Comparison Between RIFLE, AKIN, and KDIGO: Acute Kidney Injury Definition Criteria for Prediction of In-hospital Mortality in Critically Ill Patients

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Introduction. Acute kidney injury (AKI) is an important life-threatening complication in patients hospitalized in intensive care units (ICU). This study was conducted to determine the incidence of AKI in the medical intensive care unit of a tertiary university hospital and to compare the predictive performance of three different AKI criteria (RIFLE, AKIN, and KDIGO) for in-hospital mortality.
Methods. The data of all consecutive patients were evaluated from their hospitalization to ICU until discharge or death, retrospectively. Patients with end-stage renal disease, history of kidney transplantation, those who stayed in the ICU for less than 72 hours, who underwent dialysis before admission to the ICU, and those with incomplete medical records were excluded. AKI was defined using serum creatinine criteria of RIFLE, AKIN, and KDIGO.
Results. 303 patients were included in this study. According to RIFLE, AKIN, and KDIGO criteria the incidence of AKI were 47.9 %, 44.6%, and 50.2%; respectively. In-hospital mortality rates were higher in AKI patients ($P < .05$ according to all three criteria). Regression analysis revealed that AKI was a predictor of in-hospital mortality ($P < .05$, for all). The ROC analyses showed that each of these criteria had similar abilities to predict in-hospital mortality (area under (Au) ROC for RIFLE = 0.76, AuROC for AKIN = 0.72, and AuROC for KDIGO = 0.76).
Conclusion. The incidence of AKI was higher with KDIGO criteria. In-hospital mortality rates were higher in patients with AKI. Each criteria had similar abilities to predict in-hospital mortality.

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INTRODUCTION

Acute kidney injury (AKI) is defined as the accumulation of nitrogenous products in the body following a sudden decrease in kidney function. It is a frequent complication of patients in intensive care unit (ICU) as a common result of many predisposing factors such as hemodynamic instability, exposure to nephrotoxic drugs and contrast agents, infections and sepsis. Although the data may vary depending on the selected patient population and definition criteria, studies show that AKI developing in intensive care units significantly increases morbidity and mortality rates.[1,2] Until 2004, there was no consensus on definition and staging of AKI. Therefore, it has not been possible to compare and standardize the results of the studies. The Acute Dialysis Quality Initiative group established RIFLE (Risk, Injury,

Damage, Loss, and End stage kidney disease) criteria for the first time in 2004. The increase in serum creatinine value more than 1.5 times the basal value or the decrease in glomerular filtration rate by more than 25% or the decrease in urine output below 0.5 mL/kg/h was defined as AKI.[3] The adequacy and the validity of RIFLE criteria were tested by studies on a large number of patients from different populations. Over time, however, some researchers have pointed out a number of shortcomings of this classification. The use of glomerular filtration rate as one of the identification parameters and the need for patients' basal creatinine values were the leading limitations. In 2007, the Acute Kidney Injury Network (AKIN) advanced RIFLE recommendations and established new diagnostic criteria (stages I, II, and III).[4] Accordingly, although a 1.5 folds increase in serum creatinine has not yet developed, an absolute increase of 0.3 mg/dL or higher was considered as sufficient to define AKI. In addition, evaluation of serum creatinine changes over a 48 hour period was adopted, rather than comparing the current value with the baseline creatinine. The need for dialysis was defined as stage III, which corresponds to the most severe AKI. The clinical outcome stages of the RIFLE criteria and the use of the glomerular filtration rate were excluded from the definition.[4] Finally, in 2012; Kidney Disease Improving Global Outcomes (KDIGO) Initiative Group combined these two classifications and published new AKI criteria.[5]

The aim of this study was to define the AKI incidences and to compare the performances of RIFLE, AKIN, and KDIGO criteria for in-hospital mortality prediction in a medical intensive care unit of a university hospital in Turkey.

MATERIALS AND METHODS

This study was carried out in Gazi University Medical Faculty Hospital in accordance with the Helsinki Declaration and Good Clinical Practice guidelines, after approval of the local Medical Ethics Committee.

