Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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COVID-19 ARDS: getting ventilation right

We read with special interest the Article by Ryan Barbaro and colleagues,[1] describing the evolving outcomes of patients with COVID-19 who required extracorporeal membrane oxygenation (ECMO) during 2020. We were sad to corroborate the same increased mortality we had observed in our own patients. However, we wish to clarify two key aspects that we hope will supplement the conclusions of this important Article.

First, the assumption that a non-invasive ventilation (NIV) strategy can be deleterious for patients with acute respiratory distress syndrome (ARDS) and with COVID-19 has no clinical evidence so far.[2] Furthermore, NIV has been progressively used during the evolving pandemic and is probably more related to the improvement in survival observed in hospitalised patients than to a delay in intubation and hypothetically worse outcome.[3]

And second, when to start ECMO on these patients has probably changed during this period due to a higher use of NIV (the authors do not report days on NIV before intubation). We had never before ventilated so many patients with severe ARDS and we have learned that a so-called wait and see approach in terms of intubation or ECMO, as with many other invasive procedures in critically ill patients,[4] might also be valid. ECMO should be initiated in those patients who cannot be protectively ventilated in the context of extremely severe ARDS.[5] In this scenario, mortality might increase in those patients who finally require ECMO assuming that this delayed strategy will save many more other patients from receiving an intervention that is not free from complications besides its high cost of resources.

We declare no competing interests.

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Authors' reply

We thank Xosé Pérez-Fernández and colleagues for their thoughtful Correspondence regarding our study of extracorporeal membrane oxygenation (ECMO) in COVID-19.[1] We agree that our study does not provide evidence that forms of non-invasive ventilation (NIV), such as high-flow nasal cannula and mask or helmet ventilation, might be deleterious compared with other strategies. Our observational study was not designed to make causal inferences regarding the potential superiority of ECMO or any pre-ECMO support strategy. We showed that the more recent cohort with higher mortality had increased use of NIV and decreased duration of pre-ECMO invasive mechanical ventilation (IMV).[1] We did not measure the initiation time of NIV, however, and so could not test for an association between duration of pre-ECMO NIV and the relative risk of mortality.

Although many patients with severe COVID-19 might benefit from the use of NIV, the subset of patients who ultimately do not respond to NIV and require IMV are precisely those who are likely to have high work of breathing, high transpulmonary pressures, and who are therefore at risk of developing patient self-inflicted lung injury.[2] This situation might select for more severely ill patients receiving IMV and ultimately ECMO. It is one hypothesis out of a number we put forward to help explain the association with increased mortality in those who ultimately do not respond to these levels of support. However, this is not an argument for or against the use of NIV in this setting. Even if the hypothesis is correct, NIV might still be the appropriate therapy for any given patient. A randomised clinical trial is required to fully address this question.

To date, there are no prospective clinical trials evaluating the effect on outcomes of the timing of initiating ECMO support. However, in accord with the suggestion of