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Extracorporeal Membrane Oxygenation for Critically Ill Patients with COVID-19-related Acute Respiratory Distress Syndrome: Worth the Effort!

To the Editor:

Continuous assessment of therapeutic interventions in clinical practice is of paramount importance, in particular in the field of critical care medicine. Falcoz and colleagues recently published a single-center case series of 16 patients with coronavirus disease (COVID-19) requiring extracorporeal membrane oxygenation (ECMO) for severe refractory respiratory failure (1). Overall mortality was 35% at Day 60. Given the fact that average mortality in severe acute respiratory distress syndrome (ARDS) is reported to be around 45% (2), on the basis of Winston Churchill’s aphorism, we see beautiful results but we would like to look at the strategy.

The authors used a dual-lumen cannula (DLC) in 75% of cases (12/16 cannulations). A relatively high rate of bleeding complications is reported (1), and the authors state that they adopted higher anticoagulation targets for all patients than usual, with therapeutic dosing of unfractionated heparin, despite a possible higher risk of bleeding in patients with COVID-19 (3). The use of DLC in this setting might be limited by several factors: First, the blood flow of DLC is regularly generated by high pressures, being traumatic for the blood, which in turn might increase bleeding risk. In addition, the DLC is the only cannula that is not

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heparin coated. Thus, higher anticoagulation to avoid thrombosis is needed. Second, large-bore DLC are associated with a higher rate of intracranial bleeding (4) and a relatively high rate of insertion site bleeding (5) in the general ICU population, and these risks might be more accentuated with a more liberal anticoagulation strategy. Considering higher targets of anticoagulation owing to the prothrombotic status associated with COVID-19 (6), one may argue that the cannulation strategy might explain this high bleeding rate. Moreover, the authors did not comment if patients were overanticoagulated at the time of bleeding or report what their transfusion thresholds for red blood cells are, which makes it difficult to judge the severity of blood losses. The notion that patients with COVID-19 on ECMO should be on an adequately higher level of therapeutic anticoagulation than usual is not justified by the presented data.

An advantage of the DLC over conventional cannulation was not used, that is, the higher rate to achieve prone positioning compared with conventional cannulation (7).

The authors further state that they adjusted their ventilation strategy after ECMO implantation. At the time ECMO was implanted, patients were ventilated at parameters that would be in line with recommendations for protective ventilation, except for a high respiratory frequency. Reportedly, only one patient had high PCO₂ at the time of cannulation. At the time of ECMO implantation, driving pressure (ΔP) was 15 cm H₂O (range, 7–23 cm H₂O), a value seeming to be a break point for higher mortality in a previous analysis (8). Surprisingly, the authors reduced ΔP in median by 1 cm H₂O only, as positive end-expiratory pressure (PEEP) and plateau pressures were both reduced in a similar manner. During the time of ECMO, ΔP was still close to 15 cm H₂O and the range of driving pressures under ECMO was 8–23 cm H₂O; thus, some patients still had a relatively high ΔP. Hence, an important advantage of ECMO, to reduce ΔP at a constant PEEP and control for CO₂ by sweep-gas flow, was not fully used.

Another relevant aspect, rather neglected in the paper, refers to the strategy of support over time: indeed, it would have been interesting to appreciate whether cardiocirculatory depression occurred in the patients with unfavorable outcome, a condition that has been observed rather frequently in patients with COVID-19. The rate of cardiorespiratory ECMO support in the few published series shows that combined support (venoarterial or venovenoarterial ECMO) was required in less than 10% of the patients, with an even smaller rate observed in the experience of Falcoz and colleagues (only one patient). However, direct myocardial involvement, the development of circulatory shock, and other cardiovascular adverse events, like acute pulmonary embolism despite effective anticoagulation, previously described complications in COVID-19, are partially recorded but not fully explained. Therefore, it would be interesting to know the actual determinants of death in the study. Can the authors speculate if a broader use or conversion to venoarterial or venovenoarterial ECMO in some of these patients would have changed the picture?

It is of utmost importance to try to unambiguously clarify the role of ECMO in acute respiratory distress. ECMO can be part of a useful strategy in ARDS in properly selected patients (9) and if advantages are protected against complications. COVID-19–related ARDS does not make an exemption, and the data presented by Falcoz and colleagues (1) do not support that an exemption has to be made. The reported complications do not appear to be specific for this group of patients and might in part be explained by the ECMO strategy used. As two-thirds of patients in the study recovered, we agree with the authors that venovenous ECMO should be considered as a rescue therapy if conventional ventilation fails—but this is also true for all patients with ARDS.

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In conclusion, in the context of the pandemic, we have chosen a mastered management of our patients. However, ECMO implantation in refractory ARDS related to COVID-19 allowed more protective ventilation parameters, improving patient status. Our results highlighted a preference for an adaptation of ventilator parameters on the PP and moderate PEEP in this specific series characterized by more obese patients and 65% survival in the ICU.

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