Bridging to heart transplant with extracorporeal membrane oxygenation: Good or VAD?

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Central Message

VA-ECMO as a BTT is associated with increased mortality relative to patients bridged with CF-LVAD. It is unclear whether poor outcomes are due to VA-ECMO selection as opposed to patient risk factors.

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The use of venoarterial extracorporeal membrane oxygenation (VA-ECMO) as a bridge to transplant (BTT) is attractive. It is a mobile and easily deployable technique, particularly in emergency situations. Although the current standard of therapy for BTT for North American adults is placement of a durable continuous-flow left ventricular assist device (CF-LVAD), outcomes for patients with Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) level 1 heart failure with a CF-LVAD are poor, raising the question about the potential role of short-term mechanical circulatory support devices, such as VA-ECMO.¹ The recently revised United Network for Organ Sharing (UNOS) heart allocation policy now prioritizes patients listed for transplant with VA-ECMO support to the highest category. The proposed change has raised concerns that the use of nondischargeable mechanical circulatory support (such as intra-aortic balloon pumps and VA-ECMO) may increase in use as a mechanism to gain priority, perhaps without an appropriate demonstration of satisfactory posttransplant outcomes.^{2,3}

In this issue of the *Journal*, Fukuhara and colleagues⁴ report outcomes for patients bridged to heart transplant with VA-ECMO. Patients bridged by VA-ECMO were younger, sicker at baseline, and more likely to require inotropes and mechanical ventilation than those patients who were bridged with a CF-LVAD. Patients awaiting heart transplant with VA-ECMO support received higher-risk donor hearts. Not surprisingly, patients bridged with VA-ECMO showed a higher crude mortality than did those bridged with a CF-LVAD, even in a comparison that used a propensity-matched cohort. Importantly, the study shows that higher Model for End-stage Liver Disease Excluding International Normalized Ratio (MELD-XI) score predicts a very poor outcome, and this finding may help with difficult decisions, perhaps favoring a bridge to bridge strategy for the candidates at highest risk.

There are very limited data reported for such patients, particularly from North American cohorts.⁵⁻⁸ Clinical

research, such as randomized, controlled trials, is most difficult for these critical patients. Although the results of VA-ECMO as a BTT reported by Fukuhara and colleagues⁴ are poor, some perspective is warranted. Most patients that receive a CF-LVAD as a BTT are at INTERMACS level 3 or above, in light of the knowledge that outcomes with CF-LVAD for INTERMACS levels 1 and 2 are poor. Patients who receive VA-ECMO for cardiogenic shock are typically at INTERMACS level 1. Because of limitations of the UNOS database, the study reported by Fukuhara and colleagues⁴ was unable to determine which patients with CF-LVAD support were at INTERMACS level 1 or 2. Further confounding the results, patients who initially had VA-ECMO inserted as a bridge to bridge and subsequently had a CF-LVAD inserted as a BTT were also not determined due to study database limitations. In addition, the study population of patients with VA-ECMO as a BTT was sparse; only 0.4% of all patients who received transplants in a 13-year period had VA-ECMO as a BTT. The UNOS rationale of prioritizing patients with VA-ECMO support to the highest priority group is, at least in part, a consequence of the low frequency of occurrence as well as the high mortality of this cohort during the wait for a transplant. In light of the recent UNOS changes in heart allocation, continued prospective clinical outcomes studies will be important to confirm that reductions in wait list mortality by using

VA-ECMO as BTT are balanced with satisfactory posttransplant outcomes. If not good, then we should go VAD.

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