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Renal outcomes in patients with Middle East Respiratory Syndrome-Coronavirus in Korea

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Objectives : Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) outbreak hit South Korea in May 2015 with giving rise to 37 death in total 186 infected patients. Since MERS-CoV was newly isolated in 2012 from a Saudi man, some case series has been reported that severe renal injury is often accompanied by MERS-CoV infection. However, clinical features, severity and prognosis of overall renal outcomes within large retrospective cohort have never been described.

Methods : Eighteen hospitals which treated at least three confirmed cases participated in the analysis of renal outcomes throughout South Korea. We retrospectively reviewed medical records of 145 confirmed cases who was hospitalized between May 2015 and Dec 2015, and also used epidemiologic data provided by Korea Centers for Disease Control and Prevention for analyzing risk factors of acute kidney injury (AKI) and its impact on mortality.

Results : Of 145 MERS-CoV confirmed cases, 26 (17.9%) cases showed AKI event within 2 weeks, and 40 (27.8%) cases for overall hospitalization period (39.3±6.6 days). Among them, renal replacement treatment was required in 6 cases (23%, AKI <2wks) and 13 cases (33% of AKI for overall hospitalization). If we focus on AKI events within 2 weeks for excluding other medical conditions except viral infection, patients who experienced early AKI tend to have more underlying chronic kidney disease (AKI 42.3%; non-AKI 6.7%; P<0.001), chronic lung disease (AKI 23.1%, non-AKI 20.2%, P=0.008), and hypertension (AKI 50%, non-AKI 25.2%, P=0.017). The proportion of intensive care with mechanical ventilator or ECMO and of Carbapenem use was much higher in AKI group comparing to non-AKI group. On the other hand, viral load represented by Ct value of upE or ORF1 did not show any quantitative differences between AKI and non-AKI group. In multivariate logistic regression analysis, the risk of AKI events within 2 weeks was mainly determined by underlying chronic kidney disease (OR 7.663, 95% CI 1.829-32.111, P=0.005), and mechanical ventilator care (OR 4.846, 95% CI 1.611-14.576, P=0.005). In terms of mortality events, however, any AKI events did not show evident impact on overall mortality (HR 0.638, 95% CI 0.096-4.222, P=0.638, AKI within 2 weeks; HR 2.846, 95% CI 0.445-18.212, P=0.269, AKI for overall hospitalization). Mortality risk was determined by age (HR 1.130, 95% CI 1.057-1.207, P<0.001) and mechanical ventilator care (HR 18.323, 95% CI 3.632-92.426, P<0.001).

Conclusions : Around 18~28% of MERS-CoV infected patients had AKI. Especially within 2 weeks, underlying kidney disease and mechanical ventilator care can be risk factors for experiencing AKI. However, AKI events itself cannot influence on overall mortality rate significantly.

Keywords : Middle East Respiratory Syndrome-Coronavirus, Acute Kidney Injury, Prognosis