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PROFILE OF PATIENTS WHO DEVELOPED ACUTE KIDNEY INJURY IN AN INTENSIVE CARE UNIT

Perfil de pacientes que desenvolveram lesão renal aguda em unidade de terapia intensiva

Perfil de los pacientes que desarrollaron daño agudo del renal en una unidad de cuidados intensivos

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RESUMO

OBJETIVO: analisar pacientes com Lesão Renal Aguda que demandaram hemodiálise na internação em Terapia Intensiva. **Método:** estudo analítico, quantitativo. A população foram pacientes que desenvolveram Lesão Renal Aguda e necessitaram de hemodiálise. A amostra foi de 110 pacientes, os dados foram coletados de janeiro de 2020 a junho de 2022; a análise foi paramétrica. **Resultados:** 55,45% dos pacientes era do sexo masculino com idade acima de 65 anos (60,91%). Os principais motivos de internação hospitalar foram os agravos cardiovasculares (34,55%) e os agravos respiratórios (29,09%). Os principais motivos de internação foram os agravos cardiovasculares (39,09%), seguidos de agravos infecciosos (33,64%) e respiratórios (10,00%). 72,73% deles usou Ventilação Mecânica Invasiva, 94,55% drogas vasoativas e 94,55% antibioticoterapia; 67,27% dos

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pacientes morreram. **Conclusão:** o perfil de pacientes com Lesão Renal Aguda na UTI caracterizou-se por pacientes com condições crônicas e suas complicações; o comprometimento renal também está relacionado às intervenções realizadas na UTI.

DESCRITORES: Lesão renal aguda; Diálise renal; Unidade de terapia intensiva.

ABSTRACT

OBJECTIVE: to analyze patients with Acute Kidney Injury who required hemodialysis during their stay in Intensive Care. **Method:** analytical, quantitative study. The population consisted of patients who developed Acute Kidney Injury and required hemodialysis. The sample consisted of 110 patients, data were collected from January 2020 to June 2022; the analysis was parametric. **Results:** 55.45% of patients were male aged over 65 years (60.91%). The main reasons for hospitalization were cardiovascular problems (34.55%) and respiratory problems (29.09%). The main reasons for hospitalization were cardiovascular problems (39.09%), followed by infectious (33.64%) and respiratory (10.00%) diseases. 72.73% of them used Invasive Mechanical Ventilation, 94.55% vasoactive drugs and 94.55% antibiotic therapy; 67.27% of patients died. **Conclusion:** the profile of patients with Acute Kidney Injury in the ICU was characterized by patients with chronic conditions and their complications.

DESCRIPTORS: Acute kidney injury; Renal dialysis; Intensive care unit.

RESUMEN

OBJETIVO: analizar los pacientes con Insuficiencia Renal Aguda que requirieron hemodiálisis durante su estancia en Terapia Intensiva. **Método:** estudio analítico, cuantitativo. La población estuvo conformada por pacientes que desarrollaron Insuficiencia Renal Aguda y requirieron hemodiálisis. La muestra estuvo conformada por 110 pacientes, los datos fueron recolectados desde enero de 2020 hasta junio de 2022; el análisis fue paramétrico. **Resultados:** el 55,45% de los pacientes eran hombres mayores de 65 años (60,91%). Los principales motivos de hospitalización fueron problemas cardiovasculares (34,55%) y problemas respiratorios (29,09%). Los principales motivos de hospitalización fueron los problemas cardiovasculares (39,09%), seguidos de las enfermedades infecciosas (33,64%) y respiratorias (10,00%). El 72,73% de ellos utilizaba Ventilación Mecánica Invasiva, el 94,55% fármacos vasoactivos y el 94,55% antibioticoterapia; Falleció el 67,27% de los pacientes. **Conclusión:** el perfil de los pacientes con Insuficiencia Renal Aguda en la UTI se caracterizó por pacientes con condiciones crónicas y sus complicaciones.

DESCRIPTORES: Daño renal agudo; Diálisis renal; Unidad de terapia intensiva.