Patient Population and Data Collection

Medical records of 703 consecutive adult patients (> 18 years old) who were hospitalized in our medical ICU between January 2008 and July 2010 were retrospectively analyzed. Patients with end-stage renal disease (n = 63), patients with a history of kidney transplantation (n = 5), those who stayed in the ICU for less than 72 hours (n = 227), those who underwent dialysis before admission to the ICU (n = 56), and those with incomplete medical records (n = 49) were excluded from the study. The analysis was completed with the data of 303 patients.

Demographic variables such as age, gender, length of hospital stay, primary cause of ICU hospitalization comorbidities, need for mechanical ventilation (MV), and related laboratory results were recorded. All laboratory results recorded from ICU admission until discharge or death were examined. The non-renal Sequential Organ Failure Assessment (SOFA) score[6] within the first 24 hours of ICU was noted. AKI development and in-hospital mortality were clinical outcomes. The primary etiologies ICU admission were classified as sepsis / septic shock, respiratory system related disorders, gastrointestinal system related disorders, heart diseases, electrolyte disorders, cerebrovascular diseases, and others. Sepsis / septic shock was defined according to the American College of Chest Physicians (ACCP) / Society of Critical Care Medicine.[7] Acute respiratory distress syndrome, pneumonia, hypercapnic respiratory failure and hypoxic respiratory failure were grouped as respiratory system related disorders. Acute respiratory distress syndrome was diagnosed according to the recommendations of American-European Consensus Conference Committee.[8] Gastrointestinal system related disorders were gastrointestinal bleeding, cirrhosis, liver failure, pancreatitis and cholecystitis. Acute coronary syndrome, cardiac arrest, cardiogenic shock and congestive heart failure were grouped under cardiogenic disorders. Cerebrovascular events and hypoxic brain injury were considered as cerebrovascular disorders.

Hypertension, coronary artery diseases, diabetes mellitus, active malignancy (solid or hematological cancers), immune deficiency, chronic respiratory system disease, neurological disorders, chronic hepatobiliary, and rheumatologic disorders were recorded as comorbidities.

Definition and Staging of AKI

Serum creatinine criteria were used for AKI identification and staging.[3-5] Urinary output criteria

could not be used since the records did not include the patients' body weights. The lowest creatinine value recorded in the last 6 months was accepted as the basal serum creatinine value. However, no previous medical data were available in 73 patients. For these patients, the lowest serum creatinine value recorded during hospitalization and the estimated creatinine value according to the modification and diet in renal disease (MDRD) equation were recorded separately.[9] The lowest one of these two values was accepted as the basal serum creatinine value as suggested in the literature.[10] The serum creatinine values of the patients were examined daily during their stay in the ICU, and the maximum AKI stages were recorded for each classification system separately.

Statistical Analysis

Statistical analysis was done using the SPSS version 18. Two-sided *P* values < .05 were considered significant. Distribution of continuous variables was evaluated with the Kolmogorov Smirnov test. Normally distributed continuous data were compared with Student's t-test and results were presented as mean ± standard deviation. Abnormally distributed continuous data were compared using Mann-Whitney U test; the results were presented as median with interquartile range (IQR). Comparisons of categorical variables were performed with Chi-square test and Fisher's exact test; results were presented as numbers and percentages. Three different multivariate logistic regression models with backward: conditional method were created to determine the predictors of in-hospital mortality. Age, gender, non-renal SOFA score, diabetes mellitus and hypertension, serum albumin level, and need of MV during ICU stay were included into three models. AKI according to RIFLE was tested in the 1st model; AKI according to AKIN was tested in the 2nd model and AKI according to KDIGO was tested in the 3rd model.

Univariate comparisons were conducted between survivors and non-survivors. The independent effects of AKI diagnosis and AKI stages on survival were valuated by Kaplan-Meier graphs by using log-rank test. Receiver operator characteristic (ROC) curves were used to assess the performances of each criteria for in-hospital mortality prediction.

