Is it time to mandate regional acute mechanical circulatory support/extracorporeal membrane oxygenation centers?

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Morbidity and mortality remain high for patients requiring acute mechanical circulatory support/extracorporeal membrane oxygenation (ECMO). Early initiation of treatment at a referring hospital before inter-hospital transfer may present an opportunity to improve outcomes. In this retrospective review, Dr Brechot and colleagues¹ compared the outcomes of a VV mobile ECMO retrieval team (MERT) with a group of patients who underwent on-site implantation. The intensive care unit mortality and ECMO-related complications were comparable whether ECMO was initiated at the tertiary center or by the same MERT practitioners at the referring hospital. A previous study had demonstrated that implantation of VA-ECMO by a MERT team was not associated with increased mortality.²

This study is timely because VV-ECMO is being used more frequently for acute respiratory failure and refractory hypoxia or hypercarbia, and the results of the Extracorporeal Membrane Oxygenation for Severe Acute Respiratory Distress Syndrome Trial are expected soon.³ Despite increased use, there is a large variation in the availability of ECMO and mobile retrieval teams. This study was limited by its retrospective single-center methodology and a larger percentage of patients postcardiotomy in the on-site group. Nonetheless, survival and ECMO-related complications were approximately 50% in both groups. In addition, the percentage of patients switched from VV to VA ECMO, because of hemodynamic deterioration, was comparable between the 2 groups. Rapid multidisciplinary evaluation profiling cardiopulmonary status, including bedside echocardiography, contributed to these outstanding results.

The study included only patients who initially were placed on VV and not VA ECMO. Patients were transported via ground ambulance to the tertiary referral center with a median transport time of only 35 minutes. The study suggests that internal jugular-femoral cannulation was preferential in this patient cohort. In the group as a whole, patients who were initially cannulated via femoral-jugular

required subsequent recannulation 8% of the time compared with 47% of the patients who were initially cannulated via femoral-femoral. It is important to note that no dual-lumen cannulas (AVALON [Maquet, Rastatt, Germany] or PROTEK DUO [Tandem Life, Pittsburgh, Pa]) were used.

Early implantation may have contributed to survival in this patient population. For the MERT group, only 192 minutes passed between the initial call and the initiation of ECMO. The team aggressively converted VV-ECMO to VA-ECMO in those patients with signs of hemodynamic deterioration, highlighting the value of meticulous cardiovascular profiling in the presence of refractory hypoxemia and suspected acute respiratory distress syndrome. Factors independently associated with intensive care unit death were age, immunocompromised status, bacterial as opposed to viral infection, and underlying acute renal failure. In addition, longer pre-ECMO time on mechanical ventilation was associated with an increased mortality. The time between intubation and VV-ECMO implantation has been shown to be an important and independent predictor of survival, suggesting a role for early intervention.⁴

The safety of MERT was supported by similar outcomes between the 2 groups using identical care providers. On the basis of this study, consideration should be made for high-volume regional acute mechanical circulatory support/ECMO centers with mobile capabilities. This could include

Central Message

Mobile initiation of VV-ECMO may be considered for select patients with acute respiratory failure. Outcomes were the same whether ECMO was initiated at the tertiary center or by a mobile team.

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all aspects of respiratory, circulatory, ventricular, and post-arrest support in a hub and spoke model as recently proposed for cardiogenic shock.⁵ These centers could provide structural resiliency for patients, families, and caregivers. This article suggests that patients with severe acute respiratory failure should be evaluated for potential mobile VV-ECMO that allows multispecialty teams to deliver rapid, patient-centered, salvage therapy at high-volume centers.

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