INTRODUCTION

The Intensive Care Unit (ICU) is defined by the Ministry of Health as a critical sector reserved for critically ill patients who require multi-professional assistance and specialized interventions.[1]

Many interventions carried out in this sector lead to disturbances in some organs and organ functions; among them is the renal system, which is responsible for maintaining body homeostasis. Acute Kidney Injury (AKI) associated with ICU stays has an incidence of between 17% and 35%, varying according to the clinical severity of the patients.[2]

Diseases such as heart failure, shock, Systemic Inflammatory Response Syndrome, respiratory failure and sepsis increase the risk of developing AKI, and the mortality of these patients is related to the severity of non-renal diseases, advanced age, pre-existing comorbidities and their ICU stay.[2]

Anyone is subject to developing AKI, depending on the combination of variables such as age, reason for hospitalization, comorbidities and the therapy used in the ICU. A systematic review study identified the use of broad-spectrum antibiotics, Vasoactive Drugs (VADs), Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), Invasive Mechanical Ventilation (IMV), Iodine-based contrast for imaging tests as the main interventions associated with AKI in the ICU; other associated conditions are a positive Water Balance (WB) and severe bleeding.[3]

To establish the diagnosis and prognosis of AKI, one of the most widely used criteria is the RIFLE classification. This refers to the acronyms Risk (risk of renal dysfunction); Injury (injury to the kidney); Failure (failure of renal function); Loss (loss of renal function) and End stage renal disease (ESRD). By measuring and identifying the increase in Serum Creatinine (SRC), decrease in Glomerular Filtration Rate (GFR) and urine

output, the degree of AKI is determined, as well as the time needed to start HD. [4,5]

Considering the risk of acute renal failure in ICU patients, this study aimed to analyze the clinical profile of patients who presented AKI and required hemodialysis (HD) during their ICU stay.

METHOD

This is an analytical, cross-sectional study with a quantitative approach; it was carried out in a private ICU affiliated to the Unified Health System (SUS).

The population consisted of adult ICU patients who required hemodialysis treatment due to AKI. Considering that the incidence of AKI varies according to the patient's clinical condition and is higher in ICU patients, occurring in 17 to 35% of these 2, and the data on ICU patients requiring HD, the sample was calculated at 110 patients. A significance level of 5% (p= 0.05) and a relative sampling error of 8% (absolute sampling error = 4%) were considered.

The inclusion criteria were: adult patients who developed AKI and required HD during their ICU stay. Exclusion criteria were: patients who had a history of Chronic Kidney Disease (CKD) whether or not they were using HD, as well as AKI patients who were already on HD prior to ICU admission.

Data was collected from patients' medical records from January 2020 to June 2022 using an instrument organized with the following structure: age profile (age and gender); clinical profile (comorbidities, reasons for hospital admission and ICU admission; ICU admission and its association with comorbidities); renal function assessment (RIFLE); AKI-related interventions carried out in the ICU; duration and outcome of hospitalization.

The data was analyzed using the free statistical software R, version 4.2.0. For the qualitative variables, a descriptive analysis was carried out using absolute and relative frequency distributions (%). For the quantitative variables assessed in the study, descriptive statistics were analyzed for measures of data trend and dispersion. The Kolmogorov Smirnov test was used to check the normality of the quantitative variables. The Chi-square or Fisher's exact test was used to compare the patient's general profile and clinical data with the outcomes, according to the proposed objective. For all the statistical tests applied, the significance level was 5%.

The project was submitted to UERN's CEP and approved under CAAE 83977718.6.0000.5294 and opinion no. 3.202.607.

RESULTS

Table 1 shows the characterization of the patients, where 55.45% were male and 60.91% were over 65 years old. The most prevalent comorbidities were Systemic Arterial Hypertension (SAH) (66.36%), heart disease (51.82%) and Diabetes Mellitus (DM) (50.00%).

