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Commentary: When a ventricular assist device is just not enough

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The traditional view of durable ventricular assist devices (VADs) is that by supporting the left ventricle, the lethality and morbidity of heart failure are lessened. The only real concern has focused on how the right ventricle will behave. And despite only supporting one ventricle, a left VAD (LVAD) mostly works. Certainly, in truly end-stage patients, with respect to mortality and quality of life, having an LVAD is superior to not having an LVAD and is increasingly similar (in the short term) to a heart transplant. However, as experience with LVADs has increased and survival has improved, new, pesky valvular problems have emerged to challenge clinical teams. Meanwhile, the same teams have been emboldened by new technologies to intervene on valves, even after LVAD implantation. So now, new clinical decisions confront clinicians. How much aortic insufficiency is too much? Should mitral regurgitation be fixed at the time of LVAD or late after LVAD? Do catheter-based devices offer durable solutions for long-term LVAD patients?

The expert review by Smood and colleagues¹ nicely summarizes the current state and is worth reading by cardiologists and cardiac surgeons alike. The team from the University of Pennsylvania shares their experiences and current practices, and touch on the natural history and timing of various interventions. But what haunts this space is really some fundamental questions about LVADs. First is the growing realization that an LVAD alone is an imperfect solution to a complex problem. And although the patient is generally better after implantation of an LVAD, we have new markers for success: exercise capacity, long-term right ventricular function, and ultimately the long-term durability of univentricular support for a biventricular problem.

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CENTRAL MESSAGE

Improving outcomes with durable mechanical support may mean more work on the heart and not the pump.

The vast majority of LVAD surgeons likely thought (and hoped) that all they need do is pick the right patient and properly implant the LVAD, and the rest is out of their hands. The realization that residual valve disease beyond the tricuspid valve may be important in the long run is unsettling but predictable. Did we really think that univentricular support was all the patient needed? As the authors touch on superficially, there are various catheter-based solutions that may actually rescue patients post-LVAD. This expert review certainly may embolden surgeons to intervene on aortic and mitral valves for potential long-term benefits. But there is added risk to the procedure, and the future will likely revolve around catheter-based approaches to focus on residual valve disease. The promise of LVADs has now, appropriately, migrated to offering improved exercise capacity and quality of life. One critical piece may be eliminating significant aortic and mitral valvulopathy. As we see patients living longer after LVAD, it is increasingly clear that a VAD is just not enough.

Reference

1. Smood B, Han JJ, Helmers M, Atluri P. Mitral and aortic valve surgery during left ventricular assist device implantation. *J Thorac Cardiovasc Surg.* 2022;164:970-7.

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Disclosures: The author reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Feb 8, 2021; revisions received Feb 8, 2021; accepted for publication Feb 9, 2021; available ahead of print Feb 19, 2021.

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J Thorac Cardiovasc Surg 2022;164:978

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2021.02.043>