

CONCLUSION

Hypokalemia and Hyponatremia are indicators of AMI. Serum sodium and potassium levels were significantly lower at baseline and gradually becomes near normal on 4th day in the AMI patients, so estimation of these can help to assess prognostic. Serum sodium and potassium levels are prognostic indicators, i.e., rise in sodium levels after initial fall was indicative of clinical improvement. Therefore, estimation of sodium and potassium level in acute MI patients can help assess their prognosis.

Recommendations

- Estimation of Serum sodium and potassium is good for diagnosis and prognosis of acute myocardial infarction.
- Taking the sample as soon as the patients enters the hospital before any admission.
- Estimation of serum Sodium and potassium level in patients with AMI should be done as early as possible on arrival of the patients in emergency department.

REFERENCES

- 1. WHO | World Health Organization
- Park.Textbook of Preventive and Social Medicine 19th Ed. 2007:286-287.
 Shanthi Mendis, Kristian Thygesen, Kari Kuulasmaa, Simona Giampaoli, Markku Mähönen, Kathleen Ngu Blackett, Liu Lisheng, Writing group on behalf of the participating experts of the WHO consultation for revision of WHO definition of myocardial infarction, World Health Organization definition of myocardial infarction: 2008-09 revision, International Journal of Epidemiology, Volume 40, Issue 1, February 2011, Pages 139-146, https:// doi.org/10.1093/ije/dyq165
- Vetter NJ, Strange RC, Adams W, Oliver MF. Initial metabolic and hormonal response to acute myocardial infarction. Lancet. 1974 Feb 23;1(7852):284-8. doi:10.1016/s0140-6736(74)92595-1.PMID:4130473.
- Myocardial Infarction (Heart Attack) | National Health Portal Of India (nhp.gov.in)
- Textbook of Medical Laboratory Technology clinical laboratory science and molecular diagnosis third edition by Praful B. Godkar and Darshan Godkar.
- Shanthi Mendis, Kristian Thygesen, Kari Kuulasmaa, Simona Giampaoli, Markku Mahönen, Kathleen Ngu Blackett, Liu Lisheng, Writing group on behalf of the participating experts of the WHO consultation for revision of WHO definition of myocardial infarction, World Health Organization definition of myocardial infarction: 2008–09 revision, International Journal of Epidemiology, Volume 40, Issue 1, February 2011, Pages 139–146, https://doi.org/10.1093/ije/dyq165
- 8. Lamia Fasail Abu Marzoq, Wafaa Hamad Jaber, Dina K. Halaid Azzam.

Electrolyte Level Changes in Acute Myocardial Infarction Patients as Compared to Healthy Individuals in Khan Younis Governorate, Gaza Strip. Advances in Biochemistry. Vol. 4, No. 2, 2016 pp. 9-15. doi: 10.11648/ j.ab.20160402.1

- Lobo DN. Fluid, electrolytes and nutrition: physiological and clinical aspects. Proc Nutr Soc. 2004 Aug;63(3):453-66. doi: 10.1079/pns2004376. PMID: 15373958.
- Solomon RJ, Cole AG. Importance of potassium in patients with acute myocardial infarction. Acta Med Scand. 1981 Jan 12;209(S647):87-93.
 Mandole MB, Howale DS, Mamatha MT, Sharma D, Gamit D, Pandit DP.
- Mandole MB, Howale DS, Mamatha MT, Sharma D, Gamit D, Pandit DP. Evaluation of renal function tests and serum electrolytes in patients with acute myocardial infarction. Int J Biomed Res 2016;7(9):676-679.
- Stefan Agewall, Starting up a new Journal within the European Heart Journal Family, European Heart Journal - Cardiovascular Pharmacotherapy, Volume 1, Issue 4, October 2015, Page 213, https://doi.org/10.1093/ehjcvp/pvv033
- 13. Franz-Josef Neumann, Miguel Sousa-Uva, Anders Ahlsson, Fernando Alfonso, Adrian P Banning, Umberto Benedetto, Robert A Byrne, Jean-Philippe Collet, Volkmar Falk, Stuart J Head, Peter Jüni, Adnan Kastrati, Akos Koller, Steen D Kristensen, Josef Niebauer, Dimitrios J Richter, Petar M Seferovi, Dirk Sibbing, Giulio G Stefanini, Stephan Windecker, Rashmi Yadav, Michael O Zembala, ESC Scientific Document Group, 2018 ESC/EACTS Guidelines on myocardial revascularization, European Heart Journal, Volume 40, Issue 2, 07 January 2019, Pages 87–165, https://doi.org/10.1093/eurheartj/ehy394
- Parmar KB, Sharma RN, Shah J. A clinical study of serum electrolytes (NA, K, CL) and serum magnesium levels in patients of acute myocardial infarction. J. Evid. Based Med. Healthc. 2017; 4(61), 3691-3695. DOI: 10.18410/ jebmh/ 2017/736
- Hariprasad S, Basavaraj M. Electrolyte dysfunction in myocardial infarction patients. Int J Adv Med 2018;5:1172-6
- Hariprasad, Sudarsan and Madhu Aramane Basavaraj. "Electrolyte dysfunction in myocardial infarction patients." International Journal of Advances in Medicine 5 (2018): 1172-1176.