

Risk factors of Long-term Survival and Progressive Chronic Kidney Disease Associated with Acute kidney injury after cardiac surgery



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Objective

AKI is a severe complication after cardiac surgery and the long-term prognosis is concerned these years. We aim to study risk factors of long-term survival and progressive chronic kidney disease (CKD) for patients with acute kidney injury (AKI) after cardiac surgery.

Methods

Patients received cardiac surgery and with no history of CKD in our hospital were prospectively selected and grouped according to if AKI occurred. AKI was staged by AKIN classification. The main endpoints were long term mortality and progressive CKD in a follow up of 2 years. Progressive CKD was defined as GFR \leq 30ml/min per 1.73 m² or ESRD (starting renal replacement therapy or receive renal transplantation).

Results

A total of 3245 patients were enrolled, the AKI incidence was 39.9%. Kaplan-Meier survival estimates showed the 2 year accumulated survival rates of AKI group were significantly lower than non-AKI group (82.3% vs. 93.7%, $p < 0.001$). The 2 year accumulated survival rates of patients with AKIN 1, 2 and 3 were 89.9%, 78.6% and 61.4%, respectively. The 2 year accumulated survival rates for AKI patients with complete and incompleting renal recovery were 88.6% and 57.4% (Fig.1) The accumulated progressive CKD prevalence was significantly higher in AKI than in non-AKI group (6.8% vs. 0.2%, $P < 0.001$). Even if the renal function recovery is completed at discharge, AKI is still the risk factor for accumulated overall survival (RR 1.79, 95%CI 1.28 to 2.52) and progressive CKD (RR 1.92, 95%CI 1.37 to 2.69). (table.1)

Table 1. Relative risk analysis of renal function recovery in AKI sub-groups for 2 year accumulated survival

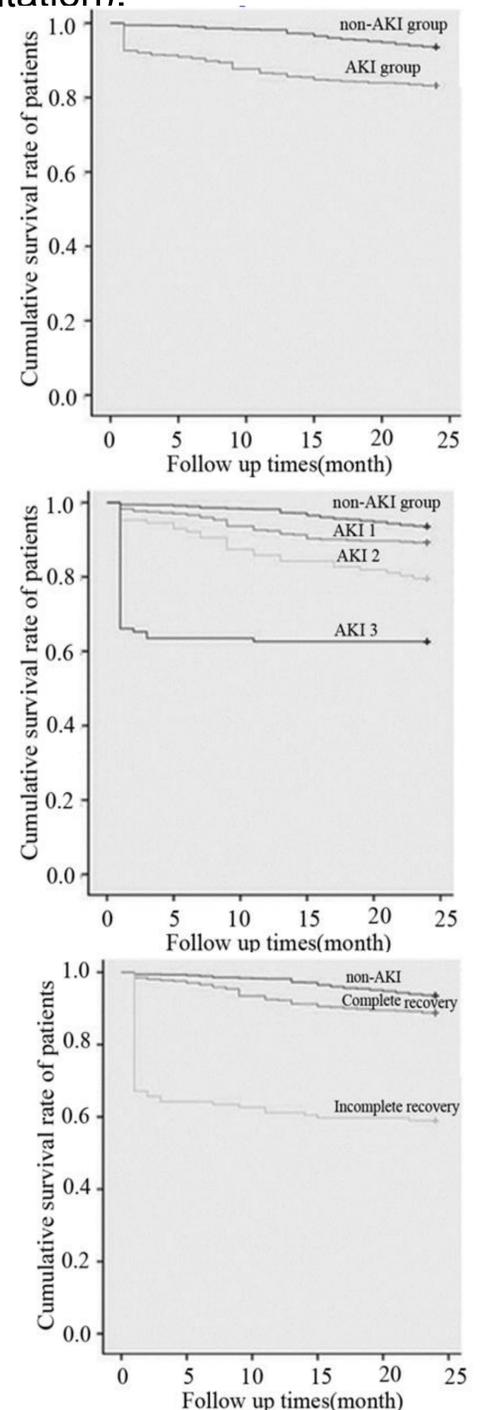
Risk factors	RR	95%CI	P
AKIN 1	1.73	1.20~2.49	<0.001
AKIN 2	3.44	2.19~5.40	<0.001
AKIN 3	7.75	5.28~11.36	<0.001
renal completed recovery	1.79	1.28~2.52	0.001
renal incompleting recovery	8.64	6.04~12.34	<0.001

Multivariate Cox regression model showed that after adjusted for age, diabetes, hypertension, type of surgery, cardiopulmonary bypass time et al, the adjusted hazard ratio (AHR) of AKI for accumulated survival was 1.74(95%CI 1.27 to 2.37) and was proportional to its severity. AKI was also the independent determinant for progressive CKD with the AHR of 20.32 (95%CI 4.55 to 97.31) after adjusted for other risk factors.(table 2)

Table 2. Multivariate Cox regression of 2-year cumulative incidence of progressive CKD

	AHR	95%CI	P
age	1.05	1.04~1.07	<0.001
diabetes	3.64	2.70~4.92	<0.001
cardiopulmonary bypass time	1.003	1.001~1.006	0.004
AKI	20.32	4.55~97.31	<0.001
ICU stay	1.002	1.001~1.003	<0.001

Figure.1



Summary

AKI was independent risk factor for long-term survival and progressive CKD after adjusted for other risk factors, even for those with complete renal recovery at discharge.