RESULTS

General Characteristics of the Patient Population

The analysis was completed with the data of 303 patients. The mean age of the cohort was 62.1 ± 18.4 years and 51.5% (n = 156) was male. The general characteristics such as primary etiologies for ICU admission, comorbidities and blood tests at ICU admission are presented in Table 1. The non-renal

Table 1. General Characteristics of the Study Population

Variables	Study Population (n = 303)
Age, y	62.1 ± 18.4
Male gender (n, %)	156 (51.5)
Primary Etiology for Admission to ICU, n (%)	
Sepsis and Septic Shock	113 (37.3)
Respiratory System Related Disorders	100 (33)
Gastrointestinal System Related Disorders	36 (11.9)
Cardiologic Disorders	13 (4.3)
Electrolite Disorders	10 (3.3)
Cerebrovascular Disorders	6 (2)
Others	25 (8.3)
Comorbidities, n (%)	
Hypertension	108 (35.6)
Cardiological Disorders	98 (32.3)
Diabetes Mellitus	73 (24.1)
Malignancies	57 (18.8)
Immune Deficiency	57 (18.8)
Chronic Respiratory System Disorders	52 (17.2)
Neurological Disorders	47 (15.5)
Hepatobiliary Disorders	17 (5.6)
Rheumatological Disorders	11 (3.6)
Illness Severity Scores	
Non-renal SOFA Score	6.5 ± 3.3
Blood Tests on ICU Admission	
Hemoglobin, g/dL	10.2 ± 2.5
Platellet,, x10^3/mm^3	141 (66 to 228)
Albumin, g/dL	2.97 ± 0.7
HCO_3^-, mEq/L	20 ± 6.3
MV During ICU Stay, n (%)	191 (63)
Lenght of Stay In-hospital, days	16 (9 to 25)
Clinical Outcomes	
AKI During ICU Stay, n (%)	
According to RIFLE	145 (47.9)
According to AKIN	135 (44.6)
According to KDIGO	152 (50.2)
In-hospital mortality, n (%)	151 (49.8)

Continuous variables are presented as either mean ± standard deviation or median and IQR (interquartile ranges). Categorical variables are presented as numbers and frequencies. Abbreviations: ICU, intensive care unit; SOFA, sequential organ failure assessment; HCO_3^-: bicarbonate; MV, mechanical ventilation; AKI, acute kidney injury; RIFLE, Risk Injury Failure Loss of Kidney Function; AKIN, acute kidney injury network; KDIGO, Kidney Disease: Improving Global Outcomes.

SOFA score was 6.5 ± 3.2 in the first 24 hours. Mechanical ventilation support was provided to 191 patients (63%) during ICU stay. The median length of hospital stay was 16 (25% to 75% IQR: 9 to 25) days.

Definition and Staging of AKI

According to RIFLE, AKI was detected in 145 (47.9 %) patients. Of the patients with AKI, 41 (13.5 %) were in the Risk group, 49 (16.2 %) were in the Injury group and 55 (18.2%) were in the Failure group (Table 2). Mortality rates of patients with AKI were higher than those without AKI [106 (73.1%) and 45 (28.5%), $P < .05$; respectively].

The mortality rates were 48.8% for the Risk, 77.6% for the Injury and 87.3% for the Failure group. Although the number of survivors and non-survivors was similar in the Risk group, the number of non-survivors was higher in advanced AKI stages. Kaplan Meier survival graph showed increased mortality with increased AKI stage ($P < .05$, Figure 1).

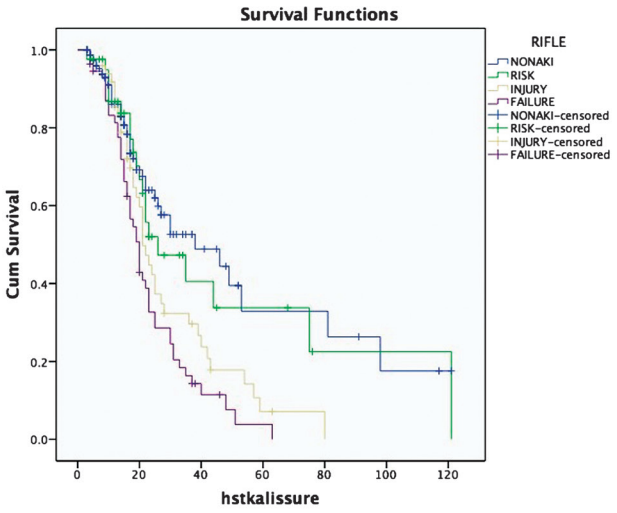

Figure 1. It shows Kaplan-Meier graph for survival, according to development of AKI (defined by RIFLE criteria). Log rank test showed increased mortality with increasing AKI stages ($P < .05$).

