A COMPARATIVE STUDY OF C-REACTIVE PROTEIN VS INITIAL LACTATE VS LACTATE CLEARANCE IN CKD IN EMERGENCY DEPARTMENT

PROJECT SUBMITTED TO

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BACHELOR OF SCIENCE HONS
(ALLIED HEALTH SCIENCE)

TRAUMA CARE MANAGEMENT

BY
D.ANUPRIYA

2021-2025

DECLARATION

I declare that the project entitled "**A COMPARATIVE STUDY OF C-REACTIVE PROTEIN VS INITIAL LACTATE VS LACTATE CLEARANCE IN CKD IN EMERGENCY DEPARTMENT**" submitted by me for the award of degree **Bachelor of Science Hons – Allied Health Science** (TRAUMA CARE MANAGEMENT) is the record of original research work carried out by me during the period under the guidance of **DR.D.VINDHYA** and has not formed the basis for the award of any degree, diploma, associateship, fellowship, titles in this or any other university.

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CERTIFICATE

This is to certify that this study titled "**A COMPARATIVE STUDY OF C-REACTIVE PROTEIN VS INITIAL LACTATE VS LACTATE CLEARANCE IN CKD IN EMERGENCY DEPARTMENT**" is a bonafide and genuine research work carried out by D. ANU PRIYA **(242101011)** in the Department of Trauma Care Management under our guidance during academic year (2021- 2025) and is being submitted in partial fulfillment of the Degree of **Bachelor of Science Hons Allied Health Science (Trauma Care Management)**.

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D. ANU PRIYA

ABBREVIATIONS

LIST OF ABBREVIATIONS

S.No	ABBREVIATION	FULL FORM
1	CAD	CORONARY ARTERY DISEASE
2	CKD	CHRONIC KIDNEY DISEASE
3	CRP	C- REACTIVE PROTEIN
4	ESRD	END STAGE RENAL DISEASE
5	HS-CRP	HIGH SENSITIVITY C-REACTIVE PROTEIN
9	T2DM	TYPE 2 DIABETES MELLITUS
10	HTN	HYPERTENSION
11	PIC	PERCUTANEOUS CORONARY INTERVENTION

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TITLE

A COMPARATIVE STUDY OF C-REACTION PROTEIN VS INITIAL LACTATE VS LACTATE CLEARANCE IN CKD IN EMERGENCY DEPARTMENT

INTRODUCTION

Chronic kidney disease is a progressive and irreversible loss of renal function that leads to a cascade of metabolic, cardiovascular and systemic derangements. The presence of CKD complicates due to the altered physiological milieu, impaired toxin clearance, and increased susceptibility to infection and cardiovascular instability.

In the context of acute presentations such as breathlessness, and chest pain or systemic inflammatory response, it becomes imperative to have reliable biomarkers for early risk stratification, treatment monitoring, and prognostication.

Lactate is a marker for anaerobic metabolism, produced by cells during tissue hypoxia. In acutely ill patients, elevated lactate >2 mmol/L is associated with poor outcomes and correlates with the severity of hypoperfusion, particularly in sepsis and shock.

Lactate clearance, calculated as the percentage reduction in lactate levels over time, especially within the first 6 hours, is increasingly recognized as a resuscitation endpoint and prognostic marker. In CKD patients, where baseline lactate may be mildly elevated, the clearance over time provides a more reliable indicator of treatment response than the absolute initial value

MECHANISMS

Dialysis related factors: dialysis, particularly haemodialysis, can stimulate cytokine release via complement activation and endotoxin exposure.

IMPLICATIONS

Elevated CRP is associated with poor outcomes, including cardiovascular events, malnutrition inflammation, atherosclerosis syndrome and mortality. It is also a sensitive, though non-specific marker of acute infection in CKD patients, especially when baseline levels are already elevated.

ELEVATED LACTATE: IMPAIRED METABOLISM AND HYPOPERFUSION

In CKD, lactate levels may rise due to both increased production and reduced clearance, with or without tissue hypoxia.

MECHANISMS

- **Reduced renal clearance:** The kidneys contribute significantly to lactate clearance (30%) reduced GFR leads to impaired gluconeogenic function and lactate accumulation.

- **Tissue Hypoxia:** Anemia, cardiac dysfunction and microvascular disease in CKD patients reduce oxygen delivery at the tissue level, promoting anaerobic glycolysis.

- **Sepsis and Shock States:** CKD patients are predisposed to infection and sepsis, which induce elevated lactate via impaired oxygen utilization and altered microcirculation

The various biomarkers used in the emergency department, C-Reactive protein and Arterial blood gas stand out for their clinical utility in detecting inflammation and tissue hypoperfusion, respectively. This research focuses on comparing CRP, INITIAL LACTATE, and 6TH HOUR LACTATE CLEARANCE in CKD patients presenting to the EMERGENCY DEPARTMENT, examining their relative roles in identifying severity, predicting outcomes and guiding early resuscitative efforts.

INTERPLAY BETWEEN CRP AND LACTATE IN CKD

In the emergency department or ICU, elevated CRP and lactate often coexist in critically ill CKD patients. Their combination often signifies systemic inflammatory response with impaired perfusion as in:

- Urosepsis in ESRD
- Dialysis catheter infections
- Cardiorenal syndrome with tissue hypoxia
- Septic shock in peritoneal dialysis
- Elevated c- reactive protein: a chronic inflammatory state

WHY IT IS IMPORTANT TO INVESTIGATE THIS ISSUE

1. **INCREASED VULNERABILITY IN CKD PATIENTS**

   CKD patients have altered immune responses and metabolic profiles, making them more prone to sepsis, shock and poor outcomes.

   Biomarkers like CRP and lactate may vary differently in these patients due to reduced renal clearance and chronic inflammation.

2. **NEED FOR RAPID RISK STRATIFICATION IN THE ED**

   Emergency physicians need quick, reliable tools to predict which CKD patients are at high risk of mortality or ICU admission.

3. **POTENTIAL PROGNOSTIC VALUE OF CRP AND LACTATE**

   CRP is a well-known marker of inflammation and lactate is a marker of tissue hypoperfusion.

   Lactate clearance over time (e, g.,6 hours) has been shown in this research to predict clinical outcomes

This research is necessary because CKD patients are at a high risk of complications in emergency department commonly used biomarkers like CRP and lactate, may behave differently due to impaired kidney function. Studying these markers can improve early risk assessment, guide timely intervention and ultimately improve outcomes

C-REACTIVE PROTEIN

Acute phase reactant produced by the liver in response to inflammation, infection and tissue injury. In patients with CKD, particularly those in stages 3-5, baseline CRP levels are elevated due to a chronic inflammatory state associated with uremia, endothelial dysfunction, and comorbid conditions such as atherosclerosis. Despite this limitation, CRP remains a valuable marker for identifying superimposed infections or acute exacerbations. Elevated CRP levels may support the presence of an underlying septic or inflammatory process, although it lacks specificity for hypoperfusion.

INITIAL LACTATE

In CKD patients, lactate clearance is partially impaired due to decreased renal excretion. Initial lactate measurement on presentation provides rapid and dynamic insight into the patients' hemodynamic status and risk of mortality.

6TH HOUR LACTATE CLEARANCE

A lactate clearance of >10% at 6 hours is generally associated with improved outcomes and is often used to evaluated the efficacy of fluid resuscitation, vasopressor therapy, and infection

control measures. In contrast poor or absent lactate clearance suggests persistent tissue hypoxia, ongoing inflammation or impending organ failure, prompting escalation of care.

REVIEW OF LITERATURE

1. INFLAMMATORY MARKERS AND PROGNOSIS IN CKD PATIENTS

C-Reactive protein is a widely used inflammatory biomarker associated with systemic inflammation, infection and sepsis. In chronic kidney disease, baseline CRP levels are often elevated due to proinflammatory state, complicating its interpretation in acute scenarios like sepsis or acute illness in the Emergency department

Zimmermann et al. (1999) reported elevated baseline CRP in CKD patients, independent of acute infections.

Stenvinkel et al. (2002) described inflammation as a key component of CKD progression and morbidity, reducing the specificity of CRP as a prognostic marker in this population.

2. LACTATE AS A MARKER OF TISSUE HYPOPERFUSION:

Lactate is a marker of anaerobic metabolism and tissue hypoperfusion, commonly used in sepsis and critical illness to guide resuscitation efforts

In CKD patients the metabolism of lactate is generally preserved unless there is hepatic dysfunction but acid base disturbances in CKD may complicate lactate interpretation.

3. LACTATE CLEARANCE AS A DYNAMIC PROGNOSTIC MARKER

Lactate clearance, particularly at 6 hour is increasingly recognized as a dynamic marker of resuscitation efficacy and prognosis.

Nguyen et al. (2004) found that early lactate clearance is associated with decreased mortality in septic shock patients.

Arnold et al. (2009) emphasized that lactate clearance >10% within the first 6 hours correlated with improved outcomes in critically ill patients.

Andersen et al. (2013) noted that lactate metabolism is affected in CKD due to reduced renal gluconeogenesis and potential mitochondrial dysfunction.

Hsu et al. (2017) discussed the effect of renal dysfunction on lactate kinetics, noting higher baseline lactate levels and delayed clearance in patients with CKD.

4. USE OF LACTATE AND LACTATE CLEARANCE IN THE EMERGENCY DEPARTMENT

In Emergency department, lactate is used as a rapid indicator of severity. Lactate clearance has emerged as a superior marker compared to static lactate values for risk stratification and prognosis

Mikkelsen et al. (2009) showed that lactate clearance is a better predictor of mortality than initial lactate in ED patients with sepsis.

Bakker et al. (2016) recommended serial lactate measurement as part of goal-directed therapy in shock management.

5. CURRENT GAPS AND FUTURE DIRECTIONS

There is large scale, prospective studies specifically evaluating lactate clearance in CKD patients in the Emergency Department

Research is needed to din this subgroup define appropriate cutoff values and timelines of lactate clearance in this subgroup

Integration of lactate clearance with other biomarkers (e.g.,) CRP improve prognostic accuracy.

AIM AND OBJECTIVES

AIM

This study aims to compare CRP, initial lactate, and 6-hour lactate clearance in CKD patients to determine their relative predictive value in assessing disease severity and outcomes.

OBJECTIVES

To compare the prognostic value of C-reactive protein (CRP), baseline lactate levels, and 6-hour lactate clearance in patients with chronic kidney disease (CKD).

To evaluate the correlation between CRP levels and patient outcomes such as morbidity and mortality in CKD.

To determine if 6-hour lactate clearance provides a better prognostic indicator than static lactate measurements or CRP in CKD patients

PRINCIPAL RESEARCH QUESTIONS FRAMING THE STUDY

Does 6-hour lactate clearance provide a better prognostic indicator than CRP or initial lactate levels in CKD patients?

Among CRP, initial lactate, and 6-hour lactate clearance, which biomarker shows the strongest association with poor clinical outcomes in CKD?

Can lactate clearance be used as a dynamic marker for predicting the need for ICU care, renal replacement therapy, or in-hospital mortality in CKD patients

HYPOTHESIS

Null Hypothesis (H_0):

There is no significant difference in the prognostic value of C-Reactive Protein (CRP), initial lactate, and 6-hour lactate clearance in predicting clinical outcomes in chronic kidney disease (CKD) patients in the emergency department.

Alternative Hypothesis (H_1):

There is a significant difference in the prognostic value of CRP, initial lactate, and 6-hour lactate clearance in predicting clinical outcomes in CKD patients in the emergency department, with 6-hour lactate clearance being the most reliable prognostic marker.

METHODOLOGY

STUDY SETTING

The prospective observational study was conducted in the Emergency Department of Saveetha Medical College and Hospital over a duration of one year (2024-2025). It included 106 adult CKD patients (Stages 3–5) with suspected infection or sepsis. The study was both retrospective and prospective in design.

PROS:

- Real-time data and observation-based inputs included.
- Critically ill population ensured relevance to emergency clinical care.
- High translational value in emergency medicine practice.

CONS:

- Single-center study limited to the emergency setting
- Possibility of variation in intubation drug protocols
- Potential for missing or incomplete data during high-acuity events

ETHICAL APPROVAL NUMBER:

The study was approved by the Institutional Ethics Committee (IEC No: 005/06/2025/IEC/SMCH), Saveetha Medical College and Hospital.

STUDY DESIGN

Both retrospective and prospective study conducted in the emergency department of a tertiary care hospital

SAMPLING SIZE

A total of 104 chronic kidney patients in the emergency department were included in the study

DURATION:

- 2024-2025

Sample form and summary:

All patients who met inclusion criteria were enrolled using convenience sampling. Chronic kidney patients who were admitted due to a variety of life threatening conditions including breathlessness, septic shock, pulmonary edema. The following predictors were assessed

- Age more than 18 years
- Diagnosis of chronic kidney patients
- Admitted with suspected infection, sepsis and acute deterioration
- Initial and 6th hour lactate value
- c-Reactive protein

Case Sheet Verification and Bias Minimization:

All case sheets were reviewed against emergency records and EMRs by the primary investigator and faculty supervisor. Discrepancies (e.g., mismatched times, missing vitals) were resolved by referring to treating physicians or source documents. A standardized proforma was used for all entries. Efforts to minimize sampling bias included the use of strict inclusion/exclusion criteria and complete enumeration of eligible patients during the study period.

INTERNAL VALIDITY

- Adults aged ≥18 years
- Diagnosed with Stage 3–5 CKD
- Admitted with suspected infection, sepsis, or acute deterioration

EXTERNAL VALIDITY:

- Patients who died or were discharged before 6-hour lactate sample
- Patients who decline hospital admission or choose to self-discharge against medical advice.

DATA COLLECTION:

PROFORMA:

Structured proforma included the following parameters:

- Demographic details (age, gender)
- Clinical diagnosis and comorbidities
- Chief complaints
- C-reactive protein value
- Initial lactate
- 6th hour lactate value
- Lactate clearance
- Urea
- Creatinine
- Outcome

DATA VERIFICATION:

All data entries were verified by D. ANU PRIYA,, Final Year B.Sc Trauma Care Management Intern under the supervision of Mr. Manikandan, Faculty of Allied Health Sciences. In case of ambiguity, the treating physician was consulted. Conflicting entries were resolved through source verification

DATA SOFTWARE:

All cleaned and verified data were imported into IBM SPSS Statistics Version 25.0. Variables were labeled appropriately, and system-missing codes were used for excluded values

STATISTICAL ANALYSIS

STATISTICAL PROCEDURES:

Descriptive statistics were used to summarize baseline variables such as age, gender, vital signs, and comorbidities.Associations between predictors and PIH were analyzed using Chi-square and Mann-Whitney U analysis test for categorical variables.Logistic regression was used to determine significant predictors of chronic kidney patients

Software Used:

Statistical analysis was performed using IBM SPSS Version 25.0 (IBM Corp., Armonk, NY, USA).

INDEPENDENT VARIABLES:

- AGE
- GENDER
- VITALS
- C- REACTIVE PROTEIN VALUE
- INITIAL LACTATE
- 6TH HOUR LACTATE
- LACTATE CLEARANCE
- UREA
- CREATININE
- OUTCOME

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Review 1

ROLE OF C-REACTIVE PROTEIN IN KIDNEY DISEASES

Li, Jiaxiao, et al. "Role of C-Reactive Protein in Kidney Diseases." Kidney and Blood Pressure Research, vol. 47, no. 12, 2022, pp. 737–750. S. Karger AG

C- Reactive protein is a pentameric protein consisting of five identical subunits, is the prototypical acute phase protein in response to infection and inflammation. In acute infection or inflammation, C- Reactive protein can be secreted at the beginning of 4-10 hours following inflammatory stimulation, peaking at 48 hours with a short half-life of 19 hours. Whereas, continuing high levels of C-Reactive protein may induce chronic inflammation, as reported in patients with chronic kidney disease or end stage renal disease. Therefore, elevated C-Reactive protein level is considered a biomarker for inflammatory response, tissue injury and chronic progression of diseases. C-Reactive protein is often compared with other biomarkers such as procalcitonin and lactate in sepsis or acute illness. While lactate reflects tissue hypoxia and metabolic stress, C-Reactive protein provides a broader view of inflammatory status. Chronic kidney disease is characterized as progressive loss of renal function. Inflammation and fibrosis are common pathological features that contribute to the progression of chronic kidney disease. It has been well established that C- Reactive protein is a risk factor of chronic kidney disease, elevated serum levels of c-reactive protein are also associated with mortality and morbidity of chronic kidney disease. In chronic kidney disease patients, a high c- reactive protein level is found to be a predictor of cardiovascular events and an independent risk factor for all cause mortality in stage 3 and 4 chronic kidney disease patients. It is highly possible that high c-reactive protein may promote the infiltration of inflammatory cells and release of cytokines, chemokines and TGF-BETA. Hence the interplay between inflammation and fibrosis is a major determinant in the progression of chronic kidney disease in response to c-reactive protein.

Review 2

THE CUMULATIVE EXPOSURE TO HIGH SENSITIVITY C-REACTIVE PROTEIN PREDICTS THE RISK OF CHRONIC KIDNEY DISEASE

Gao, Jingli, et al. "The Cumulative Exposure to High Sensitivity C-Reactive Protein Predicts the Risk of Chronic Kidney Disease." Kidney and Blood Pressure Research, vol. 44, no. 6, 2019, pp. 749–757. S. Karger AG

This study was to characterize the association of cumulative exposure to increased high sensitivity c- reactive protein with chronic kidney diseases. The kailuan study is a cohort study on risk factors for cardiovascular on risk factory of cardiovascular disease based on community population. We included 35,194 participants with Hs-CRP measured at three examinations in 2006, 2008, 2010. Participants were classified into non exposed group (Hs-CRP <3.0mg/L in all 3 examinations,1 exposed group (Hs-CRP ≥3.0 mg/L in 1 of the 3 examinations), 2-exposed group (Hs-CRP ≥3.0 mg/L in 2 of the 3 examinations) and 3-exposed group (Hs-CRP ≥3.0 mg/L in 3 examinations). Cox proportional hazards models were used to assess the association of cumulative Hs-CRP with incident CKD. CKD includes an estimated glomerular filtration rate (eGFR) <60mL/min/1.73 or urinary protein positive. The study showed the risk of CKD as the number of years of exposure to s-CRP increases. Participants in 3-exposed group had significantly increased CKD risk with hazard ratio (HR) (95% confidence interval, CI) of 1.70 (1.49–1.93), in comparison with 1.47 (1.34–1.62) for participants in the 2-exposed group, and 1.08 (1.00–1.16) for those in the 1-exposed group ($p < 0.01$); mean-while, the similar and significant associations were also observed for eGFR <60 mL/min/1.73

Review 3

ROLE OF HIGH SENSITIVITY C-REACTIVE PROTEIN AS A MARKER OF INFLAMMATION AND ITS PROGNOSTIC SIGNIFICANCE IN CHRONIC KIDNEY DISEASE PATIENTS

Khunte, Sanjeev Kumar, Jitendra Kumar, and Prakash Khunte. "Role of High Sensitivity C-Reactive Protein as a Marker of Inflammation and Its Prognostic Significance in Chronic Kidney Disease Patients." International Journal of Advances in Medicine, vol. 6, no. 2, 2019, pp. 335–340.

