THE PROGNOSTIC IMPORTANCE OF ACUTE KIDNEY INJURY (AKI) IN SEVERELY BURNED PATIENTS

Lucia Koba, Mauricio Teixeira, Etienne Macedo

Renal Division, Faculty of Medicine, University of São Paulo

INTRODUCTION AND OBJECTIVES

AKI is a major complication in severely burned patients. It has been well established that AKI increases mortality in other critically ill patients. The purpose of this study is to determine the incidence of AKI with the KDIGO criteria and the impact of this diagnosis in the outcome of severely burned patients.

METHODS

We performed a retrospective analysis of patients who were admitted in the ICU of a tertiary-care center with major burn from 2008 to 2012. Major burn was considered more than 20% of TBSA (total body surface area). Laboratory tests and information from the fluid balance were collected in the first seven days after ICU admission. We investigated the association of these parameters with our main outcome measures which were the KDIGO classification, hemodialysis and mortality.

RESULTS 1 – Criteria for AKI diagnosis

- We compared the KDIGO classification using 24 hours urine output and two baseline/reference sCr

1. sCr at hospital admission (measured creatinine – MCr)
2. sCr estimated by MDRD assuming a GFR of 90 ml/min (estimated creatinine – Ecr).

Figure 1: Comparison of KDIGO classification using urine output and sCr

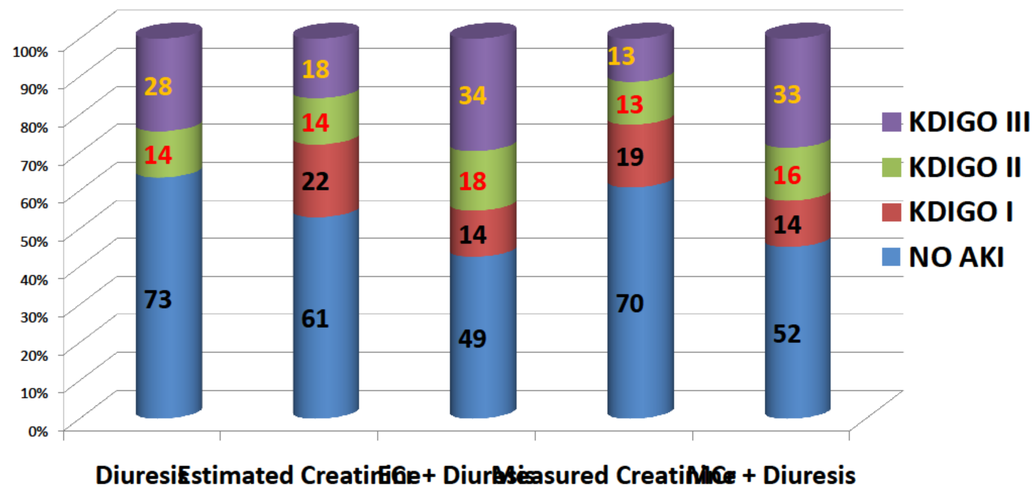
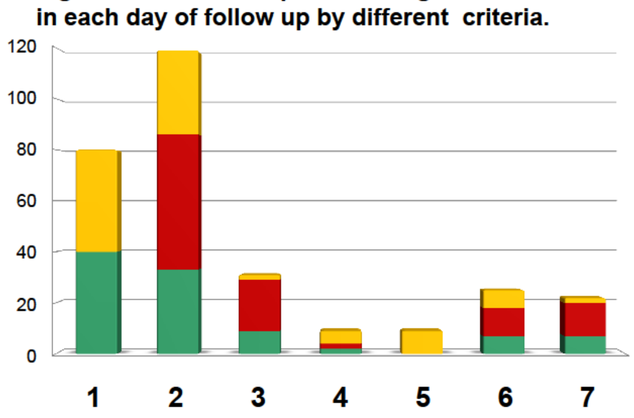


Figure 2: Number of patients diagnosed as AKI in each day of follow up by different criteria.



	1	2	3	4	5	6	7
Diuresis	40	33	2	5	9	7	2
Measured Creatinine	0	53	20	2	0	11	13
Estimated Creatinine	40	33	9	2	0	7	7

Table 1: Number of patients and day of AKI diagnosis by each criterion.

	Estimated Creatinine	Measured Creatinine	Diuresis
AKI (KDIGO)	54	45	42
NO AKI	61	70	73
Mean (First day)	2,39	3,36	2,4
Standard Deviation	1,8	1,9	1,7
Minimum	1	2	1
Maximum	7	7	7

- The main advantage of using the Estimated Creatinine was the possibility to give the diagnosis since admission.

RESULTS 2

- A total of 115 patients were analyzed. Sixty-six (57%) patients were diagnosed as AKI using ECr and urine output. Severity of AKI was stratified by KDIGO classification using the diuresis and the measured creatinine.

Table 2: Baseline characteristics of patients by severity of AKI.

