

Echocardiogram in critically ill patients with COVID-19

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Background: Describe echocardiographic characteristics in patients admitted to an intensive care unit by COVID-19 and identify clinical and laboratory findings associated with an abnormal echocardiogram and its association with in-hospital mortality.

Methods: Included all patients with RT-PCR-confirmed COVID-19 who underwent echocardiography during hospitalization. Echocardiographic characteristics were assessed in the entire population and subgroups. We also analyzed clinical characteristics associated with an abnormal echocardiogram. An echocardiogram was defined as abnormal when it demonstrates systolic ventricular dysfunction of any degree (left and/or right ventricle) and/or high filling pressures (E/E' ratio >16; SPAP >40mmHg, RAP >15mmHg or diastolic dysfunction \geq grade 2) and/or moderate to severe pericardial effusion. Clinical variables were also assessed using a classification tree and binary logistic regression was performed with characteristics that showed a statistical significance in univariate analysis. Finally, echocardiographic variables were assessed for in-hospital mortality outcome using the chi-square test.

Results: 272 admissions to ICU by COVID-19 were identified. Of these, 159 underwent echocardiography (58.5%). 39 were excluded by incom-

plete demographic data. 72 echocardiograms (60%) were abnormal according to pre-established criteria. Low occurrence of left and right ventricular systolic dysfunction was observed, as well as 30.8% of the population had a normal diastolic function. In univariate analysis, characteristics associated with abnormal echocardiogram were age, elevated troponin, previous heart failure, and SAPS3 score. In the regression model, troponin was the independent marker of abnormal echocardiography in patients admitted to the intensive care unit by COVID-19. This finding was corroborated by the classification tree. The abnormal echocardiogram was not associated with in-hospital mortality (OR 1.60; CI95% 0.75–3.41), but the presence of systolic ventricular dysfunction of any degree was associated with a higher occurrence of this outcome (OR 3.52; CI95% 1.12–11.1).

Conclusions: In intensive care COVID-19 patients, many manifested elevated ventricular filling pressures, but the occurrence of ventricular dysfunction was low. Elevated serum troponin level was the independent marker associated with an abnormal echocardiogram. Systolic ventricular dysfunction was the only echocardiographic variable associated with in-hospital mortality.