

Evaluation of right atrium-to-right ventricle diameter ratio on echocardiography in acute myocardial infarction patients with chronic kidney disease: prediction of hospital mortality

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Objectives:

Chronic kidney disease (CKD) patients usually have high incidence rate of acute myocardial infarction (AMI) with poor prognosis. However, traditional prognostic factors including high sensitive troponin T and brain natriuretic peptide turned out to be less specific in CKD. We aimed to explore prognostic factors including echocardiographic changes related with hospital mortality after AMI in CKD patients.

Methods:

Clinical characteristics and laboratory tests of 161 CKD patients with onset of AMI from database of our center through September 2011 to June 2014 were collected. Patients were divided into survive (n=132) and non-survive (n=29) group during hospital stay. Baseline characteristics and echocardiography results were compared between two groups and echocardiographic changes related with hospital mortality were analyzed.

Results:

Non-survive patients were older, with lower percutaneous coronary intervention proportion (PCI), had significant higher serum phosphate concentration, right atrium (RA)/right ventricle (RV) diameter ratio, lower RV/left ventricle (LV) diameter ratio, thinner interventricular septum thickness (IVS) and left ventricular posterior wall thickness (LVPW), and lower left ventricular ejection fraction (LVEF) compared with survived patients (Table 1). Serum phosphate concentration was related with LVEF (Spearman rho= -0.315, P<0.001). In the binary logistic regression, age (OR,1.160; 95% CI,1.045-1.288; P=0.005), phosphate concentration (OR,4.738; 95% CI,1.454-15.437; P=0.010), RA/RV diameter ratio(OR,10.799;95% CI,1.759-66.296; P=0.010) and LVEF(OR,0.946; 95% CI,0.904-0.991; P=0.019) were independently related with mortality (Table 2).

Table 1. Baseline characteristics of the study population (only variables with statistic difference are shown)

	Non-survive (n=29)	Survive (n=132)	P value
Age(y)	79.76±5.12	72.75±9.62	<0.001*
PCI(n%)	8(27.59)	93(70.45)	<0.001*
Mg(mmol/l)	1.09±0.68	0.90±0.18	0.007*
P(mmol/l)	1.65±0.78	1.21±0.42	0.011*
RA/RV	1.95±0.32	1.76±0.32	0.006*
RV/LV	0.40±0.05	0.45±0.10	0.018*
IVS(mm)	10.74±1.89	11.68±2.23	0.044*
LVPW(mm)	10.00(9.00-10.00)	10.00(9.00-11.00)	0.048*

Table 2. Binary logistic regression of factors related with mortality

variables	B	SE	Wald	Sig.	Exp(B)	95%CI
Age	0.149	0.053	7.803	0.005	1.160	1.045-1.288
P	1.556	0.603	6.665	0.010	4.738	1.454-15.437
RA/RV	2.379	0.926	6.605	0.010	10.799	1.759-66.296
LVEF	-0.055	0.024	5.470	0.019	0.946	0.904-0.991
Constant	-17.128	5.213	10.794	0.001	0.000	

Conclusions:

Age, serum phosphate concentration, RA/RV diameter ratio and LVEF may be considered as predictors for hospital mortality in CKD patients after AMI. Echocardiography, especially measurement of RA/RV diameter ratio may be an alternative and promising method for predicting short-term mortality in CKD patients after AMI.