This cross-sectional observation study was conducted in Rajendra institute of medical sciences, Ranchi during study period October 2015 to September 2017 on admitted patients with chronic kidney disease. 90 patients of different age groups between 16-75 years were enrolled in the study. Samples were selected by using a simple random sampling method. 85.6% of the patients studied were males and 14.4% of the patients were females. Most cases of CKD were associated with hypertension (77.8%) out of which there were 62 males and 8 females, followed by DM (25.5%) where there were 20 males and 3 females. 44.4% cases had an elevated level of Hs-CRP patients, 35 were male and 5 were female. Patients with elevated creatinine levels had significantly high Hs-CRP levels

Review 4

ASSOCIATION BETWEEN HIGH SENSITIVITY C-REACTIVE PROTEIN AND DIABETIC CHRONIC KIDNEY DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Tang, Min, et al. "Association Between High Sensitivity C-Reactive Protein and Diabetic Chronic Kidney Disease in Patients With Type 2 Diabetes Mellitus." Frontiers in Endocrinology, vol. 13, 2022, article 885516.

This study aimed to identify the correlation between Hs-CRP levels and diabetic kidney disease in patients with T2DM. This cross sectional and observational study included n=927 patients with T2DM. Collected the data of patients based on their medical data, including sociodemographic characteristics, laboratory data results and medical therapy. Diabetes mellitus has become a major and serious threat to global human health. T2DM has 90% proportion of DM, which is featured by insulin resistance and relatively insufficient insulin secretion. In total, 927 patients were recruited in our study. The median age of the recruited patients was 55 years, and there were 346 female patients and 581 male patients. The Hs-CRP levels were evidently higher in patients with DKD than those without DKD. After adjusting for age, sex, diastolic blood pressure, systolic blood pressure, body mass index, neck circumference, waist circumference, hypertension, duration of diabetes, common carotid artery plaque, fasting plasma glucose, glycated haemoglobin, haemoglobin, erythrocyte, leukocyte, γ-glutamyl transferase, albumin, urea nitrogen, uric acid and triglyceride, a significant increase in the odds ratios (ORs) for DKD in the fourth Hs-CRP quartile compared with the first quartile was observed (P value for trend= 0.003), and the ORs (95% confidence intervals) in the fourth quartile of Hs-CRP were 1.968 (1.244–3.114) for DKD

compared to the first quartile.. Moreover, the RCS curves presented a positive association between Hs-CRP and DKD in total subjects, male subjects and female subjects, respectively. The results of our study indicated that Hs-CRP levels were significantly and positively correlated with the presence of DKD, which may provide predictive and diagnostic values in clinical practice.

Review 5

COMPARISON OF HIGH SENSITIVITY C-REACTIVE PROTEIN LEVEL BETWEEN CHRONIC KIDNEY DISEASE STAGES

Thaha, Mochammad, et al. "Comparison of High Sensitivity C-Reactive Protein Level Between Chronic Kidney Disease Stages." Biomolecular and Health Science Journal, vol. 1,2018

This research is to evaluate the Hs-CRP level comparison between CKD stages in Dr. Soetomo General Hospital Surabaya. An analytic observational cross-sectional study, evaluating the differences of Hs-CRP level between CKD stages in 72 patients (mean age 55.49±7.62 years, the ratio between male and female was 1:1.48, mean BMI 24.18±3.64 kg/m2, 36.11% diabetics, 43.05% on ACEI/ARB, 29.16% on statin), recruited from Nephrology Outpatient Clinic, Dr Soetomo General Hospital, Surabaya, from January to May 2014. The stages were stratified according to the MDRD formula. The mean Hs-CRP of CKD stage 3 was 2.29±2.86, stage 4 was 2.48 ± 2.19, and non-dialysis stage 5 was 2.09 ± 2.54. The analysis using Kruskal-Walli's test showed no significant differences among patients with CKD stage 3, stage 4, and non-dialysis stage 5 (median 1.25 vs 1.80 vs 1.05 mg/L; p=0.430). No significant differences of the serum Hs-CRP level were detected between diabetics and non-diabetics in stage 3, 4, and non-dialysis stage 5 (p=0.673 vs 0.666 vs 0.138); between patients with and without ACEI/ARB treatment (p=0.610 vs 0.649 vs 0.671); and between patients with and without statin treatment (p=0.852 vs 0.341 vs 0.309). The elevation of serum Hs-CRP level cannot indicate the decline of kidney function, but it still needs further investigations.

Review 6

PROGNOSTIC VALUE OF HIGH SENSITIVITY C-REACTIVE PROTEIN AMONG CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION

Jones, D. et al., 2023. Prognostic value of high-sensitivity C-reactive protein among chronic kidney disease patients undergoing percutaneous coronary intervention. Journal of Cardiology

In this analysis, patients who underwent PCI between January 2012 and December 2019, with an available baseline GFR and Hs-CRP value at time of index PCI were included. Exclusion criteria were haemodialysis or known disease processes that cause elevated Hs-CRP levels such as acute myocardial infarction (MI), acute heart failure, and neoplastic disease. Patients with a Hs-CRP level >10 mg/L were excluded due to the potential of active infection. Among 12,410 patients, 3029 were defined as CKD (24.4 %) and 9381 (75.6 %) as no-CKD. A baseline Hs-CRP level > 3 mg/L was observed in 964 (31.8 %) CKD and 2418 (25.8 %) no-CKD patients. Baseline and procedural characteristics stratified by CKD status and Hs-CRP level. Among patients undergoing PCI not in the setting of an acute MI, Hs-CRP levels >3 mg/L were associated with a 2-times higher risk of mortality at 1 year in CKD patients and 3-times higher hazard in no-CKD patients. Elevated Hs-CRP did not predict the 1-year occurrence of MACE, MI, or TVR. The prognostic value of Hs-CRP was not affected by the presence of baseline CKD.

Review 7

LACTATE CLEARANCE IN THE ACUTELY TRAUMATIZED PATIENT

Jones, Alan E. "Lactate Clearance in the Acutely Traumatized Patient." Anesthesiology, vol. 117, no. 6, Dec. 2012

This study aimed to determine whether early lactate clearance, defined as a reduction of more than 20% per hour, serves as a reliable prognostic marker in acutely trauma patients beyond the initial lactate measurement and conventional trauma scoring system. This was an observational cohort study involving 586 patients (mean age 38±16 years; ~56% had elevated lactate on admission). The majority sustained blunt trauma (84%) while the rest had penetrating injuries. Blood lactate levels were measured at admission 2 hours,4 hours with

lactate clearance (LC) calculated over 0-2 hours and 2-4 hours intervals. The study found that early lactate clearance over 0–2 hours was moderately correlated with overall clearance at 4 hours ($r = 0.55$, $p < 0.001$) and was independently associated with improved survival, whereas clearance between 2–4 hours had no significant association ($r = 0.04$). The results highlighted that early lactate clearance is a superior dynamic marker for assessing response to resuscitation and predicting mortality in trauma patients.

Review 8

LACTATE CLEARANCE IS ASSOCIATED WITH MORTALITY IN SEPTIC PATIENTS WITH ACUTE KIDNEY INJURY REQUIRING CONTINUOUS RENAL REPLACEMENT THERAPY

da Hora Passos, Rogério, et al. "Lactate Clearance Is Associated with Mortality in Septic Patients with Acute Kidney Injury Requiring Continuous Renal Replacement Therapy: A Cohort Study." Medicine, vol. 95, no. 40, 2016,

This observational cohort study aimed to evaluate whether lactate levels and early lactate clearance could predict mortality in septic patients with acute kidney injury (AKI) requiring continuous renal replacement therapy (CRRT). Conducted in three intensive care units over five years, the study included **186** critically ill adult patients with sepsis and AKI who underwent CRRT. Lactate levels were measured at the start of CRRT and again after 24 hours, and lactate clearance was calculated to assess its prognostic value. The results showed that while initial lactate levels were higher in non-survivors, they were not independently predictive of mortality. In contrast, both 24-hour lactate levels and lactate clearance were significantly associated with mortality at 48 hours and 28 days. Patients with a lactate clearance of 10% or more within the first 24 hours had better survival outcomes. Receiver operating characteristic analysis confirmed that 24-hour lactate had a stronger predictive value than initial lactate, indicating that serial lactate measurements, particularly at 24 hours, are more reliable indicators of prognosis in this patient population. The study concluded that monitoring lactate dynamics—especially clearance—provides crucial information for early risk stratification and may help guide therapeutic decisions in septic AKI patients undergoing CRRT.

Review 9

LACTATE CLEARANCE IS ASSOCIATED WITH IMPROVED SURVIVAL IN CARDIOGENIC SHOCK: A SYSTEMATIC REVIEW AND META-ANALYSIS OF PROGNOSTIC FACTOR STUDIES

Marbach, Jeffrey A., et al. "Lactate Clearance Is Associated with Improved Survival in Cardiogenic Shock: A Systematic Review and Meta-Analysis of Prognostic Factor Studies." Journal of Cardiac Failure, vol. 27, no. 10, Oct. 2021, pp. 1082–1089. https://doi.org/10.1016/j.cardfail.2021.08.012.

The systematic review and meta-analysis titled *"Lactate Clearance Is Associated With Improved Survival in Cardiogenic Shock"* aimed to evaluate the prognostic value of lactate clearance in predicting mortality among adult patients with cardiogenic shock. This observational study analysed data from 12 eligible prognostic factor studies that included both prospective and retrospective cohorts, with a median sample size of 87 patients and a mean age of 56 years. Researchers systematically searched multiple databases, extracted data independently, and assessed study quality and heterogeneity. The primary focus was on comparing lactate clearance between survivors and non-survivors at two critical time points: 6–8 hours and 24 hours. Results showed that at 6–8 hours, survivors had a significantly higher median lactate clearance of 21.9% compared to just 0.6% in non-survivors, with a pooled mean difference of 17.3% ($P < .001$), indicating low heterogeneity. At 24 hours, the difference was even more pronounced—survivors cleared a median of 60.7% of lactate compared to 40.3% in non-survivors, with a pooled mean difference of 27.9% ($P < .001$), although with greater heterogeneity. Sensitivity analyses confirmed consistent results across various mortality endpoints, including ICU, in-hospital, and 30-day mortality. These findings demonstrate that greater lactate clearance, especially in the first 24 hours, is strongly associated with improved survival in cardiogenic shock, supporting its use as a valuable early prognostic biomarker. However, the study also emphasized the need for further prospective trials to evaluate whether targeting lactate clearance in treatment protocols can improve outcomes.

Review 10

LACTATE CLEARANCE IS A USEFUL BIOMARKER FOR THE PREDICTION OF ALL CAUSE-MORTALITY IN CRITICALLY ILL PATIENTS: A SYSTEMATIC REVIEW AND META ANALYSIS

Zhang, Zhongheng, and Xiao Xu. "Lactate Clearance Is a Useful Biomarker for the Prediction of All-Cause Mortality in Critically Ill Patients: A Systematic Review and Meta-Analysis." Critical Care Medicine, vol. 42, no. 9, Sept. 2014, pp. 2118–2125. https://doi.org/10.1097/CCM.0000000000000405

The systematic review and meta-analysis titled *"Lactate Clearance Is a Useful Biomarker for the Prediction of All-Cause Mortality in Critically Ill Patients"* aimed to evaluate the prognostic significance of lactate clearance across various critical illnesses. This comprehensive observational analysis included 15 studies involving a total of 4,776 critically ill adult patients from diverse clinical settings, including sepsis, trauma, post-surgical, and mixed ICU populations. results demonstrated that patients with high lactate clearance had a significantly reduced risk of all-cause mortality, with a relative risk (RR) of 0.38 (95% CI 0.29–0.50), indicating that those who cleared lactate effectively were approximately 62% less likely to die, The diagnostic performance of lactate clearance as a mortality predictor showed a pooled sensitivity of 75% and specificity of 72%, which was further improved in ICU-only subgroups (sensitivity 83%, specificity 67%). These findings support lactate clearance as a powerful, non-invasive, and dynamic biomarker for early risk stratification in critically ill patients, although the authors emphasized the need for standardized clearance thresholds and time points to enhance its clinical applicability and integration into treatment protocols.

Review 11

CLINICAL SIGNIFICANCE OF LACTATE CLEARANCE IN PATIENTS WITH CARDIOGENIC SHOCK: RESULTS FROM THE RESCUE REGISTRY

Park, Ik Hyun, et al. "Clinical Significance of Lactate Clearance in Patients with Cardiogenic Shock: Results from the RESCUE Registry." Journal of Intensive Care, vol. 9, no. 1, 2021,

The study titled *"Clinical Significance of Lactate Clearance in Patients with Cardiogenic Shock: Results from the RESCUE Registry"* was a multicentre, prospective observational

cohort study conducted in Korea between January 2014 and December 2018, involving 628 adult patients diagnosed with cardiogenic shock. The primary aim was to investigate the prognostic value of 24-hour lactate clearance in predicting in-hospital and long-term mortality. Lactate levels were measured at baseline and after 24 hours of shock management, and lactate clearance was calculated, with a cutoff of ≥64% defining "high clearance." The study found that higher lactate clearance was significantly associated with improved outcomes. In univariable logistic regression analysis, each 1% increase in lactate clearance reduced the odds of in-hospital mortality ($p < 0.001$). Patients with high lactate clearance (≥64%) had a markedly lower in-hospital mortality rate ($p < 0.001$) and significantly better 12-month survival rates ($p < 0.001$) compared to those with low clearance. Subgroup analysis further revealed that lactate clearance had greater predictive value among patients presenting with an initial lactate level >5 mmol/L, with a higher c-statistic ($p = 0.011$), suggesting that lactate dynamics are particularly meaningful in more severely ill patients. These findings underscore the clinical importance of monitoring lactate clearance in cardiogenic shock as a simple, reliable, and early prognostic indicator to guide therapy and risk stratification.

Review 12

LACTATE AND LACTATE CLEARANCE IN ACUTE CARDIAC CARE PATIENTS

Attanà, Paola, et al. "Lactate and Lactate Clearance in Acute Cardiac Care Patients." European Heart Journal: Acute Cardiovascular Care, vol. 1, no. 2, June 2012, pp. 115–121. https://doi.org/10.1177/2048872612451168.

In their 2012 observational study, Attanà et al. investigated the prognostic role of lactate levels and lactate clearance in 51 consecutive patients admitted to an Intensive Cardiac Care Unit with cardiogenic shock following ST-elevation myocardial infarction treated by primary PCI; blood lactate was measured on admission and again at 12 hours, and 12-hour lactate clearance was calculated. Patients with ≥10% clearance at 12 hours had significantly lower in-ICCU mortality ($P = 0.002$), and clearance below this threshold independently predicted both short-term and long-term survival ($P = 0.013$); Kaplan–Meier analysis further showed worse outcomes in those with <10% clearance. These findings support that lactate clearance, not just absolute lactate values, is an early, dynamic indicator of prognosis in acute cardiac care—reinforced by broader cardiac critical care evidence showing that serial lactate measurements outperform single time-point levels for risk stratification in acute coronary syndrome, cardiogenic shock, and cardiac surgery settings.

