Extracorporeal membrane oxygenation support bridge to transplant: Avoiding a bridge to nowhere

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Central Message

ECMO support can be a lifesaving technique to bridge patients with end-stage lung disease to lung transplant, but careful patient selection is critical in avoiding an ECMO bridge to nowhere.

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The discrepancy in numbers between available donor organs and patients listed for lung transplantation has resulted in increasing mortality for patients on the waiting list. Extracorporeal membrane oxygenation (ECMO) can be used to support patients with respiratory failure. The decision to cross the ECMO bridge to actual transplant can be difficult, however, because of concerns about complications, outcomes, and ethical issues surrounding the use of limited donor lungs. In their article in this issue of the *Journal*, Todd and colleagues¹ report a retrospective, single-center experience of 12 patients undergoing ECMO support as a bridge to lung transplant (BTT). All patients successfully underwent transplant, with a 1-year survival of 100%.

Although several centers have reported the successful use of ECMO support as BTT,²⁻⁴ Biscotti and colleagues² reported only 40 of 72 patients undergoing transplant (55.6%), with an 84% 2-year survival. A systematic review of 14 studies including 441 patients showed a 1-year survival of 50% to 90%.⁵ Hayanga and associates⁶ evaluated 119 patients by means of United Network for Organ Sharing data and found that 1-year survival of patients receiving ECMO support as BTT increased from 25.0% in 2000 to 2002 to 74.4% in 2009 to 2011 but was significantly worse than for patients not receiving ECMO support as BTT.⁶

Although Todd and colleagues¹ chose to limit their current study to their 1-year experience after establishing a dedicated ECMO program, they do describe 4 patients who were receiving ECMO support as BTT before this study. One patient died while on ECMO support, and another died less than 1 year after transplant, with an overall 1-year survival of 93.3%. Banga and coworkers⁷ reported that right ventricular dysfunction, worsening renal function, low albumin, and volume overload were associated with poor outcomes. With small numbers and 100% BTT and 1-year survivals, however, it is difficult to draw any conclusions regarding predictors of poor outcomes from the study of Todd and colleagues.¹

It was disappointing that no patients were able to ambulate or be weaned from the ventilator. Hoopes and associates⁴ reported on 31 patients receiving ECMO, 19 of whom were ambulatory, and Shafii and colleagues⁸ extubated 6 of 19 (33%) patients who were receiving ECMO. Todd and colleagues¹ explained that many patients were too deconditioned at the initiation of ECMO. Although some would argue against placing such deconditioned patients, with 2 of them older than 65 years, on ECMO support as BTT, Todd and colleagues¹ were able to transplant lungs into this entire cohort with 100% 1-year survival.

The decision to proceed with ECMO support as BTT must include a multidisciplinary team, and multiple factors should be considered, including age, social support, functional status, organ dysfunction, active or resistant infections, risk of bleeding, transplant evaluation status, and factors affecting wait list times, among them size, blood type, transfusions, and panel-reactive antibodies. The decision must be discussed carefully with the patient and family, outlining the possibility of withdrawal from ECMO if the patient is no longer a transplant candidate as a result of complications or deconditioning. As Todd and colleagues¹ admit, placing 1 patient on ECMO support before the transplant workup was initiated was a risky decision.

Although long-term outcomes are needed and the cohort is small, the reported 100% 1-year survival is impressive, and Todd and colleagues¹ are to be commended. ECMO

support as BTT can be life-saving, and a successful program depends on a dedicated team. Careful patient selection and a thorough and realistic discussion with patients and their families, however, are critical before crossing this bridge to avoid an ECMO bridge to nowhere.

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