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Commentary: Chicken or egg: Does risk-adjustment hide the deleterious consequences of bridging to transplant with temporary devices?

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Adult heart allocation changes implemented in 2018 after a prolonged policy discussion and refinement phase included the prioritization of candidates supported by extracorporeal membrane oxygenation (ECMO).¹ From a system perspective, the results of the change remain somewhat uncertain, but most studies have not demonstrated the feared decline in posttransplant survival following the changes.² However, there has been an increase in the use of ECMO and of intra-aortic balloon pumps (IABPs) that may result in dramatic shifts in the population of patients awaiting heart transplant.²

This systematic increase in the use of ECMO and IABP is the aggregated result of individual decisions regarding how

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CENTRAL MESSAGE

Risk-adjusted posttransplant outcomes for patients supported by ECMO are acceptable, but risk-adjustment itself may obscure the effect of end-organ injury resulting from ECMO itself.

to optimally support patients with heart failure and obtain priority listing status with rapid access to donor offers. The study by Carter and colleagues³ evaluates 1 aspect of the interaction between pretransplant support and posttransplant outcomes. The conclusion that patients supported on ECMO have only a modest decrement in long-term survival compared with those supported with other methods is reassuring for patients in whom ECMO is a necessary bridge to transplant. However, it is important to view this conclusion both critically and in context.

The estimated survival difference of 16.6 months at 16.7 years is not dramatic, but it still represents a nearly 10% decrease in survival time. This is not insignificant. More importantly, any attempt to evaluate the relative influence of various support modalities (eg, ventricular assist device [VAD], ECMO, IABP, and medical management) is

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confounded by the patient condition leading to support initiation but also by the influence of the support technique on the patient's condition. Many patients with severe biventricular failure are at higher risk for posttransplant morbidity and mortality, whether supported with ECMO, biventricular VADs, or a total artificial heart. However, we should not underestimate the influence of support modality on a patient's clinical condition at transplant. VAD support better preserves renal and hepatic function than ECMO or IABP.^{4,5} By adjusting for renal function at transplant, the authors may be underestimating the detrimental effect of bridging patients with ECMO because those patients are less likely to recover renal function before transplantation. The unadjusted survival curves (where 30-day survival is 96.0% for patients on VAD support and only 76.6% for patients on ECMO) may be a better reflection of the effect of ECMO as a bridge to transplant than the adjusted results that form the focus of the conclusion. Unfortunately, disentangling the relative influences of pre-ECMO clinical condition and ECMO-related morbidity on candidate condition at transplant may be impossible.

Some patients, because of anatomy, prior procedures, or the mechanism of heart failure, will require ECMO support. In those patients, rapid transplantation before

the accrual of the deleterious effects of ECMO support is appropriate and the data from Carter and colleagues³ suggest that those patients have acceptable (if not optimal) survival. But for patients in whom VAD support is an option, it is important to consider the consequences of using temporary support devices, including ECMO. Those consequences in terms of end-organ dysfunction and posttransplant mortality may be significant—and may not be worth the higher priority listing status.

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