

ACUTE KIDNEY INJURY AFTER CARDIAC SURGERY ACCORDING TO RIFLE: ADULTS VS PEDIATRICS

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OBJECTIVES

Aim was to evaluate incidence, risk factors, outcome of acute kidney injury (AKI) in adult and pediatric patients after cardiac surgery in intensive care unit (ICU), based on RIFLE and RIFLE modified criteria; AKI association with clinical outcomes, and predictive factors for ICU mortality.

METHODS

All patients admitted in the cardio surgical ICU, tertiary care center, during 2007 were reviewed retrospectively. Transplanted and chronic dialysis patients before admission to the ICU were excluded. AKI was classified according to the maximum RIFLE criteria using both estimated creatinine clearance (eCCI) and urine output (UO) criterion during the first week of stay. For pediatric patients (≤ 18 years) RIFLE modified was used. For baseline creatinine, was used that of hospital admission.

TABLES AND GRAFS

Characteristic	Pediatric patients (nr. 31)				Adult patients (nr. 284)			
	AKI	Risk	Injury	Failure	AKI	Risk	Injury	Failure
Incidence (%)	58	32.3	25.8	0	57.2	26.7	13.7	7.6
Incidence by eCCI (%)	41.9	22.6	19.3	0	52.8	30.6	14	8
Incidence by UO (%)	21.4	14.3	7.1	0	21.3	11.8	6.7	2.8
Age m[IQR]	9 (4-13)	11 (6-14)	6 (3-9)		58 (52-65)	59 (52-65)	58 (55-67)	53 (49-64)
Female (%)	66.7	70	62.5		31.8	27.4	37.2	37.5
Need for inotropic drugs (%)	11.7	11.1	12.5		68.2	66.7	62.7	83.3
MV (h) m[IQR]	5.5 (4-7)	4.5 (2-6)	7 (4.5-7.5)		16 (10-24)	15 (10-17)	17.5 (13.5-57)	26 (17-112)
Mortality (%)	0	0	0		7.9	1.2	9.3	29.2
Days ICU M SD	3.17 0.6	2.8 0.42	3.6 0.26		4.19 0.98	3.4 2.6	3.6 2.6	4.06 0.8

Table 1. Characteristics of AKI patients according to RIFLE.