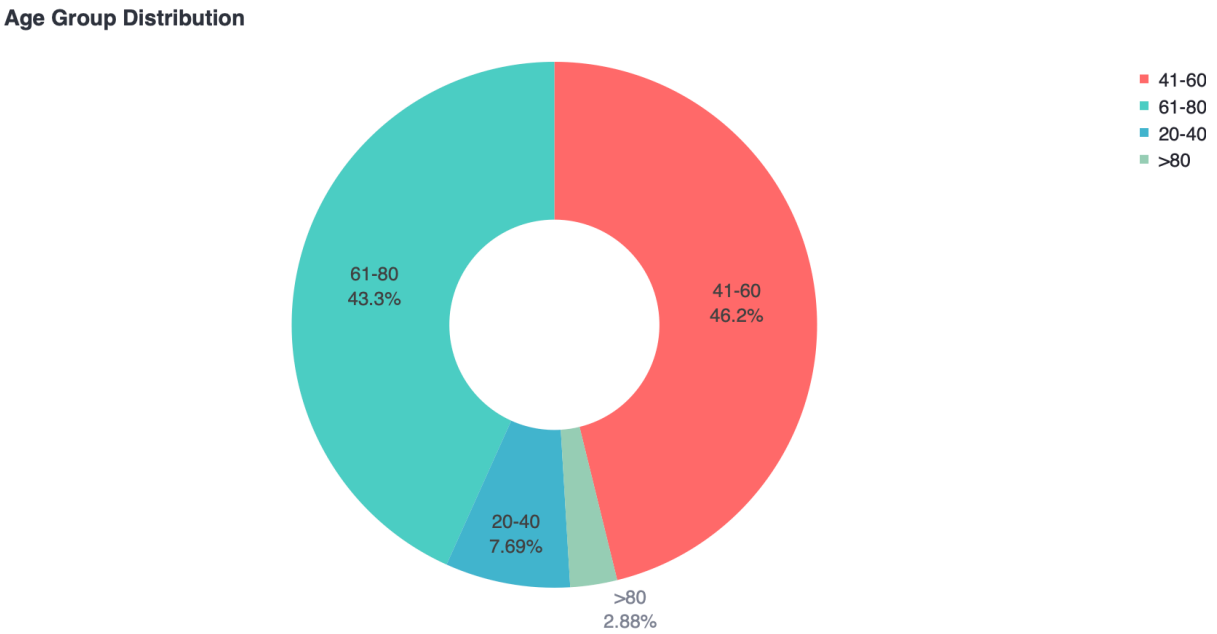
RESULTS AND STATISTICS

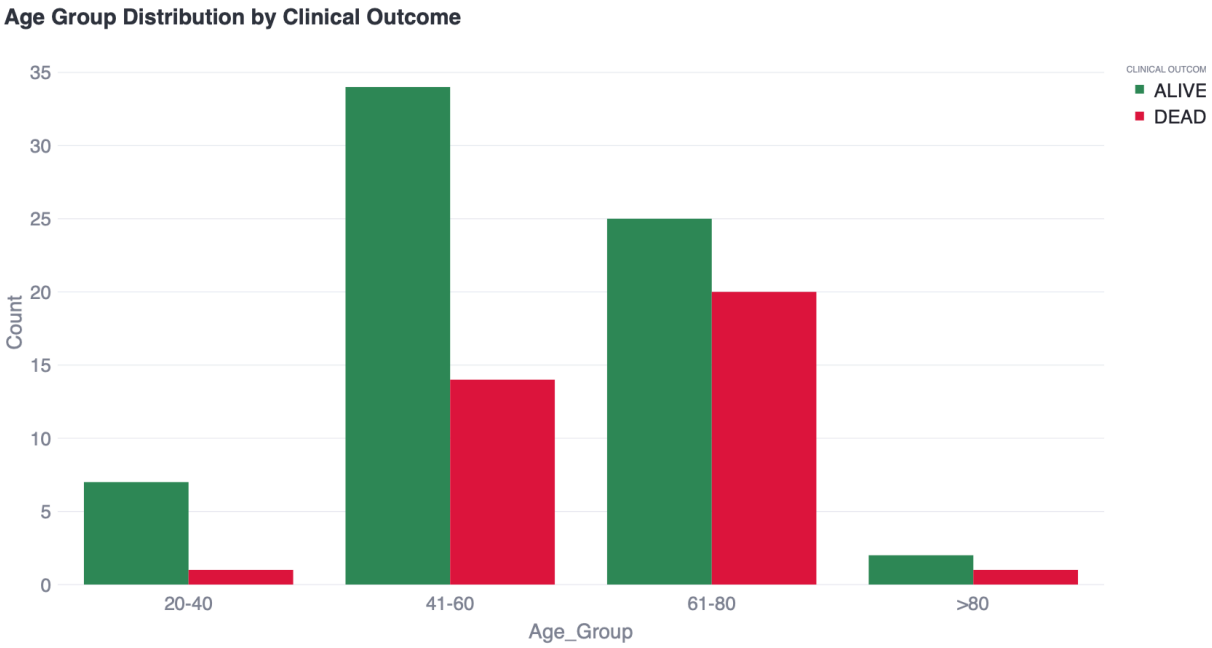
RESULTS AND STATISTICS

A total of 104 patients admitted to the **Emergency Department** with **chronic kidney disease (CKD)** were included in this study. Detailed clinical and biochemical data were collected, including **age, vital signs, comorbid conditions, CRP levels, initial lactate levels, 6th hour lactate levels,** and **lactate clearance**. Categorical variables were analyzed and numerical variables were summarized using appropriate descriptive statistics.

TABLE 1: AGE DISTRIBUTION

AGE GROUP	COUNT	PERCENTAGE
20-40	8	7.70%
41-60	48	46.20%
61-80	45	43.30%
>80	3	2.90%
TOTAL	104	100%

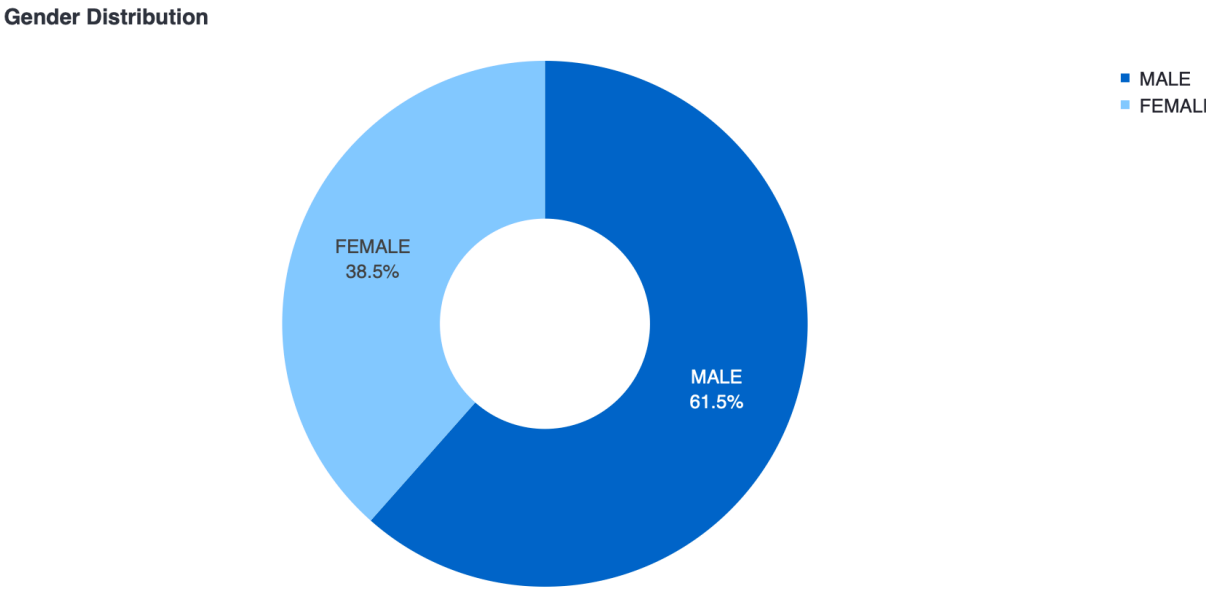




As per the diagram the distribution of age group of patients reveals that the majority falls in the age groups of 41-60 years (46.20%) and 61-80 years (43.20%) next lowest 20-40 years(7.70%) and above 80 years(2.90%)

TABLE 2: GENDER DISTRIBUTION

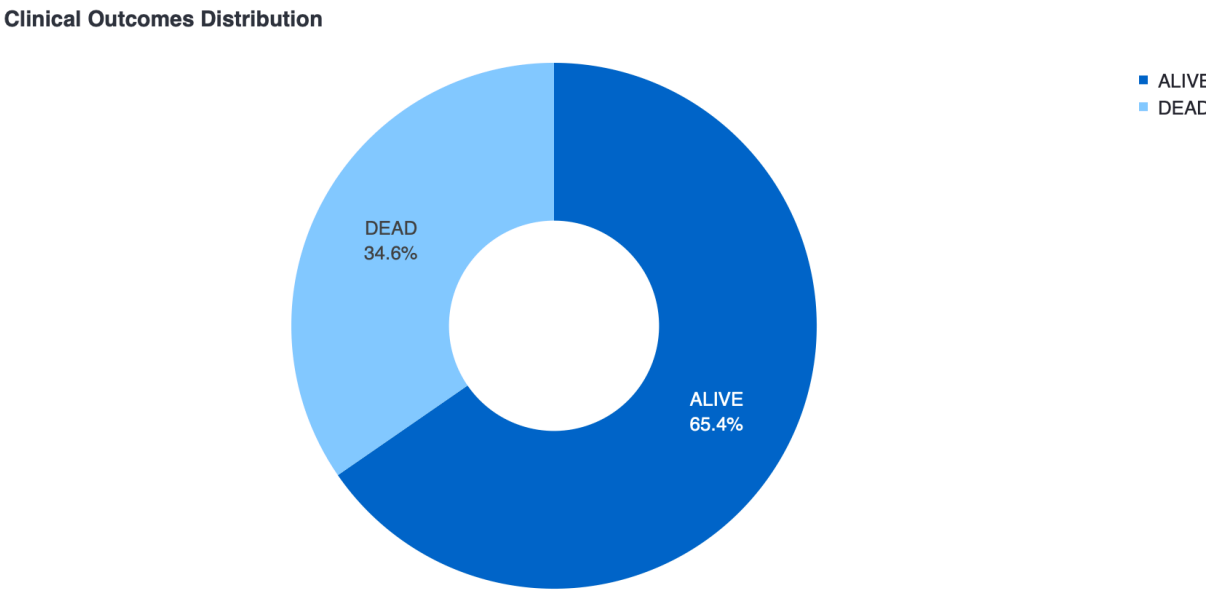
	NO OF PATIENTS	PERCENTAGE
MALE	64	61.5.%
FEMALE	40	38.5
TOTAL	104	100%



It is observed from the above table that 64 of the patients are male and 40 of the patients are reported as Female patients, total number of patients are 104.

TABLE 3: OUTCOME

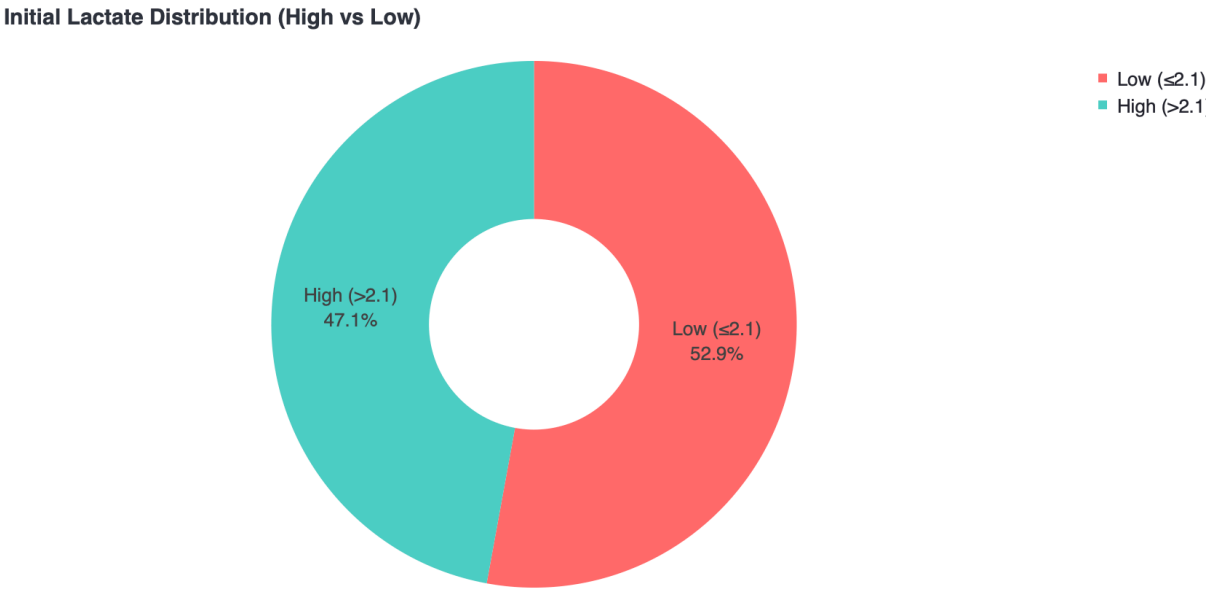
	NO OF PATIENTS	PERCENTAGE
ALIVE	68	65.04%
DEAD	36	34.60%
TOTAL	104	100%

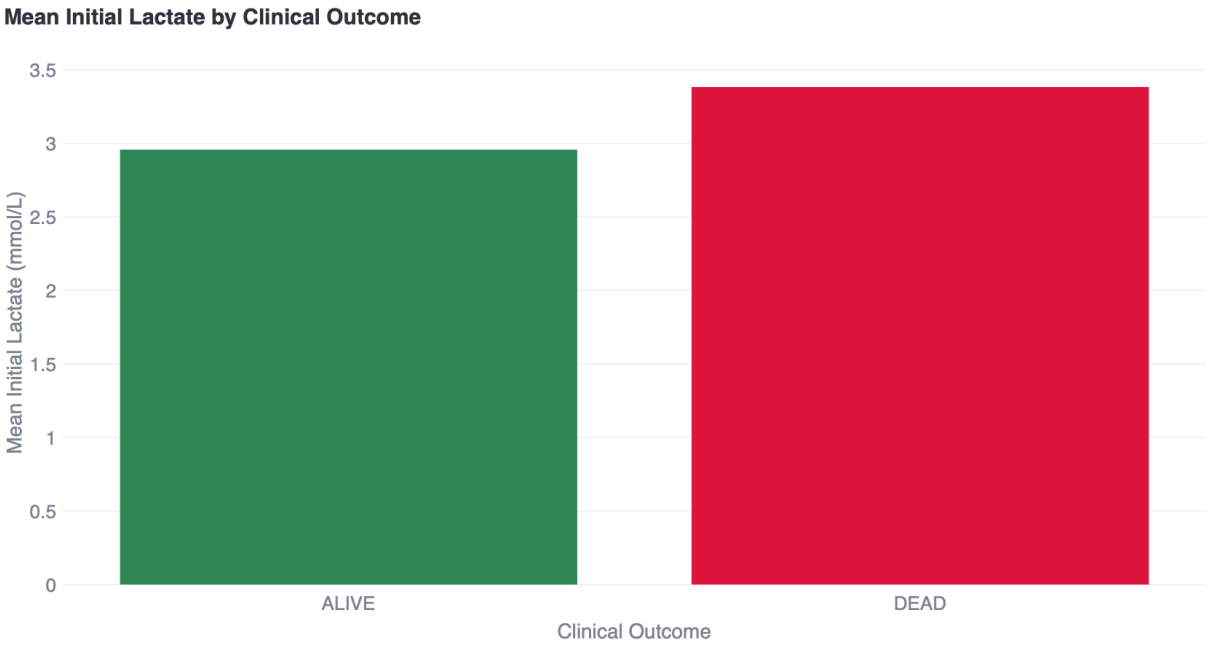


It is observed from the above table that 68% of the patients are alive 65.4% percent of patients and 36 of the patients are reported as dead 34.6 % percent of patients, total number of patients are 104.

TABLE 4: INITIAL LACTATE VS OUTCOME

GROUP	MEAN	MEDIAN	STD. DEV	COUNT
ALIVE	2.96 mmol/L	2.10 mmol/L	2.49 mmol/L	68
DEAD	3.28 mmol/L	2.10 mmol/L	3.85 mmol/L	36





It is observed from the above table that the **Alive group** (n = **68**) had a mean initial lactate of 2.96 mmol/L, a median of 2.10 mmol/L, and a standard deviation of 2.49 mmol/L. The **Dead**

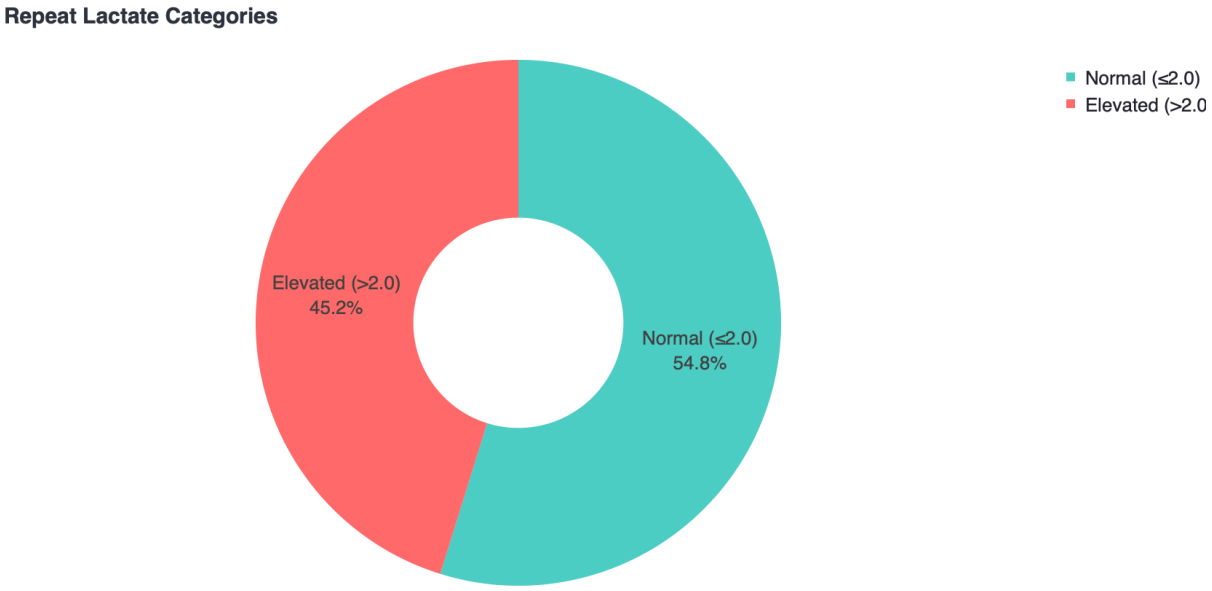
group (n = **36**) had a slightly higher mean of 3.28 mmol/L, with the same median value of 2.10 mmol/L, and a higher standard deviation of 3.85 mmol/L.

