High dose of diuretic therapy predicts acute kidney injury and outcomes after cardiac surgery

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Introduction

To evaluate high dose of diuretic after cardiac surgery in the incidence and prognosis of patients with cardiac surgery-associated acute kidney injury.

Methods and Materials

Patients who underwent cardiac surgery from January 1, 2019, to December 31, 2019, were enrolled. The occurrence and clinical outcome of acute kidney injury (AKI) were evaluated. Univariate and multivariate logistic regression models were used to analyze the risk factors of postoperative AKI. The predictive ability of postoperative use of diuretic was quantitatively evaluated by the area under the receiver operating characteristic curve (AUC).

Table 1. 24h diuretic dosage to predict KI, severe AKI, AKI-RRT, and in-hospital mortality

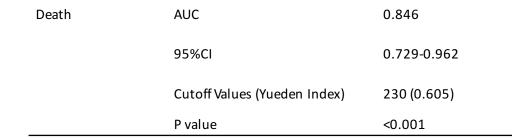|		
AKI	AUC	0.638
	95%CI	0.610-0.666
	Cutoff Values(Yueden Index)	42.5 (0.235)
	P value	<0.001
Severe AKI	AUC	0.765
	95%CI	0.714-0.815
	Cutoff Values (Yueden Index)	57.5 (0.456)
	P value	<0.001
AKI-RRT	AUC	0.880
	95%CI	0.824-0.936
	Cutoff Values (Yueden Index)	95 (0.656)
	P value	<0.001
Death	AUC	0.846
	95%CI	0.729-0.962
	Cutoff Values (Yueden Index)	230 (0.605)
	P value	<0.001

Results

Of 1891 patients, 608 (32.2%) patients developed AKI. The postoperative 24h, 48h, 72h diuretic dosage was significantly higher in AKI group compared to the non-AKI group (40[20, 60] vs. 20 [20, 40]mg; 60 [40, 100] vs. 40 [20, 60]mg; 100[40, 120] vs. 60 [30, 60]mg; all P<0.001).

The area under the receiver operating characteristic (ROC) curve for the first 24 hours use of diuretics to predict severe AKI was 0.765 (cutoff value 57.5mg). The area under the ROC curve for the first 24 hours use of diuretics to predict AKI requiring renal replacement therapy (AKI-RRT) was 0.880 (cutoff value 95mg). The area under the ROC curve for the first 24 hours use of diuretics to predict in-hospital mortality was 0.846 (cutoff value 230mg). **(Table 1)**

Logistic regression model showed older age, male, hypertension, cardiopulmonary bypass (CPB) duration >120min, aortic cross clamp (ACC) duration >90min, ultrafiltration volume >2500, low cardiac output syndrome and postoperative use of diuretics>230mg within 24h were independent risk factors of in-hospital mortality.

Conclusions

Postoperative use of diuretics more than 57.5mg, 95mg and 230mg within 24h can predict severe AKI, AKI-RRT and in-hospital mortality well, respectively. High dose of diuretics (>230mg) was one of the independent risk factors of in-hospital mortality. It is important to pay attention to those using high doses of diuretics following cardiac surgery.