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Survival benefit of extracorporeal membrane oxygenation in severe COVID-19: “perceived futility” and potential underestimation of ECMO’s effect

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Extracorporeal membrane oxygenation (ECMO) has been widely used to treat refractory respiratory failure, although there are arguments on ethical considerations and end-of-life decision-making [1]. Since coronavirus disease 2019 (COVID-19) often causes severe acute respiratory distress syndrome, researchers have sought to examine the clinical benefit of ECMO worldwide [2–4]. Whebell et al. compared COVID-19 patients who received ECMO therapy with those who did not, using propensity score matching, and exhibited lower mortality in patients undergoing ECMO [5]. Not only do their statistical analyses seem robust with multiple sensitivity analyses, but the effect sizes were also intriguing with 0.47 of odds ratio and 16.3% of absolute risk reduction for mortality. The results of this study suggest that critically ill COVID-19 patients should be referred to specialized centers and treated with ECMO.

Herein, I would like to point out the selection bias, possibly underestimating the survival benefit brought by ECMO. The authors excluded 430 patients from matching analyses because of “perceived futility,” meaning too severe patients could confound and preclude fair comparison between the ECMO and conventional arms. Indeed, the result stated that these patients with “perceived futility” were older, ventilated longer, and more likely to die (73 vs. 43.2%, $p < 0.001$). However, looking closer at Table 1 included in Whebell’s manuscript, the mortality of patients with “perceived futility” was

lower than those included for matching (34.5 vs. 52.7%, $p < 0.001$). Assuming that not the main text but Table 1 is correct, patients judged as “too severe” received ECMO more frequently and died less frequently.

In principle, prespecified protocols do not let us conduct arbitrary analyses after data collection. For this study, however, further analyses including the “too severe” patients will add remarkable value and meaning to the demonstrated results; ECMO could actually have more potential to save patients with severe COVID-19 than it was measured. The clinical benefit of ECMO initiation to severe COVID-19 patients, including those “too severe,” will be of significant interest to frontline providers.

Declarations

Conflicts of interest

I have no financial or non-financial competing interests to declare.

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