According to AKIN; AKI was detected in 135 (44.6%) patients. Of the AKI patients, 74 (24.4%) were stage I, 17 (5.6%) were stage II and 44 (14.5%) were stage III (Table 2). The mortality rates of patients with AKI were higher than those without AKI [97 (71.9%) and 54 (32.1%), $P < .05$; respectively). The mortality rate was 60.8% in stage I AKI patients, 82.4% in stage II patients, and 86.4% in stage III patients. Similar to the RIFLE, the number of non-survivors was higher in advanced AKI stages. Kaplan-Meier survival analysis showed increased mortality with increased AKI stages ($P < .05$, Figure 2).

According to KDIGO; The highest incidence

Table 2. AKI According to RIFLE, AKIN, and KDIGO Classifications (Univariate Comparisons Between Survivors and Non-survivors)

	Study Population (n = 303)	Survivors (n = 152, 50.2%)	Non-survivors (n = 151, 49.8%)	*P*
RIFLE				
None	158 (52.1)	113 (71.5)	45 (28.5)	< .05
AKI, n (%)	145 (47.9)	39 (26.9)	106 (73.1)	< .05
Risk	41 (13.5)	21 (51.2)	20 (48.8)	> .05
Injury	49 (16.2)	11 (22.4)	38 (77.6)	< .05
Failure	55 (18.2)	7 (12.7)	48 (87.3)	< .05
AKIN				
None	168 (55.4)	114 (67.9)	54 (32.1)	< .05
AKI, n (%)	135 (44.6)	38 (28.1)	97 (71.9)	< .05
Stage I	74 (24.4)	29 (39.2)	45 (60.8)	> .05
Stage II	17 (5.6)	3 (17.6)	14 (82.4)	< .05
Stage III	44 (14.5)	6 (13.6)	38 (86.4)	< .05
KDIGO				
None	151 (49.8)	109 (72.2)	42 (27.8)	< .05
AKI, n (%)	152 (50.2)	43 (28.3)	109 (71.7)	< .05
Stage I	48 (15.8)	25 (52.1)	23 (47.9)	> .05
Stage II	43 (14.2)	10 (23.3)	33 (76.7)	< .05
Stage III	61 (20.2)	8 (13.1)	53 (86.9)	< .05

Categorical variables are presented as numbers and frequencies.
Abbreviations: RIFLE, Risk Injury Failure Loss of Kidney Function; AKI, acute kidney injury, AKIN, acute kidney injury network; KDIGO, Kidney Disease: Improving Global Outcomes.

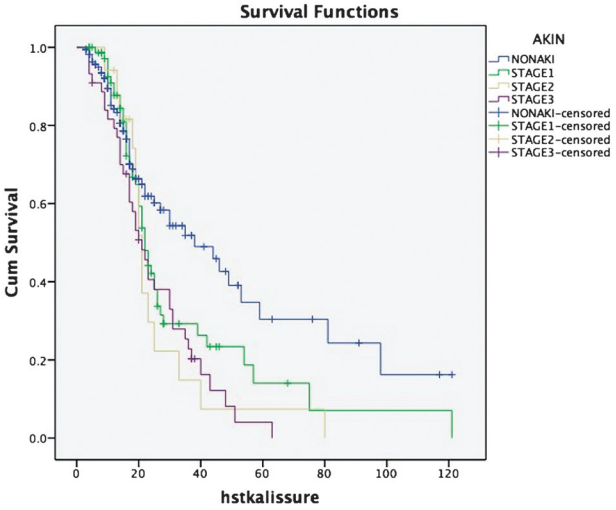

Figure 2. It demonstrates Kaplan-Meier graph for survival, according to development of AKI (defined by AKIN criteria. Log rank test demonstrated increased mortality with increasing AKI stages ($P < .05$).