Table 1 - Age and clinical profile, RIFLE classification requiring hemodialysis treatment during ICU stay. Mossoró, Rio Grande do Norte, Brazil, 2023

Characterization		Absolute frequency	%
Gender	Male	61	55,45
	Female	49	44,55
Age	Up to 65 years old	43	39,09
	Over 65	67	60,91

Characterization		Absolute frequency	%
Comorbidities	SAH	73	66,36
	Heart disease	57	51,82
	DM	55	50,00
	Obesity	18	16,36
	COPD	12	10,91
	Neoplasia	6	5,45
	Cirrhosis of the liver	2	1,82
	Asthma	2	1,82
	Lupus	1	0,91
	Polymyositis	1	0,91
	Remautoid arthritis	1	0,91
RIFLE	Failure	63	57,27
	Injury	23	20,91
	Loss	17	15,46
	Risk	7	6,36
HD in ICU (Days)	Up to 5	62	56,36
	Above 5	48	43,64
Number of sessions	Up to 5	57	51,82
	Above 5	53	48,18
ICU time	Up to 18 days	56	50,91
	Over 18 days	54	49,09
Outcome	Discharge	36	32,73
	Death	74	67,27
	Total	**110**	**100,00**

As for the assessment of renal function using the RIFLE classification, four of the five categories were found among the patients participating in the study; no patients were classified in the last stage (End Stage Renal Disease); there was a higher frequency in the Failure classification with 57.27% and Injury with 20.91%.

Table 2 shows that the main reasons for admission to the ICU were cardiovascular problems (39.09%) and infectious diseases (33.64%).

Table 2 - Main reasons for ICU admission. Mossoró, Rio Grande do Norte, Brazil, 2023

Characterization		Absolute frequency	%
Main reason for ICU admission	Cardiovascular Diseases	43	39,09
	Infectious diseases	37	33,64
	Respiratory conditions	11	10,00
	Neurological conditions	7	6,35
	Gastrointestinal conditions	5	4,55
	Metabolic disorders	3	2,73
	Renal Diseases	2	1,82
	Other conditions	2	1,82

Table 3 shows the main reasons for ICU admissions and their associations with the comorbidities prevalent in the sample. Statistical significance was observed in the association of the comorbidities SAH (p=0.029) and heart disease (p<0.001) with admissions for cardiovascular, infectious and respiratory diseases; and the association between DM (p=0.007) and admissions for cardiovascular, infectious and neurological diseases.

Table 3 - Main reasons for ICU admission and presence of comorbidities. Mossoró, Rio Grande do Norte, Brazil, 2023

Reason for ICU admission	HAS		Total	p-Value
	Yes	No		
Infectious Diseases	59,46% (n=22)	40,54% (n=15)	**100,00%(n=37)**	**0,029**
Cardiovascular Diseases	81,40% (n=35)	18,60% (n=8)	**100,00%(n=43)**	
Gastrointestinal Diseases	---	100,00% (n=5)	**100,00%(n=5)**	
Metabolic disorders	66,67% (n=2)	33,33% (n=1)	**100,00%(n=3)**	
Neurological disorders	71,43% (n=5)	28,57% (n=2)	**100,00%(n=7)**	
Renal Diseases	50,00% (n=1)	50,00% (n=1)	**100,00%(n=2)**	
Respiratory Diseases	63,64% (n=7)	36,36% (n=4)	**100,00%(n=11)**	
Other conditions	50,00% (n=1)	50,00% (n=1)	**100,00%(n=2)**	
Reason for ICU admission	**DM**		**Total**	**p-Value**
	Yes	**No**		

