

Major adverse cardiac events in critically ill COVID-19 patients

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Funding Acknowledgement: Type of funding sources: None.

Background: Critically ill patients hospitalized with COVID-19 are at high risk of developing major adverse cardiac events (MACE).

Purpose: This study aimed to identify independent predictors of MACE after intensive care unit (ICU) admission which could be used to identify high-risk patients who may benefit from preventive strategies.

Methods: We retrospectively analyzed patients consecutively admitted to an ICU with COVID-19 and followed them for a median period of 7 months. Patients admitted due to trauma or emergent surgery were excluded. Logistic regression analysis was performed to evaluate which clinical characteristics predicted MACE. MACE was defined as all-cause ICU mortality, new-onset heart failure, acute coronary syndrome, ventricular arrhythmias, pulmonary embolism, myocarditis, and stroke (ischemic or hemorrhagic).

Results: A total of 297 patients was included in the analysis. Median age was 62 (IQR 17) years, and most patients were male (198 patients, 66.7%). From a total of 297 patients, 108 (36.4%) developed at least one MACE:

ICU all-cause mortality (92 patients, 31.0%), new-onset heart failure (27 patients, 9.1%), acute coronary syndrome (7 patients, 2.4%), ventricular arrhythmias (7 patients, 2.4%), pulmonary embolism (13 patients, 4.4%), myocarditis (4 patients, 1.3%), and stroke (5 patients, 1.7%).

Univariate logistic regression analysis showed that the clinical variables associated with MACE were male sex, older age, APACHE II score, SAPS II score, hypertension, hyperlipidemia, known coronary artery disease, heart failure, new-onset atrial fibrillation, need for invasive mechanical ventilation, duration of mechanical ventilation, and vasopressor use. In multivariate logistic regression analysis, we found that the MACE's independent predictors were older age, higher APACHE II score, and new-onset atrial fibrillation. Main results are presented in Table 1.

Conclusion(s): Among critically ill COVID-19 patients, older age, higher APACHE II score, and new-onset atrial fibrillation independently predicted MACE.

Clinical characteristics	Univariate analysis	Multivariate analysis
	OR (95% CI), p-value	OR (95% CI), p-value
Age	1.60 (0.96-2.69), 0.074	1.05 (1.02-1.08), <0.001
Male gender	1.06 (1.04-1.09), <0.001	
Comorbidities		
APACHE II score	1.13 (1.08-1.18), <0.001	1.08 (1.03-1.13), 0.002
Hypertension	3.42 (1.96-5.96), <0.001	
Diabetes	1.46 (0.86-2.47), 0.159	
Hyperlipidemia	1.80 (1.10-2.95), 0.020	
Coronary artery disease	2.81 (1.11-7.12), 0.029	
Heart failure	2.80 (1.25-6.28), 0.013	
New-onset atrial fibrillation	5.06 (2.31-11.06), <0.001	3.05 (1.28-7.31), 0.012
Invasive mechanical ventilation	1.05 (1.02-1.07), <0.001	
Vasopressor use	5.16 (2.44-10.9), <0.001	
ECMO	1.63 (0.72-3.65), 0.240	

Table 1. Main results