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Synergistic effects of acute kidney injury and chronic kidney disease on the development of end-stage renal disease after coronary artery bypass grafting

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Objectives : Based on the fact that end-stage renal disease (ESRD) affects patient's outcomes in several diseases, exploring risk factors of ESRD is a critical issue in clinical practice. The present study firstly addressed to determine the synergistic effects of acute kidney injury (AKI) and chronic kidney disease (CKD) on the development of ESRD in patients with coronary artery bypass grafting (CABG).

Methods : This study included 1,899 patients (aged ≥18 years) undergoing CABG between 2004 and 2010 in two tertiary referral centers. Patients were classified as groups with post-surgical AKI, preoperative CKD, or both according to the KDIGO guideline. The Kaplan-Meier method was used to calculate the cumulative incidence of ESRD and the Cox proportional hazards regression model was used to estimate the hazard ratio (HR) of ESRD after the adjustment of covariates. Patients were followed for 86 ± 37.3 months (maximum 12 years).

Results : Postoperative AKI occurred in 633 patients (33.4%), including 30.1% in stage 1 and 3.3% in stages 2 and 3. CKD was identified in 603 patients (31.8%). During the following-period, ESRD occurred in 27 patients (1.4%) as following subject numbers and proportions: the group without AKI and CKD, 3 (11.1%); the AKI group, 1 (3.7%); the CKD group, 9 (33.3%); and the group with both AKI and CKD, 14 (51.9%). In the multivariate analysis, both AKI [HR, 2.5 (1.06 to 6.03)] and CKD [HR, 13.2 (4.10 to 42.80)] were independently associated with the risk of ESRD (all Ps<0.05). Particularly, in the CKD patients, the presence of AKI significantly increased the risk of ESRD compared with the counterpart group without AKI, as follows: HR, 2.8 (1.02 to 7.67); P<0.05 [Figure]. In the non-CKD patients, on the other hand, the presence of AKI did not affect the development of ESRD (P>0.05).

Conclusions : The presences of AKI and CKD synergistically increase the risk of

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ESRD in patients who underwent CABG.

Keywords : acute kidney injury, chronic kidney disease, end-stage renal disease, coronary artery bypass grafting