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Referral to an Extracorporeal Membrane Oxygenation Center and Mortality Among Patients With Severe 2009 Influenza A(H1N1)

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Context: Extracorporeal membrane oxygenation (ECMO) can support gas exchange in patients with severe acute respiratory distress syndrome (ARDS), but its role has remained controversial. ECMO was used to treat patients with ARDS during the 2009 influenza A(H1N1) pandemic.

Objective: To compare the hospital mortality of patients with H1N1-related ARDS referred, accepted, and transferred for ECMO with matched patients who were not referred for ECMO.

Design, Setting, and Patients: A cohort study in which ECMO-referred patients were defined as all patients with H1N1-related ARDS who were referred, accepted, and transferred to 1 of the 4 adult ECMO centers in the United Kingdom during the H1N1 pandemic in winter 2009-2010. The ECMO-referred patients and the non-ECMO-referred patients were matched using data from a concurrent, 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 matching, propensity score matching, and GenMatch matching).

Main Outcome Measure: Survival to hospital discharge analyzed according to the intention-to-treat principle.

Results: Of 80 ECMO-referred patients, 69 received ECMO (86.3%) and 22 died (27.5%) prior to discharge from the hospital. From a pool of 1756 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. The hospital mortality rate was 23.7% for ECMO-referred patients vs 52.5% for non-ECMO-referred patients (relative risk [RR], 0.45 [95% CI, 0.26-0.79]; $P = .006$) when individual matching was used; 24.0% vs 46.7%, respectively (RR, 0.51 [95% CI, 0.31-0.81]; $P = .008$) when propensity score matching was used; and 24.0% vs 50.7%, respectively (RR, 0.47 [95% CI, 0.31-0.72]; $P = .001$) when GenMatch matching was used. The results were robust to sensitivity analyses, including amending the inclusion criteria and restricting the location where the non-ECMO-referred patients were treated.

Conclusions: For patients with H1N1-related ARDS, referral and transfer to an ECMO center was associated with lower hospital mortality compared with matched non-ECMO-referred patients.