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Impact of severe anemia on new-onset cardiovascular events and mortality after continuous renal replacement therapy – a nationwide cohort study

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Objectives: Anemia is common and often severe enough to require red blood cell (RBC) transfusions in critically ill patients undergoing continuous renal replacement therapy (CRRT). Anemia is also a well-known risk factor for cardiovascular disease. In this study, we investigated the impact of anemia on cardiovascular events and mortality after discharge in critically ill patients with acute kidney injury (AKI) requiring CRRT.

Methods: In this retrospective cohort study using the Health Insurance Review and Assessment database of Korea, 10,923 adult patients who received CRRT for ≥ 3 days between 2010 and 2019 and survived until discharge were included. Patients who had pre-existing cardiovascular diseases or received major surgery, endoscopic hemostasis, or intravascular embolization were excluded. Severe anemia was defined as a requirement of RBC transfusion or erythropoiesis-stimulating agents (ESAs). The outcomes were cardiovascular events, including stroke, acute myocardial infarction, and coronary revascularization, and all-cause mortality after discharge.

Results: Severe anemia during hospitalization was found in 78% of patients. The anemia group was more likely to be older, female, and have comorbidities than the control group. The risk of cardiovascular events in the control and anemia groups was similar in multivariable analysis (1.6 vs. 2.0 per 100 person-years, adjusted HR 1.05; 95% CI 0.85–1.29). The association between anemia and cardiovascular event were also not statistically significant in the subgroup analyses according to comorbidities or ESAs. The anemia group had a significantly higher risk of all-cause mortality compared to the control group (8.4 vs. 17.3 per 100 person-years; adjusted HR 1.41; 95% CI 1.30–1.53).

Conclusions: Severe anemia during hospitalization did not increase the risk of new-onset cardiovascular events but increased the overall risk of death after discharge in critically ill patients with CRRT. Further prospective studies are required to improve the overall outcome of critically ill patients with anemia receiving CRRT.