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Commentary: Toothpick bridge

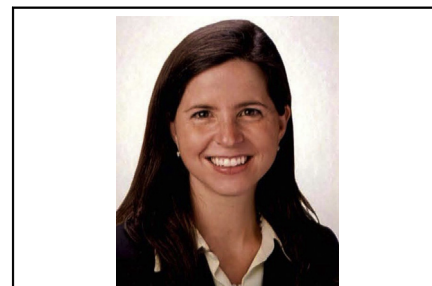
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Construction of a toothpick bridge continues to be a rite of passage for many budding young scientists. Bridges are painstakingly constructed from cocktail toothpicks and white school glue then subject to increasing weight loads to test strength. The perfect bridge is built with simple design, meticulous construction, and a little luck.

Such is true for the bridge to transplant presented by Kim and colleagues.¹ By combining the strategy of extracorporeal membrane oxygenation (ECMO), fastidious perioperative patient care, and the good fortune of a short waiting time, one of the most anatomically and physiologically complex patients survived a dual-organ transplant. The authors and their comprehensive teams are to be congratulated on this triumph.

The technique of combined heart–liver transplantation (CHLT) for patients with cardiac and hepatic failure has been increasingly used, particularly in the single-ventricle population. The surgical procedures are lengthy reoperations complicated by unusual anatomy, sequelae of previous interventions, and the development of collateral circulation, which relegates patients to a high risk of bleeding. Despite the increased complexity, survival is good. A recent meta-analysis of 16 studies published from 1985 to 2020 pooled 860 patients listed for CHLT with a 1-year survival of 85.3% in 11 of these studies.²

ECMO has been used as a mechanical circulatory support technique for either salvage therapy or bridge to cardiac, pulmonary, or combined heart–lung transplantation with mixed results. Given the current United Network of



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CENTRAL MESSAGE

Despite one of the most difficult diagnoses, this patient survived dual organ transplant by combining a strategy of ECMO with fastidious perioperative care and the good fortune of a short wait.

Organ Sharing allocation policy, Elde and colleagues³ described both significantly improved waitlist and 180-day posttransplant mortality in the new era with increased use of ECMO for those undergoing heart transplant. ECMO has been described for the treatment of cardiopulmonary failure following orthotopic liver transplantation alone, with a dismal survival of 38% in the largest reported series.⁴ As a bridge to transplant, many patients with congenital heart disease continue to be supported by ECMO and for considerably longer.⁵ Preoperative venoarterial ECMO has also been recognized as a risk factor for significantly decreased 1-year survival compared with those patients bridged with either a left ventricular assist device or those not requiring pretransplant mechanical circulatory support (hazard ratio, 3.03; $P < .001$).⁶ ECMO is an especially important modality for many single-ventricle patients, as mechanical support options may be limited. Hence, it was inevitable that these 2 strategies would be successfully combined.

Yet, this begs the question of normalizing the use of ECMO for patients awaiting CHLT. While the temptation exists to employ ECMO as a strategy to improve listing status and hence reduce wait times, it is not without significant potential risk. Prolonged wait times are attributable to both

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significant regional variability and high sensitization in the congenital population. Other considerations include responsible stewardship of not 1 but 2 organs, the financial cost of both pre- and postoperative ECMO, and the systemic burden of having patients listed on ECMO for prolonged waiting times. Given the many variables, this bridge may not be able to tolerate the strain of this unique and complex population.

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