Reason for ICU admission	HAS		Total	p-Value
	Yes	No		
Infectious Diseases	48,65% (n=18)	51,35% (n=19)	**100,00%(n=37)**	**0,007**
Cardiovascular Diseases	60,47% (n=26)	39,53% (n=17)	**100,00%(n=43)**	
Gastrointestinal Diseases	---	100,00% (n=5)	**100,00%(n=5)**	
Metabolic disorders	33,33% (n=1)	66,67% (n=2)	**100,00%(n=3)**	
Neurological disorders	85,71% (n=6)	14,29% (n=1)	**100,00%(n=7)**	
Renal Diseases	100,00% (n=2)	---	**100,00%(n=2)**	
Respiratory Diseases	18,18% (n=2)	81,82% (n=9)	**100,00%(n=11)**	
Other conditions	---	100,00% (n=2)	**100,00%(n=2)**	
Reason for ICU admission	**Heart disease**		**Total**	**p-Value**
	Yes	**No**		
Infectious Diseases	27,03% (n=10)	72,97% (n=27)	**100,00%(n=37)**	**<0,001**
Cardiovascular Diseases	95,35% (n=41)	4,65% (n=2)	**100,00%(n=43)**	
Gastrointestinal Diseases	20,00% (n=1)	80,00% (n=4)	**100,00%(n=5)**	
Metabolic disorders	---	100,00% (n=3)	**100,00%(n=3)**	
Neurological disorders	14,29% (n=1)	85,71% (n=6)	**100,00%(n=7)**	
Renal Diseases	50,00% (n=1)	50,00% (n=1)	**100,00%(n=2)**	
Respiratory Diseases	18,18% (n=2)	81,82% (n=9)	**100,00%(n=11)**	
Other conditions	50,00% (n=1)	50,00% (n=1)	**100,00%(n=2)**	
Reason for ICU admission	**Obesity**		**Total**	**p-Value**
	Yes	**No**		
Infectious Diseases	27,03% (n=10)	72,97% (n=27)	**100,00%(n=37)**	**0,278**
Cardiovascular Diseases	13,95% (n=6)	86,05% (n=37)	**100,00%(n=43)**	
Gastrointestinal Diseases	---	100,00% (n=5)	**100,00%(n=5)**	
Metabolic disorders	---	100,00% (n=3)	**100,00%(n=3)**	
Neurological disorders	---	100,00% (n=7)	**100,00%(n=7)**	
Renal Diseases	50,00% (n=1)	50,00% (n=1)	**100,00%(n=2)**	
Respiratory Diseases	9,09% (n=1)	90,91% (n=10)	**100,00%(n=11)**	
Other conditions	---	100,00% (n=2)	**100,00%(n=2)**	
Reason for ICU admission	**COPD**		**Total**	**p-Value**
	Yes	**No**		

Reason for ICU admission	HAS		Total	p-Value
	Yes	No		
Infectious Diseases	13,51% (n=5)	86,49% (n=32)	**100,00%(n=37)**	**0,596**
Cardiovascular Diseases	6,98% (n=3)	93,02% (n=40)	**100,00%(n=43)**	
Gastrointestinal Diseases	---	100,00% (n=5)	**100,00%(n=5)**	
Metabolic disorders	---	100,00% (n=3)	**100,00%(n=3)**	
Neurological disorders	14,29% (n=1)	85,71% (n=6)	**100,00%(n=7)**	
Renal Diseases	---	100,00% (n=2)	**100,00%(n=2)**	
Respiratory Diseases	27,27% (n=3)	72,73% (n=8)	**100,00%(n=11)**	
Other conditions	---	100,00% (n=2)	**100,00%(n=2)**	

Table 4 shows that a total of 72.73% of the patients surveyed used IMV; 94.55% used antibiotic therapy; 83.64% used VAD; 22.73% used contrast during imaging exams; 56.36% of patients underwent HD in the first 5 days of ICU stay; 51.82% underwent up to 5 HD sessions.

Table 4 - Therapeutic interventions carried out in the ICU with consequent nephrotoxic effects on patients. Mossoró, Rio Grande do Norte, Brazil, 2023

Characterization		Absolute frequency	%
IMV	Yes	80	72,73
	No	30	27,27
Antibiotics used in the ICU	Yes	104	94,55
	No	6	5,45
VAD	Yes	92	83,64
	No	18	16,36
Contrast	Yes	25	22,73
	No	85	77,27
HD in ICU (Days)	Up to 5	62	56,36
	Above 5	48	43,64
Number of HD sessions	Up to 5	57	51,82
	Above 5	53	48,18

Table 5 shows statistical significance between the hospitalization outcome of discharge or death and the variables studied, with a statistical association between age (p=0.040), use of IMV (p=0.001), VAD (p=0.024), length of HD in the ICU (p=0.019) and respiratory problems in the ICU (p=0.038).

