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fraction, and right ventricle free-wall longitudinal strain. When comparing the echocardiographic findings between our two high-volume COVID-19 ARDS ECMO centers, an abnormal TAPSE was associated more strongly with right ventricular dysfunction in Lazzeri's study than it was in ours. Interestingly, we found right ventricular free-wall longitudinal strain and fractional area change to be more sensitive than TAPSE in patients with COVID-19 ARDS on VV-ECMO. Given the propensity for right ventricular dysfunction in ARDS, predominantly secondary to high right ventricular afterload, right ventricular free-wall longitudinal strain is perhaps a better modality for assessing myocardial contractility and systolic function in this patient population, considering that it is relatively load-independent.[4]

The results of Lazzeri et al. bring us closer to understanding right ventricular pathology in patients with COVID-19 ARDS requiring VV-ECMO. The authors provided much-needed data on right ventricular function over the course of VV-ECMO therapy. They convincingly illustrated that one-half of the patients who died exhibited concomitant right ventricular failure, while survivors had reductions in pulmonary artery pressures. Additionally, as illustrated before the COVID-19 pandemic[5] and by the authors, initiation of VV-ECMO tends to improve right ventricular function, as it did in one-third of patients in this cohort within the first 24 hours of VV-ECMO therapy. Furthermore, protracted therapy with ECMO in patients with COVID-19 increases the risk of right ventricular failure development, which likely has a negative effect on mortality. The questions that remain for future study are (1) how is right ventricular function affected by prolonged VV-ECMO therapy for COVID-19 ARDS? and (2) how does right ventricular failure effect the mortality in these patients?

Conflict of Interest

None of the authors has any conflicts of interest to report.

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The Clinical Role of Right Ventricle Changes in COVID-19 Respiratory Failure Depends on Disease Severity

To The Editor:

We read with great interest the paper by Paternoster et al.[1] addressing the prognostic role of right ventricle (RV) dysfunction in patients with COVID-19 respiratory failure. We agree with Paternoster et al.[1] that growing evidence (and the experience of our center)[2,3] indicate that the right ventricle (RV) should be the main target of the echocardiographic assessment in COVID-19 disease, including accurate measurements of its dimensions, function, and estimation of systolic pulmonary arterial pressures (sPAP). The relationship between RV dysfunction and mortality in patients with COVID-19 seems to be dependent on the severity of disease. While papers selected in the meta-analysis by Paternoster et al.[1] included heterogeneous populations, studies including only critically ill patients with COVID-19 failed to document a relationship between mortality and RV dysfunction.[4,5] Bearing in mind the complex relationship among RV dysfunction, COVID-19 disease severity, and mortality, it is important to define the clinical significance of RV changes in COVID-19 infection.

Serial echocardiography and an appreciation of the characteristic features of COVID-19–induced respiratory failure may provide insights. As discussed by Dandel[2,6] and others,[7,8] RV dilatation and dysfunction reflect and follow COVID-19–induced pulmonary thrombotic microangiopathy, a feature recognized as a characteristic pattern of COVID-19.[9,10] Thus, RV dilatation and dysfunction may be considered a marker of COVID-19 disease severity but may not fully explain why these changes are not directly related to mortality, especially in critically ill patients.[4,5] In contrast, RV dilatation is known to adversely affect prognosis in adult respiratory distress syndrome resulting from other causes.[11,12]

COVID-19–related respiratory changes also demonstrate atypical heart-lung interactions. The relationship between the RV and the pulmonary vasculature in COVID-19 respiratory failure is emphasized by the role of echocardiographic indices of coupling between RV function and pulmonary circulation as prognostic indicators, such as the tricuspid annular plane

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systolic excursion-to-sPAP ratio.[4] The tricuspid annular plane systolic excursion and/or sPAP recently was investigated in 92 patients with COVID-19–related acute respiratory failure (64%) requiring ventilatory support, and was shown to be an independent predictor of death, with a calculated cut-off of 0.635 mm/mmHg.[6] Because RV failure is more frequent and pronounced in more severe forms of COVID-19 respiratory failure, it can be presumed that different echocardiographic patterns may be detectable across disease severity progression, probably from isolated systolic pulmonary hypertension to overt RV dilatation and dysfunction. Accordingly, in 28 patients with COVID-19–related acute respiratory distress syndrome (ARDS) admitted to our intensive care unit (ICU) assessed by serial echocardiography, sPAP was elevated in all patients on ICU admission but subsequently declined during ICU stay.[3] In mechanically ventilated patients with COVID-19 weaned from extracorporeal membrane oxygenation support, serial echocardiography documented a progressive reduction in sPAP. In nonsurvivors (all on extracorporeal membrane oxygenation support), 2 different echocardiographic patterns were identifiable. One group was characterized by RV dysfunction; all of these patients died because of unfavorable progression of COVID-19 pulmonary disease characterized by bilateral pulmonary consolidations. The second group showed higher values of left ventricular ejection fraction and normal RV dimensions and function, but these patients died from septic shock.[7]

Thus, the detection of RV dilatation and dysfunction in a patient with a COVID-19 infection suggests a severe form of COVID-19, characterized by increased pulmonary vascular resistance and RV afterload increase. Echocardiographic monitoring is strongly suggested to detect dynamic RV changes.

Conflict of Interest

None.

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Scientific Publications by the Anesthesia Department of a Single Cardiovascular Center: A 10-Year Survey

To the Editor:

THE NUMBER OF articles published in scientific journals reflects the research activity within a country.[1] China has increased its annual investment in biomedical research during the past decade.[2] Scientific publications in anesthesiology from China have increased more than 10% annually.[1] Fuwai Hospital, affiliated with the Chinese Academy of Medical Sciences and Peking Union Medical College, is the National Center for Cardiovascular Diseases of China, and one of the largest cardiovascular centers in the world.[3] We summarized publications of the Anesthesia Department of Fuwai Hospital from 2011 to 2020. The Research and Information Sharing Platform (an internal database) was searched. All papers published by the Anesthesia Department were retrieved. A bibliometric analysis was performed to quantify department publications and their impact.

A total of 249 papers were identified (Table 1). Among them, 156, 90, and 3 articles were published in Chinese, Science Citation Index (SCI)–indexed English, and non-SCI English journals, respectively. Annual publication in SCI-indexed journals and the average impact factor of the journals in which these publications appear have substantially increased. The most common types of publications were original articles (65.5%), narrative reviews (17.3%), and meta-analyses (9.2%). *Molecular Cardiology of China* and the *Journal of Cardiothoracic and Vascular Anesthesia* published the most articles from the department in Chinese and English, respectively. The most frequent research topics included organ protection, anesthesia management, and blood use. Students and attending physicians were the most