An-Najah National University

Faculty of Graduate Studies

ACIDOSIS AND URINE OUTPUT AS INDICATION FOR STARTING CONTINUOUS RENAL REPLACEMENT THERAPY AMONG ACUTE KIDNEY INJURY PATIENTS IN INTENSIVE CARE UNIT: RETROSPECTIVE STUDY AT AL-AHLI HOSPITAL IN HEBRON

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This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Critical Care Nursing, Faculty of Graduate Studies, An-Najah National University, Nablus - Palestine.

2024

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This Thesis was Defended Successfully on 23/5/2024 and approved by

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Dedication

To the one who has led the hearts and minds of humanity to a place of safety, the first teacher of mankind, our master, beloved, and intercessor Muhammad, may peace and blessings be upon him.

To the honorable martyrs, who are greater than us all, and to the brave prisoners, the resilient wounded, and their steadfast families who fight for the cause of God.

To those who made sacrifices for me to reach my academic degree, especially my parents, may God protect and grant them health and wellness.

To my pillar of support, my only brother, and my sisters.

To all my teachers who have taught me even a single letter, from elementary school through my academic journey.

To An-Najah National University, Faculty of Medicine and Health Sciences.

To my cherished friends and colleagues at work and throughout my educational path.

I dedicate this message to all of you, hoping it serves as a gateway to knowledge and understanding... and that it may benefit us and be beneficial through us.

Your son and brother, Osama Naif Hassan Al-Arameen.

Acknowledgment

We are deeply grateful for the guidance and support that illuminated my path throughout this research endeavor. This paper stands as a testament to the collective effort and encouragement of cherished family and friends, whose unwavering support propelled us forward.

First and foremost, my heartfelt appreciation goes to Dr. Mohammad Hayek whose invaluable mentorship and meticulous feedback significantly shaped this paper's content, structure, and direction.

We sincerely thank the esteemed faculty members and advisors at AL-Najah University, particularly Dr. Aida Abu Elsoud Alkaissi and all the doctors who contributed their expertise and insights to enrich our thesis.

Lastly, we extend my gratitude to all who lent their support and encouragement, contributing to the completion of this thesis.

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

ACIDOSIS AND URINE OUTPUT AS INDICATION FOR STARTING CONTINUOUS RENAL REPLACEMENT THERAPY AMONG ACUTE KIDNEY INJURY PATIENTS IN INTENSIVE CARE UNIT: RETROSPECTIVE STUDY AT AL-AHLI HOSPITAL IN HEBRON

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: OSama Naif Aramin

Signature:

Date: 23-5-2024

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Abstract

Background: Acute Kidney Injury has a substantial global impact , with an estimated 13 million people affected annually. Acute kidney injury has been reported in 30–60% of hospitalized patients and is prevalent in critically ill individuals and 5–20% of critically ill patients in the intensive care unit. Up to 4.9% of severely ill patients may require renal replacement therapy. In the last decade the absolute incidence of acute kidney injury has risen, with episodes occurring in. The study aims to investigate acidosis and urine output as indicators for starting continuous renal replacement therapy among acute kidney injury patients in the intensive care unit at AL-Ahli Hospital in the west bank of Palestine.

Methods: This Research utilized a Quantitative Retrospective and Descriptive method. The Purposive sampling technique was employed to select participants. The study included all patients diagnosed with acute kidney injury who underwent dialysis all patient with vasopressor, regardless of their age and gender. Demographic data, the presence of comorbidities, the indication for continuous renal replacement therapy, vital signs, urine output, and inotropic, laboratory findings was collected before and after the commencement of continuous renal replacement therapy.

Results: The medical records of 96 acute kidney injury patients who received continuous renal replacement therapy between April 2021 -April 2023 was reviewed, was the two -third of patients with comorbidity disease. The mortality rate was 28.1% was 69.8% of patients on mechanical ventilation and all patients was anuria, percentage of males was 56.2 % and 43.8% of females, the percentage of survivor patients was

56.5% male and 43.5% of females, went on to receive either chronic hemodialysis or normal kidney function.

Conclusion: The most diagnosis for patient on continuous renal replacement therapy commencement septic shock, and the most indication to commencement acidosis and anuria, was the anuria, acidosis, overloaded fluid, & anuria indications was more likely to have survival**,** comorbidity disease is higher mortality patients on mechanical ventilation less likely to survive, decrease serum creatinine and blood urea nitrogen was not associated with increased mortality.

Key Words: Acute Kidney Injury; Continuous Renal Replacement Therapy; Mortality.

Chapter One

Introduction and Theoretical Background

1.1 Introduction

Acute kidney injury (AKI) poses a significant public health challenge, with high levels of morbidity, mortality, and healthcare expenses associated with it (Makris et al., 2016). Deterioration of renal function over hours, days to weeks, the mortality rate of AKI is 50-80% in intensive care unit (ICU) patients (Kes et al., 2010). Recently, the incidence of AKI increased in both hospital and community settings (Makris et al., 2016). It is estimated that over 13 million people worldwide are affected by AKI (Makris et al., 2016).The frequency of AKI needing RRT is rising by almost 10% (Hsu et al., 2013). AKI is characterized by the sudden or gradual damage of kidney cells, resulting in a decline in glomerular filtration rate (GFR), which is insufficient for the elimination wastes and uremic toxins (Lameire et al., 2013). The GFR is calculated by dividing urine concentration by urine flow, multiplied by plasma concentration. AKI pathophysiology involves intricate hemodynamic and inflammatory processes, many of which are not yet fully understood, AKI has a range of causes and clinical manifestation, and patients may exhibit a wide array of symptoms, from anuria to multiple organ dysfunction (MODS) or be asymptomatic (Metha et al., 2016). In ICU the AKI has been documented in 30-60% of hospitalized patients and is prevalent in critically ill patients (Lameire et al., 2013). Over the past 10 years, the incidence of AKI has increased, with AKI occurring in 5-20 % of critically ill patients in the ICU, and up to 4.9 % of severely ill patients requiring renal replacement therapy (Edelstein et al., 2017). In the intensive care unit (ICU), sepsis is the most common cause of AKI, accounting for 45–70% of cases (Hoste et al., 2008). Acute kidney failure (AKI) presents a significant risk to critically ill patients due to its high rate of morbidity, death, and financial difficulties (Hoste et al., 2010). AKI-requiring dialysis is a serious illness with a 40–50% death rate. The mortality rises to 60–80% when accompanied by a distant organ malfunction, such as heart or respiratory failure (Chao et al., 2012).

Uremia is characterized by an elevated blood urea level, which is primarily produced by the kidney, elevated levels of urea in the blood indicate the presence of uremia, a disease that is typically accompanied by the elimination of excess amino acids and protein products in the urine (Saunders et al., 2023). Metabolic acidosis, defined by an increase in weak acids or a decrease in strong ion differences, is another common symptom of uremia (Saunders et al., 2023). Acid-base disorders kidney failure will always result in progressive metabolic acidosis because renal acid excretion is limited (Yessayan et al., 2016). When volume resuscitation is ineffective in treating vasodilatory shock, vasopressors are often employed, in addition to treating vasodilatory shock following cardiovascular surgery, post-acute myocardial infarction, and hypovolemic shock, vasopressors are also used to treat other types of shock, such as vasodilatory shock that is unresponsive to volume resuscitation and cardiogenic shock, however, their use can result in adverse effects, including excessive vasoconstriction, organ ischemia, hyperglycemia, hyperlactatemia, tachycardia, and tachyarrhythmias (Saunders et al., 2023). The high mortality rate associated with uremia is a reflection of the multiorgan failure (MOF) that develops in these patients, in the past, acute renal failure requiring dialysis was one of the most challenging conditions to treat in the ICU, patients with hemodynamic instability and a risk of tissue hypoperfusion during extracorporeal interventions are particularly vulnerable (Futier et al., 2017). Controlling hospital morbidity associated with AKI and limiting the development of long-term complications, including chronic kidney disease (CKD) and chronic cardiovascular diseases, are critical for improving patient outcomes (Li et al., 2013). The risk factors for chronic kidney disease (CKD) that are most prevalent in the Arab world include diabetes mellitus (DM), obesity, chronic obstructive pulmonary disease (COPD), and hypertension (HTN). Patients with CKD usually have damaged autoregulation, high vasodilation, increased susceptibility to nephrotoxins and antihypertensive drugs, and a higher risk of drug reaction, all of which can cause the development of acute kidney injury (Chawla et al., 2017).

The condition mentioned previously are also known as interconnected syndromes because AKI can worsen CKD. CKD can increase the risk of developing AKI (Zhou et al., 2012). Operational definition of AKI by used test to diagnose AKI is the measurement of serum creatinine (SCr), blood urea nitrogen (BUN) in blood samples and UO (Lima et al., 2018). Creatinine is a waste product that is produced during the normal breakdown of muscle tissue and digestion of proteins in the diet. It is removed from the bloodstream through the kidney, high levels of creatinine may indicate a problem with the kidney. However, the use of BUN and SCr solely as a diagnostic criterion for AKI is insufficient, as these markers are not specific (Kellum et al., 2013).

Serum creatinine has poor sensitivity and specificity, and it may be influenced by age and both acute and chronic renal failure. Therefore, it cannot accurately reflect the timing and type of renal injury. Urine biochemistry and microscopy provide better data for classifying AKI into common acute tubular necrosis and prerenal azotemia (Lima et al., 2018). The standard diagnostic criterion for AKI is a UO of (less than 200 ml/12 h) or anuria (less than 50 ml/12 h). A sudden drop in GFR, as indicated by an increase in SCr levels or a reduction in UO over a specific period, is the basis for the current diagnostic approach for AKI (Lima et al., 2018).

CRRT supplies progressive fluid removal and solute clearance over longer treatment times (ideally 24 hours per day but frequently interrupted), while IHD delivers rapid solute clearance and ultrafiltration during relatively brief treatments (3-5 hours) (Tolwani, 2012). CRRT is more effective in maintaining negative fluid balance (Bouchard et al., 2009). The therapy of a critically ill patient with kidney failure could require the use of multiple renal support modalities, such as prolonged intermittent renal replacement therapies (PIRRTs), which are a combination of IHD and CRRT, and traditional intermittent hemodialysis (IHD), all of them make use of extracorporeal blood circuits that are very similar, and their main differences are in the length of therapy as well as in the rate at which solute clearance and net ultrafiltration occur. Furthermore, the primary method of solute clearance used in dialytic treatments is diffusive, whereas convection is used in hemofiltration to remove solutes, Different types of PIRRT are differentiated by treatments that typically last 8 to 16 hours, with ultrafiltration and solute clearance rates that are faster than IHD but slower than CRRT. The most popular method of providing PIRRT is by employing IHD-style equipment that reduces blood and dialysate flow rates. It can also be carried out with CRRT-specific equipment that has higher dialysate and/or ultrafiltration rates to provide comparable administered treatment in a shorter amount of time (Marshall et al., 2004). However, the normal prescription might require alteration in order to give IHD in hemodynamically unstable patients. For example, treatment duration may need to be extended to allow more progressive ultrafiltration, greater salt concentrations in the dialysate may be used, and dialysate temperatures may need to be lowered (Vinsonneau et al., 2006). However, CRRT is a more successful method than IHD to achieve net negative fluid balance (Bouchard et al., 2009).

Stress ulcer prophylaxis and infection prevention should also be initiated in AKI patients to prevent complications. Fluid titration is essential, and attention should be given to avoiding overloading the patient (Ostermann et al., 2019). CRRT it is also used for volume management in the process known as slow continuous ultrafiltration (SCUF). CVVH, CVVHD, and CVVHDF are the most frequently used forms of CRRT, and the differentiation between them are related to the mechanisms of solute clearance, CRRT provides both volume removal and solute clearance (Tandukar et al., 2018). PIRRT, which is a combination of CRRT and IHD, makes use of relatively similar extracorporeal blood circuits, with the main differences being the length of therapy and the resulting speed of net ultrafiltration and solute clearance. In PIRRT, solute clearance occurs during hemofiltration through convection, while dialysis therapies primarily rely on diffusive solute clearance (Tandukar et al., 2018). CRRT mechanisms includes a pump-driven venovenous circuit that provides higher and more regular blood flows, reducing the risks associated with increased arterial cannulation with a large-bore catheter (Tandukar et al., 2018). Numerous CRRT delivery methods have been developed, including extra complexity levels, such as pressure monitors and air detectors (Tandukar et al., 2018). The primary goal of treatment for AKI patients is to achieve hemodynamic stability and promptly identify and address related issues such as hyperkalemia, metabolic acidosis, and fluid overload (Moore et al., 2018). Hemodynamic stability is crucial for AKI patients since their autoregulatory systems are impaired (Ostermann et al., 2019). The criteria for initiating continuous renal replacement therapy (CRRT) typically coordinates with the overall indications for RRT, which include metabolic acidosis, volume overload, electrolyte imbalances, Hyperphosphatemia, encephalopathy, Hyponatremia, Uremia, and Pericarditis (S.V. et al., 2012). Volume overload in AKI can occur in patients who are not oliguric or anuric and is caused by the kidneys' inability to maintain fluid balance when IV fluids, blood products, and/or other medications necessary for resuscitation and supportive treatment of a critically ill patient are administered (Talwani, 2012). RRT is often recommended when organ function is compromised by volume overload and the patient is not responsive to diuretics. While there is a substantial correlation between the degree of volume overload at the start of RRT and the risk of death in both pediatric and adult populations, causality has not been demonstrated (Vaara et al., 2012). Kidney failure will inevitably result in progressive metabolic acidosis, which is brought on by decreased renal acid excretion. Either intermittent or continuous RRT is useful in patients whose severe acidosis is unresponsive to medical treatment, such as the volume-overloaded patients who are unable to tolerate alkali delivery (Yessayan et al., 2016).