Table 5 - Characterization of the outcome of hospitalization, according to the age and clinical variables investigated. Mossoró, Rio Grande do Norte, Brazil, 2023

Characterization		Outcome		Total	p-value	Odds Ratio [95%CI]
		Death	Discharge			
Range	**Up to 65 years old**	55,81%(n=24)	44,19%(n=19)	**100,00%(n=43)**	**0,040**(1)	**0,43 [0,19; 0,97]**
	Over 65	74,63%(n=50)	25,37%(n=17)	**100,00%(n=67)**		
SAH	**Yes**	65,75%(n=48)	34,25%(n=25)	**100,00%(n=73)**	**0,633**(1)	**0,81 [0,35; 1,91]**
	No	70,27%(n=26)	29,73%(n=11)	**100,00%(n=37)**		
DM	**Yes**	67,27%(n=37)	32,73%(n=18)	**100,00%(n=55)**	**1,000**(1)	**1,00 [0,45; 2,22]**
	No	67,27%(n=37)	32,73%(n=18)	**100,00%(n=55)**		
Heart disease	**Yes**	64,91%(n=37)	35,09%(n=20)	**100,00%(n=57)**	**0,584**(1)	**0,80 [0,36; 1,78]**
	No	69,81%(n=37)	30,19%(n=16)	**100,00%(n=53)**		
Obesity	**Yes**	66,67%(n=12)	33,33%(n=6)	**100,00%(n=18)**	**0,952**(1)	**0,97 [0,33; 2,83]**
	No	67,39%(n=62)	32,61%(n=30)	**100,00%(n=92)**		
COPD	**Yes**	83,33%(n=10)	16,67%(n=2)	**100,00%(n=12)**	**0,330**(2)	**2,66 [0,55; 12,82]**
	No	65,31%(n=64)	34,69%(n=34)	**100,00%(n=98)**		
IMV	**Yes**	76,25%(n=61)	23,75%(n=19)	**100,00%(n=80)**	**0,001**(1)	**4,20 [1,73; 10,19]**
	No	43,33%(n=13)	56,67%(n=17)	**100,00%(n=30)**		
Antibiotics	**Yes**	68,27%(n=71)	31,73%(n=33)	**100,00%(n=104)**	**0,391**(2)	**2,15 [0,41; 11,23]**
	No	50,00%(n=3)	50,00%(n=3)	**100,00%(n=6)**		
VAD	**Yes**	71,74%(n=66)	28,26%(n=26)	**100,00%(n=92)**	**0,024**(1)	**3,17 [1,13; 8,93]**
	No	44,44%(n=8)	55,56%(n=10)	**100,00%(n=18)**		
Contrast	**Yes**	68,00%(n=17)	32,00%(n=8)	**100,00%(n=25)**	**0,930**(1)	**1,04 [0,40; 2,71]**
	No	67,06%(n=57)	32,94%(n=28)	**100,00%(n=85)**		
HD in ICU (Days)	**Up to 5**	58,06%(n=36)	41,94%(n=26)	**100,00%(n=62)**	**0,019**(1)	**0,36 [0,15; 0,86]**
	Above 5	79,17%(n=38)	20,83%(n=10)	**100,00%(n=48)**		
HD session	**Up to 5**	75,44%(n=43)	24,56%(n=14)	**100,00%(n=57)**	**0,058**(1)	**2,18 [0,97; 4,92]**
	Above 5	58,49%(n=31)	41,51%(n=22)	**100,00%(n=53)**		