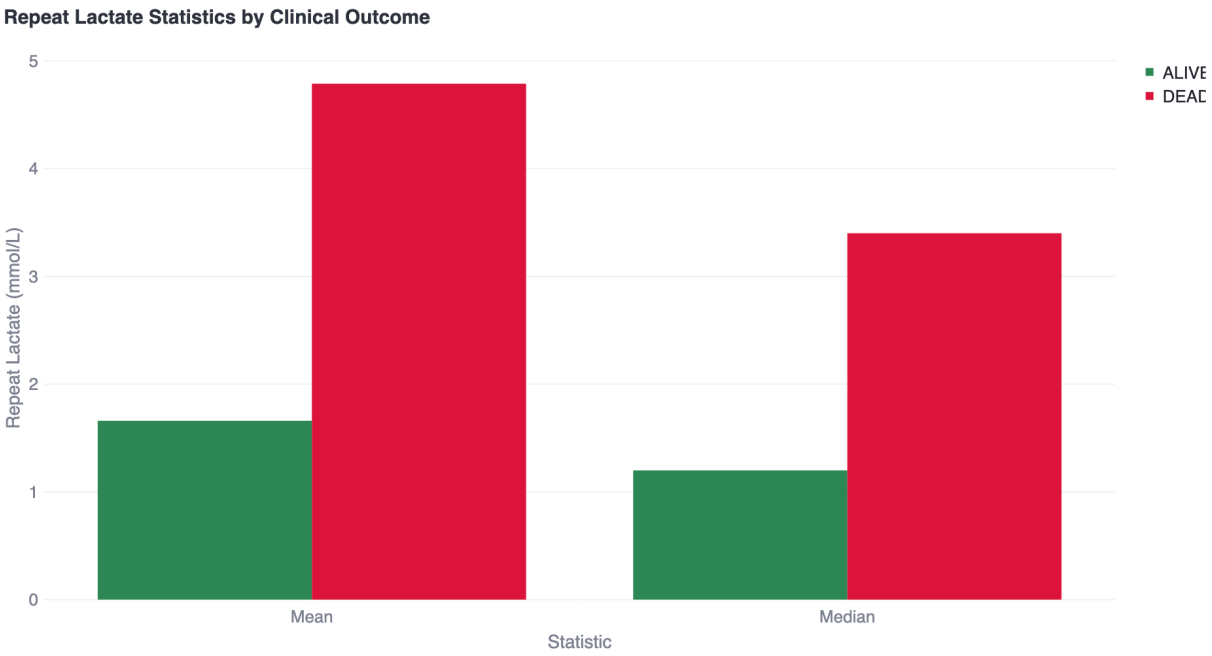
CLINICAL SIGNIFICANCE

- **NO ASSOCIATION:** There is no clinically significant association between initial lactate levels and in-hospital mortality in this CKD patient population.
- **High Mortality in Elevated Lactate Group:** Although the Dead group showed a slightly higher mean initial lactate level (3.28 mmol/L) compared to the Alive group (2.96 mmol/L), the mortality rate in this group was 100%, indicating a trend toward poor prognosis in patients with elevated lactate levels.
- **Low Mortality in Lower Lactate Group:** The Alive group, with a mean initial lactate level of 2.96 mmol/L, showed a low mortality rate (0%), suggesting a better prognosis in patients with lower initial lactate levels.

TABLE 5: REPEAT LACTATE VS OUTCOME

GROUP	MEAN	MEDIAN	STD. DEV	OUTCOME
ALIVE	1.66 mmol/L	1.20 mmol/L	1.44 mmol/L	68
DEAD	4.79 mmol/L	3.40 mmol/L	4.63 mmol/L	36





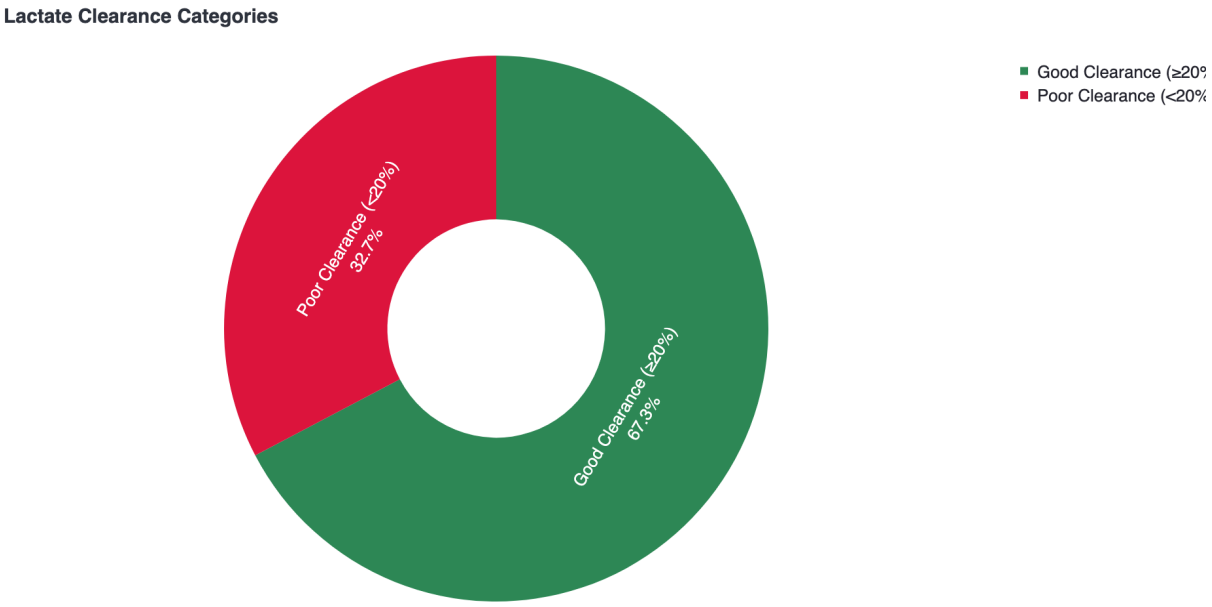
It is observed from the above table that the **Alive group** (n = **68**) had a mean initial lactate of 2.96 mmol/L, a median of 2.10 mmol/L, and a standard deviation of 2.49 mmol/L. The **Dead group** (n = **36**) had a slightly higher mean of 3.28 mmol/L, with the same median value of 2.10 mmol/L, and a higher standard deviation of 3.85 mmol/L.

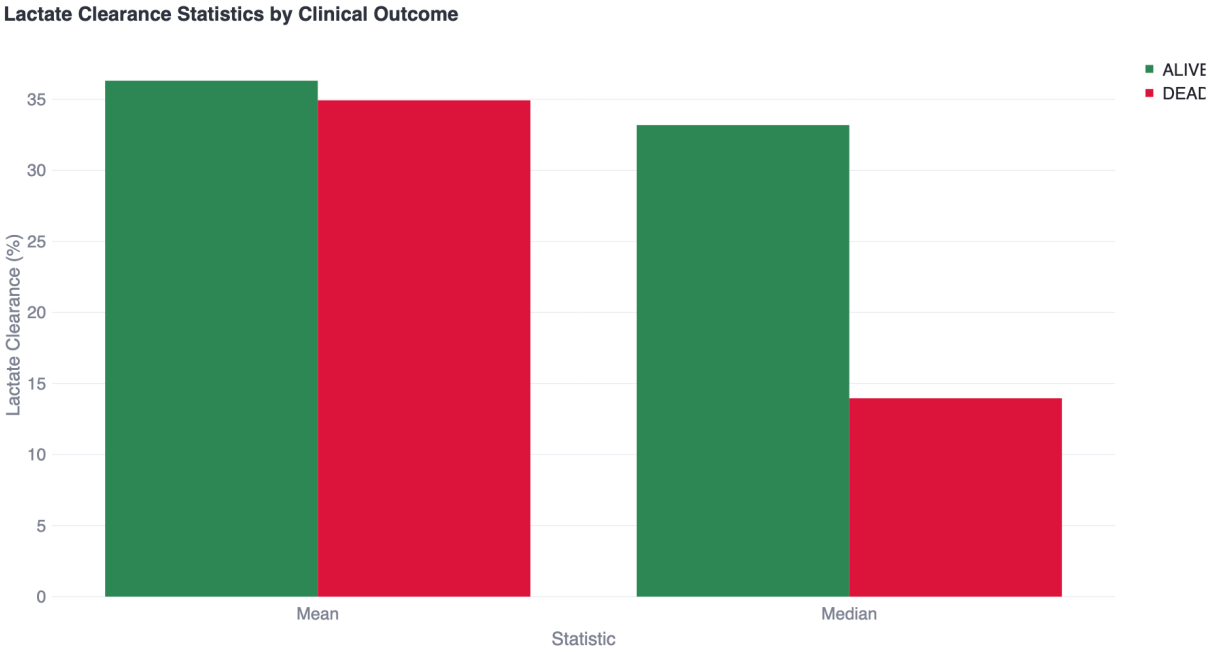
CLINICAL SIGNIFICANCE:

- **STRONG ASSOCIATION:** There is a significant clinical association between low lactate clearance and high mortality in CKD patients. Therefore, 6th-hour lactate clearance is a valuable prognostic indicator in the emergency setting.
- **Highly Mortality in Elevated Lactate Group:** Patients in the Dead group had significantly elevated 6th-hour lactate levels, indicating a strong association with poor prognosis and higher in-hospital mortality.
- **Low Mortality in Controlled Lactate Group:** Patients who survived (Alive group) had substantially lower repeat lactate levels, suggesting that better lactate clearance or normalization at 6 hours is associated with improved survival.

TABLE 6: LACTATE CLEARANCE VS OUTCOME

GROUP	MEAN	MEDIAN	STD. DEV	OUTCOME
ALIVE	36.31%	33.19%	19.44%	68
DEAD	34.93%	13.96%	43.22%	36





It is observed from the table that the Alive group (n = 68) had a mean lactate clearance of 36.31%, a median of 33.19%, and a standard deviation of 19.44%. The Dead group (n = 36)

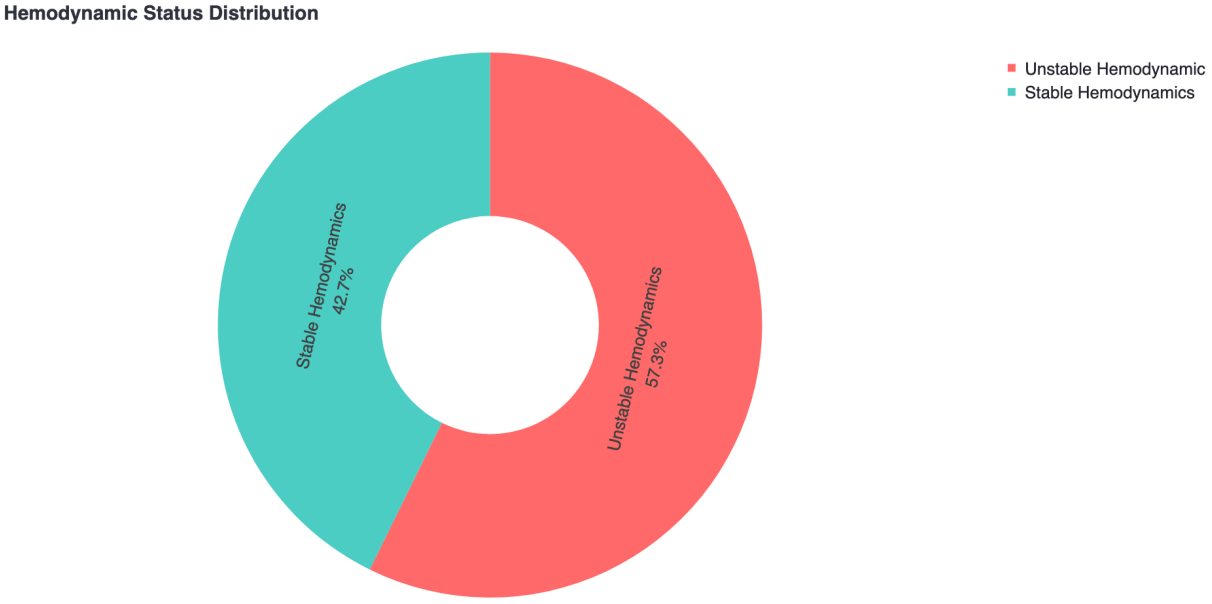
had a mean clearance of 34.93%, but a much lower median of 13.96%, with a higher standard deviation of 43.22%, indicating greater variability.

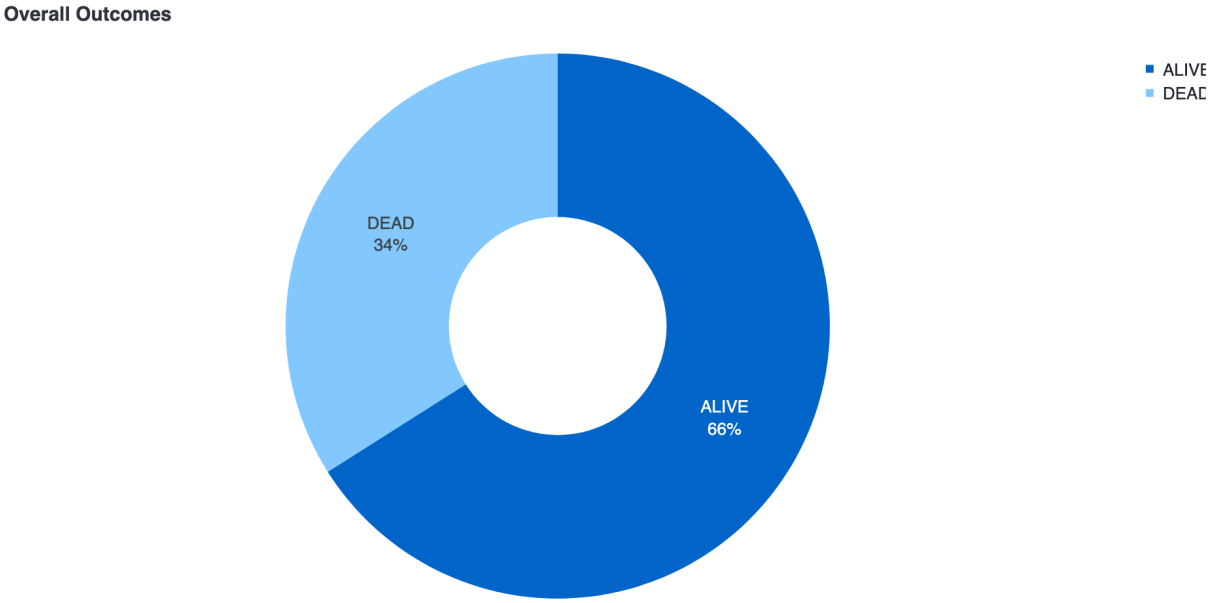
CLINICAL SIGNIFICANCE

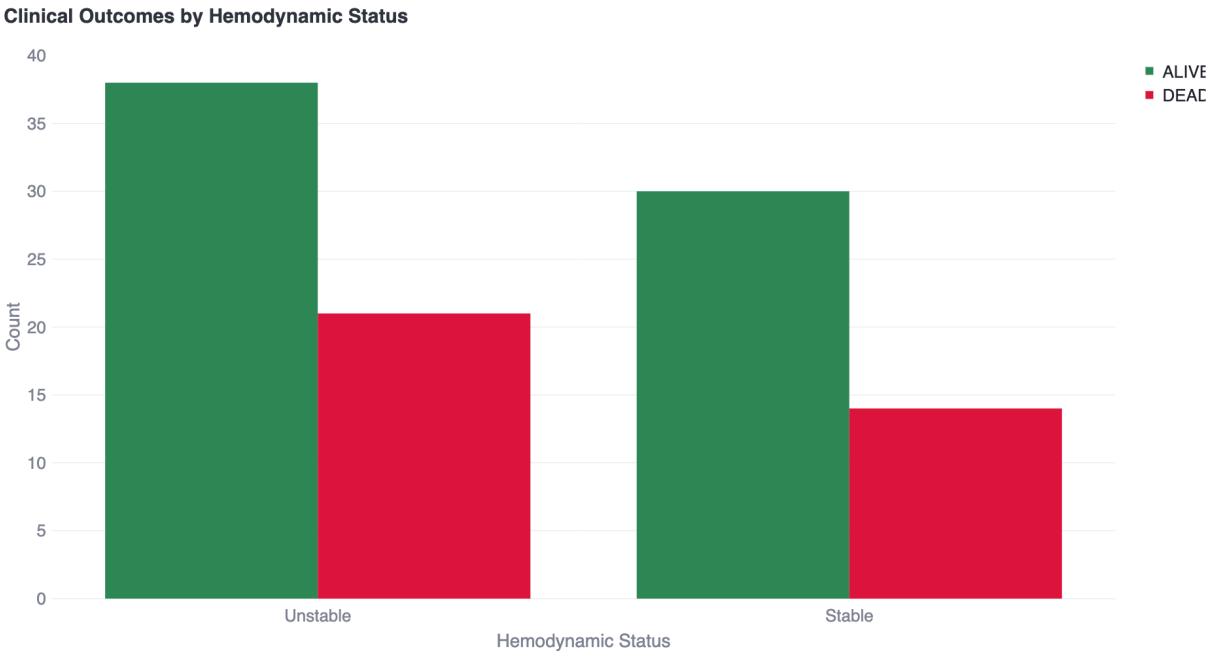
- **STRONG ASSOCIATION:** There is a significant clinical association between low lactate clearance and high mortality in CKD patients. Therefore, 6th-hour lactate clearance is a valuable prognostic indicator in the emergency setting.
- Patients in the Alive group had higher and more consistent lactate clearance, reflected by both higher median clearance and lower variability.
- In contrast, the Dead group showed lower median clearance and greater variability, suggesting ineffective lactate clearance is associated with worse outcomes.

TABLE 7: UNSTABLE HEMODYNAMICS VS OUTCOME

	UNSTABLE HEMODYNAMICS	STABLE HEMODYNAMICS
ALIVE	38	30
DEAD	21	14
TOTAL	59	44
SURVIVAL RATE	64.40%	68.20%







Patients classified as unstable if ANY of the following:

- SBP < 120 mmHg
- DBP < 80 mmHg
- SPO2 < 90%
- CBG < 75 mg/Dl
- HR < 45 BPM

CLINICAL SIGNIFICANCE

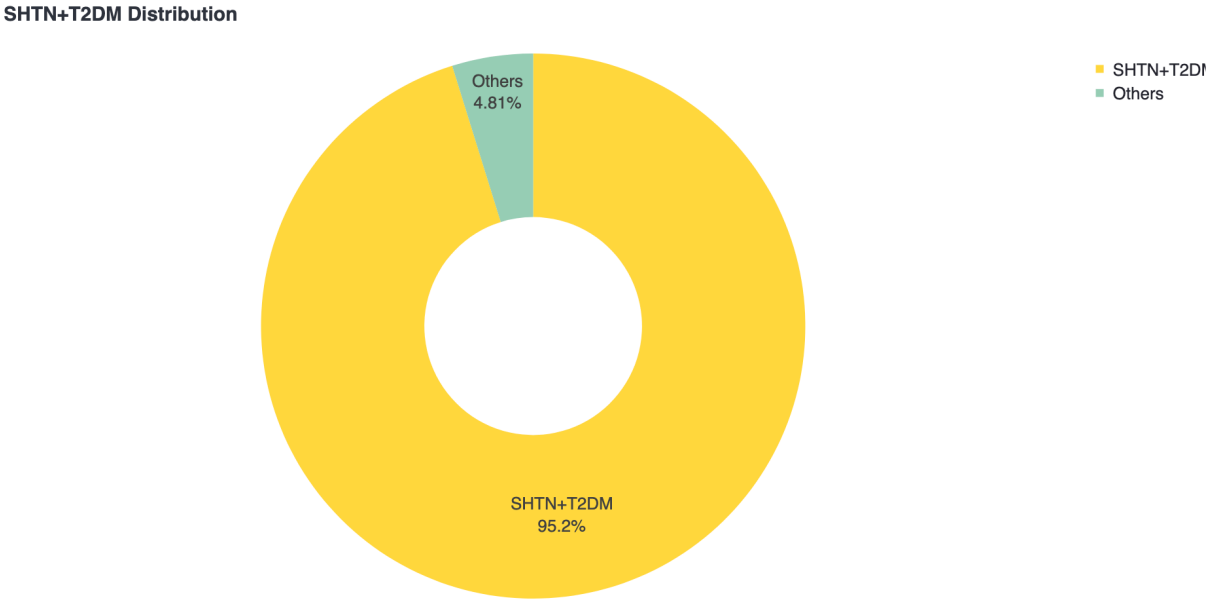
1. **NO ASSOCIATION:** Unstable hemodynamics may indicate a more critical clinical presentation, in this study, it did not show a significant impact on mortality.