The best time to start RRT in AKI is unclear in the absence of clear signs. When AKI is started earlier, volume status can be optimized, acid-base and electrolyte disturbances can be corrected early, and azotemia can be controlled before the major metabolic changes that serve as objective indicators occur. During CRRT, electrolyte imbalances are frequently observed. Continuous removal in the extracorporeal circuit may cause hypophosphatemia, which could delay the weaning process off mechanical ventilation (Renal Replacement Therapy Study, 2009). The most frequent treatment-related mechanism causing hypotension is ultrafiltration causing hemodynamic instability. Treatment-related hypotension was previously attributed to the negative inotropic and vasodilating properties of acetate- and lactate buffered solutions; however, this scenario is no longer a significant consideration due to the availability of bicarbonate-buffered dialysate and replacement fluids (Sigwalt et al., 2018). Although it can happen in certain series in over one-third of patients, hypotension during CRRT is frequent and typically unrelated to the CRRT method, per second (Sigwalt et al., 2018). With older dialysis systems, increases in blood flow through the extracorporeal circuit were linked to increased circuit volume and hypotension; however, with current CRRT technology and hollow fiber filters, there is little change in extracorporeal volume and, consequently, little hemodynamic stress associated with changes in blood flow (Sigwalt et al., 2018). Since its origins, continuous renal replacement therapy (CRRT) has developed as a prominent therapeutic modality for various critical illnesses as well as a prospective alternative for hemodialysis (HD) or peritoneal dialysis (PD) in critically ill patients with acute kidney injury (AKI) (Ronco et al., 2017). As of right now, CRRT is the most widely utilized acute RRT modality in Australia, most of Europe, and the United States. It is also increasingly being used in septic patients and for cardiac, hepatic, and pulmonary support (Legrand et al., 2013). Technological developments combined with gains in our understanding of the pathophysiology of acute kidney injury (AKI) and other critical diseases, as well as the mechanics and kinetics of extracorporeal solute removal, have defined the history of CRRT. The heater, replacement and ultrafiltration pumps, blood, dialysate, and other parts of CRRT machines were initially taken from disposables and devices used for HD maintenance; however, later on, new equipment specifically designed for CRRT was created, increasing the machine's performance and safety as well as its use in intensive care units (ICUs) (Ricci et al., 2004). As of right now, different organ functions can be supported simultaneously by the most recent generation of CRRT (Husain et al., 2018). Their goals are to prevent the serious consequences of severe renal failure (acidosis, uremia, electrolyte imbalances, and fluid overload), maintain life, and give the organs enough time to heal. By adhering to these guidelines, one may contend that the time, amount, and quality of RRT shouldn't have a significant impact on the result, so long as a minimal level is supplied. Nonetheless, there is now ample proof that the emergence of AKI is connected to death on its own (Chertow et al., 2005). Furthermore, there has been increasing worldwide consensus that CRRT is the better course of treatment for patients who are hemodynamically unstable, but the superiority of continuous renal replacement therapy (CRRT) over intermittent hemodialysis (IHD) for RRT in the intensive care unit (ICU) remains debatable regardless of intensity (Prowle et al., 2010). CRRT has emerged as the predominant method of RRT for AKI in the ICU globally, given the fact that hemodynamic instability is present in the majority of critically ill AKI patients (Uchino et al., 2005). Continuous renal replacement therapy (CRRT) is considered as an established therapeutic technique for patients with acute kidney injury (AKI) and has lately become an essential part of critical care (Ostermann et al., 2009). However, the death rate among these individuals continues to be very high (Allegretti et al., 2013). However, CRRT is linked to a significant death rate in older AKI patients. Furthermore, there is discussion on the best time to start CRRT and the variables affecting its effectiveness in clinical settings (Seabra et al., 2008). Critically ill people frequently have acute kidney failure (AKI), which raises the risk of morbidity and death as well as the development of chronic kidney disease (AN, 2017). Since there is no treatment for AKI, conservative and supportive measures continue to be the cornerstone of clinical care. A crucial strategy for improving the prognosis of patients with severe AKI is supportive CRRT (Jhee et al., 2020). However, there are no specific recommendations for using it, and the different therapeutic practices are not proven up by any evidence. Use of CRRT is advised in situations of hemodynamic instability even when the criteria are suitable for intermittent hemodialysis, despite the lack of specific recommendations or criteria for choosing CRRT over intermittent hemodialysis as the

RRT modality (Tolwani, 2012). Early CRRT is therefore essential for maintaining acid-base, fluid, and electrolyte balance as well as for treating and preventing the possibility of death from AKI and organ damage that affects organs other than the kidneys. Notably, in cases of severe AKI where intermittent hemodialysis is challenging to provide due to hemodynamic instability, fluid overload, catabolism, and/or sepsis, early CRRT becomes essential (Tolwani, 2012). As previously mentioned, the risks and difficulties related to early CRRT commencement must be weighed against any possible benefits (Wald et al., 2015). In situations of AKI presenting with refractory volume overload, intractable metabolic acidosis and hyperkalemia, and uremia, acute RRT is necessary GFR (Tandukar et al., 2019). RRT is frequently started in severe AKI patients, but, prior to the beginning of these typical RRT symptoms. Acute RRT is also administered to patients who develop anuric AKI and are not responsive to acute treatments, as well as patients who are inebriated with chemicals that can be dialyzed, such as salicylates and lithium. The degree of organ failure and the development of the disease should be taken into consideration when deciding whether the start of RRT for older AKI patients (Bagshaw et al., 2016). The most common treatment for septic AKI is continuous renal replacement therapy, or CRRT (Ronco, 2015). The present article focuses on further CRRT effects in septic acute kidney injury. In cases of septic AKI, clinicians should focus on more than only the well-known features of CRRT (Ricci et al., 2006).

1.2 Problem Statement

Lack of research about these topics in Palestine, this is considered the first study, after search in different database another, there is lack of research in Palestine there for the study conducted, and the mortality rate for AKI patients requiring RRT in the ICU is high. There for the study was be conducted in topic acidosis and anuria as indication for starting continuous renal replacement therapy among acute kidney injury in intensive care unit with unstable hemodynamic to improved knowledge and practice and improved survival and decline the mortality rate. All patient on CRRT with vasopressor support and the cut point for all patient there is MAP and the inclusion criteria there is unstable hemodynamic with acidosis and anuria, based on the literature review, the most common indications for starting continuous CRRT among AKI patients in the ICU include acidosis and anuria, and the most common side effect is hemodynamic unstable with vasopressor administration being the most common, additionally anuria and uremia are the most common complications when using a new treatment for CRRT among AKI patients in the ICU, the outcomes can include improved survival rates, treatment for acidosis, improved urine output, and better hemodynamic status to prevent chronic hemodialysis (Cerda et al., 2012). AKI leads to an increase in hospital stays in the ICU, and increased number of days on mechanical ventilation (MV), dependence on dialysis, a high mortality rate, and increased medical expenses (Omotoso et al., 2016). In critically ill elderly individuals, early use of CRRT in the treatment of AKI can lead to better outcomes and reduced vasopressor dependence (Park et al., 2016). Early initiation of AKI treatment that includes volume status monitoring, correction of acid-base and electrolyte disturbances, and control of azotemia can improve patient outcomes (Wald et al., 2015). The use of CRRT can enhance oxygenation status and hemodynamics. AKI which is becoming increasingly common in hospitalized patients, particularly those in the ICU due to major surgery, sepsis, and aging-related comorbidities, poses a significant risk to the kidneys (Hoste et al., 2015). Factors such as obesity, anemia, hyperglycemia, hypoalbuminemia, and hyperuricemia further increase the risk of AKI (Bednarek et al., 2017). Septic shock, ischemia, and nephrotoxins are the most common causes of AKI among ICU patients, international registries show that up to 50% of ICU patients with AKI require RRT, which may represent approximately 13% of ICU patients with AKI (Douvris et al., 2018). Particularly in patients with sepsis and septic shock (Gulla et al., 2015).

1.3 Objectives

1. To Identify the characteristics of patients undergoing sessions of renal replacement therapy in ICU to survival or non-survival.
2. To Comparison clinical and laboratory parameters between patients with AKI who survival and non- survive three days after the initiation of renal replacement therapy in the ICU.
3. To Assess the hazard ratio of in-hospital mortality in patients with AKI undergoing renal replacement therapy in the ICU.

1.4 Null Hypothesis

1. There was no significant association at the level of 0.05 related to the use of characteristics of patients undergoing sessions of renal replacement therapy in the ICU to survival and non-survival.
2. There was no significant association at a level of 0.05 in clinical and laboratory parameters between patients with AKI who survival- and non- survival three days after the initiation of renal replacement therapy in the ICU.
3. There is no significant association at a level of 0.05 related to the hazard ratio of in-hospital mortality for AKI patients undergoing renal replacement therapy in the ICU.

1.5 Tool Validation

The questionnaire was taken by me learning and taken from literature review other research and was taken consultation and accepted from Nephrology doctors and Intensive doctor from AL-Ahli hospital and these doctors' expert in ICU about 10 years and worked in ICU department.

1.6 Importance of the Study

The study's significance lies in examining the indications and outcomes of continuous renal replacement therapy among Acute Kidney Injury patients in the Intensive Care Unit. The first study about these topics in Palestine. The study aims to evaluate the use of CRRT as a result of improved survival or recovery of kidney disease and uremia and to increase awareness, knowledge, and practice to improved satisfaction and quality of care and administration and information among medical staff about the ideal indication and timing for CRRT among AKI patients in the ICU and improved survival and to decline the mortality, and the recommendation in future study to take database to help other researchers for anew research in these topic. CRRT is an effective approach for managing AKI in critically ill patients, and the study aims to evaluate the use of urine output and acidosis as indicators for CRRT use among AKI patients with unstable hemodynamic in the ICU furthermore additionally the study seeks to identify the characteristics of patients undergoing renal replacement therapy before initiating sessions in the ICU and compare clinical and laboratory parameters between AKI patients who survival and those who did non- survival after the initiation of RRT in the

ICU. The study also aims to assess the hazard ratio of in-hospital mortality for AKI patients undergoing RRT and evaluate the effect of CRRT therapy in facilitating the management of hemodynamically unstable patients with AKI in the ICU. Lastly the study aims to assess the survival and mortality rate of CRRT among AKI patients with acidosis and anuria in the ICU.

