

Oxygenating system associated with lower risk of death for H1N1 patients with respiratory failure

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Patients with severe 2009 H1N1 influenza who developed respiratory failure and were treated with a system that adds oxygen to the patient's blood had a lower rate of in-hospital death than similar patients who did not receive this treatment, according to a study appearing in *JAMA*. The study is being published early online to coincide with its presentation at the European Society of Intensive Care Medicine meeting in Berlin.

Extracorporeal membrane oxygenation (ECMO) is a type of life support that circulates blood through a system that adds oxygen. "ECMO may be used either as a rescue intervention or to minimize ventilator-associated lung injury and its associated multiple [organ dysfunction](#), both crucial determinants of survival for [patients](#) with acute [respiratory distress syndrome](#) [ARDS; a [lung condition](#) that leads to [respiratory failure](#) due to the rapid accumulation of [fluid in the lungs](#)]," the authors write. A previous study found more favorable outcomes for patients with severe ARDS if they were transferred to a single ECMO center. However, various factors could have affected the results. "Moreover, ECMO doubled hospital costs compared with conventional care. Hence, the role of ECMO in adults with severe ARDS remains controversial."

Moronke A. Noah, M.R.C.S., of the Heartlink ECMO Centre, Glenfield Hospital, Leicester, England, and colleagues conducted a study to examine the mortality of patients with influenza A(H1N1)-related ARDS who were referred, accepted, and transferred to 1 of the 4 adult

ECMO centers in the United Kingdom during the pandemic in winter 2009-2010. The ECMO-referred patients were matched with non-ECMO-referred patients using data from a longitudinal cohort study ([Swine Flu](#) Triage study) of critically ill patients with suspected or confirmed H1N1. Detailed demographic, physiological, and comorbidity data were used in 3 different matching techniques (individual, propensity score, and GenMatch).

Eighty patients were referred, accepted, and transferred to 1 of the 4 UK ECMO centers, of whom 69 received ECMO (86.3 percent). From a pool of 1,756 patients, there were 59 matched pairs of ECMO-referred patients and non-ECMO-referred patients identified using individual matching, 75 matched pairs identified using propensity score matching, and 75 matched pairs identified using GenMatch matching.

Twenty-two patients (27.5 percent) who had been transferred to 1 of the 4 UK ECMO centers died. The researchers found that hospital mortality for matched non-ECMO-referred patients was approximately twice that of the ECMO-referred patients. "The hospital mortality was 23.7 percent for ECMO-referred patients vs. 52.5 percent for non-ECMO-referred patients when individual matching was used; 24.0 percent vs. 46.7 percent, respectively when propensity score matching was used; and 24.0 percent vs. 50.7 percent, respectively when GenMatch matching was used. The survival curves indicate a considerable number of early deaths among the non-ECMO-referred patients. The benefit of ECMO persisted after repeating the survival analysis and excluding the matched pairs in which either the ECMO-referred patient or the non-ECMO-referred patient died during the first 48 hours."

The authors write that the unique value of this study lies in the homogeneity of the patients and the matching methods used.

"The role of ECMO in ARDS is debated. Several reports and our study

demonstrate that ECMO can be undertaken without the prohibitive morbidity and adverse events seen in the 1970s."

In an accompanying editorial, William Checkley, M.D., Ph.D., of Johns Hopkins University, Baltimore, writes that "the study by Noah et al involving critically ill patients with H1N1 joins other recent investigations that have revitalized interest in the use of ECMO as a treatment strategy for ARDS."

"While underlying risk factors may be different, severe respiratory failure from H1N1 infection presents a clinical challenge similar to that involving ARDS from other causes. Despite several decades of investigation into potential treatment strategies, use of low tidal volumes [volume of air that is drawn in or expelled] remains the only proven therapy to decrease mortality in ARDS. In light of the large observed differences in mortality with and without ECMO, large consortia of trialists may be enticed to consider ECMO as a potential target for a randomized controlled trial early in the course of severe ARDS from all causes."

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