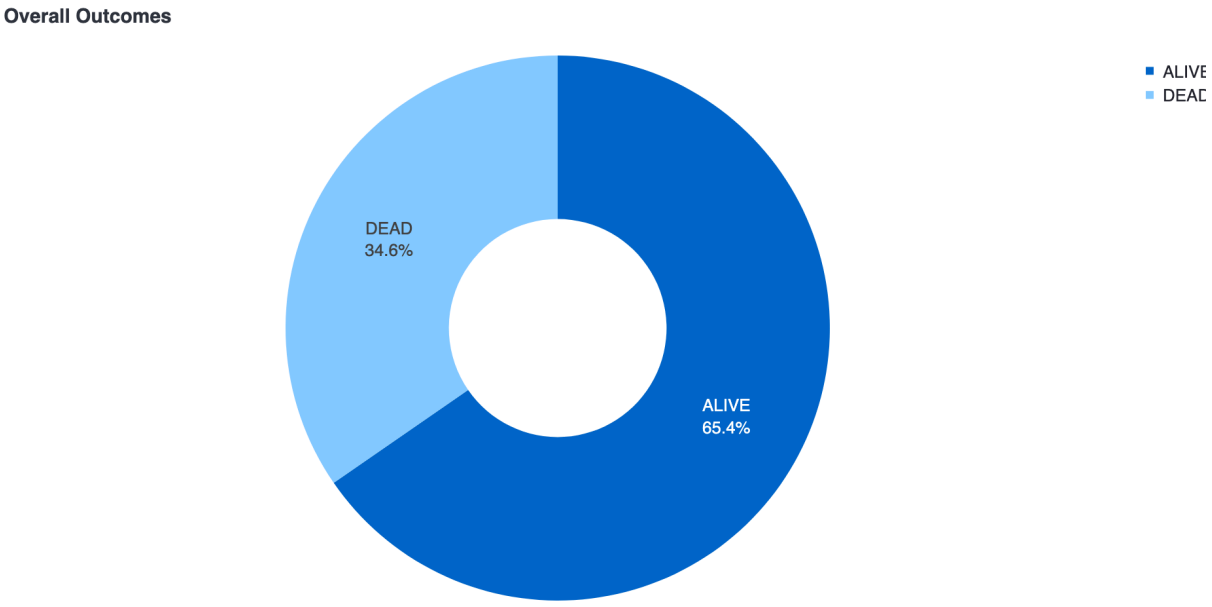
2. **High Mortality in Unstable Hemodynamic Group:** Although the mortality was slightly higher among patients with unstable hemodynamic, this difference was not statistically significant, suggesting that hemodynamic status at presentation alone may not be a strong predictor of mortality in CKD patients.

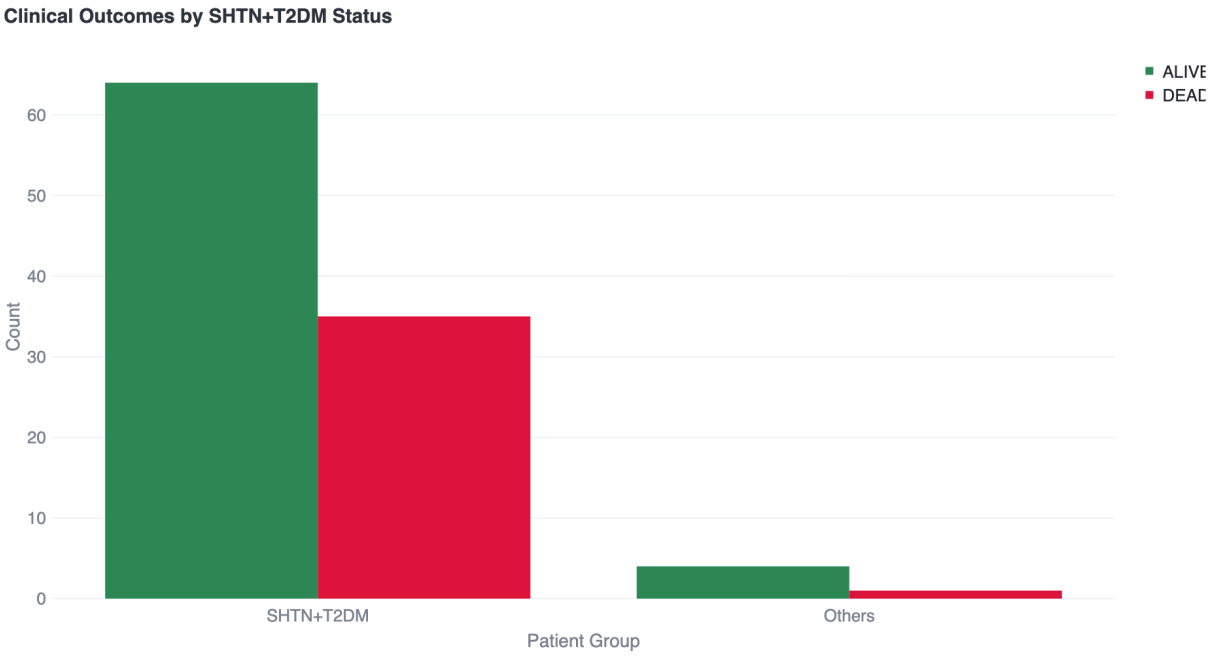
3. **Low Mortality in Stable Hemodynamic Group:** Patients with stable hemodynamic had a slightly higher survival rate (68.2%), indicating a trend toward better outcomes, but not strong enough to establish clinical significance.

TABLE 8: COMORBIDITIES VS OUTCOME

	SHTN+T2DM	OTHERS
ALIVE	64	4
DEAD	35	1
TOTAL	99	5
SURVIVAL RATE	64.60%	80.00%







An analysis was conducted to assess the relationship between common comorbidities and patient survival. Patients were grouped based on having both Systemic Hypertension (SHTN) and Type 2 Diabetes Mellitus (T2DM) versus other comorbidity profiles.

- Among patients with SHTN + T2DM (n = 99), 64 survived and 35 died, resulting in a survival rate of 64.6%.
- In the Others group (n = 5), 4 patients survived and 1 patient died, yielding a higher survival rate of 80.0%.

These results suggest that CKD patients with both SHTN and T2DM may have a lower survival rate compared to those with other or fewer comorbidities.

CLINICAL SIGNIFICANCE

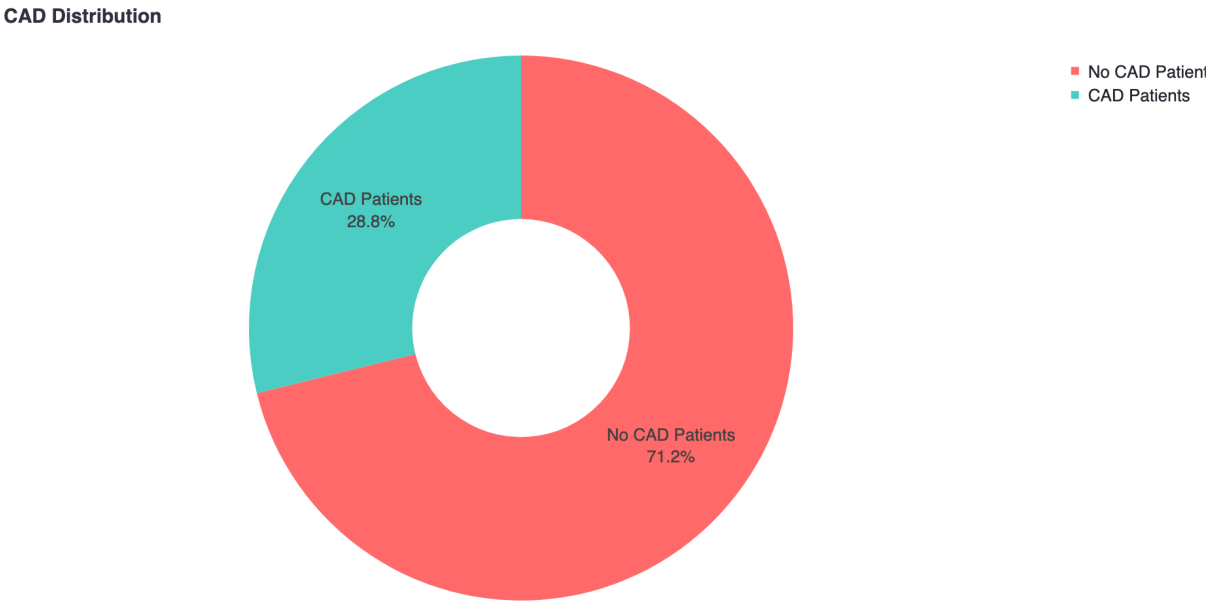
1. **NO ASSOCIATION:** Patients with SHTN and T2DM appear to have a higher mortality rate, this difference was not statistically significant (p = 1). Hence, comorbidity alone did not show a strong predictive value for mortality in this study.

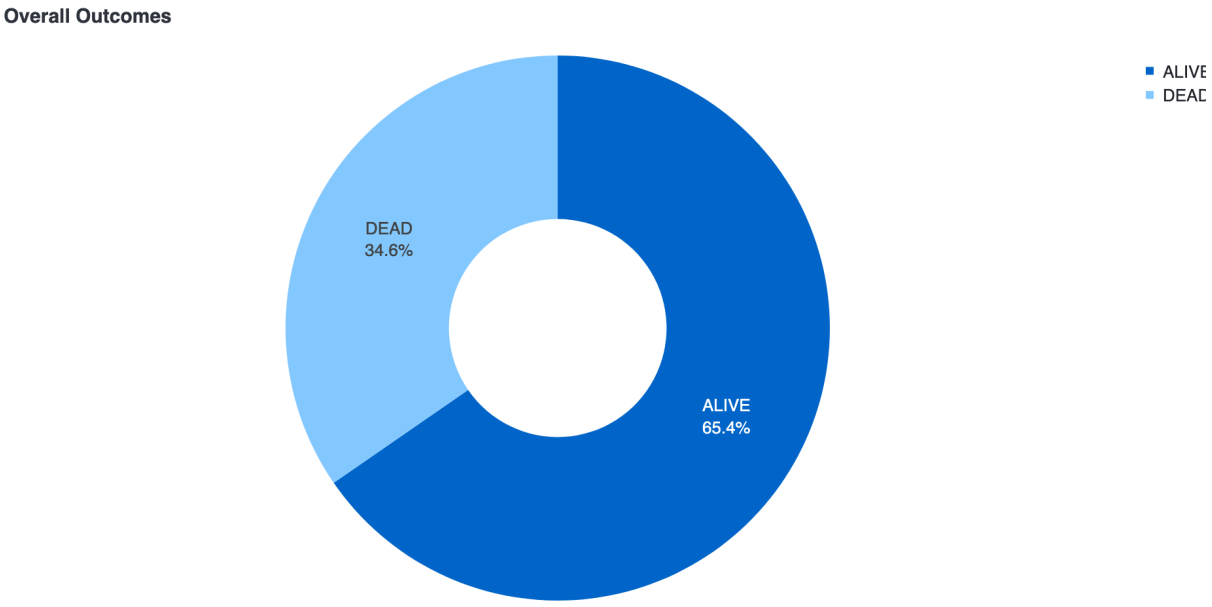
2. **High Mortality in SHTN + T2DM Group:** Patients with both systemic hypertension and type 2 diabetes had a higher number of deaths, reflecting a trend toward increased risk and poorer prognosis. However, the difference is not statistically significant.

3. **Low Mortality in Others Group:** The "Others" group showed a higher survival rate (80.0%), suggesting less complex comorbidity profiles may be linked to better outcomes, but the small sample size limits the reliability of this comparison.

TABLE 9: CAD and NON-CAD VS OUTCOME

	CAD	NON-CAD
ALIVE	22	46
DEAD	8	28
TOTAL	30	74
SURVIVAL RATE	73.30%	62.20%





The Chi-square test produced a value of 0.7352 with a p-value of 0.3912, indicating no statistically significant association between CAD status and patient outcome.

CLINICAL SIGNIFICANCE

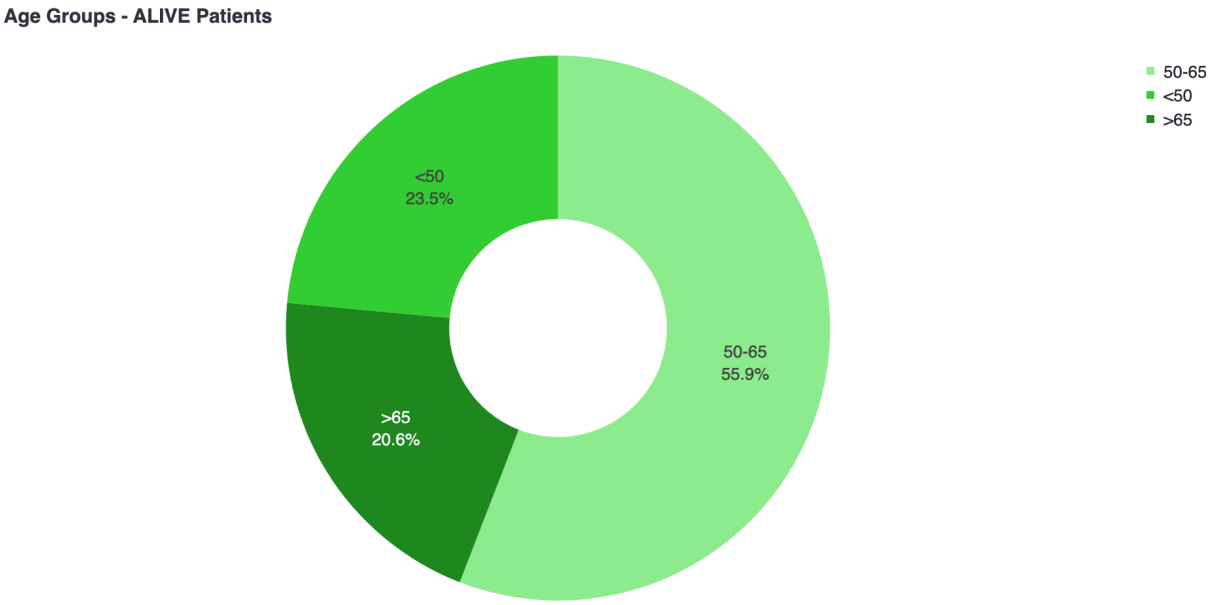
1. **NO ASSOCIATION:** Although a slightly better outcome was observed in patients with CAD, the association was not statistically significant. This suggests that CAD status alone does not strongly influence hospital mortality among CKD patients.

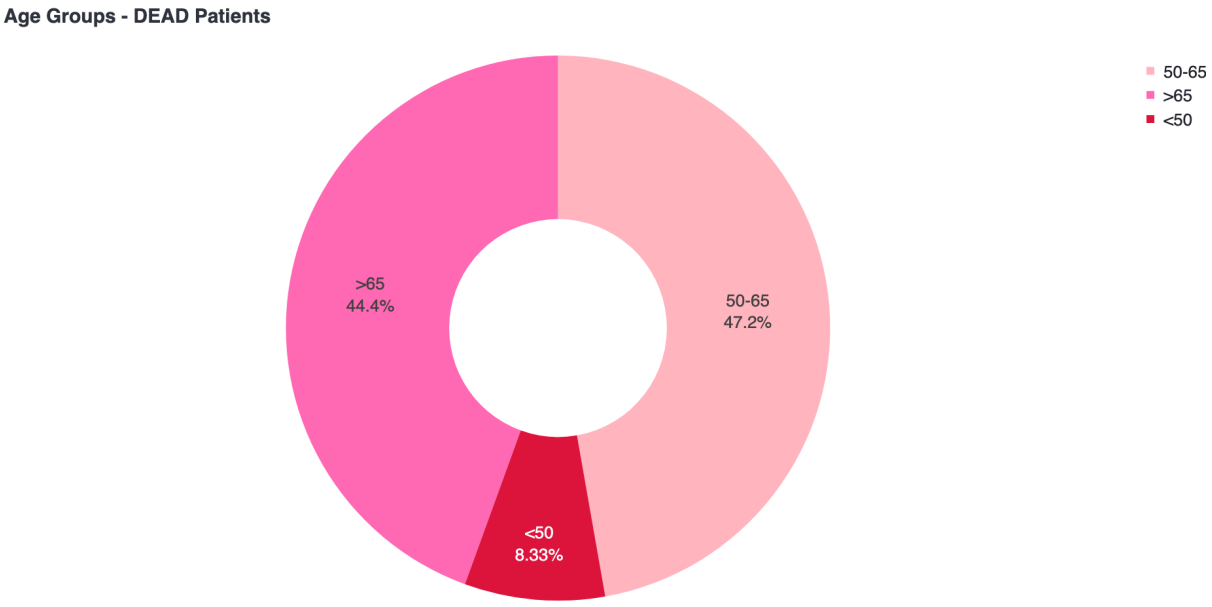
2. **Unexpected Low Mortality in CAD Group:** The CAD group had a higher survival rate (73.3%), suggesting that CAD alone may not be an indicator of poor prognosis in CKD patients in the emergency department.

