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Differential effect of hemoglobin in association with chronic kidney disease in patients with acute myocardial infarction

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Objectives: Objectives: hemoglobin (Hb) level is a critical determinant on clinical outcome after acute myocardial infarction (AMI). However, there are no comparative studies on the effect of high and low hemoglobin (Hb) level between chronic kidney disease (CKD) and non-CKD patients.

Methods: Methods: We enrolled 2,820 CKD patients 10,249 non-CKD patients from Korea Acute myocardial Infarction Registry between November 2011 and December 2015. CKD was defined as an eGFR <60mL/min/1.73m^2 and patients were categorized based on Hb level; normal (13 ≤Hb <16.0 g/dL in men, 12 ≤Hb <15.0 g/dL in women), low and high Hb. The primary endpoint was 2-year mortality after AMI occurrence.

Results: Results: The proportion of patients with low Hb was significantly higher in CKD patients than in non-CKD patients (55.7 vs. 16.1%), and high Hb level was more frequently observed in non-CKD patients (5.3 vs. 17.1%). In multivariable Cox-regression analysis, compared to non-CKD patients with normal Hb level, non-CKD patients with low Hb level were associated with higher mortality risk (HR = 1.86; 95% CI 1.52-2.27), but high Hb level did not increase the risk. In CKD patients, patients with low Hb showed significantly higher risk of mortality compared to those with normal Hb level (HR = 1.52; 95% CI 1.26-1.82), and patients with high Hb level also had greater risk (HR = 1.80; 95% CI 1.18-2.77). There was antagonistic interaction between low Hb level and CKD status on mortality risk (HR = 0.69; 95% CI 0.54-0.90), and synergistic interaction was observed between high Hb and CKD (HR = 2.03; 95% CI 1.17-3.53).

Conclusions: Conclusions: The effect of Hb level on mortality risk after AMI was different based on CKD status. While low Hb was associated with higher risk of death in both CKD and non-CKD patients, but high Hb level increased the risk in CKD patients only.