1.7 Literature Review

The study aims to evaluate the use of CRRT as a result of improved survival or recovery of kidney disease and uremia and to increase awareness, knowledge, and practice to improved satisfaction and quality of care and administration and information among medical staff about the ideal indication and timing for CRRT among AKI patients in the ICU and improved survival and to decline the mortality, there is a new research in these topic and to assess the hazard ratio of in-hospital mortality for AKI patients undergoing CRRT and evaluate the effect of CRRT therapy in facilitating the management of hemodynamically unstable patients with AKI in the ICU. Acute kidney injury is definition by sudden decrease in urine output or increase in serum creatinine or both, characteristic of AKI sudden damage of kidney cell, leading to decline in glomerular filtration rate, AKI is occurring more common in hospitalization in ICU (Ronco et al., 2019). More than 50% of hospitalized patient in ICU (Kes et al., 2010). AKI is rising globally, the pathophysiology of AKI complex hemodynamic and inflammatory process, and the primary cause for AKI ischemia and hypoxia, and the etiology of disease pre-renal, post -renal, ATN (Ronco et al., 2019). The most common cause of pre- renal is ischemia, nephrotoxic injury, and the mainly cause of pre-renal azotemia and other causes hypovolemic due to hemorrhage, burn, vomiting, leading to decrease cardiac output result from congestive heart failure, other causes due to post-renal obstruction of urinary flow, leading to increase intratubular pressure and decrease in GFR due to causes such as prostate cancer, benign prostatic hyperplasia in male or cervical cancer in female, or ureters stones, or other causes ATN, due to damage of tubular due to causes nephrotoxic or ischemia leading to decrease renal perfusion (Ronco et al., 2019). There is a significant difference in practice even though hemodynamically unstable patients are most frequently treated with CRRT and PIRRT. While some facilities are using IHD, even in patients who are vasopressor-dependent, with prescription changes, others use CRRT (or PIRRT) in all ICU patients with renal failure, independent of hemodynamic state. While it may seem obvious that patients who are hemodynamically unstable would benefit from a slow continuous kind of renal support, randomized trials have not demonstrated any differences between CRRT and either IHD in terms of mortality or kidney function recovery (Schefold et al., 2014). CRRT is a common form of dialysis used in critically ill patients with severe AKI and hemodynamic instability to enhance renal support in the ICU (Macedo et al., 2016). Some equipment's use IHD, while others use CRRT in vasopressor-dependent patients, or PIRRT in all ICU patients with renal failure and hemodynamic instability (Tandukar et al., 2018). The most common indication for starting CRRT is the treatment of patients with severe acidosis who are resistant to medical treatment, volume-overloaded patients who cannot tolerate alkali delivery, and anuria (Cerda et al., 2012). Volume management is the second part of an RRT prescription. It is possible to modify net ultrafiltration without affecting solute clearance. As was previously mentioned, in both children and adults who require RRT, the degree of volume overload is highly correlated with the probability of death. The best ways to regulate volume are unclear, though, and need striking a compromise between the danger of worsening hypotension, optimizing cardiac state, and providing net ultrafiltration to achieve euvolemia (Vaara et al., 2012). Acidosis, with a potential of hydrogen (pH) between 7.1 and 7.2 or a serum bicarbonate level between 12 and 15 mmol/L, are two frequently recommended parameters for the start of RRT (Tandukar et al., 2018). Serum bicarbonate levels of less than 12 to 15 mmol/L or a pH of less than 7.1 to 7.2 are two often recommended criteria for starting RRT. Patients with acute lung damage receiving lung-protective ventilation may need to start RRT earlier because the combination of respiratory and metabolic acidosis might cause significant acidemia. RRT increases the amount of lactate cleared from the body, however there is no proof that starting RRT to increase lactate clearance has an impact on clinical outcomes in patients with lactic acidosis who do not have medication toxicity (Yessayan et al., 2016). AKI is linked to many electrolyte imbalances. The most serious kind of hyperkalemia is severe, which needs to be treated right away to avoid arrhythmias and cardiotoxicity. When hyperkalemia is not responsive to medication or returns after treatment, RRT ought to be started. RRT used exclusively for the treatment of hyperkalemia is seldom acceptable when the potassium level is less than 6 mmol/L, even though strict thresholds based on blood potassium level cannot be supplied. On the other hand, individuals in whom the potassium level persists over 6.5 mmol/L in spite of medical treatment are usually candidates for RRT.

While IHD corrects hyperkalemia more quickly and is the recommended treatment in this situation, CRRT controls the plasma potassium content more effectively but more slowly (Kellum et al., 2016). Before starting RRT one should take into account any other electrolyte abnormalities that may accompany AKI, such as severe hyperphosphatemia, hyponatremia, or hyponatremia. Compared to IHD, CRRT allows slower and more controlled correction of sodium concentration in patients with severe hyponatremia in the setting of AKI, which is necessary to prevent the neurologic effect of osmotic demyelination (Yessayan et al., 2016). It is generally known that RRT can be used to treat uremic symptoms such pericarditis and encephalopathy, other signs of uremia, such as platelet dysfunction, malnutrition, increased susceptibility to infection and sepsis, heart failure, and pulmonary edema, may be challenging to differentiate from other etiologies in the critically ill patient with multiple organ dysfunction, even though these are relatively late complications of AKI (Meyer et al., 2007). Many substances can be dialyzed, including toxic alcohols, lithium, salicylate, valproic acid, and metformin. By using RRT promptly in cases of poisoning and drug intoxications involving these substances, major consequences may be avoided. A given medication or toxin's capacity to be eliminated from the body by RRT depends on its size, volume of distribution, and protein binding. Therefore, smaller, nonprotein-bound compounds having a volume of distribution less than 1 L/kg body weight can be effectively removed by RRT (Patel et al., 2015). CRRT is associated with reductions in plasma ammonia levels (Cardoso et al., 2017).

Older age, male sex, African-American race, higher severity of illness, sepsis, decompensated heart failure, liver failure, and mechanical ventilation are risk factors for RRT requiring AKI (Macedo et al., 2016).

AKI high mortality can lead to MOF. AKI can develop long – term complication, CKD, cardiovascular disease, risk factor for AKI more common COPD, HTN, DM by (Cerda, 2007). The clinical manifestation for AKI range from anuria to MODS, with same patient asymptomatic, the most common condition leading to increase in BUN use of steroid, dehydration, increase protein intake, and decrease in renal perfusion, the BUN and Creatinine is not specific marker for AKI poor sensitive, due to age, study by Cerda (2007) show creatinine inaccurate indicator for renal dysfunction, other study by Cheo (2018) appear anuria, creatinine increase 4 mg/dl indicators for CRRT. Dialysis is life maintain therapy that replace renal function in acute renal failure, form for dialysis hemodialysis, CRRT, peritoneal dialysis, all form of dialysis make use of the principle of diffusion and osmosis to remove waste products and excess fluid from the blood by semipermeable membrane is placed the blood and specialized solution. definition of anuria the total urine output less than 50 ml over 12 hours, or oliguria the total urine output less than 200 ml over 12 hours (Ronco et al., 2019). Hospitalized patients are at higher risk for AKI, a major complication that affects 1 in 5 adults and 1 in 3 children worldwide (Hoste et al., 2015). AKI affects a large percentage of patients during a hospital stay, which increases death rates and reduces kidney function after discharge (Hoste et al., 2015). AKI has become a public health priority because to its significant increase in morbidity, death, and healthcare-associated costs over the past few decades (Makris et al., 2016). AKI is a common hospital complication that is show in ICU and the incidence fluctuates based on the patient's clinical condition. AKI causes 50–80% of ICU patients dying (Kes et al., 2010). It is estimated that over 13 million people worldwide are affected by AKI each year (Makris et al., 2016).

Commencing renal replacement therapy (RRT) early in the treatment of AKI can remarkably improve survival rates in critically ill patients (Meersch et al., 2017). If CRRT is used early in the treatment of AKI in elderly patients, a high chance of better prognosis can be expected (Park et al., 2016). The wide range of AKI processes and symptoms is not covered by the usual diagnostic criteria for AKI, which are based on blood urea nitrogen and serum creatinine values (Kellum et al., 2013). Serum creatinine levels are also influenced by age and acute and chronic kidney disease (Slocum et al., 2012). On the other hand, research has shown that CRRT is more costly than intermittent therapy (Bannu et al., 2008). According to the Kidney Disease Improving Global Outcome (KDIGO) criteria there may not be a mortality difference between intermittent hemodialysis (IHD) and CRRT (Bitker et al., 2016). According to this that reports, approximately 10 to 70% of morbidly ill patients undergoing IHD have hypotension (Bitker et al., 2016). More reductions in cerebral perfusion pressure (CPP) have been associated with IHD than to CRRT, especially in cases when the patient has significant brain damage or increased intracranial pressure (ICP) caused by severe liver failure, intracranial bleeding, or other causes (Davenport, 2009). That has been demonstrated that CRRT optimizes hemodynamics and oxygenation status, especially in patients with sepsis and septic shock (Gulla et al., 2015). Moreover, multiple organ dysfunction-complicated severe acute pancreatitis can be treated with CRRT (Chu et al., 2012). Diuretics are usually prescribed to treat fluid overload in critically ill patients with oliguric AKI; however, when oliguria persists and cannot be responsive to diuretic treatment, or when the patient develops life - threatening complications like pulmonary edema, clinicians commonly started ultrafiltration for volume management (Murugan et al., 2020).

Although RRT is frequently utilized to treat patients with hemodynamic instability, all RRT modalities used in the ICU during ultrafiltration have been associated with hypotension (Akhoundi et al., 2015). For patients who have become hemodynamically unstable, the Kidney Disease Improving Global Outcome (KDIGO) clinical practice guidelines recommended using CRRT (kidney disease, 2012). Based on previous studies, dialysis patients have a higher risk of morbidity and death when compared to the general population, as well as other diseases including certain cancer types (Kashani et al., 2016). However, in comparison to RRT they also found that CRRT patients had greater mean arterial pressure (MAP) with a lower need for vasopressor the dosage escalation In CRRT mode continuous veno-venous hemofiltration (CVVH) is an effective mode therapy for hyperkalemia (Houze et al., 2020). It is unknown how to CRRT effect on acid-base balance to severe hepatic failure (SHF) but is effective for this patients (Houze et al., 2020). The treatment of CVVH mode might not completely correct the acid-base status-inducing effect of liver failure (Naka et al., 2006). The alkalinizing effects of hypochloremia and hypoalbuminemia fail to eliminate the base deficit; higher lactate levels and high ion gap measurements do. As a result, SHF patients may require more intense CVVH to balance their acidity (Naka et al., 2006).The available data show that, rather than based only on a specific serum creatinine or urea values, factors such as the severity of the patient's illness, the presence of oliguria and fluid overload, and any accompanied non-renal organ failure should be considered when deciding when to start RRT in critically ill patients with AKI, this is especially important in situations involving lithium overdose, metformin poisoning, valproic acid toxicity, toxic alcohol poisoning, and salicylate toxicity based on the research conducted by (Ostermann et al., 2012). IHD can remove medications from the body because of their low molecular weight, and RRT and supportive care can be used in the treatment of metformin toxicity (K.T et al., 2013).

Another study was conducted to determine the extent of the effect of early start on CRRT on mortality to go on CKD, ESRD, this study was conducted for a period of ninety days and it was found that early initiation of CRRT show not found effect on the condition of patient and survival (Christiansen et al., 2017). Comparison with other study during early initiation and commencement CRRT for AKI patient and the evaluation effect over the first 90 days show the mortality rate decreased (Zarbock et al., 2016). The risks and burdens of RRT, such as vascular access (e.g., bleeding, thrombosis, vascular injury, infection), intradialytic hypotension, resource utilization, and the possibility that RRT could delay subsequent kidney function recovery, must be weighed against these potential advantages of early initiation (Wald et al., 2015). Numerous observational studies have indicated that earlier RRT commencement is related with increased survival (Wang et al., 2012). The total ultrafiltrate flow, dialysate, and effluent flow rates are used to determine the CRRT dosage. Low-molecular-weight solutes, including urea, have concentrations in the ultrafiltrate during CVVH that are comparable to those in plasma water. Similar to this, during CVVHD, almost full equilibration of low-molecular-weight solutes is achieved between plasma and dialysate due to the dialysate flow rate typically being an order of magnitude lower than the blood flow rate. Therefore, the clearance of urea and other low-molecular weight solutes is about equal to effluent flow, independent of the CRRT modality (Van et al., 2010). Despite the suggestion that CVVH modulate cytokines as an additional treatment for sepsis, no significant effect has been shown in clinical studies. Hemofiltration did not improve clinical parameters or death in a trial including 80 patients who were randomized to receive usual treatment or isovolemic hemofiltration. comparing CVVH at 35 and 70 mL/kg per hour in patients with septic AKI, the High-volume versus standard-volume haemofiltration for septic shock patients with acute kidney injury study found no advantage to the higher hemofiltration dosage (Joannes et al., 2013). Hemorrhage, infection, venous thrombosis, venous stenosis, traumatic arteriovenous fistula, pneumothorax, hemothorax, air embolism, visceral damage, and the extracorporeal circuit linked complication are examples of connected complications. circuit thrombosis, hemolysis, hemodialyzer allergy, hypothermia, hypotension, electrolyte imbalance, hypophosphatemia, hypokalemia, hypocalcemia, hypomagnesemia, and drug dosage (Renal Replacement Therapy Study, 2009). Since clotting of the extracorporeal circuit is the most common problem in CRRT, anticoagulation is crucial. There have been several anticoagulants utilized, including trisodium citrate, heparin, and low molecular-weight heparin (LMWH). When a patient has no contraindications to citrate therapy, the KDIGO recommendations advise using regional citrate anticoagulation (RCA) as their first option (Khwaja, 2012). Comparing anticoagulant techniques in older CRRT patients has not been studied. The elderly and the general population share similar anticoagulation principles; however, older individuals are more likely to have bleeding because of their advanced age, various comorbidities, and usage of several drugs (Quinn, 2016). Renal replacement treatment (RRT) may be necessary for AKI, depending on its severity. There is disagreement about whether RRT technique is best for AKI patients who are in critical condition. Continuous renal replacement therapy (CRRT) is advised for patients in the intensive care unit (ICU) who have hemodynamic instability due to its higher hemodynamic tolerability (Osterman et al., 2016). In Denmark, the incidence of CRRT use in persons > 75 years of age has increased substantially from 23 per million in 2000 to 213 per million in 2012. In fact, older people had the highest rise in the incidence of AKI necessitating dialysis (Carlson, 2016). The elderly in South Korea have been using CRRT more often over time (Park, 2018). Similarly, over a ten-year period, the mean age of ICU patients who had RRT became from 64.75 to 68.7 years, based on data from Japan's national administrative database (Miyamoto et al., 2019). AKI has been linked in several clinical trials to long-term mortality, the onset of chronic kidney disease (CKD), and eventual development of end-stage renal disease (ESRD) (Cohen et al., 2012). On the other hand, some AKI patients who completely recover may however face adverse long-term outcomes (Bucaloiu et al., 2012). AKI is a global public health concern that has been shown to cause chronic kidney disease (CKD) in 10% of critically ill patients. Furthermore, the requirement for radiation therapy (RRT) has been found to raise the risk of CKD development by 500 times (Chawla et al., 2011). Previous research mainly examined the in-hospital mortality rate for AKI patients requiring continuous renal replacement therapy (CRRT). However, there hasn't been much worry raised about the possibility that decreased renal function at discharge may lead to higher mortality during follow-up (Stads et al., 2013). Hypotension is the most frequent complication, accounting for 20% to 30% of all treated cases. Certain factors, such the quick volume loss and variations in plasma osmolality, are specific to dialysis. This issue can result in further organ ischemia and damage, especially in individuals who are severely ill and hemodynamically unstable (Pann et al., 2005). The purpose of CRRT is to function around the clock. The total solute delivered in a unit of time is smaller than with IRRT. But because it's given over a 24-hour period, the overall solute clearance can be higher than it would be with IRRT. As a result of the slow fluid removal, CRRT may improve fluid balance management and hemodynamic stability. Additional benefits of CRRT include increased solute removal efficiency and the ability to modify the course of treatment as needed by the patient. The requirement for immobilization, the need of use of continuous anticoagulation, and the fact that CRRT is far more expensive than IHD are major drawbacks (Kidney Disease Improving Outcomes, 2012). When treating acute kidney failure, high-dose renal replacement treatment does not increase patient survival, maintain renal function generally, or benefit significant patient subgroups, such as those who are sepsis patients (Van Wert et al., 2010). Further multicenter trials of this intervention are warranted and need more research about this topic. All study about these topics found in Islamic countries outside of Palestine and there for the first study in my countries about these topic acidosis and anuria as indication for continuous renal replacement therapy among acute kidney injury in the intensive care unit at AL-Ahli hospital in west bank of Palestine.

