

## Letters to the Editor

### Cardiac involvement in COVID-19: does echocardiography matter?



### Afección cardíaca por COVID-19, ¿importa la ecocardiografía?

#### To the Editor,

After attentively reading the article by Rodríguez-Santamarta et al.,<sup>1</sup> we would like to provide some considerations regarding echocardiography for critically ill patients with 2019 coronavirus disease (COVID-19).

In the analysis of their patient series, the authors found no association between systolic dysfunction (left ventricular ejection fraction < 50%) and a poor prognosis. These results led them to propose limiting echocardiography studies to patients with congestive heart failure, arrhythmias, electrocardiographic changes, or cardiomegaly.

First, we wish to congratulate the group for an interesting and important study carried out in these difficult times of the COVID-19 pandemic. This situation has created a new scenario requiring constant efforts of adaptation, and studies such as this enable advances in the knowledge and treatment of this disease.

In our opinion, the results provided should be analyzed with caution, as the study contains a small, single-center sample and the results contrast with those reported in previous articles on COVID-19 patients in intensive care units. In these studies, elevated biomarkers of myocardial injury and stress, such as cardiac troponin and the amino-terminal fraction of pro-brain natriuretic peptide, and a lower left ventricular ejection fraction were associated with a worse prognosis.<sup>2,3</sup>

Of note, cardiac involvement in these patients is not limited to changes in left ventricular systolic function, the variable analyzed in association with the prognosis in the study. It seems that right ventricular dilation and dysfunction are even more common,<sup>4</sup> likely resulting from increased pulmonary vascular resistance due to alveolar hypoxia and possible thromboembolic phenomena.

Echocardiography, and more recently lung ultrasound, are first-line tests in the assessment of critically ill patients because of their wide availability and high diagnostic yield. We agree that it is important to balance the indication and benefits of conducting these studies when there is a potential risk of disease transmission, and in this regard, critically ill patient deserves special consideration.

There is a non-negligible prevalence of cardiac dysfunction and myocardial injury in intensive care unit patients with COVID-19, as many have various underlying heart conditions (right ventricular systolic dysfunction and dilation or systolic and diastolic left ventricular dysfunction) that require different clinical treatments. Echocardiography findings can imply a treatment change in up to 33% of these patients.<sup>5</sup>

Furthermore, in addition to assessing biventricular function (and the presence or absence of pericardial effusion), echocardiography provides other useful information, such as noninvasive estimation of cardiac output, diastolic function parameters—in particular the E/e' ratio—and evaluation of right ventricular function and the pulmonary circulation, which is of considerable value in patients with severe hypoxemia requiring mechanical ventilation. Interpreting this set of parameters is helpful for the treatment of critically ill COVID-19 patients regarding aspects such as optimizing positive end-expiratory pressure and progressing to successful weaning from mechanical ventilation.<sup>6,7</sup>

Moreover, as there is a known relationship between COVID-19 and thromboembolic phenomena, ultrasound study can be useful to promptly recognize possible thromboembolic complications of the disease.<sup>8</sup>

Finally, ultrasound of the lung complements lung function study by enabling detection of pulmonary interstitial edema, subpleural consolidations, atelectasis, pneumothorax, and pleural effusion. In certain cases, it can obviate referrals for computed tomography examination, with a consequent decrease in the risk of contagion.<sup>9</sup>

In conclusion, in situations of elevated disease transmission, we should consider the balance between the risk of contagion and the expected clinical benefit of complementary examinations. Myocardial injury is common in critically ill patients with COVID-19, and echocardiography is important for diagnosing and treating these patients.

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## Cardiac involvement in COVID-19: does echocardiography matter? Response



### Afección cardíaca por COVID-19, ¿importa la ecocardiografía? Respuesta

#### To the Editor,

We would like to thank Jorge-Pérez and Durán-Cambra for their comments on our study, which without doubt provide a richer context for the interpretation of our analysis.<sup>1</sup> We nevertheless feel that it is important to clarify 2 points that might have caused confusion.

In our study, we reported the echocardiography findings in an unselected sample of critically ill patients with COVID-19 and related them to mortality. We also analyzed the concentrations of several biomarkers; however, these were assessed in relation to ventricular dysfunction and not to prognosis, and our results cannot therefore be directly compared with previous findings. The second point is that we attempted to reiterate the recommendations of the consensus documents of the European Association of Cardiovascular Imaging and the Spanish Society of Cardiac Imaging. These societies both caution against the routine use of echocardiography in COVID-19 patients, instead recommending that echocardiography be reserved for those patients who are most likely to benefit from the procedure. The patient profiles considered to warrant echocardiography are similar to those mentioned in the American College of Cardiology document and include some that are highly prevalent in our daily clinical practice; however, we do not see the complete match that the authors appear to suggest in their letter.

Our conclusions agree with those of the European registry<sup>2</sup> cited by Jorge-Pérez and Durán-Cambra insofar as all the included echocardiograms were carried out according to specific clinical criteria and the study authors also emphasized the importance of avoiding indiscriminate use of echocardiography in COVID-19 patients. Moreover, although the echocardiography results in that study led to treatment changes in one third of patients, the prognostic effect of these changes was unclear.

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Our study was conducted in a small sample during the early phase of the pandemic and, for operational reasons, scans were performed without Doppler, using a Vscan Extend echocardiography scanner (General Electric, United States). As the authors know, non-Doppler echocardiography does not permit noninvasive monitoring of cardiac output or the assessment of diastolic function. We agree that in this situation it is important to assess the right ventricle, which has been found to be more affected than the left ventricle in many studies. Indeed, right ventricle function was one of the assessed variables in our study.

There is a debate to be had about the role of echocardiography beyond the assessment of biventricular function, for example in the monitoring of cardiac output or the optimization of mechanical ventilation, and the utility of lung ultrasound. However, these questions were not objectives of our study.

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