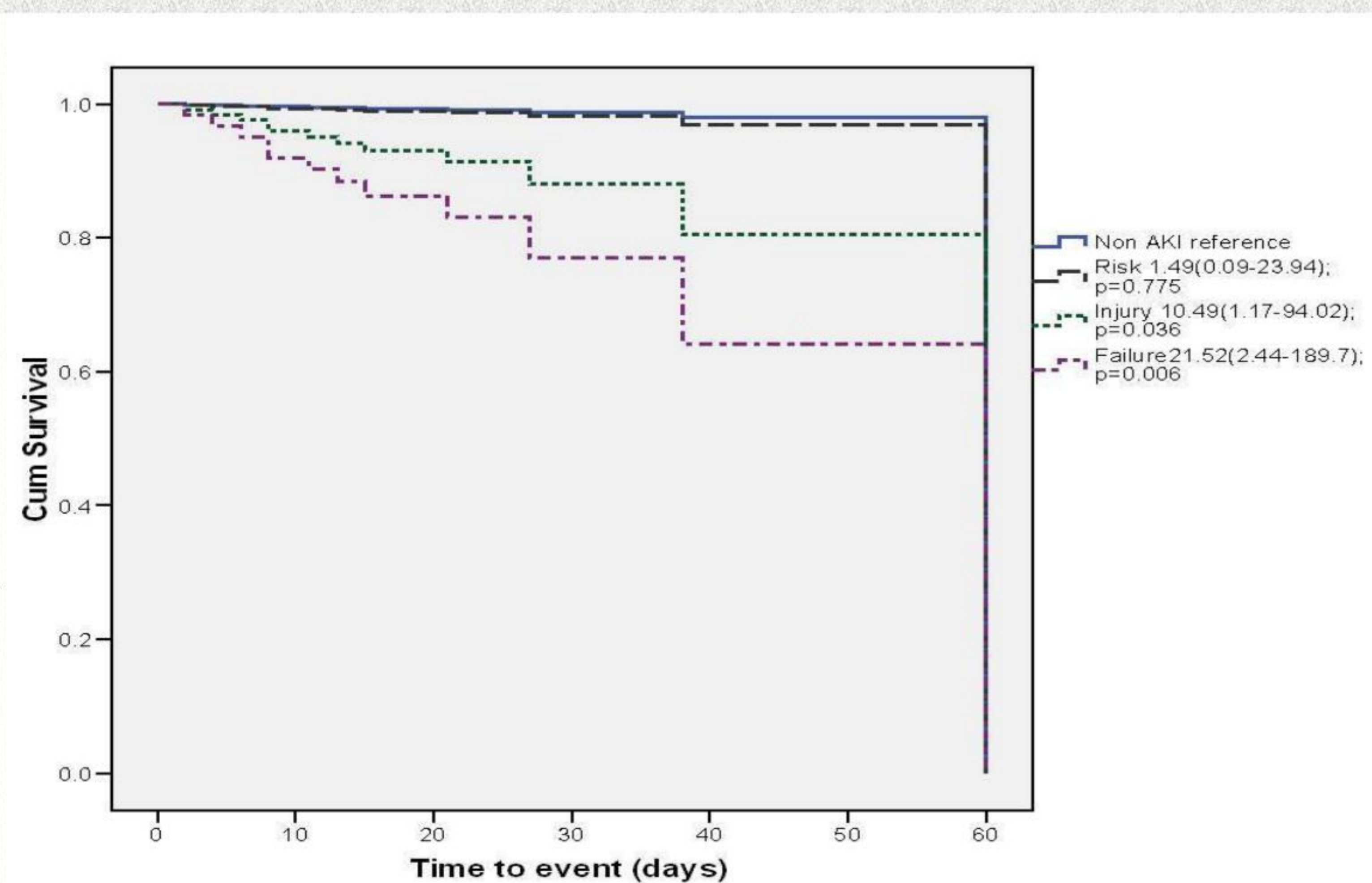


Figure 1. Cox regression analysis

RESULTS

315 ICU patients were included for the study. Among 284 adult patients, 151 (57.2%) patients met criteria for AKI during the study period and from 31 pediatric patients, 18 (58%) patients met criteria for AKI. Type of intervention for adults: 34,5 % valve operations, 51 % aortocoronary bypass (20,8 % CABG), other 14,4%. For pediatrics was: 58 % septal defects, 22.5 % tetralogy of Fallot, 19.5 % other (aortic stenosis and coarctation). Adult AKI patients were significantly aged then non AKI and had higher SOFA score: AKI 5 (3-6) vs. non AKI 3 (1-4), $p < 0.001$, while there wasn't any difference between pediatric patients. Adult male AKI patients were significantly more then non AKI. For the total cohort study hospital mortality was 13 (4.1%) patients. Mortality according to the groups: all pediatric patients 0 (0%); adult non AKI patients 1 (0.8%); Risk class 1 (1.2%), Injury class 4 (9.3%), Failure class 7 (29.2%); $p < 0.001$. AKI was found to be associated with significant prolongation of mechanical ventilation (MV) and ICU stay. Multivariate logistic regression analysis showed age (OR: 1.02, $p = 0.025$), SOFA score (OR: 1.43, 95% CI: 1.25-1.65, $p < 0.001$) as independent factors associated to AKI development for adults. Multivariate logistic regression analysis, showed independent risk factors associated to mortality, Failure (OR: 2.77, 95% CI: 0.16-47.2, $p < 0.001$); SOFA score (OR: 4.04, 95% CI: 1.69-9.65, $p < 0.001$). Kaplan-Meier curve for hospital survival by RIFLE class with Cox regression analysis was statistically significant, $p < 0,0001$.

Variable	Pediatric patients (nr. 31)			Adult patients (nr. 284)			Total cohort (nr. 315)		
	Non AKI (nr.13)	AKI (nr. 18)	P value	Non AKI (nr.133)	AKI (nr. 151)	P value	Non AKI (nr.146)	AKI (nr. 169)	P value
Age m[IQR]	9 (5.5-14.5)	9 (4-13)	0.644	54 (44-61)	58 (52-65)	<0.001	53 (41-60)	57 (47-64)	0.006
Female (%)	38.5	66.7	0.117	47.4	31.8	0.005	46.6	35.5	0.046
Need for inotropic drugs (%)	7.6	11.7	0.713	61.7	68.2	0.308	56.6	62.5	0.298
MV (h) m[IQR]	6 (4-7)	5.5 (4-7)	0.685	13 (10-16)	16 (10-24)	<0.001	12 (10-16)	15 (10-24)	0.002
Mortality (%)	0	0		0.7	7.9	0.004	0.7	7.1	0.004
Days ICU M SD	2.15 0.37	3.17 0.61	<0.001	2.39 0.86	4.19 0.98	0.003	2.37 0.83	4.08 0.6	0.002

Table 2. Characteristics of non AKI and AKI patients

CONCLUSIONS

According to RIFLE and RIFLE modified criteria high incidence of AKI after cardiac surgery in ICU patients was observed. AKI was more severe and had worse outcome in adult then pediatric patients. AKI is associated with increased short-term mortality, and ICU stay. Advanced age and higher SOFA score are independently associated to AKI development in adults. Failure of renal function according to RIFLE was found independent factor associated to hospital mortality.