Chapter Two

Methodology

2.1 Research Design

A quantitative and Retrospective and Descriptive research design was employed.

2.2 Sample and Sampling

A purposive sampling technique was used to recruit participants from the population of all AKI patients was admitted to the ICU at Al-Ahli Hospital with AKI, anuria, and severe acidosis (PH < 7) and all patient unstable blood pressure on vasopressor the cut point there is MAP, who was require CRRT therapy according to Nephrology Doctor Consultation, and who was require evaluation of the effects on uremia and vasopressors. Data was collected from patient files admitted to Al-Ahli Hospital, and laboratory results was taken during the three days of CRRT treatment. The first set of laboratory results was taken within three hours of initiating CRRT, and then every eight hours as ordered by the doctor.

Dependent Variable; Acute Kidney Injury.

Independent Variable: indication and outcomes.

2.3 Study Setting

This study was taken place at AL-Ahli Hospital in Hebron, located in the West Bank, of Palestine. The study just taken from one Centers. The focus was on patient information for individuals who are admitted to the ICU departments. AL-Ahli Hospital is a private general Hospital that can receive patients from the governmental hospital, and today has 255 beds AL-Ahli Hospital currently has over 880 employees an all it is medical and administrative department and contains big capacity in all ICU departments in Palestine around capacity, pediatric cardiac ICU 8 bed, Surgical ICU 16 bed, Medical ICU 12 bed, Pediatric ICU 4 bed, Neonate ICU 25 bed. This study found in Medical ICU and Surgical ICU, and the most common patients on a Mechanical ventilator, and found dialysis for patients with traditional and CRRT, and plasmapheresis.

2.4 Study Period

The study was included patient files from the years 2021 to 2023. It was commenc in April 2021 and conclude in April 2023. All patient files from the designated period was included in the study.

2.5 Sample Size

The number of subjects in a sample is a critical aspect of conducting and evaluating quantitative research. All eligible patients during the aforementioned period were included in the study. A total of 96 patients was required, as determined by an online sample size calculator available on the G-power website. This tool is used to determine the appropriate sample size. Considering the calculation, was need 86 patients. To account for potential, drop out, an additional 10% of the sample, 96 patients, was included in the study. These patients were required Continuous Renal Replacement Therapy (CRRT) according to the consultation of a nephrology doctor for patients with Acute Kidney Injury (AKI) with severe acidosis and anuria.

The sample size calculation by parameter confidence level 95%, margin of error 5%, population proportion 50%, population size 110, the sample size appears 86 patients for my study.

Study Test: Regression Test used in my Research.

2.6 Inclusion and Exclusion Criteria

Inclusion Criteria:

AKI patients were admitted to the ICU with anuria (urinary output less than 50 ml/12 hours), increased serum creatinine and blood urea nitrogen (BUN) levels, decreased glomerular filtration rate (GFR), and severe acidosis. Patients who was meet the consultation criteria for CRRT as determined by the nephrology doctor.

Exclusion Criteria:

All patients were included in the study unless they have a history of kidney transplantation or an autoimmune disease that affects the kidneys.

2.7 Study Tool

Retrieve History, Chief Complaint, Blood Test, UO, and Hemodynamics from was the patient's file (Appendix 1).

2.8 Questionnaire

The questionnaire was included socio Demographic Data and all information needed for patient clinical and research needs includes.

Appendix 1:

1. Demographic data:

- Age
- Gender
- D.O.B
- Diagnosis
- History of comorbidity disease
- Date of admission
- I.D number

2. Laboratory parameter (BUN, Creatinine, GFR, UO, Potassium, Sodium, PT, PTT, INR, Hemoglobin, Platelets, Ammonia, PH, PaCo2, Hco3, Pao2.
3. Hemodynamic (Vital signs, Vasopressor) MV, and oxygen sores (before starting CRRT and during three days).
4. CRRT Parameter (Mode, Blood Flow, Net Fluid Removal).
5. ABGS (before starting CRRT, and during three days) .

Normal cut point parameters:

- BUN: 7-20 mg /dl (Sapra et al., 2024).
- Creatinine: 0.7-1.3 mg/dl (Sapra et al., 2024).
- GFR: 80-120 mL/min/1.73 m^2 (Sapra et al., 2024).

- UO: 0.5-1 ml/ kg /hr (Sapra et al., 2024).
- Potassium :3.5 -5.2 mEq /L (Sapra et al., 2024).
- Sodium: 135-145 mEq/L (Sapra et al., 2024).
- PT: 11-13.5 second (Sapra et al., 2024).
- PTT: 30-40 second (Sapra et al., 2024).
- INR: 0.8 – 1.1 (Sapra et al., 2024).
- Hemoglobin :12-16 g /dl (Sapra et al., 2024).
- Platelets: 150000-450000 per microliter of blood (Sapra et al., 2024).
- PH: 7.35 – 7.45 (Chandran et al., 2021).
- PaCo2: 35- 45 mmHg (Chandran et al., 2021).
- HCO3 : 22-26 mEq/L (Chandran et al., 2021).
- PaO2: 80-100 mmHg (Chandran et al., 2021).
- Blood Pressure: 120/80 mmHg (Chandran et al., 2021).
- Heart Rate: 60-100 beats /min (Chandran et al., 2021).
- Respiratory Rate: 12-20 breath /min (Chandran et al., 2021).
- Temperature: 36.5 -37.5 (Chandran et al., 2021).
- Oxygen Saturation: above 94% (Chandran et al., 2021).
- Mean Arterial Pressure: 65-105 mmHg (Chandran et al., 2021).

2.9 Statistical Analysis Methods

The statistical package SPSS, version 24.0, will be utilized for the statistical analysis of the data. Descriptive statistics, Pearson correlation, and multiple regression modes was employed to analyze the data.

2.10 Ethical Considerations

Al-Najah National University's Institutional Review Board (IRB) approval was obtained for the study, and all data was obtained from patients' files was only be used for research purposes. Confidentiality and anonymity were maintained throughout the research process.

2.11 Data Collection or Procedure

Before commencing data collection for the study, I was seeks

permission and approval from the college and IRB at AL-Najah University. Permission was also be obtained from the clinical setting at AL-Ahli Hospital for the target patients who was admitted during the study period. To maintain patient privacy the researcher should refrain from disclosing patient names and other identifiable information during data collection. The data was collected should only be used for scientific purposes, and the following information was obtained and recorded on the datasheet: demographic data, history, case of admission, chief complaint, blood test, urinalysis (UO), and hemodynamic data. The laboratory data was taken during the three days of CRRT, with the first set of labs taken three hours before CRRT and then every eight hours as ordered by the physician.

Chapter Three

Results

3.1 Population characteristics

The data of 96 patients was included in this study. The mean age was 49.67 ± 23.32 years, and more than half (56.2%) was males. About 86.5 % was admitted to the medical ICU.

At the time of ICU admission, serum creatinine (Cr) was 2.188 ± 1.90 mg/dL and GFR was 13.34 ± 10.17 mL/min per 1.73 m^2. More than two-thirds (77.1%) had comorbid diseases such as hypertension and diabetes mellitus. About 64.6% was diagnosed with septic AKI, and nearly one-third (34.4%) had Right jugular permanent catheter . Other related information is shown in Table 1.

Table 1

Characteristics of the included patients at baseline measurement (n = 96)

Variable	All participants (n = 96)	Survivor (n = 69)	Non-survivor (n = 27)	P-value
Gender				.348
Male	54 (56.2%)	39 (56.5%)	15 (55.6%)	
Female	42 (43.8%)	30 (43.5%)	12 (44.4%)	
Admission Department				.047
MICU	83 (86.5%)	61 (88.4%)	22 (81.5%)	
SICU	13 (13.5%)	8 (11.6%)	5 (18.5%)	
Comorbidity				.164
Yes	74 (77.1%)	51 (73.9%)	23 (85.2%)	
No	22 (22.9%)	18 (26.1%)	4 (14.8%)	
Diagnosis				.237
Septic AKI	62 (64.6%)	43 (62.3%)	19 (70.4%)	
AKI	34 (35.4%)	26 (37.7%)	8 (29.6%)	
Access Site				.241
Right Femoral permaceath	28 (29.2%)	20 (29%)	8 (29.6%)	
Right Jugular permaceath	33 (34.4%)	26 (37.7%)	7 (25.9%)	
Left Femoral permacath	9 (9.4%)	6 (8.7%)	3 (11.1%)	
Right Internal Jugular permacath	20 (20.8%)	13 (18.8%)	7 (25.9%)	
Right Subclavian permacath	5 (5.2%)	4 (5.8%)	1 (3.7%)	
Left Internal Jugular permacath	1 (1%)	-	1 (3.7%)	
Age (Years)	49.67 ± 23.32	48.39 ± 22.65	52.93 ± 25.1	.001
Urine Output (cc/hr)	11.77 ± 59.66	12.17 ± 59.35	.00	.605
BUN (mg/dl)	35.42 ± 21.66	34.98 ± 21.94	37.78 ±27.29	.015
Creatinine (mg/dl)	2.09 ± 1.77	2.19 ± 1.91	1.95 ± 1.97	.001
GFR (ml/min/1.73m^2)	13.34 ± 10.17	14.17 ± 11.94	13.04 ± 5.99	.003

3.2 Comparisons of the Clinical and laboratory parameters of CRRT commencement

At the time of CRRT commencement (before 4 hours), about 89.6% of patients needed Vasopressor /Noradrenaline. Mechanical ventilation was required by 67 patients (69.8%), and drug adjustment was performed on all patients. All patients were anuria, mean serum creatinine (Cr) was 5.74 ± 3.04 mg/dL and GFR was 13.92 ± 10.56 mL/min per 1.73 m^2. The mean international normalized ratio (INR) was 4.32 ± 20.19 and activated partial thromboplastin time (aPTT) was 37.52 ± 10.05 seconds. The mean systolic blood pressure was 122.30 ± 15.93 mm Hg and diastolic blood pressure was 65.91± 13.73 mm Hg. The mean Heart rate was 91.22 ± 17.7 beats/min, respiratory rate was 21.80 ± 5.46 (breath/min), and SPO_2 was 95.47 ± 3.02 %. Other related information is shown in Table 2.3.4.

The mean PH was 7.20 ± .11, PCO_2 was 40.34 ± 16.27 mmHg, and HCO_3 was 15.39 ± 4.11 mEq/L. Sodium was 139.67 ± 5.33 mEq/L, potassium was 4.52 ± .79 mEq/L, ammonia was 220.27 ± 300.53 mg/dl, calcium was 8.10 ± .59 mg/dl, and the mean Vasopressor administered to patients was 25.20 ± 18.22 mcg/min. Other related information is shown in Table 4.

Chi-square was performed to assess the relationship between the outcome as survived/not survived and different clinical and laboratory parameters at the initiation of the renal replacement therapy. The analyses showed that there was a statistically significant association between outcome and CRRT indication $\chi^2(5) = 10.590$, $p = .045$, in which Anuria, Acidosis, Overloaded fluid, & Anuria indications were more likely to have survival is shown in Table 2.

