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Presence of chronic kidney disease affects severe clinical outcome in the hospitalized patients with COVID-19 infection

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Objectives: Aged population with comorbidities demonstrated high mortality rate and severe clinical outcome in the patients with coronavirus disease 2019 (COVID-19). This retrospective, nationwide cohort study was performed to evaluate patient mortality and clinical outcome according to comorbidities including chronic kidney disease among the hospitalized patients with COVID-19 infection.

Methods: We included 5621 patients who had been discharged from isolation or had died from COVID-19 by April 30, 2020. The primary outcome was composites of death, admission to intensive care unit, use of mechanical ventilator or extracorporeal membrane oxygenation. The secondary outcome was mortality. The age-adjusted Charlson comorbidity index score (CCIS) was calculated in each patient. The composite outcome and mortality was compared between low (<3) and high (≥3) CCIS groups.

Results: Among 5621 patients, 691 (12.3%) patients were diabetes, 1201 (21.4%) were hypertensive, and 55 (1.0%) had chronic kidney disease. The presence of chronic kidney disease increased the risk of developing composite outcome (Odds ratio (OR) 2.97, 95% confidence interval (CI) 1.51-5.84, $P < 0.001$) and patient mortality (OR 3.32, 95% CI 1.61-6.85, $P < 0.001$). The high CCIS group showed higher proportion of elderly population and lower plasma hemoglobin and lower lymphocyte and platelet counts. The high CCIS group was an independent risk factor for composite outcome (hazard ratio (HR) 3.63, 95% CI 2.45-5.37, $P < 0.001$) and patient mortality (HR 22.96, 95% CI 7.2-73.24, $P < 0.001$). The nomogram demonstrated that the CCIS was the most potent predictive factor for patient mortality.

Conclusions: The presence of chronic kidney disease increases patient mortality and severe clinical outcome among the hospitalized patients with COVID-19 infection. Age-adjusted CCIS is a useful tool to triage the high-risk patients to receive intensive care for COVID-19.