

Urinary Aquaporin 2 Predict Acute Kidney Injury in

Congestive Heart Failure Patients

Ming-Jen Chan, MD¹, George Kou, MD¹, Pei-Chun Fan, MD^{1,2}, Cheng-Chia Lee, MD^{1,2}, Ya-Chung Tein, MD, PhD¹, Chih-Hsiang Chang, MD^{1,2} ¹ Department of Nephrology, Kidney Research Center, Chang Gung Memorial Hospital, Taiwan

²Graduate Institute of Clinical Medical Science, College of Medicine, Chang Gung University, Taoyuan, Taiwan

BACKGROUND AND AIMS

- Early detection of biomarker may improve diagnosis and outcome of acute kidney injury (AKI).
- Urinary aquaporin 2 (uAQP2) is upregulated in the congestive heart failure (CHF).
- This study aims to investigate whether uAQP2 of first day of admission could to predict AKI in CHF patients.

PATIENTS AND METHODS

- A prospective observational study.
- We enrolled total 189 patients with CHF admitted to coronary care unit of a tertiary care university hospital in Taiwan between November 2009 and November 2014.
- The definition of acute kidney injury was based on KDIGO classification.

RESULTS

Table 1. Patients baseline characteristics

Variable	AKI+ (n =69)	AKI- (n =120)	P value
Male	43 (62.3)	86 (71.7)	0.197
Age (year)	50.6	56.1	53.3
MAP (mmHg)	89.5 ± 21.7	85.2 ± 17.2	0.137
LVEF (%)	45.1 ± 19.6	50.7 ± 17.7	0.048
Comorbidity			
Chronic kidney disease	38 (55.1)	17 (14.2)	<0.001
Hypertension	55 (79.7)	74 (61.7)	0.014
Diabetes mellitus	40 (58.0)	55 (45.8)	0.131
Laboratory data			
Baseline creatinine (mg/dL)	1.8 ± 1.3	1.1 ± 0.6	<0.001
WBC (×103)	10.6 ± 5.6	9.6 ± 3.3	0.132
Hb (mg/dL)	11.0 ± 2.3	12.7 ± 2.4	<0.001
Glucose (mg/dL)	184 ± 77	163 ± 81	0.093
Sodium (mg/dL)	138.9 ± 4.2	138.3 ± 3.8	0.351
Potassium (mg/dL)	4.09 ± 0.67	3.85 ± 0.49	0.007
Biomarkers			
BNP (pg/ml)	1210 [639, 1740]	479 [212, 869]	<0.001
UAQP2 (ng/ml)	61.5 [41.8, 110.3]	30.9 [17.4, 49.6]	<0.001
UAQP2/UCr (fmol/mg)	1.09 [0.41, 2.18]	0.35 [0.16, 0.68]	<0.001
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Table 2. Clinical Outcomes in Patients with and without AKI

Variable	AKI+ (n =69)	AKI- (n =120)	P value	
In-hospital mortality,	8 (11.6)	5 (4.2)	0.072	
AKI stage				
Stage 1	35 (50.7)	-		
Stage 2	16 (23.2)	-		
Stage 3	18 (26.1)	-		
Renal replacement therapy	7 (11.1)	0 (0.0)	0.001	
ICU stay (days)	5.0 [3.0, 8.0]	3.0 [2.0, 5.0]	0.002	
Readmission in 180 days	15 (24.6)	15 (13.2)	0.062	
Readmission in 365 days	21 (34.4)	25 (22.1)	0.104	

Table 3. Receiver operating characteristic curve analysis of the biomarkers in discriminating acute kidney injury

	AUC, % (95% Cl)†	Cut-off#	Sensitivity, % (95% Cl)	Specificity, % (95% Cl)
BNP (pg/mL)	75.9 (69.0–82.9)*	> 950.4	60.9 (48.4–72.4)	81.7 (73.6–88.1)
UAQP2 (ng/ml)	79.5 (73.2–85.7)*	> 35.3	92.8 (83.9–97.6)	62.5 (53.2–71.2)
UAQP2/UCr (fmol/mg)	76.1 (69.1–83.2)*	> 0.83	62.3 (49.8–73.7)	80.8 (72.6–87.4)
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according to the Youden index

Fig. 1 Receiver operating characteristic curves of biomarkers on discriminating acute kidney injury.



CONCLUSIONS

- Urinary AQP2 is a considerable biomarker for acute kidney injury in congestive heart failure patients in coronary care unit.
- · Further study is needed for validate our result.