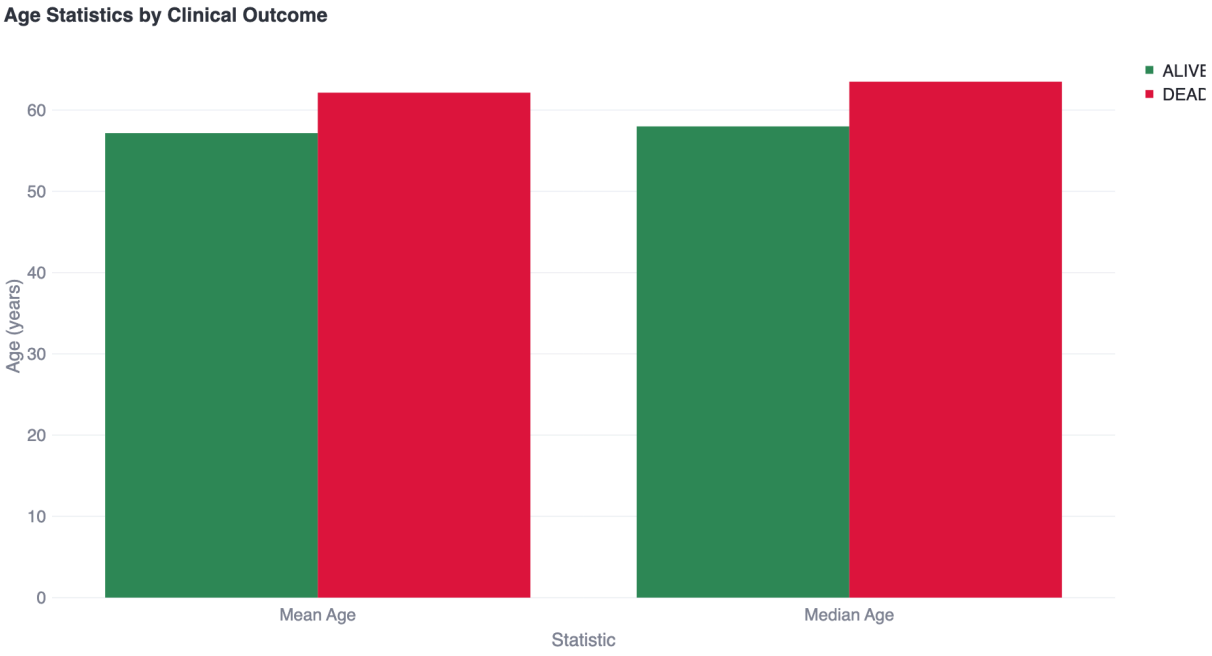
3. **Higher Mortality in Non-CAD Group:** The non-CAD group showed a lower survival rate (62.2%), but due to the non-significant p-value (0.3912), this difference is likely due to chance rather than a true clinical difference.

TABLE 10: AGE VS OUTCOME

GROUP	MEAN	MEDIAN	STD. DEV	COUNT	MANN-WHITNEY U TEST
ALIVE	57	58	14	68	919.5 (p=0.0377)
DEAD	62	64	11	36	







The Mann–Whitney U test produced a U value = 919.5 with a p-value = 0.0377, indicating a statistically significant difference in age between the two groups.

CLINICAL SIGNIFICANCE:

1. **STRONG ASSOCIATION:** There is a statistically and clinically significant association between older age and increased mortality. Age should be considered an important prognostic factor when evaluating outcomes in CKD patients.

2. **High Mortality in Older Age Group:** The Dead group had a higher mean and median age, suggesting that increasing age is associated with higher in-hospital mortality in CKD patients admitted to the emergency department.

3. **Low Mortality in Younger Age Group:** Patients in the Alive group were generally younger, indicating a better prognosis and higher survival rate among younger CKD patients.

DISCUSSION

DISCUSSION

This study was conducted to evaluate and compare the prognostic role of C-Reactive Protein (CRP), initial lactate, and 6th-hour lactate clearance in patients with Chronic Kidney Disease (CKD) admitted to the Emergency Department (ED). The main objective was to determine which biomarker provides the most reliable indication of clinical outcome, particularly in-hospital mortality.

1. IMPORTANCE OF THE RESEARCH IN CKD EMERGENCY CARE

CKD patients are inherently vulnerable due to altered immune responses, metabolic dysregulation, and reduced renal clearance of inflammatory and metabolic markers. These patients often present with overlapping symptoms such as dyspnea, altered mental status, and sepsis-like pictures, which makes it difficult to distinguish between acute deterioration and chronic baseline derangement.

Therefore, dynamic markers that reflect real-time physiological response are needed more than ever. This study targeted three such indicators:

- **CRP:** an inflammatory marker
- **Initial Lactate:** a marker of hypoperfusion
- **Lactate Clearance:** a dynamic resuscitation marker

2. INTERPRETATION OF BIOMARKER PERFORMANCE

C-REACTIVE PROTEIN (CRP)

CRP levels were elevated in almost all patients, with minimal differentiation between survivors and non-survivors. This is expected in CKD due to chronic inflammation (uremia, endothelial dysfunction, repeated infections). Although CRP remains useful to flag infection or systemic inflammation, it lacks prognostic specificity in CKD, and this study confirmed that limitation.

INITIAL LACTATE

Initial lactate levels were higher in non-survivors (mean 3.28 mmol/L) than in survivors (2.96 mmol/L), but the difference was not statistically significant ($p = 0.9455$). This reflects the

fact that CKD patients may have baseline elevated lactate levels even in the absence of acute hypoxia due to:

- Reduced renal clearance
- Metabolic acidosis
- Anemia and microvascular disease

Initial lactate is not independently predictive of outcome in this population and should not be relied upon in isolation.

6-HOUR LACTATE CLEARANCE

Lactate clearance showed a significant association with survival ($p = 0.0215$).

Survivors had:

- Higher mean clearance (36.31%)
- More consistent trends (lower SD)

Non-survivors had:

- Lower median clearance (13.96%)
- Greater variability (SD = 43.22%)

This strongly supports the role of serial lactate measurement over static values:

Lactate clearance is a dynamic, sensitive, and clinically valuable prognostic marker in critically ill CKD patients. It reflects both the initial severity of hypoperfusion and the response to therapy (fluids, antibiotics, oxygenation).

3. ADDITIONAL FINDINGS: INFLUENCE OF OTHER VARIABLES

- **Age**: Older patients had significantly higher mortality ($p = 0.0377$). Age remains an independent predictor in CKD.
- **Hemodynamics**: Despite expectations, unstable vitals at admission did not significantly predict outcome ($p = 0.8494$), suggesting that initial appearance may be misleading.
- **Comorbidities (T2DM + HTN):** These patients had slightly higher mortality, but the difference was not significant ($p = 1$).

- **CAD status:** Unexpectedly, CAD patients had higher survival, though not statistically significant. This may reflect better prior medical optimization or more aggressive care in known cardiac cases.

4. IMPLICATIONS FOR EMERGENCY DEPARTMENT PRACTICE

- Lactate clearance should be prioritized for serial measurement and used to guide clinical decisions (e.g., ICU transfer, vasopressor support).
- CRP and initial lactate can be retained as supportive tools, especially for differential diagnosis, but should not be over-relied upon for prognosis.
- CKD patients are complex. A multi-marker, time-based strategy is more effective than single-point assessment.

5. COMPARISON WITH EXISTING LITERATURE

This study aligns with previous findings:

- Nguyen et al. (2004) and Arnold et al. (2009) showed early lactate clearance predicts better outcomes in sepsis.
- Mikkelsen et al. (2009) found clearance superior to initial lactate in emergency settings.
- Zhang et al. (2014) meta-analysis confirmed clearance as a mortality predictor in ICU patients.

However, this study uniquely applies those findings to a CKD-specific population, where metabolic derangements can confound interpretation.

CONCLUSION OF DISCUSSION

In summary, 6-hour lactate clearance outperformed both CRP and initial lactate levels in predicting survival in CKD patients admitted to the emergency department. It serves as a dynamic marker that reflects treatment response and clinical trajectory. Emergency protocols should consider incorporating serial lactate monitoring in risk stratification models for CKD patients.

CONCLUSION

CONCLUSION

By identifying the most reliable biomarker among these, this study can help guide emergency physicians in making informed, timely decisions for a high-risk patient group, ultimately improving clinical outcomes and resource utilization in emergency care settings.

TABLE 5: REPEAT LACTATE VS OUTCOME - CLINICAL SIGNIFICANCE

- STRONG ASSOCIATION: There is a significant clinical association between low lactate clearance and high mortality in CKD patients. Therefore, 6th-hour lactate clearance is a valuable prognostic indicator in the emergency setting.
- Highly Mortality in Elevated Lactate Group: Patients in the Dead group had significantly elevated 6th-hour lactate levels, indicating a strong association with poor prognosis and higher in-hospital mortality.
- Low Mortality in Controlled Lactate Group: Patients who survived (Alive group) had substantially lower repeat lactate levels, suggesting that better lactate clearance or normalization at 6 hours is associated with improved survival.

REFERENCE

REFERENCE

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PRO FORMA

PRO FORMA

- PATIENT NAME
- PATIENT ID
- AGE
- GENDER
- CHIEF COMPLAINTS
- KNOWN CASE OF
- SYSTOLIC BLOOD PRESSURE
- DIASTOLIC BLOOD PRESSURE
- RESPIRATORY RATE
- CAPILLARY BLOOD GLUCOSE
- HEART RATE
- SATURATION
- TEMPERATURE
- UREA
- CREATININE
- C-REACTIVE PROTEIN
- INITIAL LACTATE
- 6TH HOUR LACTATE
- LACTATE CLEARANCE
- CLINICAL OUTCOME

CASE RECORD FORM

CLINICAL DATA COLLECTION PROFORMA

STUDY TITLE: A comparative study of CRP, Baseline Lactate and 6th hour lactate clearance in chronic kidney disease patients in emergency department

INSTITUTION: SAVEETHA MEDICAL COLLEGE AND HOSPITAL

ETHICAL APPROVAL NUMBER: 005/06/2025/IEC/SMCH

A. PATIENT IDENTIFICATION

Name:

PID (Patient ID):

Age:

Sex (Male/Female/Other):

B. CLINICAL DETAILS

Chief complaints:

Comorbidities:

DM SHTN CAD:

Others:

C. VITALS MONITORING

SBP:

DBP:

HR:

SPO2:

T:

RR:

CBG:

D. BLOOD VALUES

C-Reactive Protein:

Initial Lactate:

6th hour Lactate:

Lactate Clearance:

Urea:

Creatinine:

E. OUTCOME

ALIVE

DEAD

F. NOTES OBSERVATIONS

ADDITIONAL COMMENTS:

CONSENT FORM

INFORMED CONSENT

I certify that I have explained the nature and purpose of this study to the above-named individual, and I have discussed the potential benefits of this study participation. The questions the individual had about this study have been answered, and we will always be available to address future questions.

Date: **Signature of person obtaining consent**

ஆராய்ச்சி ஒப்புதல் படிவம்

சவிதா பல்கலைக்கழகம் மற்றும் துணை மருத்துவமனை

சவிதா பல்கலைக்கழக மாணவி **து. அனு பிரியா** அவர்களால் நடத்தப்படும் ஆராய்ச்சியின் தலைப்பு **"அவசர மருத்துவ பிரிவில் நீண்டகால சிறுநீரக நோயாளிகளில் சி-ரியாக்டிவ் புரோட்டீன் (CRP), ஆரம்ப லாக்டேட் மற்றும் 6 மணி நேர லாக்டேட் கிளியரன்ஸ் ஒப்பீட்டாய ஆய்வு"** ஆராய்ச்சி குறித்து எனக்கு விளக்கி கூறப்பட்டது. அதை புரிந்து கொண்டு நான் கீழ்கண்டவற்றில் என் முழுமனதுடன் சம்மதிக்கிறேன்.

1. எனது உடல் நிலையை குறித்து விவரங்களை அளிக்க
2. இதுகுறித்து பரிசீலனையில் பங்குபெற

இந்த ஆராய்ச்சி நோக்கம், நடைமுறை அளவிடும் முறைகள் ஆகியவை குறித்து எனக்கு விரிவாக விளக்கப்பட்டது எனது சந்தேகங்களை நிவர்த்தி செய்யப்பட்டது. இதில் பங்கு பெறுவது முற்றிலும் என் விருப்பம் சார்ந்தது என்பதும், இந்த ஆராய்ச்சியில் எவ்வித இரத்த பரிசோதனையும் சதை பரிசோதனையும் புதிதாக செய்யப்படமாட்டாது என்று, தெளிவாக எனக்கு கூறப்பட்டது. இதிலிருந்து நான் எப்பொழுது வேண்டுமானாலும் விலகலாம் என்பதையும் விளக்கி கூறப்பட்டது. ஆராய்ச்சியில் பங்கு பெறுபவர்களுக்கு எந்தவித பாதிப்பு ஒன்றும் இல்லை. இது குறித்த விவரங்கள் மற்றும் முடிவுகள் நம்பிக்கையோடு பாதுகாக்கப்படும் என்று தெளிவாக விளக்கி கூறப்பட்டது. இதில் வேறு எந்தவித உள்நோக்கமும் கிடையாது. இந்த ஆராய்ச்சியில் நோயாளிக்கு உடலளவிலும் மனதளவிலும் எந்தவித பாதிப்பும் ஏற்படாது.

பங்குபெறுபவர்கள் கையொப்பம்

தொடர்பு முகவரி:

MASTER CHART

MASTER CHART

NAME	PID NO	AGE	SEX	COMPLAINTS	K/C/O	SBP	DBP	SBP/DBP	SPO2 %	RR	CBG	TEMPERATURE	HR	UREA	CREATININE	CRP	INITIAL LACTATE	REPEAT LACTATE	LACTATE CLEARANCE	CLINICAL OUTCOMES
GOPINATH	250302308432	45	MALE	BREATHLESSNESS	CKD SHTN	90 mm Hg	60 mm Hg	90/60 mm Hg	95%	40 min^{-1}	265 mg/dL	96.4 °F	148 BPM	24 mg/dL	1.0 mg/dL	39 mg/L	4.4 mmol/L	0.9 mmol/L	17.00%	ALIVE
SUBRAMANI	240517207052	84	MALE	BREATHLESSNESS	CKD SHTN	120 mm Hg	80 mm Hg	120/80 mm Hg	85%	33 min^{-1}	190 mg/dL	98.3 °F	133 BPM	96 mg/dL	4.0 mg/dL	359 mg/L	6.1 mmol/L	9.8 mmol/L	6.13%	DEAD
ARUMUGAM	250123294432	59	MALE	AFI	CKD SHTN	110 mm Hg	70 mm Hg	110/70 mm Hg	95%	22 min^{-1}	197 mg/dL	100.8 °F	116 BPM	82 mg/dL	3.0 mg/dL	194 mg/L	1.2 mmol/L	0.7 mmol/L	41.67%	ALIVE
RAJENDRAN	241029265807	69	MALE	ALTERED SENSORIUM	CKD SHTN	100 mm Hg	60 mm Hg	100/60 mm Hg	83%	36 min^{-1}	145 mg/dL	97.4 °F	98 BPM	178 mg/dL	2.0 mg/dL	141 mg/L	4.2 mmol/L	5.8 mmol/L	8.20%	DEAD
DURAI	240704221812	55	MALE	BREATHLESSNESS	CKD SHTN	130 mm Hg	80 mm Hg	130/80 mm Hg	99%	21 min^{-1}	201 mg/dL	97.3 °F	84 BPM	147 mg/dL	3.0 mg/dL	48 mg/L	5.2 mmol/L	2.5 mmol/L	21.00%	ALIVE
CHITRA	230823121929	31	FEMALE	VOMITING	CKD T1DM	190 m	90 mm Hg	190/90 mm Hg	100%	25 min^{-1}	198 mg/dL	98.8 °F	79 BPM	58 mg/dL	5.0 mg/dL	71 mg/L	0.9 mmol/L	0.5 mmol/L	44.44%	ALIVE

					SHTN	mHg												
VIJAYALAKSHMI	250224306358	57	FEMALE	BREATHLESSNESS	CKD T2DM SHTN	130 mmHg	80 mmHg	130/80 mmHg	68%	42 min⁻¹	333 mg/dL	98.1 °F	92 BPM	47 mg/dL	3.0 mg/dL	57 mg/L	16.0 mmol/L	23. mmol/L	2.10%	DEAD
MADHURAIMUTHU	250306310374	90	MALE	BREATHLESSNESS	CKD T2DM SHTN	100 mmHg	70 mmHg	100/70 mmHg	84%	43 min⁻¹	78 mg/dL	98.4 °F	144 BPM	20 mg/dL	1.0 mg/dL	45 mg/L	2.2 mmol/L	1.6 mmol/L	27.10%	ALIVE
VETRIVEL	250313313273	22	MALE	PEDAL EDEMA	CKD T2DM SHTN	140 mmHg	110 mmHg	140/110 mmHg	100%	22 min⁻¹	102 mg/dL	98.1 °F	128 BPM	78 mg/dL	7.0 mg/dL	10 mg/L	2.0 mmol/L	0.8 mmol/L	19.00%	ALIVE
JAYACHANDRAN	250211300996	77	MALE	GIDDINESS	CKD T2DM SHTN	140 mmHg	70 mmHg	140/70 mmHg	99%	24 min⁻¹	321 mg/dL	98.1 °F	84 BPM	116 mg/dL	5.0 mg/dL	11 mg/L	2.0 mmol/L	1.2 mmol/L	40.00%	ALIVE
BASKARAN	250127295238	63	MALE	BREATHLESSNESS AFI	CKD T2DM SHTN	140 mmHg	80 mmHg	140/80 mmHg	97%	25 min⁻¹	196 mg/dL	104.5 °F	112 BPM	36 mg/dL	1.0 mg/dL	186 mg/L	3.2 mmol/L	2.4 mmol/L	25.00%	ALIVE