Furthermore, there was a statistically significant association between outcome and Oxygen Source $\chi^2(4) = 16.260$, $p = .003$, Patients who used mechanical ventilation were less likely to survive is shown in Table 2.

Table 2

CRRT Indication and Oxygen Sores

Variable CRRT Indication	All participant n= 96 Patients	Survivor n= 69 Patients	Non-Survival n= 27 Patients	P-value
Anuria and Acidosis and Unstable BP	18 Patients (18.8%)	9 Patients (13%)	9 Patients (33.3%)	
Anuria and Acidosis	51 Patients (53.1%)	37 Patients (53.6%)	14 Patients (51.9%)	
Anuria, Acidosis, Overloaded Fluid , Anuria	2 Patients (2.1%)	2 Patients (2.9%)	-	0.45
Anuria	23 Patients (24%)	20 Patients (29 %)	3 Patients (11.1%)	
Acidosis , Anuria , Hyperkalemia	1 Patient (1 %)	-	1 Patient (3.7)	
Acidosis	1 Patient (1%)	1 Patient (1.4 %)	-	
Drug adjustment (Yes)	96 Patients (100%)	69 Patients (100%)	27 Patients (100%)	
Nasal Canula	15 Patients (15.6 %)	15 Patients (21.7 %)	-	
Face mask	11 Patients (11.5 %)	11 Patients (15.9 %)	-	
High Flow O2	2 Patients (2.1 %)	2 Patient (2.9 %)	-	
Mechanical ventilation	67 Patients (69.8 %)	40 Patients (58 %)	27 Patients (100%)	0.003
CPAP	1 Patient (1 %)	1 Patient (1.4 %)	-	

Table 3

Hemodynamic and Noradrenaline /KFT / Urine Output /GFR for AKI Patients on CRRT

Hemodynamic :	All participant n= 96 Patients	Survivor n= 69 Patients	Non -Survivor n= 27 Patients	P- value
Systolic Blood pressure (mmHg)	122.30 ± 15.93	125.19 ± 15.58	114.93 ± 14.63	0.377
Diastolic Blood pressure (mmHg)	65.91 ± 13.73	68.52 ± 13.29	59.22 ± 12.72	0.128
Respiratory Rate (breath /min)	21.80 ± 5.46	21.96 ± 5.50	21.41 ± 5.44	0.320
SPO2 (%)	95.47 ± 3.02	95.52 ± 3.00	95.33 ± 3.11	0.580
Heart Rate (beat /min)	91.22 ± 17.7	90.65 ± 15.76	92.67 ± 22.18	0.256
Temperature (C)	36.47 ± 0.69	36.48 ± 0.68	36.46 ± 0.75	0.276
Vasopressors Noradrenaline Yes	86 Patients (89.6%)	60 Patients (87%)	26 Patients (96.3%)	
Vasopressors Noradrenaline No	10 Patients (10.4%)	9 Patients (13 %)	1 Patients (3.7%)	0.166
Urine Output (cc/hr)	0.00	0.00	0.00	-
BUN (mg/dl)	97.9 ± 32.4	100.88 ± 34.11	96.78 ± 31.74	0.425
Creatinine (mg/dl)	5.79 ± 2.84	5.89 ± 2.66	5.35 ± 3.82	0.537
GFR (ml/min /1.73 m2)	13.42 ± 10.13	14.28 ± 11.90	13.04 ± 5.98	0.093

Table 4

ABGS and Labs for AKI patients on CRRT

ABGS and Labs	All participant n= 96 Patients	Survivor n= 69 Patients	Non –Survivor n= 27 Patients	P- value
PH	7.20 ± 0.11	7.23 ± 0.10	7.15 ± 0.11	0.354
HCO3 (mEq/L)	15.39 ± 4.11	15.74 ± 3.91	14.49 ± 4.54	0.169
PCO2 (mmHg)	40.34 ± 16.27	39.82 ± 16.45	41.67± 16.04	0.326
Sodium (mEq/L)	139.67 ± 5.33	140.09 ± 5.28	138.59 ± 5.39	0.464
Potassium (mEq /L)	4.52 ± 0.79	4.53 ± 0.65	4.50 ± 1.09	0.286
Ammonia (mg/dl)	220.27 ± 300.53	195.21± 296.47	258.60 ± 311.72	0.500
PTT (second)	37.52 ± 10.05	36.73 ± 9.78	39.51 ± 10.63	0.372
INR	4.32± 20.19	5.46 ± 23.77	1.40 ± 0.36	0.114
Vasopressor (mcq/min)	25.20± 18.22	21.78 ± 15.16	33.08 ± 22.23	0.300
Calcium (mg/dl)	8.10 ± 0.59	8.10 ± 0.63	8..10 ± 0.50	0.417

3.3 Clinical and laboratory parameters at the initiation of the Renal Replacement Therapy

After fitting the model ($c^2(3) = 2.805$, $p = .423$, the analysis revealed that decreased blood urea nitrogen level was not associated with an increased hazard ratio of in-hospital mortality using multivariate analysis (HR=.998, 95% CI=[.985-1.011]), decreased serum creatinine was not associated with an increased hazard ratio of in-hospital mortality using multivariate analysis (HR=.846, 95% CI=[.652-1.097]), and decreased GFR was not associated with an increased hazard ratio of in-hospital mortality using multivariate analysis (HR=.998, 95% CI=[.896-1.021]).

For blood gas parameters, in the model $c^2(3) = 10.228$, $p = .017$, the analysis revealed that decreased PH was associated with an increased hazard ratio of in-hospital mortality using multivariate analysis (HR=.002, 95% CI= [.000-.183]).

However, decreased HCO3 and PCO2 were not associated with an increased hazard ratio of in-hospital mortality using multivariate analysis ((HR=.997, 95% CI= [.880-1.129]; (HR=.999, 95% CI= [.973-1.025], respectively.

For Physiological parameters, decreased Diastolic Blood Pressure was associated with an increased hazard ratio of in-hospital mortality using multivariate analysis (HR=.931, 95% CI= [.872-.993]).

However, other parameters were not associated with an increased hazard ratio of in-hospital mortality using multivariate analysis (Table 3).

Table 5

Physiological parameters and the hazard of mortality

Variable	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B)	
							Lower	Upper
Systolic Blood Pressure (mm Hg)	.005	.029	.035	1	.853	1.005	.949	1.065
Diastolic Blood Pressure (mm Hg)	-.072	.033	4.754	1	.029	.931	.872	.993
Respiratory Rate (breath/min)	.019	.047	.158	1	.691	1.019	.929	1.118
SPO_2 (%)	.083	.113	.532	1	.466	1.086	.870	1.356
Heart Rate (beat/min)	.019	.017	1.235	1	.266	1.020	.985	1.055
Temperature (C^0)	-.231	.452	.261	1	.609	.794	.327	1.924
Sodium (mEq/L)	-.057	.047	1.494	1	.222	.944	.861	1.035
Potassium (mEq/L)	.421	.433	.945	1	.331	1.523	.652	3.558
Ammonia (mg/dl)	.002	.001	2.415	1	.120	1.002	1.000	1.004
PTT (seconds)	-.002	.044	.003	1	.956	.998	.915	1.088
INR	-.800	.952	.707	1	.400	.449	.070	2.900
Vasopressor (mcg/min)	.250	.550	.206	1	.650	1.284	.437	3.777

3.4 Comparisons of the clinical and laboratory parameters of three days of the renal replacement therapy commencement

The in-hospital mortality rate was 28.1%. Data was collected for three days from the commencement of CRRT. On the first day, about 40.6% used Continuous Venovenous Hemofiltration (CVVH) as a mode for CRRT, the mean net filtration rate (NFR) was 110.54 ± 39.32, the blood flow was 192.57 ± 44.86. The mean Noradrenaline was 296.38 ± 212.21 mcq/min, and the mean total administered heparin was 12964.58 ± 11340.77 cc. The mean MAP was 93.79 ± 80.17 mm Hg, and the mean urine output was 97.38 ± 167.97 cc/hr. (Table 6).

On the second day, about 40.4% used Continuous Veno venous Hemofiltration (CVVH) as a mode for CCRT, the mean net filtration rate (NFR) was 106.11 ± 39.95, the blood flow was 187.21 ± 52.86. The mean Noradrenaline was 271.54 ± 223.55 mcq/min, and the mean total administered heparin was 12261.70 ± 2450.55 cc. The mean MAP was 93.36 ± 86.79 mm Hg, and the mean urine output was 165.97 ± 270.64 cc/hr. (Table 6).

On the third day, about 39.8% used Continuous Veno venous Hemofiltration (CVVH) as a mode for CRRT, the mean net filtration rate (NFR) was 111.40 ± 50.02, and the blood flow was 190.03 ± 53.24. The mean Noradrenaline was 238.04 ± 251.77 mcq/min, and the mean total administered heparin was 11384.27 ± 3189.50 cc. The mean MAP was 83.45 ± 13.47 mm Hg, and the mean urine output was 240.57 ± 407.59 cc/hr. (Table 6).

Table 6

laboratory parameters at three days of the initiation of the renal replacement therapy

Mode of CRRT first day	All participant n= 96 Patients	Survivor n= 69 Patients	Non -Survivor n= 27 Patients	*P -value*
CVVHD	34 (35.4%)	30 (43.5%)	4 (14.8%)	
CVVHD*F*	23 (24%)	13 (18.8%)	10 (37%)	
CVVH	39(40.6%)	26 (37.7%)	13(48.1%)	*0.021*
Mode of CRRT second day	All participant n= 96 Patients	Survivor n= 69 Patients	Non -Survivor n= 27 Patients	*P -value*
CVVHD	32 (34%)	28 (41.2)	4 (15.4%)	
CVVHD*F*	24 (25.5%*)*	15 (22.1%)	9 (34.6%)	
CVVH	38 (40.4%)	25 (36.8%)	13 (50%)	*0.059*
Mode of CRRT third day	All participant n= 96 Patients	Survivor n= 69 Patients	Non -Survivor n= 27 Patients	*P -value*
CVVHD	32 (36.3%)	27 (40.5%)	5 (22.7%)	
CVVHD*F*	21 (23.9%)	12 (18.2%)	9 (40.9%)	
CVVH	35 (39.8%)	27 (40.9%)	8 (36.4%)	*0.152*
NFR first day	110.54 ± 39.32	119.57 ± 38.5	87.47 ± 31.69	*0.000*
NFR second day	106.11 ± 39.95	114.56± 39.35	84.02± 32.96	*0.001*
NFR third day	111.40 ± 50.02	117.54± 40.91	92.73 ± 68.83	*0.004*
Blood flow first day	192.57 ± 44.86	205.07 ± 43.14	160.62 ± 31.82	*0.000*
Blood flow second day	187.21 ± 52.86	203.08 ± 48.14	145.71 ± 39.08	*0.000*
Blood flow third day	190.03 ± 53.24	207.05 ± 43.07	138.18 ± 48.02	*0.000*
Noradrenaline first day (mcq/min)	296.38 ± 212.21	238.35 ± 172.42	430.31 ± 237.11	*0.475*
Noradrenaline second day (mcq/min)	271.54 ± 223.55	189.75 ± 171.9	459 ± 217.78	*0.250*
Noradrenaline third day (mcq/min)	238.04 ± 251.77	119.80 ± 163	519.57 ± 196.44	*0.209*

Table 7

Clinical and Hemodynamic at three days of the initiation of the renal replacement therapy

Variable	All participant n= 96 Patients	Survivor n= 69 Patients	Non-Survivor n= 27 Patients	*P-value*
Blood Pressure First day				
Systolic Blood Pressure (mmHg)	123.69 ± 14.18	122.70 ± 15.59	126.23 ± 14.02	*0.487*
Diastolic Blood Pressure (mmHg)	67.72 ± 13.12	66.43 ± 13.55	71.03 ± 11.55	*0.463*
MAP First day (mmHg)	93.79 ± 80.17	88.32 ± 10.13	107.76 ± 151.44	*0.317*
Blood Pressure Second day				
Systolic Blood Pressure (mmHg)	122.01 ± 15.24	122.35 ± 13.58	121.15 ± 19	*0.573*
Diastolic Blood Pressure (mmHg	66.51 ± 10.60	65.63 ± 9.46	68.67 ± 12.94	*0.303*
MAP second day (mmHg)	93.36 ± 86.79	100.10 ± 101.25	75.73 ± 10.12	*0.178*
Blood Pressure Third day				
Systolic Blood Pressure (mmHg)	118.23 ± 21.69	116.29 ± 22.91	123.11 ± 17.73	*0.477*
Diastolic Blood Pressure (mmHg	65.88 ± 14.03	64.33 ± 13.80	69.78 ± 14.1	*0.397*
MAP Third day (mmHg)	83.45 ± 13.47	88.50 ± 8.64	68.07 ± 14.04	*0.372*

Table 8

Urine Output and ABGS and laboratory at three days of the initiation of the renal replacement therapy

