LOW HIGH-DENSITY LIPOPROTEIN LEVEL PREDICTS COVID-19 SEVERITY AND MORTALITY IN HAEMODIALYSIS PATIENTS

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BACKGROUND AND AIMS: Several recent studies have demonstrated the association between low high-density lipoprotein cholesterol (HDL-C) levels and poor outcomes in COVID-19-infected patients. However, there is a general lack of research in this field in the haemodialysis population. Therefore, in the present study, we retrospectively examined the association between HDL-C levels and the risk of developing severe outcomes of COVID-19 infection in haemodialysis (HD) patients.

METHOD: A total of 428 HD patients aged 55 (44–64) years and a dialysis vintage of 44 (21–76.6) months were enrolled in this multicentre retrospective cohort study between March 2020 and September 2021. Baseline HDL-C levels were obtained from electronic health records of the patients in the dialysis centres. (The last measurements were carried out before the COVID-19 onset.) Severe COVID-19-associated pneumonia was estimated based on chest computed tomography (CT) findings of pulmonary involvement and assessed using the following scoring system: (1) indicating <5% involvement, (2) indicating 5%–25% involvement, (3) indicating 26%–49% involvement, (4) indicating 50%–75% involvement and (5) indicating more >75% involvement. The primary and the secondary endpoints were COVID-19-related hospitalization and death, respectively.

The data were presented as the median and the interquartile ranges [Me (Q25–Q75)] and compared using the Kruskal–Wallis test. The Spearman correlation test was used to assess the association between HDL-C and other markers. The multivariate logistic regression and the receiver operating characteristic (ROC) analyses were performed to evaluate the ability of HDL-C for predicting the severity of COVID-19 infection.

RESULTS: Among 428 enrolled patients, there were 142 (33.2%) patients infected with COVID-19 and 286 (66.8%) patients who had a negative result in COVID-19 PCR tests. A total of 108 (76%) patients of 142 COVID-19 positive patients did not require any oxygen support; 40 patients (28%) were hospitalized, 34 patients (24%) needed oxygen supplements and 16 patients (11.3%) died. The chest CT findings were scored from 2 to 4 in almost all HD patients (99.3%), and only 2 patients had 75% pulmonary involvement. The baseline HDL-C level was significantly lower in the patients with severe COVID-19-associated pneumonia compared with the patients with mild and moderate pneumonia scores (Fig. 1). Moreover, HDL-C was negatively correlated with serum C-reactive protein (CRP) (r = –0.42; P = 0.0002) and D-dimer (r = –0.31; P = 0.001) levels.

In the multivariate logistic regression analysis adjusted for age, diabetes, CRP and D-dimer, HDL-C was found to be associated with COVID-19-related hospitalization (OR: 2.4, 95% confidence interval (95% CI) 1.19–4.7; P = 0.001) and deaths (OR: 3.1, 95% CI 1.28–5.6; P = 0.008) in the HD patients. The ROC curve analysis demonstrated that the most appropriate cut-off point for baseline HDL-C level for

FIGURE 1: HDL-C levels according to the chest CT severity scores in the COVID-19 infected HD patients (the Kruskal–Wallis test).

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Patients who reported difficult accessibility to the HD unit during lockdown period (n = 23, 6%) had lower HD adequacy as measured by URR (and Kr/TV) as well as hemoglobin levels in the first 3 months of the pandemic (during lockdown) in comparison to the following 3 months and missed more HD sessions (P = 0.001).

Comparing lab parameters for all patients before and during the pandemic revealed a significant decrease in URR% (P = 0.001), hemoglobin level (P < 0.001), calcium level (P = 0.005) and albumin level (P < 0.001) and an increase in phosphorus level (P = 0.033) during the pandemic.

COVID-19 infection represented the most common cause for hospitalization during the pandemic period (45.5%) followed by CV events (13.6%) and sepsis (12.9%). There was a significant decrease in the rate of surgical and elective interventions (P = 0.001) and a significant increase in the median days of hospital stay during the pandemic (P = 0.003). In the 10 months before the pandemic, 23 cases died in the 5 units, while during the first 10 months of the pandemic, 29 cases died, 24 were COVID-19 related (83%) and 5 were non-COVID-19 related (17%).

CONCLUSION: Beyond the viral morbidity and mortality of COVID-19, the quality of care of HD patients was affected significantly by the pandemic.

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