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Letter to the Editor

## A protocolized approach to veno-arterial extracorporeal membrane oxygenation for massive pulmonary embolism

*Sir,*

We recently read with interest the manuscript by George and colleagues describing their experience with veno-arterial extracorporeal membrane oxygenation (VA-ECMO) for massive pulmonary embolism (PE) [1]. The authors describe their experience over a 4-year period in 32 patients. There was a 53% survival to discharge, and a lactic acid level < 6 mmol/L was predictive of survival. Based on the results of this study, the authors felt that there were 3 groups who may not benefit from VA-ECMO: patients with 1) malignancy, 2) pre-cannulation cardiac arrest, and 3) lactate ≥ 6 mmol/L.

Consistent with George et al., several published series of VA-ECMO for massive PE have described a mortality rate between 40 and 60% [2–4]. The authors of this study are to be commended for their large experience over just a 4-year period. However, similar to the other published series, the authors do not describe a specific protocol or criteria for placement, management, or decannulation of VA-ECMO. We recently reviewed our outcomes, after establishing a protocolized approach to massive PE [5]. Over a 3-year period, we placed 20 consecutive patients on VA-ECMO as the primary planned intervention for any patient with a massive PE with end-organ dysfunction or an unclear neurologic status. There was a 95% survival to discharge and 90 days, with the 1 death in a patient who required > 60 min of cardiopulmonary resuscitation prior to ECMO consultation. In fact, 10 (50%) patients had a lactate > 6 mmol/L with a 90% survival in this subset, and 5 (25%) patients had a pre-cannulation cardiac arrest with an 80% survival in this subset. While we limit placement on VA-ECMO to patients with a predicted survival, independent of the PE, greater than 1 year, we do not believe that malignancy, cardiac arrest, or lactate level are exclusion criteria for VA-ECMO. This population of patients represents an extreme risk group, and as has been established, survival is likely to be between 40 and 60% when placing patients on VA-ECMO without a prescribed approach to cannulation, management, post-cannulation intervention, and decannulation. However, with the introduction of a protocolized approach, we have improved our own survival for massive PE more than 20%. Moreover, anticoagulation alone while on VA-ECMO resulted in normalization of right ventricular function in 40% of patients.

We, therefore, believe that outcomes may dramatically improve by utilizing VA-ECMO as the primary planned intervention for patients with a massive PE and end-organ dysfunction or an unclear neurologic status.

### Conflicts of interest

Chetan Pasrija: Conflicts of Interest: pending patent for ECMO cannula.
Zachary N Kon: Conflicts of Interest: pending patent for ECMO Cannula.

### References

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