Urine output	All participant n= 96 Patients	Survivor n= 69 Patients	Non - Survivor n= 69 Patients	*P-Value*
Urine Output first Day (cc/hr)	97.38 ± 167.97	110.02 ± 189.73	65.08 ± 86.22	*0.301*
Urine Output second Day (cc/hr)	165.97 ± 270.64	198.38 ± 296.41	77.81 ± 156.29	*0.869*
Urine Output third Day (cc/hr)	240.57 ± 407.59	308.61 ± 445.96	33.36 ± 106.58	*0.735*
ABGS	All participant n= 96 Patients	Survivor n= 69 Patients	Non - Survivor n= 69 Patients	*P-Value*
PH	9.73 ± 13.97	10.74 ± 16.43	7.19 ± 0.15	0.591
Paco2	39.34 ± 11.62	39.54 ± 12.24	38.85 ± 10.09	0.551
Pao2	83.59 ± 12.33	82.75 ± 11.19	85.70 ± 14.86	*0.444*
HCO3	19.14 ± 4.23	20.25 ± 3.93	16.33 ± 4.05	*0.435*
Labs	All participant n= 96 Patients	Survivor n= 69 Patients	Non - Survivor n= 69 Patients	*P-Value*
HGB	18.13 ± 35.06	16.54 ± 28.90	22.12 ± 47.64	0.366
Platelets	158.99 ± 73.51	162.55 ± 78.42	150.03 ± 59.76	0.494
APTT	43.60 ± 13.88	43.85 ± 15.93	42.94 ± 5.98	0.495
NA	138.59± 14.35	138.12 ± 16.82	139.79 ± 3.68	0.590
K	4.65 ± 1.11	4.67 ± 1.27	4.61 ± 0.50	0.481
Creatinine (mg/dl)	6.05 ± 11.23	6.71 ± 13.01	4.41 ± 4.03	0.452
BUN (mg/dl)	71.31 ± 24.36	71.76 ± 25.11	70.18 ± 23.79	0.491
Urine Output (cc/hr)	537.34 ± 767.25	678. 64 ± 853.02	186.70 ± 281.78	0.482

CVVHD: Continuous Venovenous Hemodialysis, CVVHDF: Continuous Venovenous Hemodiafiltration, CVVH: Continuous Venovenous Hemofiltration, MAP: mean arterial pressure.

After fitting the model ($c^2(3) = 20.349$, $p = .000$), the analysis revealed that the blood flow on the third day was associated with a decreased hazard ratio of in-hospital mortality using multivariate analysis (HR=.982, 95% CI=[.970-.993]). After fitting the model ($c^2(3) = 28.730$, $p = .000$), the analysis showed that mean arterial blood pressure (MAP) on the third day was associated with a decreased hazard ratio of in-hospital mortality using multivariate analysis (HR=.944, 95% CI= [.911-.978]).

The model for urine output, ($c^2(3) = 14.274$, $p = .003$) showed that urine output on the third day was associated with a decreased hazard ratio of in-hospital mortality using multivariate analysis (HR=.993, 95% CI= [.987-.999]).

After fitting the model ($c^2(12) = 37.289$, $p = .000$) for the three days of CRRT, the analysis revealed that the PH was associated with a decreased hazard ratio of in-hospital mortality using multivariate analysis (HR=.089, 95% CI= [.010-.810]),

HCO3 was associated with a decreased hazard ratio of in-hospital mortality using multivariate analysis (HR=.787, 95% CI=[.677-.915]), blood urea nitrogen (BUN) was not associated with decreased hazard ratio of in-hospital mortality (HR=1.008, 95% CI= [.988-1.028]), creatinine was not associated with decreased hazard ratio of in-hospital mortality (HR=.925, 95% CI= [.795-1.076]). Other related information is shown in (Table 6).

Table 9

Three days physiological parameters and the hazard of mortality

Variable	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B)	
							Lower	Upper
PH	-2.418	1.126	4.611	1	.032	.089	.010	.810
PaCO2	.010	.023	.190	1	.663	1.010	.965	1.057
HCO3	-.239	.077	9.732	1	.002	.787	.677	.915
PaO2	.000	.018	.001	1	.979	1.000	.966	1.037
HGB	.008	.006	1.750	1	.186	1.008	.996	1.020
Platelets	-.005	.004	1.989	1	.158	.995	.988	1.002
APTT	-.010	.026	.133	1	.715	.990	.941	1.043
NA	-.054	.067	.647	1	.421	.948	.831	1.080
K	-.070	.247	.081	1	.776	.932	.575	1.512
Creatinine	-.078	.077	1.033	1	.310	.925	.795	1.076
BUN	.008	.010	.546	1	.460	1.008	.988	1.028
Urine output	-.001	.001	1.470	1	.225	.999	.998	1.000

A logistic regression was performed to ascertain the effects of three days of PH, HCO_3, urine output, mean arterial blood pressure (MAP), and blood flow. The logistic regression model was statistically significant, $\chi^2(5) = 64.087$, $p = .000$.

The model explained 76.2% of the variance in surviving. Increasing blood flow rate was associated with an increased likelihood of exhibiting survival and improved MAP was associated with an increased likelihood of exhibiting survival (Table 6, 7).

The specificity for this model is 81.8%. The sensitivity for the model is 97%.

Table 10

Regression model for PH, HCO_3, urine output, mean arterial blood pressure (MAP), and blood flow for survival

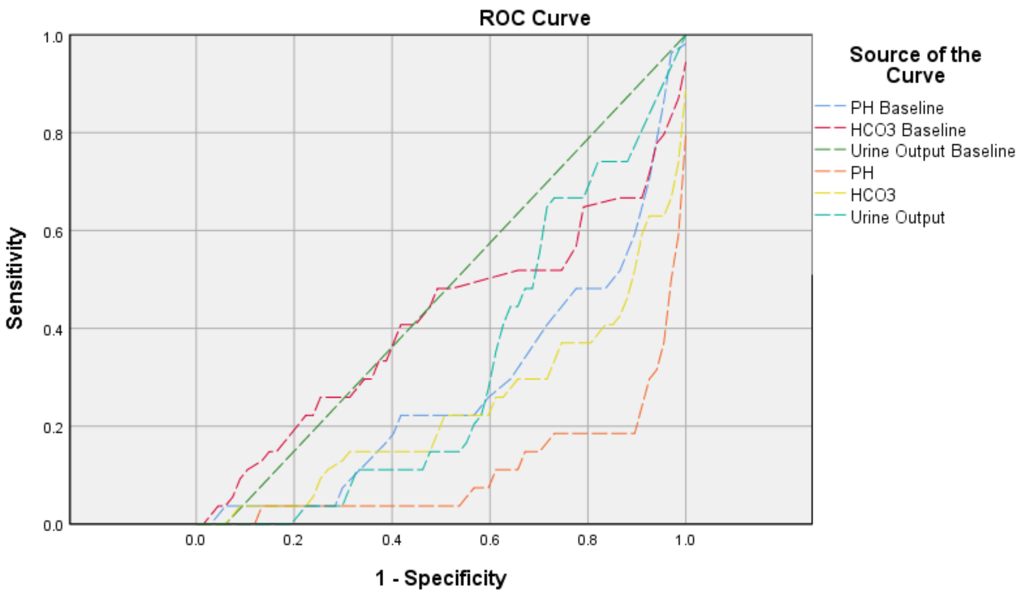
Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
Blood Flow	.025	.010	6.218	1	.013	1.026	1.005	1.046
MAP3	.119	.048	6.091	1	.014	1.126	1.025	1.238
UO3	.003	.002	1.986	1	.159	1.003	.999	1.007
PH	12.365	7.113	3.022	1	.082	234533.865	.207	2.659
HCO3	.076	.097	.614	1	.433	1.079	.893	1.303
Constant	-104.734	50.700	4.267	1	.039	.000		

The discrimination power (ROC curve and AUC) of these parameters (PH, HCO_3, Urine Output) concerning in-hospital mortality were compared (Figure 1). When the ROC curves were analyzed for these parameters, the AUC was .276 (95% CI .161-.390) for the PH baseline scores, .415 (95% CI .275-.554) for HCO_3 Baseline scores, and .470 (95% CI .344-.596) for baseline urine output scores.

The AUC was .108 (95% CI .027-.188) for the PH scores at three days, .235 (95% CI .121-349) for HCO_3 at three days scores, and .316 (95% CI .207-.425) for day three urine output scores (Table 8).

Figure 1

Receiver operating characteristic (ROC) curves and area under the curve (AUC) for mortality



Chapter Four

Discussions and Conclusions

4.1 Population Characteristics at the baseline measurement

In a prospective cohort study conducted in England, the incidence of AKI was higher in men than in women, and mortality rates were independent of socioeconomic factors (Loutradis et al., 2021). This finding is consistent with another study that reported approximately half of the participants were male (Xiao et al., 2022). In conclusion the results of these studies suggest that AKI is more common in male than in women and the percentage of AKI in male 56.3% from all patient's participant and the percentage of female from patient participant 43.8% and the percentage of survivor patient male 56.5%, and the percentage on non-survivor from male patient 55.6%, while the percentage of survivor from female 43.5 % and percentage of non- survivor 44.4% from female with AKI commencement on CRRT in this study. Other study show that reported an average age of 43 years on participant commencement on CRRT (Loutradis et al., 2021). Other study show the RRT patients have a very high in-hospital and post discharge mortality among survivors, irrespective of baseline values, patients over 75 years who survived ICU had a lower quality of life than younger patients' commencement on CRRT (Salathé et al., 2021). Conclusion on this study show the mean age of patient participant on CRRT commencement in this study was 49.67 ± 23.32 years, and the mean age of survival patient 48.39 ± 22.65 years, and the mean age of non- survivor patient 52.93 ± 25.1 years from all participant commencement on CRRT was in this study.

Furthermore, a study conducted by Kaur et al. (2023) found that diabetes and hypertension are significant risk factors for AKI, and their presence increases the risk of further episodes of AKI, progression to chronic kidney disease, ESRD, cardiac and cerebrovascular events, and all-cause mortality. Another study by Khruleva et al. (2021) found that hypertension and AKI development are significant predictors of in-hospital mortality in patients in the intensive care unit. Furthermore Zhang et al. (2022) found that continuous renal replacement therapy can effectively improve the therapeutic effect and cardiac function of patients with hypertension and refractory heart failure, protecting the health and safety of patients. Other study by Kaur et al. (2023) discovered that the incidence of comorbidity diseases, such as diabetes mellitus and hypertension, was around 86.5% in patients who started CRRT for AKI, and the survival rate for these patients was 73.9%., and diabetes and hypertension are significant risk factors for AKI. Also the CRRT can improve the therapeutic effect and cardiac function of patients with hypertension and heart failure, and the incidence of comorbidity diseases is high in patients who started CRRT for AKI.

In conclusion, the results of these studies suggest that AKI with comorbidity disease percentage in patient commencement on CRRT 77.1% and the percentage of survivor patient with comorbidity disease 73.9% and the percentage of comorbidity disease for non-survivor patients 85.2% commencement on CRRT on this study. While the percentage of patient on CRRT commencement without comorbidity disease from all patient participant 22.9% and the percentage of survivor patient from patient on CRRT without comorbidity disease 26.1% and percentage of non- survivor 14.8% from patient on CRRT commencement without comorbidity disease in this study found that meaning found AKI patient with comorbidity disease commencement on CRRT there is the mortality rate increased. A study has demonstrated that the commencement of CRRT can effectively improve the condition of patients with sepsis and AKI, promote the elimination of toxins such as serum creatinine and urea nitrogen from the body, and reduce the mortality rate Wang et al. (2021). Other study by Hoste et al. (2015) Large cohort studies focusing on critically ill patients have reported that the two most important causes of AKI are sepsis and surgery. Many studies have found that in sepsis/septic shock patients with AKI, CRRT with an adsorbing membrane may be safe and improve cardiorenal function and clinical condition, the effect on cytokines and endotoxin may partly explain these results (Hoste et al., 2015). Around 85% of patients with septic shock had AKI during the use of CRRT for 72 hours, and this was approved (Turani et al., 2019). A comparison of this study and my results shows that the percentage of patients with septic shock and AKI who were treated with CRRT was 64.6% and percentage of survivor patient 62.3% and the percentage of non- survivor patient 70.4% with diagnosis septic shock and AKI commencement on CRRT. These results support sepsis as an indication of CRRT.

In study by Hydert et al. (2019) suggest that the placement of permanent dialysis catheter in the internal jugular is lower complication and more safe for patient during comparison with other site .Other study conclude that by Badya et al. (2019) suggest that by reviewed 92 permanent catheter inserted by ultrasound found less complication by septicemia when insertion catheter in right internal jugular .In my study found the most common access site for CRRT commencement with AKI right internal jugular the percentage from all patient participant in this study 34.4% , and the percentage of survivor 37.7% and percentage of non- survivor 25.9% for patient on CRRT commencement by use right internal jugular as site for access with AKI in this study . In study found by Maria et al. (2009) by taken 879 patients with AKI found more risk and mortality in patient anuric rather than oliguria. In this study found and suggest that the mean UO in all participant was 11.77 ± 59.66 cc/hr, and the mean UO was survivor patients 12.17 ± 59.35cc/hr. and was the mean UO for non-survivor zero for patient on CRRT commencement with AKI in this study. Other study finds that the use of creatinine for AKI is a late and inaccurate indicator of renal dysfunction Cerda (2007). On study by Cho et al. (2018) show the mean of creatinine and increase 4 mg /dl or anuria patients there is indication for CRRT commencement. A comparison of my study found that decreased serum creatinine and blood urea nitrogen were not associated with an increased hazard ratio of in-hospital mortality.