	No AKI (n = 49)	KDIGO I (n = 14)	KDIGO II (n = 18)	KDIGO III (n = 34)	p value
Gender - male	69,4 %	85,7 %	88,9%	55,9%	0,04
Age, years	32 (28,6 to 35,4)	31 (25 to 37,6)	43 (35,5 to 50)	40 (35,7 to 45)	0,002
TBSA burned	38 (33 to 43)	60 (47,8 to 72)	48 (37 to 58,5)	54 (47 to 61,7)	<0,001
Diabetes	2,9 %	0	6,3 %	4 %	0,869
Hypertension	0	0	31,3%	16%	0,005
Lactate (mg/dL)	25,7 (22 to 29)	47,7 (28 to 67)	42,4 (32 to 52,4)	47 (38 to 56)	<0,001

Data are mean (95% confidence interval) or percentage of patients. We used contingency table Pearson chi-square test for categorical variables and one-way analysis of variance for continuous data.

- Age, TBSA, Hypertension and Lactate were higher among the patients who developed AKI

RESULTS 3 – Main Outcomes

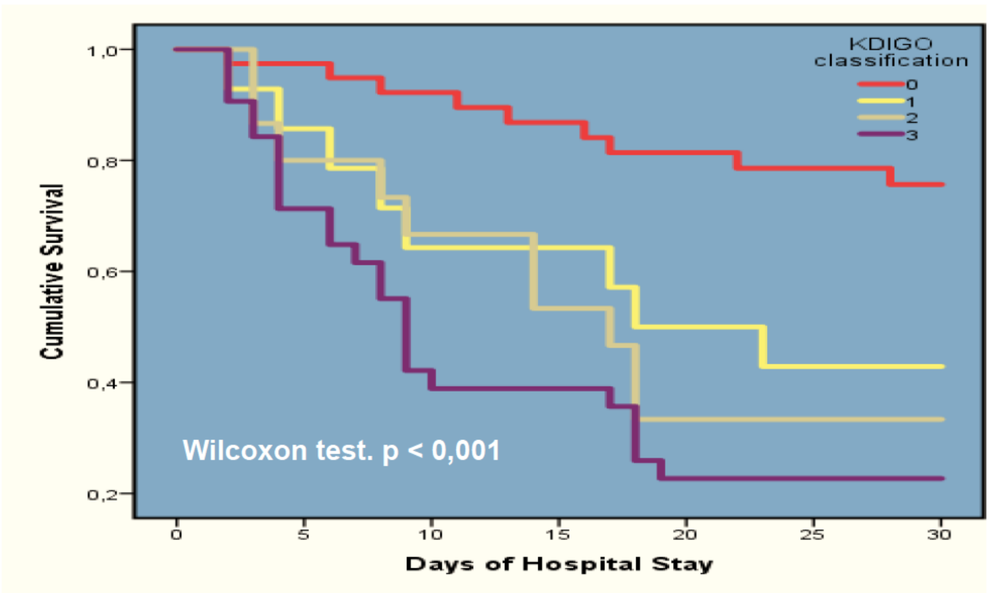
Table 3: Fluid balance, need for dialysis and ICU mortality by severity of AKI.

Outcome	No AKI (n = 49)	KDIGO I (n = 14)	KDIGO II (n= 18)	KDIGO III (n = 34)	TOTAL (n = 115)	p
Fluid Balance	19 + 12	34 + 15	35 + 20	28 + 17	26 + 16	0,003
HD	4 (8%)	2 (14%)	3 (16%)	12 (35%)	21 (18%)	0,01
ICU Mortality	17 (34%)	12 (85%)	11 (61%)	29 (85%)	69 (60%)	<0,001

Values expressed as mean + SD or number (percent). Fluid Balance in liters after 7 days. We used Pearson chi-square test for categorical variables and one-way analysis of variance for continuous data.

- Patients with AKI had a greater Fluid Balance, need for dialysis and had a higher ICU mortality.

Figure 3: Survival curve by severity of AKI.



Exposed to risk

	Day 0	5	10	15	20	25	30
NO AKI	39	38	34	32	29	27	25
KDIGO I	14	12	09	09	07	06	06
KDIGO II	15	12	10	08	05	05	05
KDIGO III	32	22	12	12	07	07	07

- Overall mortality was 68% and it was higher in AKI group (83,6%) comparing to no-AKI (43,6%). It increased with the KDIGO category and had a maximum of 87,5% in KDIGO III.

CONCLUSIONS

In our cohort of severely burned patients we found a higher incidence of AKI as compared to previous publications in the literature. This higher incidence of AKI can be due to the application of a more sensitive criteria for AKI diagnosis (KDIGO). In contrast to previous studies we used urine output and the estimated serum creatinine. In a population of young previous healthy adults, the application of KDIGO criteria based on the estimated serum creatinine allows an earlier diagnosis of AKI. The mortality rate was associated with the severity of AKI by KDIGO classification and with the degree of Fluid Balance.

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G) Acute Renal Failure. G2) Human studies.

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