Disclosures: Dr Grant is on the executive board of the ERAS Cardiac Society.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

5. Marini JJ, Gattinoni L. Management of COVID-19 respiratory distress. *JAMA*. 2020;323:2329-30.
6. Gattinoni L, Chiumello D, Caironi P, Busana M, Romitti F, Brazzi L, et al. COVID-19 pneumonia: different respiratory treatments for different phenotypes? *Intensive Care Med*. 2020;46:1099-102.
7. Gattinoni L, Coppola S, Cressoni M, Busana M, Rossi S, Chiumello D. COVID-19 does not lead to a "typical" acute respiratory distress syndrome. *Am J Respir Crit Care Med*. 2020;201:1299-300.
8. Thompson BT, Chambers RC, Liu KD. Acute respiratory distress syndrome. *N Engl J Med*. 2017;377:562-72.
9. Peek GJ, Mugford M, Tiruvoipati R, Wilson A, Allen E, Thalanany MM, et al. Efficacy and economic assessment of conventional ventilatory support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR): a multicentre randomised controlled trial. *Lancet*. 2009;374:1351-63.
10. Combes A, Hajage D, Capellier G, Demoule A, Lavoué S, Guervilly C, et al. Extracorporeal membrane oxygenation for severe acute respiratory distress syndrome. *N Engl J Med*. 2018;378:1965-75.

https://doi.org/10.1016/j.jtcvs.2020.07.010

REPLY: PROTECTING THE RIGHT VENTRICLE IN COVID-19 ACUTE RESPIRATORY DISTRESS SYNDROME—MORE DATA REQUIRED

Reply to the Editor:

Coronavirus disease 2019 (COVID-19) is a multisystem disease prominently associated with acute respiratory distress syndrome (ARDS). Anecdotal observations suggest high rates of right ventricular (RV) failure in these patients, perhaps partially attributable to venous thromboembolic disease; however, the precise incidence and significance of COVID-19–associated RV failure remains unknown. Importantly, RV failure is also common in patients with ARDS without COVID-19.[1] Extracorporeal membrane oxygenation (ECMO) has demonstrated mortality benefit in patients with severe forms of ARDS[2,3] and has been demonstrated to decrease pulmonary pressures rapidly in patients with severe ARDS.[4] If RV failure is more common in COVID-19–associated ARDS, then targeted extracorporeal therapy supporting the RV would be worthy of exploration.

In this issue of the *Journal*, Joyce[5] reports a single-center experience with an oxygenator and right ventricular assist device (oxy-RVAD) in 9 patients with COVID-19–associated ARDS.[5] The significance of the report lies not in the patient outcomes, which were incomplete at the time of reporting. Rather, the significance lies in the hypothesis that an oxy-RVAD, in contrast with venovenous ECMO alone, may provide greater support for the failing RV, and that this is particularly applicable in COVID-19.

Without greater detail regarding patient selection, severity of illness, comorbidities, complications, and other factors, and without a control group, Joyce's letter[5] simply demonstrates feasibility of this approach. The introduction of a second variable, endotracheal extubation, may complicate the ability to assess the direct effect of the primary intervention. Nonetheless, Joyce[5] reports favorable, if partial, outcomes in the cohort. Pressor requirements were eliminated, and 6 of the 9 patients were decannulated.

If the oxy-RVAD approach is rational and feasible, is it advisable? One issue raised by Joyce[5] is cost. Clearly, any future study of an oxy-RVAD in this setting, as with ECMO, should be accompanied by detailed cost-benefit analyses.

Notably, Joyce[5] couples the technology with extubation, with avoidance of ventilator-induced lung injury as the central theme of the letter (in the title and introduction). This issue therefore merits independent comment. Extubation alone is no guarantee of safe passage for the lungs. Without mitigating large pleural pressure swings, liberation from invasive mechanical ventilation, although assuredly eliminating ventilator-induced lung injury, may nonetheless result in lung injury if the patient is air hungry and working hard to breathe, so-called patient self-inflicted lung injury.[6] So although this too may be feasible, it must be seen as an additional experiment.

As Joyce[5] says, "Anecdotal evidence should always be viewed with a degree of skepticism." We agree. The experience described is intriguing but preliminary, with insufficient data to guide clinical practice or broader recommendations. As we learn more about COVID-19–associated RV failure, the specific need in this context may become clearer. Notwithstanding the separate issue of extubating patients during ECMO (or oxy-RVAD) support, the broader hypothesis may be applicable to any severe patient with ARDS with concomitant severe RV dysfunction. Clearly, more data are needed, and we look forward to Joyce's planned multicenter, randomized clinical trial.

Gurmeet Singh, MD, MSc, FRCSC[a]
Daniel Brodie, MD[b]
[a]*Division of Cardiac Surgery*
Departments of Critical Care Medicine and Surgery
Mazankowski Alberta Heart Institute
Alberta Health Services and University of Alberta
Edmonton, Alberta, Canada
[b]*Division of Pulmonary*
Allergy and Critical Care Medicine

Disclosures: Dr Singh has been on the medical advisory board for Edwards Lifesciences. Dr Brodie receives research support from ALung Technologies. He has been on the medical advisory boards for Baxter, Abiomed, Xenios, and Hemovent.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Columbia University College of Physicians and Surgeons and the New York–Presbyterian Hospital
New York, NY

References

1. Vieillard-Baron A, Matthay M, Teboul JL, Bein T, Schultz M, Magder S, et al. Experts' opinion on management of hemodynamics in ARDS patients: focus on the effects of mechanical ventilation. *Intensive Care Med*. 2016;42:739-49.
2. Combes A, Hajage D, Capellier G, Demoule A, Lavoué S, Guervilly C, et al; EOLIA Trial Group, REVA, and ECMONet. Extracorporeal membrane oxygenation for severe acute respiratory distress syndrome. *N Engl J Med*. 2018;378:1965-75.
3. Goligher EC, Tomlinson G, Hajage D, Wijeysundera DN, Fan E, Jüni P, et al. Extracorporeal membrane oxygenation for severe acute respiratory distress syndrome and posterior probability of mortality benefit in a post hoc Bayesian analysis of a randomized clinical trial. *JAMA*. 2018;320:2251-9.
4. Miranda DR, van Thiel R, Brodie D, Bakker J. Right ventricular unloading after initiation of venovenous extracorporeal membrane oxygenation. *Am J Respir Crit Care Med*. 2015;191:346-8.
5. Joyce DL. Mechanical ventilation: a necessary evil? *J Thorac Cardiovasc Surg*. 2021;161:e213-4.
6. Brochard L, Slutsky A, Pesenti A. Mechanical ventilation to minimize progression of lung injury in acute respiratory failure. *Am J Respir Crit Care Med*. 2017;195:438-42.

https://doi.org/10.1016/j.jtcvs.2020.07.043