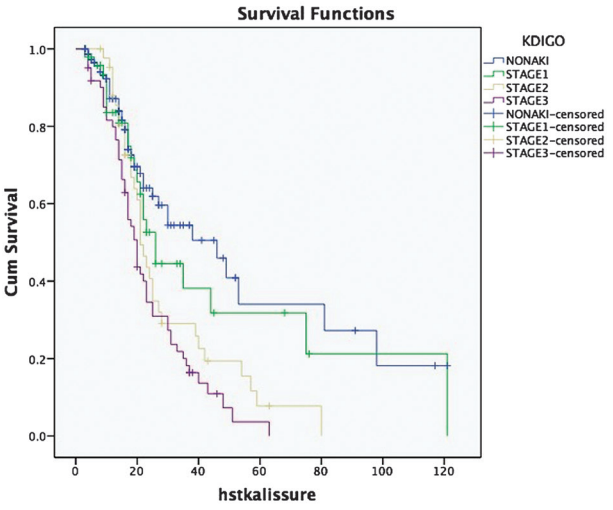

Figure 3. It shows Kaplan-Meier graph for survival, according to development of AKI (defined by KDIGO criteria. Log rank test showed increased mortality with increasing AKI stages ($P < .05$).

of AKI was diagnosed by KDIGO criteria. AKI was detected in 152 (50.2%) patients. Of the AKI patients, 48 (15.8%) were stage 1, 43 (14.2%) were stage 2, and 61 (20.2%) were stage 3 (Table 2). Mortality rate of AKI patients was higher than patients without AKI [109 (71.7%) and 42 (27.8%), $P < .05$; respectively). The mortality rates were 47.9% in stage I AKI patients, 76.7% in stage II patients, and 86.9% in stage III patients. Similar to the RIFLE and AKIN, the number of non-survivors was higher in advanced AKI stages. Kaplan-Meier survival analysis showed increased mortality with increased AKI stages ($P < .05$, Figure 3).

Table 3, 4, and 5 show the cross tabulations. 151 patients classified as non-AKI according to KDIGO were also included in the non-AKI group according to RIFLE and AKIN criteria. However, 7 non-AKI patients according to RIFLE and 12

Table 3. Cross-tabulation of AKI Patients Defined by RIFLE Versus AKIN Criteria

AKIN	RIFLE				
	Without AKI	**Risk**	**Injury**	**Failure**	**Total**
Without AKI	151 (49.83)	12 (4)	4 (1.3)	1 (0.33)	168 (55.45)
Stage I	7 (2.3)	29	28 (9.24)	10 (3.30)	74 (24.42)
Stage II	-	-	11 (3.63)	6 (2)	17 (5.61)
Stage III	-	-	6 (2)	38 (12.5)	44 (14.52)
Total	158 (52.14)	41 (13.53)	49 (16.17)	55 (18.15)	303 (100)

Grey boxes show the patients included into the same AKI stage by both criteria. Categorical variables are presented as numbers and frequencies.
Abbreviations: AKI, acute kidney injury; RIFLE, Risk Injury Failure Loss of Kidney Function; AKIN, acute kidney injury network.

Table 4. Cross-tabulation of AKI Patients Defined by RIFLE Versus KDIGO Criteria

KDIGO	RIFLE				
	Without AKI	**Risk**	**Injury**	**Failure**	**Total**
Without AKI	151 (49.83)	0	0	0	151 (49.83)
Stage I	7 (2.3)	41 (13.53)	0	0	48 (15.84)
Stage II	0	0	43 (14.19)	0	43 (14.19)
Stage III	0	0	6 (2)	55 (18.15)	61 (20.13)
Total	158 (52.14)	41 (13.53)	49 (16.17)	55 (18.15)	303 (100)

Grey boxes show the patients included into the same AKI stage by both criteria. Categorical variables are presented as numbers and frequencies.
Abbreviations: KDIGO, Kidney Disease: Improving Global Outcomes; RIFLE, Risk Injury Failure Loss of Kidney Function; AKI, Acute kidney injury.

Table 5. Cross-tabulation of AKI Patients Defined by AKIN Versus KDIGO Criteria

KDIGO	AKIN				
	Without AKI	Stage I	Stage II	Stage III	Total
Without AKI	151 (49.83)	0	0	0	151 (49.83)
Stage I	12 (4)	36 (11.9)	0	0	48 (15.84)
Stage II	4 (1.3)	28 (9.24)	11 (3.63)	0	43 (14.19)
Stage III	1 (0.33)	10 (3.30)	6 (2)	44 (14.52)	61 (20.13)
Total	168 (55.45)	74 (24.42)	17 (5.61)	44 (14.52)	303 (100)

Grey boxes show the patients included into the same AKI stage by both criteria. Categorical variables are presented as numbers and frequencies.
Abbreviations: KDIGO, Kidney Disease: Improving Global Outcomes; AKIN, acute kidney injury network; AKI, acute kidney injury.

