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THE PREVALENCE OF ACUTE KIDNEY INJURY IN PATIENTS HOSPITALIZED WITH COVID-19

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BACKGROUND

The mortality of hospitalized patients with coronavirus disease-2019 (COVID-19) is attributed to respiratory failure, frequently combined with multiorgan dysfunctions. Amoung the organs which are severely affected with covid-19 infection are the kidneys and this can significantly affect the outcomes of the disease.

Purpose:

To investigate the incidence of acute kidney injury (AKI) and its contribution to the COVID-19 severity and outcomes.

MATERIALS AND METHODS

A retrospective analysis of the register of hospitalized patients with COVID-19 was performed. COVID-19 was defined as the laboratory-confirmed infection and presence of the typical computer tomography (CT) picture. We excluded patients with single serum creatinine measurement during hospitalization, length of stay less than 48 hours and re-hospitalization. AKI definition was based on KDIGO 2012 criteria. Patients admitted to the hospital with AKI were identified as having community-acquired AKI (CA-AKI), patients with AKI development during hospitalization were identified as having hospital-acquired AKI (HA-AKI). A P value < 0.05 was considered statistically significant.

RESULTS

We included 432 patients (age 64 [52; 73] years, 53% males, obesity 50%, arterial hypertension 66.9%, diabetes mellitus 24.7%, chronic kidney disease 6%, mean Charlson index 3 [1; 5]). 25% of patients were hospitalized in the intensive care unit (ICU), 64 (14.8%) were treated with mechanical ventilation (MV). The mean length of stay was 11[9; 14] days and in the ICU was 4 [2; 7] days.

The AKI incidence was 25.7% in whole register. 63.6% of patients with AKI had CA-AKI, 36.4% — HA-AKI. AKI of the 1st, 2nd and 3rd stages was observed in 59%, 23% and 18% of patients with AKI, respectively. Patients with the AKI development had more severe lung injury (43% vs 26% with 50–75% and 12% vs 4% with 75–90% lung injury in subgroups with and without AKI respectively, p<0.0001), higher Charlson index (4 [3; 5 vs 2 [1; 4], p<0.0001), longer length of stay (12 [8; 16]vs (11 [9; 14], p<0.001), more frequently were treated with MV (38% vs 7.5%, p<0.001). ICU patients compared with non-ICU more common had AKI (50% vs 17.5%, p<0.0001), more severe course of AKI (42% vs 75% — the 1st stage, 36% vs 11% — the 2nd and 22% vs 14% — the 3rd stage, p=0.002). The majority of cases of HA-AKI were observed among patients in ICU (23.5% vs 4.6%, p=0.012) and were correlated with mechanical ventilation 33% vs 5% (p<0.0001). In-hospital mortality was 19.8%, among patients in the ICU — 56%. Incidence of AKI was 16.2% among survivals, 63.5% — among died (p<0.0001). The development of AKI was predictor of in-hospital mortality (OR 8.99, 95% CI 5.14-15.76, p<0.0001).

CONCLUSIONS

AKI is common among patients hospitalized with COVID-19 and is associated with severity of disease and adverse outcomes in this population. Applying preventative measures against the development of acute kidney injury could improve prognosis.

Keywords

Acute kidney injury, COVID -19, in-hospital mortality.