NATA RAJAN	230628103362	56	MALE	BREATHLESSNESS	CKD APESHTN	120 mmHg	80 mmHg	120/80 mmHg	96%	27 min⁻¹	158 mg/dL	99.2 °F	94 BPM	142 mg/dL	8.0 mg/dL	213 mg/L	4.3 mmol/L	5.4 mmol/L	2.50%	DEAD
RAJAN DHARMA	2210042043	63	MALE	PEDAL EDEMA	CKD T2DM SHTN	110 mmHg	70 mmHg	110/70 mmHg	97%	22 min⁻¹	125 mg/dL	92.5 °F	87 BPM	76 mg/dL	3.0 mg/dL	70 mg/L	1.4 mmol/L	1.2 mmol/L	14.29%	ALIVE
SANJEEVI	250324317166	53	MALE	DECREASED URINE OUTPUT	CKD SHTN	110 mmHg	70 mmHg	110/70 mmHg	98%	22 min⁻¹	133 mg/dL	98.1 °F	95 BPM	158 mg/dL	7.0 mg/dL	69 mg/L	1.2 mmol/L	0.7 mmol/L	42.00%	ALIVE
GANESAN	2210126346	64	MALE	BREATHLESSNESS	CKD T2DM CAD	190 mmHg	100 mmHg	190/100 mmHg	99%	36 min⁻¹	224 mg/dL	98.1 °F	106 BPM	78 mg/dL	4.0 mg/dL	5 mg/L	0.9 mmol/L	0.7 mmol/L	22.00%	ALIVE
RUKIA KHATUN	250322316868	51	FEMALE	ABDOMINAL PAIN	CKD T2DM	110 mmHg	70 mmHg	110/70 mmHg	98%	20 min⁻¹	340 mg/dL	98.7 °F	106 BPM	110 mg/dL	8.0 mg/dL	397 mg/L	1.0 mmol/L	0.9 mmol/L	10.00%	ALIVE
ETHIRAJULU	240531211189	63	MALE	LEFT LL WEAKNESS	CKD T2DM	110 mmHg	70 mmHg	110/70 mmHg	98%	16 min⁻¹	242 mg/dL	97.6 °F	80 BPM	86 mg/dL	3.0 mg/dL	<5	2.1 mmol/L	1.9 mmol/L	10.00%	ALIVE

NASIRA BEGUM	250314313963	47	FEMALE	BREATHLESSNESS	CKD LEPTOSPIROSIS	160 mmHg	110 mmHg	160/110 mmHg	94%	23 min⁻¹	134 mg/dL	98.6 °F	118 BPM	151 mg/dL	5.0 mg/dL	231 mg/L	2.8 mmol/L	1.9 mmol/L	32.00%	ALIVE
MOHAMMADISMAIL	241231287687	69	MALE	AFI DISORIENTED	CKD T2DM CAD	150 mmHg	80 mmHg	150/80 mmHg	94%	20 min⁻¹	94 mg/dL	97.9 °F	64 BPM	129 mg/dL	5.0 mg/dL	192 mg/L	1.7 mmol/L	1.2 mmol/L	29.00%	ALIVE
ELUMALAI	241230287659	74	MALE	CHEST PAIN	CKD T2DM SHTN	130 mmHg	80 mmHg	130/80 mmHg	100%	22 min⁻¹	124 mg/dL	97.4 °F	74 BPM	111 mg/dL	4.0 mg/dL	10 mg/L	1.6 mmol/L	1.4 mmol/L	13.00%	ALIVE
DHANA BAKKIYAM	241220284534	79	FEMALE	GIDDINESS	CKD T2DM SHTN	200 mmHg	100 mmHg	200/100 mmHg	97%	24 min⁻¹	81 mg/dL	96.6 °F	68 BPM	103 mg/dL	6.0 mg/dL	6 mg/L	1.4 mmol/L	0.9 mmol/L	36.00%	ALIVE
RAMCHANDRA RAUT	241215282950	64	MALE	SCROTAL SWELLING	CKD T2DM SHTN	140 mmHg	90 mmHg	140/90 mmHg	99%	22 min⁻¹	HIGH	98.1 °F	80 BPM	97 mg/dL	3.0 mg/dL	431 mg/L	4.6 mmol/L	7.2 mmol/L	5.60%	DEAD
NAGARAJ VEMPULI	241218283990	46	MALE	BREATHLESSNESS	CKD DCLD	180 m	110 m	180/110 mmHg	91%	30 min⁻¹	130 mg/dL	97.8 °F	94 BPM	103 mg/dL	7.0 mg/dL	32 mg/L	1.2 mmol/L	0.7 mmol/L	41.67%	ALIVE

					SHTN	mHg	mHg											
GIRIBABU	241216283391	51	MALE	CHEST PAIN	CKD T2DM SHTN	150 mmHg	100 mmHg	150/100 mmHg	99%	22 min^{-1}	125 mg/dL	98.2 °F	63 BPM	64 mg/dL	4.6 mg/dL	124 mg/L	1.4 mmol/L	1.1 mmol/L	20.29%	ALIVE
AYYASWAMY	241206279973	74	MALE	DIALYSIS	CKD T2DM CLD	180 mmHg	100 mmHg	180/100 mmHg	98%	21 min^{-1}	140 mg/dL	98.8 °F	97 BPM	105 mg/dL	4.4 mg/dL	76 mg/L	7.4 mmol/L	9.3 mmol/L	-25.68 %	DEAD
MALLIGA	241207280316	54	FEMALE	BREATHLESSNESS	CKD T2DM SHTN	200 mmHg	100 mmHg	200/100 mmHg	96%	21 min^{-1}	82 mg/dL	97.6 °F	95 BPM	49 mg/dL	2.3 mg/dL	<5 mg/L	4.8 mmol/L	2.2 mmol/L	54.17%	ALIVE
RAJASEKAR	241210281753	55	MALE	CHEST PAIN	CKD T2DM CAD	130 mmHg	80 mmHg	130/80 mmHg	98%	24 min^{-1}	270 mg/dL	98.2 °F	97 BPM	73 mg/dL	3.9 mg/dL	<5 mg/L	1.3 mmol/L	0.9 mmol/L	29.69%	ALIVE
MAHBOOBBASHA	241207280364	71	MALE	BREATHLESSNESS	CKD T2DM	120 mmHg	70 mmHg	120/70 mmHg	68%	20 min^{-1}	155 mg/dL	97.1 °F	96 BPM	120 mg/dL	5.4 mg/dL	66 mg/L	1.3 mmol/L	2.7 mmol/L	-103.01 %	DEAD
SUBRAMANI	241128277787	77	MALE	BREATHLESSNESS	CKD T2D	180 m	70 m	180/70	91%	26 min^{-1}	155 mg/dL	97.2 °F	110 BPM	160 mg/dL	7.3 mg/dL	55 mg/L	1.6 mmol/L	1.3 mmol/L	18.75%	ALIVE

NEELAKANDAN				ABDOMINAL PAIN	MCAD	mHg	mHg	mmHg										
ARUMUGAM	241127277450	60	MALE	GIDDINESS	CKD T2DM	150 mmHg	100 mmHg	150/100 mmHg	100%	22 min^{-1}	54 mg/dL	98.0 °F	100 BPM	67 mg/dL	3.0 mg/dL	24 mg/L	2.5 mmol/L	1.8 mmol/L	28.00%	ALIVE
THANIGAIMALAI	241125276635	47	MALE	ALTERED SENSORIUM	CKD T2DM	140 mmHg	90 mmHg	140/90 mmHg	97%	14 min^{-1}	303 mg/dL	98.1 °F	82 BPM	146 mg/dL	7.3 mg/dL	222 mg/L	2.4 mmol/L	1.2 mmol/L	50.00%	ALIVE
RAMESH	241117273480	52	MALE	VOMITING GIDDINESS	DCLD CKD T2DM	120 mmHg	80 mmHg	120/80 mmHg	100%	22 min^{-1}	168 mg/dL	97.9 °F	91 BPM	135 mg/dL	3.2 mg/dL	13 mg/L	7.7 mmol/L	2.5 mmol/L	67.53%	ALIVE
RAMACHANDRA RAJU	241007259458	67	MALE	DECREASED URINE OUTPUT	CKD APESHTN	140 mmHg	100 mmHg	140/100 mmHg	80%	24 min^{-1}	77 mg/dL	99.6 °F	100 BPM	230 mg/dL	9.9 mg/dL	238 mg/L	4.3 mmol/L	6.4 mmol/L	4.80%	DEAD
PERUMAL RAJI	241013261039	64	MALE	BREATHLESSNESS COUGH	CKD SHTN T2DM CAD	150 mmHg	100 mmHg	150/100 mmHg	85%	24 min^{-1}	134 mg/dL	98.1 °F	93 BPM	35 mg/dL	2.3 mg/dL	<5 mg/L	2.1 mmol/L	0.7 mmol/L	66.67%	ALIVE

SHANMUGAN SUNDARAM	241109269609	59	MALE	BREATHLESSNESS	CKD SHTN	170 mmHg	100 mmHg	170/100 mmHg	98%	24 min⁻¹	111 mg/dL	98.0 °F	72 BPM	83 mg/dL	4.5 mg/dL	<5 mg/L	1.9 mmol/L	1.2 mmol/L	36.84%	ALIVE
NAGARATHINAM MUNUSWAMY	240812234251	63	MALE	GIDDINESS	CKD	110 mmHg	60 mmHg	110/60 mmHg	98%	22 min⁻¹	191 mg/dL	96.7 °F	112 BPM	39 mg/dL	4.0 mg/dL	34 mg/L	3.7 mmol/L	0.8 mmol/L	78.32%	ALIVE
VINAY AGI	241015261664	56	FEMALE	BREATHLESSNESS	CKD SHTN T2DM SEIZURE DISORDER	140 mmHg	70 mmHg	140/70 mmHg	65%	34 min⁻¹	217 mg/dL	97.4 °F	108 BPM	76 mg/dL	2.8 mg/dL	12 mg/L	1.7 mmol/L	1.0 mmol/L	41.18%	ALIVE
KAMSALA	241002257755	74	FEMALE	BREATHLESSNESS FACE PUFFINESS	CKD CAD T2DM APE	110 mmHg	60 mmHg	110/60 mmHg	84%	23 min⁻¹	304 mg/dL	96.2 °F	54 BPM	57 mg/dL	1.8 mg/dL	<5mg/L	10.8 mmol/L	8.7 mmol/L	19.91%	ALIVE
SANTHOSH KUMAR	240922252824	28	MALE	FEVER	CEREBRAL	80 mmHg	60 mmHg	80/60 mmHg	85%	45 min⁻¹	86 mg/dL	98.1 °F	140 BPM	114 mg/dL	3.8 mg/dL	334 mg/L	2.1 mmol/L	4.5 mmol/L	1.43%	ALIVE

					PALSY CKD APE														
KASTHURI	231028145682	70	FEMALE	FEVER VOMITING LOOSE STOOLS	CKD SHTN HYPOTHYROIDISM HEPATOMEGALY	80 mm Hg	50 mm Hg	80/50 mm Hg	98%	24 min^{-1}	104 mg/dL	97.2 °F	98 BPM	98 mg/dL	3.5 mg/dL	420 mg/L	1.7 mmol/L	4.6 mmol/L	-26.80 %	DEAD
NAGAMMAL	240911245108	46	FEMALE	GIDDINESS VOMITING	T2DM SHTN DYSLIPIDEMIA	180 mm Hg	110 mm Hg	180/110 mm Hg	93%	22 min^{-1}	182 mg/dL	99.0 °F	102 BPM	212 mg/dL	17.2 mg/dL	33 mg/L	1.8 mmol/L	1.2 mmol/L	34.78%	ALIVE
LOGANATHAN	240911245091	45	MALE	FEVER DECREASED URINE OUTPUT	CAD SHTN	150 mm Hg	80 mm Hg	150/80 mm Hg	100%	33 min^{-1}	155 mg/dL	99.3 °F	133 BPM	170 mg/dL	12.2 mg/dL	397 mg/L	2.5 mmol/L	2.1 mmol/L	52.00%	ALIVE

PAARI	240911244840	59	MALE	B/L LIMB WEAKNESS SWELLING	DM CKD SHTN	150 mm Hg	90 mm Hg	150/90 mm Hg	93%	25 min^{-1}	508 mg/dL	97.2 °F	57 BPM	44 mg/dL	2.0 mg/dL	22 mg/L	2.7 mmol/L	0.9 mmol/L	66.67%	ALIVE
KUPPAN	231224162427	63	MALE	B/L UPPER LIMB WEAKNESS	CKD SHTN CVA	150 mm Hg	100 mm Hg	150/100 mm Hg	100%	20 min^{-1}	152 mg/dL	97.6 °F	60 BPM	250 mg/dL	5.9 mg/dL	86 mg/L	2.1 mmol/L	3.4 mmol/L	-61.90 %	DEAD
VIJAYALAKSHMI	240907242701	73	FEMALE	CHEST PAIN BREATHLESSNESS	T2DM SHTN CAD CKD	180 mm Hg	120 mm Hg	180/120 mm Hg	85%	30 min^{-1}	340 mg/dL	98.6 °F	122 BPM	54 mg/dL	2.0 mg/dL	22 mg/L	4.3 mmol/L	2.0 mmol/L	53.49%	ALIVE
GOPALNAYAKAR KAMARAJAN	240904241576	64	MALE	GIDDINESS VOMITING	CAD SHTN T2DM	170 mm Hg	90 mm Hg	170/90 mm Hg	86%	24 min^{-1}	182 mg/dL	98.0 °F	88 BPM	63 mg/dL	2.5 mg/dL	45 mg/L	3.7 mmol/L	2.9 mmol/L	21.62%	ALIVE
SAYEERA BEGUM	240831240468	66	FEMALE	BREATHLESSNESS	T2DM SHTN CKD	160 mm Hg	100 mm Hg	160/100 mm Hg	90%	23 min^{-1}	226 mg/dL	97.3 °F	101 BPM	131 mg/dL	7.6 mg/dL	15 mg/L	1.5 mmol/L	0.8 mmol/L	45.58%	ALIVE
AJAYAKUMAR	231028245360	55	MALE	ABDOMINAL DISTENSION VOMITING	CKD DCLD	120 m	90 mm Hg	120/90 mm Hg	100%	33 min^{-1}	236 mg/dL	98.1 °F	86 BPM	126 mg/dL	2.4 mg/dL	70 mg/L	2.1 mmol/L	5.2 mmol/L	-147.62 %	DEAD

YADAVA					SHTN T2DM	mHg												
MAHENTHRAN	240831240184	53	FEMALE	GIDDINESS VOMITING	CKD CAD SHTN T2DM HF	160 mmHg	100 mmHg	160/100 mmHg	96%	18 min⁻¹	375 mg/dL	98.4 °F	92 BPM	41 mg/dL	1.5 mg/dL	77 mg/L	3.8 mmol/L	2.1 mmol/L	44.74%	ALIVE
RAVI	240829239629	57	MALE	BREATHLESSNESS	DM SHTN CKD CAD	160 mmHg	110 mmHg	160/110 mmHg	84%	22 min⁻¹	228 mg/dL	98.2 °F	120 BPM	56 mg/dL	2.9 mg/dL	299 mg/L	0.8 mmol/L	0.4 mmol/L	50.00%	ALIVE
LALITHA	240813234351	64	FEMALE	DECREASED URINE OUTPUT BREATHLESSNESS	CKD	160 mmHg	80 mmHg	160/80 mmHg	100%	24 min⁻¹	98 mg/dL	98.4 °F	98 BPM	84 mg/dL	9.6 mg/dL	27 mg/L	9.2 mmol/L	7.2 mmol/L	21.74%	ALIVE
MALLIGANATESAN	240809233063	67	FEMALE	BREATHLESSNESS	CAD CKD T2DM SHTN CABR	140 mmHg	100 mmHg	140/100 mmHg	82%	27 min⁻¹	306 mg/dL	97.6 °F	84 BPM	88 mg/dL	2.9 mg/dL	35 mg/L	2.4 mmol/L	1.3 mmol/L	42.98%	ALIVE

					EAST													
JAYANTHI SLEVARAJ	240807232656	58	FEMALE	BREATHLESSNESS	T2DM SHTN HYPOTHYROIDISM	140 mmHg	80 mmHg	140/80 mmHg	85%	27 min^{-1}	245 mg/dL	97.5 °F	112 BPM	72 mg/dL	4.3 mg/dL	348 mg/L	4.3 mmol/L	2.6 mmol/L	39.53%	ALIVE
SALOMI	240727229194	52	FEMALE	BREATHLESSNESS	CKD SHTN T2DM	220 mmHg	120 mmHg	220/120 mmHg	98%	21 min^{-1}	98 mg/dL	98.4 °F	102 BPM	103 mg/dL	8.7 mg/dL	112 mg/L	2.2 mmol/L	1.3 mmol/L	40.91%	ALIVE
DURGADEVI	240725228636	54	FEMALE	BREATHLESSNESS GIDDINESS	CKD T2DM HYPOTHYROIDISM ANEMIA	150 mmHg	90 mmHg	150/90 mmHg	90%	24 min^{-1}	259 mg/dL	97.6 °F	88 BPM	138 mg/dL	9.2 mg/dL	135 mg/L	2.3 mmol/L	1.0 mmol/L	57.39%	ALIVE
ARJUN	240720226954	30	MALE	COUGH BREATHLESSNESS VOMITING	T2DM SHTN	210 m	110 m	210/110 mmHg	75%	32 min^{-1}	151 mg/dL	96.8 °F	100 BPM	197 mg/dL	15.2 mg/dL	39 mg/L	2.5 mmol/L	2.0 mmol/L	20.00%	ALIVE

						mm Hg	mm Hg											
MEENATCHI	240714224929	74	FEMALE	BREATHLESSNESS	CKD SHTN T2DM	120 mm Hg	80 mm Hg	120/80 mm Hg	64%	30 min⁻¹	125 mg/dL	98.2 °F	62 BPM	100 mg/dL	9.5 mg/dL	8 mg/L	19.0 mmol/L	20.0 mmol/L	5.55%	DEAD
ANHALATCHI NAGAPPAN	240705222222	59	FEMALE	ABDOMINAL PAIN VOMITING	T2DM SHTN CKD	100 mm Hg	60 mm Hg	100/60 mm Hg	95%	20 min⁻¹	299 mg/dL	98.0 °F	80 BPM	53 mg/dL	2.3 mg/dL	178 mg/L	1.8 mmol/L	1.4 mmol/L	23.08%	ALIVE
PUSHPA	240709223296	63	FEMALE	BREATHLESSNESS	T2DM SHTN CKD CAD	200 mm Hg	120 mm Hg	200/120 mm Hg	95%	28 min⁻¹	234 mg/dL	98.6 °F	114 BPM	123 mg/dL	5.2 mg/dL	16 mg/L	0.9 mmol/L	0.8 mmol/L	11.11%	ALIVE
HASINA	240704221852	69	FEMALE	LEG SWELLING BREATHLESSNESS	T2DM SHTN	150 mm Hg	70 mm Hg	150/70 mm Hg	83%	26 min⁻¹	164 mg/dL	98.6 °F	82 BPM	82 mg/dL	2.6 mg/dL	17 mg/L	1.1 mmol/L	0.9 mmol/L	18.18%	ALIVE
GLADYS JOSEPH	240703221437	83	FEMALE	LETHARGY DECREASED RESPONSE	CAD CKD SHTN HYPOT	180 mm Hg	100 mm Hg	180/100 mm Hg	99%	20 min⁻¹	49 mg/dL	98.2 °F	80 BPM	166 mg/dL	6.8 mg/dL	61 mg/L	1.2 mmol/L	0.8 mmol/L	31.62%	ALIVE