Other study by Allegretti et al. (2013) in hospital mortality for patients with acute kidney injury was 60.7% during take serum creatinine greater than 3 mg /dl at the time of CRRT initiation was associated with decrease mortality and lower GFR at the time of CRRT initiation was associated with decreased mortality. Comparison on these studies show the mean creatinine in all participant 2.19 ± 1.91 mg/dl and the mean creatinine in survivor patient 2.09 ± 1.77 mg /dl, and the mean creatinine was the non-survivor 1.95 ± 1.97mg /dl baseline measurement to commencement on CRRT was in this study. In this study found the mean BUN in all participant 35.42 ± 21.66 mg /dl, and the mean BUN in survivor patient 34.98 ± 21.94 mg /dl, and the mean BUN was the non-survivor 37.78 ± 27.29 mg /dl baseline measurement to commencement on CRRT was in this study. A comparison of my study found that decreased serum creatinine and blood urea nitrogen were not associated with an increased hazard ratio of in-hospital mortality. In this study found the mean GFR 13.34 ± 10.17 ml/min/1.73m^2 was the all participant, and the mean GFR for survivor patient 14.17 ± 11.94 ml/min/1.73m^2, and was the mean GFR was the non-survivor 13.04 ± 5.99 ml/min/1.73m^2 baseline measurement to commencement on CRRT was in this study.

4.2 CRRT Indications

Metabolic acidosis is a commonly encountered condition in the ICU and its presence is associated with increased mortality, even moderate metabolic acidosis carries a higher mortality rate than severe sepsis, consequently the CRRT is occasionally used to normalize acid-base imbalances resulting from metabolic acidosis in the ICU (Yagi et al., 2021). Another study conducted in Korea found that a low pH is a significant risk factor for early mortality Kee et al. (2018). Anuric patient with AKI is also common, with sepsis being the primary cause, and is associated with adverse outcomes among patients with AKI who require CRRT (Choi et al., 2014). In study by Raiku et al. (2016) suggest the severe metabolic acidosis, and low lower serum bicarbonate less than 12 mmol/l is associated with a 10 years risk for coronary artery disease and 20 % high in mortality for patient on CRRT. Other study approved that by Ruth et al. (2022) in children, the mean age 2.1 years found the mortality rate 56.3% of death occurred within 12 hours of admission and most common cause of death metabolic acidosis and AKI and hyperkalemia .A comparison of studies revealed that the most common indication for initiating CRRT in AKI patients in the ICU was acidosis and anuria , and the percentage was for acidosis and anuria 53.1% from all participant as indication for CRRT commencement among AKI patients in the ICU in this study ,and the percentage was for survivor patients for use acidosis and anuria as indication for CRRT commencement in this study 53.6% , and the percentage was for non-survivor patients 51.9% commencement on CRRT with AKI in the ICU in this study. And the percentage was for acidosis and anuria and unstable blood pressure as indication 18.8% from all participant was for CRRT commencement among AKI patients in the ICU in this study and the percentage was for survivor patients for use acidosis and anuria and unstable blood pressure as indication for CRRT commencement in this study 13%, and the percentage was for non-survivor patients 33.3% commencement on CRRT with AKI in the ICU in this study.

A recent study found that the most common indication for nephrology in AKI patients is the use of CRRT for unstable blood pressure, to maintain a mean arterial blood pressure (MAP) above 65 mmHg Kim et al. (2021). MAP is a significant predictor of mortality in AKI patients receiving CRRT, with low MAP at CRRT initiation associated with a high risk of mortality (Kim et al., 2021). Another study found that the most common indication for dialysis in AKI patients is unstable blood pressure, and patients on CRRT are more likely to achieve hemodynamic stability than those on traditional hemodialysis (Bitker et al., 2016). Other study by Matsuura et al. (2023) suggests the association with low MAP and mortality, and other study by Kim et al. (2021). approved that .In Iran other study by Alirezaei et al. (2019) unstable hemodynamic and hypotension the most common indication for CRRT among AKI in Iran .In this study found the percentage of patient with AKI commencement was on CRRT with AKI in the ICU 89% from all participant, and the percentage of survivor patient on CRRT on vasopressor 87% and the percentage on non- survivor patients on CRRT commencement on vasopressor 96.3% commencement on CRRT for AKI patients on Vasopressor /Noradrenaline in this study . Other study by Xu et al. (2021) the mortality rate and prevalence for AKI is high in ill patient with COVID -19 receiving in mechanical ventilation, and the CRRT plays role for decreasing mortality. Comparison on this study found the percentage of patient on mechanical ventilator commencement on CRRT for AKI in the ICU 69.8% and the percentage of patient survive patient from patient on MV 58% and 100% percentage of non- survivor patient on mechanical ventilator in patient with AKI commencement on CRRT in the ICU in this study. In study by Stefani et al. (2019) found drugs exerted by the kidney should be adjustment dose for kidney disease. On this study show the drug adjustment on all patient participants as doctor order. Conclusion on this study and approved that by result show Anuria, Acidosis, Overloaded fluid, & Anuria indications were more likely to have survival, and the most common indication to commencement AKI patient on CRRT there is Anuria, Acidosis, and during commencement patient on CRRT the stability for Blood pressure and can be weaning from vasopressor.

4.3 Comparison of the clinical and Laboratory Parameters of CRRT Commencement

On study by Cho et al. (2018) show the mean of creatinine and increase 4 mg /dl or anuria patients there is indication for CRRT commencement. on study by Medina et al. (2021) found the lower creatinine and blood PH were significant predictor of mortality. On this study found all patients commencement on CRRT were anuria, and the mean serum creatinine for all participant was 5.79 ± 2.84 mg/dL and the mean creatinine in survivor patient 5.89 ± 2.66 mg/dL, and the mean creatinine for non- survivor 5.35 ± 3.82 mg/dL .On this study found all patients commencement on CRRT the mean BUN for all participant was 97.9 ± 32.4 mg/dL and the mean BUN in survivor patient

100.88± 34.11 mg/dL, and the mean BUN for non- survivor 96.78± 31.74 mg/dl. Other study by Chen et al. (2021) show increased BUN level in emergency in admission is associated with hospital mortality. In study found in America by Hong et al. (2023) suggest the higher BUN concentrations are associated with higher risk of cardiovascular disease and all cause of mortality. The main conclusion on this study decreased BUN and creatinine not associated with an increased in hospital mortality rate. On this study found all patients commencement on CRRT the mean GFR for all participant was 13.42 ± 10.13 ml/min/1.73m^2, and the mean GFR in survivor patient 14.28 ± 11.90 ml/min/1.73m^2 and the mean GFR for non- survivor 13.04 ± 5.98 ml/min/1.73m^2. on study by Kee et al. (2018) found during initiation of CRRT for AKI weaning from noradrenaline is better. In study by Kee et al. (2018) show the low MAP and low arterial PH at CRRT initiation were associated with early mortality in patients.

On this study found all patients commencement on CRRT the mean Systolic Blood Pressure for all participant was 122.30 ± 15.93 mmHg and the mean Systolic Blood Pressure in survivor patient was 125.19 ± 15.58 mmHg and the mean Systolic Blood Pressure for non- survivor 114.93 ± 14.63 mmHg .On this study found all patients commencement on CRRT the mean Diastolic Blood Pressure for all participant was 65.91 ± 13.73 mmHg and the mean Diastolic Blood Pressure in survivor patient was 68.52 ± 113.29 mmHg and the mean Diastolic Blood Pressure for non- survivor 59.22 ± 12.72 mmHg. Study by Jentzer et al. (2022) suggest that acidosis is high predictor mortality for cardiogenic shock. On this study found all patients commencement on CRRT the mean PH for all participant was 7.20 ± 0.11 and the mean PH in survivor patient was 7.23 ± 0.10 and the mean PH for non- survivor 7.15 ± 0.11. Conclusion decline PH there is high mortality. On this study found all patients commencement on CRRT the mean Vasopressor for all participant was 25.20 ± 18.22 mcq/min, and the mean Vasopressor in survivor patient was 21.78 ± 15.16 mcq/min and the mean Vasopressor for non- survivor 33.08 ± 22.23mcq/min, conclusion the patient during weaning from noradrenaline the survival rate improved and mortality decline.

4.4 Clinical and laboratory parameters at three days of the initiation of the renal replacement therapy

In this study found the most common mode CRRT commencement for three days AKI patients in the ICU CVVH, and the requirement for noradrenaline will be decline. In the first day mean requirement for all participant 296.38 ± 212 mcq/min, and the mean noradrenaline requirement for survivor patients in first day 238.35 ± 172.42 mcq/min, and the mean noradrenaline requirement for non-survivor patients in first day 430.31 ± 237.11 mcq/min. comparison in third day on my study the requirement for noradrenaline the mean for all participant 238.04 ± 255.71 mcq/min , and the mean noradrenaline requirement for survivor patients in third day 119.80 ±163 mcq/min, and the mean noradrenaline requirement for non-survivor patients in third day 519.57 ± 196.44 mcq/min. In this study found the mean for MAP for CRRT Commencement on first day 93.79 ± 80.10 mmHg, and the mean MAP for survivor patient at first day 88.32 ± 10.13 mmHg, and the mean MAP for non-survivor 107.76 ± 151.44 mmHg. Comparison the mean for MAP for CRRT Commencement on third day 83.45 ± 13.47 mmHg, and the mean MAP for survivor patient at third day 88.50 ± 8.64 mmHg, and the mean MAP for non-survivor 68.07 ± 14.04 mmHg.

Main Conclusion the noradrenaline requirement for survivor patient will be decline for AKI patient commencement on CRRT as result and in this study and showed that decreased diastolic blood pressure and decreased MAP were associated with an increased hazard ratio of in-hospital mortality and the mean arterial blood pressure on the third day was associated with a decreased hazard ratio of in-hospital mortality. On this study found the mean for UO for was all participant at the first day 97.38 ± 167.97 cc, and the mean UO for survivor patient 110.02 ± 189.73 cc, and the mean UO for non-survivor 65.08 ± 86.22cc. comparison the UO at third day the mean UO for was all participant at the third day 240 .57± 407.59 cc, and the mean UO for survivor patient 308.61 ± 445.96 cc, and the mean UO for non-survivor 33.36 ± 106.58 cc. Conclusion the results of one study showed that decreased pH was associated with an increased ratio of in-hospital mortality, while the urine output on the third day was associated with a decreased ratio of in-hospital mortality.

4.5 Comparison of the clinical and Laboratory Parameters of CRRT Commencement

The mortality rate

In this study, the overall mortality rate among patients with AKI who was on CRRT in a single center in the south of the West Bank of Palestine across two years was 28.1%. Data was collected for three days from the commencement of CRRT. Study by Suzuki et al. (2017) this study suggests that late initiation of CRRT is associated with a lower risk of in-hospital mortality in patients with AKI. It is important to note that previous studies have reported variable mortality rates among patients on dialysis in different settings. For instance, in Dubai, a five-year mortality analysis of hemodialysis patients in a single center revealed a 27% mortality rate among 112 patients out of a total population of 411 patients on hemodialysis (Cozzolino et al., 2018). Similarly, a cost of illness study in Lebanon showed a high burden of hemodialysis and peritoneal dialysis costs compared to transplant and non-dialysis CKD patients, with medications being a significant cost in transplant patients. Health parameters must focus on interventions that prevent end-stage kidney disease and encourage kidney transplantation (Aoun et al., 2022). Acute kidney injury (AKI) affects more than 20% of hospitalizations in the United States in 2012, and it was associated to the risk of death that was four folds greater in hospitalized patients. These findings highlight the importance of observes AKI and the association between AKI and death in hospitalized patients. In a study done in Korea, 240 patients who began CRRT at the Academic Center between 2016-2018 were analyzed. The study compared the baseline characteristics of patients who died within seven days of initiating CRRT, and 54.2% of those patients died within seven days of CRRT initiation (Kee et al., 2018).

4.6 Strengths and Limitations of this Study

The results of this research can be best understood by looking at following strengths:

1. This study is a first of its kind to examine the use of Continuous Renal Replacement Therapy (CRRT) for patients suffering from Acute Kidney Injury (AKI) in the Intensive Care Unit (ICU) in Hebron, Palestine.
2. This study focuses on the for a new treatment in Hebron, my country, as AKI is one of the leading causes of mortality in the ICU.

3. The use of CRRT in the ICU for AKI patients shows less risk of infection compared to traditional hemodialysis, making it a safer option for patients with positive histology labs, such as hepatitis B.
4. The study describes the causes and indications for CRRT and provides parameters for patients receiving this treatment, including hemodynamic and laboratory tests, and arterial blood gas analysis over three days.
5. The first study and research in Palestine.