Characterization		Outcome		Total	p-value	Odds Ratio [95%CI]
		Death	Discharge			
ICU Time	**Up to 18 days**	67,86%(n=38)	32,14%(n=18)	**100,00%(n=56)**	**0,894**(1)	**1,06 [0,48; 2,34]**
	Over 18 days	66,67%(n=36)	33,33%(n=18)	**100,00%(n=54)**		
Neurological problems	**Yes**	70,83%(n=17)	29,17%(n=7)	**100,00%(n=24)**	**0,674**(1)	**1,24 [0,46; 3,32]**
	No	66,28%(n=57)	33,72%(n=29)	**100,00%(n=86)**		
Respiratory problems	**Yes**	74,29%(n=52)	25,71%(n=18)	**100,00%(n=70)**	**0,038**(1)	**2,36 [1,04; 5,38]**
	No	55,00%(n=22)	45,00%(n=18)	**100,00%(n=40)**		
Cardiovascular conditions	**Yes**	70,18%(n=40)	29,82%(n=17)	**100,00%(n=57)**	**0,501**(1)	**1,31 [0,59; 2,92]**
	No	64,15%(n=34)	35,85%(n=19)	**100,00%(n=53)**		
Gastrointestinal problems	**Yes**	81,25%(n=13)	18,75%(n=3)	**100,00%(n=16)**	**0,197**(1)	**2,34 [0,62; 8,82]**
	No	64,89%(n=61)	35,11%(n=33)	**100,00%(n=94)**		
Metabolic disorders	**Yes**	50,00%(n=5)	50,00%(n=5)	**100,00%(n=10)**	**0,291**(2)	**0,45 [0,12; 1,66]**
	No	69,00%(n=69)	31,00%(n=31)	**100,00%(n=100)**		
Renal disorders	**Yes**	64,00%(n=16)	36,00%(n=9)	**100,00%(n=25)**	**0,692**(1)	**0,83 [0,32; 2,11]**
	No	68,24%(n=58)	31,76%(n=27)	**100,00%(n=85)**		
RIFLE	**FAILURE**	66,67%(n=42)	33,33%(n=21)	**100,00%(n=49)**	**0,783**(1)	**---**
	INJURY	73,91%(n=17)	26,09%(n=6)	**100,00%(n=61)**		
	LOSS	58,82%(n=10)	41,18%(n=7)	**100,00%(n=43)**		
	RISK	71,43%(n=5)	28,57%(n=2)	**100,00%(n=67)**		

(1) Chi-square test
(2) Fischer's exact test

DISCUSSION

The concept of AKI encompasses patients without actual damage to the renal system, but who have some dysfunction that compromises meeting their physiological demands, as well as patients with severe acute renal failure. Using the RIFLE criteria, it is possible to classify a wide variety of acute kidney function disorders.[6]

The characterization of the clinical profile identified in this study showed a predominance of males (55.45%). This finding may be related to the ways in which men use health services at the Primary Care level; in many situations this same population is mostly treated by urgent and emergency services.[7]

Age is an important variable when it comes to the need for hospitalization due to the possibility of secondary conditions that worsen the clinical state and, consequently, the deterioration of kidney function; for example, infections and hypovolemia, which increase the likelihood of developing AKI by 80%.[8]

Infectious diseases were the second most common reason for ICU admission among the population in this study (33.64%), corroborating an observational and longitudinal study with a quantitative approach carried out with septic patients in an ICU which found that 56.2% of the sample studied developed AKI according to the RIFLE classification.[9]

SAH and heart disease are considered risk factors for the development of AKI, due to the systemic overload on the organisms. It has been identified that individuals with a previous diagnosis of SAH and heart failure are twice and five times more likely to develop AKI, respectively.[10]

It is known that decompensated DM is a potential risk factor for the development of AKI. Frequent lack of glycemic control leads to hyperglycemia, stimulating glomerular hyperfiltration and an increase in GFR. Subsequently, there is a decrease in GFR and an increase in blood pressure, leading to a progressive loss of kidney function, which is called diabetic nephropathy.[11]

Cerebrovascular and cardiovascular complications and infections compromise and worsen the clinical state, with numerous consequences for the prognosis during intensive care and favoring the onset of AKI. These conditions therefore require rigorous assessment and monitoring of renal function.[12]

