Blood transfusion strategies and ECMO during the COVID-19 pandemic

In *The Lancet Respiratory Medicine*, Ramanathan and colleagues[1] describe the provision of extracorporeal membrane oxygenation (ECMO) services for severe acute respiratory distress syndrome (ARDS) during the coronavirus disease 2019 (COVID-19) pandemic. We would like to make further comment.

ECMO is frequently complicated by haemorrhage and coagulopathy, necessitating daily transfusion of 2–5 units of packed red blood cells and 3–9 units of platelet concentrate to maintain normal haemoglobin levels, although requirements of more than 10 units of packed red blood cells per day have been reported.[2] Presently, the American Red Cross is confronted with critical blood product shortages, which are likely to be exacerbated as increasing numbers of potential blood donors become unwell.[3]

Most knowledge regarding transfusion strategies in ECMO is extrapolated from studies in patients needing critical care. A multicentre, randomised controlled trial in critically ill patients found that restrictive transfusion strategies (haemoglobin levels of 7–9 g/dL to trigger transfusion) reduced the number of packed red blood cells and the proportion of patients transfused, while also significantly decreasing inpatient mortality.[4] In an observational study of 34 adult patients receiving venovenous ECMO for ARDS, restrictive blood transfusion strategies (haemoglobin levels <7 g/dL, activated partial thromboplastin time 40–60 sec) and autotransfusion of circuit blood during decannulation reduced blood transfusion requirements (to 0·11 units per patient per day) and bleeding complications, with survival rates similar to those reported in the literature (73·7%).[5]

As COVID-19 continues to claim lives, we suggest an urgent need for updated recommendations regarding transfusion approaches in ECMO. With data suggesting that restrictive strategies are at least as effective as liberal strategies, consideration should be given to blood conservation protocols with critical, global blood shortages on the horizon.

We declare no competing interests.

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1 Ramanathan K, Antognini D, Combes A, et al. Planning and provision of ECMO services for severe ARDS during the COVID-19 pandemic and other outbreaks of emerging infectious diseases. *Lancet Respir Med* 2020; published online March 20. https://doi.org/10.1016/S2213-2600(20)30121-1.

2 Kim HS, Park S. Blood transfusion strategies in patients undergoing extracorporeal membrane oxygenation. *Korean J Crit Care Med* 2017; **32:** 22–28.

3 American Red Cross. American Red Cross faces severe blood shortage as coronavirus outbreak threatens availability of nation's supply. March 17, 2020. https://www.redcross.org/about-us/news-and-events/press-release/2020/american-red-cross-faces-severe-blood-shortage-as-coronavirus-outbreak-threatens-availability-of-nations-supply.html (accessed March 22, 2020).

4 Hébert PC, Wells G, Blajchman MA, et al. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. *N Engl J Med* 1999; **340:** 409–17.

5 Agerstrand CL, Burkart KM, Abrams DC, Bacchetta MD, Brodie D. Blood conservation in extracorporeal membrane oxygenation for acute respiratory distress syndrome. *Ann Thorac Surg* 2015; **99:** 590–95.

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