This study has a few limitations that should be considered while interpreting its findings. These limitations are as follows:

1. This study is the first of its kind that examines acidosis and urine output as indications for starting continuous renal replacement therapy among patients with acute kidney injury in the intensive care unit.
2. The study taken in one center in Palestine and limited of generalizability.
3. Patient files were used for data collection instead of computer records.
4. This was a retrospective study. Retrospective designs are less robust and reliable compared to prospective studies.
5. The political climate of the country has made it difficult to access hospitals.
6. The sample size was small, and Continuous Renal Replacement Therapy (CRRT) was not frequently used in the intensive care unit.
7. Al-Ahli Hospital does not have a dedicated dialysis center, and there are only two devices available for CRRT. Dialysis can be done if critically ill patients on mechanical ventilation cannot be transported to government hospitals in Hebron.
8. The scarcity of CRRT devices at Al-Ahli Hospital has limited the treatment options for patients.
9. The high cost of CRRT poses a significant challenge to private patients.
10. The study was conducted in one of the centers in the West Bank of Palestine in Hebron.
11. the study taken in one center in Palestine.

4.7 Conclusion

Summary of Findings

The purpose of this study was to investigate the indications and outcomes of continuous renal replacement therapy (CRRT) among patients with acute kidney injury (AKI) in the intensive care unit (ICU). The research was conducted at Al-Ahli Hospital in Hebron, and it had a quantitative and retrospective design. During the study period, a total of 96 patients with AKI were included. The inclusion criteria were AKI patients admitted to the ICU with anuria (urine output less than 50 mL/12 h), elevated serum creatinine (SCr) and blood urea nitrogen (BUN), decreased glomerular filtration rate (GFR), and severe acidosis, as determined by nephrology consultation indicating CRRT therapy. The study showed that more than two-thirds of the patient population had comorbid conditions such as diabetes mellitus and hypertension. Septic AKI was prevalent in approximately 64.6% of cases. Moreover, 89.6% of patients required vasopressor (Noradrenaline) support upon CRRT initiation, with 69% of patients necessitating mechanical ventilation. All patients had anuria, with a mean vasopressor administration of 25 mcq/min. Survival analysis indicated that anuria was the most common predictor of survival, while patients on mechanical ventilation were less likely to survive. Changes observed during the study period, including decreases in serum creatinine, GFR, and pH, was not associated with increased hospital mortality. Similarly, increases in blood urea nitrogen were not linked to higher mortality rates. However, decreased diastolic blood pressure was associated with increased hospital mortality in CRRT-treated patients. Continuous veno-venous hemofiltration (CVVH) was the most common CRRT mode. Comparisons over three days revealed a decrease in vasopressor requirements among AKI patients receiving vasopressors, accompanied by increased urine output. Particularly, decreases in pH were related with increased hospital mortality. In conclusion, monitoring of acidosis during CRRT can help predict patient outcomes. Additionally, factors such as pH, bicarbonate levels, urine output, mean arterial pressure, and blood flow influenced survival in CRRT-treated AKI patients over three days.

4.8 Implications of the Findings on practice, future research, and patient teaching

The aim of this study was to assess the effectiveness of continuous renal replacement therapy (CRRT) in managing acute kidney injury (AKI) for patients in the intensive care unit (ICU). The study was able to prove its objectives and confirm the hypothesis that CRRT is an effective treatment for managing AKI in critically ill patients. The study was also able to identify urine output (UO) and acidosis as key indicators for determining the need for CRRT among AKI patients with uremia in the ICU. Furthermore, the study found that the use of CRRT therapy helps manage hemodynamically unstable patients with AKI in the ICU and leads to improved survival or recovery of kidney disease and uremia. The research also discovered new information regarding treatment options that were not previously available in all hospitals in Palestine. The results of this study have important implications for healthcare providers and decision-makers in Palestine. The study shedslight on the need for increased awareness, knowledge, and information among clinicians to manipulate modifiable risk factors and reduce mortality rates, improve health outcomes, and increase survival rates among AKI patients in the ICU.

4.9 Recommendations for Future Research

The findings concluded in this study could have significant suggestion for future research in the field of acute kidney injury (AKI) patients in the intensive care unit (ICU). The following suggestions are made:

1. More multicenter studies should be done to explore mortality rates among AKI patients in the ICU within the Palestinian context.
2. Future research must be done that aims to determine peak periods for continuous renal replacement therapy (CRRT) utilization among AKI patients in the ICU.
3. The impact of manipulating various modifiable risk factors on mortality rates among AKI patients requiring CRRT in Palestine requiring more studying.
4. Future research should prioritize expanding the understanding of optimal indications and timing for initiating CRRT among ICU patients with AKI.
5. Comparative analyses between different modes of CRRT for AKI patients in terms of mortality rates are recommended.

6. More investigation should be done about the efficacy and potential side effects of various anticoagulants used in CRRT, such as citrate, calcium, and heparin, would provide valuable insights.
7. Examination of mortality rates among AKI patients receiving CRRT with mechanical ventilation should be justified.
8. The effect of CRRT utilization on vasopressor demand, acidosis, hemodynamic status, and arterial blood gas parameters among AKI patients are encouraged to be studied more Top of Form.

List of Abbreviations

Abbreviation	Meaning
AKI	Acute Kidney Injury
ATN	Acute Tubular Necrosis
PH	Potential of Hydrogen
PIRRT	Prolonged Intermittent Renal Replacement Therapy
BUN	Blood Urea Nitrogen
CKD	Chronic Kidney Disease
COPD	Chronic Obstruction Pulmonary Disease
CPP	Cerebral Perfusion Pressure
CART	Continuous Renal Replacement Therapy
CVVH	Continuous Veno-venous Hemodialysis
CVVHD	Continuous Veno-venous Hemofilteraion
CVVHDF	Continuous Veno-venous Hemodiafilteraion
DM	Diabetes Mellitus
GFR	Glomerular Filtration Rate
HD	Hemodialysis
HTN	Hypertension
ICP	Intracranial Pressure
ICU	Intensive Care Unit
IHD	Intermittent Hemodialysis
KFT	Kidney Function Test
KIDGO	Kidney Disease Improving Global Outcomes
MAP	Mean Arterial Pressure
MODS	Multiple Organ Dysfunction Syndrome
MOST	Multiple Organ System Failure
MV	Mechanical Ventilation
RRT	Renal Replacement Therapy
SCr	Serum Creatinine
SCUF	Slow Continuous Ultrafiltration
SHF	Severe Hepatic Failure
UO	Urine Output

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Appendices

Appendix A

IRB Form

An-Najah National University
Faculty of Medicine & Health Sciences
Department of Nursing

بسم الله الرحمن الرحيم

جامعة النجاح الوطنية
كليــة الطب وعـلـوم الصـحة
دائرة التمريض

التاريخ: 2023/8/15

حضرة د. يوسف التكروري المحترم ، مدير مستشفى الاهلي - الخليل ،

تحية طيبة وبعد،

الموضوع: تسهيل مهمـــة طالب الماجستير: اسامه نايف العرامين / ماجستير عنايه مكثفه

تهديكم دائرة التمريض والقبالة في كلية الطب وعلوم الصحه / جامعة النجاح الوطنية أطيب التحيات ونشكر لحضرتكم حسن تعاونكم معنا ونرجـو العلم بأن الطالب المذكور أعلاه يدرس ماجستير تمريض العنايه المكثفه وحيث أنه سيقوم بعمل دراسة بغرض البحث العلمي لأطروحة التخرج تحت عنوان:

Acidosis And Urine Output As Indication For Starting Continuous Renal Replacement Therapy Among Acute Kidney Injury Patients In Intensive Care Unit :

Retrospective Study At Al-Ahli Hospital In Hebron

فنرجو التكرم بالموافقة على تسهيل مهمة الطالب في مستشفى الاهلي – الخليل. في الفترة الواقعه ما بين (2023/8/20 - 2023/12/20) تحت اشراف: د. محمد حايك.

- مرفق ملخص الدراسة و IRB
- Data Sheet

وتفضلوا بقبول الطلب ولكم فائق الاحترام ، ،

مديرة دائرة التمريض والقبالة
د. عائدة أبو السعود القيسي

جامعة النجاح الوطنية
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Appendix B

Tables of Study

Table B.1

Area Under the Curve test results

Variable	Area	Std. Error	Asymptotic Sig.	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
PH Baseline	.276	.058	.001	.161	.390
HCO3 Baseline	.415	.071	.197	.275	.554
Urine Output Baseline	.470	.064	.652	.344	.596
PH	.108	.041	.000	.027	.188
HCO3	.235	.058	.000	.121	.349
Urine Output	.316	.056	.005	.207	.425

جـــامعـــــة النجاح الوطنية

كليـــة الدراســــات العليـــا

استخدام ارتفاع معدل الحموضة في الدم وكمية البول كمؤشر لبدء غسيل الكلى المستمر بين مرضى إصابات الكلى الحادة في وحدة العناية المركزة: دراسة بأثر رجعي في المستشفى الأهلي في الخليل

إعداد

أسامة نايف حسن العرامين

إشراف

د. محمد الحايك

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في تمريض العناية المكثفة، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس– فلسطين.

2024

استخدام ارتفاع معدل الحموضة في الدم وكمية البول كمؤشر لبدء غسيل الكلى المستمر بين مرضى إصابات الكلى الحادة في وحدة العناية المركزة: دراسة بأثر رجعي في المستشفى الأهلي في الخليل

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إشراف

د محمد الحايك

الملخص

خلفية الدراسة: فشل الكلى الحاد له تأثير عالمي كبير، حيث يتأثر سنويا 13 مليون شخص، حيث بلغت نسبة الإصابة بفشل الكلى الحاد داخل اقسام المستشفى 30-60 % وهي منتشرة عند المرضى الذين بحاجة الى عناية مكثفة حيث بلغت نسبة الإصابة 5-20 % داخل اقسام العناية المكثفة وبلغ نسبة هؤلاء المرضى الذين بحاجة الى غسيل الكلى المستمر والمتقدم 4.9 % وفي العقد الماضي ارتفع معدل الإصابة بفشل الكلى الحاد وتهدف هذه الدراسة الى التحقق من تأثير استخدام معدل الحموضة وكمية البول كأحد المعايير لبدأ غسيل الكلى المستمر والمتقدم للمرضى الذين يعانون من فشل مؤقت في وظائف الكلى داخل اقسام العناية المكثفة في المستشفى الأهلي في الضفة الغربية في فلسطين.

منهجية الدراسة: إستخدمت هذه الدراسة طريقة الارتباط الكمي بأثر رجعي ووصفي. تقنية أخذ العينات الهادفة لاختيار المشاركين. وشملت الدراسة جميع المرضى الذين تم تشخيص إصابتهم بالقصور الكلوي الحاد والذين خضعوا لغسيل الكلى وجميع المرضى بحاجة الى ادوية مدعمة للضغط، بغض النظر عن أعمارهم وجنسهم، تم جمع المعلومات الديموغرافية، والأمراض المصاحبة، والمؤشرات لعمل غسيل الكلى والعلامات الحيوية، وكمية البول، وجرعات الادوية المدعمة للضغط، والنتائج المخبرية قبل وبعد بدء غسيل الكلى.

نتائج الدراسة: تمت مراجعة السجلات الطبية لـ 96 مريضًا من مرضى الفشل الكلوي الحاد الذين تلقوا غسيل الكلى المستمر بين أبريل 2021 وأبريل 2023، وكان اكثر من ثلثين المرضى لديهم امراض مزمنة وكان معدل الوفيات 28.1%، ونسبة المرضى الذين على أجهزة تنفس اصطناعي بلغت 69.8% وجميعهم لا يوجد لديهم بول وكانت نسبة الذكور 56.3% و الاناث 43.8% ونسبة الذين بقوا على قيد الحياة من الذكور والاناث، الذكور 56.5 % الاناث 43.5 % الذين يخضعون اما لغسيل الكلى المزمن او عادوا الى وضعهم الطبيعي.

الاستنتاج الرئيسي: كان المؤشر الأكثر لتشخيص هؤلاء المرضى هو الصدمة الانتانية وكان المؤشر الأكثر شيوعا هو ارتفاع معدل الحموضة وعدم وجود كمية البول عند هؤلاء المرضى لعمل غسيل الكلى المستمر وكان ارتفاع معدل الحموضة في الدم وعدم وجود كمية البول المطلوبة مع وجود سوائل زائدة لهؤلاء المرضى هي النسبة الاكثر للبقاء على قيد الحياة، حيث كانت نسبة الوفاة اكثر للمرضى الذين يعانون من امراض مزمنة وأيضا النسبة الأكبر للوفاة عند المرضى الذين تم وضعهم على أجهزة التنفس الاصطناعي وتبين أيضا ان انخفاض فحوصات الكلى لا يقلل من احتمالية الوفاة.

الكلمات المفتاحية: فشل الكلى الحاد، غسيل الكلى المستمر، الوفيات.