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ECMO for ARDS due to COVID-19

Dear Editor,

As of 09 March 2020, a cumulative total of 109,577 confirmed cases of coronavirus disease 2019 (COVID-19) were reported in 105 countries and territories worldwide.[1] In China, approximately 5% (2087/44,672) of critically ill patients with COVID-19 infection have presented rapidly progressive respiratory failure, development of acute respiratory distress syndrome (ARDS), and intensive care unit (ICU) admission.[2] Of the 2087 critically ill patients with COVID-19, 1023 (49%; 95%CI, 46.1% to 52.1%) have died in the ICU.[2] The prevalence of ARDS caused by COVID-19 is approximately 8.2% (187/2278) (95% CI, 7.07% to 9.47%)[3–8] (Table 1). Recently, Xu et al.[9] described the pathological characteristics of a patient who died from severe infection with severe acute respiratory syndrome coronavirus 2. The postmortem biopsies revealed that, apart from bilateral diffuse alveolar damage with cellular fibromyxoid exudates, the lungs of the patient showed pulmonary oedema with desquamation of pneumocytes and hyaline membrane formation, indicating ARDS.

Several critically ill patients with COVID-19 infection have required invasive mechanical ventilation and rescue therapies such as, prone positioning, and extracorporeal membrane oxygenation (ECMO).[3–8] ECMO has been proposed as a rescue therapy in severely hypoxemic patients with Middle East respiratory syndrome (MERS) caused by a coronavirus who failed conventional strategies[10]; however, support with ECMO is not available in many low-and-middle income countries around the world, where the healthcare budget is not sufficient to provide this organ support. ECMO might not seem to be as much of a priority as personal protective equipment, refine processes, and check logistics in the global response to the COVID-19 outbreak.

The complexity of ECMO requires a well-qualified ICU team to deliver care to critically ill patients with ECMO; therefore, the use of ECMO may be limited to expert, high-volume centres. Annual ECMO mortality rates vary widely across ECMO centres, and the interquartile range reported by Barbaro et al.[11] was 33 to 92% for adult patients treated with ECMO. Although there little evidence on the outcomes of patients with ARDS due to COVID-19 supported with ECMO, the results of the studies published during the COVID-19 outbreak show that the mortality rate of adult patients with ARDS due to COVID-19 undergoing ECMO is approximately 82.3% (14/17) (Fig. 1).[4,6–8] In summary, the use of ECMO is associated with high mortality in patients with ARDS due to COVID-19 and refractory hypoxia. The usefulness of ECMO as a rescue therapy for critically ill patients with ARDS due to COVID-19 is limited so far, and there is not enough evidence to support its use in this group of patients.

Table 1
Comparison of studies that reported Extra Corporeal Membrane Oxygenation (ECMO) as a rescue therapy for patients with acute respiratory distress syndrome (ARDS) due to COVID-19.

	Huang C et al.[3]	Nanshan Chen et al. [4]	Wang D et al.[5]	Yang X et al. [6]	Guan WJ et al.[7]	Zhou F et al. [8]
Study type	Cross-sectional	Retrospective, observational	Case series	Retrospective, observational	Cross-sectional	Retrospective, cohort study
n	41	99	138	710	1099	191
ICU admission, proportion,% (95% CI)	31.7 (18.08–48.08)	17.17 (10.33–26.06)	26.08 (18.98–34.24)	7.32 (5.51–9.49)	5.0 (3.79–6.46)	26,17 (20.09–33.01)
ARDS, proportion,% (95% CI)	29.26 (16.13–45.53)	17.17 (10.33–26.06)	19.56 (13.3–27.17)	4.93 (3.45–6.78)	3.36 (2.38–4.6)	30.89 (24.1–37.96)
Risk of death during ECMO support, relative risk (95% CI)	Data were unavailable to calculate	0.46 (0.09–2.39)	Data were unavailable to calculate)	0.89 (0.61–1.29)	2.88 (1.65–5.01)	0.96 (0.66–1.41)
Overall mortality rate, proportion,% (95% CI)	14.63 (5.56–29.17)	11.11 (5.67–19.01)	4.34(1.61–9.22)	4.50 (3.10–6.30)	1.36 (0.76–2.24)	28,27 (22.0–35.22)