					HYROIDISM ANEMIA													
VARDHARAJAN	240601211772	58	MALE	FALL FROM BED	CAD SHTN PARKINSONS DISEASE	80 mm Hg	60 mm Hg	80/60 mm Hg	99%	36 min^{-1}	158 mg/dL	101.5 °F	105 BPM	111 mg/dL	3.0 mg/dL	8 mg/L	1.3 mmol/L	2.3 mmol/L	7.60%	DEAD
PARAMESHWARAN	240531211348	77	MALE	NUMBNESS B/L UPPER LOWER LIMB	CKD SHTN T2DM CAD	150 mm Hg	100 mm Hg	150/100 mm Hg	98%	24 min^{-1}	174 mg/dL	97.4 °F	94 BPM	84 mg/dL	2.5 mg/dL	25 mg/L	3.8 mmol/L	2.1 mmol/L	44.88%	ALIVE
GANESAN	240528210216	64	MALE	BREATHLESSNESS	T2DM SHTN CKD	160 mm Hg	90 mm Hg	160/90 mm Hg	93%	30 min^{-1}	119 mg/dL	97.5 °F	95 BPM	74 mg/dL	5.6 mg/dL	24 mg/L	1.6 mmol/L	1.4 mmol/L	12.50%	ALIVE
NATARAJAN	230807117024	56	MALE	NECK SWELLING	CKD TB	140 m	90 m	140/90	99%	20 min^{-1}	380 mg/dL	99.3 °F	112 BPM	211 mg/dL	3.4 mg/dL	112 mg/L	1.4 mmol/L	1.6 mmol/L	-14.29 %	DEAD

					SKTN CAD	mHg	mHg	mmHg										
SARALADEVI	250505331418	47	FEMALE	BREATHLESSNESS	THYROID SHTN CKD	100 mmHg	80 mmHg	100/80 mmHg	99%	24 min⁻¹	143 mg/dL	98.2 °F	143 BPM	54 mg/dL	0.8 mg/dL	38 mg/L	13.1 mmol/L	1.5 mmol/L	88.55%	ALIVE
MUNUSWAMY	250501330250	58	MALE	BREATHLESSNESS	SHTN CKD CAD	160 mmHg	60 mmHg	160/60 mmHg	100%	24 min⁻¹	148 mg/dL	97.6 °F	93 BPM	339 mg/dL	26.7 mg/dL	232 mg/L	0.8 mmol/L	0.6 mmol/L	25.00%	ALIVE
GUBENDIRAN	240718226372	58	MALE	BREATHLESSNESS	SHTN CKD CAD	120 mmHg	80 mmHg	120/80 mmHg	98%	26 min⁻¹	134 mg/dL	97.1 °F	78 BPM	193 mg/dL	16.3 mg/dL	30 mg/L	8.1 mmol/L	1.2 mmol/L	85.19%	ALIVE
PUNITHA SAMBATH	230823121809	61	FEMALE	GENERALISED FATIGUE	SHTN T2DM HF HYPOTHYROID SMAPE	130 mmHg	90 mmHg	130/90 mmHg	99%	20 min⁻¹	190 mg/dL	96.5 °F	84 BPM	143 mg/dL	4.7 mg/dL	23 mg/L	2.2 mmol/L	2.5 mmol/L	-13.64 %	DEAD

MAARTHAL	250501330270	55	FEMALE	BREATHLESSNESS FEVER	SHTN CKD CAD	130 mmHg	70 mmHg	130/70 mmHg	99%	22 min^{-1}	140 mg/dL	97.1 °F	98 BPM	66 mg/dL	2.6 mg/dL	22 mg/L	8.5 mmol/L	6.3 mmol/L	25.88%	ALIVE
KASI	250517335421	65	FEMALE	BREATHLESSNESS PEDEAL EDEMA	SHTN CKD APE	110 mmHg	70 mmHg	110/70 mmHg	100%	24 min^{-1}	151 mg/dL	97.2 °F	60 BPM	148 mg/dL	2.9 mg/dL	35 mg/L	7.8 mmol/L	1.1 mmol/L	85.90%	ALIVE
PRASANTH	241209281243	26	MALE	BREATHLESSNESS	SHTN CKD	110 mmHg	70 mmHg	110/70 mmHg	98%	32 min^{-1}	125 mg/dL	98.1 °F	80 BPM	119 mg/dL	8.5 mg/dL	120 mg/L	1.5 mmol/L	1.1 mmol/L	26.67%	ALIVE
KASTHURI	250504331017	49	FEMALE	BREATHLESSNESS CHEST PAIN	SHTN T2DM CKD	130 mmHg	80 mmHg	130/80 mmHg	98%	22 min^{-1}	201 mg/dL	97.4 °F	88 BPM	107 mg/dL	6.7 mg/dL	19 mg/L	1.7 mmol/L	1.2 mmol/L	29.82%	ALIVE
PROMODHA KUMARI	250519335853	70	FEMALE	BREATHLESSNESS FEVER	SHTN T2DM CKD	140 mmHg	80 mmHg	140/80 mmHg	89%	26 min^{-1}	152 mg/dL	99.4 °F	78 BPM	90 mg/dL	3.8 mg/dL	345 mg/L	2.3 mmol/L	1.4 mmol/L	39.13%	ALIVE
KARUNAKARAN	2210105060	70	MALE	BREATHLESSNESS	SHTN T2DM CAD	150 mmHg	80 mmHg	150/80 mmHg	85%	27 min^{-1}	186 mg/dL	98.3 °F	90 BPM	288 mg/dL	3.8 mg/dL	248 mg/L	2.2 mmol/L	4.1 mmol/L	8.90%	DEAD

GUNA	2210281 3258	57	MALE	BREATHLESS NESS FEVER	SHT N CK D	18 0 m m Hg	10 0 m m Hg	180/ 100 mm Hg	83%	40 min^{-1}	151 mg/d L	102.0 °F	151 BP M	102 mg/dL	4.3 mg/d L	323 mg/ L	3.2 mmol/ L	4.1 mmol/L	5.20%	DEAD
RUKU MANI	2211111 9149	68	FEMA LE	BREATHLESS NESS FEVER	SHT N T2D M	11 0 m m Hg	60 m m Hg	110/ 60 mm Hg	100%	19 min^{-1}	267 mg/d L	99.3 °F	70 BP M	138 mg/dL	2.5 mg/d L	224 mg/ L	1.6 mmol/ L	2.5 mmol/L	5.60%	DEAD
MAYA NBAT HBEE ALIYA R	2211152 0325	62	FEMA LE	BREATHLESS NESS CHEST PAIN	SHT N T2D M PE CK D CA D	16 0 m m Hg	90 m m Hg	160/ 90 mm Hg	82%	28 min^{-1}	261 mg/d L	96.2 °F	102 BP M	144 mg/dL	7.7 mg/d L	11 mg/ L	2.1 mmol/ L	3.2 mmol/L	-52.38 %	DEAD
KART HICK	2211152 0562	32	MALE	B/L LIMB WEAKNESS SWELLING	T2D M CK D IDA SHT N	17 0 m m Hg	10 0 m m Hg	170/ 100 mm Hg	97%	22 min^{-1}	172 mg/d L	100.1 °F	123 BP M	57 mg/dL	2.0 mg/d L	34 mg/ L	3.2 mmol/ L	2.1 mmol/L	34.38%	ALIVE
ANNA MALA I GOVID AN	2303126 7567	54	MALE	LOOSE STOOLS ABDOMINAL PAIN	T2D M HY POT HY ROI D CK D	20 0 m m Hg	11 0 m m Hg	200/ 110 mm Hg	100%	26 min^{-1}	60 mg/d L	97.2 °F	54 BP M	200 mg/dL	5.7 mg/d L	<5 mg/ L	3.2 mmol/ L	3.5 mmol/L	9.21	DEAD

MUTHUKUMAR	2212273 7627	54	MALE	BREATHLESSNESS FOOT ULCER	SHTN CKD	140 mm Hg	70 mm Hg	140/70 mm Hg	98%	22 min^{-1}	231 mg/dL	98.3 °F	90 BPM	102 mg/dL	9.4 mg/dL	42 mg/L	6.5 mmol/L	7.5 mmol/L	-15.38 %	DEAD
RAJENDHIRAN	2311211 52560	66	MALE	SCROTAL SWELLING	SHTN CKD T2DM	170 mm Hg	110 mm Hg	170/110 mm Hg	100%	19 min^{-1}	506 mg/dL	98.2 °F	116 BPM	179 mg/dL	6.2 mg/dL	238 mg/L	2.1 mmol/L	3.4 mmol/L	-61.90 %	DEAD
SUBRAMANIYAM PONNUSWAMY	2212273 7683	71	MALE	BREATHLESSNESS	SHTN T2DM CKD CAD	180 mm Hg	90 mm Hg	180/90 mm Hg	97%	22 min^{-1}	251 mg/dL	97.7 °F	120 BPM	100 mg/dL	2.4 mg/dL	86 mg/L	1.2 mmol/L	3.5 mmol/L	-191.67 %	DEAD
ANTHONYAMMAL	2212293 8233	73	FEMALE	VOMITING SLURRING OF SPEECH	CA BREAST SHTN T2DM ANEMIA	120 mm Hg	80 mm Hg	120/80 mm Hg	99%	18 min^{-1}	53 mg/dL	97.4 °F	98 BPM	69 mg/dL	2.2 mg/dL	224 mg/L	1.1 mmol/L	1.6 mmol/L	-45.45 %	DEAD
KABILAN	2212303 8771	22	MALE	BREATHLESSNESS PEDEAL EDEMA	SHTN CKD	140 mm Hg	80 mm Hg	140/80 mm Hg	100%	23 min^{-1}	102 mg/dL	95.2 °F	84 BPM	54 mg/dL	2.5 mg/dL	53 mg/L	1.2 mmol/L	2.3 mmol/L	9.10%	DEAD

PERUMAL SUBRAMANI	240105166005	50	MALE	B/L LOWER LIMB SWELLING	T2DM SHTN CKD	150 mm Hg	90 mm Hg	150/90 mm Hg	76%	30 min^{-1}	409 mg/dL	100.0 °F	114 BPM	109 mg/dL	8.5 mg/dL	221 mg/L	1.9 mmol/L	1.4 mmol/L	26.32%	ALIVE
NAGARAJAN	240127171953	43	MALE	BREATHLESSNESS	T2DM CKD SHTN HF	130 mm Hg	80 mm Hg	130/80 mm Hg	100%	22 min^{-1}	324 mg/dL	97.5 °F	76 BPM	107 mg/dL	7.8 mg/dL	60 mg/L	0.7 mmol/L	1.2 mmol/L	7.14%	DEAD
KANTHALAMMAL	240129172139	63	FEMALE	LOOSE STOOLS	CKD DM SHTN CAD	140 mm Hg	80 mm Hg	140/80 mm Hg	100%	24 min^{-1}	40 mg/dL	98.2 °F	94 BPM	74 mg/dL	3.5 mg/dL	231 mg/L	2.4 mmol/L	1.7 mmol/L	29.17%	ALIVE
DHANALAKSHMI	221101146 24	58	FEMALE	ABDOMINAL PAIN	T2DM CKD	100 mm Hg	80 mm Hg	100/80 mm Hg	98%	24 min^{-1}	444 mg/dL	98.6 °F	84 BPM	93 mg/dL	3.5 mg/dL	33 mg/L	2.4 mmol/L	1.0 mmol/L	58.33%	ALIVE
DHANRAJ	221106166 26	63	MALE	BREATHLESSNESS	T2DM CKD SHTN CAD PE	170 mm Hg	80 mm Hg	170/80 mm Hg	66%	28 min^{-1}	150 mg/dL	98.2 °F	80 BPM	86 mg/dL	6.2 mg/dL	89 mg/L	0.9 mmol/L	0.8 mmol/L	11.11%	ALIVE

ABDUL KAREEM	2211222 3927	57	MALE	DECREASED APPETITE	CKD SHTN CAD T2DM	100 mmHg	80 mmHg	100/80 mmHg	100%	38 min⁻¹	170 mg/dL	101.4 °F	115 BPM	128 mg/dL	4.6 mg/dL	289 mg/L	5.3 mmol/L	2.1 mmol/L	60.38%	ALIVE
MAQBOOL KHADAR	2301194 5838	67	MALE	HEMATOCHEZIA	CAD CKD SHTN	130 mmHg	70 mmHg	130/70 mmHg	100%	22 min⁻¹	103 mg/dL	98.3 °F	66 BPM	105 mg/dL	3.7 mg/dL	186 mg/L	1.3 mmol/L	2.0 mmol/L	-53.85 %	DEAD
DEVAKI HARIKRISHNAN	2305098 5837	68	FEMALE	BREATHLESSNESS	CKD APE SHTN T2DM	200 mmHg	90 mmHg	200/90 mmHg	85%	30 min⁻¹	152 mg/dL	98.6 °F	83 BPM	34 mg/dL	5.7 mg/dL	12 mg/L	1.2 mmol/L	2.1 mmol/L	-75.00 %	DEAD
SANKAR GOPAL	2301214 6816	60	MALE	FEVER	T2DM SHTN CKD	160 mmHg	80 mmHg	160/80 mmHg	89%	20 min⁻¹	118 mg/dL	100.9 °F	102 BPM	64 mg/dL	9.1 mg/dL	53 mg/L	1.4 mmol/L	0.8 mmol/L	42.86%	ALIVE
VASANTHA THIRUVENGADAM	2302085 575	53	FEMALE	CHEST PAIN	CKD APE SHTN CAD	170 mmHg	90 mmHg	170/90 mmHg	87%	22 min⁻¹	243 mg/dL	98.2 °F	90 BPM	114 mg/dL	7.1 mg/dL	231 mg/L	3.1 mmol/L	2.4 mmol/L	22.58%	ALIVE

RAMANI BAI PARTHASARATHY	2302155 8308	65	FEMALE	ABDOMINAL PAIN	SHTN T2DM CKD CAD	150 mm Hg	80 mm Hg	150/80 mm Hg	100%	21 min^{-1}	227 mg/dL	96.0 °F	130 BPM	87 mg/dL	6.8 mg/dL	102 mg/L	3.2 mmol/L	3.4 mmol/L	6.25%	DEAD
VIJAY ALAKSHMI	2303046 4465	55	FEMALE	GIDDINESS VOMITING	T2DM SHTN	180 mm Hg	70 mm Hg	180/70 mm Hg	98%	19 min^{-1}	230 mg/dL	97.3 °F	98 BPM	71 mg/dL	6.9 mg/dL	197 mg/L	1.6 mmol/L	2.5 mmol/L	-56.25 %	DEAD
SAMBHU KUMAR	2303076 5490	29	MALE	FEVER BREATHLESSNESS	SHTN CKD	90 mm Hg	60 mm Hg	90/60 mm Hg	88%	36 min^{-1}	165 mg/dL	97.2 °F	106 BPM	282 mg/dL	27.7 mg/dL	234 mg/L	1.9 mmol/L	1.0 mmol/L	47.37%	ALIVE
UMADEVI RAMESH	2305269 2346	44	FEMALE	ABDOMINAL PAIN CHEST PAIN	SHTN CKD T2DM	80 mm Hg	60 mm Hg	80/60 mm Hg	89%	29 min^{-1}	116 mg/dL	97.0 °F	114 BPM	151 mg/dL	7.5 mg/dL	255 mg/L	2.5 mmol/L	3.1 mmol/L	2.40%	DEAD
SASIDHARAN	2306149 8911	70	MALE	CHEST PAIN BREATHLESSNESS	CKD SHTN ACS	180 mm Hg	110 mm Hg	180/110 mm Hg	96%	18 min^{-1}	132 mg/dL	97.2 °F	86 BPM	102 mg/dL	9.9 mg/dL	102 mg/L	1.3 mmol/L	2.3 mmol/L	-76.92 %	DEAD
MURUGAN V	2307101 07371	60	MALE	BREATHLESSNESS	CKD SHTN	140 mm Hg	70 mm Hg	140/70 mm Hg	89%	24 min^{-1}	133 mg/dL	97.6 °F	90 BPM	203 mg/dL	12.9 mg/dL	285 mg/L	1.4 mmol/L	2.4 mmol/L	-71.43 %	DEAD

SARAVANAN	230818120368	51	MALE	SLIP AND FALL BACK PAIN	CKD CAD T2DM SHTN	130 mmHg	90 mmHg	130/90 mmHg	99%	20 min^{-1}	167 mg/dL	98.1 °F	88 BPM	121 mg/dL	7.7 mg/dL	84 mg/L	3.1 mmol/L	4.5 mmol/L	-45.16 %	DEAD
RAJAAMMAL	230825122789	80	FEMALE	BACK PAIN LOSS OF APPETITE	CKD SHTN	100 mmHg	60 mmHg	100/60 mmHg	97%	20 min^{-1}	102 mg/dL	97.0 °F	99 BPM	57 mg/dL	1.7 mg/dL	56 mg/L	1.7 mmol/L	2.4 mmol/L	8.60%	DEAD
SUBBIRAMANI	230910127920	58	MALE	BREATHLESSNESS	CKD T2DM SHTN APE	120 mmHg	80 mmHg	120/80 mmHg	98%	22 min^{-1}	200 mg/dL	98.2 °F	104 BPM	345 mg/dL	16.6 mg/dL	83 mg/L	1.4 mmol/L	1.6 mmol/L	-14.29 %	DEAD
THIRUVENKADAM	231051409 16	52	MALE	DECREASED URINE OUTPUT BREATHLESSNESS	CKD SHTN T2DM CAD	NR	NR	NR/NR mmHg	78%	38 min^{-1}	247 mg/dL	96.7 °F	88 BPM	107 mg/dL	3.7 mg/dL	142 mg/L	3.2 mmol/L	4.5 mmol/L	-40.63 %	DEAD