non-AKI patients according to AKIN were defined as AKI by KDIGO criteria. Thus, KDIGO defined more patients as AKI. Approximately half of the patients diagnosed as stage I AKI according to AKIN criteria were classified as advanced AKI according to RIFLE and KDIGO. The number of Injury and stage 2 patients were almost the same, according to RIFLE and KDIGO criteria; respectively. However, only 11 (3.63%) of 43 patients classified as stage 2 AKI according to KDIGO received the same stage in AKIN classification. KDIGO classified 61 patients as stage 3 AKI. Among these, 55 of them were in Failure according to RIFLE, 44 of them had stage III AKI according to AKIN criteria. All patients in Failure or stage III AKI groups (according to RIFLE and AKIN, respectively), were in stage 3 AKI according to KDIGO.

According to ROC curve analysis, RIFLE, AKIN and KDIGO had similar abilities to predict in-hospital mortality (AuROC = 0.76, 95% CI: 0.70 to 0.82 for RIFLE; AuROC = 0.72, 95% CI: 0.66 to 0.78 for AKIN; and AuROC = 0.76, 95% CI: 0.71 to 0.82 for KDIGO; Figure 4).

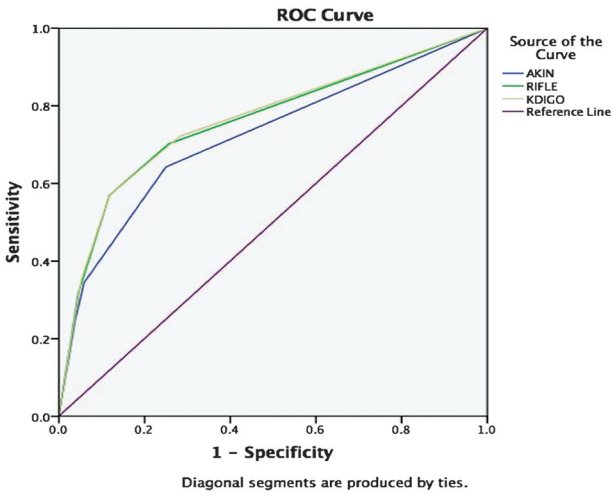

Figure 4. It demonstrates receiver operating curves for RIFLE, AKIN, and KDIGO criteria for in-hospital mortality (RIFLE AuROC = 0.76, AKIN AuROC curve = 0.72, and KDIGO AuROC curve = 0.76).

Multiple logistic regression models were created to determine in-hospital mortality determinants (Table 6). Age, gender, non-renal SOFA score, diabetes mellitus, hypertension, serum albumin level, need of mechanical ventilation during ICU stay, and AKI were included into the models. AKI according to RIFLE was tested in the 1st model. Risk was not a predictor of mortality. However, injury and failure predicted the mortality. AKI according to AKIN was tested in the 2nd model. Stage I, II, and III predicted in-hospital mortality. AKI according to KDIGO was tested in the 3rd model. Similar to RIFLE, stage 1 AKI was not a predictor; whereas

Table 6. Multivariate Logistic Regression Analysis for Determination of In-hospital Mortality (AKI and AKI Stages Defined by RIFLE, AKIN, and KDIGO Criteria)

	Multivariate analysis			
	B	OR	95% CI	*P*
RIFLE				
Risk	0.84	2.31	0.97 to 5.51	> .05
Injury	1.63	5.10	2.20 to 11.82	< .05
Failure	2.46	11.64	4.07 to 33.29	< .05
AKIN				
Stage I	0.99	2.68	1.35 to 5.32	< .05
Stage II	2.02	7.54	1.79 to 31.7	< .05
Stage III	1.89	6.59	2.18 to 19.95	< .05
KDIGO				
Stage 1	0.63	1.87	0.84 to 4.18	> .05
Stage 2	1.66	5.26	2.18 to 12.67	< .05
Stage 3	2.29	9.88	3.67 to 26.56	< .05

Three multivariate logistic regression models were created for determination of predictors for in-hospital mortality. AKI according to RIFLE was tested in the 1st model; AKI according to AKIN was tested in the 2nd model, and AKI according to KDIGO was tested in the 3rd model. Age, gender, non-renal SOFA score, diabetes mellitus and hypertension (as pre-existing comorbidities), serum albumin level (at ICU admission), and need of mechanical ventilation during ICU stay were included into three methods.
Backward: Conditional method was used.

advanced stages predicted mortality.