Due to the development of respiratory failure, patients are subjected to orotracheal intubation, the use of medications that interfere with the renal system producing nephrotoxic effects, as well as the use of invasive ventilatory support. Patients with Acute Respiratory Failure (ARF) and AKI are respectively 8.53 times and 8.99 times more likely to die during hospitalization, but when associated with the risk of in-hospital mortality, it increases to 39.13 times more than would be expected with an isolated complication.[13]

The use of VADs is indicated in cases of hemodynamic instability and a careful assessment is necessary for both continuing and discontinuing their administration. In order to optimize the hemodynamic status of patients using VADs, it is necessary to adopt measures to prevent AKI and avoid prolonged exposure to nephrotoxic agents.[14]

Patients admitted to the ICU are subjected to treatments and therapeutic interventions aimed at reversing the clinical condition and severity. A case-control study found that the use of VADs has nephrotoxic effects that increase the risk of AKI eightfold.[15] In this study, 72.73% of patients used IMV, 83.64% used VADs and 94.55% used antibiotics. Thus, we have a profile of patients who have undergone a set of interventions and risk factors directly associated with renal dysfunction.

A retrospective cohort study found that the use of IMV causes damage to kidney function in almost half of ICU patients, as well as increasing the length of stay in this sector. AKI was also associated with changes in the mechanics of the respiratory system and gas exchange, contributing to the occurrence of adverse outcomes related to the use of IMV.[16]

The outcome of ICU admission proved to be a statistically significant variable when associated with age, therapeutic interventions, respiratory problems and time since starting HD. Among the sample analyzed, 67.27% of patients died; this group showed that advanced age is a risk factor for mortality, since the chance of patients up to 65 years old having death as the outcome of hospitalization is reduced by 57% when compared to patients over 65 years old.

It was found that the chance of patients with respiratory problems dying increases 2.36 times when compared to patients whose hospitalization outcome was discharge due to clinical improvement. Associated with this condition, it was found that the chance of patients using IMV having death as the outcome of hospitalization increased 4.20 times when compared to patients who did not use IMV. Thus, IMV is a risk factor for an increased mortality rate in patients with AKI, 28.7% for patients with AKI before and during its use in the ICU and 21.5% in the group of patients who developed AKI during the use of IMV in the critical care unit.[17]

Early initiation of HD sessions is considered to be when, according to the RIFLE assessment, it is started within 5 days of hospitalization; early initiation of HD decreases mortality in the ICU.5 This study found that the chance of patients undergoing HD within 5 days of hospitalization dying decreased by 64% when compared to patients who underwent HD after 5 days of hospitalization; the use of

IMV during HD was a risk factor for prognosis associated with mortality.

Patients with a history of cardiovascular disease are more susceptible to developing hemodynamic instability and are therefore subject to the use of VADs, diuretics and renin-angiotensin system blockers which, when used for a prolonged period of time, overload the renal system.[17]

Using the RIFLE criteria, it is also possible to assess the clinical severity of each patient. A literature review identified that the correlation between AKI and hospital mortality is proportional to the severity of renal dysfunction.[18]

Limitations of the study were: the size of the sample and its profile with regard to the length of exposure to potentially nephrotoxic interventions; it is questionable whether this period may have influenced the correlation between the risk factors for developing AKI and the RIFLE classification.

CONCLUSION

The analysis showed that AKI in ICU patients is prevalent in male patients aged over 65. It is also related to the reasons for hospitalization and to some interventions with nephrotoxic potential. Although the RIFLE classification is a method with high sensitivity and specificity for determining AKI, there is a lack of studies aimed at assessing the relationship between risk factors and this classification. It is considered important to make academic and scientific investments in this subject, given its relevance to impacting on mortality rates in the ICU, as well as enabling an effective assessment of the consequences that interventions have on kidney function. Because according to the degree of injury, prophylactic and restrictive measures can be instituted, including the onset of CRF.

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