

## Summary

**Introduction:** COVID-19 has been associated with multiorgan dysfunction with a wide variety of clinical manifestations including myocardial injury. Myocarditis, cardiac arrhythmias, stress cardiomyopathy and myocardial infarction have been commonly observed in this group. Decreased healthcare resources led to a reduction in invasive cardiology procedures and increased mortality due to cardiovascular diseases.

**Aim:** This study aimed to describe the clinical characteristics, the course of hospitalization, outcomes, angiographic findings, cardiac arrhythmias and risk factors of death among patients with cardiovascular diseases and concomitant SARS-CoV-2 infection.

**Materials and methods:** This was a single-center study of consecutive patients admitted to a multi-specialist hospital from October 23<sup>rd</sup>, 2020 to April 23<sup>rd</sup>, 2021 (exactly 6 months). Data were collected into a prospective registry. Outcomes were in-hospital mortality, mechanical ventilation and a prevalence of cardiogenic shock. The GRACE risk score was calculated in patients with myocardial infarction.

**Results:** 227 patients were admitted to the ward and completed their course (i.e. discharge or death). Overall, in-hospital mortality was 21%. Non-survivors had a higher level of troponin I, NT-pro-BNP, WBC, D-dimer, CRP and PCT than survivors. Age over 65 years (OR, 2.33; 95% CI, 1.09–4.97;  $p=0.029$ ) and ejection fraction  $<50\%$  (OR, 3.94; 95% CI, 1.9–8.18;  $p<0.001$ ) were independent predictors of in-hospital death, whereas treatment with ACEIs/ARBs (OR, 0.32; 95% CI, 0.16–0.62;  $P<0.001$ ) or  $\beta$ -blockers (OR, 0.34; 95% CI, 0.17–0.68;  $p=0.002$ ) were associated with a lower risk of in-hospital death and mechanical ventilation (OR, 0.16; 95% CI, 0.05–0.5;  $p=0.002$  and OR, 0.31; 95% CI, 0.12–0.79;  $p=0.014$ , respectively).

48% patients with STEMI and concomitant COVID-19 died. Postprocedural TIMI 3 flow grade was less frequently observed in non-survivors ( $p=0.039$ ). There was a higher GRACE risk score in this group (mean  $\pm$  SD;  $210 \pm 35$  vs.  $169 \pm 42$ ,  $p=0.014$ ). In ROC analysis, GRACE score predicted in-hospital death with an AUC of 0.788 (95% CI: 0.6–0.98,  $p=0.014$ ). A score of 176 was identified as the optimal cut-off with a sensitivity of 92% and specificity of 69%.

When compared COVID-19 positive and negative patients we found that there were no differences with regard to the time from symptom onset to reperfusion (median (Q1-Q3); 165 (130-202) vs. (170 (123-210),  $p=0.86$ ) and door-to-balloon time between the compared groups (25 (21-35) vs. 29 (21-59),  $p=0.26$ ). There was a higher GRACE risk score and mortality in the COVID-19 positive patients (180 (154-226) vs. 155 (132-181) and 48% vs. 10%, respectively, both  $p<0.0001$ ). Cardiogenic shock occurred more often in this group (32 % vs. 13%;  $p=0.035$ ). COVID-19 positive patients had elevated hsCRP ( $p<0.0001$ ) and D-Dimer ( $p=0.003$ ) and reduced left ventricle ejection

fraction ( $p=0.037$ ). Postprocedural TIMI 3 flow grade was observed less frequently in this group ( $p=0.044$ ).

17% of COVID-19 positive patients were hospitalized due to cardiac arrhythmias or the need for cardiac implantable electronic devices implantation, replacements or removal.

**Conclusions:** The coexistence of COVID-19 and cardiovascular disease lead to a high in-hospital mortality rate which in patients with ST-elevation myocardial infarction was 48%. Laboratory tests, reduced left ventricle ejection fraction and coronary flow grade help identify patients with a poor prognosis. The GRACE risk score is a good predictor of in-hospital mortality in patients presenting with STEMI and concomitant COVID-19. High in-hospital mortality in this group did not result from delays in standard management and could be related to increased thrombogenicity. Cardiac arrhythmias are one of the major cardiovascular complications of COVID-19.

**Key Words:** COVID-19, in-hospital mortality, myocardial infarction, cardiac arrhythmias