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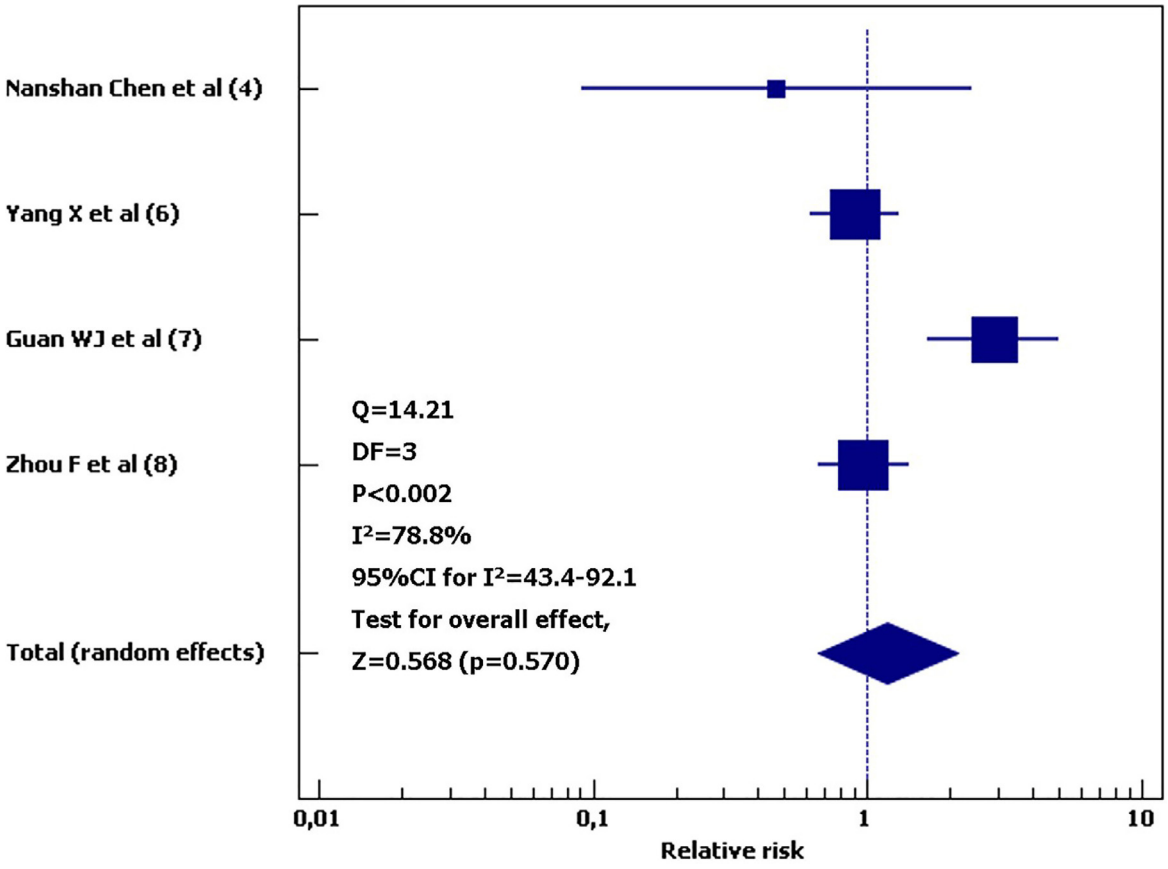

Fig. 1. Forest plot of intensive care unit mortality across 4 studies that have reported the use of ECMO in adults with ARDS due to COVID-19.

Declaration of Competing Interest

I have no competing interests.

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