The duration of survival in patients with AKI was shorter than those without AKI, regardless of the criteria used. When the survival time in relation to the AKI stages was examined, survival was shortened with increasing AKI levels according to RIFLE and KDIGO. Stage I AKI patients had a longer survival time than stage II and III AKI patients identified according to AKIN.

DISCUSSION

The present study showed that, KDIGO criteria defined more patients as AKI and found the highest incidence of AKI. AKI was a predictor of mortality. However, all criteria exhibited the same performance in predicting in-hospital mortality. The incidence of AKI was 48% according to RIFLE, 45% according to AKIN, and 50% according to KDIGO criteria; for our cohort. We consider that, these incidences are quite high. At this point, it is clear that incidences vary significantly between studies depending on the used classification system, the selected patient population, etc. A previous study focusing on AKI development in patients undergoing coronary artery bypass grafting reported the incidences as 22.9%, 31.6%, and 34.8%; respectively.[11] In another study examining 457 patients with sepsis and septic shock, the AKI incidences were detected as 84%, 72.8%, and 87.5% according to RIFLE, AKIN, and KDIGO; respectively.[12] The incidences seem to be relatively low in postoperative groups. In our cohort, most of our patients were critically ill due to septic shock or respiratory system related disorders; there were not postoperative cases. The mean age of our cohort (62.1 ± 18.4 years) and serious comorbidities (Table 1) may have also contributed to high AKI incidences. Depending on these results, it is demonstrated once more that AKI is still an important and huge problem among critically ill patients.

In our cohort, the highest AKI incidence was determined according to the KDIGO criteria. In the literature, some of the comparative studies described KDIGO as more sensitive,[13-6] while some suggested that it is not different from others.[11,17] In our study, the lowest AKI incidence was determined by AKIN criteria. We consider that, this is due to the use of absolute creatinine changes at 48-hour intervals instead of basal serum creatinine values. In fact, this criterion was theoretically presented as one of the most important advantages of AKIN compared to RIFLE criteria. Indeed, evaluating the creatinine changes may provide ease of administration in patients with unknown baseline serum creatinine values. However, absolute creatinine increases in this time interval may not be sufficient to identify or classify AKI especially in patients having low creatinine increase rates. Hence, such patients may be misclassified as non-AKI or low stage AKI according to AKIN. Our cross tabulation results also support this interpretation. Most of the AKI patients were in stage I according to AKIN; however, the number of advanced stage AKI patients was relatively higher according to RIFLE and KDIGO. The relatively small study population and the absence of urinary output criteria may have also affected our results in this regard. KDIGO appears to be more sensitive in our cohort.

In-hospital mortality rate was calculated as 49.8% in this study, supporting the data showing poor overall survival in ICU patients.[15-8] The accumulated data define AKI as an important complication contributing to mortality in critically ill patients.[11,17] Accordingly, this study showed higher mortality rates in the AKI patients and documented similar abilities of three AKI criteria in predicting mortality. The mortality rate of first stage AKI patients defined by AKIN was higher than those determined by RIFLE and KDIGO. This result supported the idea that AKIN classified some advanced AKI patients as stage 1, as previously mentioned. The results also showed increased mortality rates as AKI stage advances. Due to low patient number in stage II AKI, the mortality rates of patients in stage II and stage III were similar to each other.

Our study has some limitations. First, it was a single-center, retrospective study with relatively small number of patients. Second, because the body weights of patients did not exist in records, only serum creatinine criteria were used for AKI definitions; urinary output criteria were not used. Third, for patients with unknown baseline serum creatinine values, calculated value according to the MDRD equation[9,10] was used assuming a GFR limit of 75 mL/min.

CONCLUSION

KDIGO seemed to be a more precise tool in diagnosing AKI in our cohort. Furthermore, AKI

was a mortality indicator. However; RIFLE, AKIN, and KDIGO classifications gave similar results in predicting in-hospital mortality. We consider that, all three identification systems can be used to identify AKI in daily clinical practice under the light of current literature. However, it is important to know the advantages and disadvantages of the criteria used.

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