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COMMENTARY

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Impella bridge to durable LVAD: A short run for a long slide

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Central message: Use of the Impella device as a bridge to LVAD implantation is feasible with appropriate short and long-term outcomes.

Left ventricular assist devices (LVADs) have emerged as a comparable alternative to orthotopic heart transplant. However, as the acuity of these patients increases, so does the need for bridging strategies for those presenting with poor end-organ perfusion despite conventional therapies. Many of these patients require stabilization before LVAD implantation and temporary mechanical circulatory support (tMCS) devices could fill this gap.

The Impella, an axillary flow pump, is placed across the aortic valve and unloads the left ventricle, propelling blood into the ascending aorta to help restore end-organ perfusion and decrease left ventricular wall stress. Newer devices supply as much as 5.5 L of forward flow allowing for excellent circulatory support in critical heart failure patients, although data on their use as bridge to LVAD is limited.

This retrospective study by George et al.[1] reviewed all Heartmate 3 patients at a single institution requiring preoperative inotropes either with or without tMCS in the form of a surgical Impella 5.0/5.5. The investigators found similar survival at 30 days, 1, and 2 years post LVAD implantation with multivariable analysis demonstrating no difference in 1- or 2-year survival in the Impella group. This was in comparison to patients requiring solely inotrope use preoperatively as no patients with extracorporeal membrane oxygenation or intra-aortic balloon pumps were included in the study. There was also no difference in postoperative complications of interest such as bleeding, stroke, LVAD-related infection, or right heart failure requiring RVAD support between these groups. Uniquely, the authors measured markers of end-organ perfusion such as creatinine clearance, lactate, and total bilirubin. Impella use resulted in favorable trends in improving these markers which may also be a reason for their auspicious outcomes.

There is little doubt that patients requiring preoperative mechanical circulatory support are sicker at baseline and thus prone to develop poorer outcomes in the immediate postoperative period. Previous studies have not demonstrated as favorable of outcomes for patients requiring tMCS bridge to LVAD implantation, especially those with higher INTERMACS profiles.[2–4] While it is possible that the sample size in the current size is too small to detect a statistically significant difference in mortality, it is nevertheless reassuring that in the modern era of temporary mechanical support technologies, critically ill patients who were successfully bridged to durable LVAD had comparable survival.

An important limitation of this study is that only patients surviving to LVAD implantation were included, leading to selection bias for those that may have had favorable survival with a support device. Placement of an Impella preoperatively may serve as a litmus test for those patients that will do well with LVAD implantation and allow for improved patient selection moving forward. The Impella essentially functions as a bridge to decision on LVAD candidacy, with patients who recover their organ function being likely to benefit from durable LVAD.

Despite changes in the heart transplant allocation system, temporary and durable mechanical support will continue to be important therapies for acute exacerbations of end-stage heart failure. Temporary mechanical support such as the Impella device serves as both an exit and bridging strategy for patients failing conventional therapies and may also help to select the best candidates for durable left-ventricular support.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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